Electrical parameters test conditions and limits used for performing this test are given in the following table.

PARAMETERS	SYMBOLS	TEST CONDITIONS	MIN	MAX	UNITS
Retention Check	Func_READ_ChkBrd_Retention	Read with $55 $AA on Block#TBD			
Input Leakage Current Low	IIL	Vin=0V . VCC= VCCmax (3.6V)	-10.0	10.0	µA
Input Leakage Current High	IIH	Vin= VCC= VCCmax (3.6V)	-10.0	10.0	µA
Output Low Voltage	VOL_IO	IOL=100uA. Vcc = 3.3V	200.0		mV
Output High Voltage	VOH_IO	IOH=-100uA Vcc = 3.3V		3.100	V
Output Leakage Current Low	ILOL_IO	Vout=0V . Vcc = 3.6V DQ are disabled	-10.0	10.0	µA
Output Leakage Current High	ILOH_IO	Vout=VCCmax. Vcc = 3.6V DQ are disabled	-10.0	10.0	µA
Input Low Voltage	VIL	Vcc = 3.3V	0.660		V
Input High Voltage	VIH	Vcc = 3.3V		2.640	V
Operating Current. Page Read	ICC1	trc=25ns CE/=Vil. Iout=0mA		30.0	mA
Operating Current. Program	ICC2			30.0	mA
Operating Current. Erase	ICC3			30.0	mA
Standby Current CMOS	ICCS_VCC	CE/=VCC-0.2V . WP/=0V/VCC. VCC & VCCQ		50.0	µA
Program Time	tProg	PROGRAM PAGE operation time. internal ECC disabled. GO NOGO		700.0	µs
Block Erase Time	tBers			5.0	ms
CLE Setup Time	tCLS			12.0	ns
CLE Hold Time	tCLH			5.0	ns
CE/ Setup Time	tCS			20.0	ns
CE/ Hold Time	tCH_GONOGO			5.0	ns
WE/ Pulse Width	tWP_Search			12.0	ns
ALE Setup Time	tALS			12.0	ns
ALE Hold Time	tALH			5.0	ns
Data Setup Time	tDS			12.0	ns
Data Hold Time	tDH			5.0	ns
Write Cycle Time	tWC			25.0	ns
WE/ High Hold Time	tWH_GONOGO			10.0	ns
ALE to RE/ Delay	tAR_GONOGO			10.0	ns
CLE to RE/ Delay	tCLR_GONOGO			10.0	ns
RE/ Pulse Width	tRP			12.0	ns
Read Cycle Time	tRC			25.0	ns
RE/ Access Time	tREA			20.0	ns
WE High to Busy	tWB			100.0	ns
CE/ Access Time	tCEA			25.0	ns

PARAMETERS	SYMBOLS	TEST CONDITIONS	MIN	MAX	UNITS
RE/ High Hold Time	tREH_GONOGO			10.0	ns
WP/ High to WE/ Low	tWW_GONOGO			100.0	ns
Pattern FCT Checkerboard	Func_ChkBrd	Erase memory Write . Read with pattern Checkerboard Block#0			s
Pattern FCT SLC-March	Func_SLC_March	Erase memory Write . Read with SLC March Algorithm Block#0			s

Table 1 : Measured electrical parameters

A summary of the failed parameters is provided in the following table. Parameters not listed remained within specification limits all along testing.

Parameters	Failure Level between :		Annealing Recovery [Note 1]				
			NA	No	Partial	Complete	Rebound
Func_READ_ChkBrd_Retention	OFF samples	0 & 30 kRad(Si)		X			
tProg	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	150 & 200 kRad(Si)				X	
tBers	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	150 & 200 kRad(Si)				X	
tCLS	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	150 & 200 kRad(Si)				X	
tCLH	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	150 & 200 kRad(Si)				X	
tCS	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	150 & 200 kRad(Si)				X	
tCH_GONOGO	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	No Failure	X				
tWP_Search	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	No Failure	X				
tALS	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	150 & 200 kRad(Si)				X	
tALH	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	No Failure	X				
tDS	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	No Failure	X				
tDH	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	No Failure	X				

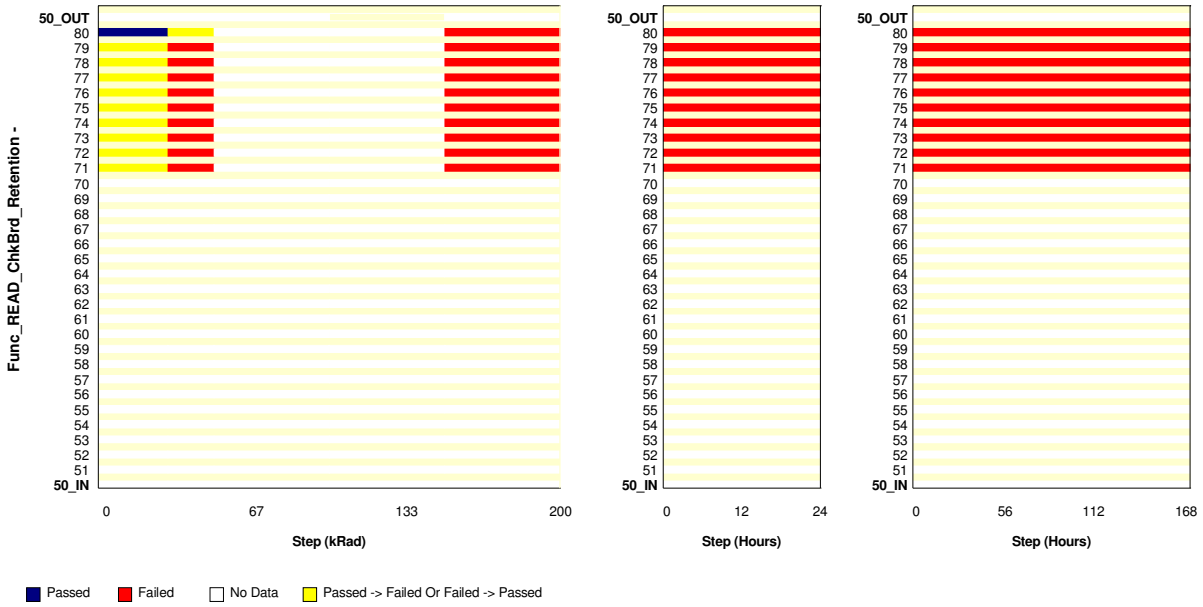
Parameters	Failure Level between :		Annealing Recovery [Note 1]				
			NA	No	Partial	Complete	Rebound
tWC	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	150 & 200 kRad(Si)				X	
tWH_GONOGO	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	150 & 200 kRad(Si)				X	
tAR_GONOGO	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	150 & 200 kRad(Si)				X	
tCLR_GONOGO	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	150 & 200 kRad(Si)				X	
tRP	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	150 & 200 kRad(Si)				X	
tRC	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	150 & 200 kRad(Si)				X	
tREA	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	150 & 200 kRad(Si)				X	
tWB	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	150 & 200 kRad(Si)				X	
tCEA	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	150 & 200 kRad(Si)				X	

Parameters	Failure Level between :		Annealing Recovery [Note 1]				
			NA	No	Partial	Complete	Rebound
tREH_GONOGO	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	150 & 200 kRad(Si)				X	
tWW_GONOGO	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	150 & 200 kRad(Si)				X	
Func_ChkBrd	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	30 & 50 kRad(Si)		X			
	OFF samples	100 & 150 kRad(Si)			X		
Func_SLC_March	ON_LDC samples	30 & 50 kRad(Si)		X			
	ON_HDC samples	0 & 30 kRad(Si)		X			
	OFF samples	150 & 200 kRad(Si)				X	

[Note 1]: **NA** = Not applicable, **No:** means no sample has recovered, **Partial:** means at least one sample has recovered, **Complete:** means all samples have recovered, **Rebound**: means rebound has been observed on at least one sample.

Table 1 : Summary of parameters failure levels

Parameter : Retention Check : Func_READ_ChkBrd_Retention
Test conditions : Read with $55 $AA on Block#TBD
Unit :
No spec limit specified.

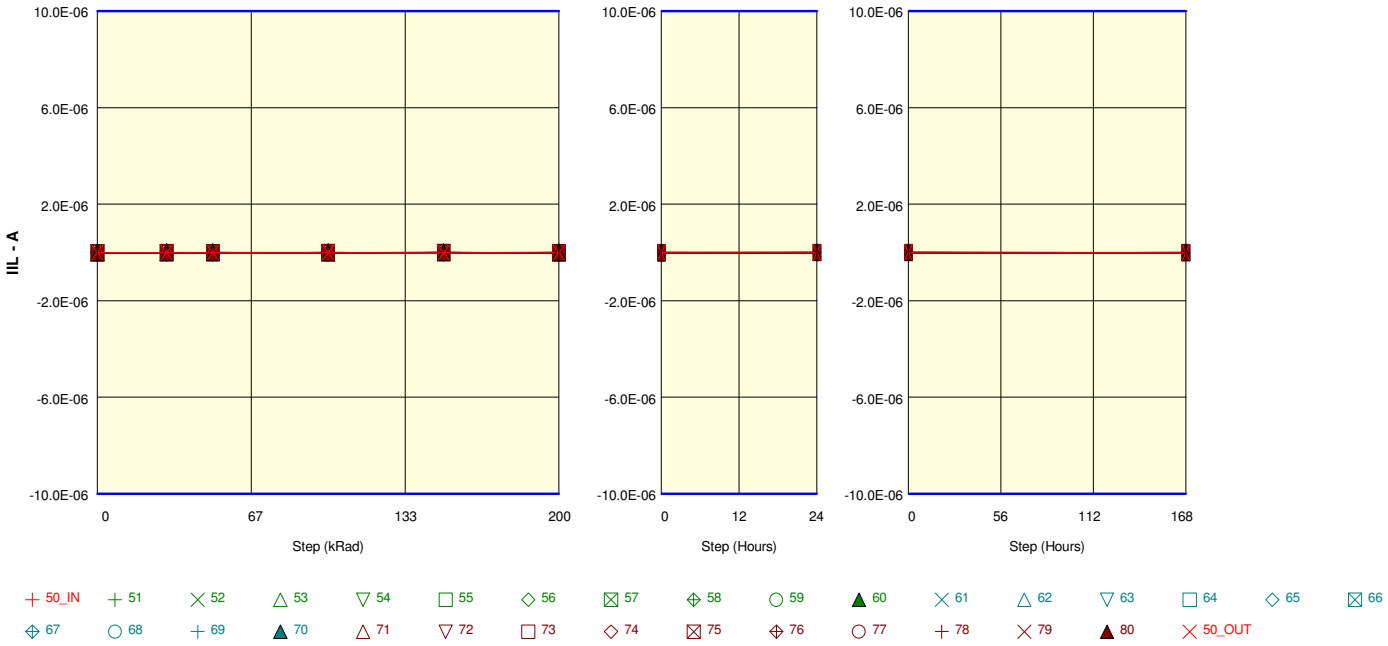


Measurements

Func_READ_ChkBrd_Retention	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF								
50_OUT_REF								
OFF samples								
71	PASS	FAIL	FAIL		FAIL	FAIL	FAIL	FAIL
72	PASS	FAIL	FAIL		FAIL	FAIL	FAIL	FAIL
73	PASS	FAIL	FAIL		FAIL	FAIL	FAIL	FAIL
74	PASS	FAIL	FAIL		FAIL	FAIL	FAIL	FAIL
75	PASS	FAIL	FAIL		FAIL	FAIL	FAIL	FAIL
76	PASS	FAIL	FAIL		FAIL	FAIL	FAIL	FAIL
77	PASS	FAIL	FAIL		FAIL	FAIL	FAIL	FAIL
78	PASS	FAIL	FAIL		FAIL	FAIL	FAIL	FAIL
79	PASS	FAIL	FAIL		FAIL	FAIL	FAIL	FAIL
80	PASS	PASS	FAIL		FAIL	FAIL	FAIL	FAIL

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current Low : IILALE
Test conditions : Vin=0V . VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IILALE	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-15.8E-09	-8.2E-09	-12.8E-09	-9.7E-09	-8.2E-09	-2.1E-09	3.2E-09	-14.3E-09
50_OUT_REF	173.3E-12	-5.9E-09	-9.0E-09	-4.4E-09	-9.7E-09	-6.7E-09	-4.4E-09	-13.6E-09
ON_LDC samples								
51	-16.6E-09	-11.3E-09	-3.6E-09	-10.5E-09	-6.7E-09	5.5E-09	4.0E-09	-2.9E-09
52	-9.0E-09	-16.6E-09	-15.1E-09	-5.9E-09	-11.3E-09	2.5E-09	9.3E-09	-12.0E-09
53	-2.9E-09	-5.9E-09	-13.6E-09	-16.6E-09	-8.2E-09	-589.6E-12	173.3E-12	-9.0E-09
54	-8.2E-09	-5.9E-09	-11.3E-09	-12.8E-09	-589.6E-12	-22.0E-09	-5.2E-09	-2.9E-09
55	-6.7E-09	-10.5E-09	-7.5E-09	-2.1E-09	-11.3E-09	-15.8E-09	-6.7E-09	-15.1E-09
56	-22.7E-09	-5.9E-09	-11.3E-09	-4.4E-09	-5.2E-09	-2.1E-09	-12.8E-09	-13.6E-09
57	-9.0E-09	-3.6E-09	-9.0E-09	-5.2E-09	-6.7E-09	-20.4E-09	-5.2E-09	-15.1E-09
58	-17.4E-09	2.5E-09	1.7E-09	-1.4E-09	-3.6E-09	-8.2E-09	8.6E-09	-18.1E-09
59	-2.9E-09	-5.2E-09	-9.0E-09	-8.2E-09	-7.5E-09	-2.9E-09	-11.3E-09	-2.1E-09
60	-9.7E-09	-5.9E-09	-13.6E-09	-19.7E-09	173.3E-12	-9.7E-09	-2.9E-09	-6.7E-09
Statistics								
Min	-22.7E-09	-16.6E-09	-15.1E-09	-19.7E-09	-11.3E-09	-22.0E-09	-12.8E-09	-18.1E-09
Max	-2.9E-09	2.5E-09	1.7E-09	-1.4E-09	173.3E-12	5.5E-09	9.3E-09	-2.1E-09
Average	-10.5E-09	-6.8E-09	-9.2E-09	-8.7E-09	-6.1E-09	-7.4E-09	-2.2E-09	-9.7E-09
Std Deviation	6.1E-09	4.8E-09	4.8E-09	5.8E-09	3.7E-09	9.0E-09	7.2E-09	5.6E-09

Measurements

IILALE	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-15.8E-09	-8.2E-09	-12.8E-09	-9.7E-09	-8.2E-09	-2.1E-09	3.2E-09	-14.3E-09
50_OUT_REF	173.3E-12	-5.9E-09	-9.0E-09	-4.4E-09	-9.7E-09	-6.7E-09	-4.4E-09	-13.6E-09
ON_HDC samples								
61	-15.1E-09	-18.1E-09	-13.6E-09	-7.5E-09	2.5E-09	-9.0E-09	-8.2E-09	-2.1E-09
62	-18.1E-09	-15.8E-09	-7.5E-09	-2.9E-09	-9.7E-09	-5.2E-09	-10.5E-09	-2.9E-09
63	-5.9E-09	-6.7E-09	-5.9E-09	936.3E-12	-2.9E-09	-15.1E-09	-12.8E-09	-6.7E-09
64	-9.7E-09	-3.6E-09	-2.9E-09	-9.0E-09	-8.2E-09	-3.6E-09	-9.0E-09	-4.4E-09
65	-7.5E-09	-4.4E-09	-11.3E-09	-8.2E-09	-18.1E-09	173.3E-12	-2.1E-09	-12.0E-09
66	-8.2E-09	-2.9E-09	-18.1E-09	-589.6E-12	-2.9E-09	-11.3E-09	-3.6E-09	-5.9E-09
67	-13.6E-09	-9.7E-09	936.3E-12	-3.6E-09	-4.4E-09	-2.1E-09	-17.4E-09	-4.4E-09
68	-12.0E-09	4.8E-09	-5.2E-09	4.0E-09	-9.7E-09	-4.4E-09	-1.4E-09	-3.6E-09
69	173.3E-12	-17.4E-09	-3.6E-09	-14.3E-09	-6.7E-09	-8.2E-09	-2.1E-09	-9.0E-09
70	-15.8E-09	-4.4E-09	-5.9E-09	4.8E-09	-12.8E-09	-5.9E-09	1.7E-09	3.2E-09
Statistics								
Min	-18.1E-09	-18.1E-09	-18.1E-09	-14.3E-09	-18.1E-09	-15.1E-09	-17.4E-09	-12.0E-09
Max	173.3E-12	4.8E-09	936.3E-12	4.8E-09	2.5E-09	173.3E-12	1.7E-09	3.2E-09

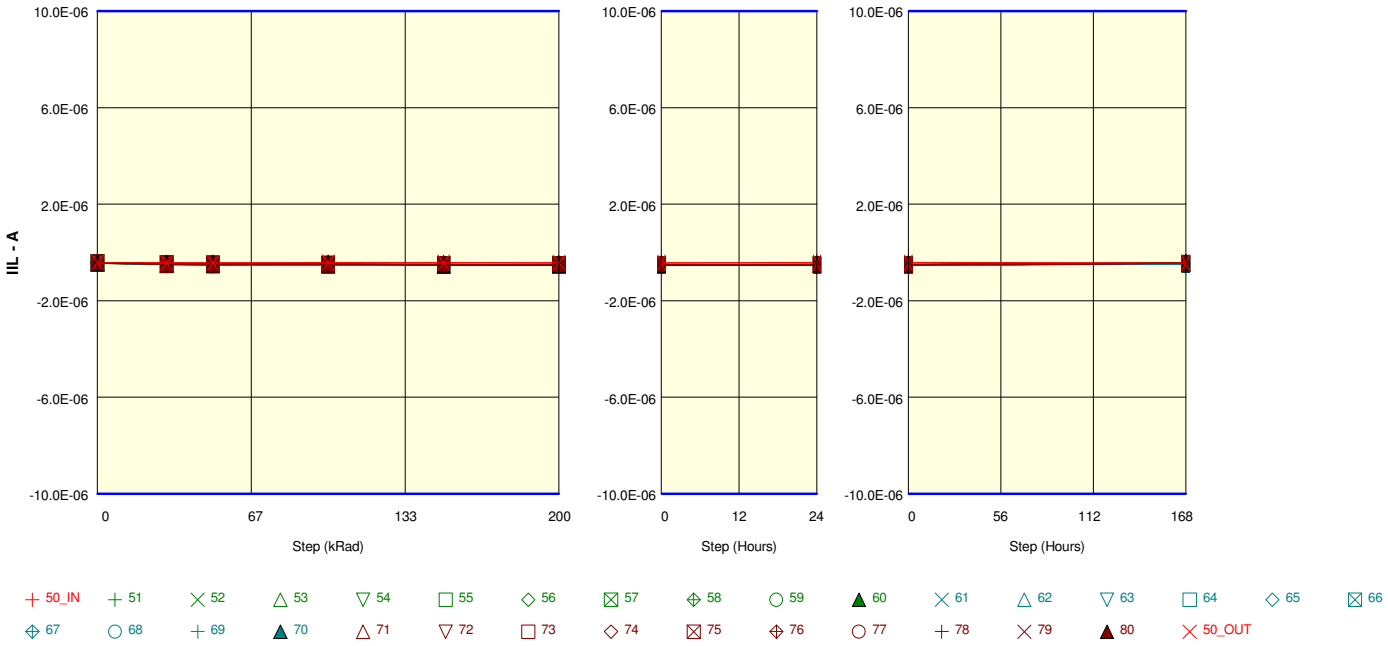
IILALE	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-10.6E-09	-7.8E-09	-7.3E-09	-3.6E-09	-7.3E-09	-6.5E-09	-6.5E-09	-4.8E-09
Std Deviation	5.2E-09	7.0E-09	5.3E-09	5.8E-09	5.5E-09	4.3E-09	5.7E-09	3.9E-09

Measurements

IILALE	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-15.8E-09	-8.2E-09	-12.8E-09	-9.7E-09	-8.2E-09	-2.1E-09	3.2E-09	-14.3E-09
50_OUT_REF	173.3E-12	-5.9E-09	-9.0E-09	-4.4E-09	-9.7E-09	-6.7E-09	-4.4E-09	-13.6E-09
OFF samples								
71	-12.8E-09	-15.8E-09	936.3E-12	-2.9E-09	-5.2E-09	-18.9E-09	-7.5E-09	-1.4E-09
72	-13.6E-09	-9.7E-09	-8.2E-09	-589.6E-12	-9.7E-09	-10.5E-09	-15.1E-09	3.2E-09
73	-12.0E-09	-9.0E-09	-9.0E-09	-10.5E-09	-589.6E-12	-10.5E-09	-6.7E-09	-7.5E-09
74	-5.2E-09	-5.9E-09	-2.9E-09	-2.1E-09	-15.1E-09	-5.2E-09	-13.6E-09	-4.4E-09
75	-19.7E-09	-13.6E-09	-13.6E-09	-14.3E-09	5.5E-09	-20.4E-09	173.3E-12	-12.0E-09
76	-20.4E-09	-18.1E-09	4.0E-09	-7.5E-09	4.8E-09	-16.6E-09	173.3E-12	936.3E-12
77	-2.1E-09	-12.0E-09	-5.9E-09	-3.6E-09	-1.4E-09	-17.4E-09	-8.2E-09	-14.3E-09
78	-4.4E-09	-13.6E-09	1.7E-09	-14.3E-09	3.2E-09	-12.8E-09	-9.7E-09	-11.3E-09
79	-5.2E-09	-18.1E-09	-1.4E-09	-7.5E-09	3.2E-09	-589.6E-12	-11.3E-09	-15.8E-09
80	-5.2E-09	-2.9E-09	4.8E-09	-9.7E-09	3.2E-09	-4.4E-09	-6.7E-09	-1.4E-09
Statistics								
Min	-20.4E-09	-18.1E-09	-13.6E-09	-14.3E-09	-15.1E-09	-20.4E-09	-15.1E-09	-15.8E-09
Max	-2.1E-09	-2.9E-09	4.8E-09	-589.6E-12	5.5E-09	-589.6E-12	173.3E-12	3.2E-09
Average	-10.1E-09	-11.9E-09	-3.0E-09	-7.3E-09	-1.2E-09	-11.7E-09	-7.8E-09	-6.4E-09
Std Deviation	6.2E-09	4.8E-09	5.8E-09	4.7E-09	6.5E-09	6.4E-09	4.8E-09	6.4E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current Low : IILCE#
Test conditions : Vin=0V . VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IILCE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-437.0E-09	-428.6E-09	-425.6E-09	-416.4E-09	-423.3E-09	-439.3E-09	-414.1E-09	-433.2E-09
50_OUT_REF	-420.2E-09	-430.1E-09	-434.7E-09	-425.6E-09	-423.3E-09	-431.7E-09	-434.7E-09	-433.2E-09
ON_LDC samples								
51	-455.3E-09	-499.6E-09	-519.4E-09	-491.2E-09	-525.5E-09	-529.3E-09	-517.1E-09	-466.8E-09
52	-441.6E-09	-504.9E-09	-517.1E-09	-491.9E-09	-529.3E-09	-515.6E-09	-530.8E-09	-466.0E-09
53	-446.2E-09	-501.1E-09	-517.9E-09	-489.6E-09	-521.7E-09	-538.5E-09	-523.2E-09	-472.9E-09
54	-432.4E-09	-493.5E-09	-514.1E-09	-488.9E-09	-517.9E-09	-527.8E-09	-521.7E-09	-469.0E-09
55	-427.8E-09	-493.5E-09	-491.9E-09	-509.5E-09	-512.5E-09	-529.3E-09	-515.6E-09	-469.0E-09
56	-434.7E-09	-502.6E-09	-510.2E-09	-511.0E-09	-527.0E-09	-511.0E-09	-511.0E-09	-471.3E-09
57	-437.0E-09	-485.1E-09	-510.2E-09	-501.1E-09	-504.9E-09	-511.8E-09	-508.7E-09	-455.3E-09
58	-424.0E-09	-491.9E-09	-502.6E-09	-501.1E-09	-501.8E-09	-507.2E-09	-513.3E-09	-475.9E-09
59	-429.4E-09	-501.8E-09	-508.7E-09	-510.2E-09	-514.8E-09	-522.4E-09	-536.2E-09	-479.0E-09
60	-440.0E-09	-506.4E-09	-512.5E-09	-501.8E-09	-532.4E-09	-530.1E-09	-518.6E-09	-471.3E-09
Statistics								
Min	-455.3E-09	-506.4E-09	-519.4E-09	-511.0E-09	-532.4E-09	-538.5E-09	-536.2E-09	-479.0E-09
Max	-424.0E-09	-485.1E-09	-491.9E-09	-488.9E-09	-501.8E-09	-507.2E-09	-508.7E-09	-455.3E-09
Average	-436.8E-09	-498.0E-09	-510.5E-09	-499.6E-09	-518.8E-09	-522.3E-09	-519.6E-09	-469.6E-09
Std Deviation	8.9E-09	6.4E-09	7.8E-09	8.3E-09	9.8E-09	9.8E-09	8.2E-09	6.1E-09

Measurements

IILCE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-437.0E-09	-428.6E-09	-425.6E-09	-416.4E-09	-423.3E-09	-439.3E-09	-414.1E-09	-433.2E-09
50_OUT_REF	-420.2E-09	-430.1E-09	-434.7E-09	-425.6E-09	-423.3E-09	-431.7E-09	-434.7E-09	-433.2E-09
ON_HDC samples								
61	-436.2E-09	-491.9E-09	-504.9E-09	-530.8E-09	-520.9E-09	-517.9E-09	-518.6E-09	-476.7E-09
62	-446.2E-09	-493.5E-09	-503.4E-09	-519.4E-09	-511.0E-09	-524.0E-09	-523.2E-09	-472.9E-09
63	-430.9E-09	-463.7E-09	-485.8E-09	-514.1E-09	-501.8E-09	-511.0E-09	-513.3E-09	-469.0E-09
64	-428.6E-09	-482.0E-09	-488.9E-09	-515.6E-09	-514.8E-09	-509.5E-09	-510.2E-09	-471.3E-09
65	-437.0E-09	-470.6E-09	-483.5E-09	-501.8E-09	-506.4E-09	-508.7E-09	-506.4E-09	-472.1E-09
66	-426.3E-09	-468.3E-09	-482.0E-09	-516.3E-09	-506.4E-09	-500.3E-09	-507.9E-09	-475.1E-09
67	-452.3E-09	-486.6E-09	-493.5E-09	-509.5E-09	-515.6E-09	-527.0E-09	-514.1E-09	-480.5E-09
68	-428.6E-09	-478.2E-09	-491.9E-09	-501.8E-09	-514.8E-09	-517.1E-09	-519.4E-09	-477.4E-09
69	-431.7E-09	-476.7E-09	-504.1E-09	-514.1E-09	-522.4E-09	-514.8E-09	-516.3E-09	-469.8E-09
70	-443.1E-09	-487.3E-09	-491.9E-09	-514.8E-09	-524.7E-09	-507.2E-09	-513.3E-09	-486.6E-09
Statistics								
Min	-452.3E-09	-493.5E-09	-504.9E-09	-530.8E-09	-524.7E-09	-527.0E-09	-523.2E-09	-486.6E-09
Max	-426.3E-09	-463.7E-09	-482.0E-09	-501.8E-09	-501.8E-09	-500.3E-09	-506.4E-09	-469.0E-09

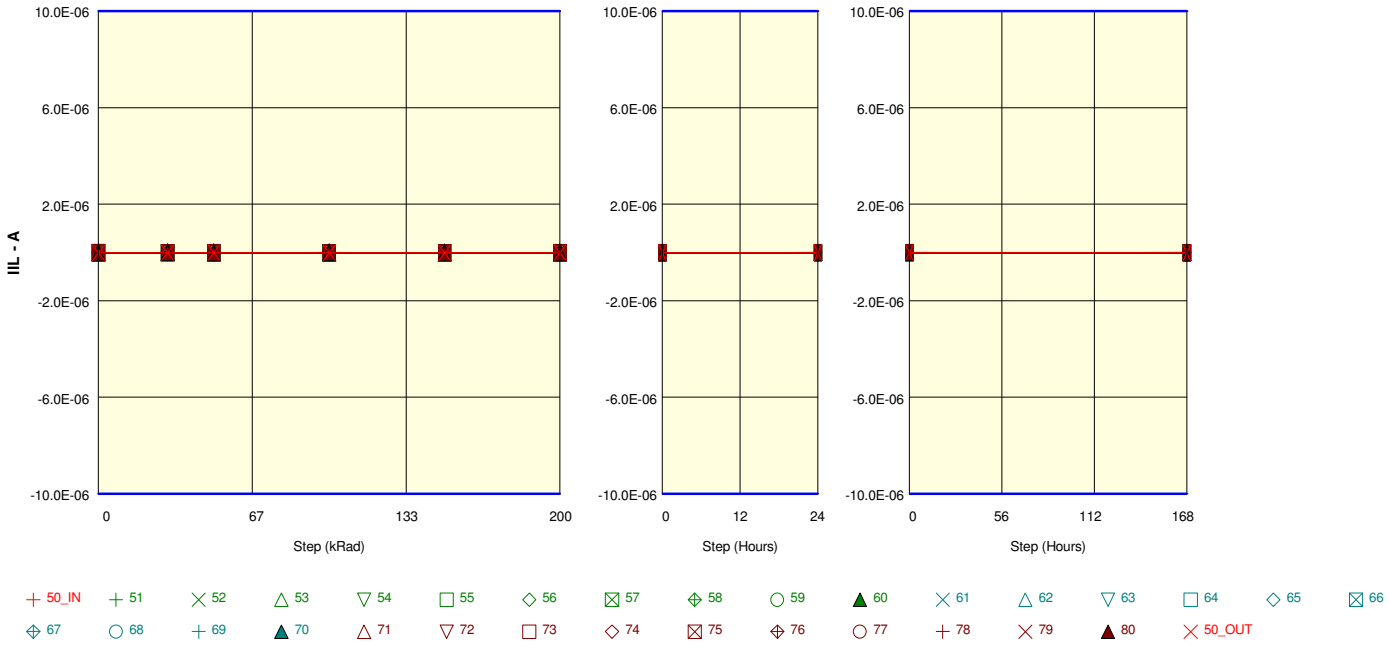
IILCE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-436.1E-09	-479.9E-09	-493.0E-09	-513.8E-09	-513.9E-09	-513.7E-09	-514.3E-09	-475.1E-09
Std Deviation	8.2E-09	9.6E-09	8.1E-09	8.0E-09	7.1E-09	7.6E-09	5.0E-09	5.1E-09

Measurements

IILCE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-437.0E-09	-428.6E-09	-425.6E-09	-416.4E-09	-423.3E-09	-439.3E-09	-414.1E-09	-433.2E-09
50_OUT_REF	-420.2E-09	-430.1E-09	-434.7E-09	-425.6E-09	-423.3E-09	-431.7E-09	-434.7E-09	-433.2E-09
OFF samples								
71	-444.6E-09	-474.4E-09	-487.3E-09	-494.2E-09	-514.1E-09	-514.1E-09	-505.7E-09	-449.2E-09
72	-438.5E-09	-475.9E-09	-480.5E-09	-487.3E-09	-509.5E-09	-518.6E-09	-517.1E-09	-447.7E-09
73	-441.6E-09	-477.4E-09	-491.2E-09	-492.7E-09	-512.5E-09	-514.1E-09	-506.4E-09	-453.0E-09
74	-433.9E-09	-469.8E-09	-472.1E-09	-489.6E-09	-495.0E-09	-492.7E-09	-495.0E-09	-436.2E-09
75	-433.9E-09	-457.6E-09	-470.6E-09	-501.8E-09	-504.9E-09	-507.9E-09	-504.9E-09	-455.3E-09
76	-429.4E-09	-462.9E-09	-473.6E-09	-490.4E-09	-507.2E-09	-498.8E-09	-511.0E-09	-437.8E-09
77	-432.4E-09	-459.1E-09	-475.1E-09	-482.8E-09	-490.4E-09	-519.4E-09	-505.7E-09	-430.9E-09
78	-427.8E-09	-460.6E-09	-475.1E-09	-486.6E-09	-504.1E-09	-502.6E-09	-501.8E-09	-445.4E-09
79	-435.5E-09	-479.7E-09	-500.3E-09	-496.5E-09	-508.7E-09	-511.8E-09	-507.2E-09	-452.3E-09
80	-420.2E-09	-463.7E-09	-475.9E-09	-485.8E-09	-494.2E-09	-510.2E-09	-484.3E-09	-435.5E-09
Statistics								
Min	-444.6E-09	-479.7E-09	-500.3E-09	-501.8E-09	-514.1E-09	-519.4E-09	-517.1E-09	-455.3E-09
Max	-420.2E-09	-457.6E-09	-470.6E-09	-482.8E-09	-490.4E-09	-492.7E-09	-484.3E-09	-430.9E-09
Average	-433.8E-09	-468.1E-09	-480.2E-09	-490.8E-09	-504.1E-09	-509.0E-09	-503.9E-09	-444.3E-09
Std Deviation	6.7E-09	7.9E-09	9.2E-09	5.4E-09	7.7E-09	8.2E-09	8.5E-09	8.1E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current Low : IILCLE
Test conditions : Vin=0V . VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IILCLE	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-10.5E-09	-9.7E-09	-9.7E-09	-28.1E-09	-10.5E-09	-18.1E-09	-17.4E-09	-6.7E-09
50_OUT_REF	-16.6E-09	-12.8E-09	-6.7E-09	-12.8E-09	-16.6E-09	-12.8E-09	-9.0E-09	-17.4E-09
ON_LDC samples								
51	-5.2E-09	-15.8E-09	-15.8E-09	-4.4E-09	-13.6E-09	-26.5E-09	-9.7E-09	-12.8E-09
52	-7.5E-09	-12.8E-09	-28.8E-09	-22.0E-09	-23.5E-09	-6.7E-09	-9.0E-09	-22.0E-09
53	-5.9E-09	-15.8E-09	-15.1E-09	-15.8E-09	-18.9E-09	-20.4E-09	-7.5E-09	-24.2E-09
54	-19.7E-09	-22.0E-09	-10.5E-09	-19.7E-09	-12.8E-09	-19.7E-09	-8.2E-09	-16.6E-09
55	-15.1E-09	-19.7E-09	-14.3E-09	-21.2E-09	-20.4E-09	-10.5E-09	-24.2E-09	-21.2E-09
56	-15.8E-09	-15.1E-09	-15.1E-09	-4.4E-09	-15.8E-09	-18.1E-09	-7.5E-09	-11.3E-09
57	-7.5E-09	-25.0E-09	-19.7E-09	-12.8E-09	-14.3E-09	-11.3E-09	-9.7E-09	-12.0E-09
58	-12.0E-09	-14.3E-09	-22.0E-09	-16.6E-09	-13.6E-09	-4.4E-09	173.3E-12	-2.1E-09
59	-9.0E-09	-12.8E-09	-13.6E-09	4.8E-09	-18.1E-09	-13.6E-09	-7.5E-09	-23.5E-09
60	-21.2E-09	-22.0E-09	-12.0E-09	-15.1E-09	-16.6E-09	-9.7E-09	-7.5E-09	-19.7E-09
Statistics								
Min	-21.2E-09	-25.0E-09	-28.8E-09	-22.0E-09	-23.5E-09	-26.5E-09	-24.2E-09	-24.2E-09
Max	-5.2E-09	-12.8E-09	-10.5E-09	4.8E-09	-12.8E-09	-4.4E-09	173.3E-12	-2.1E-09
Average	-11.9E-09	-17.5E-09	-16.7E-09	-12.7E-09	-16.8E-09	-14.1E-09	-9.1E-09	-16.5E-09
Std Deviation	5.5E-09	4.1E-09	5.1E-09	8.2E-09	3.3E-09	6.6E-09	5.7E-09	6.6E-09

Measurements

IILCLE	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-10.5E-09	-9.7E-09	-9.7E-09	-28.1E-09	-10.5E-09	-18.1E-09	-17.4E-09	-6.7E-09
50_OUT_REF	-16.6E-09	-12.8E-09	-6.7E-09	-12.8E-09	-16.6E-09	-12.8E-09	-9.0E-09	-17.4E-09
ON_HDC samples								
61	-25.8E-09	-18.1E-09	-22.7E-09	-17.4E-09	-4.4E-09	-18.9E-09	-22.7E-09	-6.7E-09
62	-18.9E-09	-16.6E-09	-9.0E-09	-9.7E-09	-8.2E-09	-10.5E-09	-9.7E-09	-18.9E-09
63	-26.5E-09	-15.8E-09	-17.4E-09	-7.5E-09	-6.7E-09	-8.2E-09	-16.6E-09	-18.1E-09
64	-15.8E-09	-12.8E-09	-5.2E-09	-18.9E-09	-6.7E-09	-15.1E-09	-7.5E-09	-9.0E-09
65	-12.0E-09	-2.9E-09	-13.6E-09	-11.3E-09	-19.7E-09	-9.0E-09	-15.8E-09	-9.0E-09
66	-2.9E-09	-11.3E-09	-13.6E-09	-9.7E-09	-10.5E-09	-18.9E-09	-12.0E-09	-21.2E-09
67	-15.1E-09	-15.1E-09	-14.3E-09	-5.9E-09	-21.2E-09	-19.7E-09	-22.0E-09	-6.7E-09
68	-23.5E-09	-8.2E-09	-18.1E-09	-11.3E-09	-7.5E-09	-9.7E-09	-10.5E-09	-1.4E-09
69	-12.0E-09	-17.4E-09	-13.6E-09	1.7E-09	-12.8E-09	-16.6E-09	-7.5E-09	-23.5E-09
70	-16.6E-09	-6.7E-09	936.3E-12	-13.6E-09	-22.0E-09	-4.4E-09	-3.6E-09	-9.7E-09
Statistics								
Min	-26.5E-09	-18.1E-09	-22.7E-09	-18.9E-09	-22.0E-09	-19.7E-09	-22.7E-09	-23.5E-09
Max	-2.9E-09	-2.9E-09	936.3E-12	1.7E-09	-4.4E-09	-4.4E-09	-3.6E-09	-1.4E-09

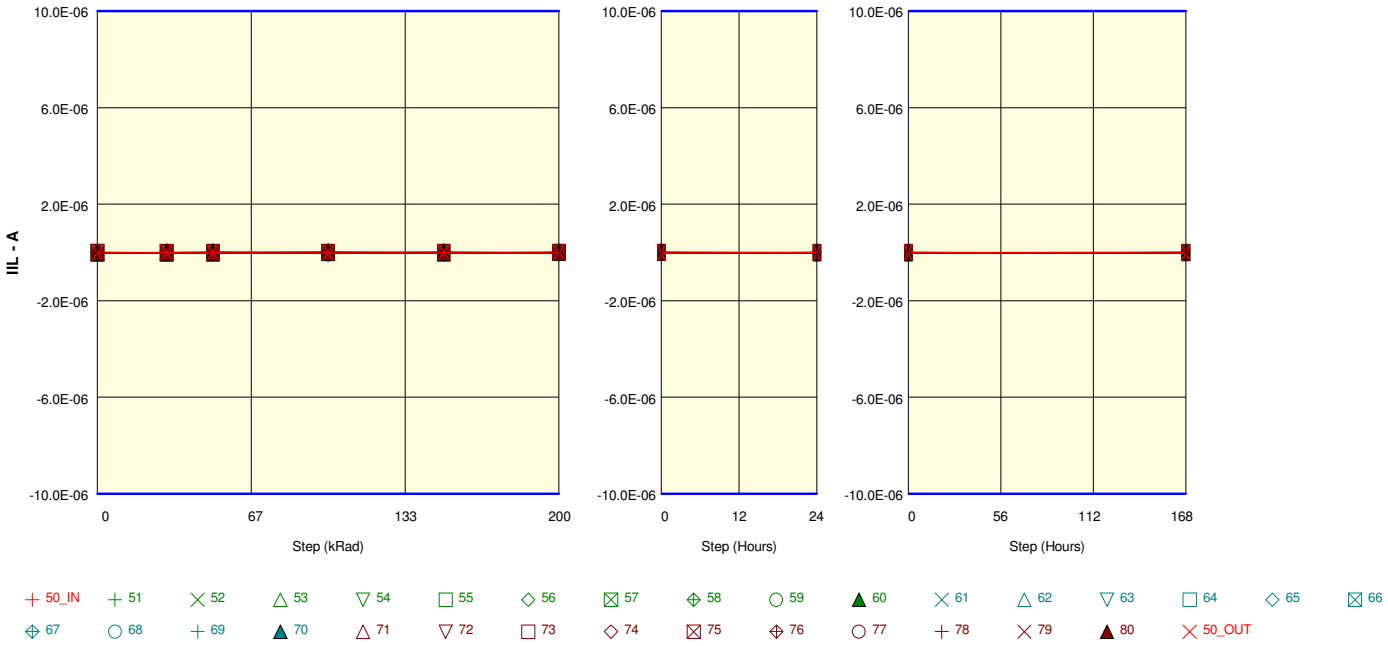
IILCLE	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-16.9E-09	-12.5E-09	-12.6E-09	-10.4E-09	-12.0E-09	-13.1E-09	-12.8E-09	-12.4E-09
Std Deviation	6.8E-09	4.9E-09	6.4E-09	5.6E-09	6.3E-09	5.1E-09	6.0E-09	7.0E-09

Measurements

IILCLE	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-10.5E-09	-9.7E-09	-9.7E-09	-28.1E-09	-10.5E-09	-18.1E-09	-17.4E-09	-6.7E-09
50_OUT_REF	-16.6E-09	-12.8E-09	-6.7E-09	-12.8E-09	-16.6E-09	-12.8E-09	-9.0E-09	-17.4E-09
OFF samples								
71	-9.0E-09	-7.5E-09	-10.5E-09	-16.6E-09	-4.4E-09	-12.0E-09	-13.6E-09	-7.5E-09
72	-4.4E-09	-5.9E-09	-12.8E-09	-16.6E-09	-7.5E-09	-14.3E-09	1.7E-09	-21.2E-09
73	-5.2E-09	-8.2E-09	-7.5E-09	-14.3E-09	-19.7E-09	-4.4E-09	-20.4E-09	-12.0E-09
74	-12.8E-09	-589.6E-12	-5.9E-09	-15.1E-09	-12.8E-09	-10.5E-09	2.5E-09	-8.2E-09
75	-15.8E-09	-7.5E-09	-15.1E-09	-12.8E-09	-9.0E-09	-14.3E-09	-6.7E-09	-1.4E-09
76	-11.3E-09	-3.6E-09	-15.8E-09	-10.5E-09	-16.6E-09	-8.2E-09	-9.0E-09	-9.0E-09
77	-17.4E-09	-9.7E-09	-12.0E-09	-15.1E-09	-15.1E-09	-11.3E-09	-5.9E-09	-17.4E-09
78	-2.9E-09	-14.3E-09	-19.7E-09	-12.0E-09	-22.0E-09	-17.4E-09	-11.3E-09	-589.6E-12
79	-15.8E-09	-7.5E-09	-22.0E-09	-9.7E-09	-17.4E-09	-15.1E-09	-15.8E-09	-11.3E-09
80	-18.9E-09	-5.2E-09	-20.4E-09	2.5E-09	-25.0E-09	-23.5E-09	-7.5E-09	-14.3E-09
Statistics								
Min	-18.9E-09	-14.3E-09	-22.0E-09	-16.6E-09	-25.0E-09	-23.5E-09	-20.4E-09	-21.2E-09
Max	-2.9E-09	-589.6E-12	-5.9E-09	2.5E-09	-4.4E-09	-4.4E-09	2.5E-09	-589.6E-12
Average	-11.3E-09	-7.0E-09	-14.2E-09	-12.0E-09	-14.9E-09	-13.1E-09	-8.6E-09	-10.3E-09
Std Deviation	5.5E-09	3.5E-09	5.2E-09	5.3E-09	6.2E-09	4.9E-09	6.8E-09	6.1E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current Low : IILRE#
Test conditions : Vin=0V . VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IILRE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	173.3E-12	-17.4E-09	-4.4E-09	-2.9E-09	4.0E-09	173.3E-12	-15.8E-09	-3.6E-09
50_OUT_REF	-11.3E-09	173.3E-12	-7.5E-09	-11.3E-09	-3.6E-09	-8.2E-09	-589.6E-12	-7.5E-09
ON_LDC samples								
51	-2.9E-09	-589.6E-12	4.8E-09	-10.5E-09	-9.7E-09	-2.1E-09	-1.4E-09	-5.9E-09
52	-9.0E-09	-589.6E-12	9.3E-09	936.3E-12	2.5E-09	-5.9E-09	-5.9E-09	9.3E-09
53	-11.3E-09	-2.9E-09	5.5E-09	6.3E-09	-589.6E-12	-589.6E-12	-1.4E-09	4.0E-09
54	-9.7E-09	-10.5E-09	-4.4E-09	8.6E-09	-9.0E-09	-12.0E-09	-4.4E-09	-4.4E-09
55	-11.3E-09	-2.9E-09	6.3E-09	-8.2E-09	-9.0E-09	-5.2E-09	-5.2E-09	-7.5E-09
56	-9.7E-09	-10.5E-09	-3.6E-09	936.3E-12	-12.0E-09	-15.8E-09	-2.9E-09	-4.4E-09
57	4.0E-09	1.7E-09	-13.6E-09	-1.4E-09	-15.1E-09	-3.6E-09	-14.3E-09	-9.0E-09
58	936.3E-12	-12.8E-09	-2.9E-09	1.7E-09	-9.7E-09	-7.5E-09	-2.9E-09	-2.1E-09
59	-12.8E-09	-14.3E-09	173.3E-12	4.0E-09	-10.5E-09	-5.2E-09	-589.6E-12	-8.2E-09
60	-10.5E-09	-11.3E-09	-11.3E-09	-5.2E-09	-12.8E-09	7.0E-09	-12.0E-09	3.2E-09
Statistics								
Min	-12.8E-09	-14.3E-09	-13.6E-09	-10.5E-09	-15.1E-09	-15.8E-09	-14.3E-09	-9.0E-09
Max	4.0E-09	1.7E-09	9.3E-09	8.6E-09	2.5E-09	7.0E-09	-589.6E-12	9.3E-09
Average	-7.2E-09	-6.5E-09	-971.1E-12	-284.4E-12	-8.6E-09	-5.1E-09	-5.1E-09	-2.5E-09
Std Deviation	5.5E-09	5.6E-09	7.2E-09	5.8E-09	5.1E-09	5.9E-09	4.4E-09	5.8E-09

Measurements

IILRE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	173.3E-12	-17.4E-09	-4.4E-09	-2.9E-09	4.0E-09	173.3E-12	-15.8E-09	-3.6E-09
50_OUT_REF	-11.3E-09	173.3E-12	-7.5E-09	-11.3E-09	-3.6E-09	-8.2E-09	-589.6E-12	-7.5E-09
ON_HDC samples								
61	-2.9E-09	-5.2E-09	-7.5E-09	-5.2E-09	-7.5E-09	-2.1E-09	-5.2E-09	-12.8E-09
62	-7.5E-09	173.3E-12	-5.2E-09	6.3E-09	-2.1E-09	-5.9E-09	4.0E-09	-5.2E-09
63	-1.4E-09	-3.6E-09	-1.4E-09	-7.5E-09	-2.1E-09	-2.9E-09	-14.3E-09	3.2E-09
64	5.5E-09	-10.5E-09	-19.7E-09	-11.3E-09	-589.6E-12	1.7E-09	-9.0E-09	1.7E-09
65	-9.7E-09	3.2E-09	-9.0E-09	-9.7E-09	-12.8E-09	-2.1E-09	-2.9E-09	4.0E-09
66	-9.0E-09	-8.2E-09	-7.5E-09	-2.1E-09	-3.6E-09	-4.4E-09	-5.2E-09	-6.7E-09
67	-2.9E-09	-10.5E-09	1.7E-09	4.8E-09	-8.2E-09	173.3E-12	-8.2E-09	-3.6E-09
68	-4.4E-09	936.3E-12	-4.4E-09	-6.7E-09	-17.4E-09	-2.9E-09	-9.0E-09	-5.9E-09
69	-9.7E-09	-2.9E-09	-3.6E-09	-10.5E-09	-1.4E-09	-8.2E-09	-12.8E-09	936.3E-12
70	-12.0E-09	-15.1E-09	-6.7E-09	-6.7E-09	-4.4E-09	10.1E-09	173.3E-12	-5.9E-09
Statistics								
Min	-12.0E-09	-15.1E-09	-19.7E-09	-11.3E-09	-17.4E-09	-8.2E-09	-14.3E-09	-12.8E-09
Max	5.5E-09	3.2E-09	1.7E-09	6.3E-09	-589.6E-12	10.1E-09	4.0E-09	4.0E-09

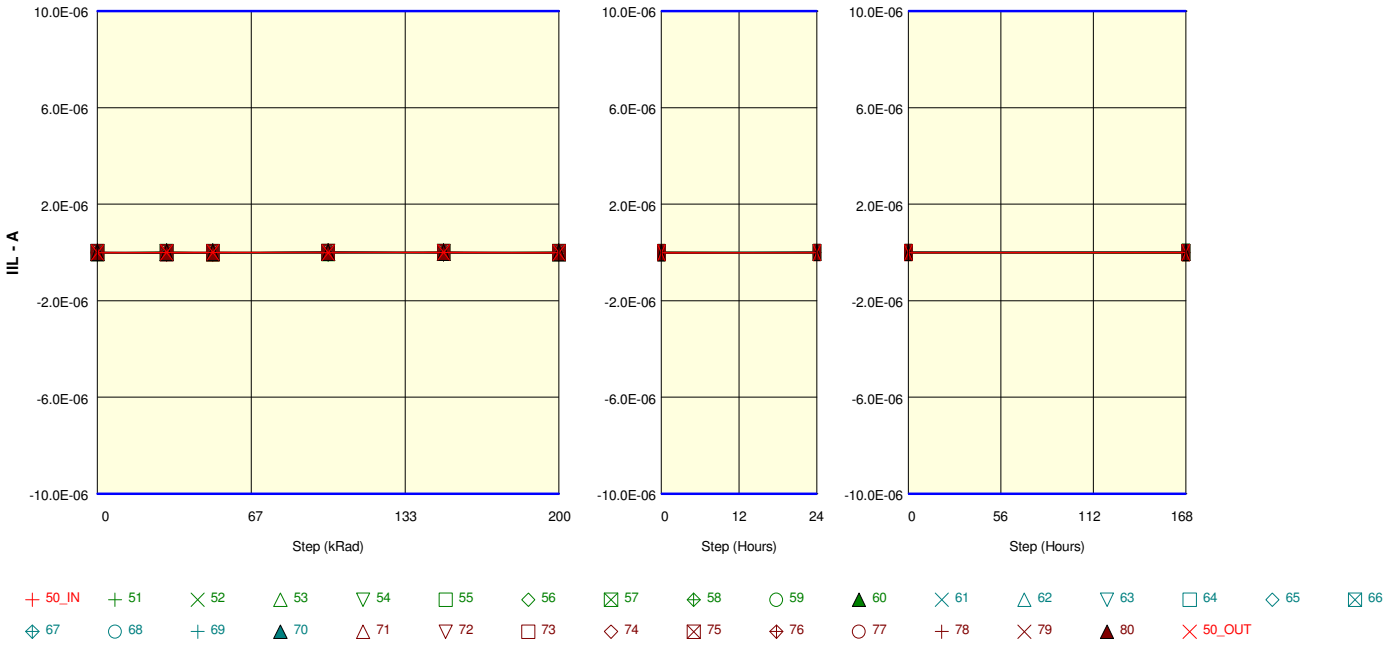
IILRE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-5.4E-09	-5.2E-09	-6.3E-09	-4.9E-09	-6.0E-09	-1.7E-09	-6.2E-09	-3.0E-09
Std Deviation	5.0E-09	5.6E-09	5.4E-09	5.8E-09	5.2E-09	4.7E-09	5.4E-09	5.1E-09

Measurements

IILRE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	173.3E-12	-17.4E-09	-4.4E-09	-2.9E-09	4.0E-09	173.3E-12	-15.8E-09	-3.6E-09
50_OUT_REF	-11.3E-09	173.3E-12	-7.5E-09	-11.3E-09	-3.6E-09	-8.2E-09	-589.6E-12	-7.5E-09
OFF samples								
71	-5.9E-09	4.0E-09	-8.2E-09	-2.9E-09	-15.8E-09	-2.9E-09	-13.6E-09	4.0E-09
72	936.3E-12	-12.0E-09	-2.9E-09	-6.7E-09	-2.9E-09	-15.8E-09	-2.9E-09	-7.5E-09
73	-589.6E-12	-9.7E-09	-5.9E-09	-7.5E-09	173.3E-12	173.3E-12	-2.9E-09	-14.3E-09
74	-5.9E-09	-12.8E-09	-4.4E-09	-9.7E-09	-11.3E-09	-2.9E-09	-12.0E-09	-2.1E-09
75	3.2E-09	936.3E-12	-13.6E-09	7.8E-09	-12.0E-09	-5.2E-09	-5.9E-09	-589.6E-12
76	-3.6E-09	173.3E-12	-589.6E-12	-22.7E-09	-13.6E-09	-589.6E-12	-4.4E-09	-13.6E-09
77	-10.5E-09	-12.0E-09	173.3E-12	-18.1E-09	-4.4E-09	-9.7E-09	-13.6E-09	-3.6E-09
78	-4.4E-09	-6.7E-09	-9.0E-09	-9.0E-09	-12.0E-09	-12.8E-09	-589.6E-12	173.3E-12
79	-5.2E-09	-17.4E-09	-589.6E-12	936.3E-12	5.5E-09	-11.3E-09	1.7E-09	-5.2E-09
80	-9.7E-09	-13.6E-09	-12.0E-09	-6.7E-09	7.8E-09	-7.5E-09	-9.0E-09	-5.2E-09
Statistics								
Min	-10.5E-09	-17.4E-09	-13.6E-09	-22.7E-09	-15.8E-09	-15.8E-09	-13.6E-09	-14.3E-09
Max	3.2E-09	4.0E-09	173.3E-12	7.8E-09	7.8E-09	173.3E-12	1.7E-09	4.0E-09
Average	-4.2E-09	-7.9E-09	-5.7E-09	-7.5E-09	-5.9E-09	-6.8E-09	-6.3E-09	-4.8E-09
Std Deviation	4.2E-09	6.9E-09	4.6E-09	8.2E-09	7.9E-09	5.2E-09	5.2E-09	5.5E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current Low : IILWE#
Test conditions : Vin=0V . VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IILWE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-6.7E-09	-6.7E-09	-4.4E-09	6.3E-09	-12.8E-09	-5.9E-09	-5.9E-09	-11.3E-09
50_OUT_REF	-5.9E-09	4.8E-09	2.5E-09	-13.6E-09	936.3E-12	-9.7E-09	-5.9E-09	936.3E-12
ON_LDC samples								
51	-8.2E-09	173.3E-12	-5.9E-09	-3.6E-09	173.3E-12	-3.6E-09	-1.4E-09	-6.7E-09
52	936.3E-12	-9.7E-09	-9.0E-09	10.1E-09	-14.3E-09	-2.1E-09	-4.4E-09	10.1E-09
53	1.7E-09	-4.4E-09	-4.4E-09	-2.9E-09	4.0E-09	-19.7E-09	-3.6E-09	7.0E-09
54	-10.5E-09	-12.8E-09	-11.3E-09	1.7E-09	1.7E-09	-6.7E-09	1.7E-09	-2.9E-09
55	-6.7E-09	8.6E-09	-10.5E-09	173.3E-12	936.3E-12	-2.9E-09	173.3E-12	-10.5E-09
56	-10.5E-09	5.5E-09	-7.5E-09	-3.6E-09	-589.6E-12	-5.2E-09	-3.6E-09	-4.4E-09
57	-17.4E-09	2.5E-09	-12.0E-09	-11.3E-09	-9.0E-09	-589.6E-12	-9.0E-09	12.4E-09
58	-9.7E-09	-2.9E-09	-10.5E-09	-10.5E-09	173.3E-12	-9.0E-09	-8.2E-09	-5.9E-09
59	4.8E-09	-8.2E-09	-1.4E-09	4.0E-09	-9.0E-09	7.0E-09	-4.4E-09	-9.0E-09
60	-6.7E-09	-5.2E-09	-2.1E-09	936.3E-12	2.5E-09	-589.6E-12	8.6E-09	4.0E-09
Statistics								
Min	-17.4E-09	-12.8E-09	-12.0E-09	-11.3E-09	-14.3E-09	-19.7E-09	-9.0E-09	-10.5E-09
Max	4.8E-09	8.6E-09	-1.4E-09	10.1E-09	4.0E-09	7.0E-09	8.6E-09	12.4E-09
Average	-6.2E-09	-2.6E-09	-7.5E-09	-1.5E-09	-2.3E-09	-4.3E-09	-2.4E-09	-589.6E-12
Std Deviation	6.4E-09	6.5E-09	3.7E-09	6.1E-09	5.8E-09	6.5E-09	4.8E-09	7.8E-09

Measurements

IILWE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-6.7E-09	-6.7E-09	-4.4E-09	6.3E-09	-12.8E-09	-5.9E-09	-5.9E-09	-11.3E-09
50_OUT_REF	-5.9E-09	4.8E-09	2.5E-09	-13.6E-09	936.3E-12	-9.7E-09	-5.9E-09	936.3E-12
ON_HDC samples								
61	-2.1E-09	-2.1E-09	-12.8E-09	6.3E-09	-7.5E-09	-2.9E-09	10.9E-09	-1.4E-09
62	-7.5E-09	173.3E-12	-3.6E-09	-6.7E-09	936.3E-12	-17.4E-09	7.0E-09	-1.4E-09
63	-2.1E-09	1.7E-09	-4.4E-09	10.9E-09	-6.7E-09	-5.9E-09	1.7E-09	6.3E-09
64	-2.9E-09	3.2E-09	173.3E-12	4.8E-09	-3.6E-09	-7.5E-09	-9.0E-09	173.3E-12
65	-5.2E-09	4.0E-09	-7.5E-09	-11.3E-09	-2.1E-09	-8.2E-09	2.5E-09	-1.4E-09
66	-12.8E-09	-20.4E-09	-9.0E-09	-7.5E-09	-5.2E-09	-2.9E-09	-2.1E-09	-2.1E-09
67	-6.7E-09	-7.5E-09	-5.9E-09	6.3E-09	4.8E-09	936.3E-12	2.5E-09	7.8E-09
68	-9.0E-09	-2.9E-09	-589.6E-12	-6.7E-09	936.3E-12	173.3E-12	-14.3E-09	936.3E-12
69	4.0E-09	1.7E-09	-2.1E-09	-9.0E-09	936.3E-12	-2.9E-09	2.5E-09	-2.1E-09
70	-4.4E-09	-2.1E-09	-10.5E-09	-2.9E-09	1.7E-09	936.3E-12	-7.5E-09	-1.4E-09
Statistics								
Min	-12.8E-09	-20.4E-09	-12.8E-09	-11.3E-09	-7.5E-09	-17.4E-09	-14.3E-09	-2.1E-09
Max	4.0E-09	4.0E-09	173.3E-12	10.9E-09	4.8E-09	936.3E-12	10.9E-09	7.8E-09

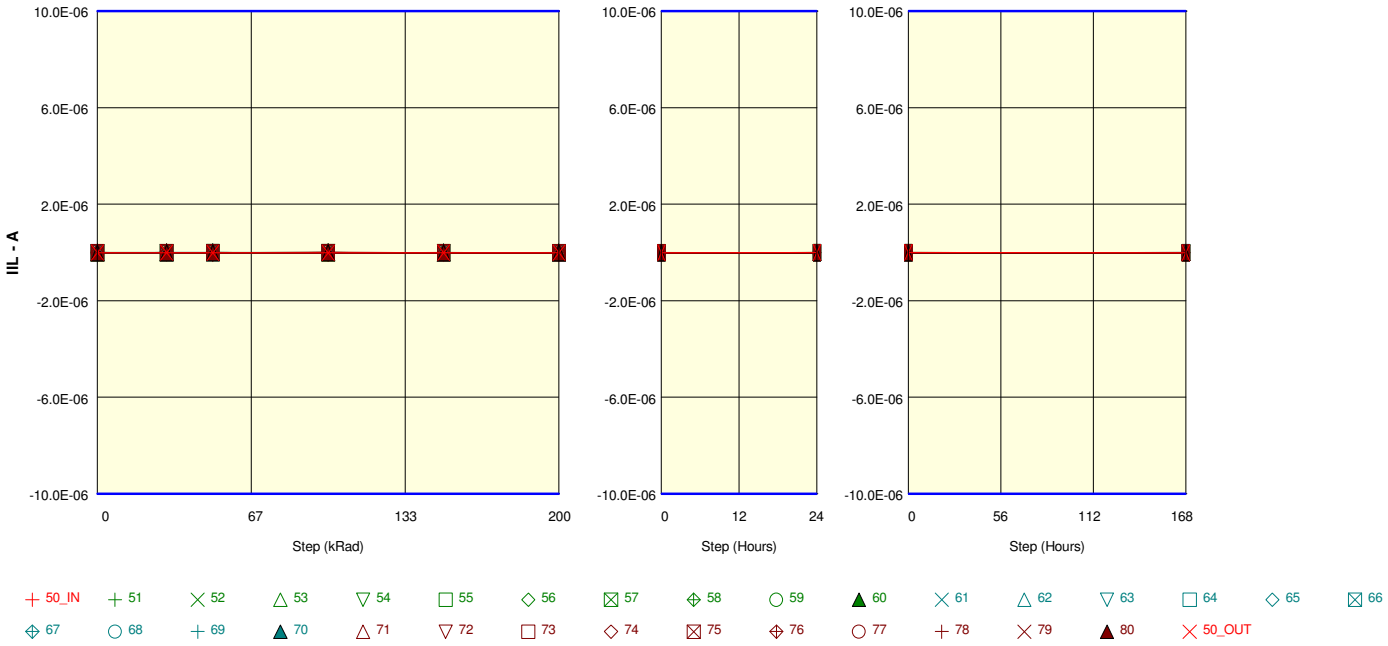
IILWE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-4.9E-09	-2.4E-09	-5.6E-09	-1.6E-09	-1.6E-09	-4.6E-09	-589.7E-12	554.8E-12
Std Deviation	4.3E-09	6.8E-09	4.1E-09	7.5E-09	3.8E-09	5.3E-09	7.3E-09	3.4E-09

Measurements

IILWE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-6.7E-09	-6.7E-09	-4.4E-09	6.3E-09	-12.8E-09	-5.9E-09	-5.9E-09	-11.3E-09
50_OUT_REF	-5.9E-09	4.8E-09	2.5E-09	-13.6E-09	936.3E-12	-9.7E-09	-5.9E-09	936.3E-12
OFF samples								
71	173.3E-12	-11.3E-09	-9.7E-09	936.3E-12	10.9E-09	-9.0E-09	-10.5E-09	-9.7E-09
72	-2.1E-09	-10.5E-09	173.3E-12	4.8E-09	-9.0E-09	-6.7E-09	4.8E-09	173.3E-12
73	-10.5E-09	-8.2E-09	-9.0E-09	4.0E-09	-5.2E-09	173.3E-12	-589.6E-12	-2.1E-09
74	-1.4E-09	5.5E-09	7.0E-09	4.0E-09	-12.0E-09	-7.5E-09	4.0E-09	1.7E-09
75	-3.6E-09	-12.8E-09	-12.8E-09	-589.6E-12	5.5E-09	-9.7E-09	-589.6E-12	-12.0E-09
76	11.6E-09	-9.0E-09	-8.2E-09	-4.4E-09	-2.9E-09	-2.9E-09	3.2E-09	-5.2E-09
77	-10.5E-09	-589.6E-12	-12.0E-09	7.0E-09	-7.5E-09	-17.4E-09	7.8E-09	5.5E-09
78	1.7E-09	-3.6E-09	-1.4E-09	-9.0E-09	-1.4E-09	10.1E-09	-7.5E-09	-8.2E-09
79	-6.7E-09	-7.5E-09	-2.1E-09	9.3E-09	2.5E-09	-3.6E-09	3.2E-09	-1.4E-09
80	4.0E-09	-2.1E-09	3.2E-09	2.5E-09	4.0E-09	-11.3E-09	-9.0E-09	4.0E-09
Statistics								
Min	-10.5E-09	-12.8E-09	-12.8E-09	-9.0E-09	-12.0E-09	-17.4E-09	-10.5E-09	-12.0E-09
Max	11.6E-09	5.5E-09	7.0E-09	9.3E-09	10.9E-09	10.1E-09	7.8E-09	5.5E-09
Average	-1.7E-09	-6.0E-09	-4.5E-09	1.9E-09	-1.5E-09	-5.8E-09	-513.3E-12	-2.7E-09
Std Deviation	6.4E-09	5.4E-09	6.5E-09	5.1E-09	6.8E-09	7.0E-09	6.0E-09	5.6E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current Low : IILWP#
Test conditions : Vin=0V . VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IILWP#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-9.7E-09	-21.2E-09	-13.6E-09	-17.4E-09	-2.9E-09	-7.5E-09	-5.9E-09	-589.6E-12
50_OUT_REF	-6.7E-09	-6.7E-09	-18.9E-09	-15.1E-09	-9.7E-09	-9.7E-09	-2.9E-09	-13.6E-09
ON_LDC samples								
51	-15.1E-09	-14.3E-09	-12.8E-09	-11.3E-09	-15.1E-09	-17.4E-09	-8.2E-09	-9.0E-09
52	2.5E-09	173.3E-12	-17.4E-09	-3.6E-09	-14.3E-09	173.3E-12	-3.6E-09	-5.2E-09
53	-12.8E-09	-9.7E-09	-17.4E-09	-5.2E-09	-16.6E-09	-12.8E-09	-18.1E-09	-6.7E-09
54	-9.7E-09	-8.2E-09	-15.1E-09	-2.9E-09	-12.8E-09	-17.4E-09	-2.1E-09	-7.5E-09
55	-15.1E-09	-14.3E-09	-5.2E-09	-9.0E-09	-5.2E-09	-4.4E-09	-18.9E-09	-13.6E-09
56	-9.7E-09	-11.3E-09	-3.6E-09	-4.4E-09	-589.6E-12	-11.3E-09	-18.9E-09	-13.6E-09
57	-13.6E-09	-20.4E-09	-6.7E-09	-27.3E-09	-24.2E-09	-13.6E-09	-2.9E-09	-11.3E-09
58	-18.9E-09	-4.4E-09	-8.2E-09	-12.8E-09	-24.2E-09	-8.2E-09	-16.6E-09	-7.5E-09
59	-2.1E-09	-9.7E-09	-16.6E-09	-12.8E-09	-7.5E-09	-9.7E-09	-12.0E-09	-5.9E-09
60	-14.3E-09	-4.4E-09	-2.9E-09	173.3E-12	-14.3E-09	-15.1E-09	-12.8E-09	-9.7E-09
Statistics								
Min	-18.9E-09	-20.4E-09	-17.4E-09	-27.3E-09	-24.2E-09	-17.4E-09	-18.9E-09	-13.6E-09
Max	2.5E-09	173.3E-12	-2.9E-09	173.3E-12	-589.6E-12	173.3E-12	-2.1E-09	-5.2E-09
Average	-10.9E-09	-9.7E-09	-10.6E-09	-8.9E-09	-13.5E-09	-11.0E-09	-11.4E-09	-9.0E-09
Std Deviation	6.2E-09	5.6E-09	5.6E-09	7.4E-09	7.2E-09	5.3E-09	6.5E-09	2.9E-09

Measurements

IILWP#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-9.7E-09	-21.2E-09	-13.6E-09	-17.4E-09	-2.9E-09	-7.5E-09	-5.9E-09	-589.6E-12
50_OUT_REF	-6.7E-09	-6.7E-09	-18.9E-09	-15.1E-09	-9.7E-09	-9.7E-09	-2.9E-09	-13.6E-09
ON_HDC samples								
61	-11.3E-09	-13.6E-09	936.3E-12	-7.5E-09	-12.8E-09	-20.4E-09	-12.0E-09	-3.6E-09
62	-1.4E-09	-18.9E-09	-12.8E-09	-5.2E-09	-9.7E-09	-19.7E-09	-3.6E-09	-12.0E-09
63	-24.2E-09	173.3E-12	-1.4E-09	-1.4E-09	-10.5E-09	-5.9E-09	-5.2E-09	4.8E-09
64	-9.0E-09	-9.7E-09	-2.9E-09	-8.2E-09	-13.6E-09	-22.7E-09	-20.4E-09	-5.2E-09
65	-11.3E-09	-7.5E-09	-3.6E-09	-6.7E-09	-3.6E-09	-13.6E-09	-12.8E-09	936.3E-12
66	-6.7E-09	-9.7E-09	-15.8E-09	-8.2E-09	-14.3E-09	-11.3E-09	-10.5E-09	-8.2E-09
67	-5.9E-09	-12.8E-09	-9.7E-09	-23.5E-09	-2.1E-09	-16.6E-09	-12.0E-09	-7.5E-09
68	-18.1E-09	173.3E-12	-16.6E-09	-6.7E-09	-12.8E-09	-12.0E-09	-17.4E-09	-9.7E-09
69	-1.4E-09	2.5E-09	1.7E-09	-5.9E-09	-15.8E-09	-16.6E-09	-15.8E-09	173.3E-12
70	-15.8E-09	-2.1E-09	-589.6E-12	-12.8E-09	-14.3E-09	-13.6E-09	-10.5E-09	-5.9E-09
Statistics								
Min	-24.2E-09	-18.9E-09	-16.6E-09	-23.5E-09	-15.8E-09	-22.7E-09	-20.4E-09	-12.0E-09
Max	-1.4E-09	2.5E-09	1.7E-09	-1.4E-09	-2.1E-09	-5.9E-09	-3.6E-09	4.8E-09

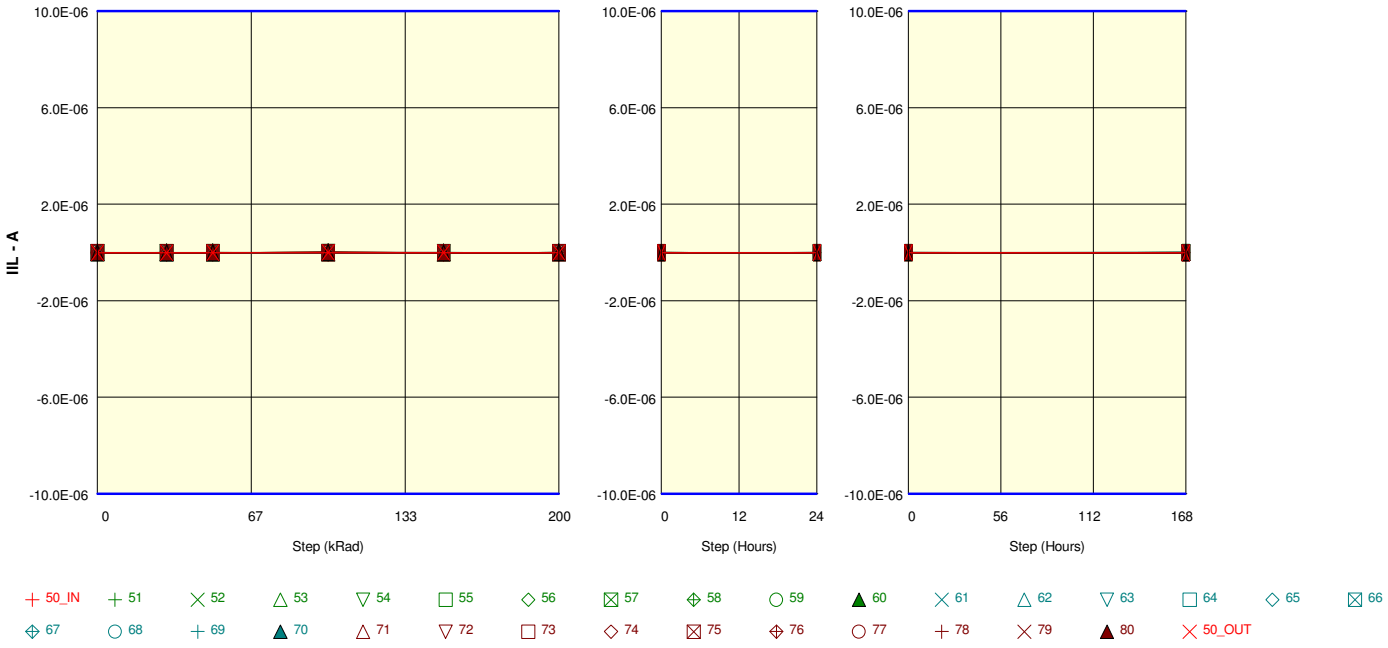
IILWP#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-10.5E-09	-7.2E-09	-6.1E-09	-8.6E-09	-11.0E-09	-15.2E-09	-12.0E-09	-4.6E-09
Std Deviation	6.9E-09	6.7E-09	6.7E-09	5.7E-09	4.4E-09	4.7E-09	4.9E-09	5.0E-09

Measurements

IILWP#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-9.7E-09	-21.2E-09	-13.6E-09	-17.4E-09	-2.9E-09	-7.5E-09	-5.9E-09	-589.6E-12
50_OUT_REF	-6.7E-09	-6.7E-09	-18.9E-09	-15.1E-09	-9.7E-09	-9.7E-09	-2.9E-09	-13.6E-09
OFF samples								
71	-9.0E-09	-2.9E-09	-12.8E-09	-4.4E-09	-19.7E-09	-12.8E-09	-7.5E-09	-9.7E-09
72	-5.9E-09	-2.1E-09	-18.1E-09	-20.4E-09	-5.2E-09	-11.3E-09	-4.4E-09	-7.5E-09
73	-9.7E-09	-10.5E-09	-8.2E-09	-589.6E-12	-13.6E-09	-11.3E-09	-13.6E-09	-17.4E-09
74	-5.9E-09	-2.1E-09	-14.3E-09	-10.5E-09	-22.7E-09	-22.7E-09	2.5E-09	-15.8E-09
75	-2.1E-09	-11.3E-09	-1.4E-09	-10.5E-09	-9.0E-09	-9.0E-09	-13.6E-09	-15.1E-09
76	-589.6E-12	-4.4E-09	-14.3E-09	-2.9E-09	-12.8E-09	-4.4E-09	-12.8E-09	-8.2E-09
77	2.5E-09	-5.2E-09	-10.5E-09	173.3E-12	-5.2E-09	-20.4E-09	-21.2E-09	-15.8E-09
78	-15.8E-09	-1.4E-09	-5.2E-09	7.0E-09	-14.3E-09	-17.4E-09	-9.7E-09	-17.4E-09
79	-18.1E-09	-9.7E-09	-1.4E-09	-18.9E-09	-9.7E-09	-23.5E-09	-11.3E-09	-18.1E-09
80	-17.4E-09	-13.6E-09	-9.7E-09	-9.7E-09	-10.5E-09	-11.3E-09	-18.1E-09	-16.6E-09
Statistics								
Min	-18.1E-09	-13.6E-09	-18.1E-09	-20.4E-09	-22.7E-09	-23.5E-09	-21.2E-09	-18.1E-09
Max	2.5E-09	-1.4E-09	-1.4E-09	7.0E-09	-5.2E-09	-4.4E-09	2.5E-09	-7.5E-09
Average	-8.2E-09	-6.3E-09	-9.6E-09	-7.1E-09	-12.3E-09	-14.4E-09	-11.0E-09	-14.2E-09
Std Deviation	6.8E-09	4.3E-09	5.3E-09	8.2E-09	5.4E-09	6.0E-09	6.4E-09	3.9E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current Low : IILIO[0]
Test conditions : Vin=0V . VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IILIO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-15.1E-09	-19.7E-09	-8.2E-09	-15.1E-09	-7.5E-09	-589.6E-12	-11.3E-09	936.3E-12
50_OUT_REF	-11.3E-09	-15.8E-09	-14.3E-09	-4.4E-09	-9.0E-09	-7.5E-09	-5.9E-09	-18.9E-09
ON_LDC samples								
51	-589.6E-12	-4.4E-09	-15.1E-09	-9.7E-09	-12.0E-09	-5.2E-09	-12.8E-09	-4.4E-09
52	-15.1E-09	-13.6E-09	-7.5E-09	-3.6E-09	-8.2E-09	-10.5E-09	-6.7E-09	-5.9E-09
53	-5.9E-09	-3.6E-09	-9.7E-09	-12.0E-09	-15.1E-09	-1.4E-09	-4.4E-09	-7.5E-09
54	-10.5E-09	-13.6E-09	-5.2E-09	-10.5E-09	-1.4E-09	-10.5E-09	-4.4E-09	1.7E-09
55	-18.9E-09	-11.3E-09	-8.2E-09	6.3E-09	-10.5E-09	-11.3E-09	-9.0E-09	-589.6E-12
56	4.0E-09	-589.6E-12	-589.6E-12	-18.1E-09	-9.0E-09	-6.7E-09	-4.4E-09	173.3E-12
57	-6.7E-09	-3.6E-09	-16.6E-09	4.0E-09	-6.7E-09	-7.5E-09	-9.7E-09	-5.2E-09
58	-10.5E-09	-18.9E-09	4.0E-09	-2.1E-09	-9.0E-09	-12.0E-09	-10.5E-09	-13.6E-09
59	-11.3E-09	-12.8E-09	-10.5E-09	-13.6E-09	-15.8E-09	1.7E-09	-3.6E-09	173.3E-12
60	-6.7E-09	-15.8E-09	-12.0E-09	-1.4E-09	-12.0E-09	-1.4E-09	-3.6E-09	173.3E-12
Statistics								
Min	-18.9E-09	-18.9E-09	-16.6E-09	-18.1E-09	-15.8E-09	-12.0E-09	-12.8E-09	-13.6E-09
Max	4.0E-09	-589.6E-12	4.0E-09	6.3E-09	-1.4E-09	1.7E-09	-3.6E-09	1.7E-09
Average	-8.2E-09	-9.8E-09	-8.1E-09	-6.1E-09	-10.0E-09	-6.5E-09	-6.9E-09	-3.5E-09
Std Deviation	6.3E-09	5.9E-09	6.0E-09	7.5E-09	4.0E-09	4.6E-09	3.2E-09	4.5E-09

Measurements

IILIO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-15.1E-09	-19.7E-09	-8.2E-09	-15.1E-09	-7.5E-09	-589.6E-12	-11.3E-09	936.3E-12
50_OUT_REF	-11.3E-09	-15.8E-09	-14.3E-09	-4.4E-09	-9.0E-09	-7.5E-09	-5.9E-09	-18.9E-09
ON_HDC samples								
61	-589.6E-12	-9.0E-09	-7.5E-09	-9.0E-09	-12.8E-09	-10.5E-09	-16.6E-09	-9.7E-09
62	-8.2E-09	-2.9E-09	-9.0E-09	-18.9E-09	-9.7E-09	-15.1E-09	-2.9E-09	173.3E-12
63	-6.7E-09	-7.5E-09	-9.0E-09	936.3E-12	-2.1E-09	-12.8E-09	-1.4E-09	-12.8E-09
64	-5.9E-09	-14.3E-09	-5.2E-09	-5.9E-09	-6.7E-09	-7.5E-09	-14.3E-09	-12.8E-09
65	-18.9E-09	-11.3E-09	-10.5E-09	-16.6E-09	-9.7E-09	-2.1E-09	936.3E-12	-12.8E-09
66	-10.5E-09	-12.8E-09	-12.8E-09	-4.4E-09	-6.7E-09	-2.1E-09	-8.2E-09	-2.1E-09
67	-9.0E-09	-3.6E-09	-18.9E-09	-1.4E-09	3.2E-09	936.3E-12	-9.7E-09	7.0E-09
68	-10.5E-09	936.3E-12	-3.6E-09	-11.3E-09	3.2E-09	-5.2E-09	-8.2E-09	936.3E-12
69	-7.5E-09	-9.0E-09	-7.5E-09	-8.2E-09	-5.2E-09	-1.4E-09	-13.6E-09	-3.6E-09
70	-5.2E-09	-5.9E-09	173.3E-12	-10.5E-09	-8.2E-09	-19.7E-09	1.7E-09	-17.4E-09
Statistics								
Min	-18.9E-09	-14.3E-09	-18.9E-09	-18.9E-09	-12.8E-09	-19.7E-09	-16.6E-09	-17.4E-09
Max	-589.6E-12	936.3E-12	173.3E-12	936.3E-12	3.2E-09	936.3E-12	1.7E-09	7.0E-09

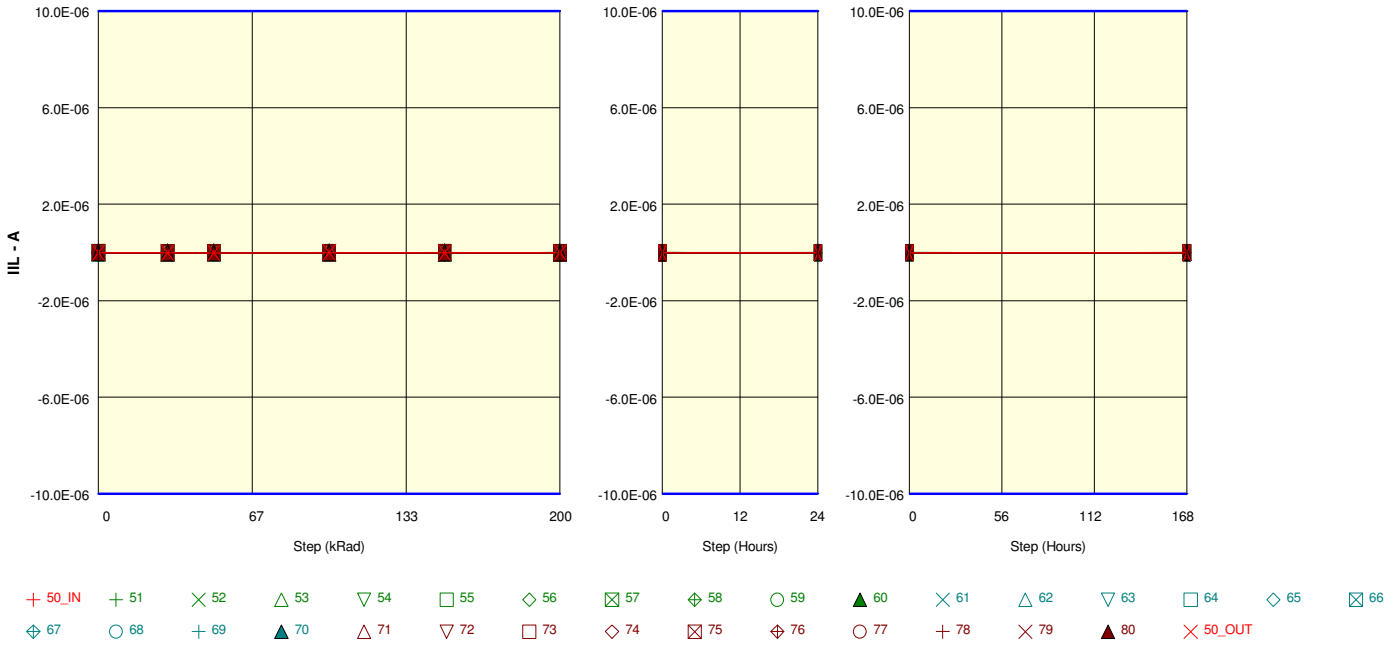
IILIO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-8.3E-09	-7.5E-09	-8.4E-09	-8.5E-09	-5.5E-09	-7.5E-09	-7.2E-09	-6.3E-09
Std Deviation	4.5E-09	4.5E-09	4.9E-09	5.9E-09	5.1E-09	6.4E-09	6.2E-09	7.5E-09

Measurements

IILIO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-15.1E-09	-19.7E-09	-8.2E-09	-15.1E-09	-7.5E-09	-589.6E-12	-11.3E-09	936.3E-12
50_OUT_REF	-11.3E-09	-15.8E-09	-14.3E-09	-4.4E-09	-9.0E-09	-7.5E-09	-5.9E-09	-18.9E-09
OFF samples								
71	-5.9E-09	-589.6E-12	-9.7E-09	6.3E-09	-2.9E-09	-9.7E-09	-12.8E-09	-22.0E-09
72	-4.4E-09	936.3E-12	-6.7E-09	8.6E-09	-10.5E-09	-11.3E-09	-18.1E-09	-14.3E-09
73	-9.7E-09	-6.7E-09	1.7E-09	-12.0E-09	-10.5E-09	173.3E-12	-15.1E-09	-12.0E-09
74	-17.4E-09	-9.7E-09	-9.7E-09	5.5E-09	-14.3E-09	-9.7E-09	-15.8E-09	-5.9E-09
75	-2.1E-09	-10.5E-09	-8.2E-09	-15.8E-09	-12.8E-09	-9.7E-09	-2.1E-09	-16.6E-09
76	-12.8E-09	-12.0E-09	-5.9E-09	3.2E-09	-9.0E-09	3.2E-09	-8.2E-09	936.3E-12
77	936.3E-12	-15.1E-09	-15.1E-09	-1.4E-09	-15.8E-09	-2.1E-09	-15.8E-09	-12.8E-09
78	-12.0E-09	-6.7E-09	3.2E-09	173.3E-12	-5.2E-09	-14.3E-09	2.5E-09	3.2E-09
79	173.3E-12	-10.5E-09	-10.5E-09	-10.5E-09	-15.1E-09	-6.7E-09	-2.1E-09	-3.6E-09
80	-21.2E-09	-13.6E-09	-10.5E-09	-5.2E-09	-16.6E-09	-5.2E-09	-6.7E-09	1.7E-09
Statistics								
Min	-21.2E-09	-15.1E-09	-15.1E-09	-15.8E-09	-16.6E-09	-14.3E-09	-18.1E-09	-22.0E-09
Max	936.3E-12	936.3E-12	3.2E-09	8.6E-09	-2.9E-09	3.2E-09	2.5E-09	3.2E-09
Average	-8.4E-09	-8.4E-09	-7.2E-09	-2.1E-09	-11.3E-09	-6.5E-09	-9.4E-09	-8.1E-09
Std Deviation	7.1E-09	5.0E-09	5.4E-09	8.0E-09	4.4E-09	5.3E-09	6.8E-09	8.2E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current Low : IILIO[1]
Test conditions : Vin=0V . VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IILIO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-5.9E-09	-9.7E-09	-5.9E-09	-9.0E-09	-4.4E-09	-14.3E-09	-14.3E-09	-17.4E-09
50_OUT_REF	-12.8E-09	-12.0E-09	-20.4E-09	-5.2E-09	-11.3E-09	-6.7E-09	-15.1E-09	-9.7E-09
ON_LDC samples								
51	-16.6E-09	-8.2E-09	-7.5E-09	-5.9E-09	-11.3E-09	-18.9E-09	-5.2E-09	-13.6E-09
52	-2.1E-09	-10.5E-09	-12.0E-09	-9.7E-09	-5.9E-09	-2.1E-09	-12.0E-09	-16.6E-09
53	-14.3E-09	-16.6E-09	-11.3E-09	-20.4E-09	-12.0E-09	-2.1E-09	-3.6E-09	-11.3E-09
54	-5.9E-09	-13.6E-09	-15.1E-09	-15.1E-09	-5.2E-09	-5.9E-09	-12.8E-09	-14.3E-09
55	-2.9E-09	-16.6E-09	-4.4E-09	-24.2E-09	-12.8E-09	-21.2E-09	-12.0E-09	-13.6E-09
56	-20.4E-09	-17.4E-09	-7.5E-09	-11.3E-09	-15.1E-09	-13.6E-09	-10.5E-09	-11.3E-09
57	-16.6E-09	-14.3E-09	-11.3E-09	-22.0E-09	-12.0E-09	-15.1E-09	-22.7E-09	-25.8E-09
58	-5.9E-09	-2.1E-09	-13.6E-09	-12.0E-09	-15.1E-09	-8.2E-09	-5.2E-09	-8.2E-09
59	-18.9E-09	-9.7E-09	-5.9E-09	-8.2E-09	-3.6E-09	-13.6E-09	-5.9E-09	-15.1E-09
60	-9.7E-09	-8.2E-09	-14.3E-09	-18.1E-09	-12.8E-09	-11.3E-09	-2.9E-09	-5.9E-09
Statistics								
Min	-20.4E-09	-17.4E-09	-15.1E-09	-24.2E-09	-15.1E-09	-21.2E-09	-22.7E-09	-25.8E-09
Max	-2.1E-09	-2.1E-09	-4.4E-09	-5.9E-09	-3.6E-09	-2.1E-09	-2.9E-09	-5.9E-09
Average	-11.3E-09	-11.7E-09	-10.3E-09	-14.7E-09	-10.6E-09	-11.2E-09	-9.3E-09	-13.6E-09
Std Deviation	6.5E-09	4.6E-09	3.5E-09	5.9E-09	3.9E-09	6.2E-09	5.7E-09	5.1E-09

Measurements

IILIO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-5.9E-09	-9.7E-09	-5.9E-09	-9.0E-09	-4.4E-09	-14.3E-09	-14.3E-09	-17.4E-09
50_OUT_REF	-12.8E-09	-12.0E-09	-20.4E-09	-5.2E-09	-11.3E-09	-6.7E-09	-15.1E-09	-9.7E-09
ON_HDC samples								
61	-18.9E-09	-10.5E-09	-20.4E-09	-12.8E-09	-9.0E-09	-2.1E-09	-2.9E-09	-4.4E-09
62	-25.0E-09	-19.7E-09	-13.6E-09	-15.1E-09	-7.5E-09	-589.6E-12	-10.5E-09	-9.7E-09
63	-10.5E-09	-9.0E-09	-24.2E-09	-4.4E-09	-18.1E-09	-4.4E-09	-6.7E-09	-12.0E-09
64	-9.7E-09	-12.8E-09	-23.5E-09	-5.2E-09	-10.5E-09	-12.8E-09	-589.6E-12	-5.9E-09
65	-15.8E-09	-17.4E-09	-9.0E-09	-9.0E-09	-9.7E-09	-2.9E-09	-12.8E-09	-7.5E-09
66	-5.2E-09	-19.7E-09	-7.5E-09	-12.0E-09	-1.4E-09	-11.3E-09	-18.9E-09	-11.3E-09
67	-15.1E-09	-25.8E-09	-15.8E-09	-15.8E-09	-12.0E-09	-21.2E-09	-3.6E-09	-22.7E-09
68	-14.3E-09	-9.0E-09	-11.3E-09	-5.9E-09	-18.9E-09	-3.6E-09	-12.8E-09	-15.1E-09
69	936.3E-12	-14.3E-09	-7.5E-09	-15.8E-09	-14.3E-09	-15.1E-09	-15.8E-09	-2.9E-09
70	-3.6E-09	-20.4E-09	-2.9E-09	-7.5E-09	-22.0E-09	-13.6E-09	-2.9E-09	-12.0E-09
Statistics								
Min	-25.0E-09	-25.8E-09	-24.2E-09	-15.8E-09	-22.0E-09	-21.2E-09	-18.9E-09	-22.7E-09
Max	936.3E-12	-9.0E-09	-2.9E-09	-4.4E-09	-1.4E-09	-589.6E-12	-589.6E-12	-2.9E-09

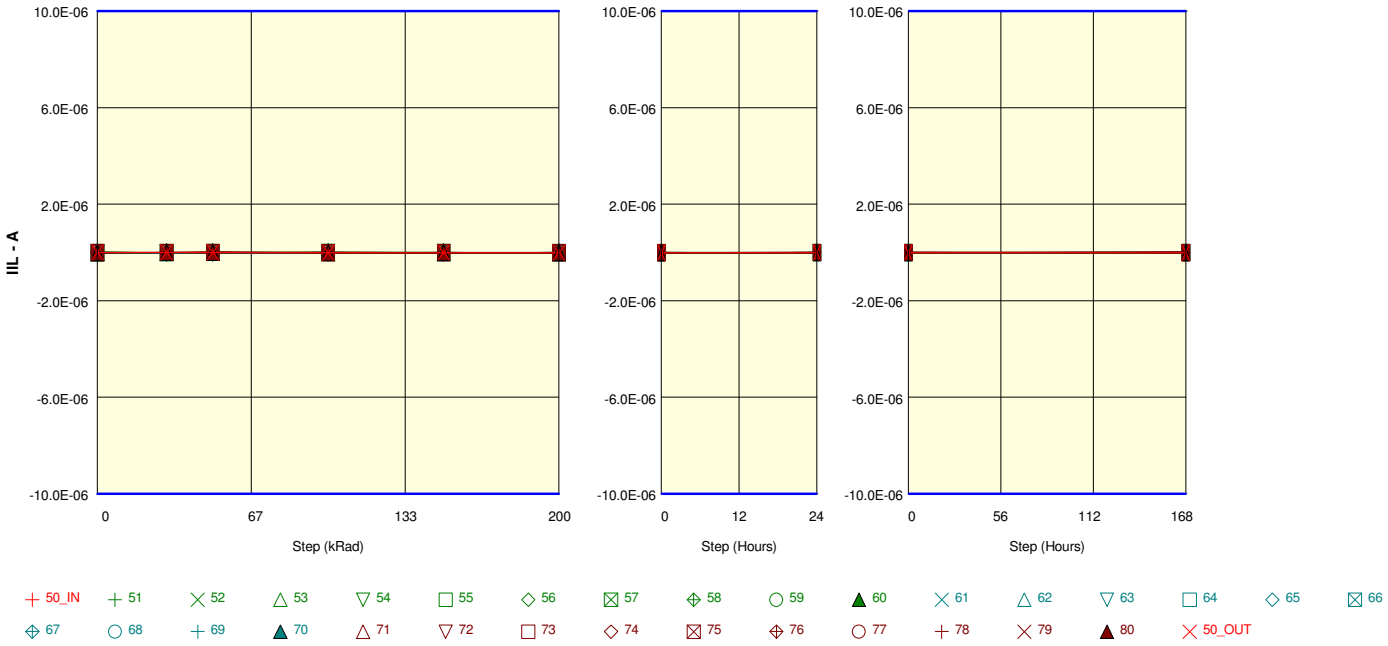
IILIO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-11.7E-09	-15.8E-09	-13.6E-09	-10.4E-09	-12.3E-09	-8.8E-09	-8.8E-09	-10.4E-09
Std Deviation	7.3E-09	5.3E-09	6.9E-09	4.3E-09	5.8E-09	6.6E-09	6.0E-09	5.5E-09

Measurements

IILIO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-5.9E-09	-9.7E-09	-5.9E-09	-9.0E-09	-4.4E-09	-14.3E-09	-14.3E-09	-17.4E-09
50_OUT_REF	-12.8E-09	-12.0E-09	-20.4E-09	-5.2E-09	-11.3E-09	-6.7E-09	-15.1E-09	-9.7E-09
OFF samples								
71	-9.0E-09	-12.8E-09	-8.2E-09	-3.6E-09	-5.9E-09	-16.6E-09	-5.2E-09	-2.1E-09
72	-10.5E-09	-17.4E-09	-19.7E-09	-9.0E-09	-16.6E-09	-10.5E-09	-18.1E-09	-5.2E-09
73	-6.7E-09	-9.0E-09	-6.7E-09	-24.2E-09	-15.1E-09	-9.7E-09	-8.2E-09	-9.7E-09
74	-17.4E-09	-6.7E-09	-6.7E-09	-589.6E-12	-5.2E-09	-15.1E-09	-15.8E-09	173.3E-12
75	4.0E-09	-15.1E-09	-15.1E-09	-11.3E-09	-5.2E-09	-26.5E-09	-10.5E-09	-9.0E-09
76	-13.6E-09	-3.6E-09	-9.0E-09	-9.0E-09	-19.7E-09	-1.4E-09	-19.7E-09	-7.5E-09
77	-19.7E-09	-6.7E-09	-6.7E-09	-14.3E-09	-6.7E-09	-14.3E-09	-5.2E-09	-18.1E-09
78	-12.8E-09	-15.1E-09	-5.9E-09	-10.5E-09	-18.9E-09	-21.2E-09	-6.7E-09	3.2E-09
79	-7.5E-09	-17.4E-09	-5.9E-09	-5.2E-09	936.3E-12	-18.9E-09	-12.0E-09	-7.5E-09
80	-10.5E-09	-14.3E-09	-15.1E-09	-12.0E-09	-11.3E-09	-17.4E-09	-19.7E-09	-9.0E-09
Statistics								
Min	-19.7E-09	-17.4E-09	-19.7E-09	-24.2E-09	-19.7E-09	-26.5E-09	-19.7E-09	-18.1E-09
Max	4.0E-09	-3.6E-09	-5.9E-09	-589.6E-12	936.3E-12	-1.4E-09	-5.2E-09	3.2E-09
Average	-10.4E-09	-11.8E-09	-9.9E-09	-10.0E-09	-10.4E-09	-15.2E-09	-12.1E-09	-6.5E-09
Std Deviation	6.2E-09	4.7E-09	4.6E-09	6.2E-09	6.6E-09	6.5E-09	5.5E-09	5.7E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current Low : IILIO[2]
Test conditions : Vin=0V . VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IILIO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-10.5E-09	-2.1E-09	-13.6E-09	-10.5E-09	-3.6E-09	-12.0E-09	-5.2E-09	-9.0E-09
50_OUT_REF	-1.4E-09	-1.4E-09	173.3E-12	-11.3E-09	-8.2E-09	-6.7E-09	-9.0E-09	-13.6E-09
ON_LDC samples								
51	-10.5E-09	-11.3E-09	-2.1E-09	-5.2E-09	-3.6E-09	-5.9E-09	-589.6E-12	-8.2E-09
52	-4.4E-09	-9.0E-09	-11.3E-09	-10.5E-09	-7.5E-09	-9.7E-09	-5.2E-09	173.3E-12
53	-10.5E-09	-8.2E-09	-589.6E-12	-4.4E-09	-3.6E-09	-4.4E-09	-12.0E-09	7.0E-09
54	5.5E-09	-4.4E-09	-1.4E-09	10.9E-09	-589.6E-12	-16.6E-09	-1.4E-09	-2.1E-09
55	7.0E-09	-9.0E-09	2.5E-09	4.8E-09	2.5E-09	-13.6E-09	-5.9E-09	-11.3E-09
56	-5.2E-09	173.3E-12	-2.9E-09	-8.2E-09	-9.0E-09	-5.9E-09	-2.1E-09	-7.5E-09
57	-9.7E-09	-12.8E-09	-6.7E-09	4.8E-09	-9.0E-09	-589.6E-12	-3.6E-09	-3.6E-09
58	-9.7E-09	-5.9E-09	-6.7E-09	4.8E-09	-1.4E-09	-9.0E-09	-8.2E-09	173.3E-12
59	4.8E-09	-5.2E-09	-5.9E-09	173.3E-12	-11.3E-09	1.7E-09	-2.9E-09	173.3E-12
60	1.7E-09	2.5E-09	3.2E-09	2.5E-09	-4.4E-09	-2.1E-09	936.3E-12	-17.4E-09
Statistics								
Min	-10.5E-09	-12.8E-09	-11.3E-09	-10.5E-09	-11.3E-09	-16.6E-09	-12.0E-09	-17.4E-09
Max	7.0E-09	2.5E-09	3.2E-09	10.9E-09	2.5E-09	1.7E-09	936.3E-12	7.0E-09
Average	-3.1E-09	-6.3E-09	-3.2E-09	-55.6E-12	-4.8E-09	-6.6E-09	-4.1E-09	-4.3E-09
Std Deviation	6.8E-09	4.6E-09	4.3E-09	6.4E-09	4.1E-09	5.4E-09	3.7E-09	6.6E-09

Measurements

IILIO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-10.5E-09	-2.1E-09	-13.6E-09	-10.5E-09	-3.6E-09	-12.0E-09	-5.2E-09	-9.0E-09
50_OUT_REF	-1.4E-09	-1.4E-09	173.3E-12	-11.3E-09	-8.2E-09	-6.7E-09	-9.0E-09	-13.6E-09
ON_HDC samples								
61	-13.6E-09	-9.7E-09	-11.3E-09	-5.9E-09	936.3E-12	-589.6E-12	-10.5E-09	-15.1E-09
62	-2.9E-09	-9.7E-09	7.0E-09	-5.9E-09	-12.0E-09	173.3E-12	-9.7E-09	-6.7E-09
63	-15.1E-09	-12.8E-09	-11.3E-09	936.3E-12	-12.8E-09	936.3E-12	936.3E-12	-5.2E-09
64	-2.1E-09	-5.2E-09	173.3E-12	-2.9E-09	-4.4E-09	-11.3E-09	-4.4E-09	-2.1E-09
65	936.3E-12	-4.4E-09	-2.1E-09	-10.5E-09	936.3E-12	-4.4E-09	-5.2E-09	7.0E-09
66	173.3E-12	-3.6E-09	-3.6E-09	-1.4E-09	1.7E-09	-9.7E-09	-5.2E-09	-589.6E-12
67	7.0E-09	-8.2E-09	-6.7E-09	-11.3E-09	-4.4E-09	-1.4E-09	-11.3E-09	-589.6E-12
68	-6.7E-09	-7.5E-09	173.3E-12	-3.6E-09	173.3E-12	-9.7E-09	-1.4E-09	1.7E-09
69	-589.6E-12	-10.5E-09	-10.5E-09	3.2E-09	-9.0E-09	-13.6E-09	-1.4E-09	-6.7E-09
70	-10.5E-09	-589.6E-12	-9.0E-09	-1.4E-09	-10.5E-09	-16.6E-09	173.3E-12	-11.3E-09
Statistics								
Min	-15.1E-09	-12.8E-09	-11.3E-09	-11.3E-09	-12.8E-09	-16.6E-09	-11.3E-09	-15.1E-09
Max	7.0E-09	-589.6E-12	7.0E-09	3.2E-09	1.7E-09	936.3E-12	936.3E-12	7.0E-09

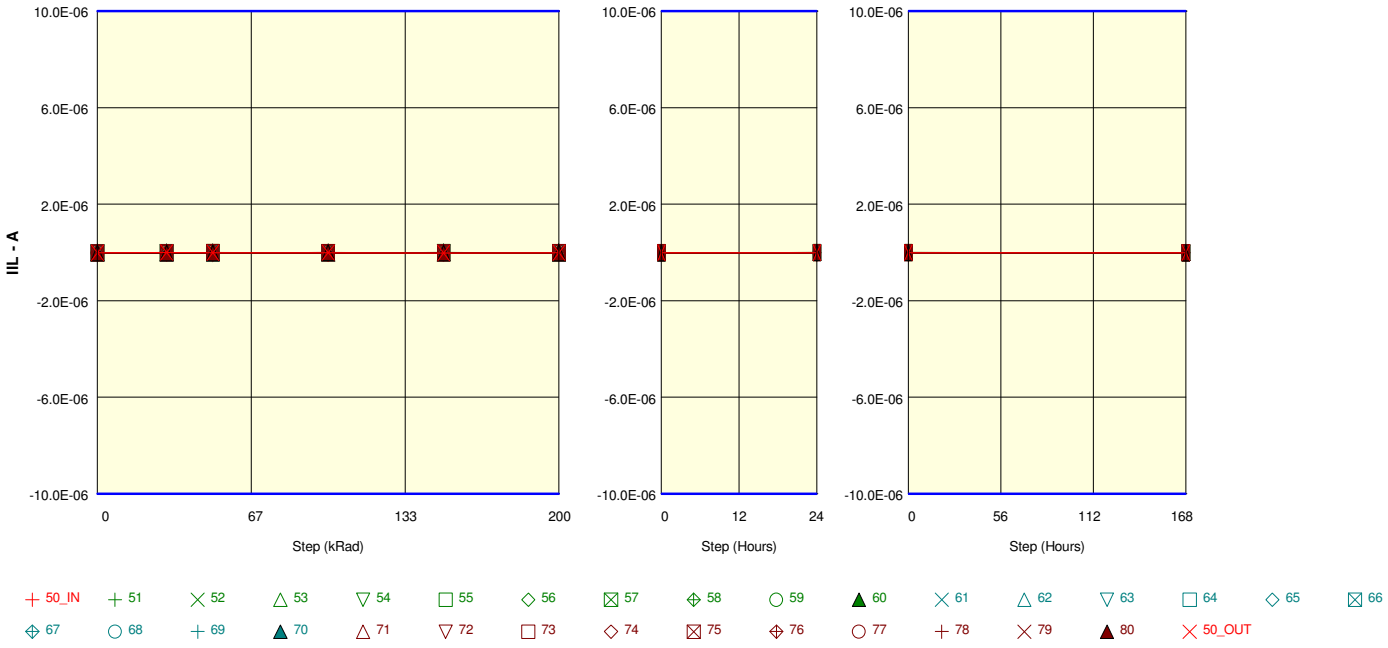
IILIO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-4.3E-09	-7.2E-09	-4.7E-09	-3.9E-09	-4.9E-09	-6.6E-09	-4.8E-09	-3.9E-09
Std Deviation	6.7E-09	3.5E-09	5.8E-09	4.4E-09	5.5E-09	6.0E-09	4.3E-09	6.1E-09

Measurements

IILIO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-10.5E-09	-2.1E-09	-13.6E-09	-10.5E-09	-3.6E-09	-12.0E-09	-5.2E-09	-9.0E-09
50_OUT_REF	-1.4E-09	-1.4E-09	173.3E-12	-11.3E-09	-8.2E-09	-6.7E-09	-9.0E-09	-13.6E-09
OFF samples								
71	-3.6E-09	-1.4E-09	-5.2E-09	-9.7E-09	-2.1E-09	-14.3E-09	5.5E-09	7.8E-09
72	3.2E-09	-13.6E-09	-5.9E-09	6.3E-09	-3.6E-09	-5.9E-09	-6.7E-09	-6.7E-09
73	-15.1E-09	-1.4E-09	-1.4E-09	-5.9E-09	-589.6E-12	-11.3E-09	-2.1E-09	-9.7E-09
74	-2.1E-09	936.3E-12	-5.2E-09	-8.2E-09	-7.5E-09	-2.9E-09	-18.1E-09	7.0E-09
75	-3.6E-09	2.5E-09	10.9E-09	-13.6E-09	-12.8E-09	-3.6E-09	-1.4E-09	-589.6E-12
76	1.7E-09	-2.1E-09	-5.2E-09	-1.4E-09	-3.6E-09	-3.6E-09	-2.1E-09	-4.4E-09
77	2.5E-09	2.5E-09	-2.1E-09	936.3E-12	173.3E-12	4.0E-09	-5.2E-09	-589.6E-12
78	-13.6E-09	-2.9E-09	13.1E-09	-1.4E-09	936.3E-12	2.5E-09	-589.6E-12	-12.0E-09
79	-2.9E-09	1.7E-09	8.6E-09	-3.6E-09	-5.2E-09	-11.3E-09	-3.6E-09	-6.7E-09
80	-10.5E-09	-5.2E-09	173.3E-12	-11.3E-09	-5.2E-09	-1.4E-09	-15.1E-09	5.5E-09
Statistics								
Min	-15.1E-09	-13.6E-09	-5.9E-09	-13.6E-09	-12.8E-09	-14.3E-09	-18.1E-09	-12.0E-09
Max	3.2E-09	2.5E-09	13.1E-09	6.3E-09	936.3E-12	4.0E-09	5.5E-09	7.8E-09
Average	-4.4E-09	-1.9E-09	783.6E-12	-4.8E-09	-3.9E-09	-4.8E-09	-4.9E-09	-2.0E-09
Std Deviation	6.2E-09	4.6E-09	6.9E-09	5.8E-09	3.9E-09	5.7E-09	6.6E-09	6.7E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current Low : IILIO[3]
Test conditions : Vin=0V . VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IILIO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-12.0E-09	-12.8E-09	-13.6E-09	-2.9E-09	-20.4E-09	-13.6E-09	-13.6E-09	-18.1E-09
50_OUT_REF	-9.7E-09	173.3E-12	-13.6E-09	-7.5E-09	-27.3E-09	-9.7E-09	-6.7E-09	-9.0E-09
ON_LDC samples								
51	-23.5E-09	-6.7E-09	-15.8E-09	-12.8E-09	-1.4E-09	-11.3E-09	-17.4E-09	-20.4E-09
52	-20.4E-09	-5.9E-09	-10.5E-09	-25.0E-09	-14.3E-09	-4.4E-09	-22.7E-09	-18.9E-09
53	-1.4E-09	-9.0E-09	-20.4E-09	-21.2E-09	-9.7E-09	-29.6E-09	-8.2E-09	-3.6E-09
54	-12.0E-09	-8.2E-09	-19.7E-09	-16.6E-09	-2.1E-09	-12.8E-09	-15.1E-09	-9.7E-09
55	-10.5E-09	-9.0E-09	-15.1E-09	-9.0E-09	-3.6E-09	-9.0E-09	173.3E-12	-15.1E-09
56	-12.0E-09	-14.3E-09	-13.6E-09	-12.0E-09	-12.0E-09	-18.9E-09	-11.3E-09	-16.6E-09
57	-21.2E-09	-12.0E-09	-5.2E-09	-12.0E-09	-9.0E-09	-9.0E-09	173.3E-12	-16.6E-09
58	-8.2E-09	-23.5E-09	-22.0E-09	-12.8E-09	-9.7E-09	-5.2E-09	-17.4E-09	-5.9E-09
59	-11.3E-09	-12.0E-09	-7.5E-09	-20.4E-09	-15.1E-09	-12.8E-09	-18.9E-09	-13.6E-09
60	-22.0E-09	-12.8E-09	-8.2E-09	-12.0E-09	-15.1E-09	-3.6E-09	-19.7E-09	-4.4E-09
Statistics								
Min	-23.5E-09	-23.5E-09	-22.0E-09	-25.0E-09	-15.1E-09	-29.6E-09	-22.7E-09	-20.4E-09
Max	-1.4E-09	-5.9E-09	-5.2E-09	-9.0E-09	-1.4E-09	-3.6E-09	173.3E-12	-3.6E-09
Average	-14.2E-09	-11.3E-09	-13.8E-09	-15.4E-09	-9.2E-09	-11.7E-09	-13.0E-09	-12.5E-09
Std Deviation	6.8E-09	4.8E-09	5.5E-09	4.9E-09	5.0E-09	7.4E-09	7.7E-09	5.8E-09

Measurements

IILIO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-12.0E-09	-12.8E-09	-13.6E-09	-2.9E-09	-20.4E-09	-13.6E-09	-13.6E-09	-18.1E-09
50_OUT_REF	-9.7E-09	173.3E-12	-13.6E-09	-7.5E-09	-27.3E-09	-9.7E-09	-6.7E-09	-9.0E-09
ON_HDC samples								
61	-19.7E-09	-10.5E-09	-14.3E-09	173.3E-12	-17.4E-09	-17.4E-09	-3.6E-09	-4.4E-09
62	-12.0E-09	-12.8E-09	-13.6E-09	-13.6E-09	-9.0E-09	-14.3E-09	-6.7E-09	-13.6E-09
63	-18.9E-09	-589.6E-12	-28.1E-09	-13.6E-09	-20.4E-09	-15.1E-09	-7.5E-09	-12.0E-09
64	-18.1E-09	-19.7E-09	-25.8E-09	-22.7E-09	-14.3E-09	-9.7E-09	-5.9E-09	-22.7E-09
65	-6.7E-09	-2.1E-09	-21.2E-09	-9.0E-09	-5.2E-09	-22.7E-09	-22.7E-09	-12.8E-09
66	-8.2E-09	-12.8E-09	-15.1E-09	-17.4E-09	-13.6E-09	-9.7E-09	-6.7E-09	-11.3E-09
67	-6.7E-09	-22.0E-09	-18.9E-09	-10.5E-09	-20.4E-09	-11.3E-09	-13.6E-09	-4.4E-09
68	-25.0E-09	-10.5E-09	-10.5E-09	-10.5E-09	-5.2E-09	-9.0E-09	-6.7E-09	-15.1E-09
69	-13.6E-09	-14.3E-09	-24.2E-09	-17.4E-09	-1.4E-09	-6.7E-09	-11.3E-09	-10.5E-09
70	-15.1E-09	-16.6E-09	-12.0E-09	-18.1E-09	-7.5E-09	-11.3E-09	-8.2E-09	-11.3E-09
Statistics								
Min	-25.0E-09	-22.0E-09	-28.1E-09	-22.7E-09	-20.4E-09	-22.7E-09	-22.7E-09	-22.7E-09
Max	-6.7E-09	-589.6E-12	-10.5E-09	173.3E-12	-1.4E-09	-6.7E-09	-3.6E-09	-4.4E-09

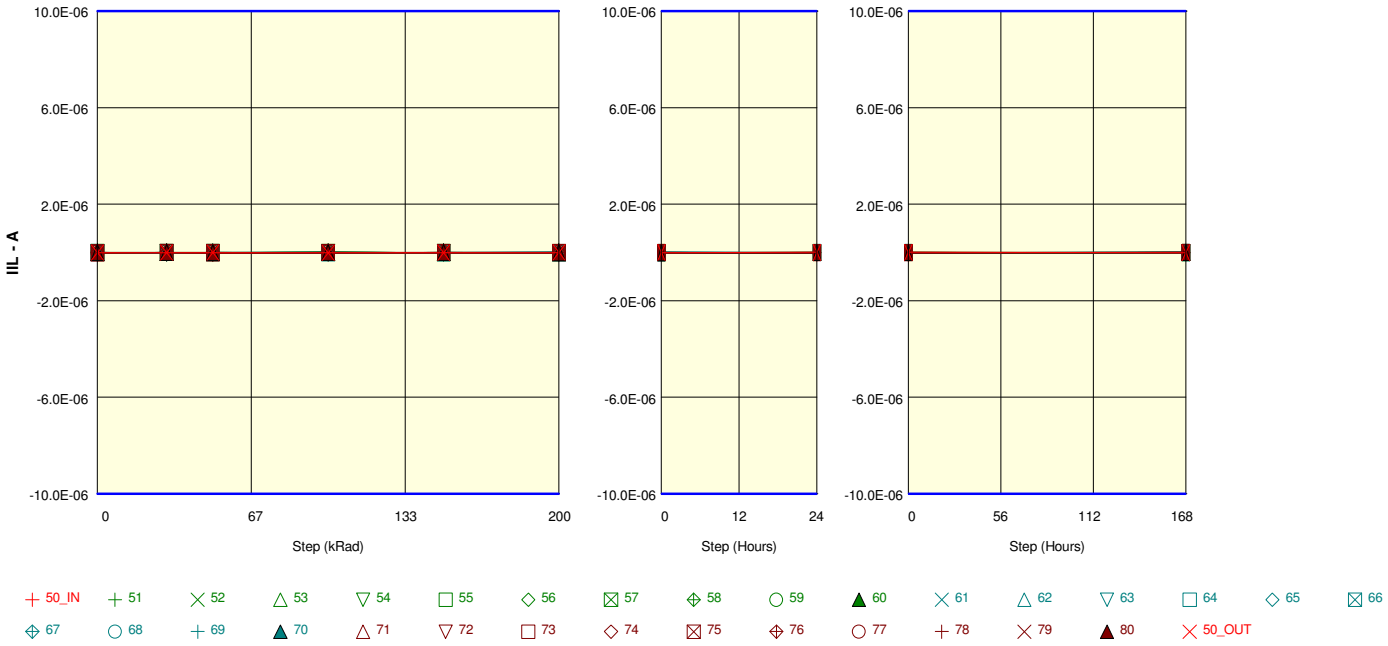
IILIO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-14.4E-09	-12.2E-09	-18.4E-09	-13.3E-09	-11.4E-09	-12.7E-09	-9.3E-09	-11.8E-09
Std Deviation	5.8E-09	6.5E-09	5.9E-09	6.0E-09	6.4E-09	4.5E-09	5.2E-09	5.0E-09

Measurements

IILIO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-12.0E-09	-12.8E-09	-13.6E-09	-2.9E-09	-20.4E-09	-13.6E-09	-13.6E-09	-18.1E-09
50_OUT_REF	-9.7E-09	173.3E-12	-13.6E-09	-7.5E-09	-27.3E-09	-9.7E-09	-6.7E-09	-9.0E-09
OFF samples								
71	-18.9E-09	-21.2E-09	-7.5E-09	-9.7E-09	-13.6E-09	-12.8E-09	-3.6E-09	-15.8E-09
72	-18.1E-09	-18.1E-09	-589.6E-12	-25.0E-09	-6.7E-09	-4.4E-09	-3.6E-09	-10.5E-09
73	-24.2E-09	-9.0E-09	-10.5E-09	-589.6E-12	-15.8E-09	-12.8E-09	-17.4E-09	-9.7E-09
74	-29.6E-09	-22.0E-09	-11.3E-09	-20.4E-09	-6.7E-09	-21.2E-09	-11.3E-09	-15.8E-09
75	-18.9E-09	-15.8E-09	-589.6E-12	-10.5E-09	-18.9E-09	-7.5E-09	-5.9E-09	-11.3E-09
76	-12.8E-09	-5.2E-09	-7.5E-09	-29.6E-09	-9.0E-09	-15.1E-09	-8.2E-09	-12.0E-09
77	-11.3E-09	-10.5E-09	-22.7E-09	-17.4E-09	-26.5E-09	-12.0E-09	-12.8E-09	-6.7E-09
78	-21.2E-09	-11.3E-09	-5.9E-09	-11.3E-09	-19.7E-09	-19.7E-09	-9.0E-09	-13.6E-09
79	-15.1E-09	-25.8E-09	-14.3E-09	-9.0E-09	-10.5E-09	-15.8E-09	-5.2E-09	-14.3E-09
80	-19.7E-09	-15.1E-09	-18.1E-09	-8.2E-09	-17.4E-09	-12.0E-09	-1.4E-09	-9.7E-09
Statistics								
Min	-29.6E-09	-25.8E-09	-22.7E-09	-29.6E-09	-26.5E-09	-21.2E-09	-17.4E-09	-15.8E-09
Max	-11.3E-09	-5.2E-09	-589.6E-12	-589.6E-12	-6.7E-09	-4.4E-09	-1.4E-09	-6.7E-09
Average	-19.0E-09	-15.4E-09	-9.9E-09	-14.2E-09	-14.5E-09	-13.3E-09	-7.8E-09	-12.0E-09
Std Deviation	5.1E-09	6.2E-09	6.7E-09	8.3E-09	6.1E-09	4.8E-09	4.7E-09	2.8E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current Low : IILIO[4]
Test conditions : Vin=0V . VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IILIO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-589.6E-12	-10.5E-09	-10.5E-09	-5.9E-09	-5.9E-09	-10.5E-09	-5.2E-09	-5.9E-09
50_OUT_REF	-9.0E-09	-6.7E-09	-7.5E-09	-16.6E-09	-11.3E-09	-5.2E-09	5.5E-09	-12.8E-09
ON_LDC samples								
51	-5.9E-09	-4.4E-09	-1.4E-09	-6.7E-09	-4.4E-09	-11.3E-09	-5.9E-09	-7.5E-09
52	-3.6E-09	-8.2E-09	-7.5E-09	-7.5E-09	-5.2E-09	-2.9E-09	-5.2E-09	7.0E-09
53	-5.9E-09	-3.6E-09	-5.2E-09	-9.0E-09	-10.5E-09	-2.9E-09	-8.2E-09	2.5E-09
54	-4.4E-09	-5.2E-09	-13.6E-09	7.8E-09	-7.5E-09	-12.8E-09	6.3E-09	-7.5E-09
55	-5.2E-09	2.5E-09	1.7E-09	-3.6E-09	3.2E-09	-12.8E-09	-5.9E-09	-3.6E-09
56	-9.7E-09	-589.6E-12	-15.8E-09	7.0E-09	-12.0E-09	-8.2E-09	-9.0E-09	-589.6E-12
57	-4.4E-09	-6.7E-09	936.3E-12	-4.4E-09	-1.4E-09	173.3E-12	-8.2E-09	-15.8E-09
58	-18.9E-09	-1.4E-09	-15.8E-09	-9.0E-09	4.0E-09	-10.5E-09	-9.0E-09	-15.8E-09
59	-12.8E-09	2.5E-09	-2.1E-09	8.6E-09	-9.0E-09	-4.4E-09	-1.4E-09	-7.5E-09
60	1.7E-09	-589.6E-12	-15.1E-09	5.5E-09	-6.7E-09	-3.6E-09	-6.7E-09	-6.7E-09
Statistics								
Min	-18.9E-09	-8.2E-09	-15.8E-09	-9.0E-09	-12.0E-09	-12.8E-09	-9.0E-09	-15.8E-09
Max	1.7E-09	2.5E-09	1.7E-09	8.6E-09	4.0E-09	173.3E-12	6.3E-09	7.0E-09
Average	-6.9E-09	-2.6E-09	-7.4E-09	-1.1E-09	-4.9E-09	-6.9E-09	-5.3E-09	-5.5E-09
Std Deviation	5.4E-09	3.5E-09	6.8E-09	7.0E-09	5.2E-09	4.5E-09	4.4E-09	6.9E-09

Measurements

IILIO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-589.6E-12	-10.5E-09	-10.5E-09	-5.9E-09	-5.9E-09	-10.5E-09	-5.2E-09	-5.9E-09
50_OUT_REF	-9.0E-09	-6.7E-09	-7.5E-09	-16.6E-09	-11.3E-09	-5.2E-09	5.5E-09	-12.8E-09
ON_HDC samples								
61	-16.6E-09	-3.6E-09	4.8E-09	-2.9E-09	173.3E-12	8.6E-09	-15.1E-09	10.9E-09
62	-2.9E-09	-1.4E-09	-6.7E-09	-10.5E-09	-8.2E-09	6.3E-09	-3.6E-09	11.6E-09
63	-19.7E-09	-9.7E-09	-7.5E-09	-7.5E-09	-5.2E-09	-11.3E-09	-9.7E-09	4.0E-09
64	-18.9E-09	-3.6E-09	-1.4E-09	-10.5E-09	-12.8E-09	-7.5E-09	-5.2E-09	-1.4E-09
65	-2.1E-09	-10.5E-09	-2.9E-09	6.3E-09	-16.6E-09	-2.9E-09	936.3E-12	-6.7E-09
66	936.3E-12	-5.2E-09	-1.4E-09	-8.2E-09	-15.1E-09	-15.1E-09	2.5E-09	-9.7E-09
67	-15.8E-09	-10.5E-09	-4.4E-09	-8.2E-09	-2.9E-09	5.5E-09	-1.4E-09	1.7E-09
68	1.7E-09	-12.8E-09	4.8E-09	-2.9E-09	-3.6E-09	-6.7E-09	-589.6E-12	-5.2E-09
69	-2.9E-09	-12.8E-09	-11.3E-09	-7.5E-09	-2.1E-09	-5.2E-09	-4.4E-09	-12.0E-09
70	-5.2E-09	-4.4E-09	-9.7E-09	-8.2E-09	-589.6E-12	-9.7E-09	-4.4E-09	-2.9E-09
Statistics								
Min	-19.7E-09	-12.8E-09	-11.3E-09	-10.5E-09	-16.6E-09	-15.1E-09	-15.1E-09	-12.0E-09
Max	1.7E-09	-1.4E-09	4.8E-09	6.3E-09	173.3E-12	8.6E-09	2.5E-09	11.6E-09

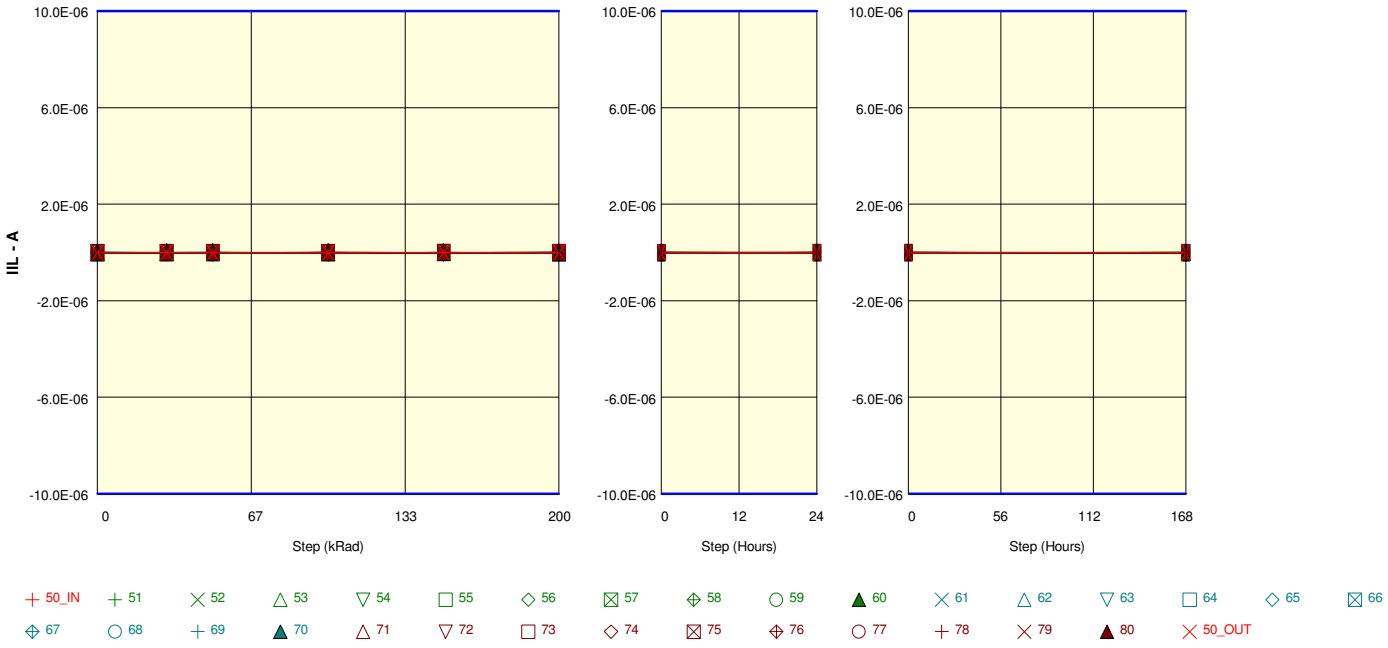
IILIO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-8.1E-09	-7.5E-09	-3.6E-09	-6.0E-09	-6.7E-09	-3.8E-09	-4.1E-09	-971.2E-12
Std Deviation	8.1E-09	4.0E-09	5.2E-09	4.8E-09	5.8E-09	7.6E-09	4.9E-09	7.6E-09

Measurements

IILIO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-589.6E-12	-10.5E-09	-10.5E-09	-5.9E-09	-5.9E-09	-10.5E-09	-5.2E-09	-5.9E-09
50_OUT_REF	-9.0E-09	-6.7E-09	-7.5E-09	-16.6E-09	-11.3E-09	-5.2E-09	5.5E-09	-12.8E-09
OFF samples								
71	-11.3E-09	936.3E-12	-7.5E-09	-2.1E-09	173.3E-12	936.3E-12	-11.3E-09	-2.9E-09
72	-17.4E-09	936.3E-12	-4.4E-09	1.7E-09	-6.7E-09	-10.5E-09	-6.7E-09	6.3E-09
73	-15.1E-09	3.2E-09	-10.5E-09	-7.5E-09	173.3E-12	4.8E-09	-5.9E-09	-2.9E-09
74	173.3E-12	-2.9E-09	-15.1E-09	-15.1E-09	-7.5E-09	-5.9E-09	-8.2E-09	-10.5E-09
75	-11.3E-09	-2.1E-09	936.3E-12	-8.2E-09	173.3E-12	-2.1E-09	-7.5E-09	-3.6E-09
76	173.3E-12	-3.6E-09	1.7E-09	3.2E-09	173.3E-12	-4.4E-09	-2.9E-09	-6.7E-09
77	-12.8E-09	-2.1E-09	-14.3E-09	4.8E-09	-15.8E-09	-14.3E-09	-18.1E-09	-2.9E-09
78	-9.0E-09	-5.2E-09	-5.9E-09	-12.8E-09	-5.2E-09	-1.4E-09	-2.9E-09	-8.2E-09
79	-7.5E-09	-6.7E-09	-9.0E-09	-6.7E-09	-3.6E-09	-12.8E-09	3.2E-09	-1.4E-09
80	-589.6E-12	-5.2E-09	-6.7E-09	-5.9E-09	1.7E-09	-11.3E-09	-5.9E-09	173.3E-12
Statistics								
Min	-17.4E-09	-6.7E-09	-15.1E-09	-15.1E-09	-15.8E-09	-14.3E-09	-18.1E-09	-10.5E-09
Max	173.3E-12	3.2E-09	1.7E-09	4.8E-09	1.7E-09	4.8E-09	3.2E-09	6.3E-09
Average	-8.4E-09	-2.3E-09	-7.1E-09	-4.9E-09	-3.6E-09	-5.7E-09	-6.6E-09	-3.3E-09
Std Deviation	6.1E-09	3.0E-09	5.3E-09	6.3E-09	5.1E-09	6.0E-09	5.3E-09	4.4E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current Low : IILIO[5]
Test conditions : Vin=0V . VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IILIO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-13.6E-09	-5.9E-09	-10.5E-09	-5.2E-09	-2.9E-09	-9.0E-09	2.5E-09	-9.0E-09
50_OUT_REF	-10.5E-09	-2.9E-09	-15.8E-09	-9.0E-09	-589.6E-12	-4.4E-09	-9.7E-09	-2.1E-09
ON_LDC samples								
51	-7.5E-09	-3.6E-09	-10.5E-09	-2.1E-09	-18.1E-09	-7.5E-09	-4.4E-09	10.1E-09
52	-4.4E-09	-5.2E-09	-589.6E-12	-6.7E-09	-13.6E-09	-15.1E-09	4.0E-09	-18.9E-09
53	936.3E-12	-6.7E-09	-5.2E-09	-6.7E-09	-10.5E-09	-5.9E-09	173.3E-12	-12.8E-09
54	-9.0E-09	-8.2E-09	-11.3E-09	-9.0E-09	-3.6E-09	6.3E-09	-1.4E-09	-7.5E-09
55	-5.9E-09	-5.9E-09	-9.7E-09	1.7E-09	-2.9E-09	-11.3E-09	-7.5E-09	-18.1E-09
56	-12.0E-09	-5.9E-09	-6.7E-09	-12.0E-09	-2.9E-09	-6.7E-09	-6.7E-09	-1.4E-09
57	-12.0E-09	-16.6E-09	-3.6E-09	-6.7E-09	173.3E-12	-7.5E-09	-11.3E-09	-2.9E-09
58	-6.7E-09	-2.9E-09	5.5E-09	-9.0E-09	-9.7E-09	-6.7E-09	-2.1E-09	-18.9E-09
59	-589.6E-12	-5.2E-09	-4.4E-09	1.7E-09	-11.3E-09	-11.3E-09	-10.5E-09	-14.3E-09
60	-3.6E-09	-4.4E-09	-5.2E-09	-1.4E-09	-5.9E-09	-2.1E-09	-9.7E-09	-2.1E-09
Statistics								
Min	-12.0E-09	-16.6E-09	-11.3E-09	-12.0E-09	-18.1E-09	-15.1E-09	-11.3E-09	-18.9E-09
Max	936.3E-12	-2.9E-09	5.5E-09	1.7E-09	173.3E-12	6.3E-09	4.0E-09	10.1E-09
Average	-6.1E-09	-6.5E-09	-5.2E-09	-5.0E-09	-7.8E-09	-6.8E-09	-4.9E-09	-8.7E-09
Std Deviation	4.1E-09	3.7E-09	4.8E-09	4.5E-09	5.4E-09	5.5E-09	4.8E-09	9.1E-09

Measurements

IILIO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-13.6E-09	-5.9E-09	-10.5E-09	-5.2E-09	-2.9E-09	-9.0E-09	2.5E-09	-9.0E-09
50_OUT_REF	-10.5E-09	-2.9E-09	-15.8E-09	-9.0E-09	-589.6E-12	-4.4E-09	-9.7E-09	-2.1E-09
ON_HDC samples								
61	6.3E-09	-2.1E-09	-2.9E-09	-3.6E-09	-7.5E-09	-7.5E-09	-6.7E-09	-589.6E-12
62	-17.4E-09	-4.4E-09	-9.7E-09	-3.6E-09	-4.4E-09	-12.0E-09	173.3E-12	-9.7E-09
63	4.8E-09	-13.6E-09	-8.2E-09	-9.0E-09	-18.9E-09	-4.4E-09	-9.0E-09	-9.7E-09
64	-589.6E-12	1.7E-09	-16.6E-09	1.7E-09	-3.6E-09	-6.7E-09	-1.4E-09	-6.7E-09
65	-12.8E-09	-13.6E-09	-15.8E-09	173.3E-12	-2.1E-09	-5.2E-09	-14.3E-09	4.8E-09
66	-12.0E-09	-2.1E-09	-7.5E-09	-17.4E-09	-2.9E-09	-6.7E-09	-2.1E-09	-8.2E-09
67	-7.5E-09	-2.9E-09	1.7E-09	-10.5E-09	-1.4E-09	3.2E-09	-9.0E-09	-2.1E-09
68	9.3E-09	-5.9E-09	-9.7E-09	-7.5E-09	-2.9E-09	-5.9E-09	-4.4E-09	-11.3E-09
69	4.0E-09	-589.6E-12	-12.0E-09	-1.4E-09	-7.5E-09	-2.9E-09	-9.7E-09	-3.6E-09
70	-12.8E-09	-2.1E-09	-8.2E-09	173.3E-12	-3.6E-09	-13.6E-09	-2.9E-09	-11.3E-09
Statistics								
Min	-17.4E-09	-13.6E-09	-16.6E-09	-17.4E-09	-18.9E-09	-13.6E-09	-14.3E-09	-11.3E-09
Max	9.3E-09	1.7E-09	1.7E-09	1.7E-09	-1.4E-09	3.2E-09	173.3E-12	4.8E-09

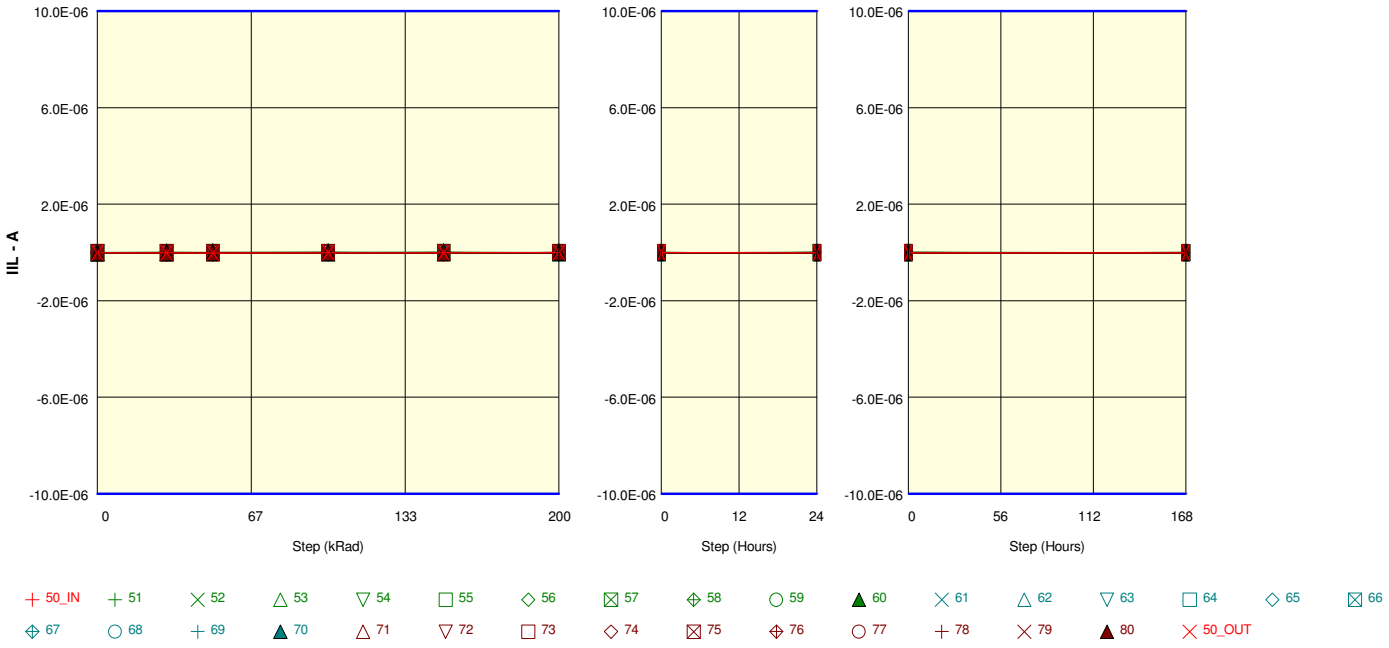
IILIO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-3.9E-09	-4.6E-09	-8.9E-09	-5.1E-09	-5.5E-09	-6.2E-09	-5.9E-09	-5.9E-09
Std Deviation	9.2E-09	4.9E-09	5.2E-09	5.7E-09	4.9E-09	4.4E-09	4.3E-09	5.0E-09

Measurements

IILIO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-13.6E-09	-5.9E-09	-10.5E-09	-5.2E-09	-2.9E-09	-9.0E-09	2.5E-09	-9.0E-09
50_OUT_REF	-10.5E-09	-2.9E-09	-15.8E-09	-9.0E-09	-589.6E-12	-4.4E-09	-9.7E-09	-2.1E-09
OFF samples								
71	-6.7E-09	-18.1E-09	1.7E-09	-7.5E-09	-3.6E-09	-589.6E-12	-11.3E-09	-2.9E-09
72	-8.2E-09	-3.6E-09	-9.7E-09	-9.0E-09	-2.9E-09	-13.6E-09	-15.8E-09	-12.8E-09
73	-5.2E-09	-9.0E-09	-589.6E-12	-15.1E-09	-8.2E-09	173.3E-12	173.3E-12	-5.2E-09
74	-15.1E-09	4.0E-09	-589.6E-12	2.5E-09	-1.4E-09	5.5E-09	-4.4E-09	-9.7E-09
75	-7.5E-09	-11.3E-09	-9.0E-09	-14.3E-09	-2.9E-09	-7.5E-09	-3.6E-09	-4.4E-09
76	-1.4E-09	-5.9E-09	-10.5E-09	7.8E-09	-4.4E-09	2.5E-09	1.7E-09	-18.1E-09
77	2.5E-09	-11.3E-09	-9.7E-09	1.7E-09	-7.5E-09	-9.0E-09	2.5E-09	-16.6E-09
78	-5.9E-09	-12.8E-09	4.8E-09	-3.6E-09	-11.3E-09	-6.7E-09	173.3E-12	936.3E-12
79	-9.7E-09	3.2E-09	-589.6E-12	-5.9E-09	-9.0E-09	-4.4E-09	-7.5E-09	-9.0E-09
80	-589.6E-12	173.3E-12	-4.4E-09	-3.6E-09	-7.5E-09	-18.9E-09	7.8E-09	-7.5E-09
Statistics								
Min	-15.1E-09	-18.1E-09	-10.5E-09	-15.1E-09	-11.3E-09	-18.9E-09	-15.8E-09	-18.1E-09
Max	2.5E-09	4.0E-09	4.8E-09	7.8E-09	-1.4E-09	5.5E-09	7.8E-09	936.3E-12
Average	-5.8E-09	-6.5E-09	-3.9E-09	-4.7E-09	-5.9E-09	-5.2E-09	-3.0E-09	-8.5E-09
Std Deviation	4.8E-09	7.0E-09	5.3E-09	6.9E-09	3.1E-09	7.1E-09	6.7E-09	5.7E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current Low : IILIO[6]
Test conditions : Vin=0V . VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IILIO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-4.4E-09	-1.4E-09	-589.6E-12	173.3E-12	-8.2E-09	-5.2E-09	-14.3E-09	-6.7E-09
50_OUT_REF	-11.3E-09	-10.5E-09	-20.4E-09	-4.4E-09	-11.3E-09	-2.1E-09	-14.3E-09	-3.6E-09
ON_LDC samples								
51	1.7E-09	7.8E-09	2.5E-09	936.3E-12	-5.9E-09	-11.3E-09	-8.2E-09	-8.2E-09
52	-9.7E-09	-15.1E-09	-10.5E-09	-9.7E-09	-17.4E-09	173.3E-12	-8.2E-09	4.8E-09
53	-15.8E-09	-11.3E-09	-7.5E-09	-589.6E-12	-6.7E-09	-5.9E-09	2.5E-09	-13.6E-09
54	-12.8E-09	-12.8E-09	-589.6E-12	-589.6E-12	-1.4E-09	-5.2E-09	-9.7E-09	-9.7E-09
55	173.3E-12	-3.6E-09	-3.6E-09	-9.0E-09	-589.6E-12	-2.9E-09	-9.7E-09	936.3E-12
56	-12.8E-09	-10.5E-09	-9.7E-09	-14.3E-09	173.3E-12	173.3E-12	-22.0E-09	-5.9E-09
57	-14.3E-09	-5.9E-09	-17.4E-09	-12.0E-09	-11.3E-09	-14.3E-09	5.5E-09	-8.2E-09
58	-14.3E-09	-12.0E-09	-1.4E-09	7.0E-09	-1.4E-09	2.5E-09	-15.1E-09	-589.6E-12
59	-1.4E-09	-3.6E-09	-9.7E-09	-5.2E-09	-1.4E-09	-5.9E-09	-2.9E-09	-8.2E-09
60	-14.3E-09	-9.0E-09	-17.4E-09	-9.7E-09	8.6E-09	-16.6E-09	-18.9E-09	-19.7E-09
Statistics								
Min	-15.8E-09	-15.1E-09	-17.4E-09	-14.3E-09	-17.4E-09	-16.6E-09	-22.0E-09	-19.7E-09
Max	1.7E-09	7.8E-09	2.5E-09	7.0E-09	8.6E-09	2.5E-09	5.5E-09	4.8E-09
Average	-9.4E-09	-7.6E-09	-7.5E-09	-5.3E-09	-3.7E-09	-5.9E-09	-8.7E-09	-6.8E-09
Std Deviation	6.5E-09	6.3E-09	6.4E-09	6.4E-09	6.7E-09	6.1E-09	8.3E-09	6.8E-09

Measurements

IILIO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-4.4E-09	-1.4E-09	-589.6E-12	173.3E-12	-8.2E-09	-5.2E-09	-14.3E-09	-6.7E-09
50_OUT_REF	-11.3E-09	-10.5E-09	-20.4E-09	-4.4E-09	-11.3E-09	-2.1E-09	-14.3E-09	-3.6E-09
ON_HDC samples								
61	-15.1E-09	-2.1E-09	-2.9E-09	-6.7E-09	-18.9E-09	-15.1E-09	-15.8E-09	-16.6E-09
62	-12.8E-09	-11.3E-09	-1.4E-09	-16.6E-09	-9.0E-09	-2.1E-09	3.2E-09	-16.6E-09
63	-13.6E-09	173.3E-12	-10.5E-09	-6.7E-09	-6.7E-09	-10.5E-09	-2.9E-09	-7.5E-09
64	-5.9E-09	-13.6E-09	-5.2E-09	4.8E-09	173.3E-12	-17.4E-09	-2.1E-09	-10.5E-09
65	-4.4E-09	-11.3E-09	-7.5E-09	-6.7E-09	-15.1E-09	-9.0E-09	-2.9E-09	-589.6E-12
66	-11.3E-09	-9.7E-09	-3.6E-09	-11.3E-09	-15.8E-09	-12.8E-09	-9.7E-09	1.7E-09
67	-9.7E-09	-15.8E-09	-2.9E-09	-1.4E-09	1.7E-09	-3.6E-09	-6.7E-09	-11.3E-09
68	-2.1E-09	173.3E-12	-12.0E-09	-5.9E-09	-5.9E-09	-8.2E-09	-12.0E-09	-8.2E-09
69	-8.2E-09	-2.1E-09	-9.0E-09	-10.5E-09	-15.8E-09	173.3E-12	-5.9E-09	-5.2E-09
70	-15.8E-09	-12.0E-09	-4.4E-09	-6.7E-09	-4.4E-09	2.5E-09	-11.3E-09	-589.6E-12
Statistics								
Min	-15.8E-09	-15.8E-09	-12.0E-09	-16.6E-09	-18.9E-09	-17.4E-09	-15.8E-09	-16.6E-09
Max	-2.1E-09	173.3E-12	-1.4E-09	4.8E-09	1.7E-09	2.5E-09	3.2E-09	1.7E-09

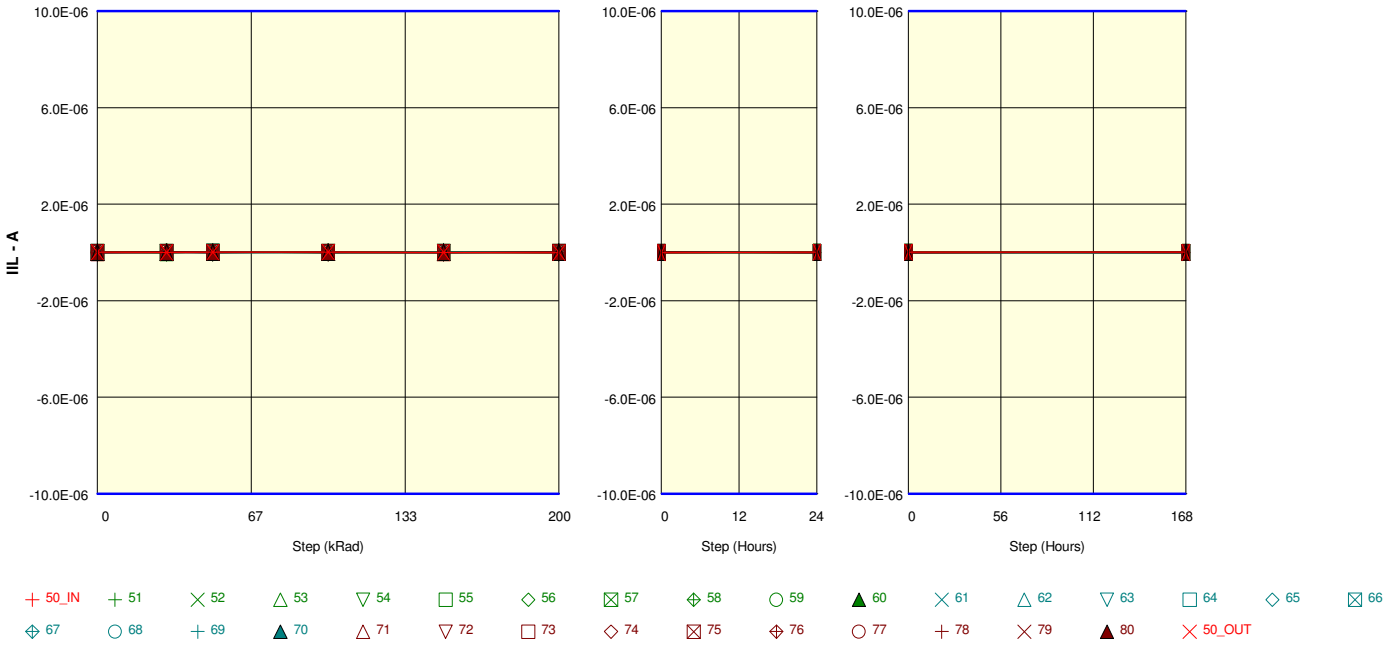
IILIO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-9.9E-09	-7.8E-09	-5.9E-09	-6.8E-09	-9.0E-09	-7.6E-09	-6.6E-09	-7.5E-09
Std Deviation	4.4E-09	5.8E-09	3.4E-09	5.4E-09	6.8E-09	6.3E-09	5.4E-09	6.1E-09

Measurements

IILIO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-4.4E-09	-1.4E-09	-589.6E-12	173.3E-12	-8.2E-09	-5.2E-09	-14.3E-09	-6.7E-09
50_OUT_REF	-11.3E-09	-10.5E-09	-20.4E-09	-4.4E-09	-11.3E-09	-2.1E-09	-14.3E-09	-3.6E-09
OFF samples								
71	2.5E-09	-12.0E-09	-12.0E-09	-2.9E-09	-15.8E-09	-4.4E-09	-5.9E-09	-2.1E-09
72	-2.9E-09	-14.3E-09	-12.8E-09	-9.0E-09	173.3E-12	-13.6E-09	-7.5E-09	-8.2E-09
73	-15.1E-09	-2.9E-09	-17.4E-09	-11.3E-09	-13.6E-09	-7.5E-09	-3.6E-09	-4.4E-09
74	-10.5E-09	-15.1E-09	-13.6E-09	-13.6E-09	-9.0E-09	936.3E-12	-22.7E-09	-11.3E-09
75	173.3E-12	-21.2E-09	-7.5E-09	173.3E-12	-8.2E-09	-3.6E-09	2.5E-09	-10.5E-09
76	-6.7E-09	-8.2E-09	-5.2E-09	-12.0E-09	-11.3E-09	-10.5E-09	-9.7E-09	-9.7E-09
77	-18.1E-09	-17.4E-09	1.7E-09	936.3E-12	-6.7E-09	936.3E-12	-8.2E-09	-11.3E-09
78	-9.7E-09	-9.0E-09	-8.2E-09	-15.1E-09	-3.6E-09	-5.2E-09	-5.2E-09	-8.2E-09
79	-16.6E-09	-9.7E-09	-14.3E-09	-10.5E-09	-13.6E-09	-4.4E-09	1.7E-09	-11.3E-09
80	-14.3E-09	-9.0E-09	-6.7E-09	-8.2E-09	-2.9E-09	-9.0E-09	-9.0E-09	-1.4E-09
Statistics								
Min	-18.1E-09	-21.2E-09	-17.4E-09	-15.1E-09	-15.8E-09	-13.6E-09	-22.7E-09	-11.3E-09
Max	2.5E-09	-2.9E-09	1.7E-09	936.3E-12	173.3E-12	936.3E-12	2.5E-09	-1.4E-09
Average	-9.1E-09	-11.9E-09	-9.6E-09	-8.1E-09	-8.4E-09	-5.6E-09	-6.8E-09	-7.8E-09
Std Deviation	6.8E-09	5.0E-09	5.3E-09	5.4E-09	5.0E-09	4.4E-09	6.6E-09	3.6E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current Low : IILIO[7]
Test conditions : Vin=0V . VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IILIO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-3.6E-09	2.5E-09	936.3E-12	4.8E-09	-2.1E-09	4.0E-09	4.8E-09	7.0E-09
50_OUT_REF	8.6E-09	1.7E-09	10.9E-09	13.1E-09	-2.1E-09	-11.3E-09	12.4E-09	5.5E-09
ON_LDC samples								
51	173.3E-12	7.0E-09	-1.4E-09	1.7E-09	7.8E-09	-589.6E-12	-7.5E-09	7.0E-09
52	936.3E-12	-12.8E-09	8.6E-09	-2.1E-09	-4.4E-09	2.5E-09	-2.1E-09	3.2E-09
53	6.3E-09	-2.9E-09	1.7E-09	7.8E-09	10.9E-09	173.3E-12	3.2E-09	2.5E-09
54	7.0E-09	5.5E-09	-5.2E-09	9.3E-09	3.2E-09	9.3E-09	13.1E-09	-2.9E-09
55	10.1E-09	-15.8E-09	12.4E-09	173.3E-12	7.8E-09	-8.2E-09	9.3E-09	8.6E-09
56	2.5E-09	936.3E-12	-2.1E-09	-5.2E-09	936.3E-12	-8.2E-09	-12.0E-09	-7.5E-09
57	936.3E-12	-4.4E-09	10.1E-09	-6.7E-09	-2.9E-09	-5.2E-09	4.0E-09	-2.9E-09
58	-589.6E-12	6.3E-09	-589.6E-12	4.8E-09	936.3E-12	4.8E-09	4.0E-09	-9.0E-09
59	173.3E-12	17.0E-09	9.3E-09	-2.1E-09	-2.9E-09	-2.9E-09	3.2E-09	4.0E-09
60	6.3E-09	1.7E-09	-2.1E-09	-589.6E-12	15.4E-09	5.5E-09	11.6E-09	6.3E-09
Statistics								
Min	-589.6E-12	-15.8E-09	-5.2E-09	-6.7E-09	-4.4E-09	-8.2E-09	-12.0E-09	-9.0E-09
Max	10.1E-09	17.0E-09	12.4E-09	9.3E-09	15.4E-09	9.3E-09	13.1E-09	8.6E-09
Average	3.4E-09	249.6E-12	3.1E-09	707.4E-12	3.7E-09	-284.4E-12	2.7E-09	936.3E-12
Std Deviation	3.5E-09	9.2E-09	6.0E-09	5.0E-09	6.2E-09	5.6E-09	7.6E-09	5.8E-09

Measurements

IILIO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-3.6E-09	2.5E-09	936.3E-12	4.8E-09	-2.1E-09	4.0E-09	4.8E-09	7.0E-09
50_OUT_REF	8.6E-09	1.7E-09	10.9E-09	13.1E-09	-2.1E-09	-11.3E-09	12.4E-09	5.5E-09
ON_HDC samples								
61	4.8E-09	173.3E-12	173.3E-12	173.3E-12	173.3E-12	-2.9E-09	2.5E-09	-12.0E-09
62	-7.5E-09	-2.1E-09	-8.2E-09	173.3E-12	1.7E-09	6.3E-09	3.2E-09	4.8E-09
63	4.0E-09	10.9E-09	-5.2E-09	-1.4E-09	5.5E-09	6.3E-09	-11.3E-09	-6.7E-09
64	-4.4E-09	5.5E-09	11.6E-09	-2.1E-09	7.0E-09	6.3E-09	4.8E-09	4.0E-09
65	-10.5E-09	173.3E-12	-6.7E-09	-2.1E-09	-12.0E-09	4.0E-09	936.3E-12	3.2E-09
66	-6.7E-09	10.9E-09	10.1E-09	-8.2E-09	3.2E-09	-4.4E-09	-2.1E-09	-5.9E-09
67	-2.9E-09	-11.3E-09	5.5E-09	4.8E-09	6.3E-09	-9.0E-09	-3.6E-09	-5.2E-09
68	1.7E-09	4.0E-09	-2.9E-09	-3.6E-09	-11.3E-09	7.0E-09	-6.7E-09	-2.9E-09
69	-10.5E-09	-3.6E-09	-9.0E-09	936.3E-12	936.3E-12	-589.6E-12	173.3E-12	5.5E-09
70	-1.4E-09	-589.6E-12	1.7E-09	-6.7E-09	173.3E-12	936.3E-12	173.3E-12	-9.0E-09
Statistics								
Min	-10.5E-09	-11.3E-09	-9.0E-09	-8.2E-09	-12.0E-09	-9.0E-09	-11.3E-09	-12.0E-09
Max	4.8E-09	10.9E-09	11.6E-09	4.8E-09	7.0E-09	7.0E-09	4.8E-09	5.5E-09

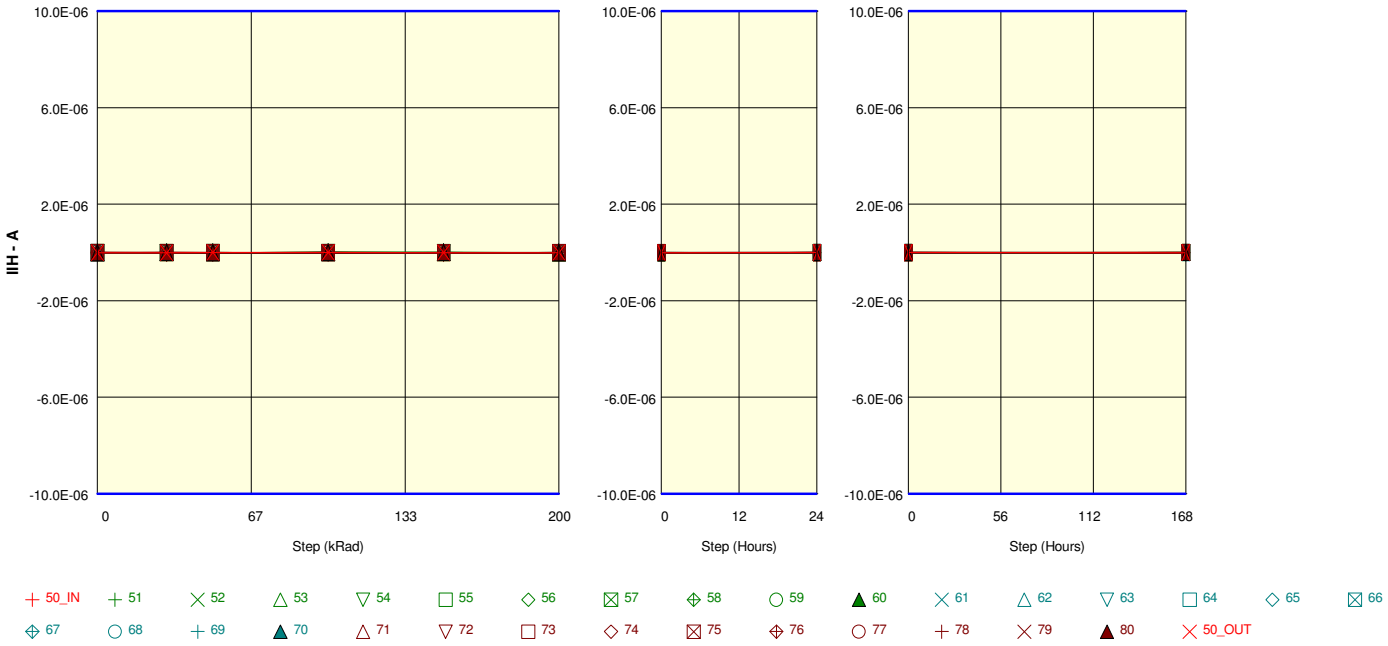
IILIO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-3.3E-09	1.4E-09	-284.4E-12	-1.8E-09	173.3E-12	1.4E-09	-1.2E-09	-2.4E-09
Std Deviation	5.3E-09	6.4E-09	7.1E-09	3.6E-09	6.4E-09	5.2E-09	4.6E-09	6.0E-09

Measurements

IILIO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-3.6E-09	2.5E-09	936.3E-12	4.8E-09	-2.1E-09	4.0E-09	4.8E-09	7.0E-09
50_OUT_REF	8.6E-09	1.7E-09	10.9E-09	13.1E-09	-2.1E-09	-11.3E-09	12.4E-09	5.5E-09
OFF samples								
71	936.3E-12	6.3E-09	-2.9E-09	4.8E-09	-11.3E-09	-6.7E-09	6.3E-09	7.0E-09
72	-589.6E-12	936.3E-12	4.8E-09	4.8E-09	-589.6E-12	-1.4E-09	-6.7E-09	-9.7E-09
73	-10.5E-09	-5.9E-09	1.7E-09	173.3E-12	-8.2E-09	4.8E-09	4.0E-09	1.7E-09
74	13.9E-09	7.0E-09	-1.4E-09	-14.3E-09	-8.2E-09	7.0E-09	-3.6E-09	-1.4E-09
75	2.5E-09	9.3E-09	-2.9E-09	8.6E-09	936.3E-12	7.8E-09	7.8E-09	-4.4E-09
76	7.8E-09	8.6E-09	7.0E-09	7.0E-09	-2.9E-09	8.6E-09	936.3E-12	936.3E-12
77	-5.2E-09	-2.9E-09	-7.5E-09	-2.1E-09	173.3E-12	-5.2E-09	1.7E-09	7.0E-09
78	2.5E-09	14.7E-09	7.8E-09	-9.7E-09	-3.6E-09	-5.9E-09	-9.0E-09	7.8E-09
79	-9.7E-09	-12.0E-09	-6.7E-09	5.5E-09	936.3E-12	13.1E-09	173.3E-12	-2.9E-09
80	173.3E-12	-589.6E-12	4.0E-09	936.3E-12	1.7E-09	173.3E-12	-6.7E-09	12.4E-09
Statistics								
Min	-10.5E-09	-12.0E-09	-7.5E-09	-14.3E-09	-11.3E-09	-6.7E-09	-9.0E-09	-9.7E-09
Max	13.9E-09	14.7E-09	7.8E-09	8.6E-09	1.7E-09	13.1E-09	7.8E-09	12.4E-09
Average	173.3E-12	2.5E-09	402.2E-12	554.8E-12	-3.1E-09	2.2E-09	-513.3E-12	1.9E-09
Std Deviation	7.1E-09	7.7E-09	5.2E-09	7.1E-09	4.4E-09	6.6E-09	5.5E-09	6.4E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current High : IIHALE
Test conditions : Vin= VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IIHALE	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-18.1E-09	-2.9E-09	936.3E-12	-589.6E-12	-1.4E-09	-589.6E-12	-9.7E-09	5.5E-09
50_OUT_REF	-9.7E-09	-15.8E-09	-2.9E-09	1.7E-09	-8.2E-09	-9.0E-09	-2.9E-09	-3.6E-09
ON_LDC samples								
51	-9.7E-09	-4.4E-09	-9.7E-09	6.3E-09	-1.4E-09	2.5E-09	-9.0E-09	-9.7E-09
52	-15.8E-09	-14.3E-09	-8.2E-09	-11.3E-09	-2.1E-09	-4.4E-09	-15.8E-09	-589.6E-12
53	-15.8E-09	-5.2E-09	4.8E-09	-3.6E-09	-4.4E-09	-9.7E-09	4.0E-09	-4.4E-09
54	-7.5E-09	-9.0E-09	936.3E-12	-15.8E-09	-12.0E-09	-7.5E-09	173.3E-12	-2.9E-09
55	2.5E-09	-12.8E-09	-9.7E-09	-15.1E-09	-9.7E-09	-13.6E-09	-9.7E-09	-2.9E-09
56	-13.6E-09	-1.4E-09	-3.6E-09	-2.1E-09	-6.7E-09	-10.5E-09	-8.2E-09	936.3E-12
57	-3.6E-09	-589.6E-12	-9.0E-09	-589.6E-12	3.2E-09	-16.6E-09	-5.2E-09	-6.7E-09
58	-10.5E-09	-9.7E-09	-7.5E-09	-8.2E-09	-10.5E-09	-6.7E-09	-12.0E-09	-9.7E-09
59	1.7E-09	-8.2E-09	-9.0E-09	173.3E-12	-9.0E-09	-15.1E-09	-8.2E-09	-7.5E-09
60	-7.5E-09	-5.2E-09	-12.0E-09	5.5E-09	5.5E-09	-15.8E-09	-5.2E-09	1.7E-09
Statistics								
Min	-15.8E-09	-14.3E-09	-12.0E-09	-15.8E-09	-12.0E-09	-16.6E-09	-15.8E-09	-9.7E-09
Max	2.5E-09	-589.6E-12	4.8E-09	6.3E-09	5.5E-09	2.5E-09	4.0E-09	1.7E-09
Average	-8.0E-09	-7.1E-09	-6.3E-09	-4.5E-09	-4.7E-09	-9.7E-09	-6.9E-09	-4.2E-09
Std Deviation	6.2E-09	4.3E-09	5.1E-09	7.5E-09	5.7E-09	5.7E-09	5.4E-09	4.0E-09

Measurements

IIHALE	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-18.1E-09	-2.9E-09	936.3E-12	-589.6E-12	-1.4E-09	-589.6E-12	-9.7E-09	5.5E-09
50_OUT_REF	-9.7E-09	-15.8E-09	-2.9E-09	1.7E-09	-8.2E-09	-9.0E-09	-2.9E-09	-3.6E-09
ON_HDC samples								
61	-5.9E-09	-12.8E-09	-12.8E-09	-1.4E-09	-9.7E-09	-4.4E-09	-4.4E-09	-9.0E-09
62	-7.5E-09	1.7E-09	-4.4E-09	-9.7E-09	-4.4E-09	-6.7E-09	-3.6E-09	-3.6E-09
63	4.0E-09	-10.5E-09	-1.4E-09	-15.1E-09	-12.0E-09	-7.5E-09	1.7E-09	-589.6E-12
64	-6.7E-09	-5.9E-09	-7.5E-09	-3.6E-09	-5.9E-09	1.7E-09	-2.9E-09	173.3E-12
65	-3.6E-09	-5.2E-09	-8.2E-09	-1.4E-09	-8.2E-09	-12.8E-09	-5.2E-09	-2.1E-09
66	-9.7E-09	173.3E-12	-5.2E-09	-1.4E-09	-5.2E-09	-6.7E-09	-2.1E-09	-11.3E-09
67	-589.6E-12	-5.2E-09	-11.3E-09	-7.5E-09	-9.7E-09	-2.1E-09	-13.6E-09	-13.6E-09
68	-5.9E-09	-9.0E-09	-6.7E-09	-5.2E-09	1.7E-09	2.5E-09	-4.4E-09	-17.4E-09
69	-13.6E-09	2.5E-09	-1.4E-09	-8.2E-09	-9.0E-09	-2.1E-09	-2.1E-09	-4.4E-09
70	-10.5E-09	-9.0E-09	4.0E-09	-589.6E-12	173.3E-12	-5.9E-09	-11.3E-09	4.0E-09
Statistics								
Min	-13.6E-09	-12.8E-09	-12.8E-09	-15.1E-09	-12.0E-09	-12.8E-09	-13.6E-09	-17.4E-09
Max	4.0E-09	2.5E-09	4.0E-09	-589.6E-12	1.7E-09	2.5E-09	1.7E-09	4.0E-09

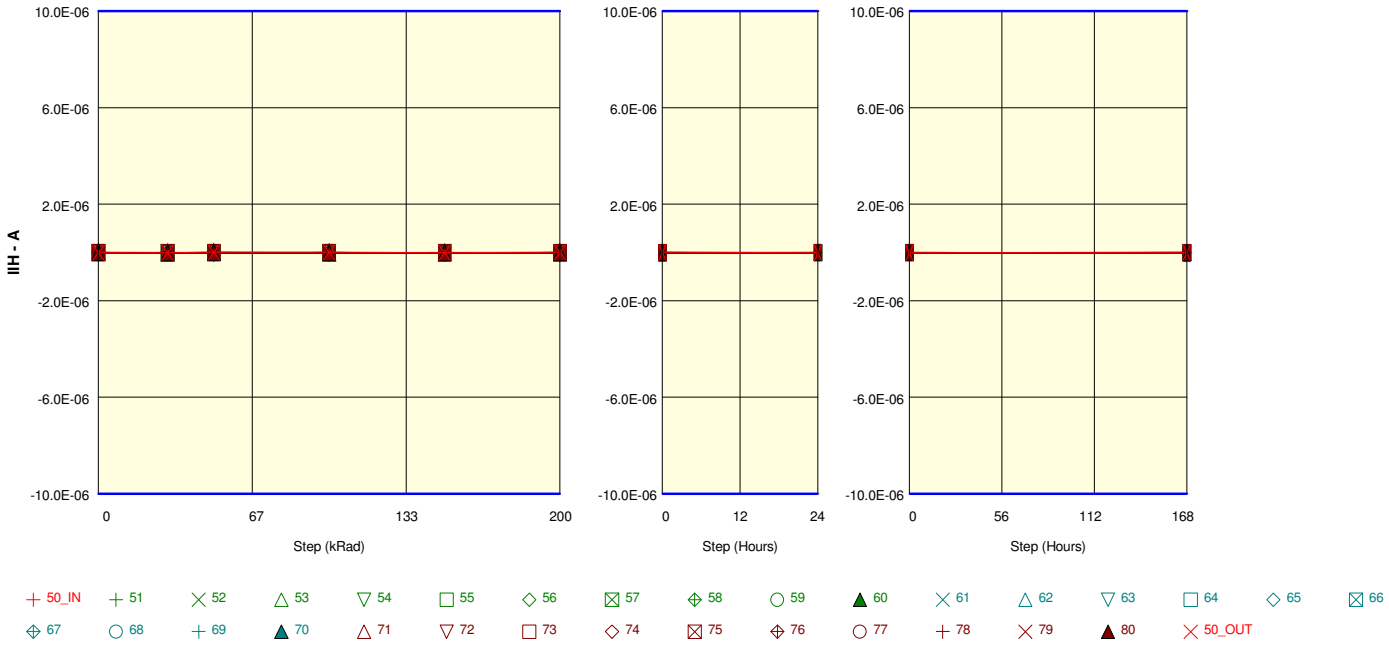
IIHALE	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-6.0E-09	-5.3E-09	-5.5E-09	-5.4E-09	-6.2E-09	-4.4E-09	-4.8E-09	-5.8E-09
Std Deviation	4.8E-09	5.0E-09	4.7E-09	4.5E-09	4.2E-09	4.3E-09	4.3E-09	6.4E-09

Measurements

IIHALE	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-18.1E-09	-2.9E-09	936.3E-12	-589.6E-12	-1.4E-09	-589.6E-12	-9.7E-09	5.5E-09
50_OUT_REF	-9.7E-09	-15.8E-09	-2.9E-09	1.7E-09	-8.2E-09	-9.0E-09	-2.9E-09	-3.6E-09
OFF samples								
71	-13.6E-09	-10.5E-09	-6.7E-09	-5.9E-09	-10.5E-09	-4.4E-09	-10.5E-09	-2.9E-09
72	-1.4E-09	-9.7E-09	-4.4E-09	-4.4E-09	-15.8E-09	-9.0E-09	2.5E-09	936.3E-12
73	173.3E-12	173.3E-12	-2.9E-09	-12.0E-09	-7.5E-09	-10.5E-09	3.2E-09	-5.2E-09
74	-6.7E-09	-12.0E-09	-12.8E-09	7.0E-09	-18.9E-09	-7.5E-09	-7.5E-09	-9.0E-09
75	-589.6E-12	-2.1E-09	-11.3E-09	-12.8E-09	-7.5E-09	173.3E-12	-12.8E-09	-3.6E-09
76	-18.9E-09	-16.6E-09	-12.8E-09	-9.0E-09	-1.4E-09	-4.4E-09	-10.5E-09	-7.5E-09
77	-11.3E-09	-5.9E-09	-3.6E-09	-2.9E-09	-8.2E-09	-6.7E-09	-2.9E-09	-5.2E-09
78	-2.1E-09	7.8E-09	-589.6E-12	-15.1E-09	-11.3E-09	-589.6E-12	5.5E-09	-16.6E-09
79	7.0E-09	-4.4E-09	-12.8E-09	-5.2E-09	-15.1E-09	-2.9E-09	-7.5E-09	-5.9E-09
80	-9.7E-09	-4.4E-09	-10.5E-09	-7.5E-09	-2.1E-09	-12.0E-09	-1.4E-09	1.7E-09
Statistics								
Min	-18.9E-09	-16.6E-09	-12.8E-09	-15.1E-09	-18.9E-09	-12.0E-09	-12.8E-09	-16.6E-09
Max	7.0E-09	7.8E-09	-589.6E-12	7.0E-09	-1.4E-09	173.3E-12	5.5E-09	1.7E-09
Average	-5.7E-09	-5.8E-09	-7.8E-09	-6.8E-09	-9.8E-09	-5.8E-09	-4.2E-09	-5.3E-09
Std Deviation	7.3E-09	6.6E-09	4.5E-09	5.9E-09	5.4E-09	3.9E-09	6.2E-09	4.9E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current High : IIHCE#
Test conditions : Vin= VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IIHCE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-5.2E-09	936.3E-12	-589.6E-12	-589.6E-12	-2.9E-09	-20.4E-09	-17.4E-09	-5.2E-09
50_OUT_REF	-12.0E-09	-13.6E-09	5.5E-09	7.8E-09	-12.0E-09	7.8E-09	-12.8E-09	-6.7E-09
ON_LDC samples								
51	-13.6E-09	-16.6E-09	-10.5E-09	-2.9E-09	-11.3E-09	-13.6E-09	-3.6E-09	-5.2E-09
52	-8.2E-09	2.5E-09	-13.6E-09	-11.3E-09	-5.2E-09	-5.9E-09	-9.7E-09	-11.3E-09
53	-6.7E-09	-14.3E-09	-6.7E-09	-9.0E-09	-11.3E-09	-15.1E-09	2.5E-09	-9.0E-09
54	-8.2E-09	-8.2E-09	-9.7E-09	-8.2E-09	-9.0E-09	-16.6E-09	-11.3E-09	-6.7E-09
55	1.7E-09	-8.2E-09	-9.0E-09	-3.6E-09	-4.4E-09	-18.1E-09	-7.5E-09	-7.5E-09
56	-7.5E-09	-9.0E-09	-9.7E-09	936.3E-12	-9.0E-09	-3.6E-09	-11.3E-09	-15.8E-09
57	-12.0E-09	-7.5E-09	-5.9E-09	-12.0E-09	-6.7E-09	-11.3E-09	-18.9E-09	-3.6E-09
58	-18.1E-09	-14.3E-09	-5.9E-09	1.7E-09	-6.7E-09	-11.3E-09	-4.4E-09	-7.5E-09
59	-9.7E-09	-6.7E-09	7.8E-09	-12.8E-09	-2.9E-09	-2.9E-09	-589.6E-12	-15.1E-09
60	-2.9E-09	-15.1E-09	-3.6E-09	-3.6E-09	-24.2E-09	936.3E-12	936.3E-12	-10.5E-09
Statistics								
Min	-18.1E-09	-16.6E-09	-13.6E-09	-12.8E-09	-24.2E-09	-18.1E-09	-18.9E-09	-15.8E-09
Max	1.7E-09	2.5E-09	7.8E-09	1.7E-09	-2.9E-09	936.3E-12	2.5E-09	-3.6E-09
Average	-8.5E-09	-9.7E-09	-6.7E-09	-6.1E-09	-9.1E-09	-9.7E-09	-6.4E-09	-9.2E-09
Std Deviation	5.2E-09	5.4E-09	5.5E-09	5.0E-09	5.7E-09	6.2E-09	6.3E-09	3.8E-09

Measurements

IIHCE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-5.2E-09	936.3E-12	-589.6E-12	-589.6E-12	-2.9E-09	-20.4E-09	-17.4E-09	-5.2E-09
50_OUT_REF	-12.0E-09	-13.6E-09	5.5E-09	7.8E-09	-12.0E-09	7.8E-09	-12.8E-09	-6.7E-09
ON_HDC samples								
61	-11.3E-09	-16.6E-09	2.5E-09	-2.1E-09	-9.7E-09	-18.1E-09	-8.2E-09	-9.7E-09
62	-8.2E-09	-15.1E-09	-15.1E-09	-10.5E-09	-10.5E-09	-1.4E-09	-2.9E-09	-10.5E-09
63	-9.7E-09	-1.4E-09	-12.0E-09	-16.6E-09	173.3E-12	-11.3E-09	-11.3E-09	-18.9E-09
64	-5.9E-09	-6.7E-09	-1.4E-09	-7.5E-09	-9.0E-09	1.7E-09	-5.9E-09	-2.1E-09
65	-12.8E-09	-17.4E-09	-4.4E-09	-589.6E-12	-11.3E-09	-17.4E-09	-8.2E-09	-18.1E-09
66	-17.4E-09	-14.3E-09	2.5E-09	-6.7E-09	-2.9E-09	-12.8E-09	-1.4E-09	-9.7E-09
67	-4.4E-09	-4.4E-09	-22.0E-09	-9.0E-09	-9.0E-09	-4.4E-09	-13.6E-09	-5.9E-09
68	-5.2E-09	-9.7E-09	-14.3E-09	173.3E-12	-16.6E-09	-1.4E-09	-7.5E-09	-5.2E-09
69	5.5E-09	-2.9E-09	-5.2E-09	-3.6E-09	-15.1E-09	-589.6E-12	-18.1E-09	-5.9E-09
70	-2.9E-09	-6.7E-09	-12.8E-09	-16.6E-09	-8.2E-09	-1.4E-09	-4.4E-09	-3.6E-09
Statistics								
Min	-17.4E-09	-17.4E-09	-22.0E-09	-16.6E-09	-16.6E-09	-18.1E-09	-18.1E-09	-18.9E-09
Max	5.5E-09	-1.4E-09	2.5E-09	173.3E-12	173.3E-12	1.7E-09	-1.4E-09	-2.1E-09

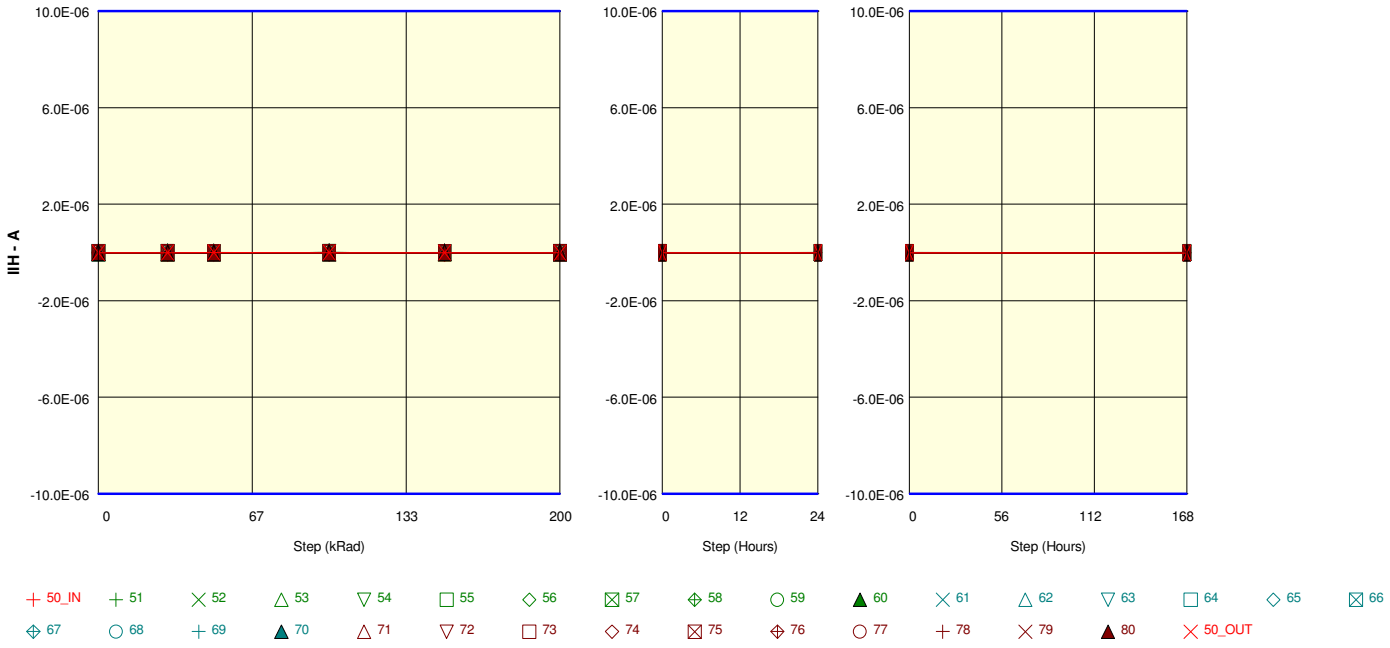
IIHCE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-7.2E-09	-9.5E-09	-8.2E-09	-7.3E-09	-9.2E-09	-6.7E-09	-8.1E-09	-9.0E-09
Std Deviation	5.9E-09	5.6E-09	7.8E-09	5.7E-09	4.7E-09	7.1E-09	4.8E-09	5.4E-09

Measurements

IIHCE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-5.2E-09	936.3E-12	-589.6E-12	-589.6E-12	-2.9E-09	-20.4E-09	-17.4E-09	-5.2E-09
50_OUT_REF	-12.0E-09	-13.6E-09	5.5E-09	7.8E-09	-12.0E-09	7.8E-09	-12.8E-09	-6.7E-09
OFF samples								
71	-16.6E-09	-4.4E-09	173.3E-12	-10.5E-09	-9.0E-09	-4.4E-09	-12.0E-09	-11.3E-09
72	-9.0E-09	3.2E-09	-2.9E-09	-7.5E-09	-5.9E-09	-7.5E-09	173.3E-12	-10.5E-09
73	-1.4E-09	-9.7E-09	-9.0E-09	-2.1E-09	-18.9E-09	2.5E-09	-1.4E-09	-18.1E-09
74	2.5E-09	-8.2E-09	-15.8E-09	-9.7E-09	-15.8E-09	-7.5E-09	-15.1E-09	-12.0E-09
75	-5.2E-09	-12.0E-09	-5.9E-09	-5.2E-09	-12.0E-09	-9.7E-09	-9.0E-09	-11.3E-09
76	-2.9E-09	-3.6E-09	-7.5E-09	-10.5E-09	-16.6E-09	-3.6E-09	-10.5E-09	-2.1E-09
77	-11.3E-09	4.0E-09	-15.8E-09	936.3E-12	-18.9E-09	-15.8E-09	-3.6E-09	-1.4E-09
78	-3.6E-09	936.3E-12	-11.3E-09	-12.8E-09	-8.2E-09	-11.3E-09	-14.3E-09	7.0E-09
79	-1.4E-09	-7.5E-09	-5.9E-09	-8.2E-09	-2.1E-09	173.3E-12	-12.0E-09	-6.7E-09
80	-589.6E-12	-15.1E-09	-4.4E-09	-13.6E-09	-9.7E-09	-13.6E-09	-5.2E-09	-11.3E-09
Statistics								
Min	-16.6E-09	-15.1E-09	-15.8E-09	-13.6E-09	-18.9E-09	-15.8E-09	-15.1E-09	-18.1E-09
Max	2.5E-09	4.0E-09	173.3E-12	936.3E-12	-2.1E-09	2.5E-09	173.3E-12	7.0E-09
Average	-4.9E-09	-5.2E-09	-7.8E-09	-7.9E-09	-11.7E-09	-7.1E-09	-8.3E-09	-7.8E-09
Std Deviation	5.5E-09	6.1E-09	5.0E-09	4.4E-09	5.4E-09	5.5E-09	5.2E-09	6.8E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current High : IIHCLE
Test conditions : Vin= VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IIHCLE	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-12.8E-09	-13.6E-09	-20.4E-09	-14.3E-09	-15.8E-09	-12.0E-09	-7.5E-09	-10.5E-09
50_OUT_REF	-10.5E-09	-9.0E-09	-2.9E-09	-9.0E-09	-5.9E-09	-17.4E-09	-8.2E-09	-22.7E-09
ON_LDC samples								
51	-7.5E-09	-9.0E-09	-13.6E-09	-2.9E-09	-15.8E-09	-12.0E-09	-16.6E-09	-9.0E-09
52	173.3E-12	-11.3E-09	-12.0E-09	-6.7E-09	173.3E-12	-20.4E-09	-12.8E-09	-10.5E-09
53	-9.7E-09	-14.3E-09	-22.0E-09	-18.1E-09	-20.4E-09	-15.8E-09	-10.5E-09	-2.9E-09
54	-9.0E-09	-22.7E-09	-21.2E-09	-19.7E-09	-16.6E-09	-9.0E-09	-13.6E-09	-9.0E-09
55	-12.0E-09	-9.7E-09	-7.5E-09	936.3E-12	-14.3E-09	-6.7E-09	-8.2E-09	-12.0E-09
56	-18.1E-09	-5.2E-09	-12.8E-09	-7.5E-09	-23.5E-09	-21.2E-09	-18.1E-09	-12.8E-09
57	-22.7E-09	-16.6E-09	-11.3E-09	-11.3E-09	-12.0E-09	-19.7E-09	-6.7E-09	-4.4E-09
58	-7.5E-09	-5.2E-09	-3.6E-09	-2.9E-09	-12.8E-09	-19.7E-09	-18.9E-09	-12.8E-09
59	-4.4E-09	-14.3E-09	-14.3E-09	-5.9E-09	-13.6E-09	-15.1E-09	-18.9E-09	-12.8E-09
60	-10.5E-09	-12.8E-09	-17.4E-09	-2.1E-09	-5.9E-09	-14.3E-09	-12.8E-09	-6.7E-09
Statistics								
Min	-22.7E-09	-22.7E-09	-22.0E-09	-19.7E-09	-23.5E-09	-21.2E-09	-18.9E-09	-12.8E-09
Max	173.3E-12	-5.2E-09	-3.6E-09	936.3E-12	173.3E-12	-6.7E-09	-6.7E-09	-2.9E-09
Average	-10.1E-09	-12.1E-09	-13.6E-09	-7.6E-09	-13.5E-09	-15.4E-09	-13.7E-09	-9.3E-09
Std Deviation	6.2E-09	5.1E-09	5.4E-09	6.5E-09	6.4E-09	4.7E-09	4.2E-09	3.4E-09

Measurements

IIHCLE	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-12.8E-09	-13.6E-09	-20.4E-09	-14.3E-09	-15.8E-09	-12.0E-09	-7.5E-09	-10.5E-09
50_OUT_REF	-10.5E-09	-9.0E-09	-2.9E-09	-9.0E-09	-5.9E-09	-17.4E-09	-8.2E-09	-22.7E-09
ON_HDC samples								
61	-12.0E-09	-12.8E-09	-9.7E-09	-16.6E-09	-14.3E-09	-2.9E-09	-3.6E-09	-6.7E-09
62	-9.0E-09	-5.2E-09	-9.0E-09	-15.8E-09	-8.2E-09	-12.0E-09	-14.3E-09	-14.3E-09
63	-2.9E-09	-21.2E-09	-13.6E-09	-2.9E-09	-19.7E-09	-4.4E-09	-6.7E-09	-23.5E-09
64	-12.0E-09	-10.5E-09	-11.3E-09	-12.8E-09	-12.0E-09	-9.0E-09	-9.0E-09	-7.5E-09
65	-13.6E-09	-3.6E-09	1.7E-09	-28.8E-09	-17.4E-09	-9.0E-09	-12.8E-09	-7.5E-09
66	-19.7E-09	-2.9E-09	-19.7E-09	-589.6E-12	-5.9E-09	-8.2E-09	-8.2E-09	-17.4E-09
67	-12.8E-09	-5.9E-09	4.8E-09	-12.0E-09	-17.4E-09	-9.7E-09	-12.8E-09	-21.2E-09
68	-14.3E-09	-13.6E-09	-22.7E-09	-7.5E-09	-12.0E-09	-4.4E-09	-2.1E-09	-12.8E-09
69	-5.2E-09	-14.3E-09	-25.8E-09	-5.9E-09	-22.0E-09	-3.6E-09	-10.5E-09	-4.4E-09
70	-9.0E-09	-6.7E-09	-17.4E-09	-4.4E-09	-8.2E-09	-10.5E-09	-19.7E-09	-16.6E-09
Statistics								
Min	-19.7E-09	-21.2E-09	-25.8E-09	-28.8E-09	-22.0E-09	-12.0E-09	-19.7E-09	-23.5E-09
Max	-2.9E-09	-2.9E-09	4.8E-09	-589.6E-12	-5.9E-09	-2.9E-09	-2.1E-09	-4.4E-09

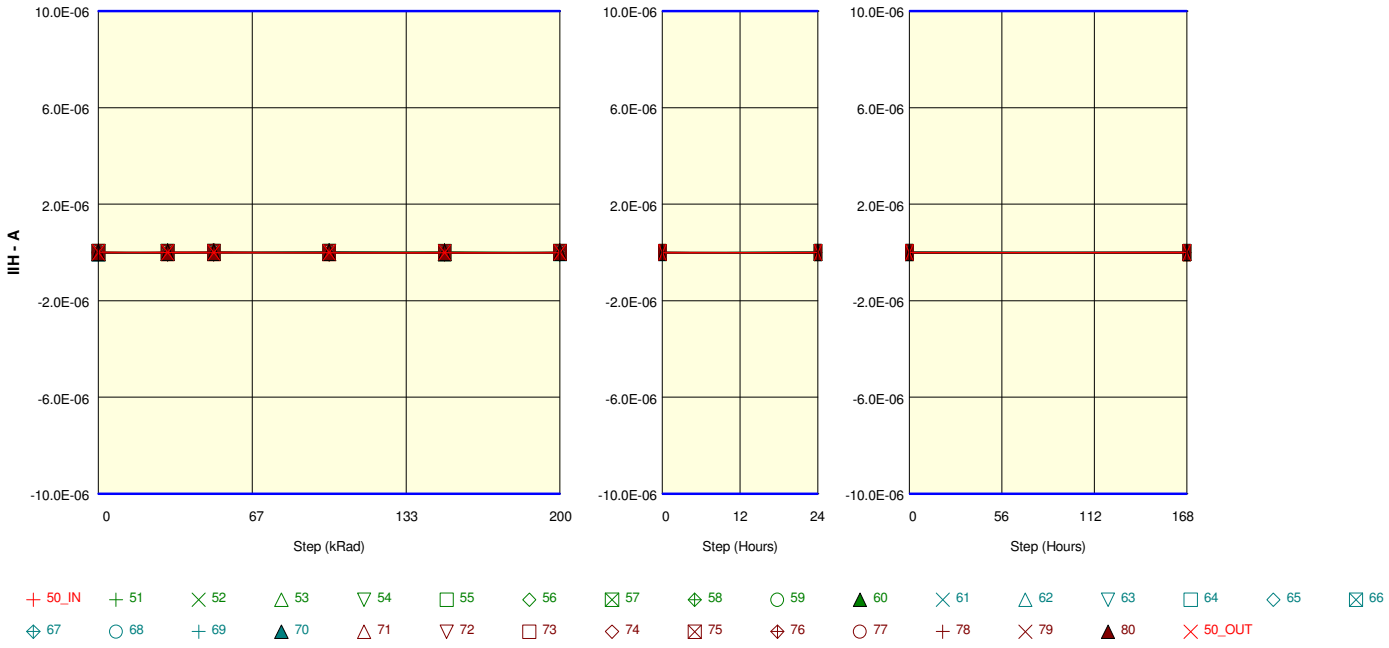
IIHCLE	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-11.0E-09	-9.7E-09	-12.3E-09	-10.7E-09	-13.7E-09	-7.4E-09	-10.0E-09	-13.2E-09
Std Deviation	4.5E-09	5.5E-09	9.4E-09	8.0E-09	5.1E-09	3.1E-09	5.0E-09	6.2E-09

Measurements

IIHCLE	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-12.8E-09	-13.6E-09	-20.4E-09	-14.3E-09	-15.8E-09	-12.0E-09	-7.5E-09	-10.5E-09
50_OUT_REF	-10.5E-09	-9.0E-09	-2.9E-09	-9.0E-09	-5.9E-09	-17.4E-09	-8.2E-09	-22.7E-09
OFF samples								
71	-7.5E-09	-16.6E-09	-8.2E-09	-10.5E-09	-16.6E-09	-17.4E-09	-20.4E-09	-589.6E-12
72	-18.1E-09	-11.3E-09	-5.9E-09	-5.9E-09	-8.2E-09	-12.0E-09	-9.7E-09	-11.3E-09
73	-8.2E-09	-5.2E-09	-18.1E-09	-8.2E-09	-8.2E-09	-12.8E-09	-12.8E-09	-17.4E-09
74	-5.2E-09	-12.8E-09	-18.1E-09	-18.9E-09	-9.0E-09	-15.8E-09	-19.7E-09	1.7E-09
75	-21.2E-09	-13.6E-09	-18.9E-09	-14.3E-09	-24.2E-09	-5.2E-09	-1.4E-09	-15.8E-09
76	-18.1E-09	-15.1E-09	-6.7E-09	-16.6E-09	-14.3E-09	-9.0E-09	-14.3E-09	-15.1E-09
77	-9.7E-09	-2.9E-09	-11.3E-09	-4.4E-09	-21.2E-09	-3.6E-09	-16.6E-09	-16.6E-09
78	-18.1E-09	-4.4E-09	-10.5E-09	936.3E-12	-6.7E-09	-16.6E-09	-7.5E-09	-21.2E-09
79	-4.4E-09	-12.0E-09	-7.5E-09	-16.6E-09	-12.0E-09	-12.0E-09	-13.6E-09	-16.6E-09
80	-8.2E-09	-16.6E-09	-20.4E-09	-14.3E-09	-4.4E-09	-11.3E-09	-20.4E-09	-18.1E-09
Statistics								
Min	-21.2E-09	-16.6E-09	-20.4E-09	-18.9E-09	-24.2E-09	-17.4E-09	-20.4E-09	-21.2E-09
Max	-4.4E-09	-2.9E-09	-5.9E-09	936.3E-12	-4.4E-09	-3.6E-09	-1.4E-09	1.7E-09
Average	-11.9E-09	-11.0E-09	-12.6E-09	-10.9E-09	-12.5E-09	-11.6E-09	-13.6E-09	-13.1E-09
Std Deviation	6.0E-09	4.8E-09	5.4E-09	6.1E-09	6.2E-09	4.4E-09	5.9E-09	7.2E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current High : IIHRE#
Test conditions : Vin= VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IIHRE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-7.5E-09	1.7E-09	1.7E-09	-1.4E-09	-9.0E-09	-7.5E-09	-5.2E-09	-9.7E-09
50_OUT_REF	5.5E-09	3.2E-09	-5.9E-09	-3.6E-09	-8.2E-09	-5.2E-09	3.2E-09	936.3E-12
ON_LDC samples								
51	-7.5E-09	173.3E-12	-2.1E-09	-12.8E-09	4.0E-09	-7.5E-09	-5.9E-09	4.8E-09
52	-10.5E-09	936.3E-12	-1.4E-09	-15.1E-09	-11.3E-09	-589.6E-12	-11.3E-09	-15.1E-09
53	4.0E-09	-5.9E-09	-4.4E-09	6.3E-09	6.3E-09	-3.6E-09	7.0E-09	-12.8E-09
54	-11.3E-09	-12.0E-09	936.3E-12	4.0E-09	-2.1E-09	-12.8E-09	1.7E-09	-5.9E-09
55	-1.4E-09	-5.2E-09	-589.6E-12	6.3E-09	-10.5E-09	-4.4E-09	-7.5E-09	-8.2E-09
56	5.5E-09	2.5E-09	936.3E-12	-7.5E-09	-2.9E-09	-7.5E-09	-2.1E-09	2.5E-09
57	3.2E-09	-5.2E-09	-6.7E-09	5.5E-09	-2.1E-09	1.7E-09	5.5E-09	2.5E-09
58	173.3E-12	-6.7E-09	3.2E-09	-589.6E-12	4.0E-09	936.3E-12	-8.2E-09	-3.6E-09
59	-7.5E-09	-13.6E-09	4.0E-09	1.7E-09	-5.9E-09	4.8E-09	-3.6E-09	-3.6E-09
60	-10.5E-09	-4.4E-09	-3.6E-09	-4.4E-09	6.3E-09	2.5E-09	-9.7E-09	2.5E-09
Statistics								
Min	-11.3E-09	-13.6E-09	-6.7E-09	-15.1E-09	-11.3E-09	-12.8E-09	-11.3E-09	-15.1E-09
Max	5.5E-09	2.5E-09	4.0E-09	6.3E-09	6.3E-09	4.8E-09	7.0E-09	4.8E-09
Average	-3.6E-09	-4.9E-09	-971.1E-12	-1.7E-09	-1.4E-09	-2.6E-09	-3.4E-09	-3.7E-09
Std Deviation	6.2E-09	4.9E-09	3.2E-09	7.5E-09	6.2E-09	5.2E-09	6.0E-09	6.5E-09

Measurements

IIHRE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-7.5E-09	1.7E-09	1.7E-09	-1.4E-09	-9.0E-09	-7.5E-09	-5.2E-09	-9.7E-09
50_OUT_REF	5.5E-09	3.2E-09	-5.9E-09	-3.6E-09	-8.2E-09	-5.2E-09	3.2E-09	936.3E-12
ON_HDC samples								
61	-8.2E-09	-10.5E-09	1.7E-09	2.5E-09	936.3E-12	3.2E-09	-5.9E-09	3.2E-09
62	-16.6E-09	4.0E-09	-2.9E-09	173.3E-12	-2.1E-09	-2.1E-09	-2.9E-09	-2.9E-09
63	-8.2E-09	-3.6E-09	-3.6E-09	4.0E-09	3.2E-09	-2.9E-09	-2.1E-09	-5.2E-09
64	-2.1E-09	-5.2E-09	1.7E-09	3.2E-09	-9.7E-09	-11.3E-09	7.0E-09	-1.4E-09
65	-2.9E-09	-12.0E-09	4.0E-09	-6.7E-09	936.3E-12	-3.6E-09	2.5E-09	936.3E-12
66	-9.7E-09	3.2E-09	-1.4E-09	6.3E-09	-10.5E-09	-6.7E-09	-1.4E-09	7.0E-09
67	173.3E-12	-7.5E-09	-6.7E-09	-2.1E-09	-6.7E-09	4.0E-09	-6.7E-09	-13.6E-09
68	936.3E-12	4.0E-09	-6.7E-09	5.5E-09	3.2E-09	-12.0E-09	-12.0E-09	7.0E-09
69	7.0E-09	2.5E-09	-7.5E-09	-2.1E-09	4.0E-09	-6.7E-09	8.6E-09	-16.6E-09
70	-15.8E-09	1.7E-09	-5.9E-09	-4.4E-09	-2.9E-09	1.7E-09	3.2E-09	-3.6E-09
Statistics								
Min	-16.6E-09	-12.0E-09	-7.5E-09	-6.7E-09	-10.5E-09	-12.0E-09	-12.0E-09	-16.6E-09
Max	7.0E-09	4.0E-09	4.0E-09	6.3E-09	4.0E-09	4.0E-09	8.6E-09	7.0E-09

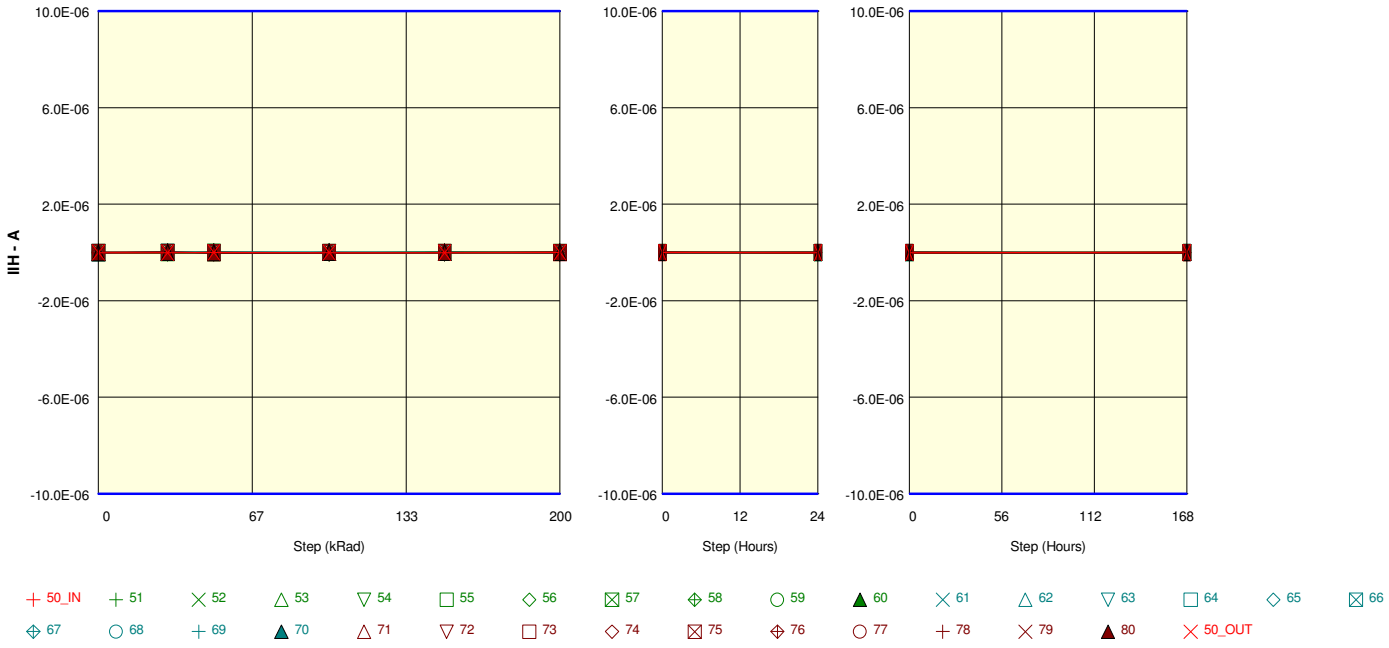
IIHRE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-5.5E-09	-2.3E-09	-2.7E-09	631.1E-12	-2.0E-09	-3.6E-09	-971.1E-12	-2.5E-09
Std Deviation	7.2E-09	5.9E-09	3.9E-09	4.1E-09	5.1E-09	5.3E-09	6.1E-09	7.5E-09

Measurements

IIHRE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-7.5E-09	1.7E-09	1.7E-09	-1.4E-09	-9.0E-09	-7.5E-09	-5.2E-09	-9.7E-09
50_OUT_REF	5.5E-09	3.2E-09	-5.9E-09	-3.6E-09	-8.2E-09	-5.2E-09	3.2E-09	936.3E-12
OFF samples								
71	-5.2E-09	-8.2E-09	-6.7E-09	-12.0E-09	-8.2E-09	173.3E-12	-5.2E-09	-9.7E-09
72	-589.6E-12	-2.1E-09	-1.4E-09	-9.0E-09	-6.7E-09	-7.5E-09	-12.8E-09	9.3E-09
73	-3.6E-09	-9.7E-09	-10.5E-09	2.5E-09	-6.7E-09	3.2E-09	-4.4E-09	-7.5E-09
74	-7.5E-09	-5.2E-09	-6.7E-09	7.0E-09	-3.6E-09	-1.4E-09	-12.8E-09	-9.7E-09
75	-1.4E-09	-6.7E-09	-589.6E-12	-8.2E-09	-13.6E-09	10.9E-09	-3.6E-09	-14.3E-09
76	7.8E-09	-6.7E-09	7.0E-09	-11.3E-09	-11.3E-09	-5.2E-09	-2.1E-09	173.3E-12
77	-14.3E-09	5.5E-09	11.6E-09	173.3E-12	-17.4E-09	-1.4E-09	4.8E-09	-6.7E-09
78	173.3E-12	-3.6E-09	-3.6E-09	4.0E-09	-5.9E-09	-3.6E-09	-4.4E-09	-12.0E-09
79	-8.2E-09	7.8E-09	5.5E-09	-2.9E-09	5.5E-09	-10.5E-09	-7.5E-09	7.0E-09
80	-3.6E-09	-589.6E-12	1.7E-09	-4.4E-09	-2.1E-09	-7.5E-09	7.0E-09	-8.2E-09
Statistics								
Min	-14.3E-09	-9.7E-09	-10.5E-09	-12.0E-09	-17.4E-09	-10.5E-09	-12.8E-09	-14.3E-09
Max	7.8E-09	7.8E-09	11.6E-09	7.0E-09	5.5E-09	10.9E-09	7.0E-09	9.3E-09
Average	-3.6E-09	-3.0E-09	-360.8E-12	-3.4E-09	-7.0E-09	-2.3E-09	-4.1E-09	-5.2E-09
Std Deviation	5.6E-09	5.5E-09	6.6E-09	6.3E-09	6.0E-09	5.8E-09	6.1E-09	7.6E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current High : IIHWE#
Test conditions : Vin= VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IIHWE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	1.7E-09	-11.3E-09	-11.3E-09	-2.9E-09	-4.4E-09	-15.8E-09	-14.3E-09	-9.0E-09
50_OUT_REF	-9.0E-09	-12.8E-09	-589.6E-12	-6.7E-09	-11.3E-09	4.0E-09	-12.0E-09	7.8E-09
ON_LDC samples								
51	3.2E-09	4.8E-09	-12.0E-09	-6.7E-09	7.0E-09	-15.1E-09	-3.6E-09	-1.4E-09
52	-1.4E-09	-3.6E-09	-9.0E-09	173.3E-12	8.6E-09	-9.0E-09	-6.7E-09	936.3E-12
53	173.3E-12	-16.6E-09	-589.6E-12	3.2E-09	-4.4E-09	-6.7E-09	7.0E-09	173.3E-12
54	-5.2E-09	-589.6E-12	11.6E-09	-7.5E-09	-1.4E-09	-589.6E-12	-2.1E-09	5.5E-09
55	3.2E-09	1.7E-09	-12.0E-09	-5.2E-09	-8.2E-09	936.3E-12	-9.0E-09	-1.4E-09
56	173.3E-12	-8.2E-09	936.3E-12	-8.2E-09	3.2E-09	5.5E-09	10.9E-09	-9.0E-09
57	-16.6E-09	-9.0E-09	3.2E-09	-3.6E-09	-3.6E-09	2.5E-09	-12.8E-09	7.8E-09
58	-589.6E-12	3.2E-09	173.3E-12	-9.7E-09	-6.7E-09	1.7E-09	-8.2E-09	-2.1E-09
59	-17.4E-09	-9.0E-09	-1.4E-09	-2.1E-09	173.3E-12	5.5E-09	-9.7E-09	-5.2E-09
60	-9.7E-09	-4.4E-09	2.5E-09	-4.4E-09	7.8E-09	-2.1E-09	-5.2E-09	-589.6E-12
Statistics								
Min	-17.4E-09	-16.6E-09	-12.0E-09	-9.7E-09	-8.2E-09	-15.1E-09	-12.8E-09	-9.0E-09
Max	3.2E-09	4.8E-09	11.6E-09	3.2E-09	8.6E-09	5.5E-09	10.9E-09	7.8E-09
Average	-4.4E-09	-4.2E-09	-1.7E-09	-4.4E-09	249.6E-12	-1.7E-09	-3.9E-09	-513.3E-12
Std Deviation	7.3E-09	6.3E-09	7.1E-09	3.8E-09	5.8E-09	6.3E-09	7.1E-09	4.5E-09

Measurements

IIHWE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	1.7E-09	-11.3E-09	-11.3E-09	-2.9E-09	-4.4E-09	-15.8E-09	-14.3E-09	-9.0E-09
50_OUT_REF	-9.0E-09	-12.8E-09	-589.6E-12	-6.7E-09	-11.3E-09	4.0E-09	-12.0E-09	7.8E-09
ON_HDC samples								
61	-7.5E-09	-5.2E-09	4.0E-09	2.5E-09	4.0E-09	-7.5E-09	-2.1E-09	-2.9E-09
62	-10.5E-09	7.0E-09	1.7E-09	2.5E-09	3.2E-09	1.7E-09	1.7E-09	-2.1E-09
63	173.3E-12	-2.9E-09	-11.3E-09	-5.9E-09	-6.7E-09	-9.7E-09	4.0E-09	-5.2E-09
64	-3.6E-09	11.6E-09	1.7E-09	-5.2E-09	-1.4E-09	-589.6E-12	6.3E-09	-2.9E-09
65	-3.6E-09	10.9E-09	-9.0E-09	-5.2E-09	-2.9E-09	173.3E-12	-10.5E-09	-1.4E-09
66	936.3E-12	3.2E-09	6.3E-09	9.3E-09	5.5E-09	-8.2E-09	-11.3E-09	-1.4E-09
67	-8.2E-09	6.3E-09	-9.0E-09	-15.1E-09	-5.2E-09	-4.4E-09	936.3E-12	-589.6E-12
68	2.5E-09	-1.4E-09	-4.4E-09	-5.2E-09	936.3E-12	936.3E-12	1.7E-09	-3.6E-09
69	1.7E-09	-2.1E-09	10.1E-09	4.8E-09	4.0E-09	-12.8E-09	1.7E-09	-4.4E-09
70	1.7E-09	1.7E-09	7.8E-09	12.4E-09	936.3E-12	936.3E-12	4.8E-09	-12.8E-09
Statistics								
Min	-10.5E-09	-5.2E-09	-11.3E-09	-15.1E-09	-6.7E-09	-12.8E-09	-11.3E-09	-12.8E-09
Max	2.5E-09	11.6E-09	10.1E-09	12.4E-09	5.5E-09	1.7E-09	6.3E-09	-589.6E-12

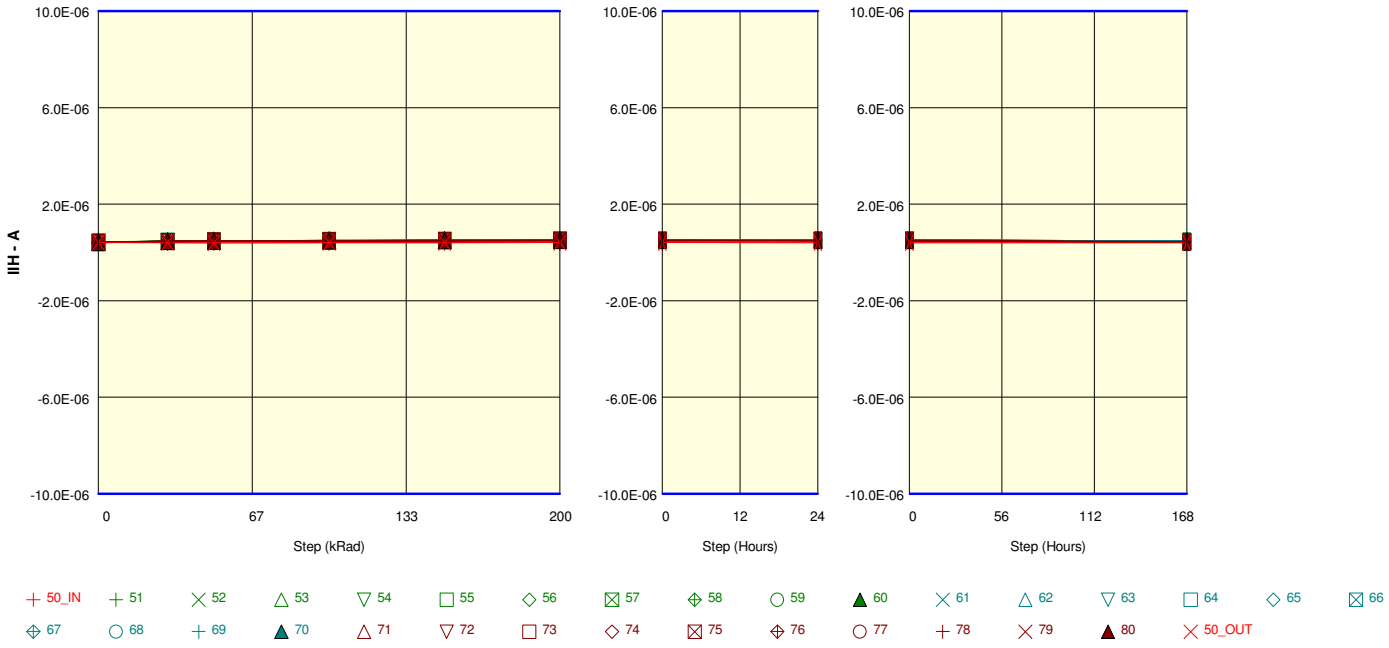
IIHWE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-2.6E-09	2.9E-09	-208.1E-12	-513.3E-12	249.6E-12	-3.9E-09	-284.5E-12	-3.7E-09
Std Deviation	4.5E-09	5.6E-09	7.3E-09	7.8E-09	3.9E-09	5.0E-09	5.7E-09	3.3E-09

Measurements

IIHWE#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	1.7E-09	-11.3E-09	-11.3E-09	-2.9E-09	-4.4E-09	-15.8E-09	-14.3E-09	-9.0E-09
50_OUT_REF	-9.0E-09	-12.8E-09	-589.6E-12	-6.7E-09	-11.3E-09	4.0E-09	-12.0E-09	7.8E-09
OFF samples								
71	-5.2E-09	-7.5E-09	-4.4E-09	-4.4E-09	936.3E-12	-12.0E-09	-4.4E-09	-4.4E-09
72	-2.9E-09	173.3E-12	-5.9E-09	4.0E-09	-589.6E-12	-6.7E-09	7.0E-09	2.5E-09
73	-2.1E-09	2.5E-09	-6.7E-09	-6.7E-09	-3.6E-09	-9.0E-09	-4.4E-09	-13.6E-09
74	6.3E-09	13.9E-09	-4.4E-09	-13.6E-09	3.2E-09	-1.4E-09	4.8E-09	-2.9E-09
75	4.8E-09	7.8E-09	-12.0E-09	4.8E-09	-589.6E-12	5.5E-09	9.3E-09	-5.9E-09
76	-1.4E-09	173.3E-12	-3.6E-09	-5.2E-09	-2.1E-09	936.3E-12	-11.3E-09	-13.6E-09
77	2.5E-09	9.3E-09	-9.7E-09	-6.7E-09	-7.5E-09	173.3E-12	-9.7E-09	-11.3E-09
78	-3.6E-09	-2.9E-09	1.7E-09	-4.4E-09	-589.6E-12	8.6E-09	-9.0E-09	-5.2E-09
79	-5.9E-09	-6.7E-09	10.1E-09	-9.0E-09	-3.6E-09	5.5E-09	936.3E-12	-4.4E-09
80	-15.1E-09	936.3E-12	-10.5E-09	3.2E-09	-8.2E-09	-7.5E-09	-4.4E-09	7.8E-09
Statistics								
Min	-15.1E-09	-7.5E-09	-12.0E-09	-13.6E-09	-8.2E-09	-12.0E-09	-11.3E-09	-13.6E-09
Max	6.3E-09	13.9E-09	10.1E-09	4.8E-09	3.2E-09	8.6E-09	9.3E-09	7.8E-09
Average	-2.3E-09	1.8E-09	-4.6E-09	-3.8E-09	-2.3E-09	-1.6E-09	-2.1E-09	-5.1E-09
Std Deviation	5.8E-09	6.5E-09	6.2E-09	5.7E-09	3.4E-09	6.6E-09	6.9E-09	6.4E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current High : IIHWP#
Test conditions : Vin= VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IIHWP#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	416.7E-09	412.2E-09	400.7E-09	400.7E-09	412.9E-09	416.7E-09	419.8E-09	410.6E-09
50_OUT_REF	412.9E-09	406.8E-09	401.5E-09	415.2E-09	407.6E-09	410.6E-09	403.8E-09	403.8E-09
ON_LDC samples								
51	435.8E-09	461.8E-09	487.7E-09	496.1E-09	519.0E-09	512.9E-09	522.0E-09	463.3E-09
52	414.5E-09	468.6E-09	474.0E-09	474.7E-09	496.9E-09	503.0E-09	509.8E-09	470.9E-09
53	435.1E-09	473.2E-09	480.1E-09	486.9E-09	509.8E-09	512.9E-09	519.0E-09	467.9E-09
54	433.5E-09	468.6E-09	473.2E-09	480.8E-09	515.2E-09	507.5E-09	508.3E-09	480.1E-09
55	419.8E-09	464.8E-09	467.1E-09	478.5E-09	493.8E-09	503.0E-09	504.5E-09	457.9E-09
56	424.4E-09	459.5E-09	464.0E-09	505.2E-09	512.9E-09	512.1E-09	498.4E-09	469.4E-09
57	412.9E-09	448.8E-09	454.9E-09	485.4E-09	489.2E-09	500.7E-09	502.2E-09	457.9E-09
58	423.6E-09	458.7E-09	469.4E-09	505.2E-09	489.2E-09	494.6E-09	491.5E-09	464.8E-09
59	430.5E-09	463.3E-09	474.0E-09	492.3E-09	504.5E-09	509.8E-09	512.1E-09	472.4E-09
60	422.8E-09	467.1E-09	488.5E-09	494.6E-09	500.7E-09	510.6E-09	522.0E-09	476.3E-09
Statistics								
Min	412.9E-09	448.8E-09	454.9E-09	474.7E-09	489.2E-09	494.6E-09	491.5E-09	457.9E-09
Max	435.8E-09	473.2E-09	488.5E-09	505.2E-09	519.0E-09	512.9E-09	522.0E-09	480.1E-09
Average	425.3E-09	463.4E-09	473.3E-09	490.0E-09	503.1E-09	506.7E-09	509.0E-09	468.1E-09
Std Deviation	7.8E-09	6.5E-09	9.8E-09	10.0E-09	10.3E-09	5.9E-09	9.7E-09	6.9E-09

Measurements

IIHWP#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	416.7E-09	412.2E-09	400.7E-09	400.7E-09	412.9E-09	416.7E-09	419.8E-09	410.6E-09
50_OUT_REF	412.9E-09	406.8E-09	401.5E-09	415.2E-09	407.6E-09	410.6E-09	403.8E-09	403.8E-09
ON_HDC samples								
61	435.8E-09	464.0E-09	488.5E-09	491.5E-09	519.7E-09	518.2E-09	521.3E-09	464.0E-09
62	433.5E-09	462.5E-09	480.1E-09	490.0E-09	504.5E-09	522.8E-09	509.1E-09	483.1E-09
63	409.1E-09	457.2E-09	455.7E-09	484.6E-09	501.4E-09	502.2E-09	503.0E-09	470.9E-09
64	422.1E-09	459.5E-09	467.1E-09	503.7E-09	498.4E-09	512.9E-09	502.2E-09	454.9E-09
65	414.5E-09	452.6E-09	467.9E-09	491.5E-09	497.6E-09	512.1E-09	513.6E-09	454.9E-09
66	400.7E-09	470.1E-09	467.9E-09	490.7E-09	493.0E-09	506.8E-09	505.2E-09	453.4E-09
67	416.0E-09	458.7E-09	471.7E-09	472.4E-09	510.6E-09	511.3E-09	515.2E-09	480.8E-09
68	419.0E-09	456.4E-09	470.1E-09	487.7E-09	502.2E-09	512.1E-09	508.3E-09	461.8E-09
69	416.7E-09	466.3E-09	473.2E-09	481.6E-09	504.5E-09	514.4E-09	517.5E-09	481.6E-09
70	429.0E-09	456.4E-09	478.5E-09	493.8E-09	506.0E-09	515.9E-09	519.7E-09	474.0E-09
Statistics								
Min	400.7E-09	452.6E-09	455.7E-09	472.4E-09	493.0E-09	502.2E-09	502.2E-09	453.4E-09
Max	435.8E-09	470.1E-09	488.5E-09	503.7E-09	519.7E-09	522.8E-09	521.3E-09	483.1E-09

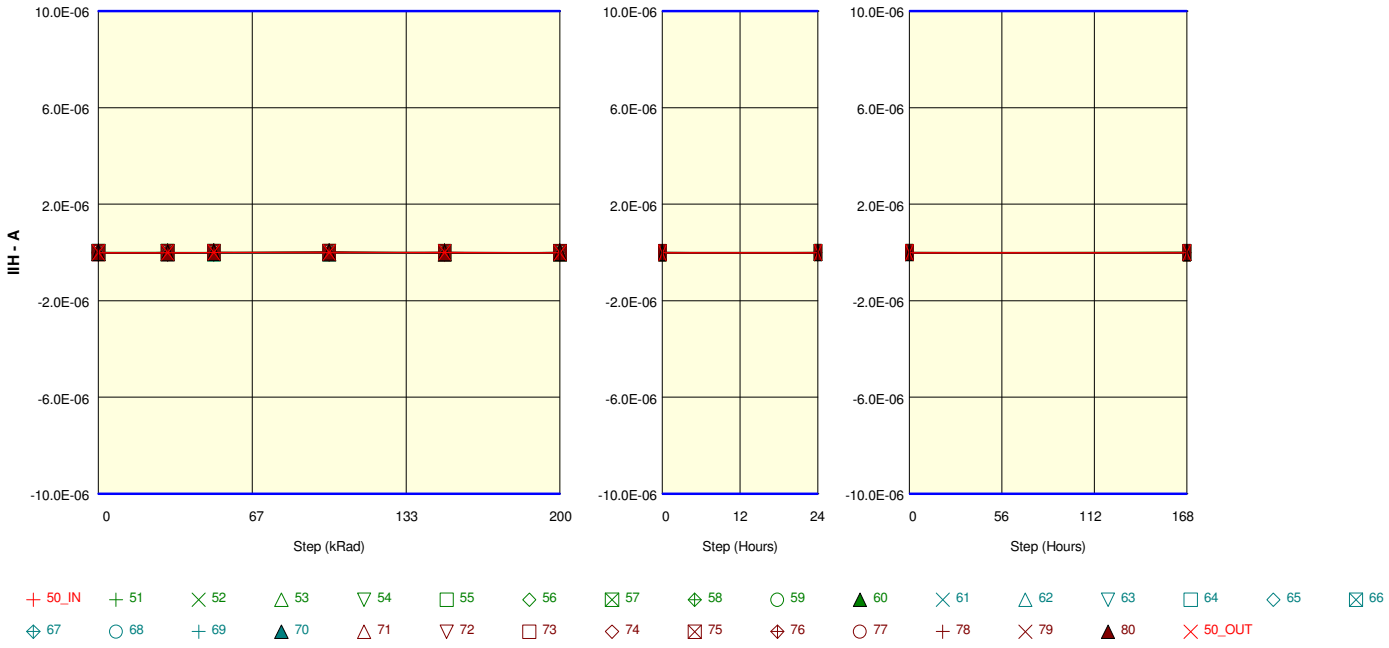
IIHWP#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	419.6E-09	460.4E-09	472.1E-09	488.8E-09	503.8E-09	512.9E-09	511.5E-09	467.9E-09
Std Deviation	10.3E-09	5.0E-09	8.4E-09	7.8E-09	7.1E-09	5.4E-09	6.6E-09	11.1E-09

Measurements

IIHWP#	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	416.7E-09	412.2E-09	400.7E-09	400.7E-09	412.9E-09	416.7E-09	419.8E-09	410.6E-09
50_OUT_REF	412.9E-09	406.8E-09	401.5E-09	415.2E-09	407.6E-09	410.6E-09	403.8E-09	403.8E-09
OFF samples								
71	419.0E-09	469.4E-09	475.5E-09	490.7E-09	492.3E-09	506.8E-09	501.4E-09	424.4E-09
72	425.9E-09	461.0E-09	477.0E-09	494.6E-09	495.3E-09	498.4E-09	509.8E-09	445.7E-09
73	417.5E-09	461.0E-09	482.4E-09	494.6E-09	497.6E-09	497.6E-09	502.2E-09	435.8E-09
74	416.0E-09	437.3E-09	464.8E-09	481.6E-09	486.9E-09	499.9E-09	487.7E-09	416.7E-09
75	415.2E-09	452.6E-09	461.8E-09	490.7E-09	492.3E-09	505.2E-09	486.9E-09	429.7E-09
76	425.9E-09	444.2E-09	464.8E-09	480.8E-09	489.2E-09	491.5E-09	502.2E-09	432.0E-09
77	414.5E-09	448.8E-09	460.2E-09	484.6E-09	477.0E-09	480.8E-09	496.1E-09	419.0E-09
78	416.0E-09	444.2E-09	447.3E-09	469.4E-09	473.2E-09	493.8E-09	470.9E-09	425.1E-09
79	429.0E-09	461.8E-09	474.0E-09	484.6E-09	503.0E-09	509.8E-09	500.7E-09	433.5E-09
80	404.5E-09	448.0E-09	466.3E-09	474.0E-09	484.6E-09	489.2E-09	485.4E-09	422.8E-09
Statistics								
Min	404.5E-09	437.3E-09	447.3E-09	469.4E-09	473.2E-09	480.8E-09	470.9E-09	416.7E-09
Max	429.0E-09	469.4E-09	482.4E-09	494.6E-09	503.0E-09	509.8E-09	509.8E-09	445.7E-09
Average	418.3E-09	452.8E-09	467.4E-09	484.6E-09	489.1E-09	497.3E-09	494.3E-09	428.5E-09
Std Deviation	6.7E-09	9.6E-09	9.6E-09	8.0E-09	8.6E-09	8.4E-09	10.9E-09	8.2E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current High : IIHIO[0]
Test conditions : Vin= VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IIHIO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-8.2E-09	4.8E-09	-5.9E-09	-1.4E-09	-9.7E-09	-5.9E-09	-5.2E-09	-9.7E-09
50_OUT_REF	-4.4E-09	-5.9E-09	1.7E-09	-4.4E-09	3.2E-09	-16.6E-09	-4.4E-09	-9.0E-09
ON_LDC samples								
51	-8.2E-09	-16.6E-09	-2.9E-09	-9.7E-09	-5.9E-09	-1.4E-09	-8.2E-09	8.6E-09
52	3.2E-09	4.0E-09	-10.5E-09	-17.4E-09	-9.0E-09	-6.7E-09	-9.7E-09	-13.6E-09
53	936.3E-12	-1.4E-09	-18.1E-09	-9.0E-09	-10.5E-09	-3.6E-09	-1.4E-09	-15.1E-09
54	-12.0E-09	2.5E-09	-5.2E-09	-2.9E-09	-13.6E-09	-20.4E-09	-5.2E-09	-8.2E-09
55	-2.1E-09	173.3E-12	-11.3E-09	-11.3E-09	-19.7E-09	-11.3E-09	-4.4E-09	-9.0E-09
56	-3.6E-09	-6.7E-09	3.2E-09	-4.4E-09	-9.0E-09	-12.8E-09	-12.0E-09	-10.5E-09
57	-5.2E-09	-2.9E-09	173.3E-12	5.5E-09	-1.4E-09	-19.7E-09	-5.2E-09	-13.6E-09
58	-13.6E-09	-6.7E-09	-10.5E-09	-9.7E-09	-15.8E-09	-1.4E-09	-2.1E-09	-2.9E-09
59	936.3E-12	-2.1E-09	2.5E-09	2.5E-09	-9.7E-09	-5.9E-09	-6.7E-09	-11.3E-09
60	-15.1E-09	-3.6E-09	-4.4E-09	-9.7E-09	-14.3E-09	-9.7E-09	3.2E-09	-9.7E-09
Statistics								
Min	-15.1E-09	-16.6E-09	-18.1E-09	-17.4E-09	-19.7E-09	-20.4E-09	-12.0E-09	-15.1E-09
Max	3.2E-09	4.0E-09	3.2E-09	5.5E-09	-1.4E-09	-1.4E-09	3.2E-09	8.6E-09
Average	-5.5E-09	-3.3E-09	-5.7E-09	-6.6E-09	-10.9E-09	-9.3E-09	-5.2E-09	-8.5E-09
Std Deviation	6.2E-09	5.5E-09	6.5E-09	6.5E-09	4.9E-09	6.5E-09	4.2E-09	6.6E-09

Measurements

IIHIO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-8.2E-09	4.8E-09	-5.9E-09	-1.4E-09	-9.7E-09	-5.9E-09	-5.2E-09	-9.7E-09
50_OUT_REF	-4.4E-09	-5.9E-09	1.7E-09	-4.4E-09	3.2E-09	-16.6E-09	-4.4E-09	-9.0E-09
ON_HDC samples								
61	-11.3E-09	-3.6E-09	-8.2E-09	-12.0E-09	-9.7E-09	1.7E-09	-4.4E-09	-1.4E-09
62	-2.9E-09	-18.9E-09	-13.6E-09	-8.2E-09	-2.9E-09	-22.0E-09	-7.5E-09	-8.2E-09
63	-5.2E-09	-9.7E-09	-2.9E-09	-7.5E-09	-589.6E-12	173.3E-12	-6.7E-09	-2.9E-09
64	-8.2E-09	2.5E-09	-18.9E-09	-2.9E-09	-12.0E-09	-7.5E-09	-7.5E-09	-5.2E-09
65	-6.7E-09	-1.4E-09	-18.1E-09	-2.9E-09	-4.4E-09	-12.8E-09	-10.5E-09	-12.0E-09
66	1.7E-09	173.3E-12	2.5E-09	-15.8E-09	-23.5E-09	-8.2E-09	-4.4E-09	-15.8E-09
67	-12.0E-09	-9.7E-09	-8.2E-09	4.8E-09	-3.6E-09	-6.7E-09	-8.2E-09	-22.7E-09
68	-9.7E-09	-12.0E-09	-2.1E-09	2.5E-09	-589.6E-12	-589.6E-12	-3.6E-09	-8.2E-09
69	-11.3E-09	173.3E-12	-5.9E-09	-5.2E-09	-5.9E-09	-589.6E-12	2.5E-09	-3.6E-09
70	-6.7E-09	-5.2E-09	-4.4E-09	-11.3E-09	-2.1E-09	-14.3E-09	-15.1E-09	-5.2E-09
Statistics								
Min	-12.0E-09	-18.9E-09	-18.9E-09	-15.8E-09	-23.5E-09	-22.0E-09	-15.1E-09	-22.7E-09
Max	1.7E-09	2.5E-09	2.5E-09	4.8E-09	-589.6E-12	1.7E-09	2.5E-09	-1.4E-09

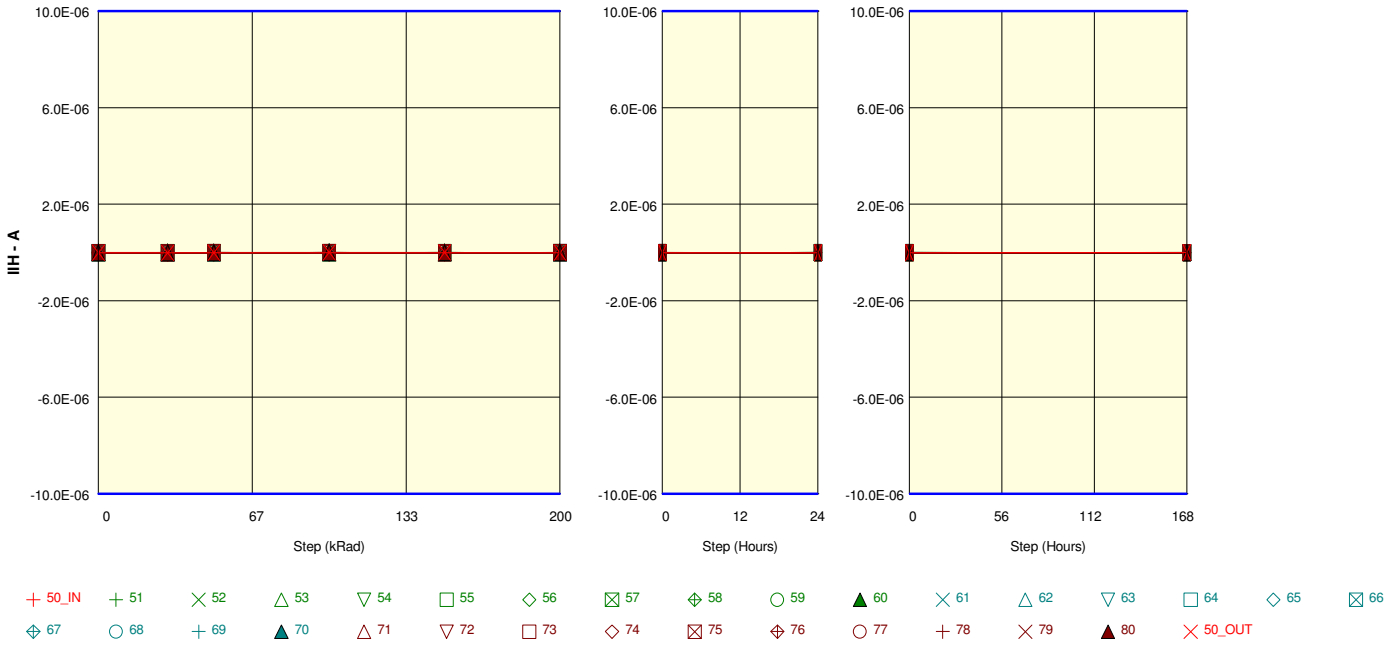
IIHIO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-7.2E-09	-5.8E-09	-8.0E-09	-5.9E-09	-6.5E-09	-7.1E-09	-6.5E-09	-8.5E-09
Std Deviation	4.1E-09	6.4E-09	6.6E-09	6.1E-09	6.7E-09	7.2E-09	4.4E-09	6.3E-09

Measurements

IIHIO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-8.2E-09	4.8E-09	-5.9E-09	-1.4E-09	-9.7E-09	-5.9E-09	-5.2E-09	-9.7E-09
50_OUT_REF	-4.4E-09	-5.9E-09	1.7E-09	-4.4E-09	3.2E-09	-16.6E-09	-4.4E-09	-9.0E-09
OFF samples								
71	-6.7E-09	-15.8E-09	-3.6E-09	4.0E-09	-15.8E-09	-1.4E-09	-5.9E-09	-10.5E-09
72	-17.4E-09	-6.7E-09	-10.5E-09	5.5E-09	-12.0E-09	-15.1E-09	-10.5E-09	-12.0E-09
73	173.3E-12	-5.9E-09	4.0E-09	-4.4E-09	-3.6E-09	1.7E-09	-1.4E-09	-18.9E-09
74	-5.2E-09	4.0E-09	-3.6E-09	-4.4E-09	6.3E-09	-16.6E-09	-10.5E-09	4.0E-09
75	-12.8E-09	-2.1E-09	-5.9E-09	3.2E-09	-12.0E-09	-11.3E-09	-8.2E-09	-5.2E-09
76	-9.7E-09	-15.8E-09	3.2E-09	-15.8E-09	-2.9E-09	-8.2E-09	-9.7E-09	-2.9E-09
77	-1.4E-09	-6.7E-09	1.7E-09	173.3E-12	-5.9E-09	3.2E-09	-13.6E-09	-10.5E-09
78	-9.0E-09	-10.5E-09	-2.9E-09	5.5E-09	-589.6E-12	-9.7E-09	936.3E-12	173.3E-12
79	-8.2E-09	-6.7E-09	173.3E-12	-589.6E-12	-6.7E-09	-6.7E-09	-11.3E-09	-2.9E-09
80	-4.4E-09	-15.1E-09	-589.6E-12	9.3E-09	-14.3E-09	-2.9E-09	1.7E-09	2.5E-09
Statistics								
Min	-17.4E-09	-15.8E-09	-10.5E-09	-15.8E-09	-15.8E-09	-16.6E-09	-13.6E-09	-18.9E-09
Max	173.3E-12	4.0E-09	4.0E-09	9.3E-09	6.3E-09	3.2E-09	1.7E-09	4.0E-09
Average	-7.5E-09	-8.1E-09	-1.8E-09	249.7E-12	-6.8E-09	-6.7E-09	-6.8E-09	-5.6E-09
Std Deviation	5.0E-09	6.1E-09	4.2E-09	6.8E-09	6.5E-09	6.4E-09	5.2E-09	6.9E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current High : IIHIO[1]
Test conditions : Vin= VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IIHIO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-2.1E-09	-2.9E-09	-11.3E-09	2.5E-09	-8.2E-09	-8.2E-09	-2.1E-09	-18.9E-09
50_OUT_REF	-9.7E-09	-15.8E-09	-14.3E-09	-5.2E-09	-5.2E-09	-12.0E-09	-13.6E-09	-589.6E-12
ON_LDC samples								
51	-6.7E-09	-14.3E-09	-14.3E-09	-14.3E-09	173.3E-12	-9.0E-09	-4.4E-09	-14.3E-09
52	-9.7E-09	-12.8E-09	-17.4E-09	-14.3E-09	-11.3E-09	-17.4E-09	-19.7E-09	-5.2E-09
53	-9.0E-09	-12.8E-09	-17.4E-09	-13.6E-09	-9.0E-09	-8.2E-09	-12.0E-09	-6.7E-09
54	-15.1E-09	-9.0E-09	-9.7E-09	-15.8E-09	-22.7E-09	-13.6E-09	-10.5E-09	-9.0E-09
55	-9.7E-09	-5.9E-09	-8.2E-09	-9.7E-09	-2.9E-09	-13.6E-09	-13.6E-09	-18.9E-09
56	-5.2E-09	-15.1E-09	-7.5E-09	-8.2E-09	-10.5E-09	-4.4E-09	-1.4E-09	-6.7E-09
57	-15.1E-09	-1.4E-09	-14.3E-09	-12.8E-09	-16.6E-09	-8.2E-09	-2.9E-09	-7.5E-09
58	-14.3E-09	-9.7E-09	-12.0E-09	-5.2E-09	-13.6E-09	-8.2E-09	-6.7E-09	-8.2E-09
59	-13.6E-09	-7.5E-09	-18.1E-09	-9.0E-09	-2.1E-09	-12.8E-09	-17.4E-09	-2.9E-09
60	-4.4E-09	-14.3E-09	-7.5E-09	-589.6E-12	-15.8E-09	-12.0E-09	-10.5E-09	-9.0E-09
Statistics								
Min	-15.1E-09	-15.1E-09	-18.1E-09	-15.8E-09	-22.7E-09	-17.4E-09	-19.7E-09	-18.9E-09
Max	-4.4E-09	-1.4E-09	-7.5E-09	-589.6E-12	173.3E-12	-4.4E-09	-1.4E-09	-2.9E-09
Average	-10.3E-09	-10.3E-09	-12.6E-09	-10.4E-09	-10.4E-09	-10.7E-09	-9.9E-09	-8.8E-09
Std Deviation	3.9E-09	4.2E-09	4.0E-09	4.5E-09	6.9E-09	3.6E-09	5.8E-09	4.4E-09

Measurements

IIHIO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-2.1E-09	-2.9E-09	-11.3E-09	2.5E-09	-8.2E-09	-8.2E-09	-2.1E-09	-18.9E-09
50_OUT_REF	-9.7E-09	-15.8E-09	-14.3E-09	-5.2E-09	-5.2E-09	-12.0E-09	-13.6E-09	-589.6E-12
ON_HDC samples								
61	-9.7E-09	-15.8E-09	-28.8E-09	-12.0E-09	-8.2E-09	-14.3E-09	-14.3E-09	-15.1E-09
62	-12.0E-09	-17.4E-09	-23.5E-09	-12.0E-09	-6.7E-09	-9.7E-09	-13.6E-09	-11.3E-09
63	-8.2E-09	-5.9E-09	4.0E-09	-13.6E-09	-2.9E-09	-5.2E-09	-10.5E-09	-8.2E-09
64	-3.6E-09	-12.8E-09	-19.7E-09	-15.8E-09	-25.8E-09	-3.6E-09	-2.9E-09	-6.7E-09
65	-16.6E-09	936.3E-12	-17.4E-09	-12.8E-09	-13.6E-09	-8.2E-09	-5.2E-09	-2.9E-09
66	-16.6E-09	-11.3E-09	-11.3E-09	-5.2E-09	-10.5E-09	-10.5E-09	-2.9E-09	-5.9E-09
67	-5.2E-09	-10.5E-09	-15.8E-09	-22.7E-09	-6.7E-09	-4.4E-09	-11.3E-09	-14.3E-09
68	-18.1E-09	-9.0E-09	-8.2E-09	1.7E-09	-3.6E-09	-9.7E-09	-5.9E-09	-18.9E-09
69	-12.0E-09	-12.8E-09	-11.3E-09	-8.2E-09	-5.9E-09	-17.4E-09	-19.7E-09	-10.5E-09
70	-9.0E-09	-8.2E-09	-9.0E-09	-6.7E-09	-18.1E-09	-5.9E-09	-2.1E-09	-11.3E-09
Statistics								
Min	-18.1E-09	-17.4E-09	-28.8E-09	-22.7E-09	-25.8E-09	-17.4E-09	-19.7E-09	-18.9E-09
Max	-3.6E-09	936.3E-12	4.0E-09	1.7E-09	-2.9E-09	-3.6E-09	-2.1E-09	-2.9E-09

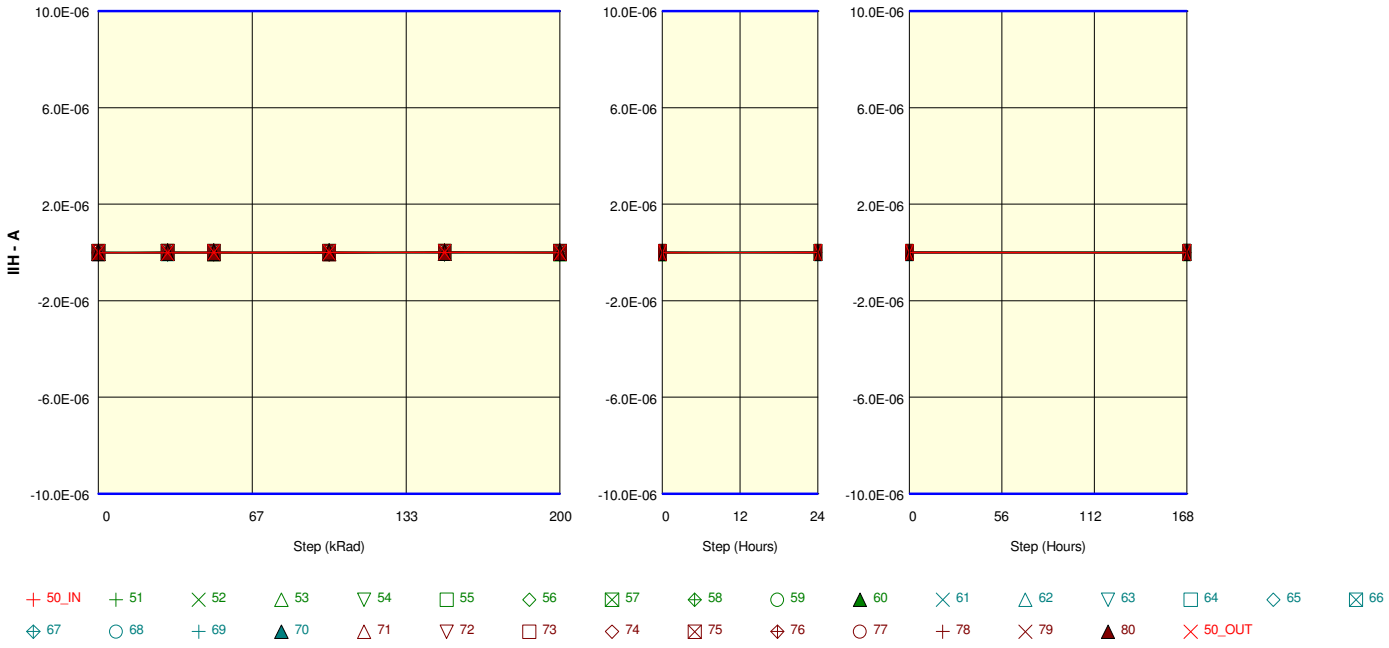
IIHIO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-11.1E-09	-10.3E-09	-14.1E-09	-10.7E-09	-10.2E-09	-8.9E-09	-8.8E-09	-10.5E-09
Std Deviation	4.7E-09	5.0E-09	8.7E-09	6.3E-09	6.8E-09	4.2E-09	5.6E-09	4.5E-09

Measurements

IIHIO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-2.1E-09	-2.9E-09	-11.3E-09	2.5E-09	-8.2E-09	-8.2E-09	-2.1E-09	-18.9E-09
50_OUT_REF	-9.7E-09	-15.8E-09	-14.3E-09	-5.2E-09	-5.2E-09	-12.0E-09	-13.6E-09	-589.6E-12
OFF samples								
71	-14.3E-09	-12.0E-09	-15.1E-09	-22.0E-09	-14.3E-09	-5.9E-09	-22.7E-09	-9.7E-09
72	-12.0E-09	-18.1E-09	-7.5E-09	-3.6E-09	-9.0E-09	-1.4E-09	-14.3E-09	-13.6E-09
73	-5.9E-09	-11.3E-09	3.2E-09	-1.4E-09	-15.1E-09	-12.0E-09	-19.7E-09	-7.5E-09
74	-15.1E-09	-14.3E-09	-6.7E-09	-12.0E-09	-5.2E-09	-13.6E-09	-9.0E-09	-10.5E-09
75	-9.0E-09	-21.2E-09	173.3E-12	-9.0E-09	-8.2E-09	936.3E-12	-7.5E-09	-6.7E-09
76	-14.3E-09	-15.8E-09	-21.2E-09	-14.3E-09	-5.9E-09	-8.2E-09	-5.2E-09	-17.4E-09
77	-15.1E-09	-15.8E-09	1.7E-09	-14.3E-09	-4.4E-09	-17.4E-09	-15.8E-09	-7.5E-09
78	-10.5E-09	-6.7E-09	-1.4E-09	-11.3E-09	-6.7E-09	-9.7E-09	-5.2E-09	-14.3E-09
79	-15.8E-09	-11.3E-09	-9.7E-09	1.7E-09	-1.4E-09	-10.5E-09	-3.6E-09	-12.0E-09
80	-13.6E-09	-11.3E-09	-9.7E-09	-1.4E-09	-6.7E-09	-10.5E-09	-5.9E-09	-11.3E-09
Statistics								
Min	-15.8E-09	-21.2E-09	-21.2E-09	-22.0E-09	-15.1E-09	-17.4E-09	-22.7E-09	-17.4E-09
Max	-5.9E-09	-6.7E-09	3.2E-09	1.7E-09	-1.4E-09	936.3E-12	-3.6E-09	-6.7E-09
Average	-12.6E-09	-13.8E-09	-6.6E-09	-8.8E-09	-7.7E-09	-8.8E-09	-10.9E-09	-11.0E-09
Std Deviation	3.0E-09	3.9E-09	7.4E-09	7.1E-09	4.0E-09	5.2E-09	6.4E-09	3.2E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current High : IIHIO[2]
Test conditions : Vin= VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IIHIO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-10.5E-09	-8.2E-09	-9.0E-09	-2.1E-09	-12.0E-09	-12.8E-09	-589.6E-12	-9.0E-09
50_OUT_REF	-4.4E-09	-9.7E-09	-3.6E-09	-2.1E-09	-1.4E-09	-10.5E-09	2.5E-09	-3.6E-09
ON_LDC samples								
51	-5.2E-09	10.9E-09	-589.6E-12	-6.7E-09	3.2E-09	-13.6E-09	-5.9E-09	-8.2E-09
52	-9.0E-09	-7.5E-09	173.3E-12	-4.4E-09	3.2E-09	-589.6E-12	-589.6E-12	4.8E-09
53	6.3E-09	-3.6E-09	-12.8E-09	2.5E-09	10.1E-09	10.9E-09	173.3E-12	-10.5E-09
54	-11.3E-09	1.7E-09	-8.2E-09	-2.9E-09	173.3E-12	-3.6E-09	173.3E-12	-1.4E-09
55	-589.6E-12	5.5E-09	936.3E-12	6.3E-09	936.3E-12	-12.0E-09	173.3E-12	8.6E-09
56	-3.6E-09	173.3E-12	-2.1E-09	-2.9E-09	-13.6E-09	1.7E-09	-2.1E-09	2.5E-09
57	-2.9E-09	-4.4E-09	-8.2E-09	-9.0E-09	8.6E-09	-12.0E-09	1.7E-09	-2.9E-09
58	-9.7E-09	-10.5E-09	-5.9E-09	936.3E-12	-4.4E-09	936.3E-12	7.0E-09	-3.6E-09
59	-3.6E-09	-10.5E-09	173.3E-12	-12.8E-09	936.3E-12	173.3E-12	-589.6E-12	-7.5E-09
60	-2.9E-09	-9.0E-09	-6.7E-09	-15.1E-09	4.8E-09	-8.2E-09	8.6E-09	11.6E-09
Statistics								
Min	-11.3E-09	-10.5E-09	-12.8E-09	-15.1E-09	-13.6E-09	-13.6E-09	-5.9E-09	-10.5E-09
Max	6.3E-09	10.9E-09	936.3E-12	6.3E-09	10.1E-09	10.9E-09	8.6E-09	11.6E-09
Average	-4.3E-09	-2.7E-09	-4.3E-09	-4.4E-09	1.4E-09	-3.6E-09	860.0E-12	-666.0E-12
Std Deviation	4.8E-09	6.8E-09	4.4E-09	6.4E-09	6.4E-09	7.4E-09	4.0E-09	7.0E-09

Measurements

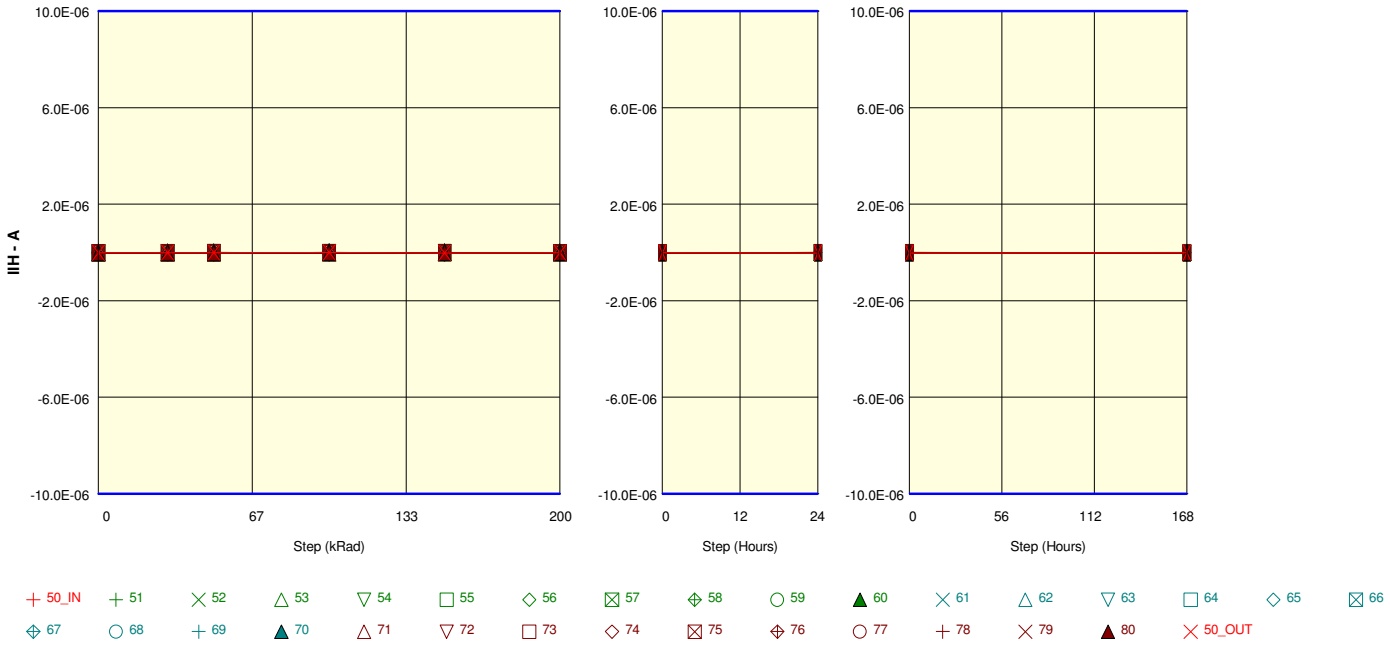
IIHIO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-10.5E-09	-8.2E-09	-9.0E-09	-2.1E-09	-12.0E-09	-12.8E-09	-589.6E-12	-9.0E-09
50_OUT_REF	-4.4E-09	-9.7E-09	-3.6E-09	-2.1E-09	-1.4E-09	-10.5E-09	2.5E-09	-3.6E-09
ON_HDC samples								
61	-2.1E-09	-8.2E-09	9.3E-09	4.0E-09	-2.9E-09	7.8E-09	4.0E-09	-9.7E-09
62	1.7E-09	-7.5E-09	-12.8E-09	4.8E-09	173.3E-12	936.3E-12	-5.9E-09	-8.2E-09
63	-15.1E-09	-11.3E-09	-5.9E-09	6.3E-09	-5.9E-09	-1.4E-09	-9.0E-09	5.5E-09
64	-10.5E-09	-12.0E-09	-2.1E-09	-5.9E-09	-7.5E-09	-6.7E-09	-10.5E-09	-2.1E-09
65	-5.2E-09	-3.6E-09	-1.4E-09	-12.8E-09	1.7E-09	4.8E-09	173.3E-12	-9.7E-09
66	-9.0E-09	-5.2E-09	-2.9E-09	173.3E-12	936.3E-12	4.0E-09	-7.5E-09	-2.1E-09
67	-12.0E-09	-589.6E-12	1.7E-09	-9.7E-09	-589.6E-12	-12.8E-09	7.0E-09	-2.1E-09
68	-1.4E-09	6.3E-09	-7.5E-09	-4.4E-09	173.3E-12	-1.4E-09	-589.6E-12	-2.9E-09
69	9.3E-09	-9.7E-09	1.7E-09	-5.9E-09	3.2E-09	4.0E-09	10.1E-09	-8.2E-09
70	-9.0E-09	3.2E-09	173.3E-12	1.7E-09	-4.4E-09	-589.6E-12	3.2E-09	6.3E-09
Statistics								
Min	-15.1E-09	-12.0E-09	-12.8E-09	-12.8E-09	-7.5E-09	-12.8E-09	-10.5E-09	-9.7E-09
Max	9.3E-09	6.3E-09	9.3E-09	6.3E-09	3.2E-09	7.8E-09	10.1E-09	6.3E-09

IIHIO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-5.3E-09	-4.9E-09	-2.0E-09	-2.2E-09	-1.5E-09	-131.9E-12	-894.8E-12	-3.3E-09
Std Deviation	7.0E-09	5.9E-09	5.7E-09	6.2E-09	3.3E-09	5.7E-09	6.7E-09	5.5E-09

Measurements

IIHIO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-10.5E-09	-8.2E-09	-9.0E-09	-2.1E-09	-12.0E-09	-12.8E-09	-589.6E-12	-9.0E-09
50_OUT_REF	-4.4E-09	-9.7E-09	-3.6E-09	-2.1E-09	-1.4E-09	-10.5E-09	2.5E-09	-3.6E-09
OFF samples								
71	173.3E-12	-7.5E-09	4.8E-09	-5.2E-09	-1.4E-09	-2.9E-09	4.0E-09	-2.9E-09
72	-2.1E-09	-2.1E-09	6.3E-09	-6.7E-09	9.3E-09	7.8E-09	-10.5E-09	-3.6E-09
73	-15.1E-09	1.7E-09	1.7E-09	-2.1E-09	3.2E-09	-9.0E-09	4.8E-09	-2.9E-09
74	-5.2E-09	13.1E-09	-2.1E-09	-5.2E-09	-5.2E-09	173.3E-12	-1.4E-09	-2.9E-09
75	-2.9E-09	4.8E-09	-14.3E-09	-12.8E-09	6.3E-09	-5.2E-09	8.6E-09	-1.4E-09
76	-9.7E-09	-6.7E-09	-5.2E-09	-11.3E-09	6.3E-09	173.3E-12	-2.1E-09	-15.8E-09
77	-589.6E-12	-5.9E-09	173.3E-12	-5.2E-09	936.3E-12	3.2E-09	-3.6E-09	-3.6E-09
78	2.5E-09	-2.1E-09	-11.3E-09	173.3E-12	-2.9E-09	-2.1E-09	-5.2E-09	-2.9E-09
79	-1.4E-09	4.0E-09	6.3E-09	6.3E-09	936.3E-12	-11.3E-09	7.0E-09	1.7E-09
80	-589.6E-12	3.2E-09	173.3E-12	8.6E-09	-6.7E-09	-2.1E-09	-6.7E-09	3.2E-09
Statistics								
Min	-15.1E-09	-7.5E-09	-14.3E-09	-12.8E-09	-6.7E-09	-11.3E-09	-10.5E-09	-15.8E-09
Max	2.5E-09	13.1E-09	6.3E-09	8.6E-09	9.3E-09	7.8E-09	8.6E-09	3.2E-09
Average	-3.5E-09	249.6E-12	-1.4E-09	-3.3E-09	1.1E-09	-2.1E-09	-513.3E-12	-3.1E-09
Std Deviation	5.0E-09	6.1E-09	6.7E-09	6.5E-09	5.0E-09	5.3E-09	6.0E-09	4.8E-09

Parameter : Input Leakage Current High : IIHIO[3]
Test conditions : Vin= VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IIHIO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-18.1E-09	-13.6E-09	-15.8E-09	-16.6E-09	-11.3E-09	-15.8E-09	-8.2E-09	-9.0E-09
50_OUT_REF	-12.0E-09	-6.7E-09	-8.2E-09	936.3E-12	-21.2E-09	-12.8E-09	-21.2E-09	-8.2E-09
ON_LDC samples								
51	-4.4E-09	-18.9E-09	-12.8E-09	-14.3E-09	-5.2E-09	-21.2E-09	-14.3E-09	-13.6E-09
52	-10.5E-09	-18.1E-09	-13.6E-09	-14.3E-09	-14.3E-09	-3.6E-09	-5.2E-09	-7.5E-09
53	-13.6E-09	-9.7E-09	-6.7E-09	-15.8E-09	-8.2E-09	-15.1E-09	-2.1E-09	-21.2E-09
54	-15.1E-09	-8.2E-09	-6.7E-09	-18.9E-09	-3.6E-09	-6.7E-09	-6.7E-09	-14.3E-09
55	-22.7E-09	-8.2E-09	-22.0E-09	-19.7E-09	-20.4E-09	-10.5E-09	-20.4E-09	-18.9E-09
56	-5.2E-09	-7.5E-09	-17.4E-09	-19.7E-09	-24.2E-09	-13.6E-09	173.3E-12	-9.7E-09
57	-12.8E-09	-13.6E-09	-7.5E-09	-9.0E-09	-13.6E-09	-12.8E-09	-11.3E-09	-15.1E-09
58	-12.8E-09	-6.7E-09	-17.4E-09	-12.0E-09	-9.7E-09	-10.5E-09	-9.7E-09	-12.8E-09
59	-3.6E-09	-19.7E-09	-9.0E-09	-5.2E-09	-25.0E-09	-16.6E-09	-13.6E-09	-5.9E-09
60	-6.7E-09	-10.5E-09	-12.0E-09	-9.7E-09	-13.6E-09	-18.1E-09	-14.3E-09	-2.9E-09
Statistics								
Min	-22.7E-09	-19.7E-09	-22.0E-09	-19.7E-09	-25.0E-09	-21.2E-09	-20.4E-09	-21.2E-09
Max	-3.6E-09	-6.7E-09	-6.7E-09	-5.2E-09	-3.6E-09	-3.6E-09	173.3E-12	-2.9E-09
Average	-10.7E-09	-12.1E-09	-12.5E-09	-13.9E-09	-13.8E-09	-12.9E-09	-9.7E-09	-12.2E-09
Std Deviation	5.6E-09	4.8E-09	4.9E-09	4.7E-09	7.1E-09	5.0E-09	6.0E-09	5.4E-09

Measurements

IIHIO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-18.1E-09	-13.6E-09	-15.8E-09	-16.6E-09	-11.3E-09	-15.8E-09	-8.2E-09	-9.0E-09
50_OUT_REF	-12.0E-09	-6.7E-09	-8.2E-09	936.3E-12	-21.2E-09	-12.8E-09	-21.2E-09	-8.2E-09
ON_HDC samples								
61	-17.4E-09	-7.5E-09	-7.5E-09	-8.2E-09	-9.0E-09	-12.8E-09	-9.7E-09	-25.0E-09
62	-12.0E-09	-15.8E-09	-5.2E-09	-10.5E-09	-8.2E-09	-5.9E-09	-22.0E-09	-15.8E-09
63	-12.8E-09	-12.0E-09	-12.8E-09	-589.6E-12	-15.1E-09	-22.0E-09	-12.8E-09	-14.3E-09
64	-19.7E-09	936.3E-12	-24.2E-09	-4.4E-09	-3.6E-09	-16.6E-09	-14.3E-09	-2.1E-09
65	-4.4E-09	-9.7E-09	-14.3E-09	-17.4E-09	-11.3E-09	-15.8E-09	-5.2E-09	-5.2E-09
66	-6.7E-09	-5.9E-09	-5.2E-09	-5.2E-09	-8.2E-09	-11.3E-09	-12.0E-09	-11.3E-09
67	-14.3E-09	-16.6E-09	-6.7E-09	-5.9E-09	-12.0E-09	-15.1E-09	-16.6E-09	-13.6E-09
68	-6.7E-09	-10.5E-09	-12.0E-09	-15.8E-09	-9.7E-09	-15.8E-09	-12.0E-09	-18.1E-09
69	-10.5E-09	-14.3E-09	-16.6E-09	-17.4E-09	-20.4E-09	-19.7E-09	-16.6E-09	-5.9E-09
70	-18.1E-09	-10.5E-09	-20.4E-09	-2.1E-09	-5.9E-09	-4.4E-09	-12.0E-09	-5.9E-09
Statistics								
Min	-19.7E-09	-16.6E-09	-24.2E-09	-17.4E-09	-20.4E-09	-22.0E-09	-22.0E-09	-25.0E-09
Max	-4.4E-09	936.3E-12	-5.2E-09	-589.6E-12	-3.6E-09	-4.4E-09	-5.2E-09	-2.1E-09

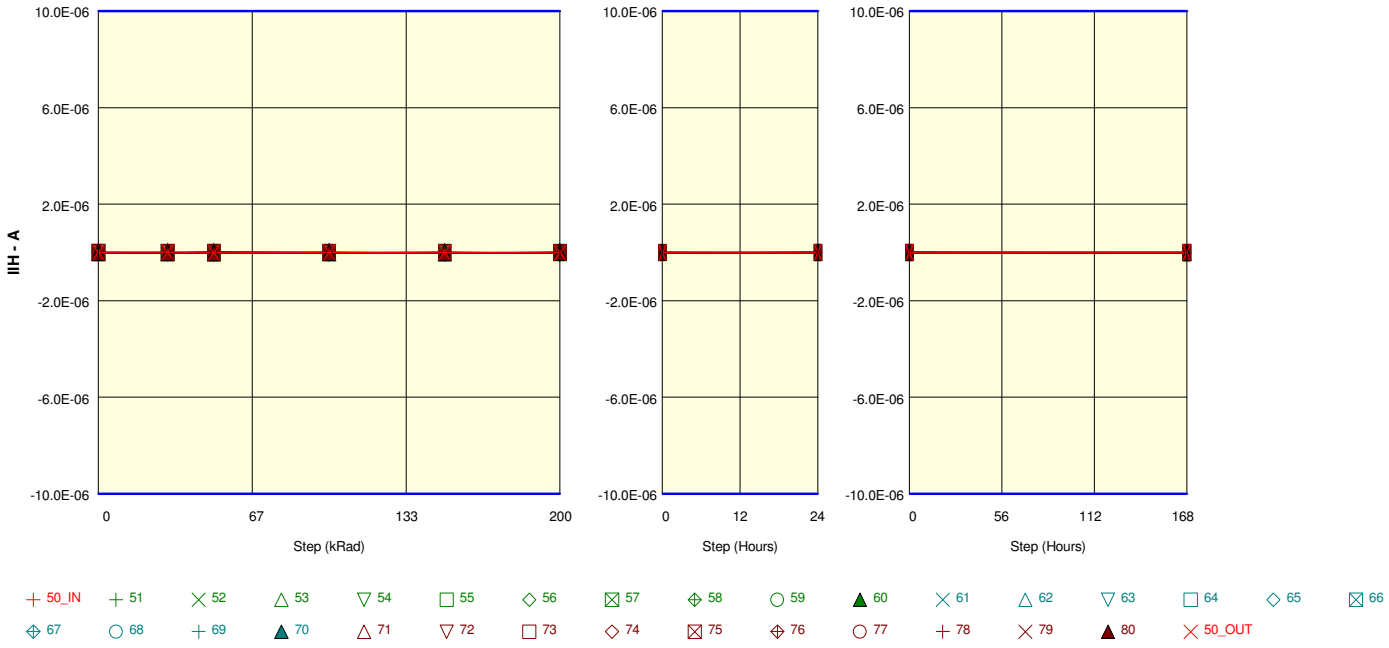
IIHIO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-12.3E-09	-10.2E-09	-12.5E-09	-8.8E-09	-10.4E-09	-13.9E-09	-13.3E-09	-11.7E-09
Std Deviation	5.0E-09	4.9E-09	6.2E-09	5.9E-09	4.5E-09	5.3E-09	4.3E-09	6.7E-09

Measurements

IIHIO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-18.1E-09	-13.6E-09	-15.8E-09	-16.6E-09	-11.3E-09	-15.8E-09	-8.2E-09	-9.0E-09
50_OUT_REF	-12.0E-09	-6.7E-09	-8.2E-09	936.3E-12	-21.2E-09	-12.8E-09	-21.2E-09	-8.2E-09
OFF samples								
71	-9.7E-09	-11.3E-09	-18.9E-09	-15.1E-09	-8.2E-09	-15.8E-09	-13.6E-09	-9.0E-09
72	-7.5E-09	-15.1E-09	-2.1E-09	-15.1E-09	-14.3E-09	-16.6E-09	-8.2E-09	-15.1E-09
73	-24.2E-09	-12.0E-09	-589.6E-12	-6.7E-09	-13.6E-09	-14.3E-09	-9.0E-09	-22.0E-09
74	-13.6E-09	-15.8E-09	-7.5E-09	-4.4E-09	-12.0E-09	-10.5E-09	-11.3E-09	-7.5E-09
75	-8.2E-09	-15.8E-09	-13.6E-09	-14.3E-09	-4.4E-09	-8.2E-09	-1.4E-09	-16.6E-09
76	-7.5E-09	-8.2E-09	-14.3E-09	-12.8E-09	-2.9E-09	-9.0E-09	-6.7E-09	-12.8E-09
77	-15.8E-09	-7.5E-09	-2.1E-09	-10.5E-09	-14.3E-09	-5.9E-09	-12.0E-09	-20.4E-09
78	-11.3E-09	-12.8E-09	-2.1E-09	-9.0E-09	-14.3E-09	-18.9E-09	-10.5E-09	-12.0E-09
79	-9.7E-09	-2.9E-09	-9.0E-09	-2.9E-09	-11.3E-09	-8.2E-09	1.7E-09	-21.2E-09
80	-20.4E-09	-5.9E-09	-12.8E-09	-2.1E-09	-3.6E-09	-8.2E-09	-7.5E-09	-12.8E-09
Statistics								
Min	-24.2E-09	-15.8E-09	-18.9E-09	-15.1E-09	-14.3E-09	-18.9E-09	-13.6E-09	-22.0E-09
Max	-7.5E-09	-2.9E-09	-589.6E-12	-2.1E-09	-2.9E-09	-5.9E-09	1.7E-09	-7.5E-09
Average	-12.8E-09	-10.7E-09	-8.3E-09	-9.3E-09	-9.9E-09	-11.6E-09	-7.8E-09	-14.9E-09
Std Deviation	5.5E-09	4.2E-09	6.1E-09	4.8E-09	4.5E-09	4.2E-09	4.5E-09	4.8E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current High : IIHIO[4]
Test conditions : Vin= VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IIHIO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-9.7E-09	-2.1E-09	-10.5E-09	-5.9E-09	-1.4E-09	-15.1E-09	-7.5E-09	9.3E-09
50_OUT_REF	936.3E-12	6.3E-09	-10.5E-09	4.0E-09	-2.9E-09	-11.3E-09	-3.6E-09	-5.2E-09
ON_LDC samples								
51	-589.6E-12	-8.2E-09	-6.7E-09	4.0E-09	-4.4E-09	-4.4E-09	936.3E-12	-2.9E-09
52	-13.6E-09	173.3E-12	9.3E-09	-11.3E-09	-10.5E-09	-5.2E-09	-2.1E-09	-8.2E-09
53	-5.9E-09	-9.7E-09	-11.3E-09	7.0E-09	-1.4E-09	-11.3E-09	5.5E-09	936.3E-12
54	-8.2E-09	1.7E-09	-2.1E-09	-7.5E-09	-10.5E-09	9.3E-09	-15.8E-09	936.3E-12
55	-3.6E-09	-11.3E-09	-13.6E-09	-6.7E-09	-9.0E-09	4.0E-09	-6.7E-09	-10.5E-09
56	173.3E-12	2.5E-09	-3.6E-09	-5.2E-09	-5.9E-09	3.2E-09	173.3E-12	6.3E-09
57	-3.6E-09	-4.4E-09	-6.7E-09	-1.4E-09	-2.1E-09	-1.4E-09	-2.1E-09	-589.6E-12
58	936.3E-12	936.3E-12	4.0E-09	-10.5E-09	7.0E-09	-14.3E-09	-1.4E-09	-589.6E-12
59	2.5E-09	2.5E-09	-1.4E-09	-4.4E-09	-5.2E-09	-9.7E-09	-1.4E-09	-7.5E-09
60	-11.3E-09	-2.1E-09	-5.2E-09	173.3E-12	-17.4E-09	3.2E-09	-1.4E-09	-12.8E-09
Statistics								
Min	-13.6E-09	-11.3E-09	-13.6E-09	-11.3E-09	-17.4E-09	-14.3E-09	-15.8E-09	-12.8E-09
Max	2.5E-09	2.5E-09	9.3E-09	7.0E-09	7.0E-09	9.3E-09	5.5E-09	6.3E-09
Average	-4.3E-09	-2.8E-09	-3.7E-09	-3.6E-09	-5.9E-09	-2.6E-09	-2.4E-09	-3.5E-09
Std Deviation	5.1E-09	5.0E-09	6.4E-09	5.7E-09	6.2E-09	7.3E-09	5.3E-09	5.7E-09

Measurements

IIHIO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-9.7E-09	-2.1E-09	-10.5E-09	-5.9E-09	-1.4E-09	-15.1E-09	-7.5E-09	9.3E-09
50_OUT_REF	936.3E-12	6.3E-09	-10.5E-09	4.0E-09	-2.9E-09	-11.3E-09	-3.6E-09	-5.2E-09
ON_HDC samples								
61	-6.7E-09	4.0E-09	3.2E-09	-2.9E-09	2.5E-09	3.2E-09	-7.5E-09	4.0E-09
62	-1.4E-09	1.7E-09	-11.3E-09	-5.2E-09	-10.5E-09	-1.4E-09	7.0E-09	-9.0E-09
63	-2.9E-09	1.7E-09	4.8E-09	-5.2E-09	4.8E-09	-15.1E-09	-5.2E-09	2.5E-09
64	-4.4E-09	-9.0E-09	-3.6E-09	-6.7E-09	-9.0E-09	-6.7E-09	-2.1E-09	936.3E-12
65	-5.2E-09	2.5E-09	4.8E-09	-4.4E-09	-9.7E-09	-5.2E-09	-1.4E-09	2.5E-09
66	-10.5E-09	2.5E-09	173.3E-12	5.5E-09	-12.8E-09	-9.0E-09	-2.9E-09	-589.6E-12
67	5.5E-09	6.3E-09	2.5E-09	2.5E-09	-7.5E-09	10.9E-09	-9.0E-09	-9.7E-09
68	-6.7E-09	-9.7E-09	-9.7E-09	-3.6E-09	-5.9E-09	-13.6E-09	3.2E-09	-2.9E-09
69	-3.6E-09	-589.6E-12	-4.4E-09	-3.6E-09	-13.6E-09	-5.9E-09	2.5E-09	-15.8E-09
70	1.7E-09	-589.6E-12	8.6E-09	-13.6E-09	-4.4E-09	936.3E-12	-12.0E-09	-9.0E-09
Statistics								
Min	-10.5E-09	-9.7E-09	-11.3E-09	-13.6E-09	-13.6E-09	-15.1E-09	-12.0E-09	-15.8E-09
Max	5.5E-09	6.3E-09	8.6E-09	5.5E-09	4.8E-09	10.9E-09	7.0E-09	4.0E-09

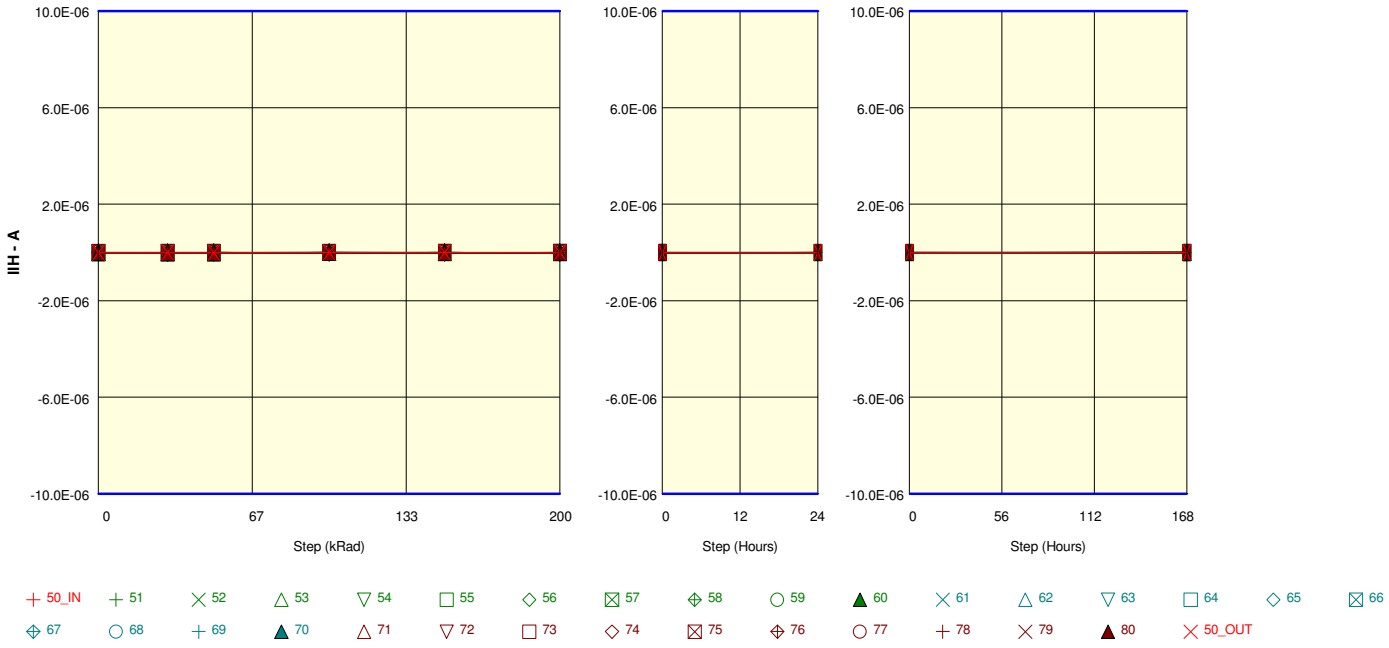
IIHIO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-3.4E-09	-131.8E-12	-513.3E-12	-3.7E-09	-6.6E-09	-4.2E-09	-2.7E-09	-3.7E-09
Std Deviation	4.3E-09	5.0E-09	6.2E-09	4.8E-09	5.8E-09	7.5E-09	5.6E-09	6.4E-09

Measurements

IIHIO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-9.7E-09	-2.1E-09	-10.5E-09	-5.9E-09	-1.4E-09	-15.1E-09	-7.5E-09	9.3E-09
50_OUT_REF	936.3E-12	6.3E-09	-10.5E-09	4.0E-09	-2.9E-09	-11.3E-09	-3.6E-09	-5.2E-09
OFF samples								
71	-5.2E-09	-5.2E-09	7.8E-09	1.7E-09	-12.0E-09	-6.7E-09	-5.9E-09	-3.6E-09
72	-5.2E-09	-8.2E-09	2.5E-09	-4.4E-09	-2.9E-09	-15.1E-09	-2.9E-09	173.3E-12
73	-2.1E-09	-2.1E-09	-15.8E-09	-10.5E-09	-589.6E-12	-4.4E-09	-3.6E-09	-13.6E-09
74	-2.1E-09	-589.6E-12	5.5E-09	-2.1E-09	-12.8E-09	-589.6E-12	-5.2E-09	-4.4E-09
75	-3.6E-09	-13.6E-09	7.8E-09	-2.1E-09	-2.1E-09	-6.7E-09	6.3E-09	-2.9E-09
76	6.3E-09	-3.6E-09	6.3E-09	-2.9E-09	-4.4E-09	-5.2E-09	-5.2E-09	-12.8E-09
77	-8.2E-09	936.3E-12	-6.7E-09	-3.6E-09	9.3E-09	-9.7E-09	-9.7E-09	-3.6E-09
78	1.7E-09	-3.6E-09	-10.5E-09	-2.1E-09	-8.2E-09	5.5E-09	5.5E-09	-2.1E-09
79	-9.0E-09	-6.7E-09	-9.0E-09	-13.6E-09	-2.9E-09	-4.4E-09	173.3E-12	-13.6E-09
80	936.3E-12	-7.5E-09	-9.7E-09	-1.4E-09	-5.2E-09	1.7E-09	-5.2E-09	-5.2E-09
Statistics								
Min	-9.0E-09	-13.6E-09	-15.8E-09	-13.6E-09	-12.8E-09	-15.1E-09	-9.7E-09	-13.6E-09
Max	6.3E-09	936.3E-12	7.8E-09	1.7E-09	9.3E-09	5.5E-09	6.3E-09	173.3E-12
Average	-2.6E-09	-5.0E-09	-2.2E-09	-4.1E-09	-4.2E-09	-4.6E-09	-2.6E-09	-6.2E-09
Std Deviation	4.4E-09	4.0E-09	8.6E-09	4.3E-09	6.0E-09	5.5E-09	4.9E-09	4.9E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current High : IIHIO[5]
Test conditions : Vin= VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IIHIO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-11.3E-09	-14.3E-09	-13.6E-09	-5.2E-09	-9.7E-09	-9.7E-09	-6.7E-09	-12.8E-09
50_OUT_REF	-12.8E-09	-4.4E-09	-12.0E-09	-589.6E-12	-2.1E-09	-6.7E-09	-4.4E-09	-2.9E-09
ON_LDC samples								
51	-9.0E-09	-9.7E-09	173.3E-12	-5.9E-09	-589.6E-12	-15.1E-09	-3.6E-09	-5.2E-09
52	-8.2E-09	-12.0E-09	-4.4E-09	-5.9E-09	-1.4E-09	-5.9E-09	-12.8E-09	-5.9E-09
53	-12.0E-09	-589.6E-12	-9.7E-09	173.3E-12	-9.7E-09	-5.9E-09	-5.9E-09	-12.0E-09
54	-5.9E-09	-5.2E-09	-6.7E-09	-7.5E-09	-5.9E-09	-5.9E-09	-3.6E-09	-589.6E-12
55	-6.7E-09	-2.9E-09	4.0E-09	-5.9E-09	4.8E-09	-4.4E-09	-4.4E-09	-2.1E-09
56	-6.7E-09	-5.9E-09	4.8E-09	-2.1E-09	-5.9E-09	-15.1E-09	-4.4E-09	3.2E-09
57	-4.4E-09	-7.5E-09	-9.0E-09	4.0E-09	1.7E-09	-5.2E-09	-10.5E-09	7.8E-09
58	-5.9E-09	-5.2E-09	-10.5E-09	-3.6E-09	4.8E-09	-6.7E-09	-9.7E-09	-6.7E-09
59	-12.8E-09	-9.7E-09	-7.5E-09	1.7E-09	-2.1E-09	173.3E-12	-5.9E-09	-1.4E-09
60	-14.3E-09	-14.3E-09	3.2E-09	-2.9E-09	-1.4E-09	-2.9E-09	-2.1E-09	-2.9E-09
Statistics								
Min	-14.3E-09	-14.3E-09	-10.5E-09	-7.5E-09	-9.7E-09	-15.1E-09	-12.8E-09	-12.0E-09
Max	-4.4E-09	-589.6E-12	4.8E-09	4.0E-09	4.8E-09	173.3E-12	-2.1E-09	7.8E-09
Average	-8.6E-09	-7.3E-09	-3.6E-09	-2.8E-09	-1.6E-09	-6.7E-09	-6.3E-09	-2.6E-09
Std Deviation	3.2E-09	4.0E-09	5.7E-09	3.6E-09	4.4E-09	4.6E-09	3.3E-09	5.2E-09

Measurements

IIHIO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-11.3E-09	-14.3E-09	-13.6E-09	-5.2E-09	-9.7E-09	-9.7E-09	-6.7E-09	-12.8E-09
50_OUT_REF	-12.8E-09	-4.4E-09	-12.0E-09	-589.6E-12	-2.1E-09	-6.7E-09	-4.4E-09	-2.9E-09
ON_HDC samples								
61	-13.6E-09	-8.2E-09	-8.2E-09	2.5E-09	-2.9E-09	-11.3E-09	-5.2E-09	-2.1E-09
62	-5.2E-09	-7.5E-09	-2.1E-09	-8.2E-09	-5.2E-09	-9.0E-09	-2.1E-09	-1.4E-09
63	-9.7E-09	-4.4E-09	4.8E-09	-9.0E-09	-5.2E-09	-3.6E-09	-5.9E-09	7.0E-09
64	-589.6E-12	2.5E-09	-11.3E-09	-8.2E-09	-5.9E-09	-589.6E-12	2.5E-09	-6.7E-09
65	-3.6E-09	-9.0E-09	1.7E-09	-3.6E-09	-9.7E-09	-11.3E-09	-589.6E-12	-589.6E-12
66	-10.5E-09	-12.8E-09	-8.2E-09	6.3E-09	-5.9E-09	1.7E-09	4.0E-09	-589.6E-12
67	-6.7E-09	-8.2E-09	-1.4E-09	-13.6E-09	-3.6E-09	-12.8E-09	-4.4E-09	-1.4E-09
68	-6.7E-09	-14.3E-09	-5.9E-09	3.2E-09	-12.8E-09	-5.9E-09	-11.3E-09	-10.5E-09
69	-17.4E-09	-3.6E-09	3.2E-09	-12.8E-09	-5.2E-09	-10.5E-09	-5.2E-09	-8.2E-09
70	-2.1E-09	4.0E-09	-13.6E-09	-7.5E-09	-5.2E-09	-5.9E-09	-6.7E-09	-2.9E-09
Statistics								
Min	-17.4E-09	-14.3E-09	-13.6E-09	-13.6E-09	-12.8E-09	-12.8E-09	-11.3E-09	-10.5E-09
Max	-589.6E-12	4.0E-09	4.8E-09	6.3E-09	-2.9E-09	1.7E-09	4.0E-09	7.0E-09

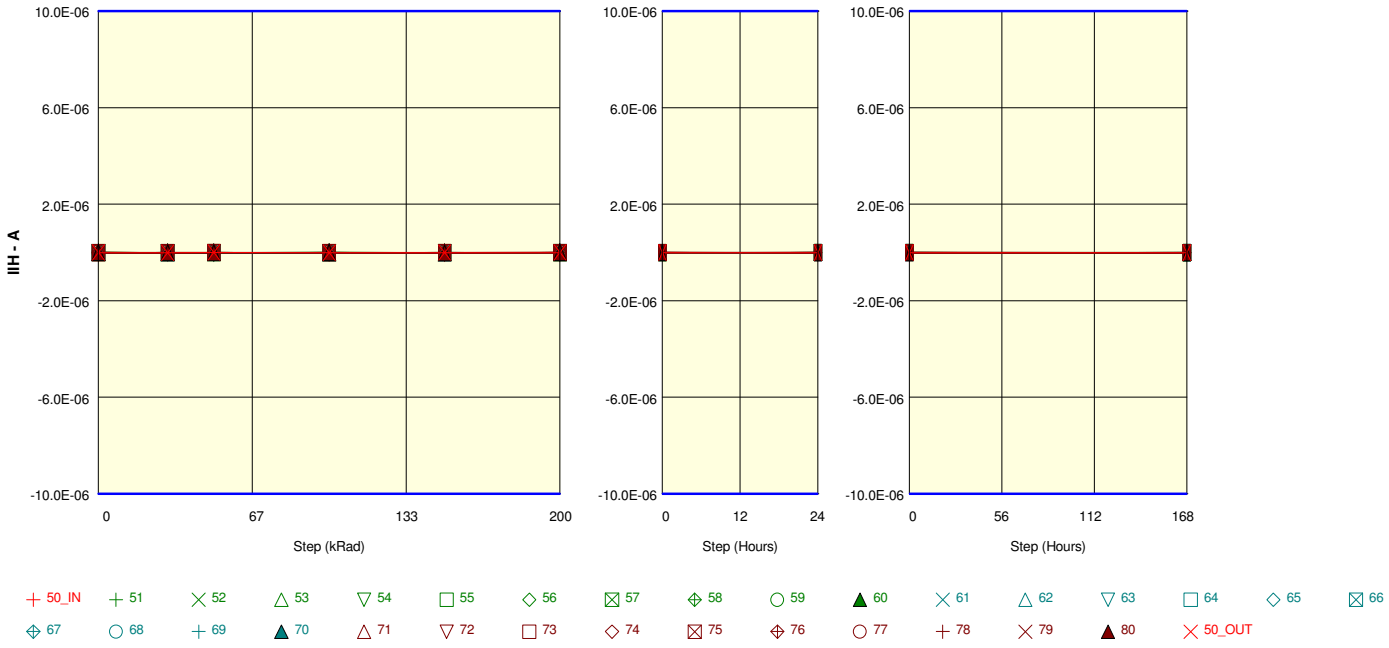
IIHIO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-7.6E-09	-6.2E-09	-4.1E-09	-5.1E-09	-6.2E-09	-6.9E-09	-3.5E-09	-2.7E-09
Std Deviation	5.0E-09	5.6E-09	6.0E-09	6.5E-09	2.8E-09	4.7E-09	4.3E-09	4.6E-09

Measurements

IIHIO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-11.3E-09	-14.3E-09	-13.6E-09	-5.2E-09	-9.7E-09	-9.7E-09	-6.7E-09	-12.8E-09
50_OUT_REF	-12.8E-09	-4.4E-09	-12.0E-09	-589.6E-12	-2.1E-09	-6.7E-09	-4.4E-09	-2.9E-09
OFF samples								
71	173.3E-12	-5.2E-09	-8.2E-09	-5.2E-09	-4.4E-09	-2.9E-09	1.7E-09	-2.9E-09
72	936.3E-12	-9.7E-09	4.8E-09	-589.6E-12	936.3E-12	-5.2E-09	-18.1E-09	-1.4E-09
73	-8.2E-09	4.0E-09	-2.1E-09	-5.2E-09	-5.2E-09	-14.3E-09	1.7E-09	-1.4E-09
74	-3.6E-09	-8.2E-09	-11.3E-09	-9.7E-09	936.3E-12	-12.0E-09	-2.1E-09	-1.4E-09
75	-8.2E-09	-14.3E-09	173.3E-12	-5.9E-09	-2.9E-09	936.3E-12	-8.2E-09	-12.8E-09
76	-9.0E-09	-9.7E-09	-9.7E-09	2.5E-09	-13.6E-09	1.7E-09	-2.9E-09	-7.5E-09
77	-5.2E-09	-19.7E-09	-12.0E-09	-5.9E-09	-3.6E-09	-3.6E-09	-8.2E-09	5.5E-09
78	-2.9E-09	-2.9E-09	4.0E-09	-2.9E-09	-15.8E-09	-5.2E-09	-2.9E-09	-10.5E-09
79	-2.9E-09	3.2E-09	173.3E-12	-5.9E-09	-7.5E-09	-4.4E-09	173.3E-12	-1.4E-09
80	-5.2E-09	-9.7E-09	-9.7E-09	-8.2E-09	-2.1E-09	-5.9E-09	-7.5E-09	-5.9E-09
Statistics								
Min	-9.0E-09	-19.7E-09	-12.0E-09	-9.7E-09	-15.8E-09	-14.3E-09	-18.1E-09	-12.8E-09
Max	936.3E-12	4.0E-09	4.8E-09	2.5E-09	936.3E-12	1.7E-09	1.7E-09	5.5E-09
Average	-4.4E-09	-7.2E-09	-4.4E-09	-4.7E-09	-5.3E-09	-5.1E-09	-4.6E-09	-3.9E-09
Std Deviation	3.3E-09	7.0E-09	6.2E-09	3.4E-09	5.3E-09	4.7E-09	5.8E-09	5.1E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current High : IIHIO[6]
Test conditions : Vin= VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IIHIO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-6.7E-09	-1.4E-09	-5.9E-09	-8.2E-09	-9.0E-09	-2.9E-09	-4.4E-09	-2.1E-09
50_OUT_REF	-3.6E-09	-13.6E-09	936.3E-12	-12.8E-09	-8.2E-09	-4.4E-09	-6.7E-09	-12.8E-09
ON_LDC samples								
51	5.5E-09	-12.0E-09	-10.5E-09	-4.4E-09	2.5E-09	-8.2E-09	-13.6E-09	-15.8E-09
52	-16.6E-09	-7.5E-09	173.3E-12	-17.4E-09	-14.3E-09	-11.3E-09	-2.9E-09	-12.8E-09
53	-11.3E-09	-9.7E-09	-17.4E-09	-12.8E-09	-1.4E-09	-8.2E-09	-7.5E-09	-10.5E-09
54	-4.4E-09	-15.1E-09	-11.3E-09	-11.3E-09	-11.3E-09	-4.4E-09	-5.2E-09	-589.6E-12
55	-7.5E-09	-9.0E-09	-8.2E-09	-5.9E-09	-2.9E-09	-11.3E-09	-5.2E-09	-16.6E-09
56	3.2E-09	173.3E-12	-8.2E-09	7.0E-09	-6.7E-09	-8.2E-09	2.5E-09	-12.0E-09
57	-5.9E-09	-9.0E-09	-1.4E-09	-13.6E-09	-9.0E-09	-9.7E-09	-3.6E-09	4.0E-09
58	-4.4E-09	936.3E-12	-1.4E-09	-12.0E-09	-9.0E-09	-6.7E-09	-1.4E-09	-3.6E-09
59	-9.7E-09	-3.6E-09	-15.1E-09	-5.9E-09	-8.2E-09	-9.7E-09	173.3E-12	173.3E-12
60	-2.9E-09	-15.8E-09	936.3E-12	-5.2E-09	-13.6E-09	-3.6E-09	-5.9E-09	-3.6E-09
Statistics								
Min	-16.6E-09	-15.8E-09	-17.4E-09	-17.4E-09	-14.3E-09	-11.3E-09	-13.6E-09	-16.6E-09
Max	5.5E-09	936.3E-12	936.3E-12	7.0E-09	2.5E-09	-3.6E-09	2.5E-09	4.0E-09
Average	-5.4E-09	-8.1E-09	-7.2E-09	-8.1E-09	-7.4E-09	-8.1E-09	-4.3E-09	-7.2E-09
Std Deviation	6.2E-09	5.5E-09	6.2E-09	6.5E-09	5.1E-09	2.5E-09	4.2E-09	6.9E-09

Measurements

IIHIO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-6.7E-09	-1.4E-09	-5.9E-09	-8.2E-09	-9.0E-09	-2.9E-09	-4.4E-09	-2.1E-09
50_OUT_REF	-3.6E-09	-13.6E-09	936.3E-12	-12.8E-09	-8.2E-09	-4.4E-09	-6.7E-09	-12.8E-09
ON_HDC samples								
61	1.7E-09	-18.1E-09	-7.5E-09	-3.6E-09	-589.6E-12	-6.7E-09	-11.3E-09	2.5E-09
62	-10.5E-09	-10.5E-09	-8.2E-09	-18.1E-09	-4.4E-09	-3.6E-09	-2.1E-09	-13.6E-09
63	-6.7E-09	-14.3E-09	-12.0E-09	-5.9E-09	-8.2E-09	-16.6E-09	-2.9E-09	-1.4E-09
64	-8.2E-09	-10.5E-09	-6.7E-09	-12.0E-09	-7.5E-09	-13.6E-09	-9.7E-09	-2.9E-09
65	-6.7E-09	-1.4E-09	-14.3E-09	-4.4E-09	-5.9E-09	-13.6E-09	-20.4E-09	-12.0E-09
66	-5.9E-09	936.3E-12	-6.7E-09	-18.1E-09	-10.5E-09	1.7E-09	-5.2E-09	-3.6E-09
67	-15.8E-09	-14.3E-09	-2.1E-09	2.5E-09	-13.6E-09	-17.4E-09	-15.8E-09	-11.3E-09
68	-6.7E-09	3.2E-09	-8.2E-09	-12.0E-09	-12.8E-09	-9.0E-09	-7.5E-09	-4.4E-09
69	-5.2E-09	-2.9E-09	-7.5E-09	-2.1E-09	-15.1E-09	-9.0E-09	-19.7E-09	-16.6E-09
70	-8.2E-09	936.3E-12	-7.5E-09	-3.6E-09	-12.8E-09	-2.9E-09	1.7E-09	-12.0E-09
Statistics								
Min	-15.8E-09	-18.1E-09	-14.3E-09	-18.1E-09	-15.1E-09	-17.4E-09	-20.4E-09	-16.6E-09
Max	1.7E-09	3.2E-09	-2.1E-09	2.5E-09	-589.6E-12	1.7E-09	1.7E-09	2.5E-09

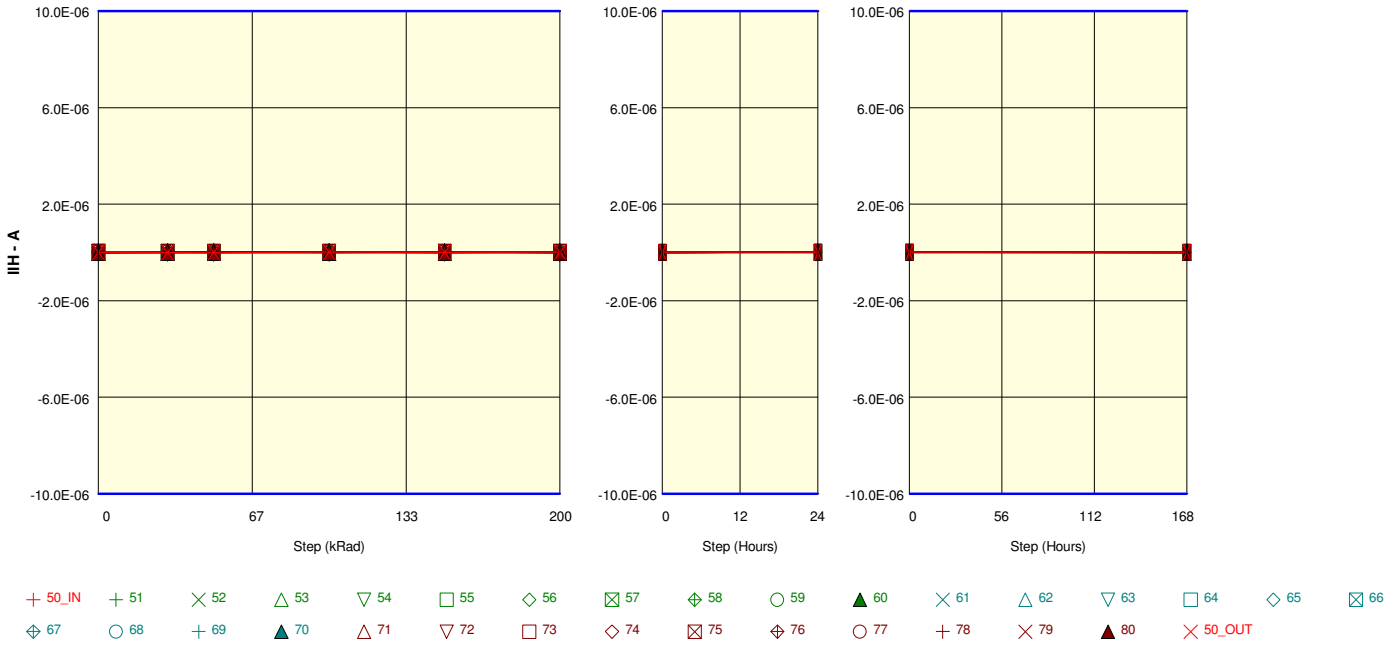
IIHIO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-7.2E-09	-6.7E-09	-8.1E-09	-7.8E-09	-9.1E-09	-9.1E-09	-9.3E-09	-7.5E-09
Std Deviation	4.2E-09	7.3E-09	3.1E-09	6.6E-09	4.4E-09	6.0E-09	7.2E-09	6.0E-09

Measurements

IIHIO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-6.7E-09	-1.4E-09	-5.9E-09	-8.2E-09	-9.0E-09	-2.9E-09	-4.4E-09	-2.1E-09
50_OUT_REF	-3.6E-09	-13.6E-09	936.3E-12	-12.8E-09	-8.2E-09	-4.4E-09	-6.7E-09	-12.8E-09
OFF samples								
71	-8.2E-09	-5.2E-09	-8.2E-09	-10.5E-09	-3.6E-09	173.3E-12	-10.5E-09	-4.4E-09
72	-1.4E-09	-7.5E-09	-5.2E-09	1.7E-09	-14.3E-09	-16.6E-09	-11.3E-09	-9.7E-09
73	-13.6E-09	4.8E-09	-2.9E-09	-12.0E-09	-1.4E-09	5.5E-09	-5.9E-09	-9.0E-09
74	-4.4E-09	-7.5E-09	-5.9E-09	-3.6E-09	-5.2E-09	-4.4E-09	-5.2E-09	-7.5E-09
75	-12.0E-09	-17.4E-09	173.3E-12	3.2E-09	-2.1E-09	-15.1E-09	936.3E-12	-2.1E-09
76	-12.8E-09	-8.2E-09	-2.9E-09	-3.6E-09	-9.7E-09	-589.6E-12	-8.2E-09	173.3E-12
77	-3.6E-09	-15.8E-09	-7.5E-09	-12.0E-09	-12.0E-09	-10.5E-09	7.8E-09	-10.5E-09
78	-10.5E-09	-14.3E-09	-3.6E-09	-2.9E-09	-10.5E-09	-9.0E-09	-15.1E-09	-1.4E-09
79	4.8E-09	173.3E-12	173.3E-12	-13.6E-09	-5.9E-09	173.3E-12	3.2E-09	-4.4E-09
80	7.0E-09	-8.2E-09	-13.6E-09	173.3E-12	-18.9E-09	-589.6E-12	-9.7E-09	-9.7E-09
Statistics								
Min	-13.6E-09	-17.4E-09	-13.6E-09	-13.6E-09	-18.9E-09	-16.6E-09	-15.1E-09	-10.5E-09
Max	7.0E-09	4.8E-09	173.3E-12	3.2E-09	-1.4E-09	5.5E-09	7.8E-09	173.3E-12
Average	-5.5E-09	-7.9E-09	-4.9E-09	-5.3E-09	-8.4E-09	-5.1E-09	-5.4E-09	-5.9E-09
Std Deviation	6.9E-09	6.5E-09	3.9E-09	5.9E-09	5.4E-09	7.0E-09	6.9E-09	3.7E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Leakage Current High : IIHIO[7]
Test conditions : Vin= VCC= VCCmax (3.6V)
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

IIHIO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-7.5E-09	7.0E-09	-2.1E-09	-9.7E-09	-2.9E-09	4.0E-09	-2.9E-09	-6.7E-09
50_OUT_REF	1.7E-09	1.7E-09	-3.6E-09	10.1E-09	-2.9E-09	10.9E-09	5.5E-09	15.4E-09
ON_LDC samples								
51	936.3E-12	9.3E-09	9.3E-09	1.7E-09	3.2E-09	173.3E-12	-1.4E-09	-4.4E-09
52	-4.4E-09	-1.4E-09	-12.0E-09	10.9E-09	20.0E-09	-9.0E-09	11.6E-09	4.0E-09
53	3.2E-09	-7.5E-09	1.7E-09	1.7E-09	-1.4E-09	-2.9E-09	-8.2E-09	3.2E-09
54	1.7E-09	7.0E-09	-2.1E-09	936.3E-12	936.3E-12	-2.1E-09	7.0E-09	-1.4E-09
55	1.7E-09	-4.4E-09	2.5E-09	5.5E-09	7.8E-09	936.3E-12	173.3E-12	2.5E-09
56	-6.7E-09	1.7E-09	2.5E-09	10.9E-09	1.7E-09	-5.9E-09	-589.6E-12	-8.2E-09
57	-2.1E-09	3.2E-09	-589.6E-12	4.0E-09	-3.6E-09	-589.6E-12	2.5E-09	-589.6E-12
58	-589.6E-12	-4.4E-09	-10.5E-09	-3.6E-09	-3.6E-09	-2.1E-09	-2.1E-09	5.5E-09
59	936.3E-12	-1.4E-09	4.0E-09	-3.6E-09	936.3E-12	-8.2E-09	3.2E-09	-9.0E-09
60	173.3E-12	3.2E-09	-7.5E-09	936.3E-12	3.2E-09	9.3E-09	13.9E-09	-2.9E-09
Statistics								
Min	-6.7E-09	-7.5E-09	-12.0E-09	-3.6E-09	-3.6E-09	-9.0E-09	-8.2E-09	-9.0E-09
Max	3.2E-09	9.3E-09	9.3E-09	10.9E-09	20.0E-09	9.3E-09	13.9E-09	5.5E-09
Average	-513.3E-12	554.8E-12	-1.3E-09	2.9E-09	2.9E-09	-2.0E-09	2.6E-09	-1.1E-09
Std Deviation	2.9E-09	5.1E-09	6.5E-09	4.8E-09	6.6E-09	5.0E-09	6.3E-09	4.8E-09

Measurements

IIHIO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-7.5E-09	7.0E-09	-2.1E-09	-9.7E-09	-2.9E-09	4.0E-09	-2.9E-09	-6.7E-09
50_OUT_REF	1.7E-09	1.7E-09	-3.6E-09	10.1E-09	-2.9E-09	10.9E-09	5.5E-09	15.4E-09
ON_HDC samples								
61	1.7E-09	-11.3E-09	5.5E-09	2.5E-09	4.8E-09	5.5E-09	10.9E-09	-7.5E-09
62	-5.2E-09	-2.9E-09	4.0E-09	-1.4E-09	5.5E-09	-8.2E-09	5.5E-09	1.7E-09
63	15.4E-09	3.2E-09	-6.7E-09	4.8E-09	173.3E-12	936.3E-12	-2.1E-09	1.7E-09
64	-9.0E-09	-5.2E-09	5.5E-09	5.5E-09	173.3E-12	8.6E-09	3.2E-09	5.5E-09
65	-3.6E-09	-5.9E-09	4.8E-09	4.8E-09	4.0E-09	-589.6E-12	173.3E-12	10.1E-09
66	9.3E-09	-2.1E-09	3.2E-09	9.3E-09	-8.2E-09	10.1E-09	936.3E-12	-2.1E-09
67	-1.4E-09	3.2E-09	-589.6E-12	15.4E-09	11.6E-09	-4.4E-09	9.3E-09	12.4E-09
68	936.3E-12	3.2E-09	-8.2E-09	-589.6E-12	3.2E-09	-589.6E-12	8.6E-09	-8.2E-09
69	936.3E-12	-2.1E-09	936.3E-12	-5.2E-09	-2.9E-09	9.3E-09	-589.6E-12	8.6E-09
70	-9.0E-09	4.0E-09	-2.9E-09	173.3E-12	4.0E-09	-2.9E-09	4.0E-09	-9.0E-09
Statistics								
Min	-9.0E-09	-11.3E-09	-8.2E-09	-5.2E-09	-8.2E-09	-8.2E-09	-2.1E-09	-9.0E-09
Max	15.4E-09	4.0E-09	5.5E-09	15.4E-09	11.6E-09	10.1E-09	10.9E-09	12.4E-09

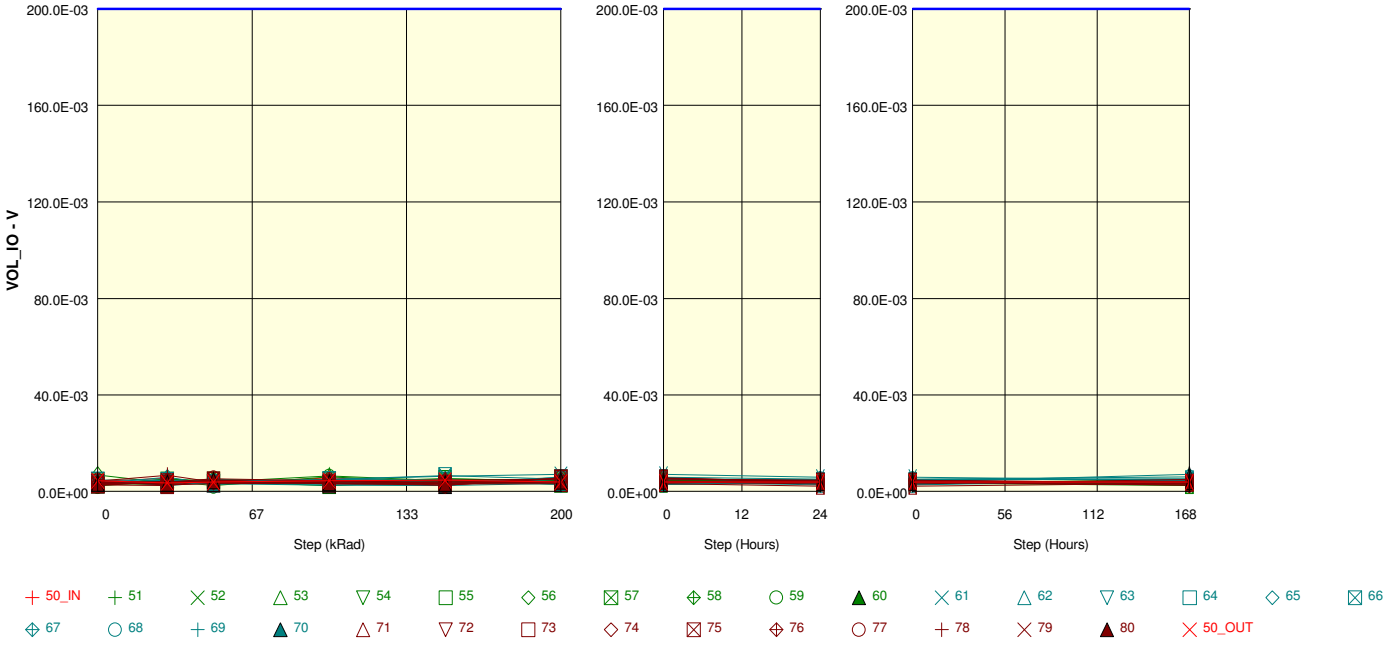
IIHIO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	20.7E-12	-1.6E-09	554.8E-12	3.5E-09	2.2E-09	1.8E-09	4.0E-09	1.3E-09
Std Deviation	7.3E-09	4.8E-09	4.8E-09	5.6E-09	5.1E-09	6.0E-09	4.3E-09	7.5E-09

Measurements

IIHIO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-7.5E-09	7.0E-09	-2.1E-09	-9.7E-09	-2.9E-09	4.0E-09	-2.9E-09	-6.7E-09
50_OUT_REF	1.7E-09	1.7E-09	-3.6E-09	10.1E-09	-2.9E-09	10.9E-09	5.5E-09	15.4E-09
OFF samples								
71	3.2E-09	3.2E-09	13.9E-09	173.3E-12	2.5E-09	-1.4E-09	-2.1E-09	4.0E-09
72	-4.4E-09	1.7E-09	936.3E-12	7.8E-09	9.3E-09	5.5E-09	8.6E-09	8.6E-09
73	-3.6E-09	6.3E-09	1.7E-09	936.3E-12	-3.6E-09	173.3E-12	16.2E-09	4.0E-09
74	13.9E-09	4.0E-09	6.3E-09	-2.1E-09	4.0E-09	936.3E-12	3.2E-09	1.7E-09
75	-6.7E-09	2.5E-09	-2.9E-09	10.1E-09	-3.6E-09	7.0E-09	4.8E-09	173.3E-12
76	2.5E-09	-2.1E-09	10.9E-09	5.5E-09	4.8E-09	-589.6E-12	3.2E-09	-589.6E-12
77	6.3E-09	10.9E-09	8.6E-09	3.2E-09	936.3E-12	-9.7E-09	-3.6E-09	-9.0E-09
78	1.7E-09	1.7E-09	7.8E-09	-15.8E-09	7.8E-09	-3.6E-09	8.6E-09	13.1E-09
79	-5.2E-09	6.3E-09	173.3E-12	173.3E-12	-9.0E-09	-7.5E-09	5.5E-09	-3.6E-09
80	-8.2E-09	-3.6E-09	-4.4E-09	173.3E-12	5.5E-09	10.9E-09	7.0E-09	13.9E-09
Statistics								
Min	-8.2E-09	-3.6E-09	-4.4E-09	-15.8E-09	-9.0E-09	-9.7E-09	-3.6E-09	-9.0E-09
Max	13.9E-09	10.9E-09	13.9E-09	10.1E-09	9.3E-09	10.9E-09	16.2E-09	13.9E-09
Average	-55.6E-12	3.1E-09	4.3E-09	1.0E-09	1.9E-09	173.3E-12	5.1E-09	3.2E-09
Std Deviation	6.5E-09	4.0E-09	5.8E-09	6.7E-09	5.4E-09	6.0E-09	5.4E-09	6.8E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Low Voltage : VOL_IO[0]
Test conditions : IOL=100uA. Vcc = 3.3V
Unit : V
Spec Limit Max : 200.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

VOL_IO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	4.2E-03	5.5E-03	3.4E-03	5.7E-03	3.5E-03	4.0E-03	3.8E-03	3.5E-03
50_OUT_REF	4.5E-03	3.5E-03	3.8E-03	4.5E-03	4.6E-03	3.8E-03	3.8E-03	3.8E-03
ON_LDC samples								
51	3.1E-03	3.8E-03	3.8E-03	4.5E-03	4.0E-03	4.6E-03	4.0E-03	3.1E-03
52	3.4E-03	2.9E-03	4.0E-03	4.8E-03	3.7E-03	4.9E-03	3.1E-03	4.3E-03
53	2.6E-03	5.2E-03	3.8E-03	6.4E-03	4.5E-03	4.8E-03	4.0E-03	3.1E-03
54	4.3E-03	3.1E-03	3.4E-03	4.5E-03	4.3E-03	3.7E-03	3.2E-03	4.0E-03
55	2.9E-03	4.8E-03	4.5E-03	2.3E-03	4.6E-03	2.9E-03	4.0E-03	3.8E-03
56	6.9E-03	3.5E-03	5.1E-03	3.7E-03	5.1E-03	4.6E-03	4.0E-03	3.5E-03
57	3.4E-03	2.9E-03	4.8E-03	3.7E-03	5.4E-03	4.2E-03	3.5E-03	2.5E-03
58	3.4E-03	4.8E-03	4.8E-03	3.7E-03	3.2E-03	4.5E-03	3.4E-03	4.9E-03
59	2.3E-03	4.3E-03	2.5E-03	6.0E-03	3.8E-03	5.1E-03	4.2E-03	3.2E-03
60	2.6E-03	5.1E-03	3.1E-03	3.7E-03	3.5E-03	3.4E-03	3.8E-03	4.0E-03
Statistics								
Min	2.3E-03	2.9E-03	2.5E-03	2.3E-03	3.2E-03	2.9E-03	3.1E-03	2.5E-03
Max	6.9E-03	5.2E-03	5.1E-03	6.4E-03	5.4E-03	5.1E-03	4.2E-03	4.9E-03
Average	3.5E-03	4.0E-03	4.0E-03	4.3E-03	4.2E-03	4.3E-03	3.7E-03	3.7E-03
Std Deviation	1.3E-03	849.7E-06	780.4E-06	1.1E-03	644.5E-06	668.8E-06	359.8E-06	672.3E-06

Measurements

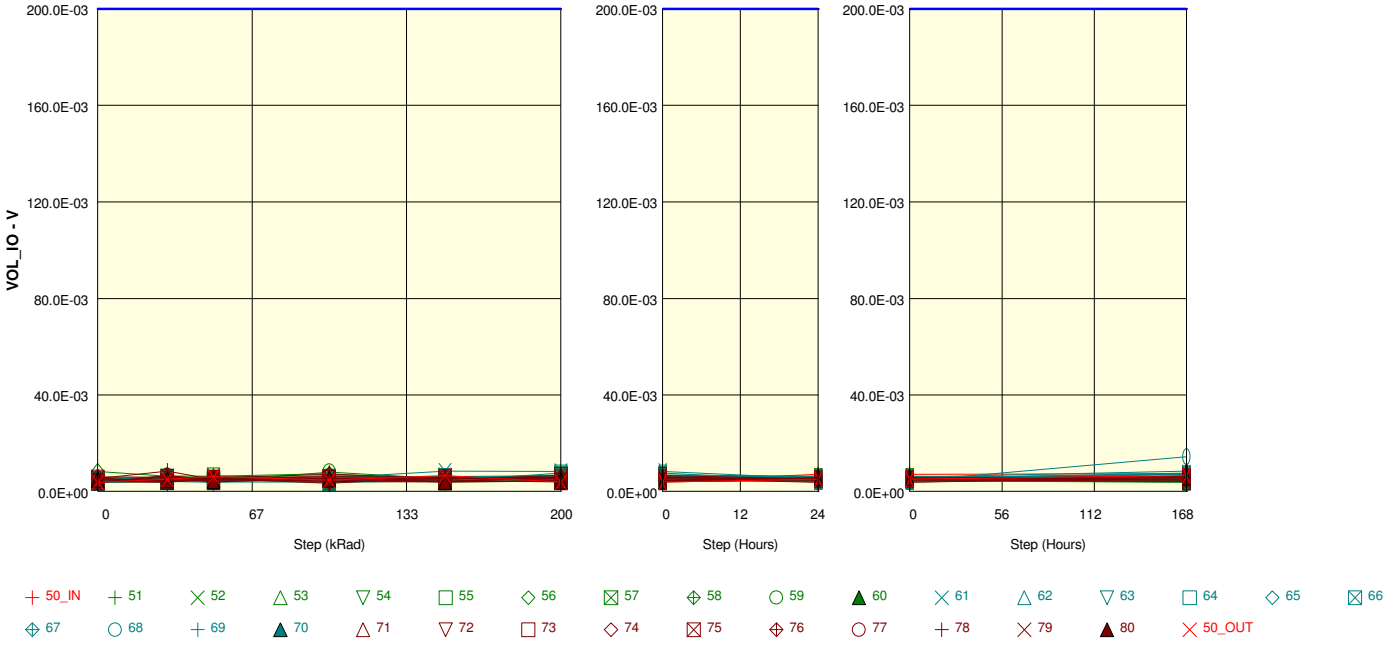
VOL_IO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	4.2E-03	5.5E-03	3.4E-03	5.7E-03	3.5E-03	4.0E-03	3.8E-03	3.5E-03
50_OUT_REF	4.5E-03	3.5E-03	3.8E-03	4.5E-03	4.6E-03	3.8E-03	3.8E-03	3.8E-03
ON_HDC samples								
61	3.5E-03	3.8E-03	4.3E-03	4.9E-03	6.3E-03	7.1E-03	5.8E-03	4.8E-03
62	2.9E-03	4.6E-03	3.1E-03	4.2E-03	4.8E-03	3.2E-03	3.7E-03	4.3E-03
63	4.6E-03	4.6E-03	3.5E-03	4.9E-03	4.8E-03	3.8E-03	2.8E-03	4.6E-03
64	4.8E-03	2.5E-03	3.7E-03	3.1E-03	3.4E-03	5.8E-03	2.9E-03	4.6E-03
65	3.2E-03	5.8E-03	2.9E-03	4.3E-03	4.0E-03	2.9E-03	3.4E-03	3.8E-03
66	3.5E-03	3.5E-03	3.5E-03	4.9E-03	6.6E-03	5.1E-03	4.6E-03	5.2E-03
67	3.4E-03	4.2E-03	3.4E-03	3.1E-03	4.8E-03	2.9E-03	4.0E-03	4.2E-03
68	3.2E-03	4.6E-03	3.5E-03	3.1E-03	2.6E-03	5.8E-03	5.1E-03	6.0E-03
69	4.3E-03	3.4E-03	4.9E-03	3.8E-03	3.4E-03	4.9E-03	4.9E-03	5.1E-03
70	4.2E-03	3.1E-03	3.2E-03	2.6E-03	2.5E-03	3.4E-03	4.0E-03	7.1E-03
Statistics								
Min	2.9E-03	2.5E-03	2.9E-03	2.6E-03	2.5E-03	2.9E-03	2.8E-03	3.8E-03
Max	4.8E-03	5.8E-03	4.9E-03	4.9E-03	6.6E-03	7.1E-03	5.8E-03	7.1E-03
Average	3.8E-03	4.0E-03	3.6E-03	3.9E-03	4.3E-03	4.5E-03	4.1E-03	5.0E-03
Std Deviation	603.6E-06	909.0E-06	559.6E-06	833.1E-06	1.3E-03	1.4E-03	930.2E-06	900.3E-06

Measurements

VOL_IO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	4.2E-03	5.5E-03	3.4E-03	5.7E-03	3.5E-03	4.0E-03	3.8E-03	3.5E-03
50_OUT_REF	4.5E-03	3.5E-03	3.8E-03	4.5E-03	4.6E-03	3.8E-03	3.8E-03	3.8E-03
OFF samples								
71	4.0E-03	2.8E-03	3.2E-03	3.4E-03	4.0E-03	4.2E-03	4.5E-03	3.7E-03
72	3.7E-03	3.2E-03	4.8E-03	3.4E-03	2.6E-03	5.7E-03	4.0E-03	2.6E-03
73	2.6E-03	4.0E-03	4.5E-03	3.5E-03	3.4E-03	5.4E-03	4.3E-03	3.8E-03
74	3.4E-03	3.5E-03	4.0E-03	4.0E-03	4.6E-03	5.1E-03	4.6E-03	2.9E-03
75	2.8E-03	2.5E-03	4.8E-03	3.1E-03	3.1E-03	3.2E-03	2.2E-03	3.4E-03
76	2.9E-03	3.8E-03	4.0E-03	4.3E-03	3.5E-03	4.0E-03	4.5E-03	3.8E-03
77	4.3E-03	3.8E-03	5.2E-03	4.5E-03	2.6E-03	5.4E-03	3.7E-03	2.8E-03
78	4.3E-03	6.7E-03	3.8E-03	4.8E-03	3.2E-03	3.8E-03	3.1E-03	4.9E-03
79	2.8E-03	4.3E-03	3.5E-03	4.3E-03	4.3E-03	3.7E-03	3.7E-03	4.2E-03
80	3.4E-03	3.4E-03	4.5E-03	3.5E-03	3.1E-03	4.3E-03	3.7E-03	4.2E-03
Statistics								
Min	2.6E-03	2.5E-03	3.2E-03	3.1E-03	2.6E-03	3.2E-03	2.2E-03	2.6E-03
Max	4.3E-03	6.7E-03	5.2E-03	4.8E-03	4.6E-03	5.7E-03	4.6E-03	4.9E-03
Average	3.4E-03	3.8E-03	4.2E-03	3.9E-03	3.5E-03	4.5E-03	3.8E-03	3.6E-03
Std Deviation	605.8E-06	1.1E-03	580.0E-06	532.1E-06	637.2E-06	794.2E-06	708.5E-06	676.2E-06

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Low Voltage : VOL_IO[1]
Test conditions : IOL=100uA. Vcc = 3.3V
Unit : V
Spec Limit Max : 200.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

VOL_IO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	5.7E-03	5.7E-03	4.9E-03	6.6E-03	5.7E-03	4.3E-03	7.1E-03	7.4E-03
50_OUT_REF	3.7E-03	5.1E-03	6.1E-03	4.6E-03	6.6E-03	3.8E-03	5.1E-03	6.6E-03
ON_LDC samples								
51	5.1E-03	5.5E-03	6.1E-03	4.8E-03	5.4E-03	6.1E-03	4.0E-03	5.8E-03
52	5.5E-03	4.6E-03	4.9E-03	4.9E-03	4.5E-03	4.3E-03	6.0E-03	4.5E-03
53	4.0E-03	6.4E-03	6.3E-03	7.4E-03	4.6E-03	6.0E-03	5.5E-03	5.2E-03
54	4.9E-03	6.0E-03	4.6E-03	5.8E-03	6.3E-03	5.1E-03	4.9E-03	4.0E-03
55	4.9E-03	4.6E-03	4.8E-03	5.8E-03	3.8E-03	4.3E-03	4.5E-03	4.0E-03
56	8.3E-03	6.3E-03	4.8E-03	5.5E-03	5.4E-03	5.5E-03	5.4E-03	6.3E-03
57	3.7E-03	4.3E-03	6.4E-03	5.7E-03	5.4E-03	6.9E-03	6.3E-03	6.0E-03
58	4.9E-03	4.3E-03	5.2E-03	4.6E-03	5.8E-03	4.2E-03	6.1E-03	5.4E-03
59	4.3E-03	6.3E-03	4.0E-03	8.1E-03	5.2E-03	5.8E-03	5.8E-03	5.1E-03
60	3.7E-03	6.6E-03	4.8E-03	3.8E-03	5.5E-03	4.5E-03	4.3E-03	3.8E-03
Statistics								
Min	3.7E-03	4.3E-03	4.0E-03	3.8E-03	3.8E-03	4.2E-03	4.0E-03	3.8E-03
Max	8.3E-03	6.6E-03	6.4E-03	8.1E-03	6.3E-03	6.9E-03	6.3E-03	6.3E-03
Average	4.9E-03	5.5E-03	5.2E-03	5.6E-03	5.2E-03	5.3E-03	5.3E-03	5.0E-03
Std Deviation	1.3E-03	894.4E-06	777.5E-06	1.2E-03	671.4E-06	900.3E-06	775.7E-06	844.6E-06

Measurements

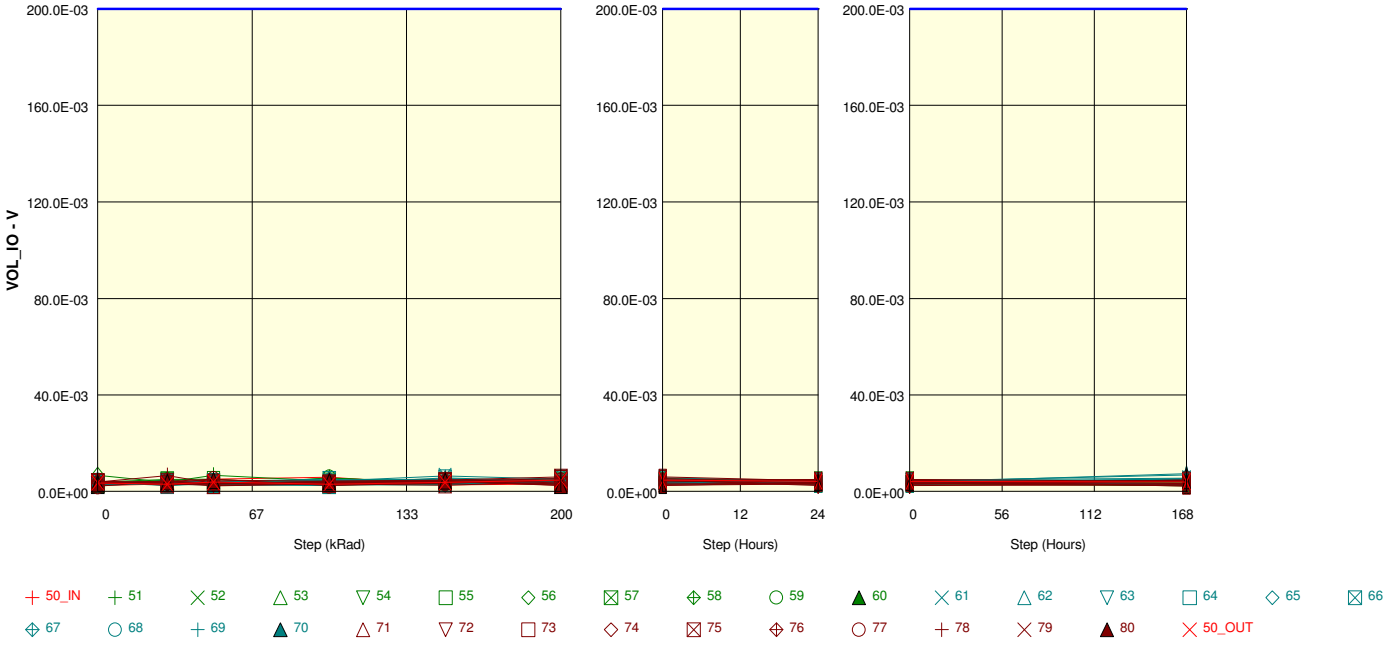
VOL_IO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	5.7E-03	5.7E-03	4.9E-03	6.6E-03	5.7E-03	4.3E-03	7.1E-03	7.4E-03
50_OUT_REF	3.7E-03	5.1E-03	6.1E-03	4.6E-03	6.6E-03	3.8E-03	5.1E-03	6.6E-03
ON_HDC samples								
61	4.6E-03	6.1E-03	4.3E-03	5.7E-03	8.4E-03	8.3E-03	5.4E-03	7.7E-03
62	3.8E-03	4.0E-03	5.2E-03	3.8E-03	4.8E-03	4.9E-03	4.3E-03	5.1E-03
63	4.0E-03	4.2E-03	3.7E-03	5.8E-03	6.1E-03	6.6E-03	5.7E-03	7.2E-03
64	4.0E-03	5.5E-03	5.5E-03	3.7E-03	4.3E-03	7.7E-03	4.5E-03	7.2E-03
65	4.0E-03	4.8E-03	3.8E-03	4.0E-03	5.8E-03	4.9E-03	5.7E-03	4.5E-03
66	4.6E-03	5.8E-03	4.9E-03	6.0E-03	5.8E-03	6.1E-03	5.7E-03	7.1E-03
67	4.0E-03	4.5E-03	4.8E-03	4.3E-03	5.7E-03	5.8E-03	6.0E-03	4.9E-03
68	4.6E-03	4.5E-03	5.5E-03	6.0E-03	6.0E-03	5.1E-03	4.3E-03	14.4E-03
69	3.5E-03	5.1E-03	5.4E-03	5.2E-03	5.4E-03	6.6E-03	5.8E-03	4.8E-03
70	4.9E-03	4.3E-03	4.2E-03	5.1E-03	4.9E-03	5.5E-03	5.8E-03	8.4E-03
Statistics								
Min	3.5E-03	4.0E-03	3.7E-03	3.7E-03	4.3E-03	4.9E-03	4.3E-03	4.5E-03
Max	4.9E-03	6.1E-03	5.5E-03	6.0E-03	8.4E-03	8.3E-03	6.0E-03	14.4E-03
Average	4.2E-03	4.9E-03	4.7E-03	5.0E-03	5.7E-03	6.2E-03	5.3E-03	7.1E-03
Std Deviation	416.2E-06	702.7E-06	657.4E-06	874.0E-06	1.1E-03	1.1E-03	644.5E-06	2.8E-03

Measurements

VOL_IO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	5.7E-03	5.7E-03	4.9E-03	6.6E-03	5.7E-03	4.3E-03	7.1E-03	7.4E-03
50_OUT_REF	3.7E-03	5.1E-03	6.1E-03	4.6E-03	6.6E-03	3.8E-03	5.1E-03	6.6E-03
OFF samples								
71	4.2E-03	4.2E-03	4.9E-03	5.1E-03	4.8E-03	4.0E-03	4.9E-03	4.2E-03
72	4.2E-03	3.7E-03	5.4E-03	3.4E-03	5.8E-03	5.7E-03	4.8E-03	6.1E-03
73	4.0E-03	5.8E-03	4.0E-03	5.5E-03	5.1E-03	6.6E-03	5.2E-03	6.3E-03
74	6.0E-03	5.8E-03	5.7E-03	7.1E-03	5.5E-03	5.8E-03	5.1E-03	5.8E-03
75	5.5E-03	4.2E-03	4.8E-03	5.2E-03	4.0E-03	4.3E-03	4.9E-03	5.2E-03
76	3.8E-03	5.2E-03	5.4E-03	4.2E-03	3.8E-03	6.0E-03	4.6E-03	4.3E-03
77	4.0E-03	6.4E-03	5.1E-03	6.1E-03	5.7E-03	4.5E-03	5.4E-03	5.1E-03
78	5.4E-03	8.4E-03	4.9E-03	4.3E-03	5.5E-03	5.4E-03	3.7E-03	6.0E-03
79	4.2E-03	4.5E-03	4.6E-03	5.4E-03	5.4E-03	4.6E-03	5.7E-03	4.8E-03
80	5.1E-03	4.8E-03	4.6E-03	5.2E-03	4.2E-03	4.3E-03	5.7E-03	6.0E-03
Statistics								
Min	3.8E-03	3.7E-03	4.0E-03	3.4E-03	3.8E-03	4.0E-03	3.7E-03	4.2E-03
Max	6.0E-03	8.4E-03	5.7E-03	7.1E-03	5.8E-03	6.6E-03	5.7E-03	6.3E-03
Average	4.6E-03	5.3E-03	4.9E-03	5.1E-03	5.0E-03	5.1E-03	5.0E-03	5.4E-03
Std Deviation	739.5E-06	1.3E-03	454.9E-06	980.0E-06	703.2E-06	841.4E-06	551.2E-06	741.3E-06

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Low Voltage : VOL_IO[2]
Test conditions : IOL=100uA. Vcc = 3.3V
Unit : V
Spec Limit Max : 200.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

VOL_IO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	2.5E-03	3.1E-03	5.1E-03	5.8E-03	2.8E-03	3.1E-03	4.8E-03	4.5E-03
50_OUT_REF	3.5E-03	2.9E-03	3.8E-03	2.9E-03	3.7E-03	4.6E-03	4.2E-03	4.0E-03
ON_LDC samples								
51	3.8E-03	3.8E-03	6.7E-03	4.3E-03	4.3E-03	4.6E-03	3.4E-03	2.8E-03
52	3.8E-03	3.8E-03	2.8E-03	4.5E-03	3.5E-03	3.2E-03	3.4E-03	3.7E-03
53	2.9E-03	4.0E-03	3.2E-03	5.4E-03	4.2E-03	4.3E-03	2.9E-03	4.3E-03
54	2.9E-03	4.5E-03	3.4E-03	4.3E-03	4.5E-03	3.2E-03	4.9E-03	2.6E-03
55	3.8E-03	4.9E-03	5.1E-03	2.5E-03	4.2E-03	4.5E-03	3.1E-03	2.5E-03
56	6.7E-03	3.7E-03	3.4E-03	4.0E-03	3.4E-03	3.2E-03	3.8E-03	3.1E-03
57	2.8E-03	3.2E-03	4.2E-03	3.7E-03	4.2E-03	4.2E-03	4.3E-03	2.9E-03
58	3.1E-03	4.3E-03	2.8E-03	2.9E-03	2.9E-03	3.7E-03	4.3E-03	2.6E-03
59	2.8E-03	4.6E-03	2.6E-03	5.7E-03	3.2E-03	5.5E-03	3.8E-03	2.3E-03
60	2.5E-03	4.8E-03	2.5E-03	4.0E-03	4.0E-03	4.0E-03	3.8E-03	2.5E-03
Statistics								
Min	2.5E-03	3.2E-03	2.5E-03	2.5E-03	2.9E-03	3.2E-03	2.9E-03	2.3E-03
Max	6.7E-03	4.9E-03	6.7E-03	5.7E-03	4.5E-03	5.5E-03	4.9E-03	4.3E-03
Average	3.5E-03	4.2E-03	3.7E-03	4.1E-03	3.8E-03	4.0E-03	3.8E-03	2.9E-03
Std Deviation	1.2E-03	503.5E-06	1.3E-03	922.6E-06	489.5E-06	696.1E-06	579.8E-06	591.0E-06

Measurements

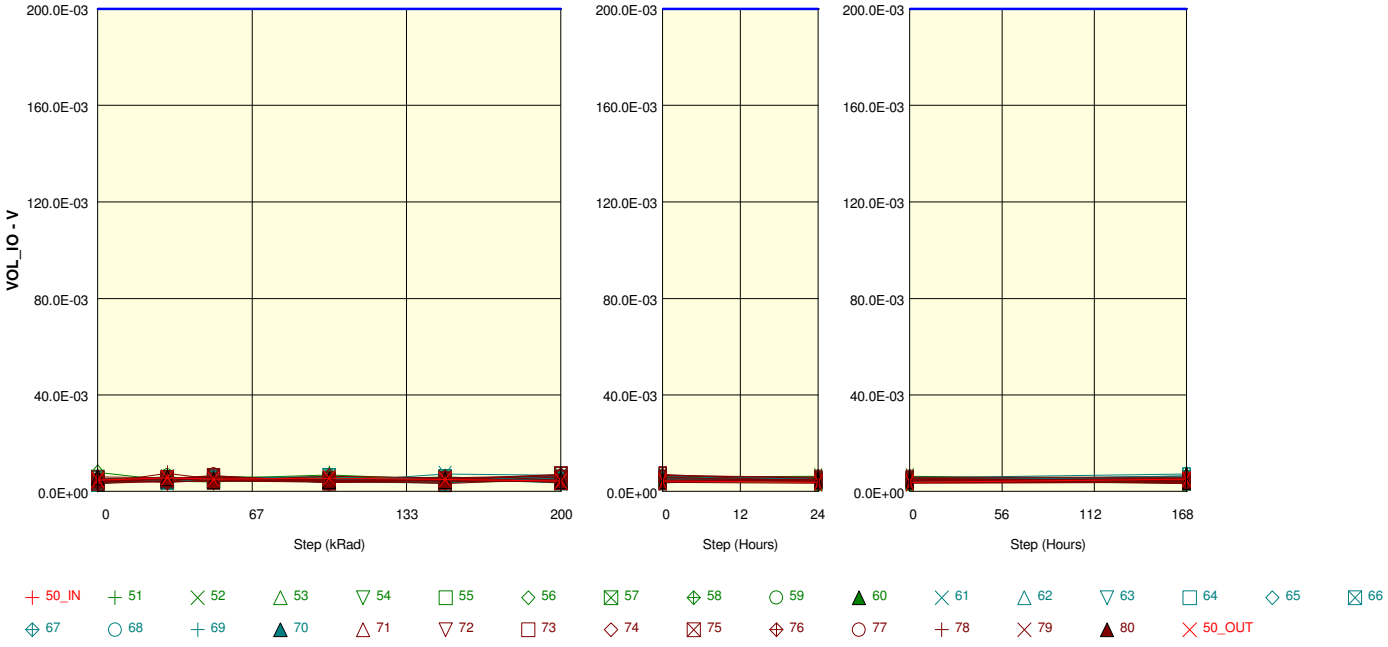
VOL_IO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	2.5E-03	3.1E-03	5.1E-03	5.8E-03	2.8E-03	3.1E-03	4.8E-03	4.5E-03
50_OUT_REF	3.5E-03	2.9E-03	3.8E-03	2.9E-03	3.7E-03	4.6E-03	4.2E-03	4.0E-03
ON_HDC samples								
61	2.9E-03	4.5E-03	3.2E-03	4.3E-03	6.4E-03	5.1E-03	3.1E-03	5.4E-03
62	3.4E-03	2.9E-03	2.8E-03	2.5E-03	5.4E-03	3.7E-03	3.7E-03	7.4E-03
63	2.8E-03	3.8E-03	4.2E-03	5.1E-03	3.2E-03	5.7E-03	4.3E-03	4.9E-03
64	3.7E-03	2.5E-03	3.2E-03	3.1E-03	3.1E-03	4.9E-03	2.9E-03	4.9E-03
65	2.6E-03	3.2E-03	2.9E-03	3.5E-03	3.2E-03	3.8E-03	3.4E-03	3.4E-03
66	3.4E-03	4.0E-03	3.5E-03	3.1E-03	5.7E-03	4.2E-03	4.3E-03	2.9E-03
67	4.0E-03	2.9E-03	3.8E-03	4.6E-03	5.1E-03	3.1E-03	3.8E-03	2.8E-03
68	4.3E-03	2.6E-03	3.5E-03	4.3E-03	3.5E-03	4.3E-03	4.6E-03	5.5E-03
69	2.8E-03	3.8E-03	3.2E-03	2.8E-03	2.8E-03	4.5E-03	2.9E-03	4.3E-03
70	3.7E-03	4.2E-03	4.0E-03	3.5E-03	4.6E-03	3.1E-03	4.2E-03	6.9E-03
Statistics								
Min	2.6E-03	2.5E-03	2.8E-03	2.5E-03	2.8E-03	3.1E-03	2.9E-03	2.8E-03
Max	4.3E-03	4.5E-03	4.2E-03	5.1E-03	6.4E-03	5.7E-03	4.6E-03	7.4E-03
Average	3.4E-03	3.5E-03	3.5E-03	3.7E-03	4.3E-03	4.2E-03	3.7E-03	4.8E-03
Std Deviation	540.8E-06	658.8E-06	427.3E-06	811.6E-06	1.2E-03	799.5E-06	586.2E-06	1.5E-03

Measurements

VOL_IO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	2.5E-03	3.1E-03	5.1E-03	5.8E-03	2.8E-03	3.1E-03	4.8E-03	4.5E-03
50_OUT_REF	3.5E-03	2.9E-03	3.8E-03	2.9E-03	3.7E-03	4.6E-03	4.2E-03	4.0E-03
OFF samples								
71	3.1E-03	4.3E-03	2.3E-03	3.1E-03	2.6E-03	4.0E-03	4.8E-03	2.2E-03
72	4.0E-03	4.2E-03	3.1E-03	3.4E-03	4.6E-03	6.0E-03	4.5E-03	3.2E-03
73	3.8E-03	3.2E-03	2.5E-03	3.5E-03	4.2E-03	5.4E-03	3.4E-03	4.8E-03
74	4.0E-03	3.4E-03	2.9E-03	4.3E-03	4.8E-03	4.8E-03	2.5E-03	2.8E-03
75	4.0E-03	2.6E-03	3.8E-03	2.9E-03	4.0E-03	2.9E-03	3.5E-03	2.9E-03
76	4.2E-03	3.4E-03	3.5E-03	3.7E-03	4.3E-03	2.6E-03	3.1E-03	2.6E-03
77	2.2E-03	4.2E-03	5.1E-03	2.5E-03	3.5E-03	4.5E-03	3.1E-03	4.8E-03
78	4.0E-03	6.6E-03	3.4E-03	3.5E-03	4.3E-03	3.1E-03	3.1E-03	4.3E-03
79	3.4E-03	3.4E-03	3.4E-03	3.5E-03	3.4E-03	4.6E-03	4.9E-03	4.2E-03
80	3.1E-03	3.8E-03	4.6E-03	4.2E-03	4.3E-03	2.5E-03	3.7E-03	4.5E-03
Statistics								
Min	2.2E-03	2.6E-03	2.3E-03	2.5E-03	2.6E-03	2.5E-03	2.5E-03	2.2E-03
Max	4.2E-03	6.6E-03	5.1E-03	4.3E-03	4.8E-03	6.0E-03	4.9E-03	4.8E-03
Average	3.6E-03	3.9E-03	3.5E-03	3.5E-03	4.0E-03	4.0E-03	3.7E-03	3.6E-03
Std Deviation	601.9E-06	1.0E-03	822.4E-06	516.3E-06	610.3E-06	1.1E-03	769.2E-06	921.2E-06

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Low Voltage : VOL_IO[3]
Test conditions : IOL=100uA. Vcc = 3.3V
Unit : V
Spec Limit Max : 200.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

VOL_IO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.8E-03	5.2E-03	5.7E-03	6.0E-03	5.2E-03	5.8E-03	4.9E-03	4.8E-03
50_OUT_REF	4.8E-03	5.7E-03	5.1E-03	5.5E-03	4.9E-03	4.3E-03	3.7E-03	5.1E-03
ON_LDC samples								
51	5.2E-03	5.1E-03	6.3E-03	5.2E-03	3.7E-03	4.5E-03	4.2E-03	3.5E-03
52	5.4E-03	3.7E-03	5.2E-03	4.2E-03	4.8E-03	5.8E-03	6.3E-03	4.6E-03
53	3.4E-03	4.6E-03	5.4E-03	6.9E-03	4.9E-03	6.3E-03	4.3E-03	4.9E-03
54	5.5E-03	4.3E-03	3.8E-03	6.3E-03	4.2E-03	4.5E-03	4.9E-03	4.8E-03
55	4.9E-03	4.9E-03	5.1E-03	4.8E-03	5.5E-03	4.0E-03	3.7E-03	3.7E-03
56	7.8E-03	4.6E-03	5.2E-03	4.5E-03	6.0E-03	3.8E-03	5.1E-03	5.7E-03
57	3.8E-03	4.6E-03	4.9E-03	4.9E-03	4.6E-03	4.9E-03	4.2E-03	5.4E-03
58	4.0E-03	4.3E-03	4.3E-03	5.5E-03	5.2E-03	3.8E-03	5.1E-03	3.8E-03
59	4.0E-03	6.1E-03	4.5E-03	6.0E-03	3.8E-03	5.8E-03	5.2E-03	4.2E-03
60	4.9E-03	4.6E-03	5.2E-03	4.0E-03	4.8E-03	4.0E-03	5.2E-03	4.8E-03
Statistics								
Min	3.4E-03	3.7E-03	3.8E-03	4.0E-03	3.7E-03	3.8E-03	3.7E-03	3.5E-03
Max	7.8E-03	6.1E-03	6.3E-03	6.9E-03	6.0E-03	6.3E-03	6.3E-03	5.7E-03
Average	4.9E-03	4.7E-03	5.0E-03	5.2E-03	4.7E-03	4.7E-03	4.8E-03	4.5E-03
Std Deviation	1.2E-03	599.8E-06	637.4E-06	902.7E-06	683.9E-06	875.1E-06	709.3E-06	676.4E-06

Measurements

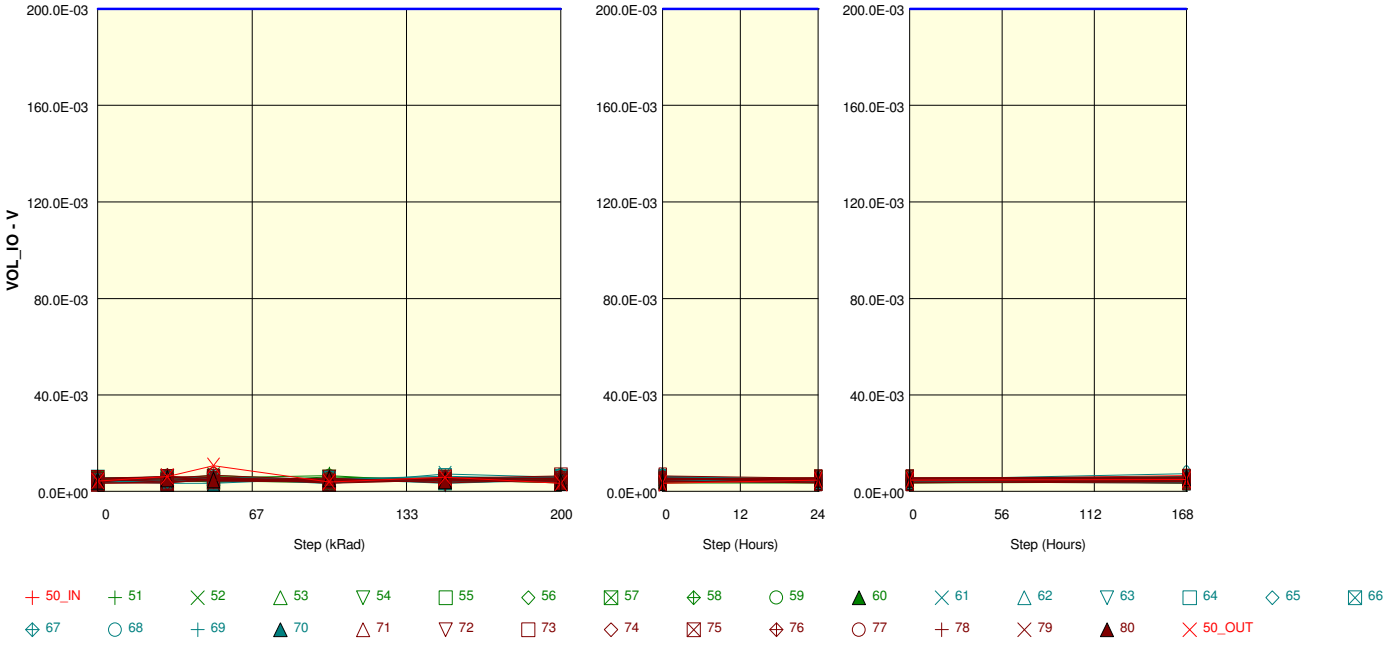
VOL_IO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.8E-03	5.2E-03	5.7E-03	6.0E-03	5.2E-03	5.8E-03	4.9E-03	4.8E-03
50_OUT_REF	4.8E-03	5.7E-03	5.1E-03	5.5E-03	4.9E-03	4.3E-03	3.7E-03	5.1E-03
ON_HDC samples								
61	3.2E-03	6.0E-03	4.5E-03	4.0E-03	7.2E-03	6.7E-03	4.5E-03	5.5E-03
62	3.4E-03	4.9E-03	5.5E-03	5.1E-03	4.8E-03	4.5E-03	4.5E-03	4.2E-03
63	5.1E-03	5.2E-03	5.5E-03	6.1E-03	4.0E-03	5.2E-03	4.2E-03	6.4E-03
64	4.2E-03	4.3E-03	5.2E-03	5.7E-03	3.7E-03	6.6E-03	4.8E-03	6.4E-03
65	4.2E-03	5.1E-03	5.8E-03	4.3E-03	4.0E-03	5.1E-03	4.0E-03	5.7E-03
66	4.0E-03	4.3E-03	5.7E-03	4.5E-03	5.8E-03	5.2E-03	4.9E-03	4.0E-03
67	5.2E-03	4.2E-03	5.5E-03	3.7E-03	5.2E-03	3.5E-03	5.8E-03	5.5E-03
68	4.2E-03	5.5E-03	4.8E-03	4.2E-03	5.4E-03	5.1E-03	5.1E-03	5.4E-03
69	4.8E-03	4.2E-03	5.1E-03	4.0E-03	3.5E-03	6.1E-03	5.4E-03	3.4E-03
70	4.8E-03	5.2E-03	5.1E-03	4.8E-03	5.4E-03	5.1E-03	5.7E-03	7.2E-03
Statistics								
Min	3.2E-03	4.2E-03	4.5E-03	3.7E-03	3.5E-03	3.5E-03	4.0E-03	3.4E-03
Max	5.2E-03	6.0E-03	5.8E-03	6.1E-03	7.2E-03	6.7E-03	5.8E-03	7.2E-03
Average	4.3E-03	4.9E-03	5.3E-03	4.6E-03	4.9E-03	5.3E-03	4.9E-03	5.4E-03
Std Deviation	630.8E-06	601.9E-06	409.7E-06	748.9E-06	1.1E-03	918.6E-06	591.2E-06	1.1E-03

Measurements

VOL_IO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.8E-03	5.2E-03	5.7E-03	6.0E-03	5.2E-03	5.8E-03	4.9E-03	4.8E-03
50_OUT_REF	4.8E-03	5.7E-03	5.1E-03	5.5E-03	4.9E-03	4.3E-03	3.7E-03	5.1E-03
OFF samples								
71	4.3E-03	5.5E-03	4.5E-03	4.5E-03	4.3E-03	4.2E-03	4.9E-03	5.1E-03
72	3.2E-03	4.3E-03	5.7E-03	3.7E-03	4.9E-03	7.1E-03	4.0E-03	4.0E-03
73	3.7E-03	5.4E-03	4.3E-03	3.8E-03	4.6E-03	6.7E-03	5.5E-03	4.5E-03
74	5.1E-03	4.0E-03	4.5E-03	6.3E-03	5.7E-03	6.6E-03	5.8E-03	5.8E-03
75	5.2E-03	5.2E-03	6.1E-03	4.8E-03	3.2E-03	5.2E-03	4.9E-03	4.6E-03
76	3.8E-03	3.8E-03	4.5E-03	4.8E-03	4.5E-03	4.3E-03	4.5E-03	5.5E-03
77	4.5E-03	5.4E-03	6.6E-03	3.7E-03	4.0E-03	6.0E-03	3.7E-03	3.8E-03
78	3.5E-03	7.5E-03	5.1E-03	4.0E-03	5.1E-03	3.7E-03	4.9E-03	3.2E-03
79	4.2E-03	4.5E-03	6.0E-03	4.5E-03	5.5E-03	3.7E-03	3.4E-03	3.7E-03
80	6.0E-03	5.7E-03	4.5E-03	4.6E-03	4.6E-03	4.6E-03	4.6E-03	4.2E-03
Statistics								
Min	3.2E-03	3.8E-03	4.3E-03	3.7E-03	3.2E-03	3.7E-03	3.4E-03	3.2E-03
Max	6.0E-03	7.5E-03	6.6E-03	6.3E-03	5.7E-03	7.1E-03	5.8E-03	5.8E-03
Average	4.4E-03	5.1E-03	5.2E-03	4.5E-03	4.6E-03	5.2E-03	4.6E-03	4.4E-03
Std Deviation	810.4E-06	1.0E-03	816.6E-06	728.6E-06	681.7E-06	1.2E-03	730.0E-06	785.3E-06

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Low Voltage : VOL_IO[4]
Test conditions : IOL=100uA. Vcc = 3.3V
Unit : V
Spec Limit Max : 200.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

VOL_IO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	4.0E-03	5.4E-03	3.8E-03	5.4E-03	5.7E-03	4.9E-03	4.9E-03	6.6E-03
50_OUT_REF	4.3E-03	6.1E-03	10.7E-03	4.0E-03	5.8E-03	3.4E-03	4.8E-03	4.9E-03
ON_LDC samples								
51	3.8E-03	4.9E-03	6.1E-03	4.6E-03	5.1E-03	4.3E-03	5.1E-03	4.5E-03
52	4.5E-03	5.1E-03	6.7E-03	4.5E-03	4.8E-03	4.8E-03	4.2E-03	4.2E-03
53	4.8E-03	4.8E-03	5.7E-03	6.6E-03	4.0E-03	4.8E-03	5.4E-03	5.1E-03
54	5.1E-03	4.6E-03	4.2E-03	5.5E-03	4.5E-03	4.9E-03	5.2E-03	3.4E-03
55	3.7E-03	5.4E-03	4.6E-03	5.4E-03	5.5E-03	5.7E-03	5.5E-03	5.5E-03
56	5.7E-03	5.8E-03	4.3E-03	3.8E-03	4.5E-03	3.8E-03	4.3E-03	6.1E-03
57	4.3E-03	4.0E-03	4.6E-03	4.5E-03	4.8E-03	4.5E-03	5.4E-03	5.4E-03
58	4.9E-03	4.8E-03	4.2E-03	5.4E-03	3.8E-03	4.9E-03	3.8E-03	4.2E-03
59	4.3E-03	5.1E-03	3.7E-03	6.0E-03	4.8E-03	6.3E-03	3.7E-03	3.8E-03
60	3.5E-03	5.7E-03	4.3E-03	3.7E-03	4.9E-03	3.5E-03	3.5E-03	3.8E-03
Statistics								
Min	3.5E-03	4.0E-03	3.7E-03	3.7E-03	3.8E-03	3.5E-03	3.5E-03	3.4E-03
Max	5.7E-03	5.8E-03	6.7E-03	6.6E-03	5.5E-03	6.3E-03	5.5E-03	6.1E-03
Average	4.5E-03	5.0E-03	4.8E-03	5.0E-03	4.7E-03	4.7E-03	4.6E-03	4.6E-03
Std Deviation	632.8E-06	507.0E-06	946.2E-06	885.1E-06	468.1E-06	764.3E-06	738.1E-06	839.8E-06

Measurements

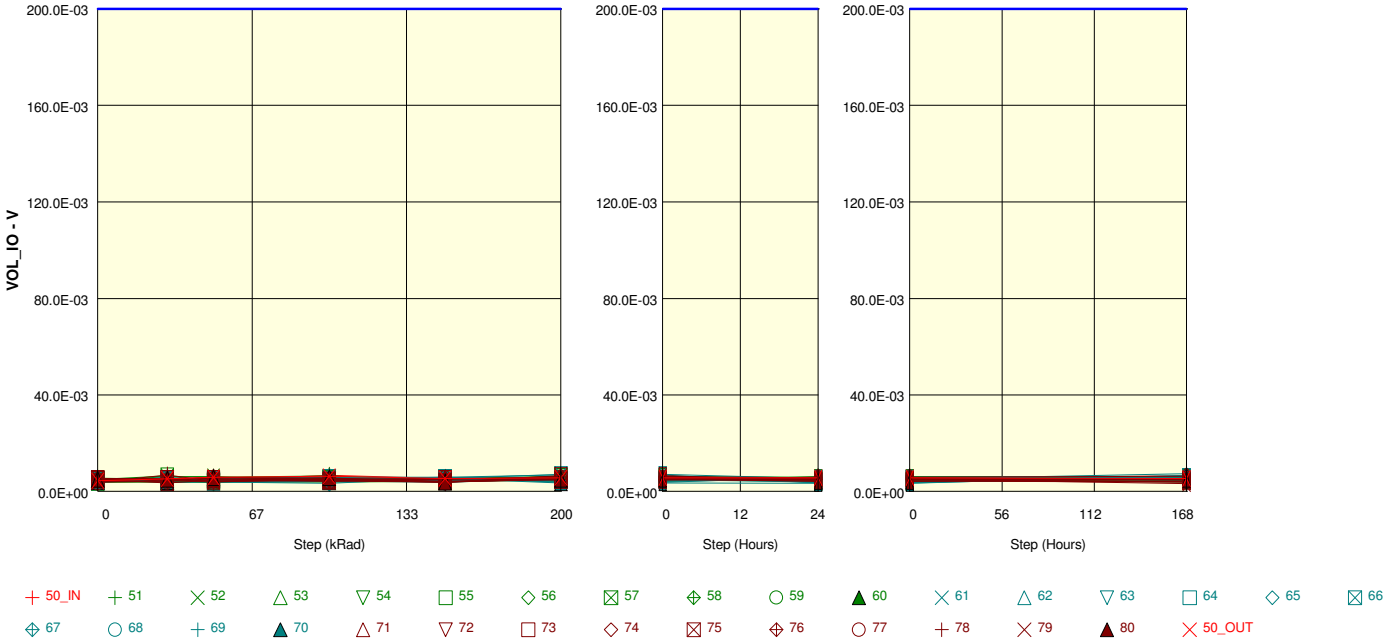
VOL_IO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	4.0E-03	5.4E-03	3.8E-03	5.4E-03	5.7E-03	4.9E-03	4.9E-03	6.6E-03
50_OUT_REF	4.3E-03	6.1E-03	10.7E-03	4.0E-03	5.8E-03	3.4E-03	4.8E-03	4.9E-03
ON_HDC samples								
61	4.2E-03	5.5E-03	5.7E-03	3.2E-03	7.2E-03	5.8E-03	4.5E-03	5.4E-03
62	4.5E-03	3.8E-03	5.7E-03	5.4E-03	4.0E-03	4.5E-03	4.9E-03	4.2E-03
63	5.5E-03	5.8E-03	5.5E-03	5.2E-03	3.4E-03	4.6E-03	3.7E-03	5.1E-03
64	3.8E-03	3.7E-03	5.8E-03	4.9E-03	5.2E-03	5.8E-03	4.6E-03	5.1E-03
65	5.4E-03	6.0E-03	3.8E-03	4.9E-03	5.7E-03	5.4E-03	4.8E-03	3.7E-03
66	3.8E-03	4.6E-03	4.6E-03	5.1E-03	6.3E-03	5.2E-03	4.5E-03	5.2E-03
67	4.5E-03	3.8E-03	5.1E-03	3.8E-03	4.6E-03	5.4E-03	5.4E-03	6.0E-03
68	3.4E-03	6.0E-03	4.5E-03	5.4E-03	3.8E-03	6.3E-03	4.9E-03	7.4E-03
69	4.0E-03	5.4E-03	4.5E-03	5.1E-03	4.5E-03	4.2E-03	4.0E-03	3.5E-03
70	4.3E-03	3.4E-03	3.4E-03	5.4E-03	4.6E-03	5.5E-03	4.0E-03	6.0E-03
Statistics								
Min	3.4E-03	3.4E-03	3.4E-03	3.2E-03	3.4E-03	4.2E-03	3.7E-03	3.5E-03
Max	5.5E-03	6.0E-03	5.8E-03	5.4E-03	7.2E-03	6.3E-03	5.4E-03	7.4E-03
Average	4.3E-03	4.8E-03	4.9E-03	4.8E-03	4.9E-03	5.3E-03	4.5E-03	5.1E-03
Std Deviation	635.7E-06	989.0E-06	796.4E-06	683.2E-06	1.1E-03	640.3E-06	483.5E-06	1.1E-03

Measurements

VOL_IO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	4.0E-03	5.4E-03	3.8E-03	5.4E-03	5.7E-03	4.9E-03	4.9E-03	6.6E-03
50_OUT_REF	4.3E-03	6.1E-03	10.7E-03	4.0E-03	5.8E-03	3.4E-03	4.8E-03	4.9E-03
OFF samples								
71	3.5E-03	4.0E-03	4.5E-03	4.6E-03	5.4E-03	4.5E-03	3.5E-03	4.8E-03
72	5.4E-03	5.8E-03	4.8E-03	5.5E-03	3.5E-03	4.9E-03	5.7E-03	6.0E-03
73	3.4E-03	3.5E-03	5.1E-03	3.8E-03	5.5E-03	6.4E-03	5.5E-03	5.7E-03
74	5.4E-03	3.7E-03	5.5E-03	4.3E-03	5.4E-03	5.7E-03	4.6E-03	4.6E-03
75	4.6E-03	4.3E-03	6.0E-03	3.4E-03	4.6E-03	4.2E-03	3.7E-03	4.2E-03
76	3.7E-03	6.3E-03	4.6E-03	4.8E-03	4.9E-03	5.2E-03	4.6E-03	4.2E-03
77	5.4E-03	5.5E-03	6.7E-03	4.8E-03	5.2E-03	5.4E-03	5.2E-03	5.1E-03
78	5.5E-03	6.1E-03	5.8E-03	4.3E-03	5.1E-03	5.4E-03	3.8E-03	3.5E-03
79	5.1E-03	6.1E-03	4.3E-03	4.0E-03	4.3E-03	4.6E-03	5.7E-03	5.5E-03
80	4.3E-03	5.2E-03	4.8E-03	5.2E-03	4.5E-03	3.7E-03	5.1E-03	5.7E-03
Statistics								
Min	3.4E-03	3.5E-03	4.3E-03	3.4E-03	3.5E-03	3.7E-03	3.5E-03	3.5E-03
Max	5.5E-03	6.3E-03	6.7E-03	5.5E-03	5.5E-03	6.4E-03	5.7E-03	6.0E-03
Average	4.6E-03	5.1E-03	5.2E-03	4.5E-03	4.8E-03	5.0E-03	4.7E-03	4.9E-03
Std Deviation	797.1E-06	1.0E-03	748.9E-06	608.2E-06	584.0E-06	757.6E-06	779.4E-06	766.0E-06

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Low Voltage : VOL_IO[5]
Test conditions : IOL=100uA. Vcc = 3.3V
Unit : V
Spec Limit Max : 200.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

VOL_IO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	5.1E-03	5.1E-03	4.8E-03	6.7E-03	5.4E-03	5.5E-03	5.7E-03	6.4E-03
50_OUT_REF	4.5E-03	5.2E-03	5.8E-03	6.3E-03	5.4E-03	5.7E-03	5.7E-03	5.4E-03
ON_LDC samples								
51	4.2E-03	4.9E-03	5.5E-03	5.1E-03	4.9E-03	4.2E-03	6.1E-03	6.1E-03
52	4.3E-03	6.1E-03	6.1E-03	4.5E-03	4.5E-03	5.8E-03	4.6E-03	5.7E-03
53	4.3E-03	4.5E-03	5.8E-03	6.4E-03	4.8E-03	5.5E-03	4.3E-03	6.1E-03
54	4.9E-03	3.8E-03	3.7E-03	5.7E-03	5.5E-03	6.1E-03	5.8E-03	4.6E-03
55	4.9E-03	6.4E-03	4.2E-03	5.4E-03	4.3E-03	5.5E-03	5.5E-03	5.7E-03
56	5.5E-03	5.1E-03	4.6E-03	5.4E-03	4.8E-03	5.1E-03	5.5E-03	4.8E-03
57	3.7E-03	4.0E-03	4.2E-03	5.4E-03	4.8E-03	6.3E-03	3.7E-03	6.0E-03
58	4.8E-03	4.2E-03	5.2E-03	5.2E-03	5.1E-03	5.4E-03	5.1E-03	4.0E-03
59	5.4E-03	4.5E-03	3.8E-03	5.1E-03	5.5E-03	5.4E-03	5.7E-03	6.0E-03
60	5.1E-03	4.5E-03	3.8E-03	4.0E-03	4.2E-03	4.8E-03	4.3E-03	4.5E-03
Statistics								
Min	3.7E-03	3.8E-03	3.7E-03	4.0E-03	4.2E-03	4.2E-03	3.7E-03	4.0E-03
Max	5.5E-03	6.4E-03	6.1E-03	6.4E-03	5.5E-03	6.3E-03	6.1E-03	6.1E-03
Average	4.7E-03	4.8E-03	4.7E-03	5.2E-03	4.8E-03	5.4E-03	5.1E-03	5.3E-03
Std Deviation	546.8E-06	829.6E-06	858.3E-06	623.4E-06	438.0E-06	601.9E-06	759.9E-06	759.3E-06

Measurements

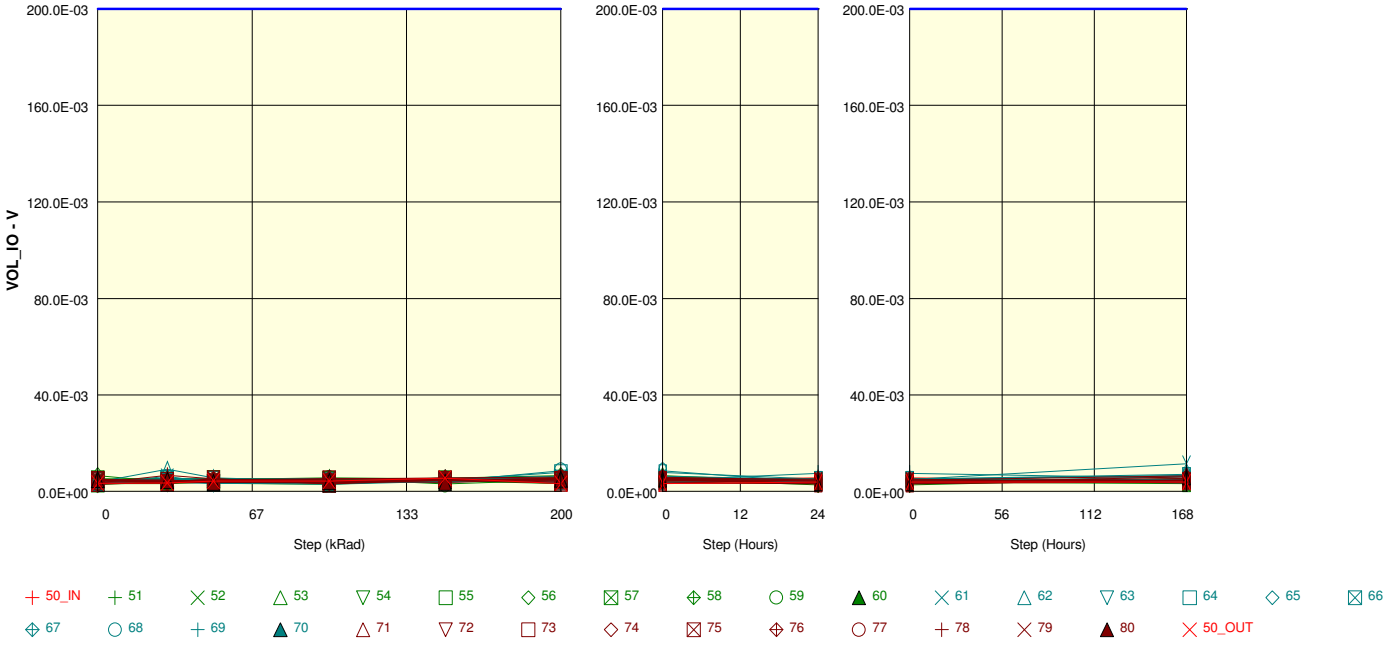
VOL_IO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	5.1E-03	5.1E-03	4.8E-03	6.7E-03	5.4E-03	5.5E-03	5.7E-03	6.4E-03
50_OUT_REF	4.5E-03	5.2E-03	5.8E-03	6.3E-03	5.4E-03	5.7E-03	5.7E-03	5.4E-03
ON_HDC samples								
61	4.2E-03	4.6E-03	5.4E-03	4.2E-03	5.4E-03	7.1E-03	5.4E-03	4.8E-03
62	4.6E-03	5.5E-03	5.4E-03	6.0E-03	4.5E-03	4.6E-03	4.2E-03	6.1E-03
63	4.8E-03	4.9E-03	4.5E-03	5.8E-03	5.8E-03	6.9E-03	3.5E-03	6.3E-03
64	4.9E-03	3.7E-03	3.8E-03	4.2E-03	4.5E-03	5.2E-03	3.7E-03	6.3E-03
65	3.8E-03	5.8E-03	4.0E-03	3.4E-03	5.5E-03	4.2E-03	5.2E-03	5.8E-03
66	4.0E-03	4.9E-03	5.1E-03	5.1E-03	5.8E-03	4.6E-03	5.5E-03	5.4E-03
67	4.5E-03	4.9E-03	4.5E-03	4.5E-03	5.8E-03	3.7E-03	5.8E-03	6.3E-03
68	5.1E-03	5.2E-03	4.3E-03	4.5E-03	3.7E-03	5.4E-03	5.2E-03	5.5E-03
69	4.0E-03	4.6E-03	5.5E-03	4.3E-03	4.6E-03	5.5E-03	5.1E-03	7.4E-03
70	4.2E-03	4.2E-03	5.1E-03	4.3E-03	5.4E-03	3.5E-03	3.4E-03	6.7E-03
Statistics								
Min	3.8E-03	3.7E-03	3.8E-03	3.4E-03	3.7E-03	3.5E-03	3.4E-03	4.8E-03
Max	5.1E-03	5.8E-03	5.5E-03	6.0E-03	5.8E-03	7.1E-03	5.8E-03	7.4E-03
Average	4.4E-03	4.8E-03	4.7E-03	4.6E-03	5.1E-03	5.1E-03	4.7E-03	6.1E-03
Std Deviation	404.9E-06	592.0E-06	576.8E-06	756.8E-06	705.2E-06	1.1E-03	863.7E-06	693.4E-06

Measurements

VOL_IO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	5.1E-03	5.1E-03	4.8E-03	6.7E-03	5.4E-03	5.5E-03	5.7E-03	6.4E-03
50_OUT_REF	4.5E-03	5.2E-03	5.8E-03	6.3E-03	5.4E-03	5.7E-03	5.7E-03	5.4E-03
OFF samples								
71	4.9E-03	3.5E-03	4.8E-03	5.1E-03	5.4E-03	5.2E-03	5.4E-03	4.9E-03
72	4.2E-03	5.4E-03	4.2E-03	4.8E-03	3.7E-03	6.6E-03	4.5E-03	4.2E-03
73	5.1E-03	5.4E-03	4.3E-03	4.5E-03	5.4E-03	4.6E-03	4.9E-03	5.1E-03
74	5.4E-03	5.2E-03	5.8E-03	5.1E-03	4.9E-03	6.1E-03	5.7E-03	4.9E-03
75	5.4E-03	5.2E-03	5.4E-03	4.3E-03	4.0E-03	5.2E-03	4.3E-03	4.0E-03
76	4.9E-03	4.6E-03	5.8E-03	4.6E-03	3.8E-03	4.9E-03	4.9E-03	4.6E-03
77	3.8E-03	4.2E-03	4.9E-03	4.2E-03	5.4E-03	5.1E-03	5.8E-03	6.3E-03
78	3.7E-03	6.9E-03	4.2E-03	5.4E-03	3.8E-03	5.8E-03	4.9E-03	4.0E-03
79	3.8E-03	4.8E-03	4.0E-03	5.2E-03	4.3E-03	4.9E-03	5.1E-03	3.2E-03
80	5.1E-03	5.1E-03	5.7E-03	5.7E-03	3.8E-03	5.1E-03	4.2E-03	5.1E-03
Statistics								
Min	3.7E-03	3.5E-03	4.0E-03	4.2E-03	3.7E-03	4.6E-03	4.2E-03	3.2E-03
Max	5.4E-03	6.9E-03	5.8E-03	5.7E-03	5.4E-03	6.6E-03	5.8E-03	6.3E-03
Average	4.6E-03	5.0E-03	4.9E-03	4.9E-03	4.5E-03	5.4E-03	5.0E-03	4.6E-03
Std Deviation	630.8E-06	838.7E-06	697.4E-06	468.1E-06	682.4E-06	592.7E-06	528.8E-06	791.3E-06

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Low Voltage : VOL_IO[6]
Test conditions : IOL=100uA. Vcc = 3.3V
Unit : V
Spec Limit Max : 200.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

VOL_IO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.4E-03	5.2E-03	4.0E-03	4.5E-03	3.8E-03	4.6E-03	5.7E-03	4.3E-03
50_OUT_REF	3.4E-03	3.5E-03	4.3E-03	4.3E-03	5.5E-03	3.2E-03	3.8E-03	3.8E-03
ON_LDC samples								
51	4.5E-03	3.8E-03	5.2E-03	5.1E-03	4.5E-03	3.2E-03	5.1E-03	4.6E-03
52	4.6E-03	5.2E-03	4.9E-03	4.9E-03	4.0E-03	5.8E-03	4.5E-03	4.8E-03
53	3.5E-03	4.3E-03	4.9E-03	5.7E-03	5.2E-03	4.9E-03	5.1E-03	4.0E-03
54	3.1E-03	5.2E-03	5.4E-03	4.3E-03	4.9E-03	4.3E-03	3.8E-03	5.1E-03
55	3.1E-03	4.0E-03	3.7E-03	5.1E-03	4.5E-03	5.1E-03	5.1E-03	3.7E-03
56	6.6E-03	3.8E-03	3.8E-03	4.6E-03	5.5E-03	6.6E-03	4.0E-03	4.6E-03
57	5.2E-03	4.6E-03	5.2E-03	4.9E-03	5.2E-03	5.1E-03	4.0E-03	3.2E-03
58	3.2E-03	3.2E-03	4.0E-03	4.6E-03	4.8E-03	5.1E-03	2.8E-03	5.4E-03
59	2.9E-03	3.7E-03	3.8E-03	5.4E-03	3.1E-03	4.8E-03	4.3E-03	4.9E-03
60	5.1E-03	5.4E-03	3.4E-03	2.9E-03	4.8E-03	5.1E-03	5.2E-03	4.6E-03
Statistics								
Min	2.9E-03	3.2E-03	3.4E-03	2.9E-03	3.1E-03	3.2E-03	2.8E-03	3.2E-03
Max	6.6E-03	5.4E-03	5.4E-03	5.7E-03	5.5E-03	6.6E-03	5.2E-03	5.4E-03
Average	4.2E-03	4.3E-03	4.4E-03	4.7E-03	4.6E-03	5.0E-03	4.4E-03	4.5E-03
Std Deviation	1.1E-03	701.9E-06	713.9E-06	710.6E-06	667.9E-06	830.9E-06	726.2E-06	620.9E-06

Measurements

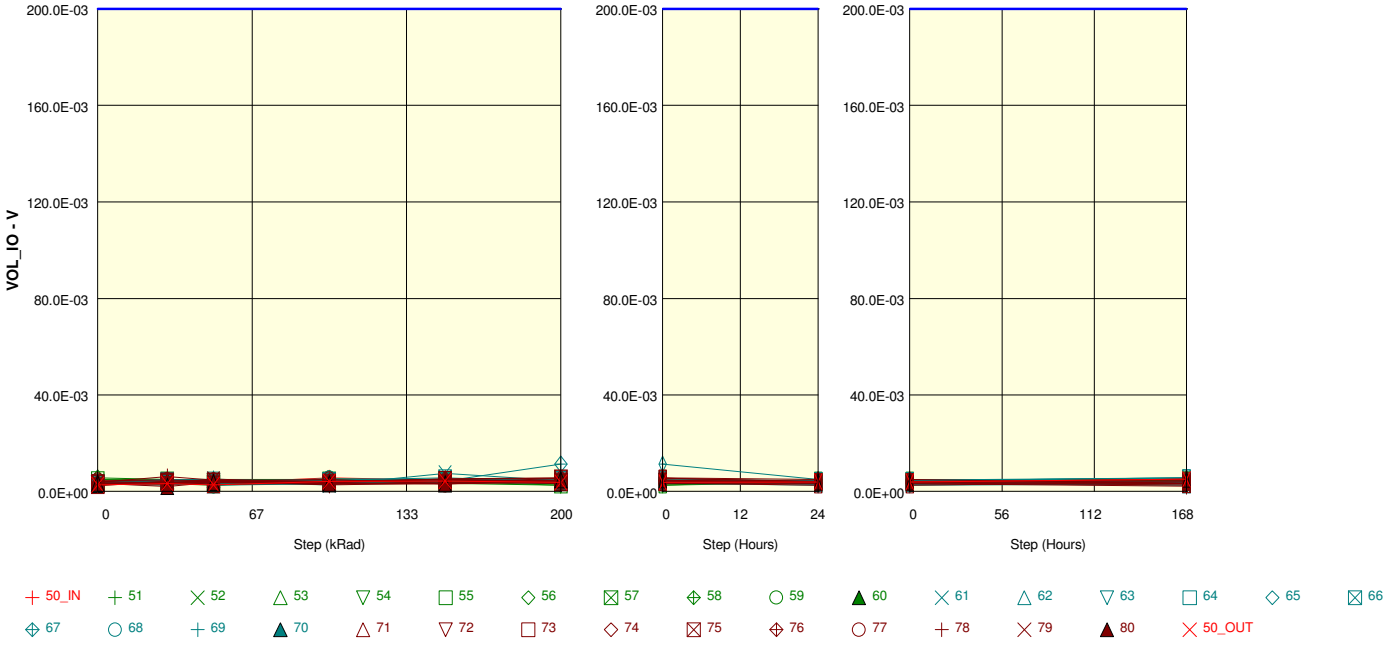
VOL_IO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.4E-03	5.2E-03	4.0E-03	4.5E-03	3.8E-03	4.6E-03	5.7E-03	4.3E-03
50_OUT_REF	3.4E-03	3.5E-03	4.3E-03	4.3E-03	5.5E-03	3.2E-03	3.8E-03	3.8E-03
ON_HDC samples								
61	3.1E-03	6.3E-03	3.4E-03	4.2E-03	5.4E-03	6.3E-03	4.9E-03	11.5E-03
62	3.8E-03	9.2E-03	5.7E-03	4.3E-03	4.9E-03	4.0E-03	4.8E-03	4.9E-03
63	4.5E-03	4.0E-03	3.2E-03	4.0E-03	4.0E-03	5.1E-03	4.9E-03	6.6E-03
64	4.8E-03	5.2E-03	3.5E-03	4.5E-03	4.8E-03	7.8E-03	5.1E-03	6.6E-03
65	2.9E-03	5.4E-03	3.4E-03	3.5E-03	5.7E-03	3.5E-03	5.2E-03	3.5E-03
66	3.7E-03	5.4E-03	5.1E-03	3.8E-03	4.8E-03	5.5E-03	4.9E-03	4.2E-03
67	3.5E-03	4.5E-03	4.9E-03	5.2E-03	5.4E-03	5.1E-03	4.0E-03	4.6E-03
68	3.8E-03	4.3E-03	3.5E-03	2.9E-03	4.2E-03	8.6E-03	3.7E-03	6.1E-03
69	4.5E-03	4.5E-03	4.0E-03	3.8E-03	4.0E-03	4.6E-03	7.5E-03	5.5E-03
70	3.4E-03	5.2E-03	4.9E-03	5.4E-03	4.6E-03	5.5E-03	5.1E-03	7.1E-03
Statistics								
Min	2.9E-03	4.0E-03	3.2E-03	2.9E-03	4.0E-03	3.5E-03	3.7E-03	3.5E-03
Max	4.8E-03	9.2E-03	5.7E-03	5.4E-03	5.7E-03	8.6E-03	7.5E-03	11.5E-03
Average	3.8E-03	5.4E-03	4.2E-03	4.2E-03	4.8E-03	5.6E-03	5.0E-03	6.1E-03
Std Deviation	575.2E-06	1.4E-03	842.6E-06	694.1E-06	562.7E-06	1.5E-03	955.8E-06	2.1E-03

Measurements

VOL_IO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.4E-03	5.2E-03	4.0E-03	4.5E-03	3.8E-03	4.6E-03	5.7E-03	4.3E-03
50_OUT_REF	3.4E-03	3.5E-03	4.3E-03	4.3E-03	5.5E-03	3.2E-03	3.8E-03	3.8E-03
OFF samples								
71	3.4E-03	3.4E-03	4.6E-03	3.4E-03	4.9E-03	3.8E-03	3.1E-03	4.8E-03
72	4.8E-03	3.5E-03	3.7E-03	3.8E-03	5.1E-03	5.1E-03	4.3E-03	3.8E-03
73	4.3E-03	4.6E-03	3.8E-03	5.2E-03	5.1E-03	4.6E-03	3.5E-03	4.6E-03
74	4.9E-03	4.2E-03	4.9E-03	5.1E-03	5.7E-03	5.8E-03	4.8E-03	6.4E-03
75	5.1E-03	3.7E-03	5.2E-03	3.1E-03	4.8E-03	3.4E-03	3.4E-03	4.0E-03
76	2.9E-03	4.0E-03	3.7E-03	3.5E-03	4.8E-03	5.4E-03	5.1E-03	3.5E-03
77	3.7E-03	4.2E-03	4.6E-03	4.5E-03	4.5E-03	5.5E-03	4.2E-03	5.4E-03
78	3.5E-03	6.7E-03	5.2E-03	3.4E-03	5.1E-03	4.8E-03	3.4E-03	4.6E-03
79	4.5E-03	4.3E-03	4.6E-03	5.2E-03	5.2E-03	4.3E-03	4.6E-03	4.5E-03
80	4.9E-03	4.6E-03	3.7E-03	4.2E-03	3.7E-03	5.1E-03	3.5E-03	6.0E-03
Statistics								
Min	2.9E-03	3.4E-03	3.7E-03	3.1E-03	3.7E-03	3.4E-03	3.1E-03	3.5E-03
Max	5.1E-03	6.7E-03	5.2E-03	5.2E-03	5.7E-03	5.8E-03	5.1E-03	6.4E-03
Average	4.2E-03	4.3E-03	4.4E-03	4.1E-03	4.9E-03	4.8E-03	4.0E-03	4.8E-03
Std Deviation	715.9E-06	898.7E-06	595.1E-06	773.4E-06	497.0E-06	723.6E-06	649.0E-06	879.2E-06

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Low Voltage : VOL_IO[7]
Test conditions : IOL=100uA. Vcc = 3.3V
Unit : V
Spec Limit Max : 200.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

VOL_IO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	4.6E-03	4.9E-03	3.5E-03	5.7E-03	4.8E-03	3.1E-03	4.2E-03	4.8E-03
50_OUT_REF	2.8E-03	3.2E-03	2.8E-03	4.2E-03	4.3E-03	3.7E-03	4.0E-03	5.1E-03
ON_LDC samples								
51	3.1E-03	4.0E-03	4.3E-03	4.6E-03	3.8E-03	4.8E-03	4.5E-03	4.5E-03
52	4.0E-03	3.2E-03	4.8E-03	4.6E-03	3.8E-03	4.0E-03	3.4E-03	3.4E-03
53	3.4E-03	4.5E-03	4.9E-03	4.9E-03	4.8E-03	3.5E-03	3.5E-03	3.5E-03
54	3.2E-03	4.0E-03	3.1E-03	3.2E-03	3.4E-03	2.6E-03	3.7E-03	4.3E-03
55	4.9E-03	4.8E-03	4.0E-03	4.0E-03	4.2E-03	2.6E-03	4.8E-03	3.8E-03
56	5.7E-03	4.9E-03	4.3E-03	3.2E-03	4.9E-03	4.3E-03	4.5E-03	4.8E-03
57	3.4E-03	3.5E-03	3.4E-03	4.8E-03	4.6E-03	3.8E-03	4.5E-03	4.9E-03
58	2.9E-03	3.1E-03	4.5E-03	3.2E-03	4.6E-03	3.1E-03	4.5E-03	4.2E-03
59	4.3E-03	3.2E-03	2.6E-03	5.2E-03	4.5E-03	4.3E-03	4.2E-03	4.3E-03
60	3.4E-03	4.6E-03	2.6E-03	4.0E-03	3.5E-03	4.2E-03	4.8E-03	4.9E-03
Statistics								
Min	2.9E-03	3.1E-03	2.6E-03	3.2E-03	3.4E-03	2.6E-03	3.4E-03	3.4E-03
Max	5.7E-03	4.9E-03	4.9E-03	5.2E-03	4.9E-03	4.8E-03	4.8E-03	4.9E-03
Average	3.8E-03	4.0E-03	3.8E-03	4.2E-03	4.2E-03	3.7E-03	4.2E-03	4.3E-03
Std Deviation	845.3E-06	649.0E-06	810.3E-06	711.8E-06	507.0E-06	698.6E-06	473.8E-06	510.9E-06

Measurements

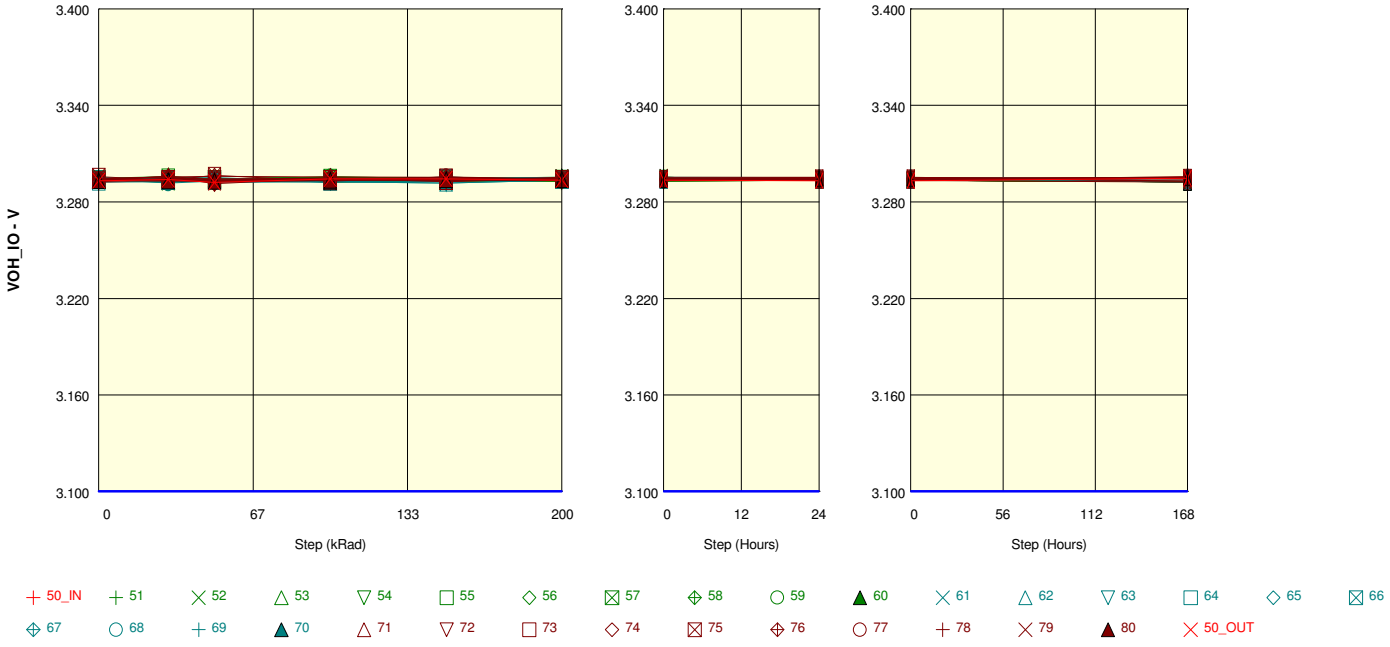
VOL_IO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	4.6E-03	4.9E-03	3.5E-03	5.7E-03	4.8E-03	3.1E-03	4.2E-03	4.8E-03
50_OUT_REF	2.8E-03	3.2E-03	2.8E-03	4.2E-03	4.3E-03	3.7E-03	4.0E-03	5.1E-03
ON_HDC samples								
61	3.1E-03	3.8E-03	3.7E-03	2.8E-03	7.5E-03	4.5E-03	2.9E-03	4.3E-03
62	2.8E-03	4.8E-03	5.1E-03	3.7E-03	4.6E-03	3.7E-03	3.5E-03	3.5E-03
63	3.1E-03	2.6E-03	4.0E-03	4.2E-03	5.1E-03	5.1E-03	4.5E-03	5.7E-03
64	3.7E-03	3.5E-03	3.4E-03	3.7E-03	3.2E-03	4.3E-03	4.5E-03	5.7E-03
65	3.1E-03	4.6E-03	2.6E-03	3.2E-03	3.8E-03	3.4E-03	2.6E-03	3.1E-03
66	3.4E-03	4.6E-03	4.8E-03	4.6E-03	5.7E-03	4.2E-03	3.2E-03	2.6E-03
67	3.4E-03	3.7E-03	4.3E-03	4.3E-03	4.3E-03	11.3E-03	4.9E-03	3.8E-03
68	3.1E-03	4.2E-03	4.0E-03	5.2E-03	4.9E-03	4.8E-03	2.9E-03	4.0E-03
69	3.7E-03	4.9E-03	4.2E-03	4.5E-03	4.5E-03	4.5E-03	3.7E-03	5.1E-03
70	2.8E-03	4.2E-03	3.5E-03	3.7E-03	4.6E-03	3.5E-03	4.6E-03	5.7E-03
Statistics								
Min	2.8E-03	2.6E-03	2.6E-03	2.8E-03	3.2E-03	3.4E-03	2.6E-03	2.6E-03
Max	3.7E-03	4.9E-03	5.1E-03	5.2E-03	7.5E-03	11.3E-03	4.9E-03	5.7E-03
Average	3.2E-03	4.1E-03	4.0E-03	4.0E-03	4.8E-03	4.9E-03	3.7E-03	4.4E-03
Std Deviation	311.2E-06	658.8E-06	661.8E-06	673.6E-06	1.1E-03	2.2E-03	775.2E-06	1.1E-03

Measurements

VOL_IO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	4.6E-03	4.9E-03	3.5E-03	5.7E-03	4.8E-03	3.1E-03	4.2E-03	4.8E-03
50_OUT_REF	2.8E-03	3.2E-03	2.8E-03	4.2E-03	4.3E-03	3.7E-03	4.0E-03	5.1E-03
OFF samples								
71	4.2E-03	3.4E-03	4.3E-03	4.3E-03	4.9E-03	3.5E-03	2.6E-03	3.8E-03
72	3.2E-03	3.7E-03	4.2E-03	2.8E-03	3.5E-03	5.5E-03	4.2E-03	3.4E-03
73	2.3E-03	4.3E-03	4.3E-03	3.8E-03	5.1E-03	5.5E-03	4.0E-03	4.5E-03
74	3.4E-03	2.9E-03	4.0E-03	3.5E-03	5.2E-03	5.7E-03	4.9E-03	3.2E-03
75	3.7E-03	4.0E-03	2.9E-03	3.4E-03	3.2E-03	4.3E-03	3.5E-03	2.8E-03
76	3.1E-03	3.4E-03	3.8E-03	3.7E-03	4.5E-03	4.6E-03	3.5E-03	5.1E-03
77	4.5E-03	4.6E-03	4.5E-03	4.9E-03	3.1E-03	4.0E-03	3.7E-03	3.2E-03
78	3.7E-03	6.1E-03	4.8E-03	3.1E-03	4.0E-03	3.2E-03	3.2E-03	2.2E-03
79	2.9E-03	3.4E-03	5.1E-03	4.0E-03	4.9E-03	4.3E-03	4.2E-03	4.3E-03
80	3.4E-03	2.0E-03	3.7E-03	3.1E-03	3.1E-03	4.8E-03	3.8E-03	5.1E-03
Statistics								
Min	2.3E-03	2.0E-03	2.9E-03	2.8E-03	3.1E-03	3.2E-03	2.6E-03	2.2E-03
Max	4.5E-03	6.1E-03	5.1E-03	4.9E-03	5.2E-03	5.7E-03	4.9E-03	5.1E-03
Average	3.4E-03	3.8E-03	4.2E-03	3.7E-03	4.2E-03	4.6E-03	3.8E-03	3.8E-03
Std Deviation	579.2E-06	1.0E-03	562.7E-06	605.8E-06	821.7E-06	799.3E-06	580.0E-06	916.0E-06

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output High Voltage : VOH_IO[0]
Test conditions : IOH=-100uA Vcc = 3.3V
Unit : V
Spec Limit Min : 3.100
Spec limits are represented in bold lines on the graphic.



Measurements

VOH_IO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.292	3.294	3.294	3.293	3.293	3.293	3.294	3.295
50_OUT_REF	3.293	3.294	3.292	3.294	3.294	3.294	3.293	3.295
ON_LDC samples								
51	3.295	3.293	3.294	3.293	3.293	3.293	3.294	3.295
52	3.295	3.292	3.294	3.293	3.293	3.295	3.294	3.292
53	3.294	3.295	3.294	3.293	3.293	3.295	3.294	3.292
54	3.294	3.294	3.294	3.293	3.293	3.293	3.294	3.292
55	3.293	3.296	3.294	3.294	3.293	3.295	3.294	3.292
56	3.295	3.296	3.294	3.294	3.295	3.294	3.294	3.292
57	3.294	3.294	3.294	3.295	3.295	3.294	3.294	3.292
58	3.295	3.294	3.294	3.295	3.295	3.294	3.294	3.292
59	3.294	3.292	3.294	3.296	3.295	3.294	3.294	3.292
60	3.294	3.293	3.294	3.296	3.295	3.295	3.294	3.292
Statistics								
Min	3.293	3.292	3.294	3.293	3.293	3.293	3.294	3.292
Max	3.295	3.296	3.294	3.296	3.295	3.295	3.294	3.295
Average	3.294	3.294	3.294	3.294	3.294	3.294	3.294	3.293
Std Deviation	0.001	0.001	0.000	0.001	0.001	0.001	0.000	0.001

Measurements

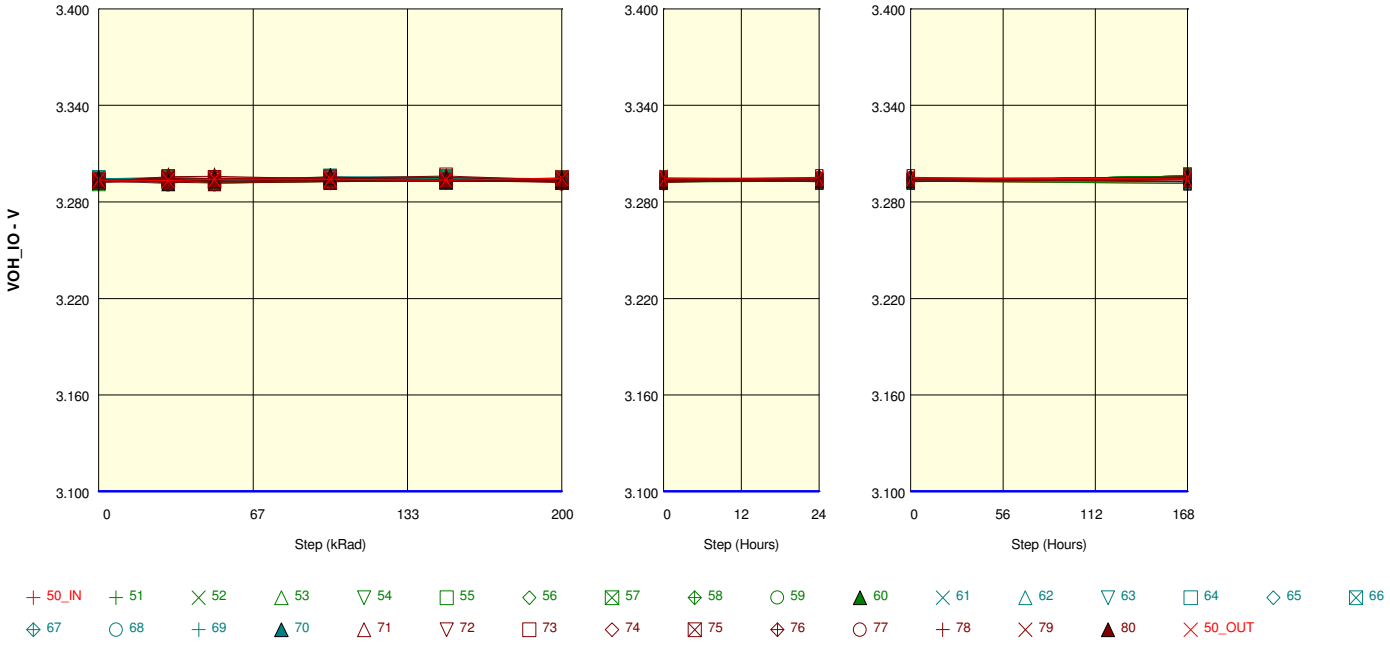
VOH_IO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.292	3.294	3.294	3.293	3.293	3.293	3.294	3.295
50_OUT_REF	3.293	3.294	3.292	3.294	3.294	3.294	3.293	3.295
ON_HDC samples								
61	3.294	3.294	3.292	3.292	3.295	3.295	3.294	3.294
62	3.295	3.294	3.293	3.292	3.292	3.294	3.294	3.295
63	3.294	3.293	3.294	3.292	3.292	3.294	3.294	3.295
64	3.292	3.293	3.294	3.292	3.295	3.294	3.294	3.295
65	3.294	3.293	3.294	3.292	3.295	3.294	3.294	3.295
66	3.293	3.294	3.294	3.292	3.295	3.294	3.294	3.295
67	3.294	3.295	3.295	3.292	3.295	3.294	3.294	3.295
68	3.294	3.292	3.293	3.292	3.296	3.293	3.295	3.295
69	3.294	3.295	3.293	3.292	3.294	3.295	3.295	3.295
70	3.294	3.294	3.293	3.292	3.293	3.295	3.295	3.292
Statistics								
Min	3.292	3.292	3.292	3.292	3.292	3.293	3.294	3.292
Max	3.295	3.295	3.295	3.292	3.296	3.295	3.295	3.295
Average	3.294	3.294	3.293	3.292	3.294	3.294	3.294	3.294
Std Deviation	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001

Measurements

VOH_IO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.292	3.294	3.294	3.293	3.293	3.293	3.294	3.295
50_OUT_REF	3.293	3.294	3.292	3.294	3.294	3.294	3.293	3.295
OFF samples								
71	3.294	3.296	3.294	3.295	3.295	3.294	3.293	3.295
72	3.293	3.295	3.294	3.295	3.294	3.294	3.294	3.294
73	3.294	3.294	3.294	3.295	3.293	3.295	3.295	3.294
74	3.294	3.296	3.296	3.296	3.295	3.294	3.294	3.296
75	3.296	3.294	3.297	3.293	3.296	3.294	3.294	3.295
76	3.294	3.296	3.291	3.295	3.294	3.294	3.295	3.295
77	3.294	3.294	3.292	3.293	3.296	3.293	3.293	3.292
78	3.294	3.293	3.294	3.294	3.294	3.293	3.295	3.293
79	3.294	3.294	3.293	3.294	3.293	3.295	3.295	3.293
80	3.293	3.293	3.293	3.293	3.294	3.294	3.295	3.295
Statistics								
Min	3.293	3.293	3.291	3.293	3.293	3.293	3.293	3.292
Max	3.296	3.296	3.297	3.296	3.296	3.295	3.295	3.296
Average	3.294	3.294	3.294	3.294	3.294	3.294	3.294	3.294
Std Deviation	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output High Voltage : VOH_IO[1]
Test conditions : IOH=-100uA Vcc = 3.3V
Unit : V
Spec Limit Min : 3.100
Spec limits are represented in bold lines on the graphic.



Measurements

VOH_IO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.292	3.294	3.293	3.294	3.293	3.293	3.293	3.292
50_OUT_REF	3.294	3.293	3.294	3.294	3.294	3.295	3.295	3.294
ON_LDC samples								
51	3.294	3.294	3.293	3.294	3.293	3.293	3.293	3.292
52	3.295	3.292	3.294	3.294	3.294	3.294	3.293	3.296
53	3.292	3.295	3.294	3.294	3.294	3.294	3.293	3.296
54	3.293	3.294	3.294	3.294	3.294	3.292	3.293	3.296
55	3.294	3.294	3.294	3.293	3.294	3.294	3.293	3.296
56	3.294	3.293	3.294	3.293	3.295	3.294	3.293	3.296
57	3.294	3.295	3.294	3.294	3.295	3.294	3.293	3.296
58	3.294	3.294	3.294	3.294	3.295	3.294	3.293	3.296
59	3.293	3.294	3.292	3.293	3.295	3.294	3.293	3.296
60	3.293	3.294	3.292	3.293	3.295	3.293	3.293	3.296
Statistics								
Min	3.292	3.292	3.292	3.293	3.293	3.292	3.293	3.292
Max	3.295	3.295	3.294	3.294	3.295	3.294	3.293	3.296
Average	3.293	3.294	3.293	3.293	3.295	3.294	3.293	3.296
Std Deviation	0.001	0.001	0.001	0.000	0.001	0.001	0.000	0.001

Measurements

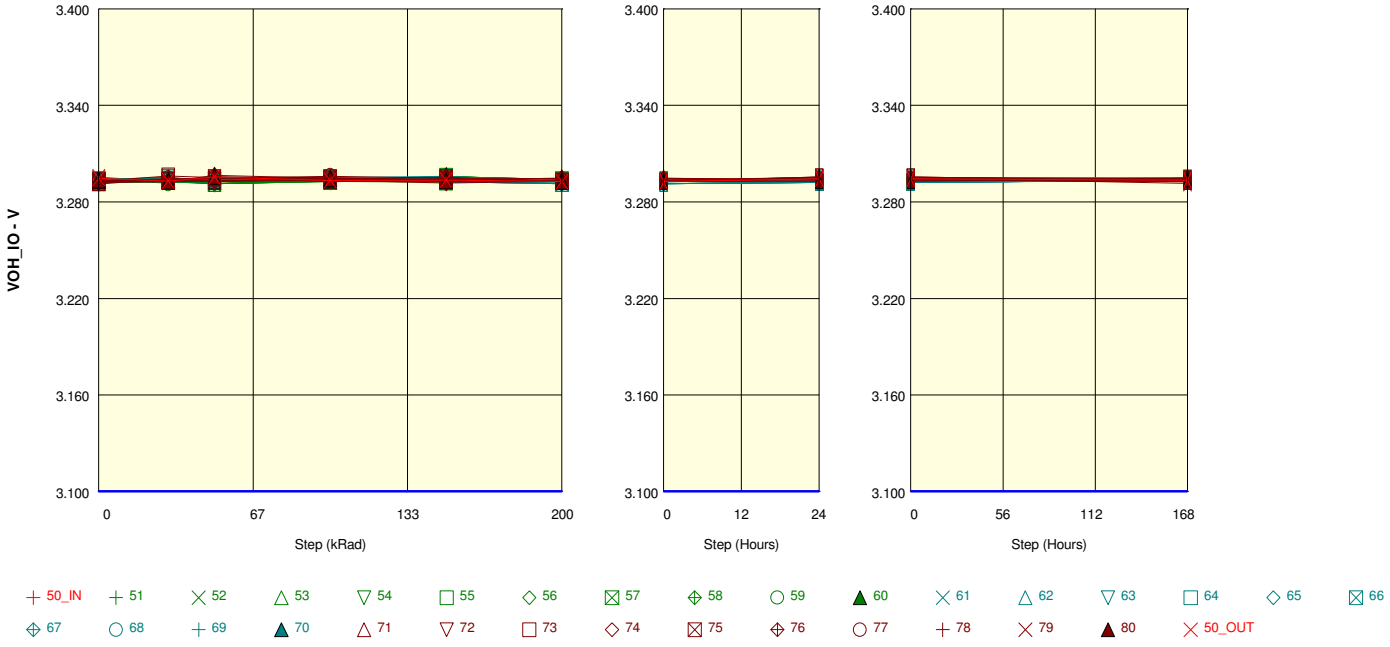
VOH_IO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.292	3.294	3.293	3.294	3.293	3.293	3.293	3.292
50_OUT_REF	3.294	3.293	3.294	3.294	3.294	3.295	3.295	3.294
ON_HDC samples								
61	3.294	3.294	3.293	3.295	3.294	3.293	3.293	3.295
62	3.295	3.294	3.293	3.295	3.293	3.293	3.293	3.295
63	3.293	3.294	3.294	3.295	3.293	3.293	3.293	3.295
64	3.295	3.293	3.294	3.295	3.295	3.293	3.293	3.295
65	3.294	3.293	3.294	3.295	3.295	3.293	3.293	3.295
66	3.293	3.293	3.294	3.295	3.295	3.293	3.293	3.295
67	3.292	3.295	3.292	3.295	3.295	3.293	3.293	3.295
68	3.294	3.291	3.295	3.295	3.295	3.294	3.294	3.295
69	3.293	3.295	3.295	3.295	3.294	3.293	3.294	3.295
70	3.294	3.295	3.294	3.295	3.295	3.293	3.294	3.292
Statistics								
Min	3.292	3.291	3.292	3.295	3.293	3.293	3.293	3.292
Max	3.295	3.295	3.295	3.295	3.295	3.294	3.294	3.295
Average	3.294	3.294	3.294	3.295	3.295	3.293	3.293	3.295
Std Deviation	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001

Measurements

VOH_IO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.292	3.294	3.293	3.294	3.293	3.293	3.293	3.292
50_OUT_REF	3.294	3.293	3.294	3.294	3.294	3.295	3.295	3.294
OFF samples								
71	3.293	3.296	3.296	3.294	3.295	3.293	3.294	3.295
72	3.293	3.293	3.295	3.293	3.293	3.294	3.293	3.296
73	3.293	3.294	3.294	3.295	3.296	3.294	3.295	3.293
74	3.294	3.293	3.294	3.293	3.294	3.293	3.295	3.293
75	3.293	3.295	3.292	3.293	3.293	3.293	3.293	3.294
76	3.293	3.294	3.294	3.295	3.293	3.293	3.293	3.293
77	3.292	3.292	3.292	3.293	3.293	3.292	3.294	3.295
78	3.293	3.294	3.293	3.294	3.294	3.292	3.295	3.295
79	3.293	3.294	3.295	3.294	3.294	3.295	3.294	3.294
80	3.294	3.292	3.294	3.296	3.294	3.294	3.294	3.296
Statistics								
Min	3.292	3.292	3.292	3.293	3.293	3.292	3.293	3.293
Max	3.294	3.296	3.296	3.296	3.296	3.295	3.295	3.296
Average	3.293	3.294	3.294	3.294	3.294	3.293	3.294	3.294
Std Deviation	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output High Voltage : VOH_IO[2]
Test conditions : IOH=-100uA Vcc = 3.3V
Unit : V
Spec Limit Min : 3.100
Spec limits are represented in bold lines on the graphic.



Measurements

VOH_IO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.292	3.292	3.292	3.293	3.294	3.294	3.292	3.295
50_OUT_REF	3.295	3.293	3.296	3.293	3.294	3.293	3.294	3.294
ON_LDC samples								
51	3.293	3.294	3.292	3.293	3.294	3.294	3.292	3.295
52	3.294	3.294	3.291	3.293	3.292	3.293	3.292	3.295
53	3.294	3.294	3.291	3.293	3.292	3.293	3.292	3.295
54	3.292	3.295	3.291	3.293	3.292	3.294	3.292	3.295
55	3.292	3.293	3.291	3.294	3.292	3.293	3.292	3.295
56	3.292	3.293	3.291	3.294	3.296	3.294	3.292	3.295
57	3.293	3.293	3.291	3.293	3.296	3.294	3.292	3.295
58	3.292	3.293	3.291	3.293	3.296	3.294	3.292	3.295
59	3.294	3.292	3.294	3.293	3.296	3.294	3.292	3.295
60	3.293	3.294	3.294	3.293	3.296	3.294	3.292	3.295
Statistics								
Min	3.292	3.292	3.291	3.293	3.292	3.293	3.292	3.295
Max	3.294	3.295	3.294	3.294	3.296	3.294	3.292	3.295
Average	3.293	3.293	3.292	3.293	3.294	3.293	3.292	3.295
Std Deviation	0.001	0.001	0.001	0.000	0.002	0.000	0.000	0.000

Measurements

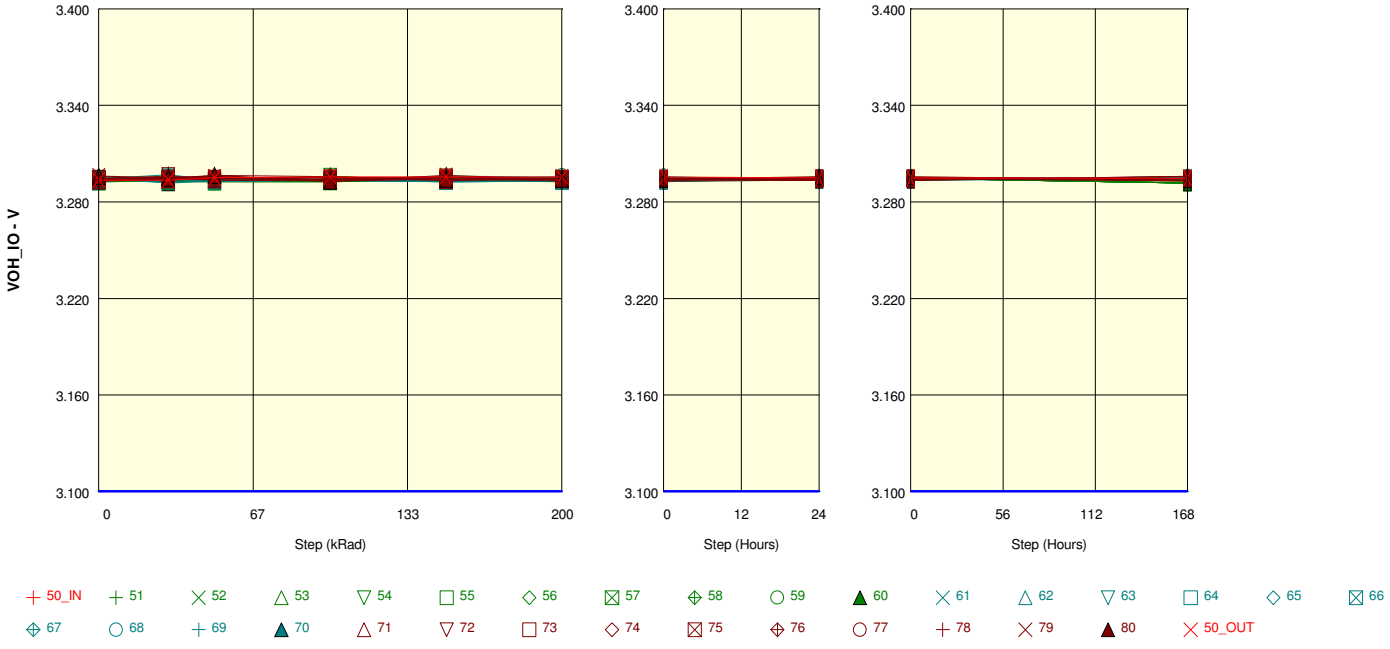
VOH_IO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.292	3.292	3.292	3.293	3.294	3.294	3.292	3.295
50_OUT_REF	3.295	3.293	3.296	3.293	3.294	3.293	3.294	3.294
ON_HDC samples								
61	3.296	3.292	3.294	3.295	3.293	3.294	3.292	3.293
62	3.293	3.293	3.294	3.295	3.294	3.291	3.292	3.294
63	3.294	3.295	3.293	3.295	3.294	3.291	3.292	3.294
64	3.294	3.294	3.293	3.295	3.293	3.291	3.292	3.294
65	3.294	3.295	3.293	3.295	3.293	3.291	3.292	3.294
66	3.293	3.294	3.293	3.295	3.293	3.291	3.292	3.294
67	3.292	3.293	3.293	3.295	3.293	3.291	3.292	3.294
68	3.293	3.294	3.294	3.295	3.294	3.292	3.295	3.294
69	3.292	3.294	3.294	3.295	3.293	3.292	3.295	3.294
70	3.292	3.294	3.293	3.295	3.296	3.293	3.295	3.295
Statistics								
Min	3.292	3.292	3.293	3.295	3.293	3.291	3.292	3.293
Max	3.296	3.295	3.294	3.295	3.296	3.294	3.295	3.295
Average	3.293	3.294	3.293	3.295	3.293	3.292	3.293	3.294
Std Deviation	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.000

Measurements

VOH_IO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.292	3.292	3.292	3.293	3.294	3.294	3.292	3.295
50_OUT_REF	3.295	3.293	3.296	3.293	3.294	3.293	3.294	3.294
OFF samples								
71	3.292	3.294	3.293	3.294	3.294	3.295	3.294	3.293
72	3.293	3.293	3.293	3.294	3.294	3.293	3.293	3.294
73	3.293	3.296	3.295	3.295	3.293	3.293	3.296	3.293
74	3.292	3.293	3.297	3.295	3.294	3.295	3.294	3.294
75	3.293	3.294	3.295	3.294	3.295	3.293	3.296	3.293
76	3.292	3.293	3.293	3.294	3.292	3.293	3.294	3.293
77	3.293	3.294	3.295	3.296	3.295	3.293	3.294	3.295
78	3.291	3.294	3.294	3.294	3.293	3.294	3.295	3.294
79	3.293	3.293	3.295	3.292	3.294	3.293	3.295	3.292
80	3.294	3.293	3.296	3.294	3.293	3.293	3.293	3.294
Statistics								
Min	3.291	3.293	3.293	3.292	3.292	3.293	3.293	3.292
Max	3.294	3.296	3.297	3.296	3.295	3.295	3.296	3.295
Average	3.293	3.294	3.294	3.294	3.294	3.293	3.294	3.293
Std Deviation	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output High Voltage : VOH_IO[3]
Test conditions : IOH=-100uA Vcc = 3.3V
Unit : V
Spec Limit Min : 3.100
Spec limits are represented in bold lines on the graphic.



Measurements

VOH_IO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.294	3.292	3.294	3.296	3.294	3.294	3.295	3.293
50_OUT_REF	3.294	3.294	3.295	3.296	3.296	3.296	3.295	3.295
ON_LDC samples								
51	3.295	3.294	3.294	3.296	3.294	3.294	3.295	3.293
52	3.293	3.293	3.292	3.296	3.293	3.295	3.295	3.292
53	3.294	3.294	3.292	3.296	3.293	3.295	3.295	3.292
54	3.294	3.294	3.292	3.296	3.293	3.293	3.295	3.292
55	3.292	3.294	3.292	3.294	3.293	3.294	3.295	3.292
56	3.294	3.294	3.292	3.294	3.294	3.294	3.295	3.292
57	3.294	3.293	3.292	3.292	3.294	3.294	3.295	3.292
58	3.295	3.293	3.292	3.292	3.294	3.294	3.295	3.292
59	3.293	3.294	3.294	3.293	3.294	3.294	3.295	3.292
60	3.294	3.292	3.294	3.293	3.294	3.294	3.295	3.292
Statistics								
Min	3.292	3.292	3.292	3.292	3.293	3.293	3.295	3.292
Max	3.295	3.294	3.294	3.296	3.294	3.295	3.295	3.293
Average	3.294	3.293	3.293	3.294	3.294	3.294	3.295	3.292
Std Deviation	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.000

Measurements

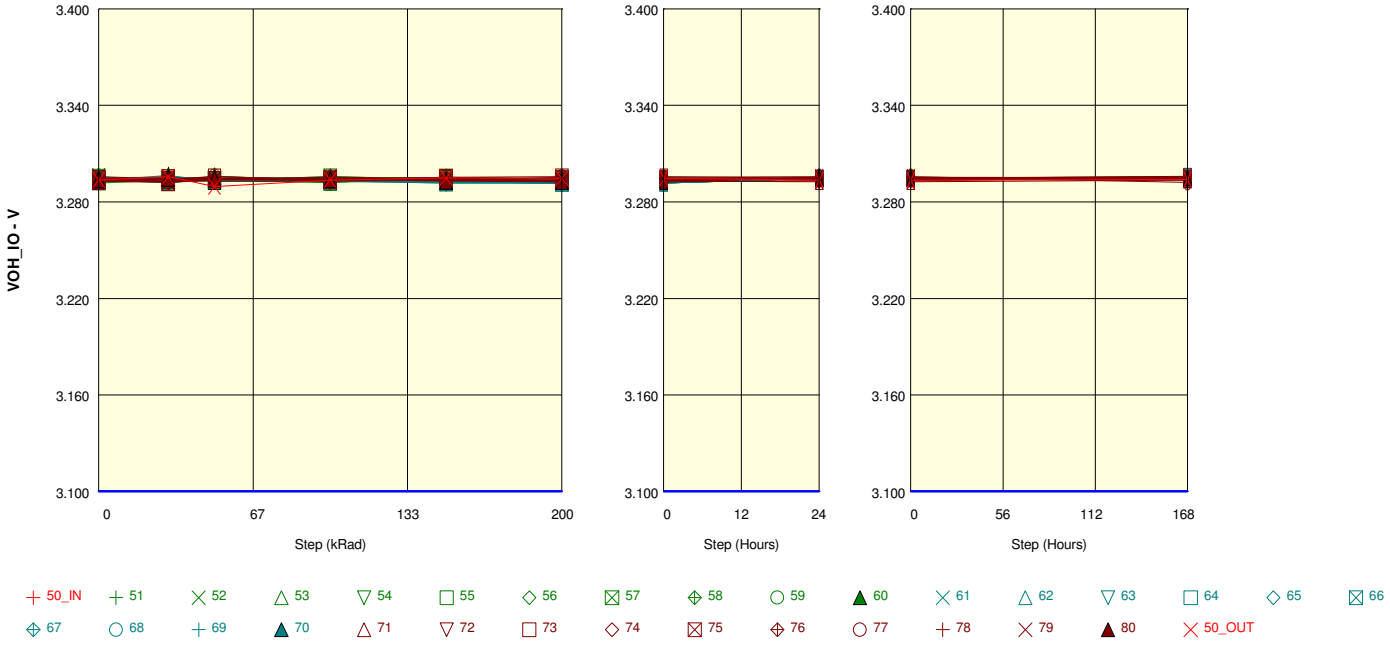
VOH_IO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.294	3.292	3.294	3.296	3.294	3.294	3.295	3.293
50_OUT_REF	3.294	3.294	3.295	3.296	3.296	3.296	3.295	3.295
ON_HDC samples								
61	3.295	3.292	3.293	3.294	3.295	3.294	3.295	3.295
62	3.294	3.297	3.294	3.294	3.293	3.293	3.295	3.295
63	3.294	3.296	3.293	3.294	3.293	3.293	3.295	3.295
64	3.293	3.295	3.293	3.294	3.293	3.293	3.295	3.295
65	3.296	3.294	3.293	3.294	3.293	3.293	3.295	3.295
66	3.295	3.294	3.293	3.294	3.293	3.293	3.295	3.295
67	3.294	3.295	3.295	3.294	3.293	3.293	3.295	3.295
68	3.294	3.293	3.294	3.294	3.294	3.296	3.294	3.295
69	3.295	3.294	3.294	3.294	3.295	3.293	3.294	3.295
70	3.293	3.296	3.294	3.294	3.296	3.295	3.294	3.296
Statistics								
Min	3.293	3.292	3.293	3.294	3.293	3.293	3.294	3.295
Max	3.296	3.297	3.295	3.294	3.296	3.296	3.295	3.296
Average	3.294	3.294	3.293	3.294	3.294	3.294	3.294	3.295
Std Deviation	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.000

Measurements

VOH_IO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.294	3.292	3.294	3.296	3.294	3.294	3.295	3.293
50_OUT_REF	3.294	3.294	3.295	3.296	3.296	3.296	3.295	3.295
OFF samples								
71	3.293	3.294	3.296	3.296	3.293	3.295	3.294	3.294
72	3.294	3.296	3.294	3.294	3.296	3.295	3.295	3.294
73	3.295	3.294	3.295	3.295	3.294	3.294	3.295	3.294
74	3.293	3.295	3.294	3.294	3.294	3.295	3.293	3.296
75	3.293	3.295	3.294	3.293	3.295	3.295	3.294	3.295
76	3.294	3.295	3.295	3.295	3.294	3.294	3.294	3.293
77	3.293	3.295	3.295	3.295	3.295	3.294	3.295	3.294
78	3.294	3.295	3.296	3.294	3.296	3.293	3.294	3.296
79	3.296	3.295	3.296	3.293	3.296	3.294	3.294	3.294
80	3.296	3.295	3.296	3.293	3.294	3.294	3.296	3.294
Statistics								
Min	3.293	3.294	3.294	3.293	3.293	3.293	3.293	3.293
Max	3.296	3.296	3.296	3.296	3.296	3.295	3.296	3.296
Average	3.294	3.295	3.295	3.294	3.295	3.294	3.294	3.294
Std Deviation	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output High Voltage : VOH_IO[4]
Test conditions : IOH=-100uA Vcc = 3.3V
Unit : V
Spec Limit Min : 3.100
Spec limits are represented in bold lines on the graphic.



Measurements

VOH_IO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.293	3.293	3.294	3.294	3.293	3.294	3.295	3.296
50_OUT_REF	3.294	3.296	3.290	3.294	3.295	3.295	3.294	3.294
ON_LDC samples								
51	3.292	3.294	3.294	3.294	3.293	3.294	3.295	3.296
52	3.294	3.296	3.294	3.294	3.295	3.294	3.295	3.294
53	3.293	3.293	3.294	3.294	3.295	3.294	3.295	3.294
54	3.295	3.294	3.294	3.294	3.295	3.294	3.295	3.294
55	3.294	3.292	3.294	3.292	3.295	3.294	3.295	3.294
56	3.293	3.294	3.294	3.292	3.294	3.294	3.295	3.294
57	3.294	3.295	3.294	3.296	3.294	3.294	3.295	3.294
58	3.293	3.295	3.294	3.296	3.294	3.294	3.295	3.294
59	3.296	3.292	3.296	3.294	3.294	3.294	3.295	3.294
60	3.292	3.294	3.296	3.294	3.294	3.295	3.295	3.294
Statistics								
Min	3.292	3.292	3.294	3.292	3.293	3.294	3.295	3.294
Max	3.296	3.296	3.296	3.296	3.295	3.295	3.295	3.296
Average	3.294	3.294	3.294	3.294	3.294	3.294	3.295	3.294
Std Deviation	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.001

Measurements

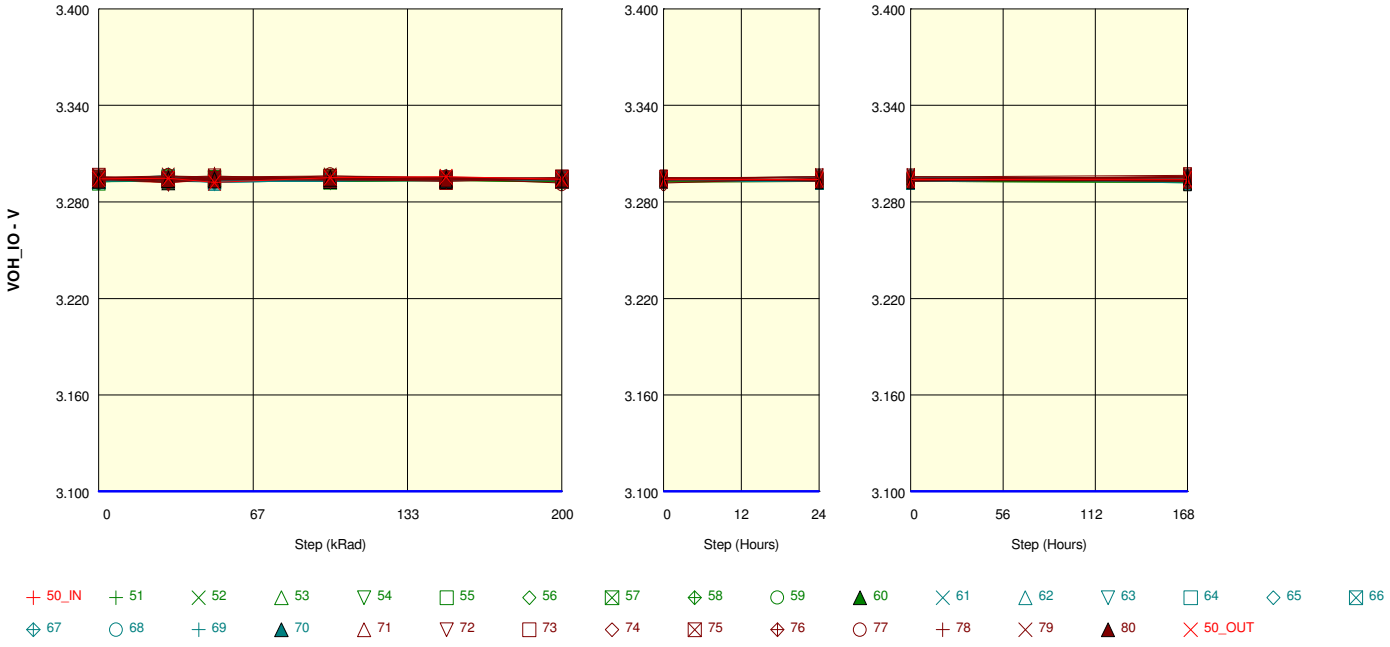
VOH_IO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.293	3.293	3.294	3.294	3.293	3.294	3.295	3.296
50_OUT_REF	3.294	3.296	3.290	3.294	3.295	3.295	3.294	3.294
ON_HDC samples								
61	3.293	3.294	3.294	3.293	3.294	3.295	3.295	3.294
62	3.294	3.295	3.294	3.293	3.292	3.292	3.295	3.295
63	3.293	3.293	3.294	3.293	3.292	3.292	3.295	3.295
64	3.294	3.294	3.294	3.293	3.292	3.292	3.295	3.295
65	3.293	3.294	3.294	3.293	3.292	3.292	3.295	3.295
66	3.294	3.292	3.294	3.293	3.292	3.292	3.295	3.295
67	3.295	3.293	3.294	3.293	3.292	3.292	3.295	3.295
68	3.294	3.292	3.294	3.293	3.294	3.294	3.295	3.295
69	3.295	3.296	3.294	3.293	3.293	3.293	3.295	3.295
70	3.293	3.296	3.293	3.293	3.292	3.293	3.295	3.294
Statistics								
Min	3.293	3.292	3.293	3.293	3.292	3.292	3.295	3.294
Max	3.295	3.296	3.294	3.293	3.294	3.295	3.295	3.295
Average	3.294	3.294	3.294	3.293	3.293	3.293	3.295	3.295
Std Deviation	0.001	0.001	0.000	0.000	0.001	0.001	0.000	0.001

Measurements

VOH_IO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.293	3.293	3.294	3.294	3.293	3.294	3.295	3.296
50_OUT_REF	3.294	3.296	3.290	3.294	3.295	3.295	3.294	3.294
OFF samples								
71	3.293	3.294	3.296	3.294	3.294	3.293	3.294	3.295
72	3.294	3.295	3.294	3.295	3.295	3.294	3.294	3.295
73	3.295	3.294	3.296	3.294	3.295	3.296	3.295	3.296
74	3.294	3.292	3.294	3.294	3.294	3.294	3.294	3.294
75	3.293	3.292	3.294	3.294	3.295	3.293	3.293	3.294
76	3.294	3.293	3.294	3.295	3.294	3.295	3.294	3.294
77	3.294	3.293	3.293	3.293	3.294	3.295	3.296	3.292
78	3.294	3.294	3.294	3.295	3.294	3.292	3.293	3.296
79	3.296	3.294	3.294	3.294	3.294	3.292	3.295	3.294
80	3.294	3.295	3.294	3.294	3.293	3.293	3.295	3.295
Statistics								
Min	3.293	3.292	3.293	3.293	3.293	3.292	3.293	3.292
Max	3.296	3.295	3.296	3.295	3.295	3.296	3.296	3.296
Average	3.294	3.294	3.294	3.294	3.294	3.294	3.294	3.294
Std Deviation	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output High Voltage : VOH_IO[5]
Test conditions : IOH=-100uA Vcc = 3.3V
Unit : V
Spec Limit Min : 3.100
Spec limits are represented in bold lines on the graphic.



Measurements

VOH_IO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.293	3.292	3.294	3.293	3.294	3.293	3.293	3.295
50_OUT_REF	3.294	3.295	3.292	3.295	3.296	3.294	3.294	3.294
ON_LDC samples								
51	3.293	3.295	3.294	3.293	3.294	3.293	3.293	3.295
52	3.294	3.294	3.294	3.293	3.293	3.294	3.293	3.293
53	3.294	3.295	3.294	3.293	3.293	3.294	3.293	3.293
54	3.293	3.292	3.294	3.293	3.293	3.292	3.293	3.293
55	3.292	3.294	3.294	3.295	3.293	3.294	3.293	3.293
56	3.295	3.294	3.294	3.295	3.294	3.294	3.293	3.293
57	3.295	3.295	3.294	3.295	3.294	3.294	3.293	3.293
58	3.293	3.293	3.294	3.295	3.294	3.294	3.293	3.293
59	3.292	3.296	3.295	3.295	3.294	3.294	3.293	3.293
60	3.294	3.292	3.295	3.295	3.294	3.294	3.293	3.293
Statistics								
Min	3.292	3.292	3.294	3.293	3.293	3.292	3.293	3.293
Max	3.295	3.296	3.295	3.295	3.294	3.294	3.293	3.295
Average	3.293	3.294	3.294	3.294	3.293	3.293	3.293	3.293
Std Deviation	0.001	0.001	0.000	0.001	0.000	0.001	0.000	0.001

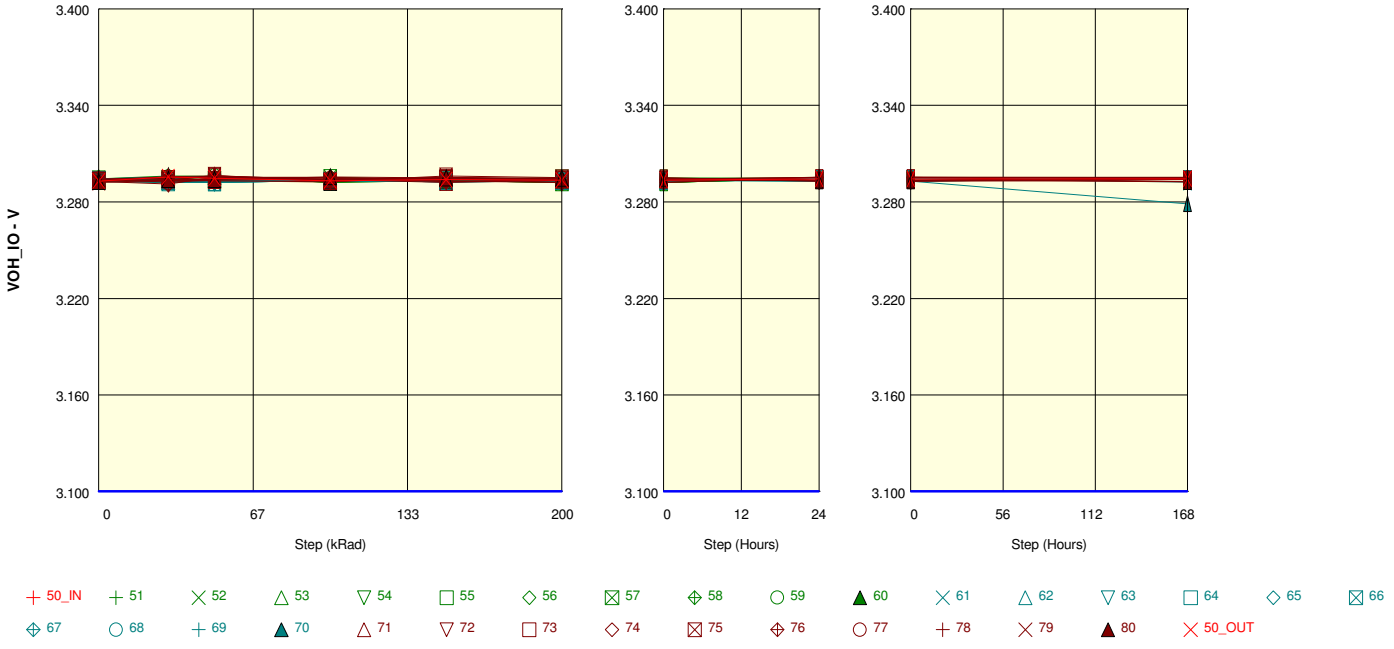
Measurements

VOH_IO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.293	3.292	3.294	3.293	3.294	3.293	3.293	3.295
50_OUT_REF	3.294	3.295	3.292	3.295	3.296	3.294	3.294	3.294
ON_HDC samples								
61	3.294	3.296	3.295	3.293	3.295	3.294	3.293	3.295
62	3.293	3.294	3.294	3.293	3.294	3.294	3.293	3.295
63	3.293	3.293	3.292	3.293	3.294	3.294	3.293	3.295
64	3.293	3.294	3.292	3.293	3.294	3.294	3.293	3.295
65	3.294	3.294	3.292	3.293	3.294	3.294	3.293	3.295
66	3.294	3.294	3.292	3.293	3.294	3.294	3.293	3.295
67	3.294	3.294	3.294	3.293	3.294	3.294	3.293	3.295
68	3.294	3.294	3.293	3.293	3.295	3.295	3.296	3.295
69	3.294	3.297	3.293	3.293	3.295	3.294	3.296	3.295
70	3.295	3.295	3.295	3.293	3.293	3.294	3.296	3.292
Statistics								
Min	3.293	3.293	3.292	3.293	3.293	3.294	3.293	3.292
Max	3.295	3.297	3.295	3.293	3.295	3.295	3.296	3.295
Average	3.294	3.294	3.293	3.293	3.294	3.294	3.294	3.294
Std Deviation	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.001

Measurements

VOH_IO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.293	3.292	3.294	3.293	3.294	3.293	3.293	3.295
50_OUT_REF	3.294	3.295	3.292	3.295	3.296	3.294	3.294	3.294
OFF samples								
71	3.295	3.295	3.296	3.294	3.295	3.294	3.294	3.295
72	3.294	3.292	3.294	3.294	3.294	3.294	3.294	3.296
73	3.295	3.294	3.296	3.294	3.293	3.295	3.294	3.293
74	3.295	3.294	3.295	3.295	3.295	3.294	3.294	3.296
75	3.296	3.294	3.294	3.295	3.294	3.295	3.296	3.296
76	3.294	3.292	3.294	3.295	3.295	3.295	3.293	3.293
77	3.294	3.296	3.294	3.296	3.295	3.292	3.295	3.293
78	3.295	3.293	3.295	3.294	3.294	3.295	3.294	3.294
79	3.295	3.296	3.296	3.296	3.295	3.295	3.296	3.294
80	3.294	3.294	3.294	3.295	3.294	3.294	3.293	3.296
Statistics								
Min	3.294	3.292	3.294	3.294	3.293	3.292	3.293	3.293
Max	3.296	3.296	3.296	3.296	3.295	3.295	3.296	3.296
Average	3.295	3.294	3.295	3.295	3.294	3.294	3.294	3.295
Std Deviation	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Parameter : Output High Voltage : VOH_IO[6]
Test conditions : IOH=-100uA Vcc = 3.3V
Unit : V
Spec Limit Min : 3.100
Spec limits are represented in bold lines on the graphic.



Measurements

VOH_IO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.293	3.294	3.293	3.293	3.293	3.293	3.295	3.294
50_OUT_REF	3.293	3.296	3.295	3.293	3.294	3.294	3.294	3.294
ON_LDC samples								
51	3.293	3.295	3.293	3.293	3.293	3.293	3.295	3.294
52	3.294	3.292	3.294	3.293	3.294	3.294	3.295	3.294
53	3.293	3.293	3.294	3.293	3.294	3.294	3.295	3.294
54	3.293	3.294	3.294	3.293	3.294	3.295	3.295	3.294
55	3.294	3.295	3.294	3.293	3.294	3.292	3.295	3.294
56	3.293	3.293	3.294	3.293	3.293	3.292	3.295	3.294
57	3.294	3.294	3.294	3.295	3.293	3.292	3.295	3.294
58	3.295	3.292	3.294	3.295	3.293	3.292	3.295	3.294
59	3.293	3.295	3.296	3.292	3.293	3.292	3.295	3.294
60	3.294	3.296	3.296	3.292	3.293	3.294	3.295	3.294
Statistics								
Min	3.293	3.292	3.293	3.292	3.293	3.292	3.295	3.294
Max	3.295	3.296	3.296	3.295	3.294	3.295	3.295	3.294
Average	3.294	3.294	3.294	3.293	3.294	3.293	3.295	3.294
Std Deviation	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.000

Measurements

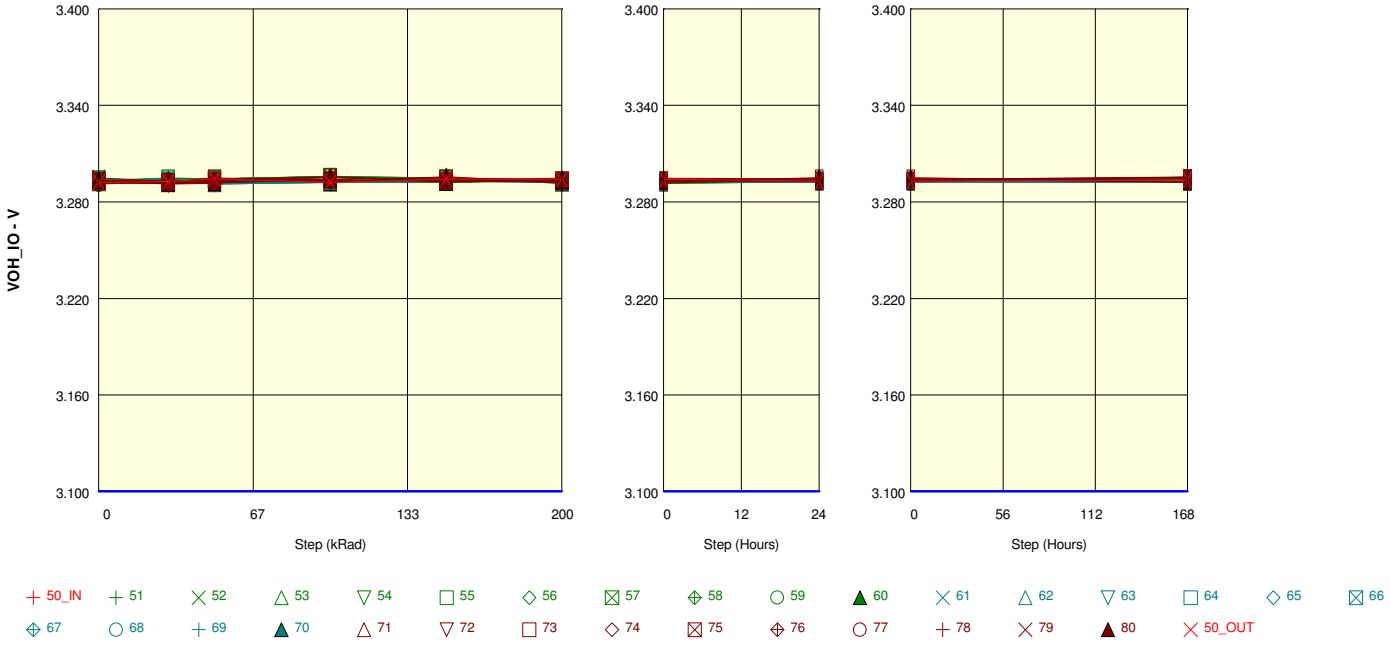
VOH_IO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.293	3.294	3.293	3.293	3.293	3.293	3.295	3.294
50_OUT_REF	3.293	3.296	3.295	3.293	3.294	3.294	3.294	3.294
ON_HDC samples								
61	3.292	3.292	3.293	3.293	3.294	3.294	3.295	3.292
62	3.293	3.293	3.295	3.293	3.292	3.293	3.295	3.295
63	3.293	3.292	3.292	3.293	3.292	3.293	3.295	3.295
64	3.293	3.292	3.292	3.293	3.293	3.293	3.295	3.295
65	3.294	3.294	3.292	3.293	3.293	3.293	3.295	3.295
66	3.294	3.293	3.292	3.293	3.293	3.293	3.295	3.295
67	3.294	3.293	3.294	3.293	3.293	3.293	3.295	3.295
68	3.293	3.293	3.294	3.293	3.294	3.293	3.293	3.295
69	3.294	3.295	3.294	3.293	3.293	3.294	3.293	3.295
70	3.294	3.296	3.296	3.293	3.295	3.294	3.293	3.279
Statistics								
Min	3.292	3.292	3.292	3.293	3.292	3.293	3.293	3.279
Max	3.294	3.296	3.296	3.293	3.295	3.294	3.295	3.295
Average	3.294	3.293	3.293	3.293	3.293	3.293	3.294	3.293
Std Deviation	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.005

Measurements

VOH_IO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.293	3.294	3.293	3.293	3.293	3.293	3.295	3.294
50_OUT_REF	3.293	3.296	3.295	3.293	3.294	3.294	3.294	3.294
OFF samples								
71	3.294	3.296	3.296	3.294	3.292	3.294	3.293	3.295
72	3.293	3.294	3.297	3.293	3.296	3.295	3.293	3.294
73	3.294	3.295	3.296	3.293	3.295	3.294	3.295	3.293
74	3.294	3.295	3.295	3.295	3.293	3.292	3.295	3.295
75	3.294	3.294	3.293	3.293	3.295	3.294	3.294	3.294
76	3.293	3.291	3.295	3.295	3.293	3.294	3.295	3.295
77	3.294	3.292	3.294	3.294	3.294	3.294	3.293	3.295
78	3.293	3.293	3.295	3.295	3.294	3.292	3.295	3.295
79	3.292	3.294	3.296	3.294	3.295	3.294	3.294	3.295
80	3.293	3.294	3.294	3.296	3.295	3.295	3.294	3.293
Statistics								
Min	3.292	3.291	3.293	3.293	3.292	3.292	3.293	3.293
Max	3.294	3.296	3.297	3.296	3.296	3.295	3.295	3.295
Average	3.293	3.294	3.295	3.294	3.294	3.294	3.294	3.294
Std Deviation	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output High Voltage : VOH_IO[7]
Test conditions : IOH=-100uA Vcc = 3.3V
Unit : V
Spec Limit Min : 3.100
Spec limits are represented in bold lines on the graphic.



Measurements

VOH_IO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.294	3.293	3.294	3.296	3.294	3.293	3.292	3.294
50_OUT_REF	3.292	3.293	3.294	3.292	3.294	3.294	3.293	3.294
ON_LDC samples								
51	3.293	3.295	3.294	3.296	3.294	3.293	3.292	3.294
52	3.293	3.294	3.294	3.296	3.295	3.292	3.292	3.294
53	3.294	3.294	3.294	3.296	3.295	3.292	3.292	3.294
54	3.292	3.292	3.294	3.296	3.295	3.294	3.292	3.294
55	3.293	3.295	3.294	3.292	3.295	3.292	3.292	3.294
56	3.294	3.293	3.294	3.292	3.292	3.294	3.292	3.294
57	3.294	3.294	3.294	3.296	3.292	3.294	3.292	3.294
58	3.293	3.293	3.294	3.296	3.292	3.294	3.292	3.294
59	3.291	3.292	3.294	3.294	3.292	3.294	3.292	3.294
60	3.294	3.292	3.294	3.294	3.292	3.293	3.292	3.294
Statistics								
Min	3.291	3.292	3.294	3.292	3.292	3.292	3.292	3.294
Max	3.294	3.295	3.294	3.296	3.295	3.294	3.292	3.294
Average	3.293	3.293	3.294	3.295	3.293	3.293	3.292	3.294
Std Deviation	0.001	0.001	0.000	0.001	0.001	0.001	0.000	0.000

Measurements

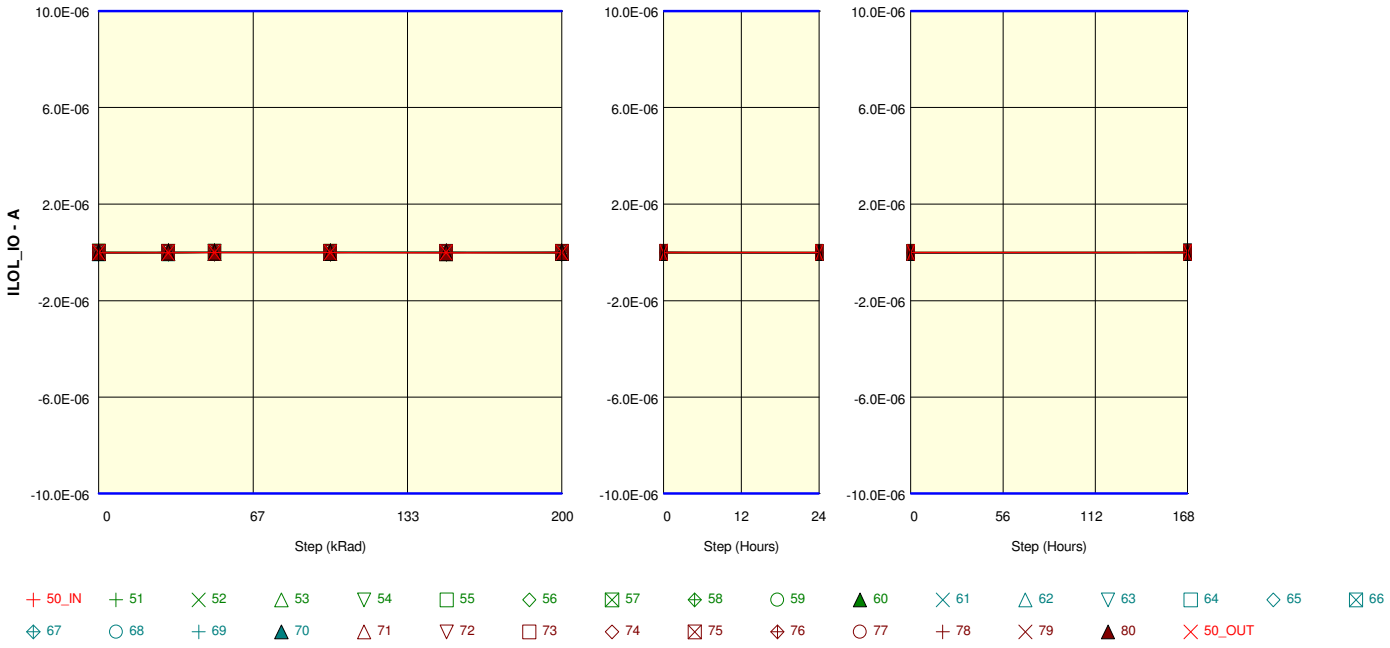
VOH_IO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.294	3.293	3.294	3.296	3.294	3.293	3.292	3.294
50_OUT_REF	3.292	3.293	3.294	3.292	3.294	3.294	3.293	3.294
ON_HDC samples								
61	3.294	3.292	3.292	3.292	3.293	3.293	3.292	3.292
62	3.292	3.294	3.291	3.292	3.293	3.292	3.292	3.292
63	3.294	3.293	3.294	3.292	3.293	3.292	3.292	3.292
64	3.293	3.294	3.294	3.292	3.295	3.292	3.292	3.292
65	3.295	3.292	3.294	3.292	3.295	3.292	3.292	3.292
66	3.294	3.292	3.294	3.292	3.295	3.292	3.292	3.292
67	3.292	3.292	3.294	3.292	3.295	3.292	3.292	3.292
68	3.294	3.293	3.291	3.292	3.293	3.294	3.293	3.292
69	3.293	3.295	3.291	3.292	3.295	3.293	3.293	3.292
70	3.293	3.294	3.292	3.292	3.293	3.293	3.293	3.292
Statistics								
Min	3.292	3.292	3.291	3.292	3.293	3.292	3.292	3.292
Max	3.295	3.295	3.294	3.292	3.295	3.294	3.293	3.292
Average	3.293	3.293	3.293	3.292	3.294	3.292	3.293	3.292
Std Deviation	0.001	0.001	0.001	0.000	0.001	0.001	0.000	0.000

Measurements

VOH_IO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.294	3.293	3.294	3.296	3.294	3.293	3.292	3.294
50_OUT_REF	3.292	3.293	3.294	3.292	3.294	3.294	3.293	3.294
OFF samples								
71	3.293	3.291	3.292	3.295	3.293	3.294	3.293	3.295
72	3.294	3.291	3.292	3.293	3.294	3.293	3.294	3.294
73	3.292	3.293	3.293	3.296	3.293	3.292	3.295	3.292
74	3.292	3.292	3.293	3.292	3.296	3.292	3.294	3.296
75	3.293	3.292	3.295	3.293	3.293	3.293	3.293	3.295
76	3.292	3.293	3.294	3.295	3.294	3.294	3.294	3.293
77	3.293	3.293	3.292	3.294	3.293	3.294	3.294	3.295
78	3.292	3.292	3.292	3.293	3.294	3.295	3.294	3.292
79	3.295	3.293	3.294	3.295	3.292	3.294	3.294	3.295
80	3.293	3.291	3.292	3.294	3.295	3.294	3.294	3.293
Statistics								
Min	3.292	3.291	3.292	3.292	3.292	3.292	3.293	3.292
Max	3.295	3.293	3.295	3.296	3.296	3.295	3.295	3.296
Average	3.293	3.292	3.293	3.294	3.294	3.293	3.294	3.294
Std Deviation	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Leakage Current Low : ILOL_IO[0]
Test conditions : Vout=0V . Vcc = 3.6V DQ are disabled
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

ILOL_IO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-9.7E-09	-11.3E-09	-8.2E-09	1.7E-09	-4.4E-09	-9.0E-09	-1.4E-09	-8.2E-09
50_OUT_REF	-13.6E-09	-18.1E-09	-10.5E-09	-11.3E-09	-14.3E-09	-12.0E-09	-8.2E-09	-17.4E-09
ON_LDC samples								
51	-13.6E-09	-6.7E-09	-8.2E-09	1.7E-09	-4.4E-09	-9.0E-09	-1.4E-09	-8.2E-09
52	-15.8E-09	-15.1E-09	2.5E-09	1.7E-09	-5.9E-09	-5.9E-09	-1.4E-09	1.7E-09
53	-16.6E-09	-15.1E-09	2.5E-09	1.7E-09	-5.9E-09	-5.9E-09	-1.4E-09	1.7E-09
54	-9.0E-09	-2.9E-09	2.5E-09	1.7E-09	-5.9E-09	-1.4E-09	-1.4E-09	1.7E-09
55	3.2E-09	-8.2E-09	2.5E-09	-3.6E-09	-5.9E-09	-9.7E-09	-1.4E-09	-9.7E-09
56	-12.0E-09	-17.4E-09	2.5E-09	-9.0E-09	-6.7E-09	-12.8E-09	-16.6E-09	-9.7E-09
57	-17.4E-09	-10.5E-09	2.5E-09	-589.6E-12	-6.7E-09	-12.8E-09	-16.6E-09	-9.7E-09
58	-13.6E-09	-9.0E-09	2.5E-09	-589.6E-12	-6.7E-09	-12.8E-09	-16.6E-09	-9.7E-09
59	-6.7E-09	-5.9E-09	-5.9E-09	-10.5E-09	-6.7E-09	-12.8E-09	-16.6E-09	-9.7E-09
60	7.0E-09	3.2E-09	-5.9E-09	-10.5E-09	-6.7E-09	-12.8E-09	-16.6E-09	-12.0E-09
Statistics								
Min	-17.4E-09	-17.4E-09	-8.2E-09	-10.5E-09	-6.7E-09	-12.8E-09	-16.6E-09	-12.0E-09
Max	7.0E-09	3.2E-09	2.5E-09	1.7E-09	-4.4E-09	-1.4E-09	-1.4E-09	1.7E-09
Average	-9.4E-09	-8.8E-09	-284.4E-12	-2.8E-09	-6.2E-09	-9.6E-09	-9.0E-09	-6.4E-09
Std Deviation	8.0E-09	5.9E-09	4.2E-09	5.0E-09	686.6E-12	3.8E-09	7.6E-09	5.4E-09

Measurements

ILOL_IO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-9.7E-09	-11.3E-09	-8.2E-09	1.7E-09	-4.4E-09	-9.0E-09	-1.4E-09	-8.2E-09
50_OUT_REF	-13.6E-09	-18.1E-09	-10.5E-09	-11.3E-09	-14.3E-09	-12.0E-09	-8.2E-09	-17.4E-09
ON_HDC samples								
61	-15.8E-09	-11.3E-09	-8.2E-09	-7.5E-09	-3.6E-09	173.3E-12	-16.6E-09	-13.6E-09
62	-11.3E-09	-10.5E-09	-5.2E-09	-7.5E-09	-10.5E-09	-9.0E-09	-16.6E-09	4.0E-09
63	-22.7E-09	-14.3E-09	-2.9E-09	-7.5E-09	-10.5E-09	-9.0E-09	-16.6E-09	4.0E-09
64	-19.7E-09	-18.1E-09	-2.9E-09	-7.5E-09	-4.4E-09	-9.0E-09	-16.6E-09	4.0E-09
65	-15.1E-09	-4.4E-09	-2.9E-09	-7.5E-09	-4.4E-09	-9.0E-09	-16.6E-09	4.0E-09
66	-17.4E-09	-2.1E-09	-2.9E-09	-7.5E-09	-4.4E-09	-9.0E-09	-16.6E-09	4.0E-09
67	-8.2E-09	2.5E-09	-11.3E-09	-7.5E-09	-4.4E-09	-9.0E-09	-16.6E-09	4.0E-09
68	-12.0E-09	-7.5E-09	-9.0E-09	-7.5E-09	936.3E-12	-17.4E-09	-17.4E-09	4.0E-09
69	-11.3E-09	-9.0E-09	-9.0E-09	-7.5E-09	-11.3E-09	-7.5E-09	-17.4E-09	-7.5E-09
70	-13.6E-09	-7.5E-09	-7.5E-09	-7.5E-09	-6.7E-09	-12.8E-09	-17.4E-09	-12.8E-09
Statistics								
Min	-22.7E-09	-18.1E-09	-11.3E-09	-7.5E-09	-11.3E-09	-17.4E-09	-17.4E-09	-13.6E-09
Max	-8.2E-09	2.5E-09	-2.9E-09	-7.5E-09	936.3E-12	173.3E-12	-16.6E-09	4.0E-09

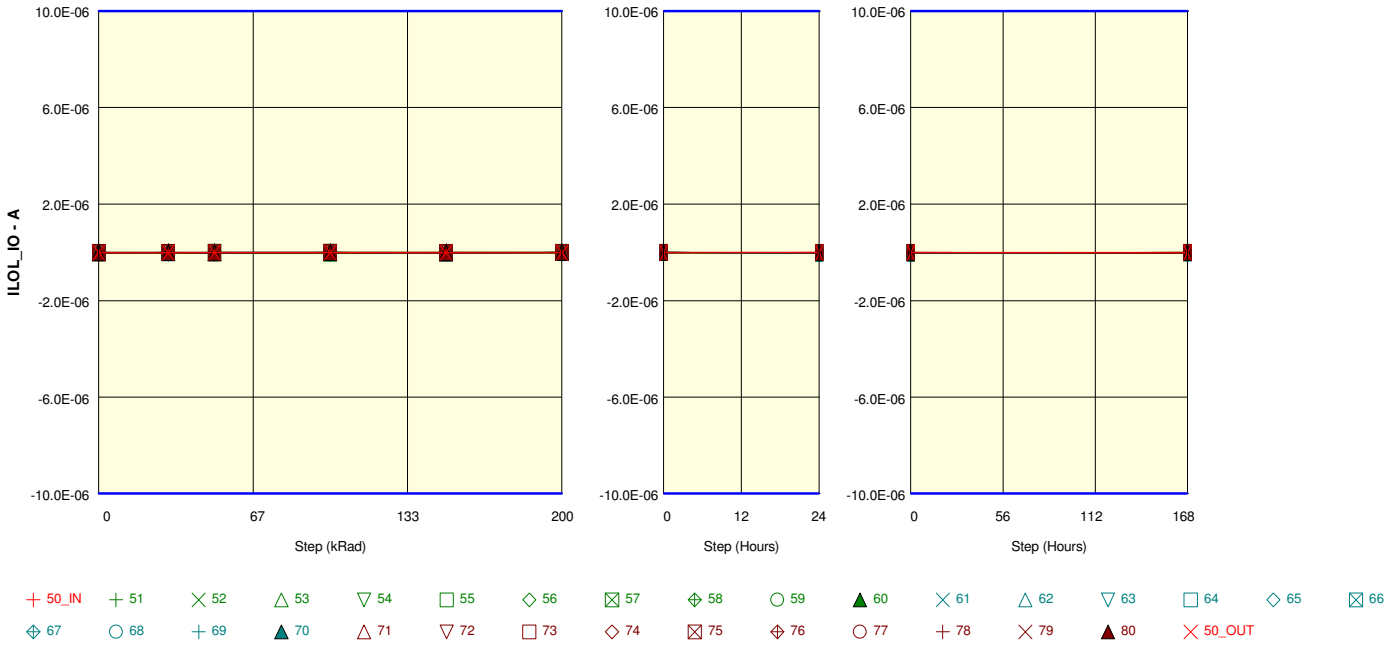
ILOL_IO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-14.7E-09	-8.2E-09	-6.2E-09	-7.5E-09	-5.9E-09	-9.1E-09	-16.8E-09	-589.7E-12
Std Deviation	4.1E-09	5.6E-09	3.0E-09	157.0E-18	3.6E-09	4.1E-09	349.7E-12	7.1E-09

Measurements

ILOL_IO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-9.7E-09	-11.3E-09	-8.2E-09	1.7E-09	-4.4E-09	-9.0E-09	-1.4E-09	-8.2E-09
50_OUT_REF	-13.6E-09	-18.1E-09	-10.5E-09	-11.3E-09	-14.3E-09	-12.0E-09	-8.2E-09	-17.4E-09
OFF samples								
71	-6.7E-09	-5.9E-09	-6.7E-09	-8.2E-09	-2.1E-09	-5.2E-09	-4.4E-09	-10.5E-09
72	-10.5E-09	173.3E-12	-9.7E-09	-5.9E-09	-9.0E-09	-11.3E-09	-12.0E-09	1.7E-09
73	-5.2E-09	-12.0E-09	-15.1E-09	-12.8E-09	-13.6E-09	-5.2E-09	-6.7E-09	-15.1E-09
74	-13.6E-09	-12.0E-09	936.3E-12	-20.4E-09	2.5E-09	-18.1E-09	-16.6E-09	4.8E-09
75	-2.1E-09	-7.5E-09	173.3E-12	-5.2E-09	-15.1E-09	-10.5E-09	-8.2E-09	10.1E-09
76	-21.2E-09	1.7E-09	-11.3E-09	936.3E-12	-15.1E-09	-10.5E-09	-9.7E-09	2.5E-09
77	-5.9E-09	-1.4E-09	-11.3E-09	-1.4E-09	-2.1E-09	-12.8E-09	-17.4E-09	-18.1E-09
78	-12.8E-09	-10.5E-09	-9.7E-09	-9.7E-09	-9.0E-09	-4.4E-09	-14.3E-09	-6.7E-09
79	-6.7E-09	-8.2E-09	-13.6E-09	-15.8E-09	-5.2E-09	5.5E-09	-4.4E-09	1.7E-09
80	-1.4E-09	2.5E-09	936.3E-12	-5.2E-09	-18.9E-09	-2.1E-09	-10.5E-09	-10.5E-09
Statistics								
Min	-21.2E-09	-12.0E-09	-15.1E-09	-20.4E-09	-18.9E-09	-18.1E-09	-17.4E-09	-18.1E-09
Max	-1.4E-09	2.5E-09	936.3E-12	936.3E-12	2.5E-09	5.5E-09	-4.4E-09	10.1E-09
Average	-8.6E-09	-5.3E-09	-7.5E-09	-8.4E-09	-8.8E-09	-7.5E-09	-10.4E-09	-4.0E-09
Std Deviation	5.7E-09	5.3E-09	5.8E-09	6.2E-09	6.6E-09	6.3E-09	4.4E-09	8.9E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Leakage Current Low : ILOL_IO[1]
Test conditions : Vout=0V . Vcc = 3.6V DQ are disabled
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

ILOL_IO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-7.5E-09	-9.0E-09	-7.5E-09	-10.5E-09	-10.5E-09	-5.9E-09	-20.4E-09	-1.4E-09
50_OUT_REF	-17.4E-09	-19.7E-09	-5.9E-09	-7.5E-09	-14.3E-09	-18.9E-09	-7.5E-09	-15.1E-09
ON_LDC samples								
51	-5.9E-09	-19.7E-09	-7.5E-09	-10.5E-09	-10.5E-09	-5.9E-09	-20.4E-09	-1.4E-09
52	-2.1E-09	-28.1E-09	-13.6E-09	-10.5E-09	-10.5E-09	-4.4E-09	-20.4E-09	173.3E-12
53	-9.0E-09	-9.7E-09	-13.6E-09	-10.5E-09	-10.5E-09	-4.4E-09	-20.4E-09	173.3E-12
54	-9.7E-09	-15.1E-09	-13.6E-09	-10.5E-09	-10.5E-09	-2.1E-09	-20.4E-09	173.3E-12
55	-19.7E-09	-9.7E-09	-13.6E-09	-22.7E-09	-10.5E-09	-1.4E-09	-20.4E-09	-14.3E-09
56	-5.2E-09	-9.0E-09	-13.6E-09	-19.7E-09	-14.3E-09	-16.6E-09	-20.4E-09	-14.3E-09
57	-5.9E-09	-6.7E-09	-13.6E-09	-26.5E-09	-14.3E-09	-16.6E-09	-20.4E-09	-14.3E-09
58	-4.4E-09	-20.4E-09	-13.6E-09	-26.5E-09	-14.3E-09	-16.6E-09	-20.4E-09	-14.3E-09
59	-12.0E-09	173.3E-12	-15.8E-09	-15.8E-09	-14.3E-09	-16.6E-09	-20.4E-09	-14.3E-09
60	-19.7E-09	-15.1E-09	-15.8E-09	-15.8E-09	-14.3E-09	-1.4E-09	-20.4E-09	-13.6E-09
Statistics								
Min	-19.7E-09	-28.1E-09	-15.8E-09	-26.5E-09	-14.3E-09	-16.6E-09	-20.4E-09	-14.3E-09
Max	-2.1E-09	173.3E-12	-7.5E-09	-10.5E-09	-10.5E-09	-1.4E-09	-20.4E-09	173.3E-12
Average	-9.4E-09	-13.3E-09	-13.4E-09	-16.9E-09	-12.4E-09	-8.6E-09	-20.4E-09	-8.6E-09
Std Deviation	5.8E-09	7.6E-09	2.2E-09	6.3E-09	1.9E-09	6.7E-09	262.7E-18	6.9E-09

Measurements

ILOL_IO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-7.5E-09	-9.0E-09	-7.5E-09	-10.5E-09	-10.5E-09	-5.9E-09	-20.4E-09	-1.4E-09
50_OUT_REF	-17.4E-09	-19.7E-09	-5.9E-09	-7.5E-09	-14.3E-09	-18.9E-09	-7.5E-09	-15.1E-09
ON_HDC samples								
61	-15.8E-09	-6.7E-09	-13.6E-09	-2.1E-09	-12.8E-09	-6.7E-09	-20.4E-09	-16.6E-09
62	-6.7E-09	-25.0E-09	-3.6E-09	-2.1E-09	-18.1E-09	-9.0E-09	-20.4E-09	-19.7E-09
63	-5.2E-09	-17.4E-09	-3.6E-09	-2.1E-09	-18.1E-09	-9.0E-09	-20.4E-09	-19.7E-09
64	-12.0E-09	-15.8E-09	-3.6E-09	-2.1E-09	-18.1E-09	-9.0E-09	-20.4E-09	-19.7E-09
65	-17.4E-09	-2.9E-09	-3.6E-09	-2.1E-09	-18.1E-09	-9.0E-09	-20.4E-09	-19.7E-09
66	-11.3E-09	-9.7E-09	-3.6E-09	-2.1E-09	-18.1E-09	-9.0E-09	-20.4E-09	-19.7E-09
67	-13.6E-09	-9.0E-09	-11.3E-09	-2.1E-09	-18.1E-09	-9.0E-09	-20.4E-09	-19.7E-09
68	-3.6E-09	-9.0E-09	-22.0E-09	-2.1E-09	-12.0E-09	-2.1E-09	-15.1E-09	-19.7E-09
69	-13.6E-09	-15.8E-09	-22.0E-09	-2.1E-09	-2.9E-09	-8.2E-09	-15.1E-09	-9.7E-09
70	-12.0E-09	-5.2E-09	-18.1E-09	-2.1E-09	-12.8E-09	-15.8E-09	-15.1E-09	-12.0E-09
Statistics								
Min	-17.4E-09	-25.0E-09	-22.0E-09	-2.1E-09	-18.1E-09	-15.8E-09	-20.4E-09	-19.7E-09
Max	-3.6E-09	-2.9E-09	-3.6E-09	-2.1E-09	-2.9E-09	-2.1E-09	-15.1E-09	-9.7E-09

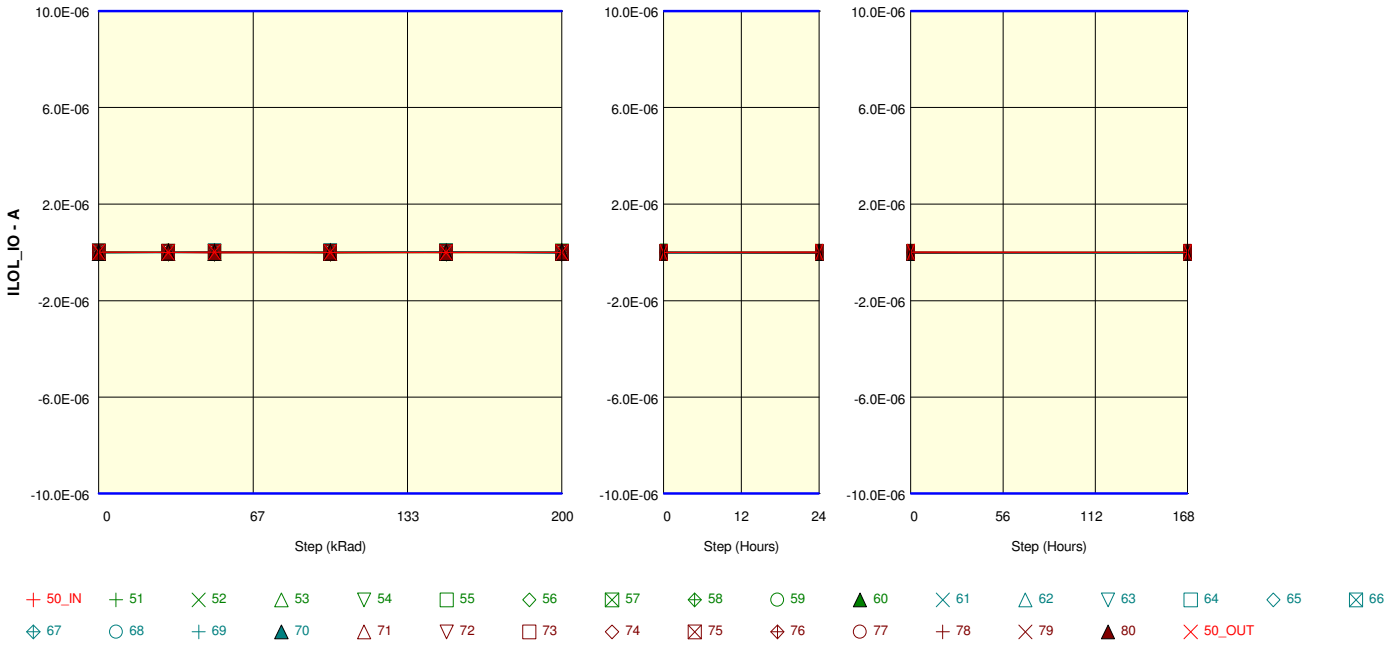
ILOL_IO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-11.1E-09	-11.7E-09	-10.5E-09	-2.1E-09	-14.9E-09	-8.7E-09	-18.8E-09	-17.6E-09
Std Deviation	4.3E-09	6.4E-09	7.5E-09	12.4E-18	4.7E-09	3.1E-09	2.4E-09	3.5E-09

Measurements

ILOL_IO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-7.5E-09	-9.0E-09	-7.5E-09	-10.5E-09	-10.5E-09	-5.9E-09	-20.4E-09	-1.4E-09
50_OUT_REF	-17.4E-09	-19.7E-09	-5.9E-09	-7.5E-09	-14.3E-09	-18.9E-09	-7.5E-09	-15.1E-09
OFF samples								
71	-11.3E-09	-10.5E-09	-589.6E-12	-2.1E-09	-8.2E-09	-7.5E-09	-15.8E-09	-13.6E-09
72	-11.3E-09	936.3E-12	-4.4E-09	-589.6E-12	-11.3E-09	-5.9E-09	-9.7E-09	-17.4E-09
73	-15.8E-09	-13.6E-09	-9.0E-09	-12.8E-09	-19.7E-09	-6.7E-09	-3.6E-09	-2.1E-09
74	-22.7E-09	-8.2E-09	936.3E-12	3.2E-09	-1.4E-09	-9.0E-09	-7.5E-09	-10.5E-09
75	-18.9E-09	-6.7E-09	-16.6E-09	-4.4E-09	-10.5E-09	-9.7E-09	-15.8E-09	-7.5E-09
76	-11.3E-09	-14.3E-09	-4.4E-09	-12.8E-09	-21.2E-09	-2.1E-09	-13.6E-09	-12.0E-09
77	-2.9E-09	-18.9E-09	-17.4E-09	-13.6E-09	-5.9E-09	-18.1E-09	-9.7E-09	-13.6E-09
78	-19.7E-09	-15.1E-09	-12.8E-09	-17.4E-09	-15.8E-09	-9.0E-09	-3.6E-09	-17.4E-09
79	-12.0E-09	-6.7E-09	-2.9E-09	-5.2E-09	-15.8E-09	-13.6E-09	-10.5E-09	-22.7E-09
80	-4.4E-09	-7.5E-09	-18.9E-09	-11.3E-09	-21.2E-09	-2.9E-09	-12.0E-09	-9.7E-09
Statistics								
Min	-22.7E-09	-18.9E-09	-18.9E-09	-17.4E-09	-21.2E-09	-18.1E-09	-15.8E-09	-22.7E-09
Max	-2.9E-09	936.3E-12	936.3E-12	3.2E-09	-1.4E-09	-2.1E-09	-3.6E-09	-2.1E-09
Average	-13.0E-09	-10.1E-09	-8.6E-09	-7.7E-09	-13.1E-09	-8.4E-09	-10.2E-09	-12.6E-09
Std Deviation	6.1E-09	5.4E-09	7.0E-09	6.4E-09	6.4E-09	4.5E-09	4.2E-09	5.5E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Leakage Current Low : ILOL_IO[2]
Test conditions : Vout=0V . Vcc = 3.6V DQ are disabled
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

ILOL_IO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-13.6E-09	-589.6E-12	-4.4E-09	-1.4E-09	-18.1E-09	936.3E-12	-5.2E-09	-5.9E-09
50_OUT_REF	7.0E-09	-2.1E-09	7.0E-09	-1.4E-09	-8.2E-09	-2.1E-09	6.3E-09	173.3E-12
ON_LDC samples								
51	-10.5E-09	-9.0E-09	-4.4E-09	-1.4E-09	-18.1E-09	936.3E-12	-5.2E-09	-5.9E-09
52	-7.5E-09	3.2E-09	-8.2E-09	-1.4E-09	4.0E-09	-3.6E-09	-5.2E-09	-15.1E-09
53	-13.6E-09	-6.7E-09	-8.2E-09	-1.4E-09	4.0E-09	-3.6E-09	-5.2E-09	-15.1E-09
54	5.5E-09	-9.7E-09	-8.2E-09	-1.4E-09	4.0E-09	4.0E-09	-5.2E-09	-15.1E-09
55	-6.7E-09	-1.4E-09	-8.2E-09	-1.4E-09	4.0E-09	-2.9E-09	-5.2E-09	-9.7E-09
56	-3.6E-09	-7.5E-09	-8.2E-09	-6.7E-09	-2.9E-09	-5.2E-09	-15.1E-09	-9.7E-09
57	-6.7E-09	-7.5E-09	-8.2E-09	-10.5E-09	-2.9E-09	-5.2E-09	-15.1E-09	-9.7E-09
58	-5.2E-09	-9.7E-09	-8.2E-09	-10.5E-09	-2.9E-09	-5.2E-09	-15.1E-09	-9.7E-09
59	-11.3E-09	3.2E-09	173.3E-12	-14.3E-09	-2.9E-09	-5.2E-09	-15.1E-09	-9.7E-09
60	-10.5E-09	-8.2E-09	173.3E-12	-14.3E-09	-2.9E-09	-589.6E-12	-15.1E-09	8.6E-09
Statistics								
Min	-13.6E-09	-9.7E-09	-8.2E-09	-14.3E-09	-18.1E-09	-5.2E-09	-15.1E-09	-15.1E-09
Max	5.5E-09	3.2E-09	173.3E-12	-1.4E-09	4.0E-09	4.0E-09	-5.2E-09	8.6E-09
Average	-7.0E-09	-5.3E-09	-6.2E-09	-6.3E-09	-1.7E-09	-2.6E-09	-10.1E-09	-9.1E-09
Std Deviation	5.1E-09	4.8E-09	3.4E-09	5.4E-09	6.4E-09	3.0E-09	5.0E-09	6.6E-09

Measurements

ILOL_IO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-13.6E-09	-589.6E-12	-4.4E-09	-1.4E-09	-18.1E-09	936.3E-12	-5.2E-09	-5.9E-09
50_OUT_REF	7.0E-09	-2.1E-09	7.0E-09	-1.4E-09	-8.2E-09	-2.1E-09	6.3E-09	173.3E-12
ON_HDC samples								
61	-2.1E-09	-15.8E-09	-589.6E-12	3.2E-09	173.3E-12	-12.0E-09	-15.1E-09	-10.5E-09
62	-16.6E-09	173.3E-12	-5.9E-09	3.2E-09	-5.9E-09	-12.0E-09	-15.1E-09	-13.6E-09
63	-11.3E-09	936.3E-12	5.5E-09	3.2E-09	-5.9E-09	-12.0E-09	-15.1E-09	-13.6E-09
64	-9.0E-09	-5.9E-09	5.5E-09	3.2E-09	9.3E-09	-12.0E-09	-15.1E-09	-13.6E-09
65	-16.6E-09	-11.3E-09	5.5E-09	3.2E-09	9.3E-09	-12.0E-09	-15.1E-09	-13.6E-09
66	3.2E-09	173.3E-12	5.5E-09	3.2E-09	9.3E-09	-12.0E-09	-15.1E-09	-13.6E-09
67	-6.7E-09	-4.4E-09	-2.1E-09	3.2E-09	9.3E-09	-12.0E-09	-15.1E-09	-13.6E-09
68	-15.1E-09	-1.4E-09	3.2E-09	3.2E-09	5.5E-09	-2.9E-09	-4.4E-09	-13.6E-09
69	-7.5E-09	-4.4E-09	3.2E-09	3.2E-09	-8.2E-09	2.5E-09	-4.4E-09	-20.4E-09
70	-6.7E-09	-15.1E-09	-9.0E-09	3.2E-09	-6.7E-09	7.0E-09	-4.4E-09	4.8E-09
Statistics								
Min	-16.6E-09	-15.8E-09	-9.0E-09	3.2E-09	-8.2E-09	-12.0E-09	-15.1E-09	-20.4E-09
Max	3.2E-09	936.3E-12	5.5E-09	3.2E-09	9.3E-09	7.0E-09	-4.4E-09	4.8E-09

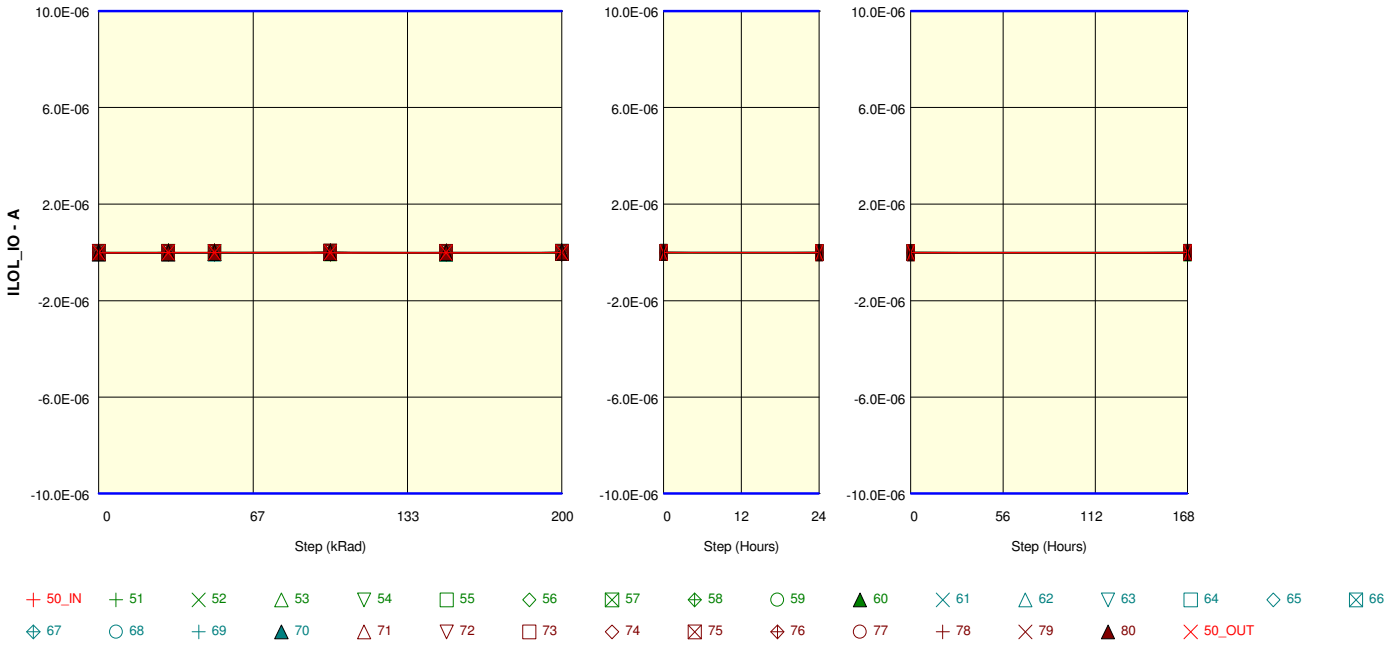
ILOL_IO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-8.8E-09	-5.7E-09	1.1E-09	3.2E-09	1.6E-09	-7.8E-09	-11.9E-09	-12.1E-09
Std Deviation	6.1E-09	6.0E-09	5.0E-09	72.4E-18	7.3E-09	6.9E-09	4.9E-09	6.1E-09

Measurements

ILOL_IO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-13.6E-09	-589.6E-12	-4.4E-09	-1.4E-09	-18.1E-09	936.3E-12	-5.2E-09	-5.9E-09
50_OUT_REF	7.0E-09	-2.1E-09	7.0E-09	-1.4E-09	-8.2E-09	-2.1E-09	6.3E-09	173.3E-12
OFF samples								
71	-2.1E-09	2.5E-09	-16.6E-09	936.3E-12	-589.6E-12	-1.4E-09	-12.0E-09	173.3E-12
72	-5.2E-09	1.7E-09	-9.0E-09	-2.1E-09	-589.6E-12	-7.5E-09	-9.0E-09	-1.4E-09
73	4.0E-09	-3.6E-09	-7.5E-09	173.3E-12	-589.6E-12	-5.9E-09	-1.4E-09	2.5E-09
74	-5.2E-09	4.0E-09	-5.9E-09	-3.6E-09	-11.3E-09	-10.5E-09	936.3E-12	-17.4E-09
75	-2.1E-09	-2.9E-09	2.5E-09	-7.5E-09	-9.0E-09	-15.8E-09	-13.6E-09	936.3E-12
76	-9.7E-09	-2.9E-09	-12.8E-09	-11.3E-09	2.5E-09	-2.9E-09	9.3E-09	-3.6E-09
77	-9.0E-09	-589.6E-12	-13.6E-09	-15.8E-09	936.3E-12	173.3E-12	936.3E-12	-10.5E-09
78	936.3E-12	-11.3E-09	-4.4E-09	2.5E-09	173.3E-12	-5.2E-09	-9.0E-09	-6.7E-09
79	-8.2E-09	-9.7E-09	9.3E-09	-15.1E-09	-4.4E-09	-3.6E-09	-12.0E-09	-5.9E-09
80	-9.7E-09	173.3E-12	-10.5E-09	173.3E-12	-11.3E-09	3.2E-09	-2.9E-09	1.7E-09
Statistics								
Min	-9.7E-09	-11.3E-09	-16.6E-09	-15.8E-09	-11.3E-09	-15.8E-09	-13.6E-09	-17.4E-09
Max	4.0E-09	4.0E-09	9.3E-09	2.5E-09	2.5E-09	3.2E-09	9.3E-09	2.5E-09
Average	-4.6E-09	-2.3E-09	-6.8E-09	-5.2E-09	-3.4E-09	-4.9E-09	-4.9E-09	-4.0E-09
Std Deviation	4.5E-09	4.7E-09	7.4E-09	6.5E-09	5.0E-09	5.2E-09	7.1E-09	6.0E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Leakage Current Low : ILOL_IO[3]
Test conditions : Vout=0V . Vcc = 3.6V DQ are disabled
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

ILOL_IO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-11.3E-09	-13.6E-09	-15.1E-09	2.5E-09	-14.3E-09	-589.6E-12	-16.6E-09	-8.2E-09
50_OUT_REF	-12.8E-09	-11.3E-09	-7.5E-09	-15.1E-09	-18.1E-09	-9.0E-09	-8.2E-09	-8.2E-09
ON_LDC samples								
51	-11.3E-09	-8.2E-09	-15.1E-09	2.5E-09	-14.3E-09	-589.6E-12	-16.6E-09	-8.2E-09
52	-12.0E-09	-17.4E-09	-13.6E-09	2.5E-09	-18.1E-09	-5.2E-09	-16.6E-09	-7.5E-09
53	-2.9E-09	-2.9E-09	-13.6E-09	2.5E-09	-18.1E-09	-5.2E-09	-16.6E-09	-7.5E-09
54	-22.7E-09	936.3E-12	-13.6E-09	2.5E-09	-18.1E-09	-13.6E-09	-16.6E-09	-7.5E-09
55	-15.8E-09	-9.7E-09	-13.6E-09	-18.9E-09	-18.1E-09	-2.9E-09	-16.6E-09	-21.2E-09
56	-17.4E-09	-15.1E-09	-13.6E-09	-9.0E-09	-19.7E-09	-12.0E-09	-7.5E-09	-21.2E-09
57	-12.0E-09	-589.6E-12	-13.6E-09	-9.0E-09	-19.7E-09	-12.0E-09	-7.5E-09	-21.2E-09
58	-9.0E-09	-8.2E-09	-13.6E-09	-9.0E-09	-19.7E-09	-12.0E-09	-7.5E-09	-21.2E-09
59	-18.9E-09	-16.6E-09	-11.3E-09	-4.4E-09	-19.7E-09	-12.0E-09	-7.5E-09	-21.2E-09
60	-9.0E-09	-4.4E-09	-11.3E-09	-4.4E-09	-19.7E-09	-8.2E-09	-7.5E-09	-12.0E-09
Statistics								
Min	-22.7E-09	-17.4E-09	-15.1E-09	-18.9E-09	-19.7E-09	-13.6E-09	-16.6E-09	-21.2E-09
Max	-2.9E-09	936.3E-12	-11.3E-09	2.5E-09	-14.3E-09	-589.6E-12	-7.5E-09	-7.5E-09
Average	-13.1E-09	-8.2E-09	-13.3E-09	-4.5E-09	-18.5E-09	-8.4E-09	-12.0E-09	-14.9E-09
Std Deviation	5.4E-09	6.2E-09	1.1E-09	6.8E-09	1.6E-09	4.4E-09	4.6E-09	6.5E-09

Measurements

ILOL_IO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-11.3E-09	-13.6E-09	-15.1E-09	2.5E-09	-14.3E-09	-589.6E-12	-16.6E-09	-8.2E-09
50_OUT_REF	-12.8E-09	-11.3E-09	-7.5E-09	-15.1E-09	-18.1E-09	-9.0E-09	-8.2E-09	-8.2E-09
ON_HDC samples								
61	-15.8E-09	-15.1E-09	-9.0E-09	2.5E-09	-10.5E-09	-1.4E-09	-7.5E-09	-13.6E-09
62	-10.5E-09	-19.7E-09	-18.9E-09	2.5E-09	-10.5E-09	-3.6E-09	-7.5E-09	1.7E-09
63	-15.1E-09	-13.6E-09	-20.4E-09	2.5E-09	-10.5E-09	-3.6E-09	-7.5E-09	1.7E-09
64	-18.1E-09	-13.6E-09	-20.4E-09	2.5E-09	-22.0E-09	-3.6E-09	-7.5E-09	1.7E-09
65	-26.5E-09	173.3E-12	-20.4E-09	2.5E-09	-22.0E-09	-3.6E-09	-7.5E-09	1.7E-09
66	-19.7E-09	-18.9E-09	-20.4E-09	2.5E-09	-22.0E-09	-3.6E-09	-7.5E-09	1.7E-09
67	-3.6E-09	-14.3E-09	-13.6E-09	2.5E-09	-22.0E-09	-3.6E-09	-7.5E-09	1.7E-09
68	-9.0E-09	-19.7E-09	-6.7E-09	2.5E-09	-21.2E-09	-15.8E-09	-18.1E-09	1.7E-09
69	-12.8E-09	-15.1E-09	-6.7E-09	2.5E-09	-6.7E-09	-2.9E-09	-18.1E-09	-11.3E-09
70	-9.7E-09	-10.5E-09	-12.8E-09	2.5E-09	-13.6E-09	-7.5E-09	-18.1E-09	-8.2E-09
Statistics								
Min	-26.5E-09	-19.7E-09	-20.4E-09	2.5E-09	-22.0E-09	-15.8E-09	-18.1E-09	-13.6E-09
Max	-3.6E-09	173.3E-12	-6.7E-09	2.5E-09	-6.7E-09	-1.4E-09	-7.5E-09	1.7E-09

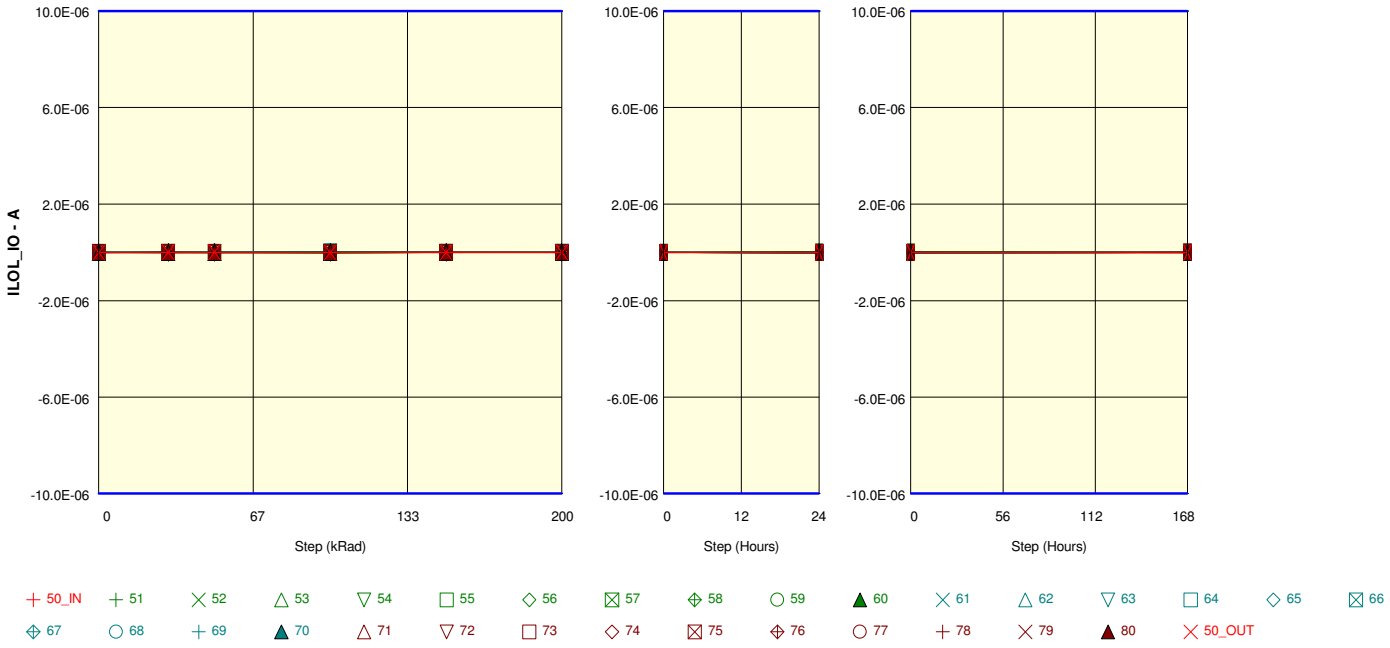
ILOL_IO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-14.1E-09	-14.0E-09	-14.9E-09	2.5E-09	-16.1E-09	-4.9E-09	-10.7E-09	-2.1E-09
Std Deviation	6.1E-09	5.5E-09	5.6E-09	21.5E-18	5.9E-09	3.9E-09	4.9E-09	5.9E-09

Measurements

ILOL_IO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-11.3E-09	-13.6E-09	-15.1E-09	2.5E-09	-14.3E-09	-589.6E-12	-16.6E-09	-8.2E-09
50_OUT_REF	-12.8E-09	-11.3E-09	-7.5E-09	-15.1E-09	-18.1E-09	-9.0E-09	-8.2E-09	-8.2E-09
OFF samples								
71	-22.7E-09	-20.4E-09	-5.9E-09	-15.1E-09	-14.3E-09	-11.3E-09	-22.0E-09	-15.1E-09
72	-9.7E-09	-5.9E-09	-14.3E-09	-21.2E-09	-7.5E-09	-23.5E-09	-5.9E-09	-9.0E-09
73	-4.4E-09	-13.6E-09	-8.2E-09	-15.8E-09	-15.8E-09	-8.2E-09	-10.5E-09	-9.0E-09
74	-22.0E-09	-12.8E-09	4.0E-09	-10.5E-09	-19.7E-09	-23.5E-09	-5.2E-09	-19.7E-09
75	-1.4E-09	-7.5E-09	-9.7E-09	6.3E-09	-4.4E-09	-2.9E-09	-17.4E-09	-14.3E-09
76	-13.6E-09	-5.2E-09	-11.3E-09	-1.4E-09	-15.8E-09	1.7E-09	-15.8E-09	-5.9E-09
77	-12.0E-09	-8.2E-09	-4.4E-09	-12.0E-09	-20.4E-09	-5.9E-09	-9.7E-09	-15.8E-09
78	-25.0E-09	1.7E-09	-25.0E-09	-8.2E-09	-20.4E-09	-22.0E-09	-17.4E-09	-21.2E-09
79	-21.2E-09	-12.0E-09	-12.0E-09	-18.1E-09	-3.6E-09	-9.0E-09	-14.3E-09	-7.5E-09
80	-21.2E-09	-18.9E-09	-14.3E-09	-16.6E-09	-9.0E-09	3.2E-09	3.2E-09	-12.8E-09
Statistics								
Min	-25.0E-09	-20.4E-09	-25.0E-09	-21.2E-09	-20.4E-09	-23.5E-09	-22.0E-09	-21.2E-09
Max	-1.4E-09	1.7E-09	4.0E-09	6.3E-09	-3.6E-09	3.2E-09	3.2E-09	-5.9E-09
Average	-15.3E-09	-10.3E-09	-10.1E-09	-11.3E-09	-13.1E-09	-10.1E-09	-11.5E-09	-13.0E-09
Std Deviation	7.9E-09	6.3E-09	7.2E-09	7.9E-09	6.2E-09	9.4E-09	7.1E-09	4.9E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Leakage Current Low : ILOL_IO[4]
Test conditions : Vout=0V . Vcc = 3.6V DQ are disabled
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

ILOL_IO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-7.5E-09	-13.6E-09	-12.0E-09	-14.3E-09	-8.2E-09	-3.6E-09	7.8E-09	-9.7E-09
50_OUT_REF	-7.5E-09	936.3E-12	4.8E-09	-7.5E-09	-11.3E-09	-2.9E-09	-4.4E-09	-17.4E-09
ON_LDC samples								
51	173.3E-12	-15.8E-09	-12.0E-09	-14.3E-09	-8.2E-09	-3.6E-09	7.8E-09	-9.7E-09
52	-7.5E-09	-2.9E-09	-5.9E-09	-14.3E-09	-2.9E-09	-7.5E-09	7.8E-09	-5.9E-09
53	-5.2E-09	-2.9E-09	-5.9E-09	-14.3E-09	-2.9E-09	-7.5E-09	7.8E-09	-5.9E-09
54	-9.0E-09	-1.4E-09	-5.9E-09	-14.3E-09	-2.9E-09	-2.1E-09	7.8E-09	-5.9E-09
55	-9.0E-09	-11.3E-09	-5.9E-09	-3.6E-09	-2.9E-09	-8.2E-09	7.8E-09	173.3E-12
56	936.3E-12	7.8E-09	-5.9E-09	-14.3E-09	936.3E-12	173.3E-12	-14.3E-09	173.3E-12
57	-5.2E-09	936.3E-12	-5.9E-09	173.3E-12	936.3E-12	173.3E-12	-14.3E-09	173.3E-12
58	1.7E-09	936.3E-12	-5.9E-09	173.3E-12	936.3E-12	173.3E-12	-14.3E-09	173.3E-12
59	-9.7E-09	-2.1E-09	173.3E-12	-5.2E-09	936.3E-12	173.3E-12	-14.3E-09	173.3E-12
60	-2.9E-09	-7.5E-09	173.3E-12	-5.2E-09	936.3E-12	2.5E-09	-14.3E-09	-5.9E-09
Statistics								
Min	-9.7E-09	-15.8E-09	-12.0E-09	-14.3E-09	-8.2E-09	-8.2E-09	-14.3E-09	-9.7E-09
Max	1.7E-09	7.8E-09	173.3E-12	173.3E-12	936.3E-12	2.5E-09	7.8E-09	173.3E-12
Average	-4.6E-09	-3.4E-09	-5.3E-09	-8.5E-09	-1.5E-09	-2.6E-09	-3.3E-09	-3.3E-09
Std Deviation	4.1E-09	6.3E-09	3.3E-09	6.0E-09	2.9E-09	3.7E-09	11.1E-09	3.6E-09

Measurements

ILOL_IO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-7.5E-09	-13.6E-09	-12.0E-09	-14.3E-09	-8.2E-09	-3.6E-09	7.8E-09	-9.7E-09
50_OUT_REF	-7.5E-09	936.3E-12	4.8E-09	-7.5E-09	-11.3E-09	-2.9E-09	-4.4E-09	-17.4E-09
ON_HDC samples								
61	173.3E-12	5.5E-09	-2.9E-09	13.1E-09	-9.0E-09	5.5E-09	-14.3E-09	3.2E-09
62	-1.4E-09	173.3E-12	173.3E-12	13.1E-09	-6.7E-09	173.3E-12	-14.3E-09	-2.1E-09
63	-10.5E-09	-4.4E-09	-11.3E-09	13.1E-09	-6.7E-09	173.3E-12	-14.3E-09	-2.1E-09
64	-10.5E-09	-9.7E-09	-11.3E-09	13.1E-09	-3.6E-09	173.3E-12	-14.3E-09	-2.1E-09
65	-13.6E-09	-3.6E-09	-11.3E-09	13.1E-09	-3.6E-09	173.3E-12	-14.3E-09	-2.1E-09
66	-2.1E-09	-7.5E-09	-11.3E-09	13.1E-09	-3.6E-09	173.3E-12	-14.3E-09	-2.1E-09
67	936.3E-12	-7.5E-09	-12.8E-09	13.1E-09	-3.6E-09	173.3E-12	-14.3E-09	-2.1E-09
68	173.3E-12	-18.9E-09	9.3E-09	13.1E-09	-6.7E-09	-9.0E-09	-5.2E-09	-2.1E-09
69	7.8E-09	173.3E-12	9.3E-09	13.1E-09	-6.7E-09	-11.3E-09	-5.2E-09	10.1E-09
70	-589.6E-12	-2.1E-09	-3.6E-09	13.1E-09	1.7E-09	-589.6E-12	-5.2E-09	936.3E-12
Statistics								
Min	-13.6E-09	-18.9E-09	-12.8E-09	13.1E-09	-9.0E-09	-11.3E-09	-14.3E-09	-2.1E-09
Max	7.8E-09	5.5E-09	9.3E-09	13.1E-09	1.7E-09	5.5E-09	-5.2E-09	10.1E-09

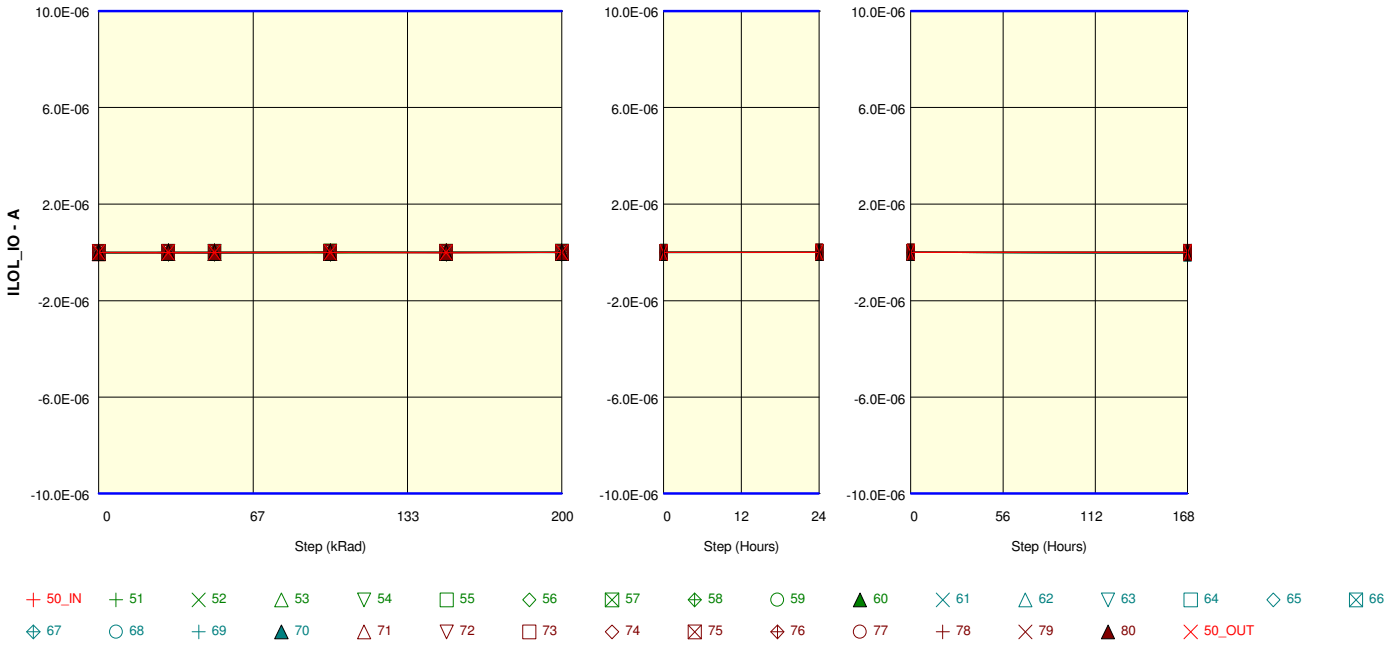
ILOL_IO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-3.0E-09	-4.8E-09	-4.6E-09	13.1E-09	-4.9E-09	-1.4E-09	-11.6E-09	-55.5E-12
Std Deviation	6.2E-09	6.3E-09	8.1E-09	185.8E-18	2.8E-09	4.7E-09	4.2E-09	3.8E-09

Measurements

ILOL_IO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-7.5E-09	-13.6E-09	-12.0E-09	-14.3E-09	-8.2E-09	-3.6E-09	7.8E-09	-9.7E-09
50_OUT_REF	-7.5E-09	936.3E-12	4.8E-09	-7.5E-09	-11.3E-09	-2.9E-09	-4.4E-09	-17.4E-09
OFF samples								
71	-9.0E-09	-4.4E-09	-3.6E-09	-8.2E-09	4.8E-09	-10.5E-09	2.5E-09	-6.7E-09
72	-10.5E-09	-12.0E-09	936.3E-12	-10.5E-09	2.5E-09	-11.3E-09	-1.4E-09	-5.2E-09
73	-8.2E-09	-4.4E-09	-13.6E-09	-10.5E-09	-10.5E-09	-2.1E-09	-17.4E-09	4.8E-09
74	1.7E-09	-10.5E-09	-4.4E-09	-2.1E-09	-3.6E-09	1.7E-09	-1.4E-09	-14.3E-09
75	-4.4E-09	-1.4E-09	-589.6E-12	-11.3E-09	-8.2E-09	-8.2E-09	2.5E-09	13.1E-09
76	-3.6E-09	3.2E-09	2.5E-09	-12.0E-09	-589.6E-12	1.7E-09	-15.8E-09	-9.7E-09
77	-7.5E-09	-1.4E-09	-3.6E-09	-2.9E-09	-12.0E-09	-8.2E-09	-1.4E-09	-8.2E-09
78	-2.1E-09	-4.4E-09	-9.0E-09	-9.0E-09	-2.9E-09	-12.0E-09	4.0E-09	-4.4E-09
79	-15.8E-09	6.3E-09	-2.9E-09	-7.5E-09	-9.7E-09	-6.7E-09	-2.1E-09	-18.9E-09
80	-12.0E-09	-11.3E-09	-2.1E-09	-1.4E-09	7.8E-09	-5.2E-09	8.6E-09	-8.2E-09
Statistics								
Min	-15.8E-09	-12.0E-09	-13.6E-09	-12.0E-09	-12.0E-09	-12.0E-09	-17.4E-09	-18.9E-09
Max	1.7E-09	6.3E-09	2.5E-09	-1.4E-09	7.8E-09	1.7E-09	8.6E-09	13.1E-09
Average	-7.2E-09	-4.0E-09	-3.6E-09	-7.5E-09	-3.3E-09	-6.1E-09	-2.2E-09	-5.8E-09
Std Deviation	4.9E-09	5.8E-09	4.4E-09	3.8E-09	6.5E-09	4.8E-09	7.9E-09	8.6E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Leakage Current Low : ILOL_IO[5]
Test conditions : Vout=0V . Vcc = 3.6V DQ are disabled
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

ILOL_IO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	936.3E-12	-8.2E-09	-10.5E-09	-4.4E-09	-4.4E-09	-11.3E-09	-5.2E-09	4.8E-09
50_OUT_REF	-589.6E-12	-2.1E-09	-6.7E-09	-5.2E-09	-17.4E-09	-1.4E-09	1.7E-09	-5.2E-09
ON_LDC samples								
51	-10.5E-09	3.2E-09	-10.5E-09	-4.4E-09	-4.4E-09	-11.3E-09	-5.2E-09	4.8E-09
52	-10.5E-09	-9.0E-09	-8.2E-09	-4.4E-09	-1.4E-09	-5.2E-09	-5.2E-09	-6.7E-09
53	-6.7E-09	-15.8E-09	-8.2E-09	-4.4E-09	-1.4E-09	-5.2E-09	-5.2E-09	-6.7E-09
54	-13.6E-09	-9.7E-09	-8.2E-09	-4.4E-09	-1.4E-09	-4.4E-09	-5.2E-09	-6.7E-09
55	-589.6E-12	-10.5E-09	-8.2E-09	11.6E-09	-1.4E-09	-5.2E-09	-5.2E-09	-15.8E-09
56	-12.0E-09	-7.5E-09	-8.2E-09	-12.0E-09	173.3E-12	-5.2E-09	-2.9E-09	-15.8E-09
57	-12.0E-09	-5.9E-09	-8.2E-09	-12.0E-09	173.3E-12	-5.2E-09	-2.9E-09	-15.8E-09
58	-15.8E-09	173.3E-12	-8.2E-09	-12.0E-09	173.3E-12	-5.2E-09	-2.9E-09	-15.8E-09
59	173.3E-12	-3.6E-09	-15.8E-09	-9.0E-09	173.3E-12	-5.2E-09	-2.9E-09	-15.8E-09
60	-1.4E-09	-7.5E-09	-15.8E-09	-9.0E-09	173.3E-12	-5.9E-09	-2.9E-09	-3.6E-09
Statistics								
Min	-15.8E-09	-15.8E-09	-15.8E-09	-12.0E-09	-4.4E-09	-11.3E-09	-5.2E-09	-15.8E-09
Max	173.3E-12	3.2E-09	-8.2E-09	11.6E-09	173.3E-12	-4.4E-09	-2.9E-09	4.8E-09
Average	-8.3E-09	-6.6E-09	-10.0E-09	-6.0E-09	-894.8E-12	-5.8E-09	-4.0E-09	-9.8E-09
Std Deviation	5.5E-09	5.2E-09	3.0E-09	6.7E-09	1.4E-09	1.9E-09	1.1E-09	6.8E-09

Measurements

ILOL_IO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	936.3E-12	-8.2E-09	-10.5E-09	-4.4E-09	-4.4E-09	-11.3E-09	-5.2E-09	4.8E-09
50_OUT_REF	-589.6E-12	-2.1E-09	-6.7E-09	-5.2E-09	-17.4E-09	-1.4E-09	1.7E-09	-5.2E-09
ON_HDC samples								
61	-6.7E-09	1.7E-09	-8.2E-09	-10.5E-09	-2.9E-09	1.7E-09	-2.9E-09	4.8E-09
62	-2.9E-09	-5.9E-09	-14.3E-09	-10.5E-09	-6.7E-09	936.3E-12	-2.9E-09	-18.9E-09
63	-6.7E-09	-11.3E-09	173.3E-12	-10.5E-09	-6.7E-09	936.3E-12	-2.9E-09	-18.9E-09
64	-15.8E-09	-1.4E-09	173.3E-12	-10.5E-09	-7.5E-09	936.3E-12	-2.9E-09	-18.9E-09
65	-15.1E-09	-6.7E-09	173.3E-12	-10.5E-09	-7.5E-09	936.3E-12	-2.9E-09	-18.9E-09
66	-7.5E-09	-4.4E-09	173.3E-12	-10.5E-09	-7.5E-09	936.3E-12	-2.9E-09	-18.9E-09
67	-6.7E-09	-1.4E-09	-1.4E-09	-10.5E-09	-7.5E-09	936.3E-12	-2.9E-09	-18.9E-09
68	-2.9E-09	-2.1E-09	-12.8E-09	-10.5E-09	-4.4E-09	-1.4E-09	2.5E-09	-18.9E-09
69	-15.1E-09	-9.7E-09	-12.8E-09	-10.5E-09	-15.8E-09	-11.3E-09	2.5E-09	-9.0E-09
70	-11.3E-09	-4.4E-09	-11.3E-09	-10.5E-09	-2.9E-09	-15.1E-09	2.5E-09	-18.1E-09
Statistics								
Min	-15.8E-09	-11.3E-09	-14.3E-09	-10.5E-09	-15.8E-09	-15.1E-09	-2.9E-09	-18.9E-09
Max	-2.9E-09	1.7E-09	173.3E-12	-10.5E-09	-2.9E-09	1.7E-09	2.5E-09	4.8E-09

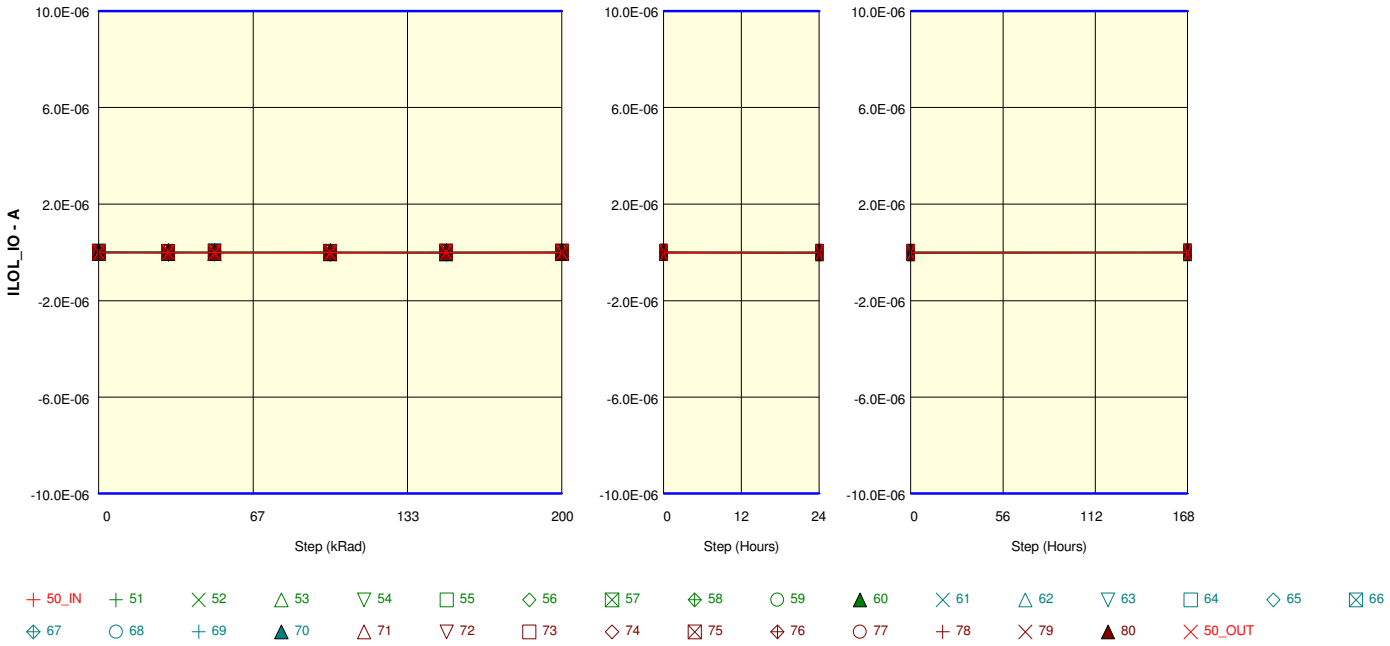
ILOL_IO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-9.1E-09	-4.6E-09	-6.0E-09	-10.5E-09	-6.9E-09	-2.0E-09	-1.3E-09	-15.5E-09
Std Deviation	4.7E-09	3.8E-09	6.1E-09	164.7E-18	3.5E-09	5.7E-09	2.4E-09	7.4E-09

Measurements

ILOL_IO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	936.3E-12	-8.2E-09	-10.5E-09	-4.4E-09	-4.4E-09	-11.3E-09	-5.2E-09	4.8E-09
50_OUT_REF	-589.6E-12	-2.1E-09	-6.7E-09	-5.2E-09	-17.4E-09	-1.4E-09	1.7E-09	-5.2E-09
OFF samples								
71	-7.5E-09	-12.0E-09	-15.1E-09	-9.0E-09	936.3E-12	-6.7E-09	-10.5E-09	-3.6E-09
72	-14.3E-09	-15.1E-09	-15.1E-09	-12.0E-09	-6.7E-09	-10.5E-09	4.8E-09	-14.3E-09
73	-19.7E-09	-11.3E-09	-5.9E-09	2.5E-09	-15.1E-09	-7.5E-09	10.1E-09	-3.6E-09
74	-1.4E-09	2.5E-09	-7.5E-09	-10.5E-09	-13.6E-09	-6.7E-09	-2.1E-09	-11.3E-09
75	-8.2E-09	-3.6E-09	-9.0E-09	-5.2E-09	-4.4E-09	173.3E-12	-589.6E-12	-2.9E-09
76	-5.2E-09	-12.0E-09	3.2E-09	9.3E-09	4.8E-09	-2.9E-09	1.7E-09	6.3E-09
77	-8.2E-09	-8.2E-09	-3.6E-09	-6.7E-09	-9.7E-09	-8.2E-09	-11.3E-09	-18.1E-09
78	-9.0E-09	-16.6E-09	-10.5E-09	-4.4E-09	-7.5E-09	-5.2E-09	-10.5E-09	-1.4E-09
79	-6.7E-09	-14.3E-09	-23.5E-09	-3.6E-09	-4.4E-09	936.3E-12	-9.7E-09	-2.1E-09
80	-2.1E-09	-3.6E-09	-10.5E-09	-4.4E-09	-8.2E-09	-10.5E-09	-5.2E-09	3.2E-09
Statistics								
Min	-19.7E-09	-16.6E-09	-23.5E-09	-12.0E-09	-15.1E-09	-10.5E-09	-11.3E-09	-18.1E-09
Max	-1.4E-09	2.5E-09	3.2E-09	9.3E-09	4.8E-09	936.3E-12	10.1E-09	6.3E-09
Average	-8.2E-09	-9.4E-09	-9.7E-09	-4.4E-09	-6.4E-09	-5.7E-09	-3.3E-09	-4.8E-09
Std Deviation	5.2E-09	5.8E-09	6.9E-09	6.0E-09	5.7E-09	3.8E-09	7.0E-09	7.2E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Leakage Current Low : ILOL_IO[6]
Test conditions : Vout=0V . Vcc = 3.6V DQ are disabled
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

ILOL_IO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-5.9E-09	-9.0E-09	4.8E-09	-4.4E-09	-9.7E-09	936.3E-12	-20.4E-09	-1.4E-09
50_OUT_REF	-5.2E-09	173.3E-12	-11.3E-09	-6.7E-09	4.0E-09	-3.6E-09	-8.2E-09	-3.6E-09
ON_LDC samples								
51	-2.9E-09	7.8E-09	4.8E-09	-4.4E-09	-9.7E-09	936.3E-12	-20.4E-09	-1.4E-09
52	-7.5E-09	936.3E-12	-2.9E-09	-4.4E-09	-2.9E-09	-9.7E-09	-20.4E-09	-18.9E-09
53	-6.7E-09	-5.9E-09	-2.9E-09	-4.4E-09	-2.9E-09	-9.7E-09	-20.4E-09	-18.9E-09
54	-8.2E-09	-21.2E-09	-2.9E-09	-4.4E-09	-2.9E-09	-2.9E-09	-20.4E-09	-18.9E-09
55	-4.4E-09	-11.3E-09	-2.9E-09	-15.8E-09	-2.9E-09	-9.7E-09	-20.4E-09	4.8E-09
56	-3.6E-09	173.3E-12	-2.9E-09	-2.1E-09	-11.3E-09	-2.9E-09	-2.1E-09	4.8E-09
57	173.3E-12	-11.3E-09	-2.9E-09	-3.6E-09	-11.3E-09	-2.9E-09	-2.1E-09	4.8E-09
58	-6.7E-09	-10.5E-09	-2.9E-09	-3.6E-09	-11.3E-09	-2.9E-09	-2.1E-09	4.8E-09
59	-589.6E-12	936.3E-12	-14.3E-09	-9.0E-09	-11.3E-09	-2.9E-09	-2.1E-09	4.8E-09
60	-4.4E-09	-9.7E-09	-14.3E-09	-9.0E-09	-11.3E-09	-9.7E-09	-2.1E-09	-9.7E-09
Statistics								
Min	-8.2E-09	-21.2E-09	-14.3E-09	-15.8E-09	-11.3E-09	-9.7E-09	-20.4E-09	-18.9E-09
Max	173.3E-12	7.8E-09	4.8E-09	-2.1E-09	-2.9E-09	936.3E-12	-2.1E-09	4.8E-09
Average	-4.5E-09	-6.0E-09	-4.4E-09	-6.1E-09	-7.8E-09	-5.2E-09	-11.3E-09	-4.4E-09
Std Deviation	2.7E-09	8.0E-09	5.4E-09	3.9E-09	4.0E-09	3.8E-09	9.2E-09	10.4E-09

Measurements

ILOL_IO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-5.9E-09	-9.0E-09	4.8E-09	-4.4E-09	-9.7E-09	936.3E-12	-20.4E-09	-1.4E-09
50_OUT_REF	-5.2E-09	173.3E-12	-11.3E-09	-6.7E-09	4.0E-09	-3.6E-09	-8.2E-09	-3.6E-09
ON_HDC samples								
61	-16.6E-09	-5.9E-09	-7.5E-09	-10.5E-09	-11.3E-09	-9.0E-09	-2.1E-09	-18.9E-09
62	-15.1E-09	-5.9E-09	936.3E-12	-10.5E-09	-15.1E-09	2.5E-09	-2.1E-09	-9.7E-09
63	-6.7E-09	-15.8E-09	4.0E-09	-10.5E-09	-15.1E-09	2.5E-09	-2.1E-09	-9.7E-09
64	7.8E-09	-9.7E-09	4.0E-09	-10.5E-09	-18.9E-09	2.5E-09	-2.1E-09	-9.7E-09
65	-9.7E-09	-12.0E-09	4.0E-09	-10.5E-09	-18.9E-09	2.5E-09	-2.1E-09	-9.7E-09
66	-7.5E-09	-4.4E-09	4.0E-09	-10.5E-09	-18.9E-09	2.5E-09	-2.1E-09	-9.7E-09
67	-14.3E-09	-9.0E-09	-5.2E-09	-10.5E-09	-18.9E-09	2.5E-09	-2.1E-09	-9.7E-09
68	-13.6E-09	-2.1E-09	-4.4E-09	-10.5E-09	-13.6E-09	-589.6E-12	-12.8E-09	-9.7E-09
69	-8.2E-09	-13.6E-09	-4.4E-09	-10.5E-09	173.3E-12	-11.3E-09	-12.8E-09	-9.0E-09
70	-12.8E-09	-12.0E-09	-1.4E-09	-10.5E-09	-9.7E-09	-5.9E-09	-12.8E-09	-11.3E-09
Statistics								
Min	-16.6E-09	-15.8E-09	-7.5E-09	-10.5E-09	-18.9E-09	-11.3E-09	-12.8E-09	-18.9E-09
Max	7.8E-09	-2.1E-09	4.0E-09	-10.5E-09	173.3E-12	2.5E-09	-2.1E-09	-9.0E-09

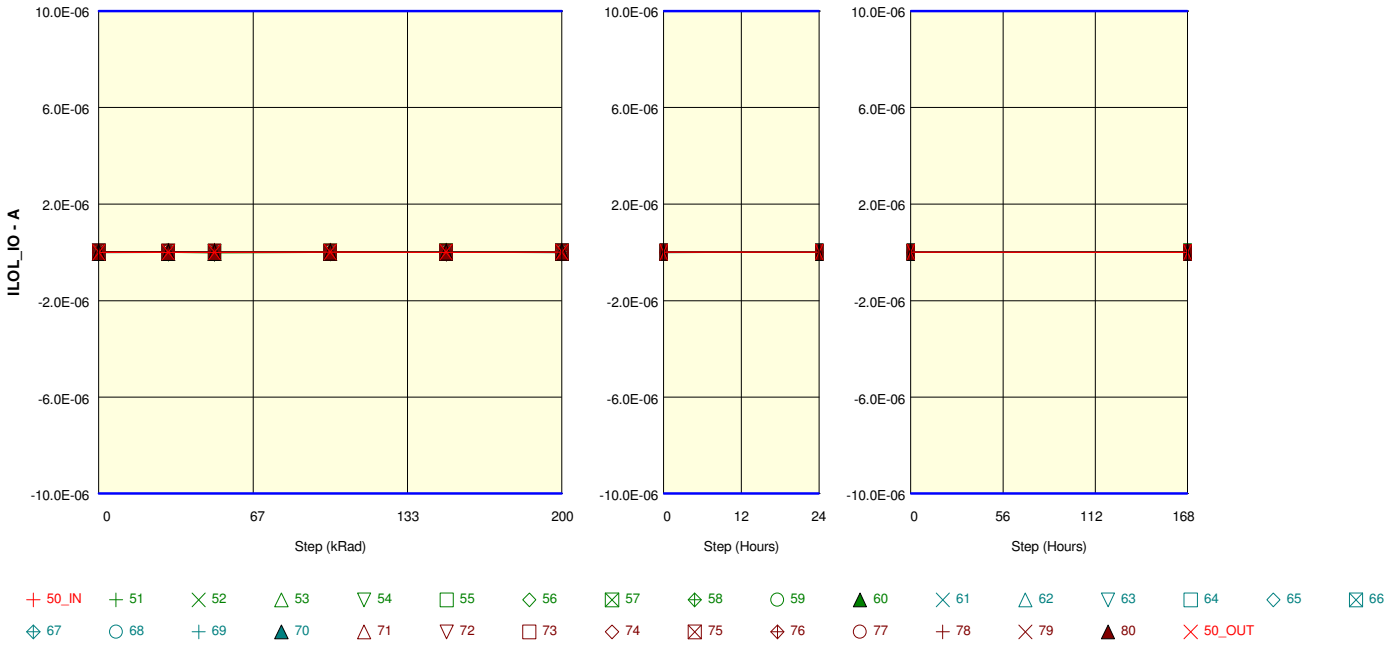
ILOL_IO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-9.7E-09	-9.1E-09	-589.6E-12	-10.5E-09	-14.0E-09	-1.2E-09	-5.3E-09	-10.7E-09
Std Deviation	6.7E-09	4.2E-09	4.3E-09	164.7E-18	5.7E-09	5.1E-09	4.9E-09	2.8E-09

Measurements

ILOL_IO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-5.9E-09	-9.0E-09	4.8E-09	-4.4E-09	-9.7E-09	936.3E-12	-20.4E-09	-1.4E-09
50_OUT_REF	-5.2E-09	173.3E-12	-11.3E-09	-6.7E-09	4.0E-09	-3.6E-09	-8.2E-09	-3.6E-09
OFF samples								
71	-6.7E-09	3.2E-09	-11.3E-09	-9.0E-09	-9.0E-09	-14.3E-09	-2.9E-09	-5.2E-09
72	-1.4E-09	-5.2E-09	-4.4E-09	-2.9E-09	4.0E-09	-6.7E-09	-16.6E-09	-1.4E-09
73	2.5E-09	-17.4E-09	-10.5E-09	-18.9E-09	-3.6E-09	6.3E-09	-2.9E-09	3.2E-09
74	-5.2E-09	-9.7E-09	-11.3E-09	-8.2E-09	-8.2E-09	-13.6E-09	-25.8E-09	173.3E-12
75	-5.9E-09	-6.7E-09	-15.1E-09	-16.6E-09	1.7E-09	-9.7E-09	-3.6E-09	-589.6E-12
76	-8.2E-09	-3.6E-09	-12.0E-09	-6.7E-09	-5.2E-09	-16.6E-09	-1.4E-09	4.0E-09
77	-23.5E-09	-2.9E-09	-15.1E-09	-4.4E-09	-7.5E-09	-15.8E-09	-3.6E-09	-16.6E-09
78	-2.9E-09	-4.4E-09	-8.2E-09	-17.4E-09	-16.6E-09	-8.2E-09	4.0E-09	-2.9E-09
79	6.3E-09	-12.0E-09	-8.2E-09	-13.6E-09	-14.3E-09	-12.8E-09	-3.6E-09	-1.4E-09
80	-3.6E-09	-9.7E-09	-6.7E-09	-7.5E-09	-8.2E-09	936.3E-12	1.7E-09	-9.0E-09
Statistics								
Min	-23.5E-09	-17.4E-09	-15.1E-09	-18.9E-09	-16.6E-09	-16.6E-09	-25.8E-09	-16.6E-09
Max	6.3E-09	3.2E-09	-4.4E-09	-2.9E-09	4.0E-09	6.3E-09	4.0E-09	4.0E-09
Average	-4.9E-09	-6.8E-09	-10.3E-09	-10.5E-09	-6.7E-09	-9.1E-09	-5.5E-09	-3.0E-09
Std Deviation	7.5E-09	5.4E-09	3.3E-09	5.4E-09	6.0E-09	7.1E-09	8.5E-09	5.8E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Leakage Current Low : ILOL_IO[7]
Test conditions : Vout=0V . Vcc = 3.6V DQ are disabled
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

ILOL_IO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	4.8E-09	-2.1E-09	7.8E-09	7.8E-09	1.7E-09	4.0E-09	4.0E-09	-10.5E-09
50_OUT_REF	-1.4E-09	173.3E-12	2.5E-09	6.3E-09	4.8E-09	5.5E-09	8.6E-09	173.3E-12
ON_LDC samples								
51	936.3E-12	-8.2E-09	7.8E-09	7.8E-09	1.7E-09	4.0E-09	4.0E-09	-10.5E-09
52	936.3E-12	173.3E-12	-1.4E-09	7.8E-09	16.2E-09	-9.0E-09	4.0E-09	5.5E-09
53	6.3E-09	4.0E-09	-1.4E-09	7.8E-09	16.2E-09	-9.0E-09	4.0E-09	5.5E-09
54	-3.6E-09	-5.9E-09	-1.4E-09	7.8E-09	16.2E-09	5.5E-09	4.0E-09	5.5E-09
55	1.7E-09	2.5E-09	-1.4E-09	173.3E-12	16.2E-09	-3.6E-09	4.0E-09	15.4E-09
56	2.5E-09	-6.7E-09	-1.4E-09	13.1E-09	10.9E-09	4.8E-09	10.9E-09	15.4E-09
57	1.7E-09	173.3E-12	-1.4E-09	-2.9E-09	10.9E-09	4.8E-09	10.9E-09	15.4E-09
58	6.3E-09	2.5E-09	-1.4E-09	-2.9E-09	10.9E-09	4.8E-09	10.9E-09	15.4E-09
59	-9.7E-09	3.2E-09	-13.6E-09	1.7E-09	10.9E-09	4.8E-09	10.9E-09	15.4E-09
60	-589.6E-12	173.3E-12	-13.6E-09	1.7E-09	10.9E-09	4.8E-09	10.9E-09	-4.4E-09
Statistics								
Min	-9.7E-09	-8.2E-09	-13.6E-09	-2.9E-09	1.7E-09	-9.0E-09	4.0E-09	-10.5E-09
Max	6.3E-09	4.0E-09	7.8E-09	13.1E-09	16.2E-09	5.5E-09	10.9E-09	15.4E-09
Average	631.1E-12	-818.5E-12	-2.9E-09	4.2E-09	12.1E-09	1.2E-09	7.4E-09	7.9E-09
Std Deviation	4.4E-09	4.2E-09	6.0E-09	5.1E-09	4.3E-09	5.7E-09	3.4E-09	8.9E-09

Measurements

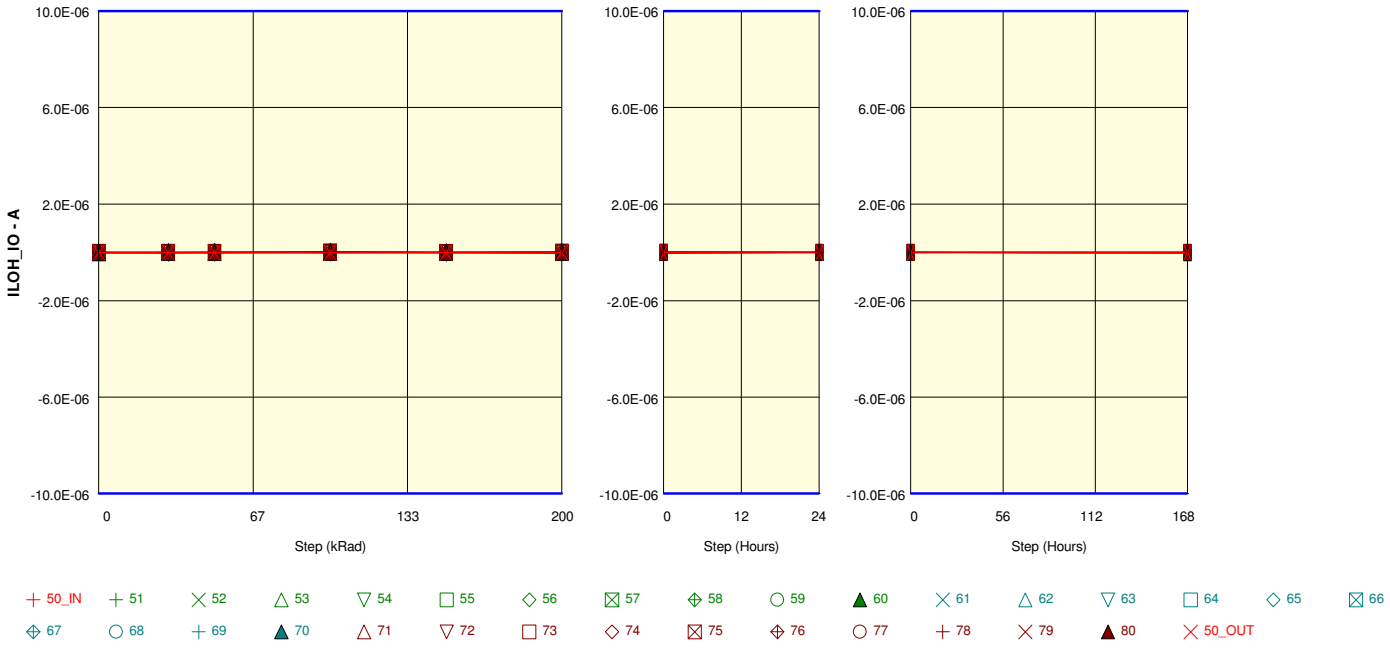
ILOL_IO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	4.8E-09	-2.1E-09	7.8E-09	7.8E-09	1.7E-09	4.0E-09	4.0E-09	-10.5E-09
50_OUT_REF	-1.4E-09	173.3E-12	2.5E-09	6.3E-09	4.8E-09	5.5E-09	8.6E-09	173.3E-12
ON_HDC samples								
61	4.0E-09	13.1E-09	8.6E-09	173.3E-12	7.0E-09	4.0E-09	10.9E-09	-3.6E-09
62	4.0E-09	3.2E-09	1.7E-09	173.3E-12	-2.1E-09	4.0E-09	10.9E-09	1.7E-09
63	5.5E-09	936.3E-12	-1.4E-09	173.3E-12	-2.1E-09	4.0E-09	10.9E-09	1.7E-09
64	936.3E-12	1.7E-09	-1.4E-09	173.3E-12	-4.4E-09	4.0E-09	10.9E-09	1.7E-09
65	-17.4E-09	-4.4E-09	-1.4E-09	173.3E-12	-4.4E-09	4.0E-09	10.9E-09	1.7E-09
66	3.2E-09	-589.6E-12	-1.4E-09	173.3E-12	-4.4E-09	4.0E-09	10.9E-09	1.7E-09
67	3.2E-09	-6.7E-09	14.7E-09	173.3E-12	-4.4E-09	4.0E-09	10.9E-09	1.7E-09
68	-5.9E-09	7.0E-09	-4.4E-09	173.3E-12	-1.4E-09	13.9E-09	13.9E-09	1.7E-09
69	-5.9E-09	7.8E-09	-4.4E-09	173.3E-12	-2.9E-09	-589.6E-12	13.9E-09	1.7E-09
70	-589.6E-12	-5.2E-09	7.0E-09	173.3E-12	7.0E-09	-12.8E-09	13.9E-09	173.3E-12
Statistics								
Min	-17.4E-09	-6.7E-09	-4.4E-09	173.3E-12	-4.4E-09	-12.8E-09	10.9E-09	-3.6E-09
Max	5.5E-09	13.1E-09	14.7E-09	173.3E-12	7.0E-09	13.9E-09	13.9E-09	1.7E-09

ILOL_IO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-894.8E-12	1.7E-09	1.8E-09	173.3E-12	-1.2E-09	2.8E-09	11.8E-09	1.0E-09
Std Deviation	6.7E-09	6.0E-09	6.0E-09	2.7E-18	4.3E-09	6.2E-09	1.4E-09	1.6E-09

Measurements

ILOL_IO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	4.8E-09	-2.1E-09	7.8E-09	7.8E-09	1.7E-09	4.0E-09	4.0E-09	-10.5E-09
50_OUT_REF	-1.4E-09	173.3E-12	2.5E-09	6.3E-09	4.8E-09	5.5E-09	8.6E-09	173.3E-12
OFF samples								
71	173.3E-12	-2.1E-09	4.0E-09	6.3E-09	-1.4E-09	3.2E-09	-4.4E-09	-2.9E-09
72	7.8E-09	13.9E-09	-10.5E-09	8.6E-09	-4.4E-09	4.0E-09	-9.0E-09	1.7E-09
73	-6.7E-09	-1.4E-09	-1.4E-09	-3.6E-09	4.8E-09	7.8E-09	10.9E-09	-11.3E-09
74	3.2E-09	-2.9E-09	-10.5E-09	1.7E-09	-9.0E-09	4.0E-09	-1.4E-09	-5.2E-09
75	13.1E-09	-589.6E-12	4.8E-09	-9.7E-09	-589.6E-12	-4.4E-09	-589.6E-12	-10.5E-09
76	13.9E-09	4.0E-09	3.2E-09	173.3E-12	-3.6E-09	1.7E-09	2.5E-09	8.6E-09
77	1.7E-09	936.3E-12	-9.7E-09	4.0E-09	-2.9E-09	2.5E-09	-9.7E-09	2.5E-09
78	-5.9E-09	17.7E-09	5.5E-09	173.3E-12	-1.4E-09	3.2E-09	-5.2E-09	-2.1E-09
79	7.0E-09	-11.3E-09	8.6E-09	3.2E-09	-6.7E-09	7.0E-09	3.2E-09	-6.7E-09
80	-3.6E-09	-2.9E-09	-2.1E-09	6.3E-09	5.5E-09	4.8E-09	-10.5E-09	7.0E-09
Statistics								
Min	-6.7E-09	-11.3E-09	-10.5E-09	-9.7E-09	-9.0E-09	-4.4E-09	-10.5E-09	-11.3E-09
Max	13.9E-09	17.7E-09	8.6E-09	8.6E-09	5.5E-09	7.8E-09	10.9E-09	8.6E-09
Average	3.1E-09	1.5E-09	-818.5E-12	1.7E-09	-2.0E-09	3.4E-09	-2.4E-09	-1.9E-09
Std Deviation	7.0E-09	8.1E-09	6.8E-09	5.1E-09	4.3E-09	3.2E-09	6.4E-09	6.5E-09

Parameter : Output Leakage Current High : ILOH_IO[0]
Test conditions : Vout=VCCmax. Vcc = 3.6V DQ are disabled
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

ILOH_IO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	2.5E-09	173.3E-12	-8.2E-09	-5.9E-09	1.7E-09	-2.1E-09	-4.4E-09	-13.6E-09
50_OUT_REF	-9.7E-09	-2.1E-09	-10.5E-09	-22.7E-09	-7.5E-09	-10.5E-09	-22.7E-09	-2.9E-09
ON_LDC samples								
51	-3.6E-09	-4.4E-09	-8.2E-09	-5.9E-09	1.7E-09	-2.1E-09	-4.4E-09	-13.6E-09
52	-15.1E-09	-1.4E-09	-1.4E-09	-5.9E-09	-11.3E-09	-5.9E-09	-4.4E-09	-2.1E-09
53	-5.9E-09	-2.1E-09	-1.4E-09	-5.9E-09	-11.3E-09	-5.9E-09	-4.4E-09	-2.1E-09
54	-15.8E-09	-14.3E-09	-1.4E-09	-5.9E-09	-11.3E-09	-9.0E-09	-4.4E-09	-3.6E-09
55	-12.0E-09	-2.1E-09	-1.4E-09	-11.3E-09	-11.3E-09	-3.6E-09	-4.4E-09	-12.8E-09
56	-8.2E-09	-9.7E-09	-1.4E-09	4.0E-09	-6.7E-09	5.5E-09	173.3E-12	-12.8E-09
57	-9.0E-09	-11.3E-09	-1.4E-09	-17.4E-09	-6.7E-09	5.5E-09	173.3E-12	-12.8E-09
58	-8.2E-09	-14.3E-09	-1.4E-09	-17.4E-09	-6.7E-09	5.5E-09	173.3E-12	-12.8E-09
59	-10.5E-09	-20.4E-09	-2.1E-09	-15.8E-09	-6.7E-09	5.5E-09	173.3E-12	-12.8E-09
60	-3.6E-09	-16.6E-09	-2.1E-09	-15.8E-09	-6.7E-09	-14.3E-09	173.3E-12	-9.7E-09
Statistics								
Min	-15.8E-09	-20.4E-09	-8.2E-09	-17.4E-09	-11.3E-09	-14.3E-09	-4.4E-09	-13.6E-09
Max	-3.6E-09	-1.4E-09	-1.4E-09	4.0E-09	1.7E-09	5.5E-09	173.3E-12	-2.1E-09
Average	-9.2E-09	-9.7E-09	-2.2E-09	-9.7E-09	-7.7E-09	-1.9E-09	-2.1E-09	-9.5E-09
Std Deviation	4.0E-09	6.5E-09	2.0E-09	6.6E-09	3.8E-09	6.8E-09	2.3E-09	4.6E-09

Measurements

ILOH_IO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	2.5E-09	173.3E-12	-8.2E-09	-5.9E-09	1.7E-09	-2.1E-09	-4.4E-09	-13.6E-09
50_OUT_REF	-9.7E-09	-2.1E-09	-10.5E-09	-22.7E-09	-7.5E-09	-10.5E-09	-22.7E-09	-2.9E-09
ON_HDC samples								
61	-12.0E-09	-5.2E-09	3.2E-09	4.8E-09	-9.7E-09	-13.6E-09	173.3E-12	2.5E-09
62	-22.0E-09	-4.4E-09	-12.0E-09	4.8E-09	-2.9E-09	-11.3E-09	173.3E-12	-589.6E-12
63	1.7E-09	1.7E-09	-6.7E-09	4.8E-09	-2.9E-09	-11.3E-09	173.3E-12	-589.6E-12
64	-2.9E-09	-5.2E-09	-6.7E-09	4.8E-09	-5.9E-09	-11.3E-09	173.3E-12	-589.6E-12
65	-15.1E-09	-15.8E-09	-6.7E-09	4.8E-09	-8.2E-09	-11.3E-09	173.3E-12	-589.6E-12
66	-18.1E-09	-5.9E-09	-6.7E-09	4.8E-09	-8.2E-09	-11.3E-09	173.3E-12	-589.6E-12
67	-5.9E-09	173.3E-12	-11.3E-09	4.8E-09	-8.2E-09	-11.3E-09	173.3E-12	-589.6E-12
68	-5.9E-09	-5.9E-09	-15.8E-09	4.8E-09	-13.6E-09	-5.2E-09	173.3E-12	-12.0E-09
69	-4.4E-09	-14.3E-09	-15.8E-09	4.8E-09	-8.2E-09	-12.8E-09	173.3E-12	936.3E-12
70	-5.2E-09	-4.4E-09	-13.6E-09	4.8E-09	-10.5E-09	-13.6E-09	173.3E-12	-18.1E-09
Statistics								
Min	-22.0E-09	-15.8E-09	-15.8E-09	4.8E-09	-13.6E-09	-13.6E-09	173.3E-12	-18.1E-09
Max	1.7E-09	1.7E-09	3.2E-09	4.8E-09	-2.9E-09	-5.2E-09	173.3E-12	2.5E-09

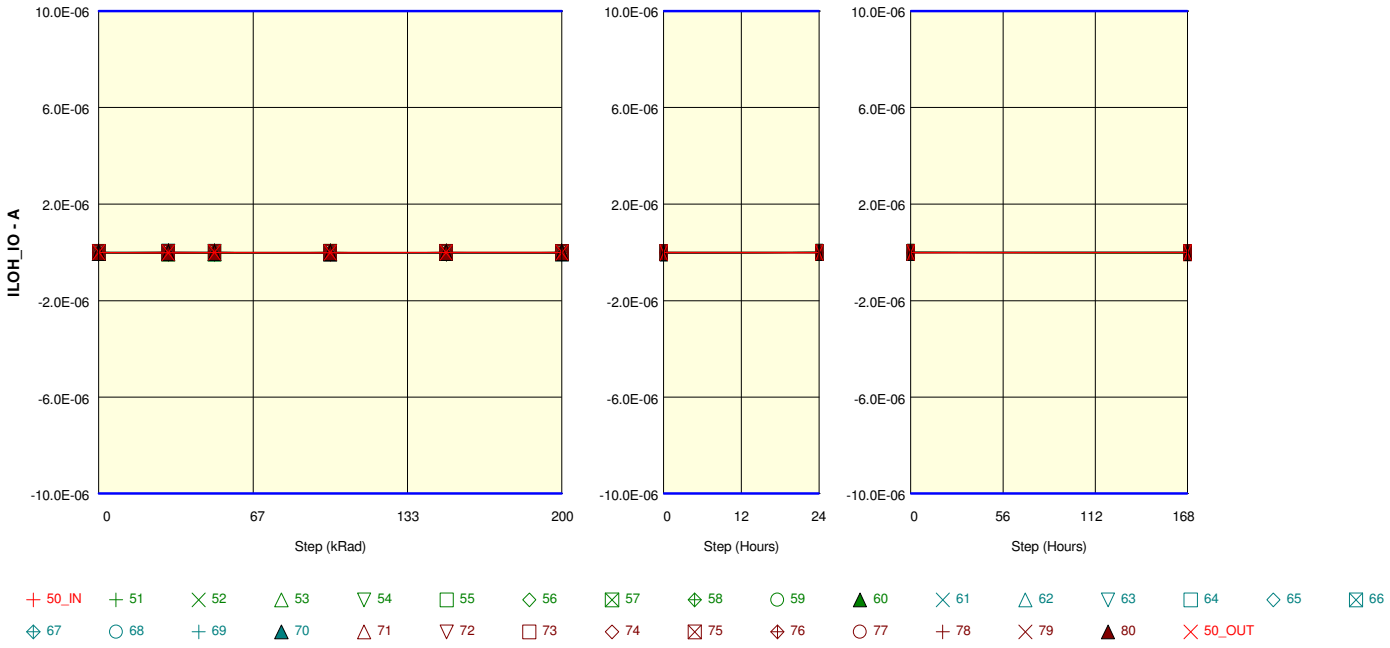
ILOH_IO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-9.0E-09	-5.9E-09	-9.2E-09	4.8E-09	-7.8E-09	-11.3E-09	173.3E-12	-3.0E-09
Std Deviation	7.1E-09	5.2E-09	5.5E-09	43.0E-18	3.1E-09	2.2E-09	2.7E-18	6.3E-09

Measurements

ILOH_IO[0]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	2.5E-09	173.3E-12	-8.2E-09	-5.9E-09	1.7E-09	-2.1E-09	-4.4E-09	-13.6E-09
50_OUT_REF	-9.7E-09	-2.1E-09	-10.5E-09	-22.7E-09	-7.5E-09	-10.5E-09	-22.7E-09	-2.9E-09
OFF samples								
71	-5.2E-09	-12.0E-09	-11.3E-09	5.5E-09	-5.9E-09	7.0E-09	-9.7E-09	-8.2E-09
72	-9.0E-09	-9.0E-09	-9.0E-09	-5.9E-09	-14.3E-09	-14.3E-09	1.7E-09	-9.7E-09
73	-4.4E-09	-7.5E-09	-13.6E-09	-8.2E-09	-9.7E-09	-589.6E-12	-6.7E-09	173.3E-12
74	-3.6E-09	-15.1E-09	8.6E-09	2.5E-09	-15.1E-09	-2.9E-09	1.7E-09	-5.2E-09
75	-7.5E-09	-2.9E-09	-6.7E-09	-589.6E-12	-10.5E-09	-9.0E-09	-5.9E-09	-11.3E-09
76	-1.4E-09	-11.3E-09	-15.1E-09	6.3E-09	-5.2E-09	-13.6E-09	-1.4E-09	-10.5E-09
77	-4.4E-09	-6.7E-09	3.2E-09	7.0E-09	-589.6E-12	-3.6E-09	-10.5E-09	-12.8E-09
78	-10.5E-09	-5.9E-09	-9.0E-09	1.7E-09	-6.7E-09	-5.9E-09	-10.5E-09	-2.9E-09
79	-589.6E-12	-6.7E-09	-4.4E-09	-5.9E-09	-13.6E-09	-12.8E-09	-12.8E-09	-589.6E-12
80	-12.8E-09	-3.6E-09	-10.5E-09	7.8E-09	-6.7E-09	-12.8E-09	-7.5E-09	-5.2E-09
Statistics								
Min	-12.8E-09	-15.1E-09	-15.1E-09	-8.2E-09	-15.1E-09	-14.3E-09	-12.8E-09	-12.8E-09
Max	-589.6E-12	-2.9E-09	8.6E-09	7.8E-09	-589.6E-12	7.0E-09	1.7E-09	173.3E-12
Average	-5.9E-09	-8.1E-09	-6.8E-09	1.0E-09	-8.8E-09	-6.8E-09	-6.2E-09	-6.6E-09
Std Deviation	3.7E-09	3.6E-09	7.1E-09	5.6E-09	4.4E-09	6.6E-09	4.9E-09	4.3E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Leakage Current High : ILOH_IO[1]
Test conditions : Vout=VCCmax. Vcc = 3.6V DQ are disabled
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

ILOH_IO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-1.4E-09	-4.4E-09	-10.5E-09	-15.8E-09	-5.9E-09	-2.9E-09	-5.2E-09	-12.0E-09
50_OUT_REF	936.3E-12	-21.2E-09	-2.1E-09	-15.1E-09	-8.2E-09	-9.7E-09	-6.7E-09	-2.9E-09
ON_LDC samples								
51	-21.2E-09	-15.8E-09	-10.5E-09	-15.8E-09	-5.9E-09	-2.9E-09	-5.2E-09	-12.0E-09
52	-10.5E-09	-15.8E-09	-22.0E-09	-15.8E-09	-17.4E-09	-17.4E-09	-5.2E-09	-3.6E-09
53	-16.6E-09	-20.4E-09	-22.0E-09	-15.8E-09	-17.4E-09	-17.4E-09	-5.2E-09	-3.6E-09
54	-15.8E-09	-21.2E-09	-22.0E-09	-15.8E-09	-17.4E-09	-7.5E-09	-5.2E-09	-21.2E-09
55	-2.9E-09	-19.7E-09	-22.0E-09	-3.6E-09	-17.4E-09	-13.6E-09	-5.2E-09	-15.1E-09
56	-7.5E-09	-10.5E-09	-22.0E-09	-9.0E-09	-16.6E-09	-17.4E-09	2.5E-09	-15.1E-09
57	-5.9E-09	-12.0E-09	-22.0E-09	-5.2E-09	-16.6E-09	-17.4E-09	2.5E-09	-15.1E-09
58	-18.1E-09	-4.4E-09	-22.0E-09	-5.2E-09	-16.6E-09	-17.4E-09	2.5E-09	-15.1E-09
59	-5.9E-09	-5.2E-09	-5.9E-09	-9.0E-09	-16.6E-09	-17.4E-09	2.5E-09	-15.1E-09
60	-15.1E-09	-21.2E-09	-5.9E-09	-9.0E-09	-16.6E-09	-7.5E-09	2.5E-09	-5.9E-09
Statistics								
Min	-21.2E-09	-21.2E-09	-22.0E-09	-15.8E-09	-17.4E-09	-17.4E-09	-5.2E-09	-21.2E-09
Max	-2.9E-09	-4.4E-09	-5.9E-09	-3.6E-09	-5.9E-09	-2.9E-09	2.5E-09	-3.6E-09
Average	-12.0E-09	-14.6E-09	-17.6E-09	-10.4E-09	-15.8E-09	-13.6E-09	-1.4E-09	-12.2E-09
Std Deviation	5.9E-09	6.0E-09	6.7E-09	4.7E-09	3.3E-09	5.3E-09	3.8E-09	5.6E-09

Measurements

ILOH_IO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-1.4E-09	-4.4E-09	-10.5E-09	-15.8E-09	-5.9E-09	-2.9E-09	-5.2E-09	-12.0E-09
50_OUT_REF	936.3E-12	-21.2E-09	-2.1E-09	-15.1E-09	-8.2E-09	-9.7E-09	-6.7E-09	-2.9E-09
ON_HDC samples								
61	-5.2E-09	-9.7E-09	-6.7E-09	-18.1E-09	-14.3E-09	-9.7E-09	2.5E-09	-9.0E-09
62	-8.2E-09	-8.2E-09	-20.4E-09	-18.1E-09	-5.9E-09	-22.7E-09	2.5E-09	-5.9E-09
63	-8.2E-09	-16.6E-09	-4.4E-09	-18.1E-09	-5.9E-09	-22.7E-09	2.5E-09	-5.9E-09
64	-13.6E-09	-14.3E-09	-4.4E-09	-18.1E-09	-12.8E-09	-22.7E-09	2.5E-09	-5.9E-09
65	-4.4E-09	-2.1E-09	-4.4E-09	-18.1E-09	-14.3E-09	-22.7E-09	2.5E-09	-5.9E-09
66	-15.1E-09	3.2E-09	-4.4E-09	-18.1E-09	-14.3E-09	-22.7E-09	2.5E-09	-5.9E-09
67	-17.4E-09	-17.4E-09	-9.0E-09	-18.1E-09	-14.3E-09	-22.7E-09	2.5E-09	-5.9E-09
68	-11.3E-09	-2.1E-09	-4.4E-09	-18.1E-09	-8.2E-09	1.7E-09	-8.2E-09	-5.9E-09
69	-1.4E-09	-5.2E-09	-4.4E-09	-18.1E-09	-12.0E-09	-3.6E-09	-8.2E-09	-2.9E-09
70	1.7E-09	936.3E-12	-10.5E-09	-18.1E-09	-17.4E-09	-589.6E-12	-8.2E-09	-15.8E-09
Statistics								
Min	-17.4E-09	-17.4E-09	-20.4E-09	-18.1E-09	-17.4E-09	-22.7E-09	-8.2E-09	-15.8E-09
Max	1.7E-09	3.2E-09	-4.4E-09	-18.1E-09	-5.9E-09	1.7E-09	2.5E-09	-2.9E-09

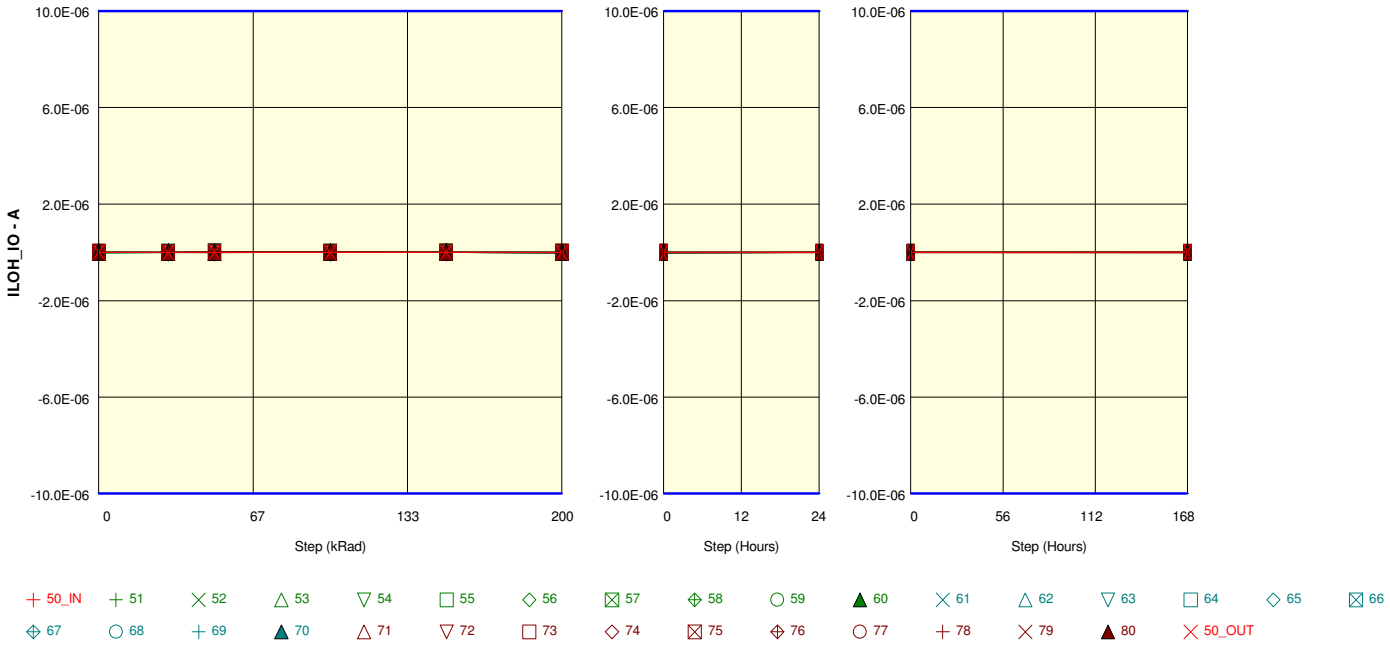
ILOH_IO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-8.3E-09	-7.2E-09	-7.3E-09	-18.1E-09	-12.0E-09	-14.9E-09	-742.2E-12	-6.9E-09
Std Deviation	5.8E-09	6.9E-09	4.9E-09	99.3E-18	3.7E-09	10.0E-09	4.9E-09	3.3E-09

Measurements

ILOH_IO[1]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-1.4E-09	-4.4E-09	-10.5E-09	-15.8E-09	-5.9E-09	-2.9E-09	-5.2E-09	-12.0E-09
50_OUT_REF	936.3E-12	-21.2E-09	-2.1E-09	-15.1E-09	-8.2E-09	-9.7E-09	-6.7E-09	-2.9E-09
OFF samples								
71	2.5E-09	-12.0E-09	-17.4E-09	-15.1E-09	-5.9E-09	-15.1E-09	-6.7E-09	-10.5E-09
72	-15.1E-09	-17.4E-09	-6.7E-09	-6.7E-09	-6.7E-09	-10.5E-09	-11.3E-09	-8.2E-09
73	-17.4E-09	-13.6E-09	-12.8E-09	-21.2E-09	-9.0E-09	-6.7E-09	-4.4E-09	-9.7E-09
74	-12.8E-09	-4.4E-09	-5.9E-09	-22.0E-09	-13.6E-09	-8.2E-09	-25.0E-09	-589.6E-12
75	-6.7E-09	-12.0E-09	-10.5E-09	-2.9E-09	-2.9E-09	-18.1E-09	-11.3E-09	-20.4E-09
76	-15.1E-09	6.3E-09	-1.4E-09	-2.9E-09	-13.6E-09	-15.1E-09	-12.0E-09	173.3E-12
77	-9.7E-09	-15.1E-09	-13.6E-09	-8.2E-09	-5.2E-09	-5.9E-09	-9.7E-09	-5.9E-09
78	-5.9E-09	-8.2E-09	-12.0E-09	-14.3E-09	-9.0E-09	-10.5E-09	-12.8E-09	-17.4E-09
79	-4.4E-09	-12.8E-09	-11.3E-09	-12.0E-09	-19.7E-09	-12.8E-09	-13.6E-09	-1.4E-09
80	-9.7E-09	-5.9E-09	-7.5E-09	-5.9E-09	-7.5E-09	-5.2E-09	-5.9E-09	-6.7E-09
Statistics								
Min	-17.4E-09	-17.4E-09	-17.4E-09	-22.0E-09	-19.7E-09	-18.1E-09	-25.0E-09	-20.4E-09
Max	2.5E-09	6.3E-09	-1.4E-09	-2.9E-09	-2.9E-09	-5.2E-09	-4.4E-09	173.3E-12
Average	-9.4E-09	-9.5E-09	-9.9E-09	-11.1E-09	-9.3E-09	-10.8E-09	-11.3E-09	-8.1E-09
Std Deviation	5.7E-09	6.5E-09	4.4E-09	6.6E-09	4.7E-09	4.2E-09	5.4E-09	6.5E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Leakage Current High : ILOH_IO[2]
Test conditions : Vout=VCCmax. Vcc = 3.6V DQ are disabled
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

ILOH_IO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-5.9E-09	-9.7E-09	-8.2E-09	-10.5E-09	-2.9E-09	-9.7E-09	-4.4E-09	-5.2E-09
50_OUT_REF	936.3E-12	-10.5E-09	2.5E-09	-11.3E-09	-1.4E-09	-5.9E-09	-10.5E-09	7.8E-09
ON_LDC samples								
51	-9.7E-09	-9.7E-09	-8.2E-09	-10.5E-09	-2.9E-09	-9.7E-09	-4.4E-09	-5.2E-09
52	-5.2E-09	4.0E-09	-2.1E-09	-10.5E-09	4.0E-09	-10.5E-09	-4.4E-09	-1.4E-09
53	-8.2E-09	4.0E-09	-2.1E-09	-10.5E-09	4.0E-09	-10.5E-09	-4.4E-09	-1.4E-09
54	-2.1E-09	-7.5E-09	-2.1E-09	-10.5E-09	4.0E-09	7.0E-09	-4.4E-09	-11.3E-09
55	-12.0E-09	-8.2E-09	-2.1E-09	6.3E-09	4.0E-09	-9.0E-09	-4.4E-09	-5.9E-09
56	2.5E-09	-4.4E-09	-2.1E-09	-5.2E-09	3.2E-09	-3.6E-09	-9.0E-09	-5.9E-09
57	-13.6E-09	-9.0E-09	-2.1E-09	-2.9E-09	3.2E-09	-3.6E-09	-9.0E-09	-5.9E-09
58	-3.6E-09	-4.4E-09	-2.1E-09	-2.9E-09	3.2E-09	-3.6E-09	-9.0E-09	-5.9E-09
59	4.8E-09	1.7E-09	-1.4E-09	-1.4E-09	3.2E-09	-3.6E-09	-9.0E-09	-5.9E-09
60	-13.6E-09	-2.1E-09	-1.4E-09	-1.4E-09	3.2E-09	-5.9E-09	-9.0E-09	-2.1E-09
Statistics								
Min	-13.6E-09	-9.7E-09	-8.2E-09	-10.5E-09	-2.9E-09	-10.5E-09	-9.0E-09	-11.3E-09
Max	4.8E-09	4.0E-09	-1.4E-09	6.3E-09	4.0E-09	7.0E-09	-4.4E-09	-1.4E-09
Average	-6.1E-09	-3.6E-09	-2.6E-09	-4.9E-09	2.9E-09	-5.3E-09	-6.7E-09	-5.1E-09
Std Deviation	6.1E-09	5.0E-09	1.9E-09	5.3E-09	2.0E-09	5.0E-09	2.3E-09	2.8E-09

Measurements

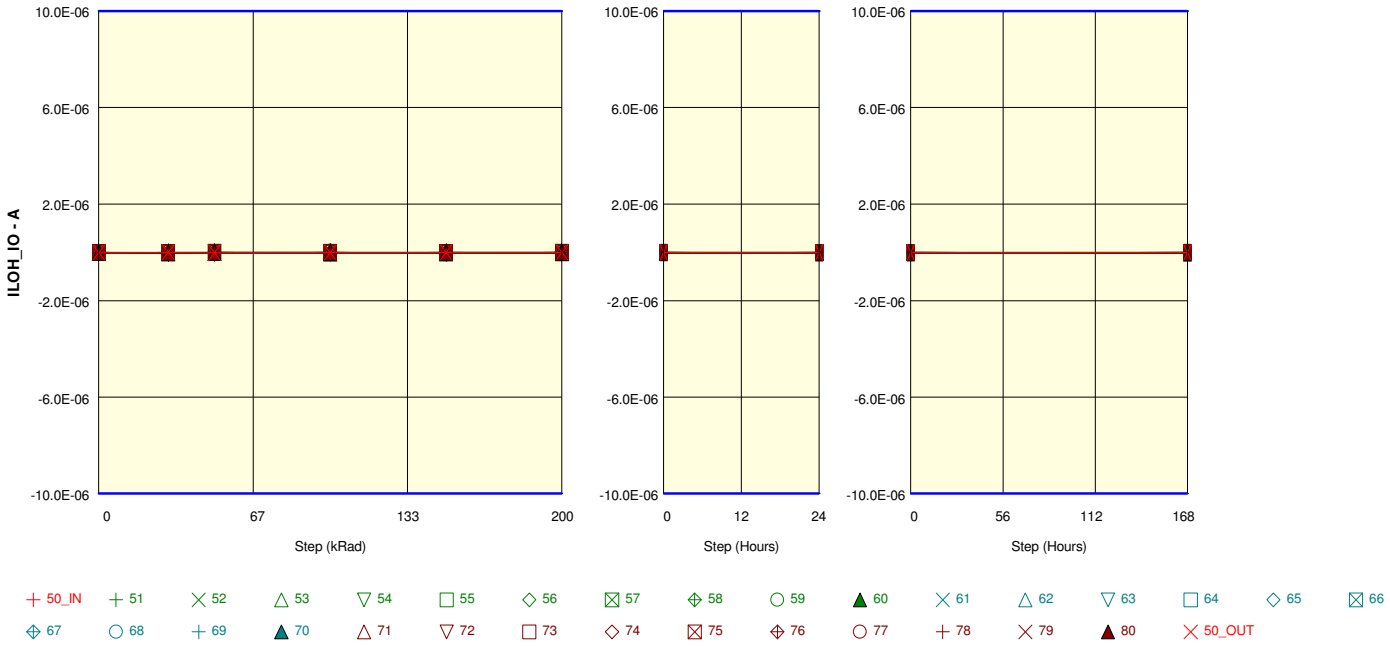
ILOH_IO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-5.9E-09	-9.7E-09	-8.2E-09	-10.5E-09	-2.9E-09	-9.7E-09	-4.4E-09	-5.2E-09
50_OUT_REF	936.3E-12	-10.5E-09	2.5E-09	-11.3E-09	-1.4E-09	-5.9E-09	-10.5E-09	7.8E-09
ON_HDC samples								
61	-12.0E-09	173.3E-12	936.3E-12	-2.9E-09	-5.9E-09	-6.7E-09	-9.0E-09	9.3E-09
62	-3.6E-09	936.3E-12	1.7E-09	-2.9E-09	173.3E-12	-13.6E-09	-9.0E-09	-3.6E-09
63	-589.6E-12	3.2E-09	3.2E-09	-2.9E-09	173.3E-12	-13.6E-09	-9.0E-09	-3.6E-09
64	-6.7E-09	-2.9E-09	3.2E-09	-2.9E-09	1.7E-09	-13.6E-09	-9.0E-09	-3.6E-09
65	-19.7E-09	-12.0E-09	3.2E-09	-2.9E-09	-6.7E-09	-13.6E-09	-9.0E-09	-3.6E-09
66	-5.2E-09	-9.7E-09	3.2E-09	-2.9E-09	-6.7E-09	-13.6E-09	-9.0E-09	-3.6E-09
67	-9.0E-09	4.0E-09	173.3E-12	-2.9E-09	-6.7E-09	-13.6E-09	-9.0E-09	-3.6E-09
68	2.5E-09	-4.4E-09	7.8E-09	-2.9E-09	-5.9E-09	-12.0E-09	-1.4E-09	5.5E-09
69	-7.5E-09	-2.9E-09	7.8E-09	-2.9E-09	1.7E-09	-10.5E-09	-1.4E-09	-2.9E-09
70	-8.2E-09	173.3E-12	-589.6E-12	-2.9E-09	6.3E-09	-3.6E-09	-1.4E-09	1.7E-09
Statistics								
Min	-19.7E-09	-12.0E-09	-589.6E-12	-2.9E-09	-6.7E-09	-13.6E-09	-9.0E-09	-3.6E-09
Max	2.5E-09	4.0E-09	7.8E-09	-2.9E-09	6.3E-09	-3.6E-09	-1.4E-09	9.3E-09

ILOH_IO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-7.0E-09	-2.3E-09	3.1E-09	-2.9E-09	-2.2E-09	-11.4E-09	-6.7E-09	-818.5E-12
Std Deviation	5.8E-09	5.0E-09	2.7E-09	0.0E+00	4.5E-09	3.3E-09	3.5E-09	4.5E-09

Measurements

ILOH_IO[2]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-5.9E-09	-9.7E-09	-8.2E-09	-10.5E-09	-2.9E-09	-9.7E-09	-4.4E-09	-5.2E-09
50_OUT_REF	936.3E-12	-10.5E-09	2.5E-09	-11.3E-09	-1.4E-09	-5.9E-09	-10.5E-09	7.8E-09
OFF samples								
71	-2.1E-09	3.2E-09	4.0E-09	-3.6E-09	9.3E-09	173.3E-12	-9.0E-09	3.2E-09
72	-5.9E-09	936.3E-12	3.2E-09	-1.4E-09	936.3E-12	-5.9E-09	-5.9E-09	1.7E-09
73	7.0E-09	-4.4E-09	173.3E-12	-5.2E-09	-3.6E-09	-9.0E-09	5.5E-09	173.3E-12
74	173.3E-12	3.2E-09	7.8E-09	5.5E-09	-589.6E-12	-6.7E-09	173.3E-12	-12.8E-09
75	-9.7E-09	-2.9E-09	173.3E-12	-5.9E-09	-1.4E-09	3.2E-09	-5.2E-09	-5.9E-09
76	-5.2E-09	-4.4E-09	-5.2E-09	-6.7E-09	-11.3E-09	936.3E-12	936.3E-12	9.3E-09
77	-11.3E-09	173.3E-12	9.3E-09	-2.9E-09	3.2E-09	-15.1E-09	-12.8E-09	-12.8E-09
78	-9.0E-09	4.8E-09	9.3E-09	-5.9E-09	1.7E-09	-15.1E-09	-589.6E-12	-1.4E-09
79	936.3E-12	-3.6E-09	-2.1E-09	4.8E-09	-589.6E-12	-9.0E-09	-1.4E-09	-10.5E-09
80	4.0E-09	-5.2E-09	-15.1E-09	7.0E-09	936.3E-12	-5.9E-09	-5.2E-09	-5.9E-09
Statistics								
Min	-11.3E-09	-5.2E-09	-15.1E-09	-6.7E-09	-11.3E-09	-15.1E-09	-12.8E-09	-12.8E-09
Max	7.0E-09	4.8E-09	9.3E-09	7.0E-09	9.3E-09	3.2E-09	5.5E-09	9.3E-09
Average	-3.1E-09	-818.5E-12	1.2E-09	-1.4E-09	-131.9E-12	-6.2E-09	-3.3E-09	-3.5E-09
Std Deviation	5.8E-09	3.5E-09	7.1E-09	5.0E-09	4.9E-09	6.0E-09	5.1E-09	7.0E-09

Parameter : Output Leakage Current High : ILOH_IO[3]
Test conditions : Vout=VCCmax. Vcc = 3.6V DQ are disabled
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

ILOH_IO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-15.1E-09	-8.2E-09	-20.4E-09	-6.7E-09	-15.8E-09	-19.7E-09	-11.3E-09	-13.6E-09
50_OUT_REF	-17.4E-09	-589.6E-12	-22.0E-09	-11.3E-09	-4.4E-09	-2.1E-09	-2.1E-09	-5.2E-09
ON_LDC samples								
51	-15.1E-09	-7.5E-09	-20.4E-09	-6.7E-09	-15.8E-09	-19.7E-09	-11.3E-09	-13.6E-09
52	-19.7E-09	-19.7E-09	-1.4E-09	-6.7E-09	-15.8E-09	-9.7E-09	-11.3E-09	-2.9E-09
53	-12.0E-09	-11.3E-09	-1.4E-09	-6.7E-09	-15.8E-09	-9.7E-09	-11.3E-09	-2.9E-09
54	-15.1E-09	-20.4E-09	-1.4E-09	-6.7E-09	-15.8E-09	-14.3E-09	-11.3E-09	936.3E-12
55	-11.3E-09	-24.2E-09	-1.4E-09	-2.1E-09	-15.8E-09	-9.7E-09	-11.3E-09	-18.1E-09
56	-9.7E-09	-15.1E-09	-1.4E-09	-5.9E-09	-18.9E-09	-12.8E-09	-12.0E-09	-18.1E-09
57	-16.6E-09	-9.0E-09	-1.4E-09	-16.6E-09	-18.9E-09	-12.8E-09	-12.0E-09	-18.1E-09
58	-589.6E-12	-18.9E-09	-1.4E-09	-16.6E-09	-18.9E-09	-12.8E-09	-12.0E-09	-18.1E-09
59	-7.5E-09	-14.3E-09	-16.6E-09	173.3E-12	-18.9E-09	-12.8E-09	-12.0E-09	-18.1E-09
60	-12.8E-09	-14.3E-09	-16.6E-09	173.3E-12	-18.9E-09	-14.3E-09	-12.0E-09	-18.9E-09
Statistics								
Min	-19.7E-09	-24.2E-09	-20.4E-09	-16.6E-09	-18.9E-09	-19.7E-09	-12.0E-09	-18.9E-09
Max	-589.6E-12	-7.5E-09	-1.4E-09	173.3E-12	-15.8E-09	-9.7E-09	-11.3E-09	936.3E-12
Average	-12.0E-09	-15.5E-09	-6.3E-09	-6.8E-09	-17.4E-09	-12.9E-09	-11.7E-09	-12.8E-09
Std Deviation	5.1E-09	5.1E-09	7.6E-09	5.6E-09	1.5E-09	2.8E-09	381.5E-12	7.5E-09

Measurements

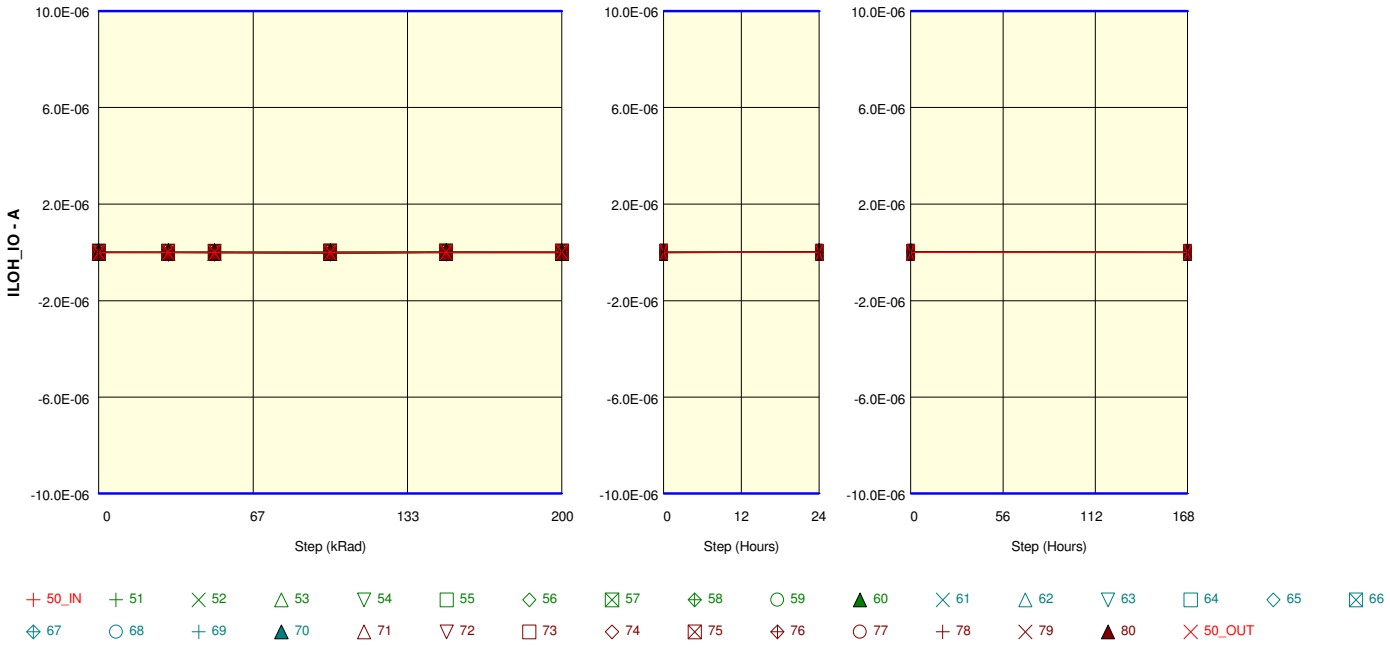
ILOH_IO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-15.1E-09	-8.2E-09	-20.4E-09	-6.7E-09	-15.8E-09	-19.7E-09	-11.3E-09	-13.6E-09
50_OUT_REF	-17.4E-09	-589.6E-12	-22.0E-09	-11.3E-09	-4.4E-09	-2.1E-09	-2.1E-09	-5.2E-09
ON_HDC samples								
61	-20.4E-09	-3.6E-09	-16.6E-09	-20.4E-09	-10.5E-09	-13.6E-09	-12.0E-09	-1.4E-09
62	-8.2E-09	-10.5E-09	-10.5E-09	-20.4E-09	-12.0E-09	-5.2E-09	-12.0E-09	-5.2E-09
63	-15.8E-09	-4.4E-09	-7.5E-09	-20.4E-09	-12.0E-09	-5.2E-09	-12.0E-09	-5.2E-09
64	-9.7E-09	-17.4E-09	-7.5E-09	-20.4E-09	-7.5E-09	-5.2E-09	-12.0E-09	-5.2E-09
65	-9.7E-09	-18.9E-09	-7.5E-09	-20.4E-09	-10.5E-09	-5.2E-09	-12.0E-09	-5.2E-09
66	-12.0E-09	-15.8E-09	-7.5E-09	-20.4E-09	-10.5E-09	-5.2E-09	-12.0E-09	-5.2E-09
67	-7.5E-09	-20.4E-09	-14.3E-09	-20.4E-09	-10.5E-09	-5.2E-09	-12.0E-09	-5.2E-09
68	-22.0E-09	-14.3E-09	-15.1E-09	-20.4E-09	-15.8E-09	-9.7E-09	-18.9E-09	-20.4E-09
69	-21.2E-09	-25.0E-09	-15.1E-09	-20.4E-09	-13.6E-09	-16.6E-09	-18.9E-09	-18.1E-09
70	-8.2E-09	-13.6E-09	-12.0E-09	-20.4E-09	-4.4E-09	-4.4E-09	-18.9E-09	-7.5E-09
Statistics								
Min	-22.0E-09	-25.0E-09	-16.6E-09	-20.4E-09	-15.8E-09	-16.6E-09	-18.9E-09	-20.4E-09
Max	-7.5E-09	-3.6E-09	-7.5E-09	-20.4E-09	-4.4E-09	-4.4E-09	-12.0E-09	-1.4E-09

ILOH_IO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-13.5E-09	-14.4E-09	-11.3E-09	-20.4E-09	-10.7E-09	-7.5E-09	-14.1E-09	-7.8E-09
Std Deviation	5.5E-09	6.4E-09	3.6E-09	262.7E-18	3.0E-09	4.1E-09	3.1E-09	5.9E-09

Measurements

ILOH_IO[3]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-15.1E-09	-8.2E-09	-20.4E-09	-6.7E-09	-15.8E-09	-19.7E-09	-11.3E-09	-13.6E-09
50_OUT_REF	-17.4E-09	-589.6E-12	-22.0E-09	-11.3E-09	-4.4E-09	-2.1E-09	-2.1E-09	-5.2E-09
OFF samples								
71	-5.9E-09	-10.5E-09	-9.7E-09	-3.6E-09	-3.6E-09	-18.9E-09	-9.7E-09	-1.4E-09
72	-9.0E-09	-18.9E-09	-17.4E-09	-1.4E-09	-14.3E-09	936.3E-12	-9.7E-09	-14.3E-09
73	-9.7E-09	-11.3E-09	-5.2E-09	-14.3E-09	-12.0E-09	-10.5E-09	-7.5E-09	-14.3E-09
74	-4.4E-09	-16.6E-09	-9.0E-09	-6.7E-09	-23.5E-09	-15.8E-09	-8.2E-09	-18.9E-09
75	-14.3E-09	-15.8E-09	-12.0E-09	-17.4E-09	-12.0E-09	-14.3E-09	-22.7E-09	-7.5E-09
76	-7.5E-09	-13.6E-09	-9.0E-09	-9.7E-09	-3.6E-09	-13.6E-09	-9.0E-09	-18.9E-09
77	-20.4E-09	-14.3E-09	-13.6E-09	4.0E-09	-7.5E-09	-11.3E-09	-18.9E-09	-8.2E-09
78	-12.0E-09	-18.1E-09	-14.3E-09	-13.6E-09	-2.1E-09	-23.5E-09	-12.0E-09	-12.0E-09
79	-9.7E-09	-17.4E-09	-2.9E-09	-15.1E-09	-5.9E-09	-9.0E-09	-10.5E-09	-21.2E-09
80	-12.0E-09	-22.7E-09	-5.2E-09	-9.0E-09	-10.5E-09	-11.3E-09	-17.4E-09	-25.8E-09
Statistics								
Min	-20.4E-09	-22.7E-09	-17.4E-09	-17.4E-09	-23.5E-09	-23.5E-09	-22.7E-09	-25.8E-09
Max	-4.4E-09	-10.5E-09	-2.9E-09	4.0E-09	-2.1E-09	936.3E-12	-7.5E-09	-1.4E-09
Average	-10.5E-09	-15.9E-09	-9.8E-09	-8.7E-09	-9.5E-09	-12.7E-09	-12.6E-09	-14.2E-09
Std Deviation	4.3E-09	3.5E-09	4.3E-09	6.5E-09	6.1E-09	6.1E-09	4.9E-09	6.9E-09

Parameter : Output Leakage Current High : ILOH_IO[4]
Test conditions : Vout=VCCmax. Vcc = 3.6V DQ are disabled
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

ILOH_IO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-6.7E-09	-3.6E-09	6.3E-09	1.7E-09	-2.9E-09	-7.5E-09	-8.2E-09	-589.6E-12
50_OUT_REF	-17.4E-09	-1.4E-09	-5.9E-09	-6.7E-09	173.3E-12	8.6E-09	-5.2E-09	-2.9E-09
ON_LDC samples								
51	4.8E-09	936.3E-12	6.3E-09	1.7E-09	-2.9E-09	-7.5E-09	-8.2E-09	-589.6E-12
52	-7.5E-09	-12.8E-09	-7.5E-09	1.7E-09	10.9E-09	4.0E-09	-8.2E-09	-8.2E-09
53	-5.2E-09	2.5E-09	-7.5E-09	1.7E-09	10.9E-09	4.0E-09	-8.2E-09	-8.2E-09
54	-589.6E-12	-2.1E-09	-7.5E-09	1.7E-09	10.9E-09	936.3E-12	-8.2E-09	-8.2E-09
55	1.7E-09	-7.5E-09	-7.5E-09	-5.9E-09	10.9E-09	-3.6E-09	-8.2E-09	-6.7E-09
56	-8.2E-09	-2.9E-09	-7.5E-09	6.3E-09	-2.9E-09	-11.3E-09	-7.5E-09	-6.7E-09
57	-5.2E-09	-5.2E-09	-7.5E-09	3.2E-09	-2.9E-09	-11.3E-09	-7.5E-09	-6.7E-09
58	-8.2E-09	2.5E-09	-7.5E-09	3.2E-09	-2.9E-09	-11.3E-09	-7.5E-09	-6.7E-09
59	-11.3E-09	-3.6E-09	-5.9E-09	-2.9E-09	-2.9E-09	-11.3E-09	-7.5E-09	-6.7E-09
60	5.5E-09	-7.5E-09	-5.9E-09	-2.9E-09	-2.9E-09	-2.1E-09	-7.5E-09	-7.5E-09
Statistics								
Min	-11.3E-09	-12.8E-09	-7.5E-09	-5.9E-09	-2.9E-09	-11.3E-09	-8.2E-09	-8.2E-09
Max	5.5E-09	2.5E-09	6.3E-09	6.3E-09	10.9E-09	4.0E-09	-7.5E-09	-589.6E-12
Average	-3.4E-09	-3.6E-09	-5.8E-09	783.7E-12	2.6E-09	-4.9E-09	-7.8E-09	-6.6E-09
Std Deviation	5.6E-09	4.6E-09	4.1E-09	3.4E-09	6.7E-09	6.1E-09	381.4E-12	2.1E-09

Measurements

ILOH_IO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-6.7E-09	-3.6E-09	6.3E-09	1.7E-09	-2.9E-09	-7.5E-09	-8.2E-09	-589.6E-12
50_OUT_REF	-17.4E-09	-1.4E-09	-5.9E-09	-6.7E-09	173.3E-12	8.6E-09	-5.2E-09	-2.9E-09
ON_HDC samples								
61	-9.0E-09	3.2E-09	173.3E-12	-12.0E-09	-1.4E-09	-6.7E-09	-7.5E-09	-13.6E-09
62	1.7E-09	5.5E-09	2.5E-09	-12.0E-09	-589.6E-12	-5.2E-09	-7.5E-09	2.5E-09
63	173.3E-12	-3.6E-09	-589.6E-12	-12.0E-09	-589.6E-12	-5.2E-09	-7.5E-09	2.5E-09
64	3.2E-09	1.7E-09	-589.6E-12	-12.0E-09	-10.5E-09	-5.2E-09	-7.5E-09	2.5E-09
65	2.5E-09	-6.7E-09	-589.6E-12	-12.0E-09	173.3E-12	-5.2E-09	-7.5E-09	2.5E-09
66	-13.6E-09	-1.4E-09	-589.6E-12	-12.0E-09	173.3E-12	-5.2E-09	-7.5E-09	2.5E-09
67	3.2E-09	1.7E-09	-12.0E-09	-12.0E-09	173.3E-12	-5.2E-09	-7.5E-09	2.5E-09
68	4.0E-09	-9.0E-09	2.5E-09	-12.0E-09	4.8E-09	-12.8E-09	7.0E-09	-2.1E-09
69	-9.7E-09	-3.6E-09	2.5E-09	-12.0E-09	-12.8E-09	-7.5E-09	7.0E-09	-5.2E-09
70	10.9E-09	-5.2E-09	-12.8E-09	-12.0E-09	4.8E-09	-7.5E-09	7.0E-09	-11.3E-09
Statistics								
Min	-13.6E-09	-9.0E-09	-12.8E-09	-12.0E-09	-12.8E-09	-12.8E-09	-7.5E-09	-13.6E-09
Max	10.9E-09	5.5E-09	2.5E-09	-12.0E-09	4.8E-09	-5.2E-09	7.0E-09	2.5E-09

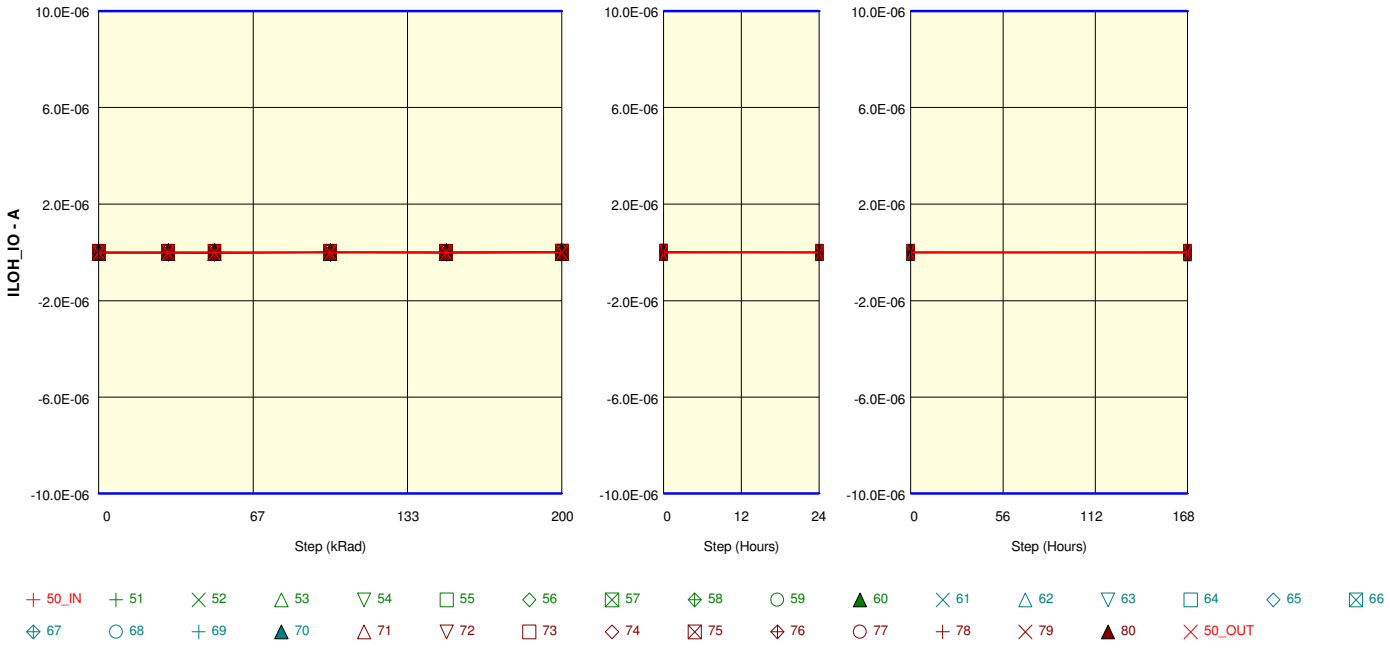
ILOH_IO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-666.0E-12	-1.7E-09	-2.0E-09	-12.0E-09	-1.6E-09	-6.5E-09	-3.1E-09	-1.7E-09
Std Deviation	7.2E-09	4.4E-09	5.4E-09	121.6E-18	5.4E-09	2.3E-09	6.6E-09	5.9E-09

Measurements

ILOH_IO[4]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-6.7E-09	-3.6E-09	6.3E-09	1.7E-09	-2.9E-09	-7.5E-09	-8.2E-09	-589.6E-12
50_OUT_REF	-17.4E-09	-1.4E-09	-5.9E-09	-6.7E-09	173.3E-12	8.6E-09	-5.2E-09	-2.9E-09
OFF samples								
71	-9.0E-09	-9.7E-09	-4.4E-09	2.5E-09	-1.4E-09	-3.6E-09	-589.6E-12	173.3E-12
72	-2.1E-09	-3.6E-09	173.3E-12	-589.6E-12	-8.2E-09	4.0E-09	-11.3E-09	1.7E-09
73	-8.2E-09	-4.4E-09	-13.6E-09	3.2E-09	-3.6E-09	-3.6E-09	5.5E-09	-10.5E-09
74	1.7E-09	-7.5E-09	-2.1E-09	3.2E-09	4.8E-09	-10.5E-09	3.2E-09	-7.5E-09
75	-9.7E-09	-1.4E-09	-12.0E-09	-7.5E-09	173.3E-12	-10.5E-09	-8.2E-09	-5.9E-09
76	-10.5E-09	-12.8E-09	-6.7E-09	-5.2E-09	-6.7E-09	936.3E-12	-4.4E-09	-9.7E-09
77	-5.9E-09	-5.9E-09	-5.2E-09	-2.1E-09	-589.6E-12	173.3E-12	10.9E-09	-10.5E-09
78	-5.9E-09	-1.4E-09	936.3E-12	-13.6E-09	-18.1E-09	-12.0E-09	7.8E-09	-9.0E-09
79	-5.9E-09	-1.4E-09	-11.3E-09	-13.6E-09	-4.4E-09	-3.6E-09	-9.0E-09	-3.6E-09
80	-3.6E-09	936.3E-12	4.0E-09	-15.8E-09	-5.2E-09	-2.9E-09	7.8E-09	-2.9E-09
Statistics								
Min	-10.5E-09	-12.8E-09	-13.6E-09	-15.8E-09	-18.1E-09	-12.0E-09	-11.3E-09	-10.5E-09
Max	1.7E-09	936.3E-12	4.0E-09	3.2E-09	4.8E-09	4.0E-09	10.9E-09	1.7E-09
Average	-5.9E-09	-4.7E-09	-5.0E-09	-4.9E-09	-4.3E-09	-4.2E-09	173.3E-12	-5.8E-09
Std Deviation	3.6E-09	4.1E-09	5.6E-09	7.0E-09	5.8E-09	5.1E-09	7.6E-09	4.2E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Leakage Current High : ILOH_IO[5]
Test conditions : Vout=VCCmax. Vcc = 3.6V DQ are disabled
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

ILOH_IO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-12.0E-09	-2.1E-09	-9.0E-09	-7.5E-09	1.7E-09	-5.9E-09	-9.7E-09	1.7E-09
50_OUT_REF	-12.8E-09	-15.1E-09	-2.1E-09	-12.0E-09	-4.4E-09	-1.4E-09	-9.7E-09	-8.2E-09
ON_LDC samples								
51	-5.9E-09	-7.5E-09	-9.0E-09	-7.5E-09	1.7E-09	-5.9E-09	-9.7E-09	1.7E-09
52	-4.4E-09	-9.0E-09	-13.6E-09	-7.5E-09	-12.0E-09	-5.9E-09	-9.7E-09	-11.3E-09
53	4.0E-09	173.3E-12	-13.6E-09	-7.5E-09	-12.0E-09	-5.9E-09	-9.7E-09	-11.3E-09
54	-6.7E-09	-13.6E-09	-13.6E-09	-7.5E-09	-12.0E-09	-13.6E-09	-9.7E-09	-4.4E-09
55	-7.5E-09	-11.3E-09	-13.6E-09	-7.5E-09	-12.0E-09	-6.7E-09	-9.7E-09	-3.6E-09
56	-4.4E-09	-11.3E-09	-13.6E-09	-11.3E-09	-9.7E-09	7.0E-09	-5.2E-09	-3.6E-09
57	-11.3E-09	-5.2E-09	-13.6E-09	-10.5E-09	-9.7E-09	7.0E-09	-5.2E-09	-3.6E-09
58	-7.5E-09	-1.4E-09	-13.6E-09	-10.5E-09	-9.7E-09	7.0E-09	-5.2E-09	-3.6E-09
59	-1.4E-09	-2.1E-09	-2.1E-09	-4.4E-09	-9.7E-09	7.0E-09	-5.2E-09	-3.6E-09
60	4.0E-09	-12.8E-09	-2.1E-09	-4.4E-09	-9.7E-09	2.5E-09	-5.2E-09	-15.1E-09
Statistics								
Min	-11.3E-09	-13.6E-09	-13.6E-09	-11.3E-09	-12.0E-09	-13.6E-09	-9.7E-09	-15.1E-09
Max	4.0E-09	173.3E-12	-2.1E-09	-4.4E-09	1.7E-09	7.0E-09	-5.2E-09	1.7E-09
Average	-4.1E-09	-7.4E-09	-10.8E-09	-7.8E-09	-9.5E-09	-742.2E-12	-7.5E-09	-5.9E-09
Std Deviation	4.7E-09	4.8E-09	4.6E-09	2.2E-09	3.9E-09	7.3E-09	2.3E-09	4.8E-09

Measurements

ILOH_IO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-12.0E-09	-2.1E-09	-9.0E-09	-7.5E-09	1.7E-09	-5.9E-09	-9.7E-09	1.7E-09
50_OUT_REF	-12.8E-09	-15.1E-09	-2.1E-09	-12.0E-09	-4.4E-09	-1.4E-09	-9.7E-09	-8.2E-09
ON_HDC samples								
61	-13.6E-09	-5.2E-09	-10.5E-09	-2.9E-09	-9.7E-09	-2.9E-09	-5.2E-09	-9.7E-09
62	-15.1E-09	-2.9E-09	-1.4E-09	-2.9E-09	-10.5E-09	-6.7E-09	-5.2E-09	-10.5E-09
63	-7.5E-09	-4.4E-09	-5.2E-09	-2.9E-09	-10.5E-09	-6.7E-09	-5.2E-09	-10.5E-09
64	1.7E-09	-8.2E-09	-5.2E-09	-2.9E-09	-6.7E-09	-6.7E-09	-5.2E-09	-10.5E-09
65	-5.2E-09	-5.2E-09	-5.2E-09	-2.9E-09	-5.2E-09	-6.7E-09	-5.2E-09	-10.5E-09
66	-10.5E-09	-10.5E-09	-5.2E-09	-2.9E-09	-5.2E-09	-6.7E-09	-5.2E-09	-10.5E-09
67	-6.7E-09	-5.2E-09	-589.6E-12	-2.9E-09	-5.2E-09	-6.7E-09	-5.2E-09	-10.5E-09
68	2.5E-09	-2.1E-09	4.0E-09	-2.9E-09	-4.4E-09	1.7E-09	-589.6E-12	-12.0E-09
69	-16.6E-09	-12.8E-09	4.0E-09	-2.9E-09	-8.2E-09	-1.4E-09	-589.6E-12	-10.5E-09
70	-7.5E-09	-8.2E-09	-1.4E-09	-2.9E-09	7.0E-09	-15.1E-09	-589.6E-12	-2.9E-09
Statistics								
Min	-16.6E-09	-12.8E-09	-10.5E-09	-2.9E-09	-10.5E-09	-15.1E-09	-5.2E-09	-12.0E-09
Max	2.5E-09	-2.1E-09	4.0E-09	-2.9E-09	7.0E-09	1.7E-09	-589.6E-12	-2.9E-09

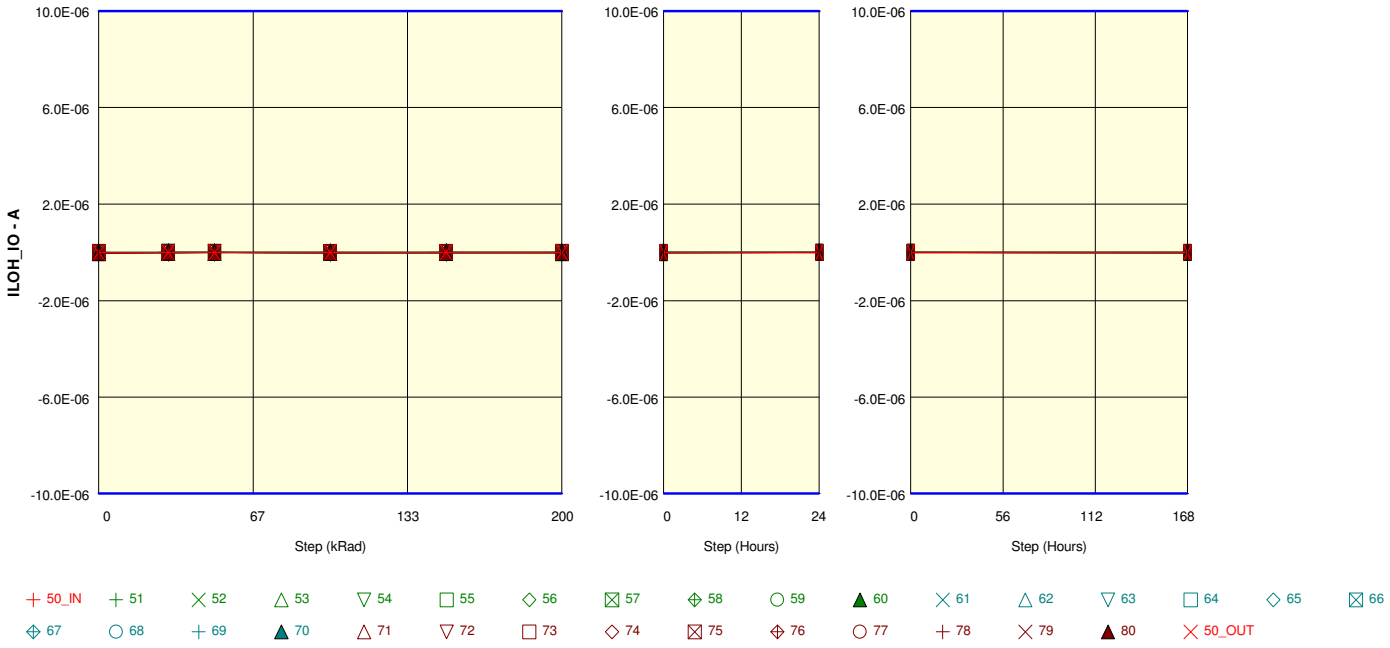
ILOH_IO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-7.8E-09	-6.5E-09	-2.6E-09	-2.9E-09	-5.9E-09	-5.8E-09	-3.8E-09	-9.8E-09
Std Deviation	6.1E-09	3.2E-09	4.3E-09	0.0E+00	4.8E-09	4.2E-09	2.1E-09	2.4E-09

Measurements

ILOH_IO[5]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-12.0E-09	-2.1E-09	-9.0E-09	-7.5E-09	1.7E-09	-5.9E-09	-9.7E-09	1.7E-09
50_OUT_REF	-12.8E-09	-15.1E-09	-2.1E-09	-12.0E-09	-4.4E-09	-1.4E-09	-9.7E-09	-8.2E-09
OFF samples								
71	-6.7E-09	-13.6E-09	-14.3E-09	6.3E-09	2.5E-09	-2.1E-09	-2.1E-09	936.3E-12
72	-11.3E-09	-589.6E-12	-9.7E-09	-4.4E-09	-6.7E-09	936.3E-12	-12.8E-09	-4.4E-09
73	2.5E-09	-12.8E-09	-16.6E-09	-9.7E-09	-5.2E-09	-7.5E-09	-589.6E-12	-7.5E-09
74	-11.3E-09	3.2E-09	-3.6E-09	-21.2E-09	-9.7E-09	-2.9E-09	-10.5E-09	-11.3E-09
75	-10.5E-09	-8.2E-09	-9.0E-09	-9.0E-09	-12.0E-09	-12.0E-09	-5.9E-09	-18.1E-09
76	-9.7E-09	-11.3E-09	-7.5E-09	-1.4E-09	-3.6E-09	-2.1E-09	-9.0E-09	-589.6E-12
77	-15.1E-09	-5.9E-09	-6.7E-09	-2.1E-09	-15.8E-09	-2.9E-09	-14.3E-09	-589.6E-12
78	-15.8E-09	-19.7E-09	4.8E-09	-13.6E-09	-1.4E-09	-3.6E-09	-12.0E-09	-9.0E-09
79	4.8E-09	-5.9E-09	-14.3E-09	-6.7E-09	-589.6E-12	-4.4E-09	-3.6E-09	-9.7E-09
80	2.5E-09	-2.1E-09	-6.7E-09	-3.6E-09	-4.4E-09	2.5E-09	-7.5E-09	-12.0E-09
Statistics								
Min	-15.8E-09	-19.7E-09	-16.6E-09	-21.2E-09	-15.8E-09	-12.0E-09	-14.3E-09	-18.1E-09
Max	4.8E-09	3.2E-09	4.8E-09	6.3E-09	2.5E-09	2.5E-09	-589.6E-12	936.3E-12
Average	-7.1E-09	-7.7E-09	-8.4E-09	-6.5E-09	-5.7E-09	-3.4E-09	-7.8E-09	-7.2E-09
Std Deviation	7.2E-09	6.5E-09	5.8E-09	7.1E-09	5.3E-09	3.9E-09	4.5E-09	5.8E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Leakage Current High : ILOH_IO[6]
Test conditions : Vout=VCCmax. Vcc = 3.6V DQ are disabled
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

ILOH_IO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-14.3E-09	-9.0E-09	-4.4E-09	-6.7E-09	-12.0E-09	-15.8E-09	-9.0E-09	-9.0E-09
50_OUT_REF	-6.7E-09	-2.9E-09	-9.7E-09	-5.2E-09	-589.6E-12	-1.4E-09	-12.8E-09	-10.5E-09
ON_LDC samples								
51	-16.6E-09	-10.5E-09	-4.4E-09	-6.7E-09	-12.0E-09	-15.8E-09	-9.0E-09	-9.0E-09
52	-7.5E-09	-12.0E-09	-9.0E-09	-6.7E-09	-6.7E-09	-11.3E-09	-9.0E-09	-5.2E-09
53	-8.2E-09	-12.8E-09	-9.0E-09	-6.7E-09	-6.7E-09	-11.3E-09	-9.0E-09	-5.2E-09
54	-17.4E-09	-3.6E-09	-9.0E-09	-6.7E-09	-6.7E-09	-12.0E-09	-9.0E-09	-1.4E-09
55	-9.0E-09	-15.8E-09	-9.0E-09	-8.2E-09	-6.7E-09	-20.4E-09	-9.0E-09	-4.4E-09
56	-7.5E-09	-9.0E-09	-9.0E-09	1.7E-09	2.5E-09	-3.6E-09	-4.4E-09	-4.4E-09
57	-12.8E-09	-6.7E-09	-9.0E-09	-9.7E-09	2.5E-09	-3.6E-09	-4.4E-09	-4.4E-09
58	-9.7E-09	936.3E-12	-9.0E-09	-9.7E-09	2.5E-09	-3.6E-09	-4.4E-09	-4.4E-09
59	-9.7E-09	-16.6E-09	-9.0E-09	-14.3E-09	2.5E-09	-3.6E-09	-4.4E-09	-4.4E-09
60	-13.6E-09	-1.4E-09	-9.0E-09	-14.3E-09	2.5E-09	-8.2E-09	-4.4E-09	-15.8E-09
Statistics								
Min	-17.4E-09	-16.6E-09	-9.0E-09	-14.3E-09	-12.0E-09	-20.4E-09	-9.0E-09	-15.8E-09
Max	-7.5E-09	936.3E-12	-4.4E-09	1.7E-09	2.5E-09	-3.6E-09	-4.4E-09	-1.4E-09
Average	-11.2E-09	-8.8E-09	-8.5E-09	-8.1E-09	-2.6E-09	-9.4E-09	-6.7E-09	-5.9E-09
Std Deviation	3.5E-09	5.7E-09	1.4E-09	4.3E-09	5.3E-09	5.6E-09	2.3E-09	3.8E-09

Measurements

ILOH_IO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-14.3E-09	-9.0E-09	-4.4E-09	-6.7E-09	-12.0E-09	-15.8E-09	-9.0E-09	-9.0E-09
50_OUT_REF	-6.7E-09	-2.9E-09	-9.7E-09	-5.2E-09	-589.6E-12	-1.4E-09	-12.8E-09	-10.5E-09
ON_HDC samples								
61	-5.2E-09	-7.5E-09	-2.1E-09	-15.1E-09	-8.2E-09	-21.2E-09	-4.4E-09	1.7E-09
62	-14.3E-09	-2.9E-09	-9.7E-09	-15.1E-09	-14.3E-09	-10.5E-09	-4.4E-09	-13.6E-09
63	-18.1E-09	-10.5E-09	-2.9E-09	-15.1E-09	-14.3E-09	-10.5E-09	-4.4E-09	-13.6E-09
64	173.3E-12	1.7E-09	-2.9E-09	-15.1E-09	-5.9E-09	-10.5E-09	-4.4E-09	-13.6E-09
65	-5.2E-09	-9.7E-09	-2.9E-09	-15.1E-09	-5.9E-09	-10.5E-09	-4.4E-09	-13.6E-09
66	-12.0E-09	4.8E-09	-2.9E-09	-15.1E-09	-5.9E-09	-10.5E-09	-4.4E-09	-13.6E-09
67	2.5E-09	173.3E-12	-12.8E-09	-15.1E-09	-5.9E-09	-10.5E-09	-4.4E-09	-13.6E-09
68	-5.2E-09	-14.3E-09	-1.4E-09	-15.1E-09	-14.3E-09	-8.2E-09	-10.5E-09	-23.5E-09
69	-9.0E-09	-9.0E-09	-1.4E-09	-15.1E-09	-10.5E-09	-8.2E-09	-10.5E-09	-10.5E-09
70	-9.0E-09	-9.7E-09	-8.2E-09	-15.1E-09	-15.8E-09	-5.2E-09	-10.5E-09	4.0E-09
Statistics								
Min	-18.1E-09	-14.3E-09	-12.8E-09	-15.1E-09	-15.8E-09	-21.2E-09	-10.5E-09	-23.5E-09
Max	2.5E-09	4.8E-09	-1.4E-09	-15.1E-09	-5.9E-09	-5.2E-09	-4.4E-09	4.0E-09

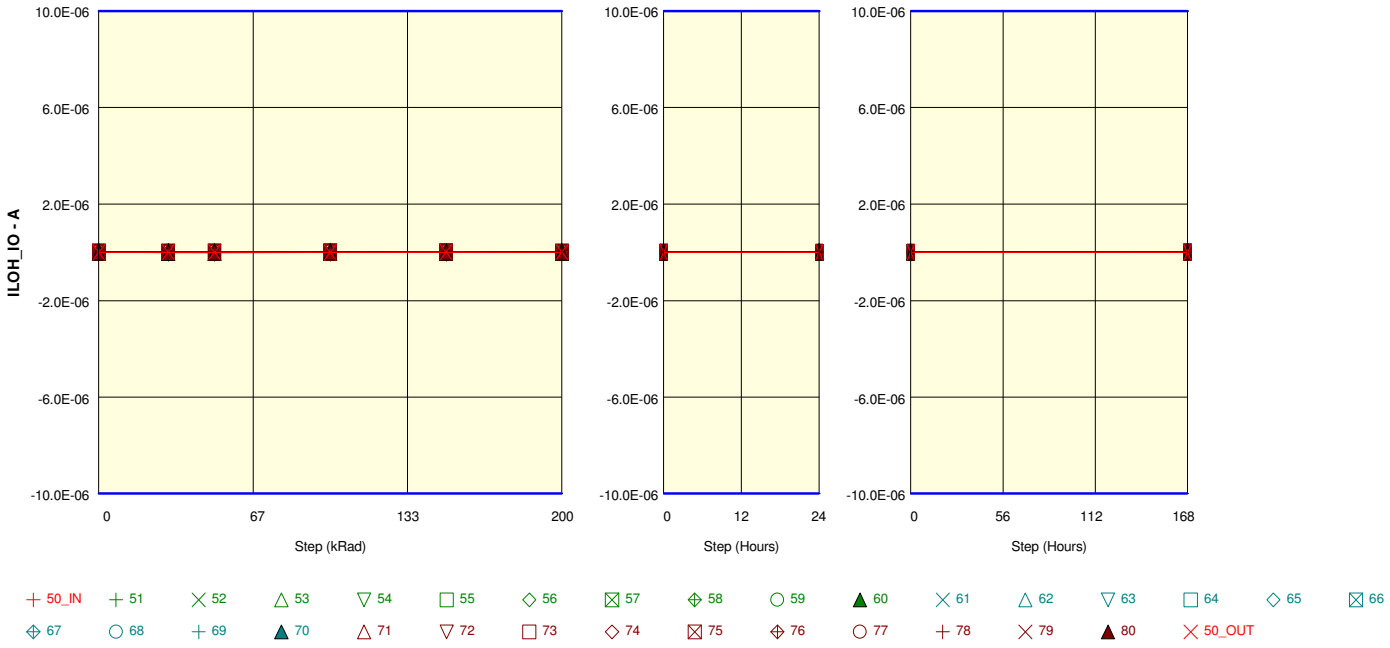
ILOH_IO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	-7.5E-09	-5.7E-09	-4.7E-09	-15.1E-09	-10.1E-09	-10.6E-09	-6.2E-09	-11.0E-09
Std Deviation	6.0E-09	5.9E-09	3.8E-09	358.0E-18	4.0E-09	3.9E-09	2.8E-09	7.6E-09

Measurements

ILOH_IO[6]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-14.3E-09	-9.0E-09	-4.4E-09	-6.7E-09	-12.0E-09	-15.8E-09	-9.0E-09	-9.0E-09
50_OUT_REF	-6.7E-09	-2.9E-09	-9.7E-09	-5.2E-09	-589.6E-12	-1.4E-09	-12.8E-09	-10.5E-09
OFF samples								
71	-18.1E-09	-10.5E-09	-12.0E-09	-6.7E-09	-10.5E-09	-5.9E-09	-12.0E-09	-12.8E-09
72	-14.3E-09	-10.5E-09	-9.0E-09	-11.3E-09	-9.0E-09	-6.7E-09	4.0E-09	-2.9E-09
73	-17.4E-09	-14.3E-09	-4.4E-09	-5.2E-09	-10.5E-09	-4.4E-09	-4.4E-09	-7.5E-09
74	2.5E-09	-13.6E-09	-589.6E-12	-8.2E-09	-2.9E-09	-12.8E-09	-10.5E-09	-11.3E-09
75	2.5E-09	-2.1E-09	1.7E-09	-7.5E-09	-5.2E-09	-2.9E-09	-9.7E-09	-4.4E-09
76	-18.9E-09	-10.5E-09	-5.2E-09	-19.7E-09	-9.0E-09	936.3E-12	-3.6E-09	-1.4E-09
77	-13.6E-09	-11.3E-09	-2.9E-09	-7.5E-09	1.7E-09	-5.9E-09	-7.5E-09	1.7E-09
78	-16.6E-09	-9.0E-09	-9.0E-09	-8.2E-09	-4.4E-09	-10.5E-09	-5.9E-09	-6.7E-09
79	-7.5E-09	-5.2E-09	-6.7E-09	173.3E-12	-12.0E-09	-13.6E-09	-9.7E-09	-15.8E-09
80	-15.8E-09	-589.6E-12	-5.9E-09	-13.6E-09	-15.1E-09	-2.1E-09	4.0E-09	-3.6E-09
Statistics								
Min	-18.9E-09	-14.3E-09	-12.0E-09	-19.7E-09	-15.1E-09	-13.6E-09	-12.0E-09	-15.8E-09
Max	2.5E-09	-589.6E-12	1.7E-09	173.3E-12	1.7E-09	936.3E-12	4.0E-09	1.7E-09
Average	-11.7E-09	-8.8E-09	-5.4E-09	-8.8E-09	-7.7E-09	-6.4E-09	-5.5E-09	-6.5E-09
Std Deviation	7.7E-09	4.4E-09	3.9E-09	5.0E-09	4.7E-09	4.5E-09	5.4E-09	5.2E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Output Leakage Current High : ILOH_IO[7]
Test conditions : Vout=VCCmax. Vcc = 3.6V DQ are disabled
Unit : A
Spec Limit Min : -10.0E-06
Spec Limit Max : 10.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

ILOH_IO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	9.3E-09	-5.9E-09	-2.9E-09	5.5E-09	6.3E-09	-1.4E-09	-3.6E-09	-3.6E-09
50_OUT_REF	-1.4E-09	2.5E-09	1.7E-09	-5.2E-09	4.8E-09	4.0E-09	173.3E-12	-1.4E-09
ON_LDC samples								
51	5.5E-09	4.8E-09	-2.9E-09	5.5E-09	6.3E-09	-1.4E-09	-3.6E-09	-3.6E-09
52	7.0E-09	-6.7E-09	-4.4E-09	5.5E-09	3.2E-09	-4.4E-09	-3.6E-09	-4.4E-09
53	1.7E-09	9.3E-09	-4.4E-09	5.5E-09	3.2E-09	-4.4E-09	-3.6E-09	-4.4E-09
54	173.3E-12	-8.2E-09	-4.4E-09	5.5E-09	3.2E-09	-4.4E-09	-3.6E-09	-3.6E-09
55	9.3E-09	-7.5E-09	-4.4E-09	4.0E-09	3.2E-09	1.7E-09	-3.6E-09	4.8E-09
56	-5.9E-09	173.3E-12	-4.4E-09	173.3E-12	11.6E-09	1.7E-09	173.3E-12	4.8E-09
57	8.6E-09	-9.7E-09	-4.4E-09	-9.0E-09	11.6E-09	1.7E-09	173.3E-12	4.8E-09
58	8.6E-09	2.5E-09	-4.4E-09	-9.0E-09	11.6E-09	1.7E-09	173.3E-12	4.8E-09
59	-1.4E-09	-2.9E-09	8.6E-09	5.5E-09	11.6E-09	1.7E-09	173.3E-12	4.8E-09
60	10.9E-09	-6.7E-09	8.6E-09	5.5E-09	11.6E-09	-2.1E-09	173.3E-12	-2.9E-09
Statistics								
Min	-5.9E-09	-9.7E-09	-4.4E-09	-9.0E-09	3.2E-09	-4.4E-09	-3.6E-09	-4.4E-09
Max	10.9E-09	9.3E-09	8.6E-09	5.5E-09	11.6E-09	1.7E-09	173.3E-12	4.8E-09
Average	4.4E-09	-2.5E-09	-1.7E-09	1.9E-09	7.7E-09	-818.5E-12	-1.7E-09	478.5E-12
Std Deviation	5.2E-09	6.1E-09	5.1E-09	5.7E-09	4.0E-09	2.7E-09	1.9E-09	4.3E-09

Measurements

ILOH_IO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	9.3E-09	-5.9E-09	-2.9E-09	5.5E-09	6.3E-09	-1.4E-09	-3.6E-09	-3.6E-09
50_OUT_REF	-1.4E-09	2.5E-09	1.7E-09	-5.2E-09	4.8E-09	4.0E-09	173.3E-12	-1.4E-09
ON_HDC samples								
61	9.3E-09	936.3E-12	-1.4E-09	-8.2E-09	6.3E-09	3.2E-09	173.3E-12	10.9E-09
62	-3.6E-09	10.1E-09	173.3E-12	-8.2E-09	-4.4E-09	1.7E-09	173.3E-12	8.6E-09
63	6.3E-09	1.7E-09	13.9E-09	-8.2E-09	-4.4E-09	1.7E-09	173.3E-12	8.6E-09
64	-7.5E-09	-5.2E-09	13.9E-09	-8.2E-09	7.0E-09	1.7E-09	173.3E-12	8.6E-09
65	-2.1E-09	173.3E-12	13.9E-09	-8.2E-09	-3.6E-09	1.7E-09	173.3E-12	8.6E-09
66	-7.5E-09	-7.5E-09	13.9E-09	-8.2E-09	-3.6E-09	1.7E-09	173.3E-12	8.6E-09
67	5.5E-09	-6.7E-09	2.5E-09	-8.2E-09	-3.6E-09	1.7E-09	173.3E-12	8.6E-09
68	7.0E-09	-2.1E-09	1.7E-09	-8.2E-09	14.7E-09	-1.4E-09	4.0E-09	7.8E-09
69	-7.5E-09	-589.6E-12	1.7E-09	-8.2E-09	173.3E-12	-2.1E-09	4.0E-09	5.5E-09
70	9.3E-09	-13.6E-09	-589.6E-12	-8.2E-09	7.0E-09	3.2E-09	4.0E-09	-589.6E-12
Statistics								
Min	-7.5E-09	-13.6E-09	-1.4E-09	-8.2E-09	-4.4E-09	-2.1E-09	173.3E-12	-589.6E-12
Max	9.3E-09	10.1E-09	13.9E-09	-8.2E-09	14.7E-09	3.2E-09	4.0E-09	10.9E-09

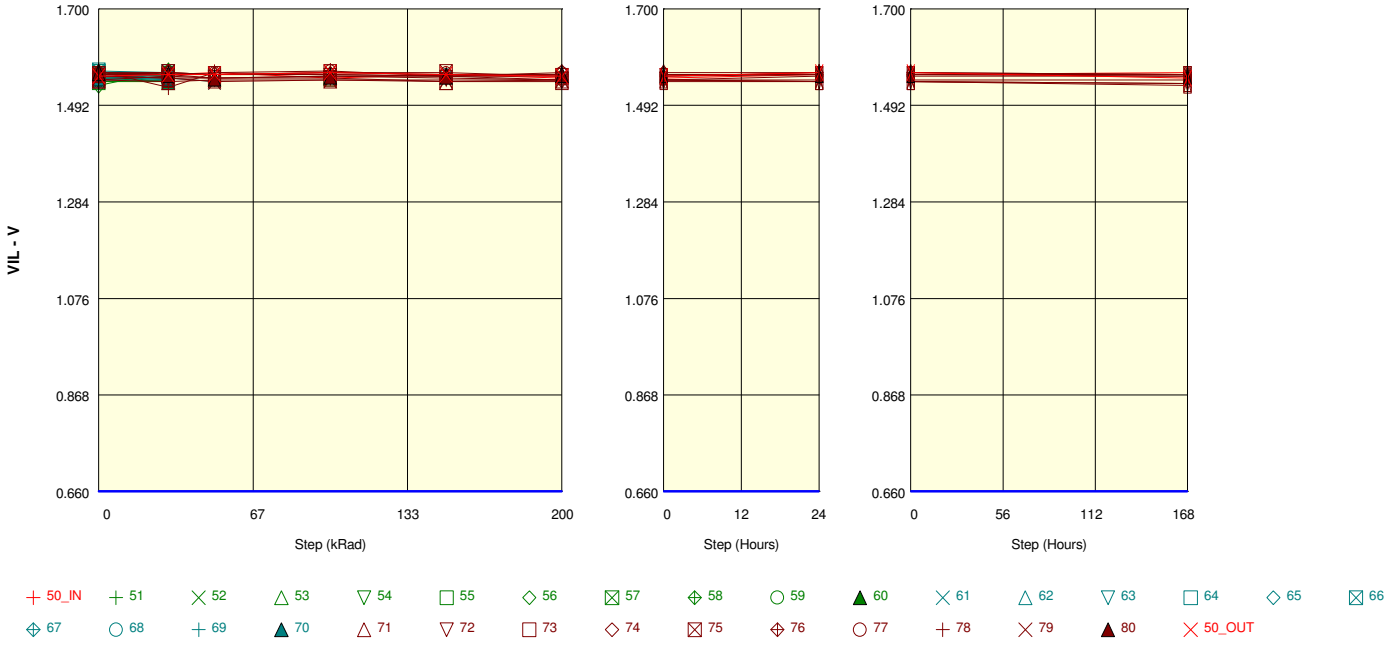
ILOH_IO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
Average	936.3E-12	-2.3E-09	6.0E-09	-8.2E-09	1.5E-09	1.3E-09	1.3E-09	7.5E-09
Std Deviation	6.8E-09	6.1E-09	6.6E-09	86.0E-18	6.4E-09	1.6E-09	1.7E-09	3.0E-09

Measurements

ILOH_IO[7]	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	9.3E-09	-5.9E-09	-2.9E-09	5.5E-09	6.3E-09	-1.4E-09	-3.6E-09	-3.6E-09
50_OUT_REF	-1.4E-09	2.5E-09	1.7E-09	-5.2E-09	4.8E-09	4.0E-09	173.3E-12	-1.4E-09
OFF samples								
71	-4.4E-09	4.8E-09	1.7E-09	7.8E-09	-589.6E-12	2.5E-09	10.9E-09	-2.9E-09
72	2.5E-09	-3.6E-09	-2.1E-09	4.8E-09	-3.6E-09	14.7E-09	-2.1E-09	-589.6E-12
73	-8.2E-09	-2.1E-09	-14.3E-09	-2.9E-09	4.0E-09	-8.2E-09	2.5E-09	4.0E-09
74	7.8E-09	-589.6E-12	-589.6E-12	-10.5E-09	-4.4E-09	11.6E-09	12.4E-09	-4.4E-09
75	-8.2E-09	5.5E-09	-2.9E-09	5.5E-09	7.8E-09	-7.5E-09	-1.4E-09	-1.4E-09
76	5.5E-09	7.0E-09	-2.9E-09	936.3E-12	2.5E-09	-3.6E-09	6.3E-09	6.3E-09
77	5.5E-09	5.5E-09	-2.9E-09	4.8E-09	-4.4E-09	-2.1E-09	-7.5E-09	4.8E-09
78	7.8E-09	-3.6E-09	12.4E-09	11.6E-09	-589.6E-12	6.3E-09	6.3E-09	12.4E-09
79	-589.6E-12	7.8E-09	8.6E-09	-9.7E-09	173.3E-12	5.5E-09	-4.4E-09	-5.9E-09
80	4.8E-09	-5.9E-09	173.3E-12	8.6E-09	936.3E-12	5.5E-09	-589.6E-12	12.4E-09
Statistics								
Min	-8.2E-09	-5.9E-09	-14.3E-09	-10.5E-09	-4.4E-09	-8.2E-09	-7.5E-09	-5.9E-09
Max	7.8E-09	7.8E-09	12.4E-09	11.6E-09	7.8E-09	14.7E-09	12.4E-09	12.4E-09
Average	1.2E-09	1.5E-09	-284.5E-12	2.1E-09	173.3E-12	2.5E-09	2.2E-09	2.5E-09
Std Deviation	5.9E-09	4.9E-09	6.8E-09	7.2E-09	3.7E-09	7.3E-09	6.2E-09	6.2E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Low Voltage : VILCONTROL
Test conditions : Vcc = 3.3V
Unit : V
Spec Limit Min : 0.660
Spec limits are represented in bold lines on the graphic.



Measurements

VILCONTROL	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	1.551	1.559	1.563	1.551	1.559	1.551	1.559	1.563
50_OUT_REF	1.555	1.559	1.559	1.563	1.559	1.555	1.563	1.551
ON_LDC samples								
51	1.555	1.551						
52	1.563	1.555						
53	1.543	1.547						
54	1.543	1.543						
55	1.563	1.559						
56	1.535	1.566						
57	1.559	1.559		1.551				
58	1.563	1.563						
59	1.551	1.543						
60	1.555	1.543						
Statistics								
Min	1.535	1.543	-	1.551	-	-	-	-
Max	1.563	1.566	-	1.551	-	-	-	-
Average	1.553	1.553	-	1.551	-	-	-	-
Std Deviation	0.009	0.008	-	0.000	-	-	-	-

Measurements

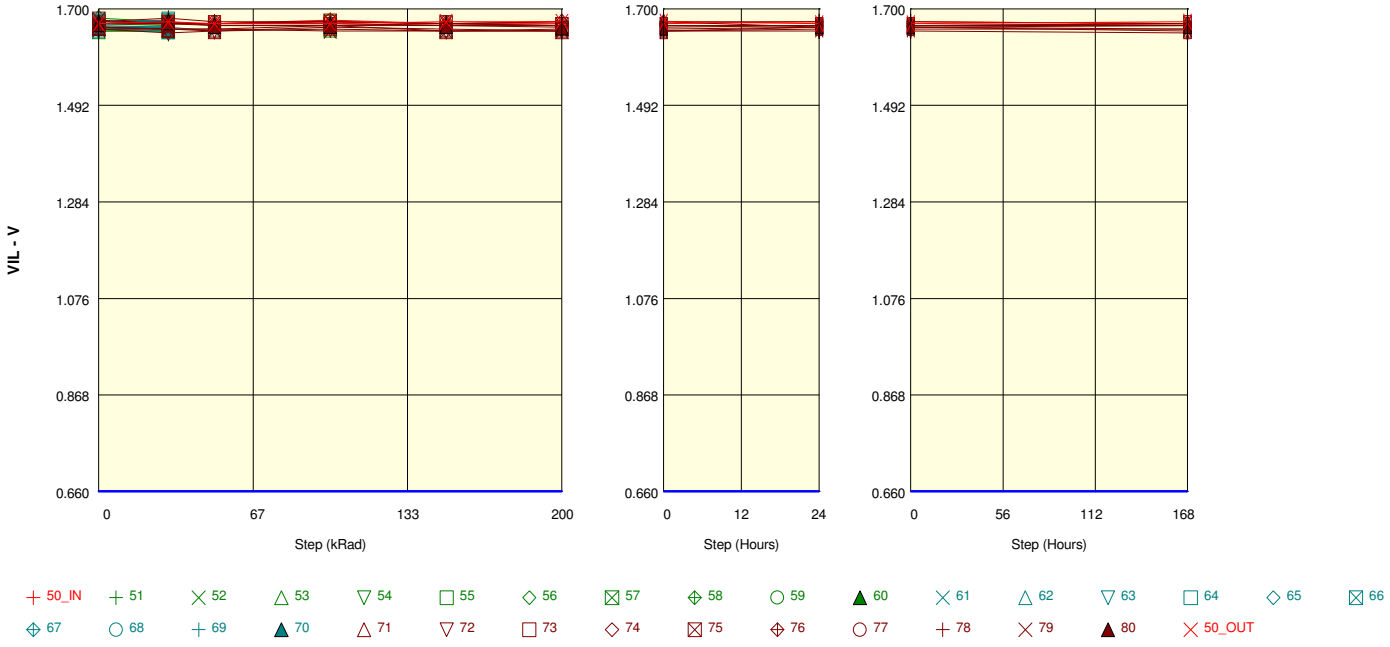
VILCONTROL	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	1.551	1.559	1.563	1.551	1.559	1.551	1.559	1.563
50_OUT_REF	1.555	1.559	1.559	1.563	1.559	1.555	1.563	1.551
ON_HDC samples								
61	1.551	1.551	1.543					
62	1.547	1.547						
63	1.563	1.563						
64	1.559	1.555						
65	1.563	1.563						
66	1.566	1.563						
67	1.559	1.551						
68	1.547	1.555			1.555			
69	1.555	1.547						
70	1.551	1.551						
Statistics								
Min	1.547	1.547	1.543	-	1.555	-	-	-
Max	1.566	1.563	1.543	-	1.555	-	-	-
Average	1.556	1.554	1.543	-	1.555	-	-	-
Std Deviation	0.007	0.006	0.000	-	0.000	-	-	-

Measurements

VILCONTROL	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	1.551	1.559	1.563	1.551	1.559	1.551	1.559	1.563
50_OUT_REF	1.555	1.559	1.559	1.563	1.559	1.555	1.563	1.551
OFF samples								
71	1.547	1.543	1.547	1.547	1.543	1.547	1.543	1.535
72	1.555	1.551	1.551	1.555	1.551	1.547	1.543	1.539
73	1.547	1.555	1.551	1.551	1.543	1.543	1.543	1.539
74	1.559	1.563	1.559	1.559	1.555	1.547	1.555	1.555
75	1.559	1.563	1.559	1.563	1.563	1.555	1.559	1.559
76	1.563	1.563	1.559	1.559	1.555	1.563	1.563	1.559
77	1.559	1.559	1.559	1.563	1.559	1.559	1.559	1.559
78	1.566	1.531	1.563	1.566	1.555	1.555	1.563	1.559
79	1.555	1.551	1.543	1.547	1.547	1.547	1.547	1.547
80	1.563	1.559	1.551	1.555	1.555	1.559	1.559	1.555
Statistics								
Min	1.547	1.531	1.543	1.547	1.543	1.543	1.543	1.535
Max	1.566	1.563	1.563	1.566	1.563	1.563	1.563	1.559
Average	1.557	1.554	1.554	1.556	1.552	1.552	1.553	1.550
Std Deviation	0.006	0.010	0.006	0.006	0.006	0.006	0.008	0.009

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input Low Voltage : VILIO
Test conditions : Vcc = 3.3V
Unit : V
Spec Limit Min : 0.660
Spec limits are represented in bold lines on the graphic.



Measurements

VILIO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	1.668	1.668	1.668	1.676	1.668	1.668	1.672	1.668
50_OUT_REF	1.668	1.672	1.668	1.668	1.672	1.672	1.668	1.672
ON_LDC samples								
51	1.660	1.656						
52	1.660	1.656						
53	1.652	1.652						
54	1.652	1.652						
55	1.668	1.672		1.668				
56	1.680	1.672						
57	1.668	1.664		1.656				
58	1.668	1.672						
59	1.660	1.660						
60	1.660	1.660						
Statistics								
Min	1.652	1.652	-	1.656	-	-	-	-
Max	1.680	1.672	-	1.668	-	-	-	-
Average	1.663	1.662	-	1.662	-	-	-	-
Std Deviation	0.008	0.007	-	0.006	-	-	-	-

Measurements

VILIO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	1.668	1.668	1.668	1.676	1.668	1.668	1.672	1.668
50_OUT_REF	1.668	1.672	1.668	1.668	1.672	1.672	1.668	1.672
ON_HDC samples								
61	1.656	1.660	1.652					
62	1.656	1.652						
63	1.668	1.668						
64	1.672	1.676						
65	1.668	1.676						
66	1.672	1.672						
67	1.660	1.660						
68	1.664	1.660			1.656			
69	1.656	1.656						
70	1.660	1.656						
Statistics								
Min	1.656	1.652	1.652	-	1.656	-	-	-
Max	1.672	1.676	1.652	-	1.656	-	-	-
Average	1.663	1.664	1.652	-	1.656	-	-	-
Std Deviation	0.006	0.008	0.000	-	0.000	-	-	-

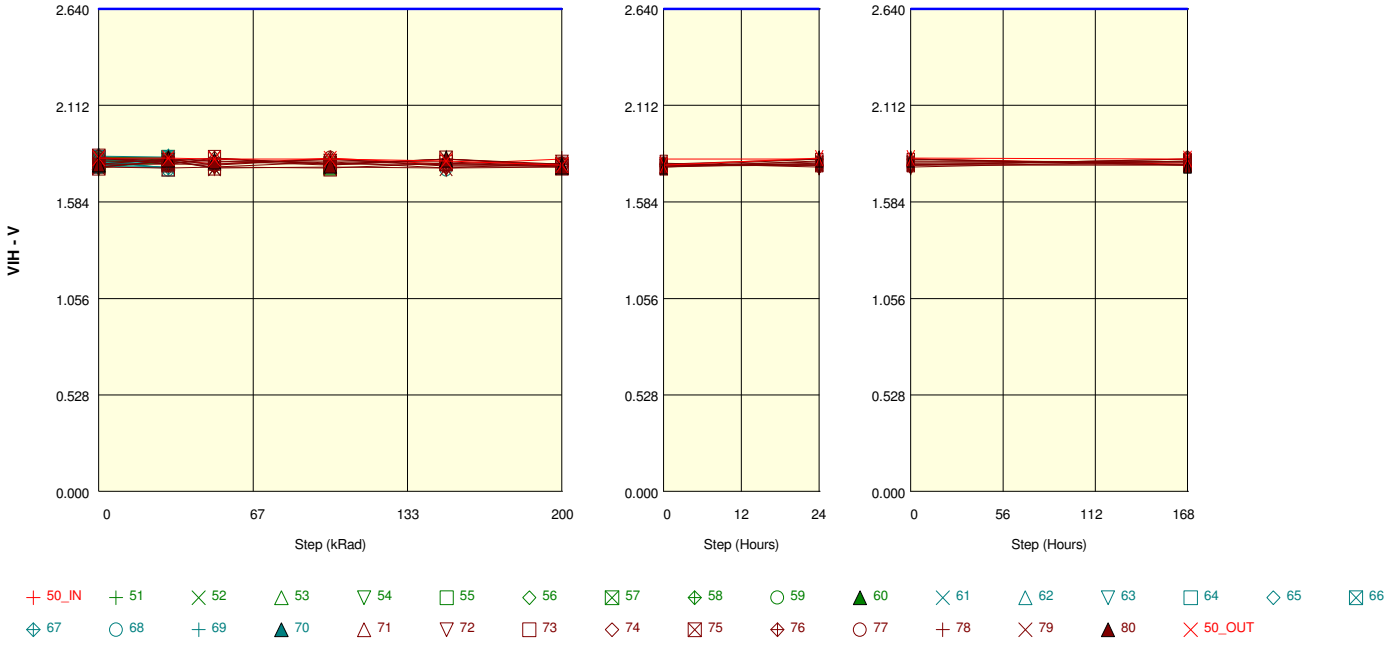
Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Measurements

VILIO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	1.668	1.668	1.668	1.676	1.668	1.668	1.672	1.668
50_OUT_REF	1.668	1.672	1.668	1.668	1.672	1.672	1.668	1.672
OFF samples								
71	1.660	1.656	1.652	1.660	1.656	1.652	1.660	1.656
72	1.656	1.648	1.652	1.656	1.652	1.652	1.652	1.648
73	1.660	1.656	1.656	1.664	1.652	1.656	1.660	1.652
74	1.668	1.668	1.664	1.664	1.668	1.672	1.660	1.664
75	1.676	1.668	1.668	1.672	1.668	1.664	1.664	1.668
76	1.668	1.668	1.668	1.668	1.664	1.664	1.664	1.668
77	1.668	1.668	1.668	1.672	1.668	1.664	1.664	1.664
78	1.672	1.680	1.672	1.672	1.668	1.672	1.672	1.668
79	1.656	1.656	1.656	1.652	1.652	1.652	1.656	1.656
80	1.668	1.672	1.664	1.664	1.664	1.660	1.664	1.664
Statistics								
Min	1.656	1.648	1.652	1.652	1.652	1.652	1.652	1.648
Max	1.676	1.680	1.672	1.672	1.668	1.672	1.672	1.668
Average	1.665	1.664	1.662	1.664	1.661	1.661	1.662	1.661
Std Deviation	0.006	0.009	0.007	0.006	0.007	0.007	0.005	0.007

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input High Voltage : VIHCONTROL
Test conditions : Vcc = 3.3V
Unit : V
Spec Limit Max : 2.640
Spec limits are represented in bold lines on the graphic.



Measurements

VIHCONTROL	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	1.823	1.818	1.791	1.823	1.791	1.818	1.818	1.791
50_OUT_REF	1.823	1.823	1.818	1.818	1.807	1.785	1.823	1.818
ON_LDC samples								
51	1.785	1.796						
52	1.818	1.807						
53	1.807	1.802						
54	1.769	1.807						
55	1.791	1.823		1.780				
56	1.829	1.823						
57	1.791	1.818		1.774				
58	1.829	1.823						
59	1.807	1.802						
60	1.807	1.807						
Statistics								
Min	1.769	1.796	-	1.774	-	-	-	-
Max	1.829	1.823	-	1.780	-	-	-	-
Average	1.803	1.811	-	1.777	-	-	-	-
Std Deviation	0.018	0.010	-	0.003	-	-	-	-

Measurements

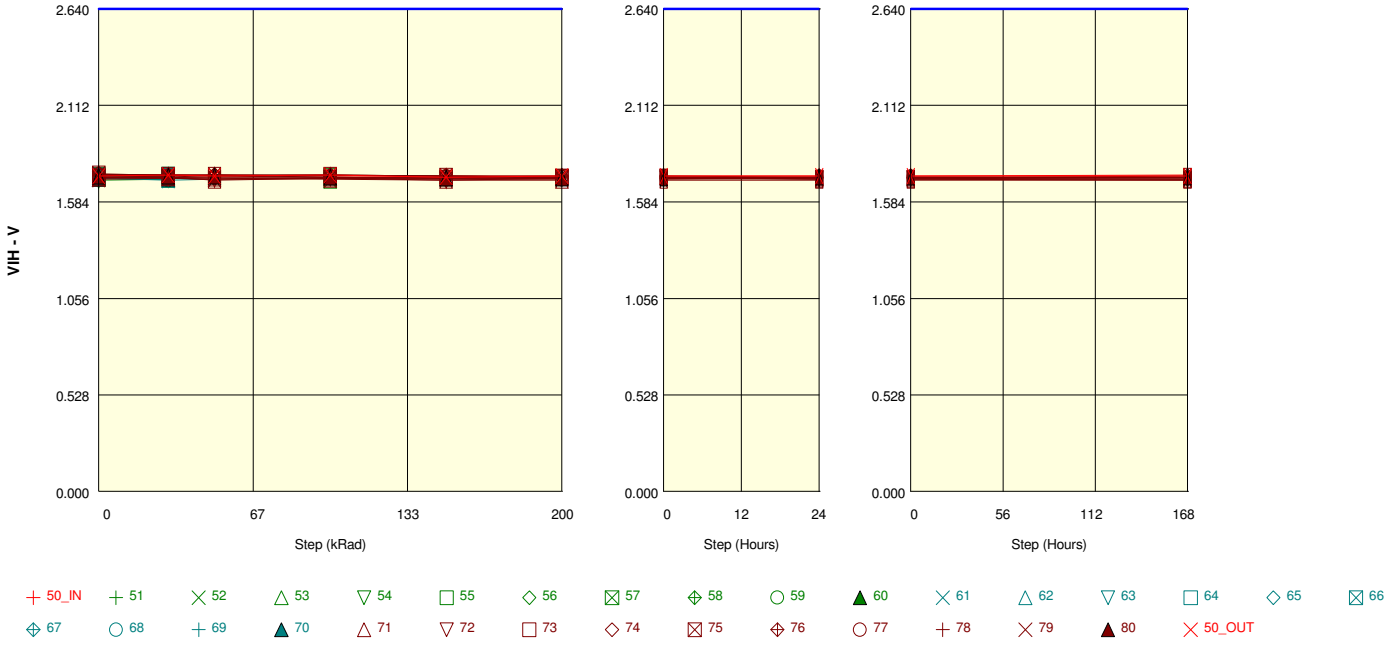
VIHCONTROL	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	1.823	1.818	1.791	1.823	1.791	1.818	1.818	1.791
50_OUT_REF	1.823	1.823	1.818	1.818	1.807	1.785	1.823	1.818
ON_HDC samples								
61	1.807	1.813	1.769					
62	1.807	1.769						
63	1.785	1.818						
64	1.818	1.823						
65	1.834	1.829						
66	1.823	1.791						
67	1.785	1.774						
68	1.802	1.769			1.769			
69	1.780	1.769						
70	1.785	1.807						
Statistics								
Min	1.780	1.769	1.769	-	1.769	-	-	-
Max	1.834	1.829	1.769	-	1.769	-	-	-
Average	1.803	1.796	1.769	-	1.769	-	-	-
Std Deviation	0.018	0.023	0.000	-	0.000	-	-	-

Measurements

VIHCONTROL	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	1.823	1.818	1.791	1.823	1.791	1.818	1.818	1.791
50_OUT_REF	1.823	1.823	1.818	1.818	1.807	1.785	1.823	1.818
OFF samples								
71	1.807	1.802	1.802	1.807	1.802	1.780	1.802	1.802
72	1.774	1.807	1.774	1.802	1.769	1.796	1.774	1.807
73	1.774	1.769	1.774	1.769	1.796	1.774	1.807	1.802
74	1.818	1.818	1.785	1.818	1.780	1.780	1.785	1.785
75	1.829	1.791	1.823	1.791	1.818	1.785	1.791	1.791
76	1.791	1.791	1.818	1.791	1.791	1.791	1.785	1.818
77	1.823	1.791	1.791	1.818	1.785	1.785	1.785	1.818
78	1.823	1.807	1.823	1.791	1.818	1.791	1.818	1.785
79	1.774	1.807	1.769	1.774	1.769	1.774	1.796	1.802
80	1.791	1.818	1.807	1.785	1.818	1.780	1.818	1.785
Statistics								
Min	1.774	1.769	1.769	1.769	1.769	1.774	1.774	1.785
Max	1.829	1.818	1.823	1.818	1.818	1.796	1.818	1.818
Average	1.800	1.800	1.797	1.794	1.794	1.784	1.796	1.799
Std Deviation	0.021	0.014	0.020	0.016	0.018	0.007	0.014	0.012

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Input High Voltage : VIHIO
Test conditions : Vcc = 3.3V
Unit : V
Spec Limit Max : 2.640
Spec limits are represented in bold lines on the graphic.



Measurements

VIHIO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	1.720	1.731	1.731	1.725	1.725	1.725	1.725	1.731
50_OUT_REF	1.725	1.731	1.725	1.731	1.720	1.725	1.725	1.725
ON_LDC samples								
51	1.714	1.714						
52	1.720	1.714						
53	1.714	1.709						
54	1.703	1.709						
55	1.731	1.731		1.725				
56	1.725	1.725						
57	1.725	1.725		1.703				
58	1.725	1.731						
59	1.714	1.709						
60	1.714	1.714						
Statistics								
Min	1.703	1.709	-	1.703	-	-	-	-
Max	1.731	1.731	-	1.725	-	-	-	-
Average	1.718	1.718	-	1.714	-	-	-	-
Std Deviation	0.008	0.008	-	0.011	-	-	-	-

Measurements

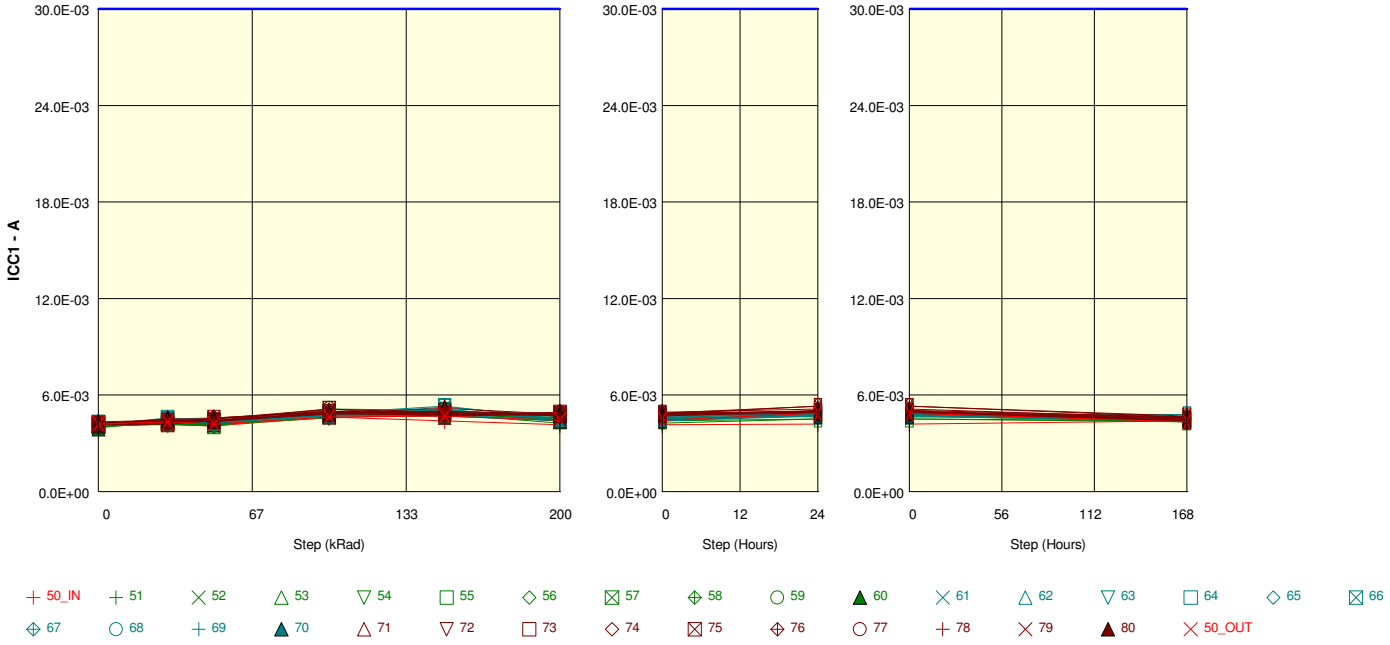
VIHIO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	1.720	1.731	1.731	1.725	1.725	1.725	1.725	1.731
50_OUT_REF	1.725	1.731	1.725	1.731	1.720	1.725	1.725	1.725
ON_HDC samples								
61	1.714	1.703	1.709					
62	1.714	1.709						
63	1.725	1.725						
64	1.725	1.731						
65	1.731	1.725						
66	1.725	1.731						
67	1.720	1.720						
68	1.720	1.714			1.714			
69	1.720	1.709						
70	1.714	1.714						
Statistics								
Min	1.714	1.703	1.709	-	1.714	-	-	-
Max	1.731	1.731	1.709	-	1.714	-	-	-
Average	1.721	1.718	1.709	-	1.714	-	-	-
Std Deviation	0.005	0.009	0.000	-	0.000	-	-	-

Measurements

VIHIO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	1.720	1.731	1.731	1.725	1.725	1.725	1.725	1.731
50_OUT_REF	1.725	1.731	1.725	1.731	1.720	1.725	1.725	1.725
OFF samples								
71	1.714	1.720	1.714	1.709	1.703	1.703	1.703	1.703
72	1.720	1.714	1.709	1.714	1.703	1.714	1.709	1.703
73	1.720	1.720	1.703	1.714	1.714	1.720	1.709	1.709
74	1.720	1.720	1.731	1.720	1.714	1.714	1.714	1.714
75	1.736	1.731	1.731	1.731	1.725	1.720	1.714	1.725
76	1.736	1.731	1.731	1.731	1.725	1.725	1.720	1.720
77	1.731	1.720	1.720	1.720	1.720	1.714	1.720	1.720
78	1.731	1.731	1.725	1.731	1.725	1.720	1.720	1.720
79	1.709	1.714	1.709	1.714	1.709	1.709	1.714	1.709
80	1.725	1.725	1.725	1.720	1.714	1.714	1.720	1.720
Statistics								
Min	1.709	1.714	1.703	1.709	1.703	1.703	1.703	1.703
Max	1.736	1.731	1.731	1.731	1.725	1.725	1.720	1.725
Average	1.724	1.722	1.720	1.720	1.715	1.715	1.714	1.714
Std Deviation	0.009	0.006	0.010	0.008	0.008	0.006	0.005	0.007

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Operating Current. Page Read : ICC1
Test conditions : trc=25ns CE/=Vil. Iout=0mA
Unit : A
Spec Limit Max : 30.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

ICC1	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	4.2E-03	4.2E-03	4.1E-03	4.6E-03	4.4E-03	4.2E-03	4.2E-03	4.4E-03
50_OUT_REF	4.2E-03	4.3E-03	4.2E-03	4.6E-03	4.7E-03	4.5E-03	4.9E-03	4.3E-03
ON_LDC samples								
51	4.1E-03	4.2E-03	4.2E-03	4.6E-03	4.8E-03	4.3E-03	4.5E-03	4.4E-03
52	4.2E-03	4.2E-03	4.2E-03	4.8E-03	5.0E-03	4.5E-03	4.8E-03	4.4E-03
53	4.2E-03	4.4E-03	4.3E-03	4.8E-03	4.9E-03	4.5E-03	4.8E-03	4.6E-03
54	4.2E-03	4.5E-03	4.2E-03	4.8E-03	4.9E-03	4.6E-03	4.9E-03	4.4E-03
55	4.2E-03	4.3E-03	4.1E-03	5.1E-03	5.1E-03	4.4E-03	4.5E-03	4.3E-03
56	4.2E-03	4.3E-03	4.2E-03	4.8E-03	4.9E-03	4.5E-03	4.9E-03	4.5E-03
57	4.2E-03	4.3E-03	4.2E-03	4.8E-03	4.9E-03	4.5E-03	4.8E-03	4.5E-03
58	4.1E-03	4.2E-03	4.1E-03	4.9E-03	4.9E-03	4.5E-03	4.8E-03	4.6E-03
59	4.0E-03	4.3E-03	4.3E-03	4.8E-03	5.0E-03	4.5E-03	4.7E-03	4.3E-03
60	4.0E-03	4.4E-03	4.2E-03	4.8E-03	4.7E-03	4.5E-03	4.8E-03	4.5E-03
Statistics								
Min	4.0E-03	4.2E-03	4.1E-03	4.6E-03	4.7E-03	4.3E-03	4.5E-03	4.3E-03
Max	4.2E-03	4.5E-03	4.3E-03	5.1E-03	5.1E-03	4.6E-03	4.9E-03	4.6E-03
Average	4.1E-03	4.3E-03	4.2E-03	4.8E-03	4.9E-03	4.5E-03	4.7E-03	4.4E-03
Std Deviation	73.5E-06	82.8E-06	72.5E-06	135.0E-06	99.2E-06	79.3E-06	131.0E-06	82.1E-06

Measurements

ICC1	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	4.2E-03	4.2E-03	4.1E-03	4.6E-03	4.4E-03	4.2E-03	4.2E-03	4.4E-03
50_OUT_REF	4.2E-03	4.3E-03	4.2E-03	4.6E-03	4.7E-03	4.5E-03	4.9E-03	4.3E-03
ON_HDC samples								
61	4.2E-03	4.5E-03	4.3E-03	4.8E-03	4.8E-03	4.8E-03	4.6E-03	4.6E-03
62	4.2E-03	4.3E-03	4.4E-03	5.0E-03	5.0E-03	4.6E-03	4.7E-03	4.5E-03
63	4.2E-03	4.5E-03	4.2E-03	4.9E-03	4.9E-03	4.6E-03	4.7E-03	4.4E-03
64	4.3E-03	4.4E-03	4.3E-03	4.9E-03	5.3E-03	4.5E-03	4.8E-03	4.8E-03
65	4.1E-03	4.5E-03	4.3E-03	4.7E-03	4.8E-03	4.4E-03	4.9E-03	4.6E-03
66	4.2E-03	4.6E-03	4.3E-03	4.8E-03	5.2E-03	4.6E-03	4.8E-03	4.5E-03
67	4.1E-03	4.5E-03	4.3E-03	4.7E-03	4.7E-03	4.4E-03	4.7E-03	4.5E-03
68	4.2E-03	4.5E-03	4.3E-03	4.9E-03	5.1E-03	4.7E-03	4.9E-03	4.5E-03
69	4.2E-03	4.5E-03	4.4E-03	4.8E-03	5.1E-03	4.7E-03	4.8E-03	4.5E-03
70	4.2E-03	4.5E-03	4.6E-03	4.7E-03	5.1E-03	4.5E-03	4.8E-03	4.6E-03
Statistics								
Min	4.1E-03	4.3E-03	4.2E-03	4.7E-03	4.7E-03	4.4E-03	4.6E-03	4.4E-03
Max	4.3E-03	4.6E-03	4.6E-03	5.0E-03	5.3E-03	4.8E-03	4.9E-03	4.8E-03
Average	4.2E-03	4.5E-03	4.4E-03	4.8E-03	5.0E-03	4.6E-03	4.8E-03	4.6E-03
Std Deviation	53.2E-06	68.2E-06	90.7E-06	98.6E-06	193.9E-06	133.7E-06	90.7E-06	103.1E-06

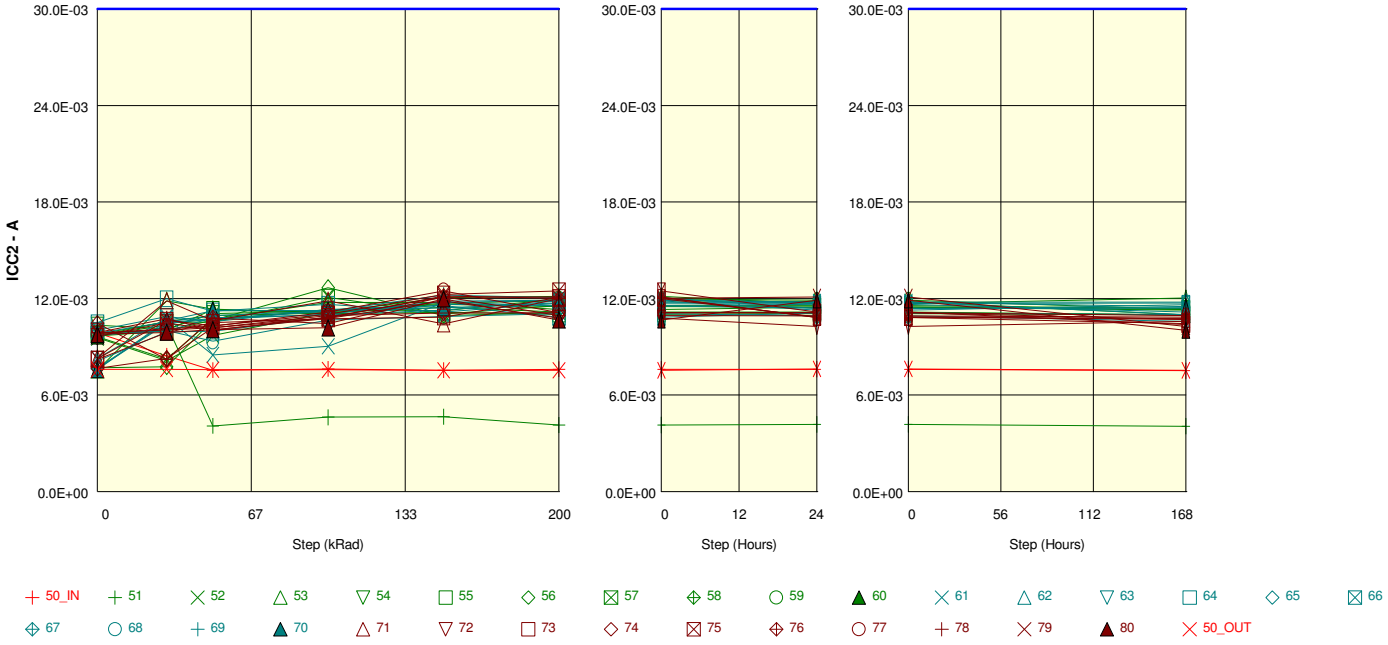
Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Measurements

ICC1	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	4.2E-03	4.2E-03	4.1E-03	4.6E-03	4.4E-03	4.2E-03	4.2E-03	4.4E-03
50_OUT_REF	4.2E-03	4.3E-03	4.2E-03	4.6E-03	4.7E-03	4.5E-03	4.9E-03	4.3E-03
OFF samples								
71	4.3E-03	4.4E-03	4.4E-03	4.9E-03	4.7E-03	4.8E-03	4.9E-03	4.4E-03
72	4.2E-03	4.4E-03	4.4E-03	5.1E-03	4.7E-03	4.9E-03	5.0E-03	4.5E-03
73	4.2E-03	4.2E-03	4.4E-03	4.8E-03	4.8E-03	4.8E-03	4.9E-03	4.4E-03
74	4.2E-03	4.5E-03	4.5E-03	5.0E-03	4.8E-03	4.9E-03	5.0E-03	4.5E-03
75	4.2E-03	4.3E-03	4.6E-03	4.9E-03	5.0E-03	4.8E-03	5.3E-03	4.7E-03
76	4.3E-03	4.3E-03	4.6E-03	5.0E-03	4.8E-03	4.9E-03	5.1E-03	4.6E-03
77	4.2E-03	4.3E-03	4.5E-03	5.1E-03	4.9E-03	4.9E-03	5.3E-03	4.6E-03
78	4.3E-03	4.5E-03	4.3E-03	4.9E-03	4.9E-03	4.7E-03	5.1E-03	4.6E-03
79	4.2E-03	4.4E-03	4.5E-03	4.9E-03	4.8E-03	4.8E-03	5.0E-03	4.6E-03
80	4.2E-03	4.5E-03	4.5E-03	4.9E-03	5.2E-03	4.8E-03	4.9E-03	4.5E-03
Statistics								
Min	4.2E-03	4.2E-03	4.3E-03	4.8E-03	4.7E-03	4.7E-03	4.9E-03	4.4E-03
Max	4.3E-03	4.5E-03	4.6E-03	5.1E-03	5.2E-03	4.9E-03	5.3E-03	4.7E-03
Average	4.2E-03	4.4E-03	4.5E-03	5.0E-03	4.9E-03	4.8E-03	5.1E-03	4.5E-03
Std Deviation	47.7E-06	86.5E-06	79.3E-06	98.6E-06	142.0E-06	65.7E-06	140.4E-06	99.2E-06

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Operating Current. Program : ICC2
Test conditions :
Unit : A
Spec Limit Max : 30.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

ICC2	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	9.9E-03	8.4E-03	7.6E-03	7.6E-03	7.6E-03	7.6E-03	7.6E-03	7.5E-03
50_OUT_REF	7.6E-03	7.6E-03	7.6E-03	7.6E-03	7.5E-03	7.5E-03	7.6E-03	7.5E-03
ON_LDC samples								
51	9.7E-03	10.4E-03	4.1E-03	4.6E-03	4.7E-03	4.1E-03	4.2E-03	4.1E-03
52	9.6E-03	8.1E-03	9.7E-03	11.1E-03	11.5E-03	11.2E-03	11.2E-03	11.0E-03
53	7.6E-03	11.9E-03	11.3E-03	11.1E-03	12.1E-03	12.1E-03	11.7E-03	12.0E-03
54	10.3E-03	10.1E-03	11.1E-03	11.2E-03	11.6E-03	11.5E-03	11.5E-03	11.3E-03
55	9.8E-03	10.0E-03	11.3E-03	11.1E-03	11.1E-03	11.0E-03	11.1E-03	11.0E-03
56	7.7E-03	7.8E-03	10.6E-03	12.7E-03	11.0E-03	11.1E-03	11.1E-03	11.0E-03
57	9.8E-03	10.5E-03	10.5E-03	12.1E-03	11.0E-03	11.6E-03	11.6E-03	11.4E-03
58	9.6E-03	8.2E-03	10.7E-03	11.8E-03	11.8E-03	11.3E-03	11.5E-03	11.3E-03
59	9.7E-03	10.0E-03	10.7E-03	11.3E-03	11.2E-03	12.0E-03	11.9E-03	11.3E-03
60	9.7E-03	10.6E-03	10.9E-03	11.1E-03	11.7E-03	11.8E-03	11.8E-03	11.0E-03
Statistics								
Min	7.6E-03	7.8E-03	4.1E-03	4.6E-03	4.7E-03	4.1E-03	4.2E-03	4.1E-03
Max	10.3E-03	11.9E-03	11.3E-03	12.7E-03	12.1E-03	12.1E-03	11.9E-03	12.0E-03
Average	9.3E-03	9.8E-03	10.1E-03	10.8E-03	10.8E-03	10.8E-03	10.7E-03	10.5E-03
Std Deviation	879.4E-06	1.2E-03	2.1E-03	2.1E-03	2.1E-03	2.2E-03	2.2E-03	2.2E-03

Measurements

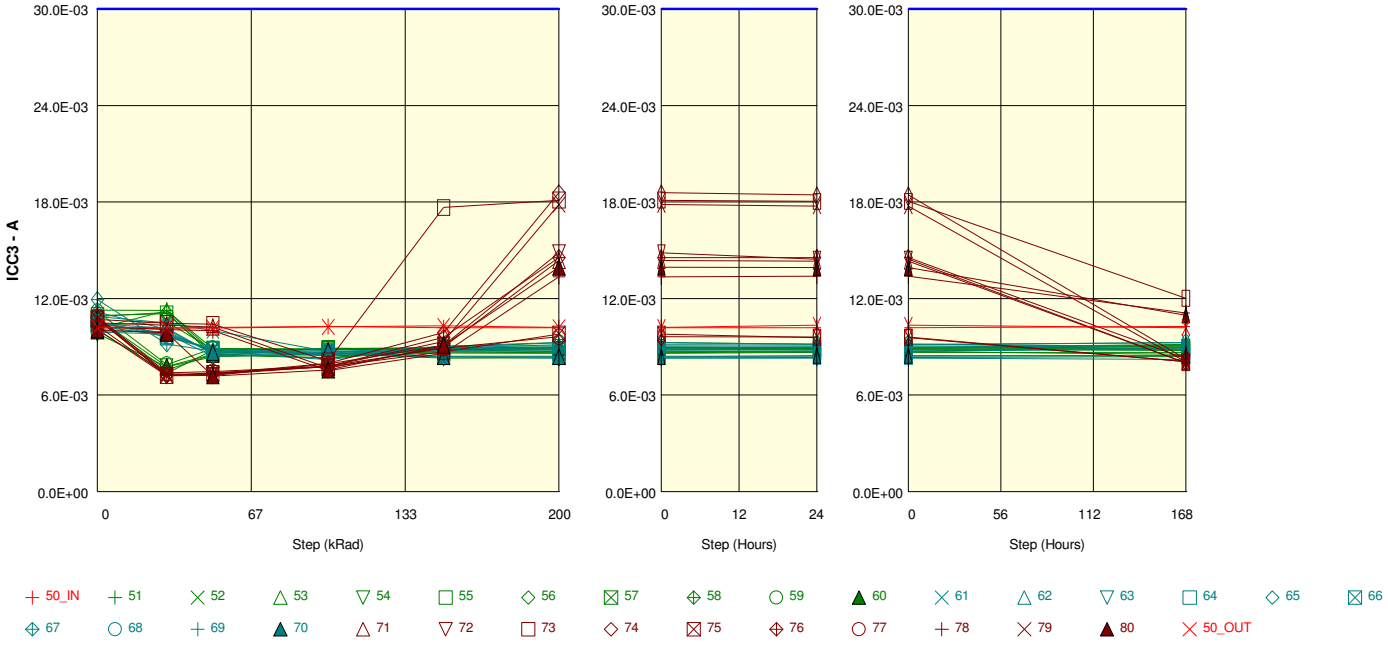
ICC2	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	9.9E-03	8.4E-03	7.6E-03	7.6E-03	7.6E-03	7.6E-03	7.6E-03	7.5E-03
50_OUT_REF	7.6E-03	7.6E-03	7.6E-03	7.6E-03	7.5E-03	7.5E-03	7.6E-03	7.5E-03
ON_HDC samples								
61	8.3E-03	10.8E-03	8.5E-03	9.0E-03	11.7E-03	11.9E-03	11.8E-03	11.0E-03
62	8.1E-03	9.9E-03	10.0E-03	10.8E-03	11.6E-03	11.6E-03	11.7E-03	11.2E-03
63	9.9E-03	10.0E-03	10.8E-03	11.0E-03	11.3E-03	11.9E-03	11.3E-03	11.6E-03
64	10.5E-03	12.0E-03	11.2E-03	11.6E-03	11.2E-03	11.7E-03	11.7E-03	11.7E-03
65	7.7E-03	10.5E-03	10.8E-03	11.2E-03	11.8E-03	11.5E-03	11.4E-03	11.4E-03
66	10.0E-03	10.9E-03	10.6E-03	11.3E-03	11.6E-03	10.8E-03	11.1E-03	11.0E-03
67	7.6E-03	10.4E-03	10.7E-03	11.0E-03	11.8E-03	11.9E-03	11.8E-03	11.8E-03
68	9.7E-03	10.0E-03	9.3E-03	10.7E-03	10.9E-03	11.1E-03	10.9E-03	10.6E-03
69	9.8E-03	10.6E-03	10.9E-03	11.2E-03	12.2E-03	12.1E-03	11.4E-03	11.4E-03
70	7.6E-03	10.6E-03	11.3E-03	11.3E-03	11.4E-03	11.7E-03	11.7E-03	11.5E-03
Statistics								
Min	7.6E-03	9.9E-03	8.5E-03	9.0E-03	10.9E-03	10.8E-03	10.9E-03	10.6E-03
Max	10.5E-03	12.0E-03	11.3E-03	11.6E-03	12.2E-03	12.1E-03	11.8E-03	11.8E-03
Average	8.9E-03	10.6E-03	10.4E-03	10.9E-03	11.6E-03	11.6E-03	11.5E-03	11.3E-03
Std Deviation	1.1E-03	569.6E-06	839.9E-06	678.7E-06	359.3E-06	365.4E-06	292.9E-06	360.4E-06

Measurements

ICC2	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	9.9E-03	8.4E-03	7.6E-03	7.6E-03	7.6E-03	7.6E-03	7.6E-03	7.5E-03
50_OUT_REF	7.6E-03	7.6E-03	7.6E-03	7.6E-03	7.5E-03	7.5E-03	7.6E-03	7.5E-03
OFF samples								
71	8.3E-03	11.9E-03	10.6E-03	11.9E-03	10.4E-03	12.0E-03	10.9E-03	10.7E-03
72	9.7E-03	10.5E-03	10.1E-03	10.8E-03	11.9E-03	10.8E-03	10.3E-03	10.6E-03
73	8.2E-03	9.9E-03	10.5E-03	10.7E-03	10.8E-03	12.1E-03	10.8E-03	10.4E-03
74	7.7E-03	8.3E-03	10.2E-03	11.0E-03	11.1E-03	11.1E-03	11.1E-03	10.7E-03
75	8.3E-03	10.7E-03	10.3E-03	11.0E-03	12.3E-03	12.5E-03	11.2E-03	10.4E-03
76	10.5E-03	8.2E-03	10.8E-03	10.4E-03	12.1E-03	10.9E-03	10.9E-03	10.8E-03
77	9.8E-03	10.1E-03	10.3E-03	11.2E-03	12.5E-03	11.1E-03	11.1E-03	10.9E-03
78	9.9E-03	10.7E-03	10.1E-03	10.8E-03	12.1E-03	12.1E-03	10.8E-03	10.8E-03
79	9.9E-03	10.0E-03	10.2E-03	10.8E-03	12.2E-03	12.0E-03	12.1E-03	10.3E-03
80	9.8E-03	9.9E-03	10.1E-03	10.2E-03	12.0E-03	10.7E-03	11.9E-03	10.0E-03
Statistics								
Min	7.7E-03	8.2E-03	10.1E-03	10.2E-03	10.4E-03	10.7E-03	10.3E-03	10.0E-03
Max	10.5E-03	11.9E-03	10.8E-03	11.9E-03	12.5E-03	12.5E-03	12.1E-03	10.9E-03
Average	9.2E-03	10.0E-03	10.3E-03	10.9E-03	11.7E-03	11.5E-03	11.1E-03	10.6E-03
Std Deviation	920.7E-06	1.0E-03	241.0E-06	427.3E-06	654.0E-06	629.0E-06	508.1E-06	268.3E-06

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Operating Current. Erase : ICC3
Test conditions :
Unit : A
Spec Limit Max : 30.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

ICC3	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	10.1E-03	10.2E-03	10.2E-03	10.3E-03	10.2E-03	10.2E-03	10.2E-03	10.3E-03
50_OUT_REF	10.2E-03	10.2E-03	10.2E-03	10.2E-03	10.3E-03	10.2E-03	10.3E-03	10.2E-03
ON_LDC samples								
51	11.3E-03	11.3E-03	8.9E-03	8.8E-03	8.8E-03	8.9E-03	9.0E-03	9.2E-03
52	10.0E-03	7.4E-03	8.8E-03	8.5E-03	8.6E-03	8.6E-03	8.7E-03	8.7E-03
53	10.2E-03	11.2E-03	8.7E-03	8.6E-03	8.7E-03	8.6E-03	8.7E-03	8.5E-03
54	9.8E-03	7.8E-03	8.4E-03	8.6E-03	8.3E-03	8.3E-03	8.3E-03	8.4E-03
55	10.9E-03	11.1E-03	8.6E-03	8.9E-03	8.9E-03	9.0E-03	8.9E-03	9.0E-03
56	10.9E-03	11.1E-03	8.4E-03	8.9E-03	8.8E-03	8.8E-03	8.9E-03	8.8E-03
57	10.4E-03	10.6E-03	8.8E-03	8.8E-03	8.8E-03	8.7E-03	8.7E-03	9.0E-03
58	10.7E-03	7.6E-03	8.5E-03	8.3E-03	8.9E-03	8.9E-03	8.9E-03	9.1E-03
59	11.2E-03	7.9E-03	8.9E-03	8.9E-03	9.0E-03	9.3E-03	9.2E-03	9.0E-03
60	10.8E-03	7.8E-03	8.5E-03	8.3E-03	8.9E-03	9.0E-03	8.9E-03	8.9E-03
Statistics								
Min	9.8E-03	7.4E-03	8.4E-03	8.3E-03	8.3E-03	8.3E-03	8.3E-03	8.4E-03
Max	11.3E-03	11.3E-03	8.9E-03	8.9E-03	9.0E-03	9.3E-03	9.2E-03	9.2E-03
Average	10.6E-03	9.4E-03	8.7E-03	8.7E-03	8.8E-03	8.8E-03	8.8E-03	8.8E-03
Std Deviation	468.4E-06	1.7E-03	179.6E-06	234.3E-06	184.3E-06	242.4E-06	212.9E-06	232.8E-06

Measurements

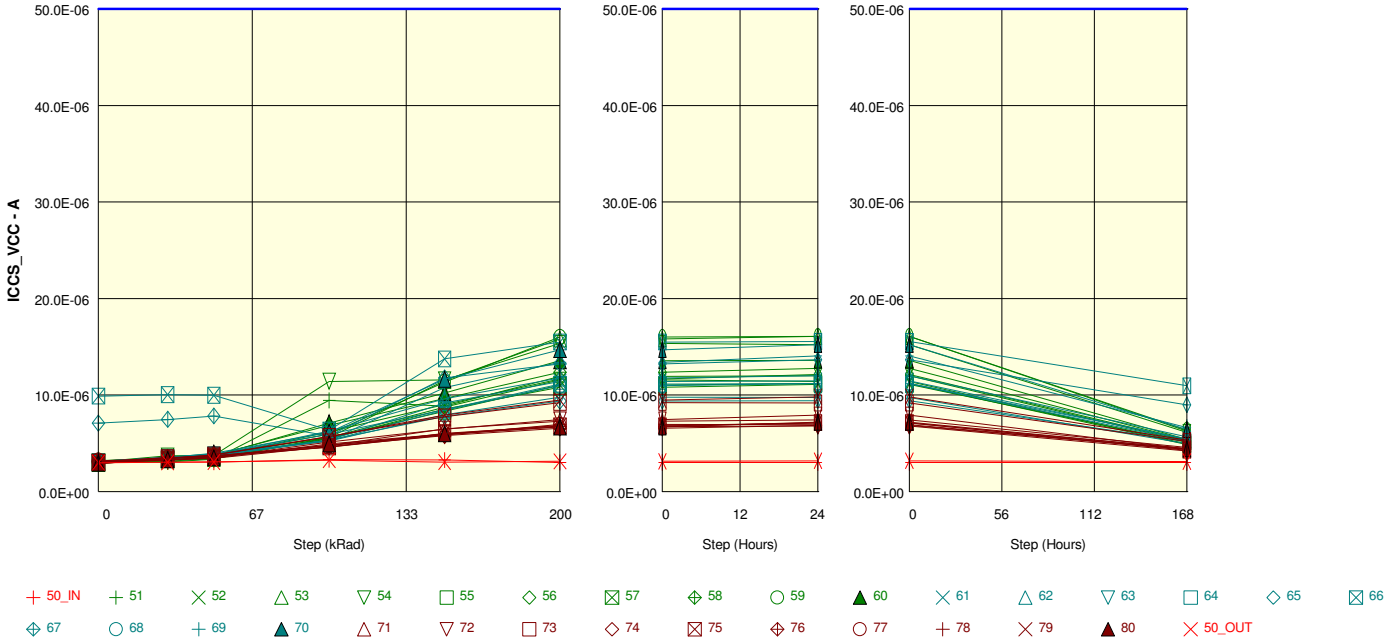
ICC3	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	10.1E-03	10.2E-03	10.2E-03	10.3E-03	10.2E-03	10.2E-03	10.2E-03	10.3E-03
50_OUT_REF	10.2E-03	10.2E-03	10.2E-03	10.2E-03	10.3E-03	10.2E-03	10.3E-03	10.2E-03
ON_HDC samples								
61	10.9E-03	10.5E-03	10.0E-03	8.7E-03	8.9E-03	9.1E-03	9.1E-03	9.3E-03
62	10.5E-03	9.9E-03	8.7E-03	8.2E-03	9.0E-03	9.1E-03	9.0E-03	9.1E-03
63	10.4E-03	10.1E-03	8.6E-03	8.7E-03	8.7E-03	8.7E-03	8.7E-03	8.9E-03
64	10.5E-03	9.6E-03	8.8E-03	8.5E-03	8.9E-03	8.8E-03	8.8E-03	8.8E-03
65	11.2E-03	10.1E-03	8.5E-03	8.5E-03	8.8E-03	8.8E-03	8.8E-03	8.9E-03
66	10.3E-03	9.7E-03	8.9E-03	8.6E-03	8.4E-03	8.4E-03	8.4E-03	8.5E-03
67	11.9E-03	9.2E-03	8.7E-03	8.5E-03	8.9E-03	8.9E-03	9.0E-03	9.1E-03
68	10.5E-03	9.7E-03	8.8E-03	8.6E-03	9.0E-03	9.3E-03	9.1E-03	9.3E-03
69	9.9E-03	9.8E-03	8.4E-03	8.5E-03	8.4E-03	8.3E-03	8.3E-03	8.2E-03
70	10.0E-03	10.0E-03	8.6E-03	8.8E-03	8.4E-03	8.4E-03	8.5E-03	8.5E-03
Statistics								
Min	9.9E-03	9.2E-03	8.4E-03	8.2E-03	8.4E-03	8.3E-03	8.3E-03	8.2E-03
Max	11.9E-03	10.5E-03	10.0E-03	8.8E-03	9.0E-03	9.3E-03	9.1E-03	9.3E-03
Average	10.6E-03	9.9E-03	8.8E-03	8.6E-03	8.8E-03	8.8E-03	8.8E-03	8.9E-03
Std Deviation	563.9E-06	331.2E-06	417.1E-06	149.7E-06	255.0E-06	311.1E-06	286.1E-06	344.3E-06

Measurements

ICC3	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	10.1E-03	10.2E-03	10.2E-03	10.3E-03	10.2E-03	10.2E-03	10.2E-03	10.3E-03
50_OUT_REF	10.2E-03	10.2E-03	10.2E-03	10.2E-03	10.3E-03	10.2E-03	10.3E-03	10.2E-03
OFF samples								
71	10.5E-03	10.4E-03	10.2E-03	7.7E-03	9.0E-03	14.4E-03	14.3E-03	8.0E-03
72	10.1E-03	7.2E-03	7.2E-03	7.9E-03	9.1E-03	14.9E-03	14.4E-03	8.0E-03
73	10.7E-03	10.5E-03	10.4E-03	8.1E-03	17.7E-03	18.1E-03	18.0E-03	12.0E-03
74	10.8E-03	7.2E-03	7.3E-03	8.0E-03	9.9E-03	18.6E-03	18.4E-03	8.2E-03
75	10.8E-03	7.2E-03	7.4E-03	7.8E-03	8.7E-03	9.8E-03	9.6E-03	8.1E-03
76	10.3E-03	7.2E-03	7.4E-03	7.8E-03	9.6E-03	14.5E-03	14.6E-03	8.3E-03
77	10.9E-03	7.4E-03	7.5E-03	7.8E-03	8.9E-03	9.6E-03	9.6E-03	8.1E-03
78	10.3E-03	10.1E-03	10.0E-03	7.5E-03	8.6E-03	13.4E-03	13.4E-03	11.1E-03
79	10.7E-03	7.3E-03	7.3E-03	7.8E-03	9.3E-03	17.8E-03	17.8E-03	8.1E-03
80	10.0E-03	9.9E-03	7.2E-03	7.6E-03	9.1E-03	13.9E-03	13.9E-03	11.0E-03
Statistics								
Min	10.0E-03	7.2E-03	7.2E-03	7.5E-03	8.6E-03	9.6E-03	9.6E-03	8.0E-03
Max	10.9E-03	10.5E-03	10.4E-03	8.1E-03	17.7E-03	18.6E-03	18.4E-03	12.0E-03
Average	10.5E-03	8.4E-03	8.2E-03	7.8E-03	10.0E-03	14.5E-03	14.4E-03	9.1E-03
Std Deviation	289.8E-06	1.4E-03	1.3E-03	173.2E-06	2.6E-03	3.0E-03	3.0E-03	1.5E-03

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Standby Current CMOS : ICCS_VCC
Test conditions : CE/=VCC-0.2V . WP/=0V/VCC. VCC & VCCQ
Unit : A
Spec Limit Max : 50.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

ICCS_VCC	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.1E-06	3.1E-06	3.1E-06	3.3E-06	3.3E-06	3.0E-06	3.0E-06	3.0E-06
50_OUT_REF	3.0E-06	3.1E-06	3.1E-06	3.3E-06	3.1E-06	3.2E-06	3.2E-06	3.1E-06
ON_LDC samples								
51	3.1E-06	3.1E-06	3.3E-06	9.5E-06	8.9E-06	12.0E-06	12.0E-06	5.2E-06
52	3.0E-06	3.2E-06	3.4E-06	5.6E-06	8.8E-06	11.6E-06	11.4E-06	5.0E-06
53	3.3E-06	3.4E-06	3.8E-06	5.6E-06	11.5E-06	15.8E-06	16.1E-06	6.3E-06
54	3.1E-06	3.7E-06	3.8E-06	11.4E-06	11.6E-06	15.4E-06	15.2E-06	6.1E-06
55	3.1E-06	3.4E-06	3.5E-06	5.5E-06	8.6E-06	10.8E-06	11.1E-06	5.1E-06
56	3.0E-06	3.4E-06	3.6E-06	6.2E-06	9.0E-06	11.7E-06	12.1E-06	5.3E-06
57	2.9E-06	3.3E-06	3.4E-06	5.5E-06	8.3E-06	11.0E-06	11.2E-06	4.9E-06
58	3.2E-06	3.5E-06	3.8E-06	6.9E-06	9.6E-06	12.4E-06	12.8E-06	5.4E-06
59	3.1E-06	3.3E-06	3.8E-06	6.0E-06	11.4E-06	16.0E-06	16.1E-06	6.4E-06
60	3.0E-06	3.4E-06	3.7E-06	7.1E-06	10.2E-06	13.6E-06	13.6E-06	5.4E-06
Statistics								
Min	2.9E-06	3.1E-06	3.3E-06	5.5E-06	8.3E-06	10.8E-06	11.1E-06	4.9E-06
Max	3.3E-06	3.7E-06	3.8E-06	11.4E-06	11.6E-06	16.0E-06	16.1E-06	6.4E-06
Average	3.1E-06	3.4E-06	3.6E-06	6.9E-06	9.8E-06	13.0E-06	13.2E-06	5.5E-06
Std Deviation	90.3E-09	159.5E-09	163.7E-09	1.9E-06	1.2E-06	1.9E-06	1.9E-06	532.3E-09

Measurements

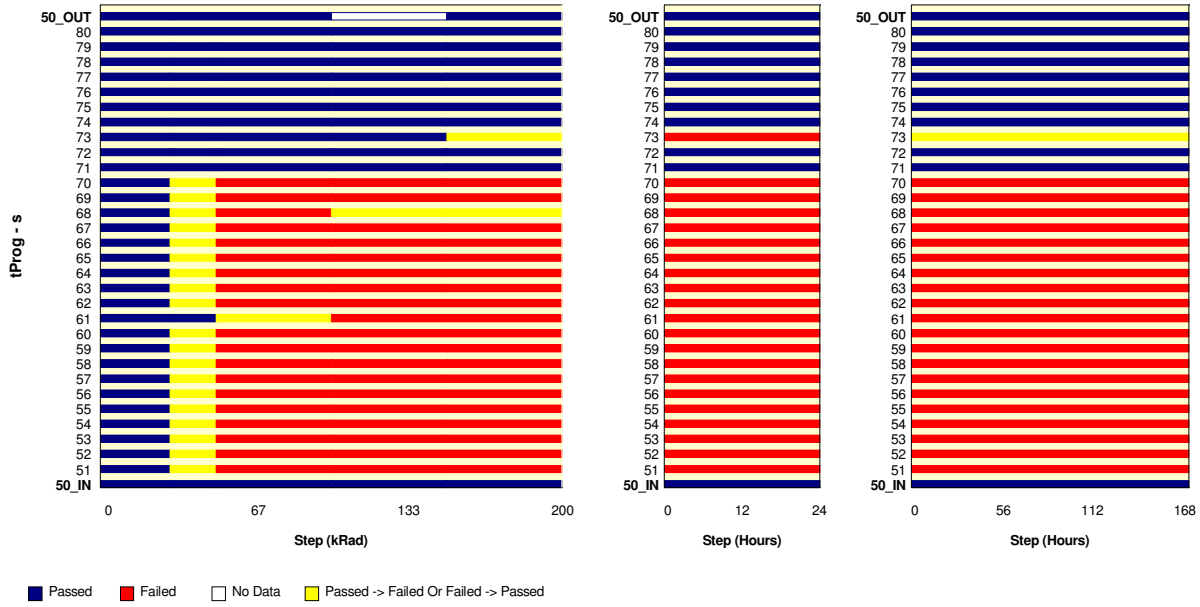
ICCS_VCC	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.1E-06	3.1E-06	3.1E-06	3.3E-06	3.3E-06	3.0E-06	3.0E-06	3.0E-06
50_OUT_REF	3.0E-06	3.1E-06	3.1E-06	3.3E-06	3.1E-06	3.2E-06	3.2E-06	3.1E-06
ON_HDC samples								
61	3.1E-06	3.5E-06	3.6E-06	5.4E-06	9.2E-06	11.4E-06	11.5E-06	5.4E-06
62	3.1E-06	3.3E-06	3.8E-06	6.3E-06	9.6E-06	11.8E-06	12.0E-06	5.7E-06
63	3.0E-06	3.4E-06	3.8E-06	5.2E-06	7.9E-06	9.8E-06	9.8E-06	5.0E-06
64	3.1E-06	3.6E-06	3.8E-06	5.9E-06	8.5E-06	11.1E-06	11.2E-06	5.2E-06
65	3.2E-06	3.4E-06	3.8E-06	5.3E-06	7.8E-06	9.4E-06	9.4E-06	5.2E-06
66	9.9E-06	10.1E-06	10.0E-06	6.4E-06	13.7E-06	15.5E-06	15.5E-06	11.0E-06
67	7.1E-06	7.5E-06	7.8E-06	5.8E-06	11.8E-06	13.2E-06	13.7E-06	9.0E-06
68	3.1E-06	3.5E-06	3.8E-06	5.3E-06	8.4E-06	11.0E-06	11.2E-06	5.5E-06
69	3.0E-06	3.6E-06	3.9E-06	5.3E-06	10.8E-06	13.4E-06	14.1E-06	6.7E-06
70	3.2E-06	3.5E-06	4.0E-06	6.1E-06	11.6E-06	14.7E-06	15.2E-06	6.4E-06
Statistics								
Min	3.0E-06	3.3E-06	3.6E-06	5.2E-06	7.8E-06	9.4E-06	9.4E-06	5.0E-06
Max	9.9E-06	10.1E-06	10.0E-06	6.4E-06	13.7E-06	15.5E-06	15.5E-06	11.0E-06
Average	4.2E-06	4.5E-06	4.8E-06	5.7E-06	9.9E-06	12.1E-06	12.4E-06	6.5E-06
Std Deviation	2.3E-06	2.2E-06	2.1E-06	428.4E-09	1.9E-06	1.9E-06	2.1E-06	1.9E-06

Measurements

ICCS_VCC	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.1E-06	3.1E-06	3.1E-06	3.3E-06	3.3E-06	3.0E-06	3.0E-06	3.0E-06
50_OUT_REF	3.0E-06	3.1E-06	3.1E-06	3.3E-06	3.1E-06	3.2E-06	3.2E-06	3.1E-06
OFF samples								
71	3.1E-06	3.4E-06	3.7E-06	4.8E-06	6.5E-06	7.3E-06	7.4E-06	4.6E-06
72	3.1E-06	3.3E-06	3.5E-06	5.2E-06	6.5E-06	7.5E-06	7.9E-06	4.4E-06
73	3.0E-06	3.4E-06	3.8E-06	5.7E-06	7.8E-06	9.2E-06	9.2E-06	5.2E-06
74	3.1E-06	3.3E-06	3.5E-06	4.7E-06	5.8E-06	6.6E-06	6.9E-06	4.4E-06
75	3.1E-06	3.5E-06	3.6E-06	4.6E-06	6.0E-06	6.8E-06	7.1E-06	4.3E-06
76	3.1E-06	3.3E-06	3.6E-06	4.8E-06	5.9E-06	6.7E-06	6.8E-06	4.2E-06
77	3.2E-06	3.5E-06	3.6E-06	4.8E-06	6.0E-06	6.9E-06	7.1E-06	4.5E-06
78	2.9E-06	3.5E-06	3.7E-06	4.6E-06	5.9E-06	7.0E-06	6.9E-06	4.4E-06
79	3.1E-06	3.5E-06	3.8E-06	5.7E-06	7.9E-06	9.5E-06	9.8E-06	5.3E-06
80	2.9E-06	3.3E-06	3.5E-06	4.9E-06	6.0E-06	6.7E-06	7.2E-06	4.5E-06
Statistics								
Min	2.9E-06	3.3E-06	3.5E-06	4.6E-06	5.8E-06	6.6E-06	6.8E-06	4.2E-06
Max	3.2E-06	3.5E-06	3.8E-06	5.7E-06	7.9E-06	9.5E-06	9.8E-06	5.3E-06
Average	3.1E-06	3.4E-06	3.6E-06	5.0E-06	6.4E-06	7.4E-06	7.6E-06	4.6E-06
Std Deviation	81.3E-09	90.3E-09	117.0E-09	394.6E-09	746.0E-09	1.0E-06	994.0E-09	364.6E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Program Time : tProg
Test conditions : PROGRAM PAGE operation time. internal ECC disabled. GO NOGO
Unit : s
Spec Limit Max : 700.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

tProg	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_LDC samples								
51	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
52	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
53	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
54	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
55	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
56	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
57	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
58	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
59	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
60	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

Measurements

tProg	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_HDC samples								
61	PASS	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL
62	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
63	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
64	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
65	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
66	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
67	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
68	PASS	PASS	FAIL	FAIL	PASS	FAIL	FAIL	FAIL
69	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
70	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

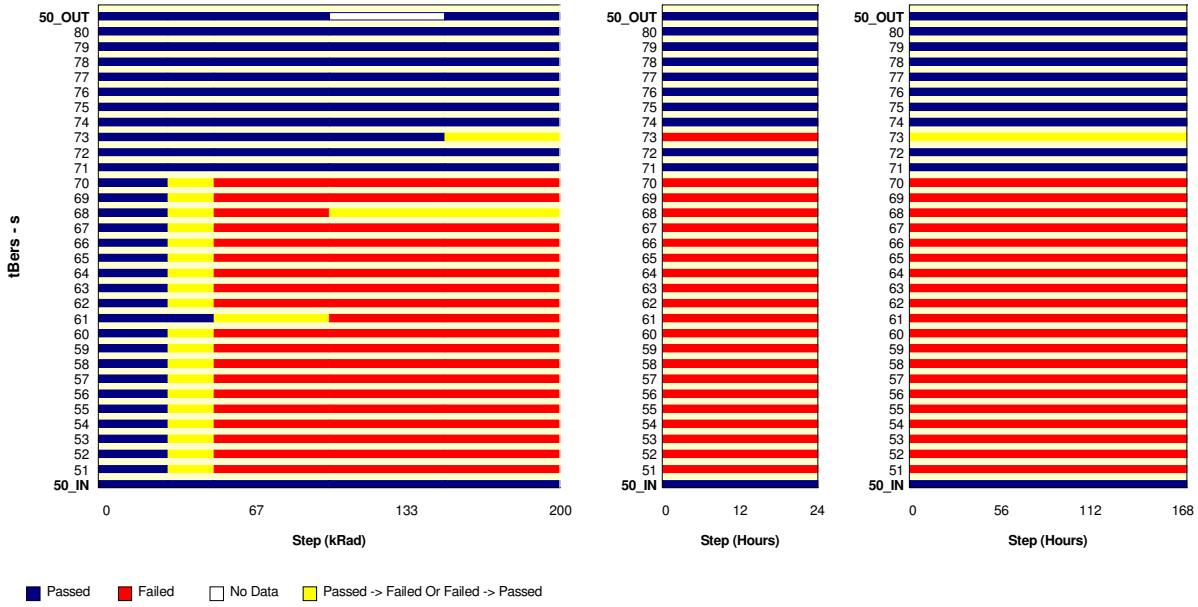
Measurements

tProg	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
OFF samples								
71	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
72	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
73	PASS	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS
74	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

tProg	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
75	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
76	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
77	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
78	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
79	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
80	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Block Erase Time : tBers
Test conditions :
Unit : s
Spec Limit Max : 5.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

tBers	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_LDC samples								
51	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
52	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
53	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
54	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
55	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
56	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
57	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
58	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
59	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
60	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

Measurements

tBers	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_HDC samples								
61	PASS	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL
62	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
63	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
64	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
65	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
66	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
67	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
68	PASS	PASS	FAIL	FAIL	PASS	FAIL	FAIL	FAIL
69	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
70	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

Measurements

tBers	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
OFF samples								
71	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
72	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
73	PASS	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS
74	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

tBers	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
75	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
76	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
77	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
78	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
79	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
80	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

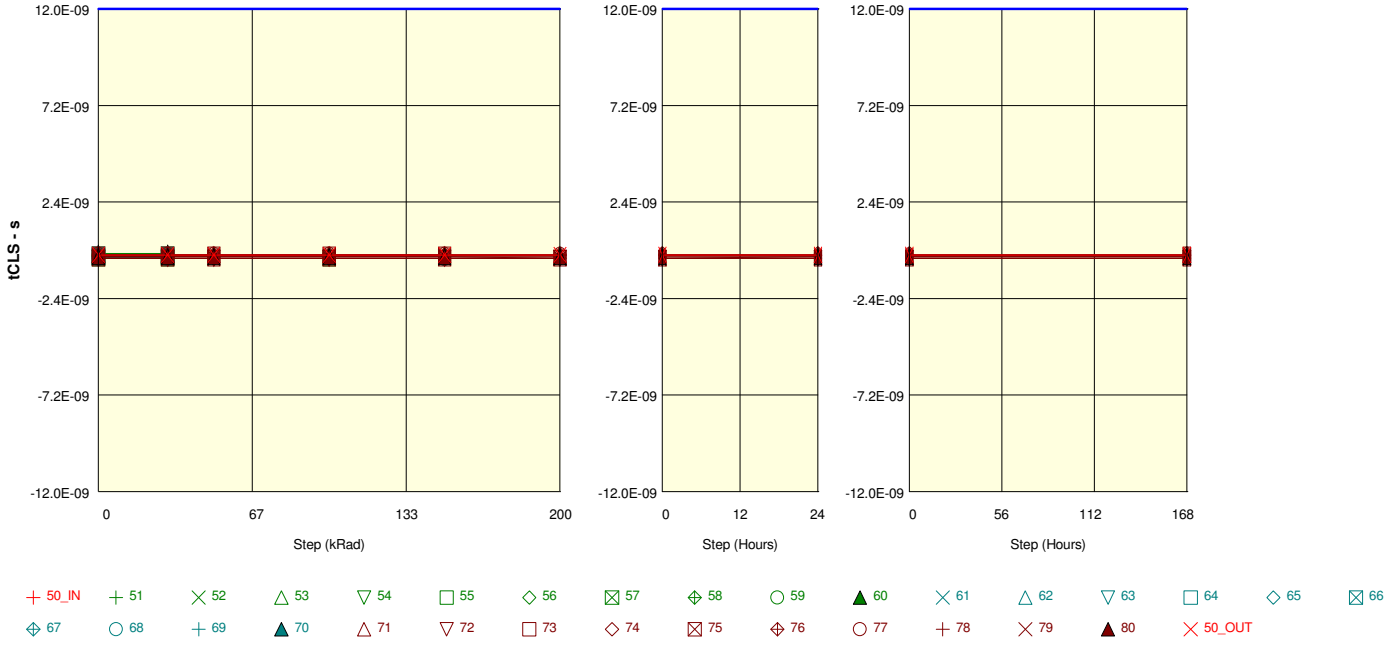
Parameter : CLE Setup Time : tCLS

Test conditions :

Unit : s

Spec Limit Max : 12.0E-09

Spec limits are represented in bold lines on the graphic.



Measurements

tCLS	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12
50_OUT_REF	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12
ON_LDC samples								
51	-312.5E-12	-312.5E-12						
52	-312.5E-12	-312.5E-12						
53	-234.4E-12	-234.4E-12						
54	-234.4E-12	-234.4E-12						
55	-390.6E-12	-390.6E-12						
56	-234.4E-12	-234.4E-12						
57	-312.5E-12	-312.5E-12		-390.6E-12				
58	-312.5E-12	-312.5E-12						
59	-312.5E-12	-312.5E-12						
60	-156.3E-12	-156.3E-12						
Statistics								
Min	-390.6E-12	-390.6E-12	-	-390.6E-12	-	-	-	-
Max	-156.3E-12	-156.3E-12	-	-390.6E-12	-	-	-	-
Average	-281.3E-12	-281.3E-12	-	-390.6E-12	-	-	-	-
Std Deviation	62.5E-12	62.5E-12	-	0.0E+00	-	-	-	-

Measurements

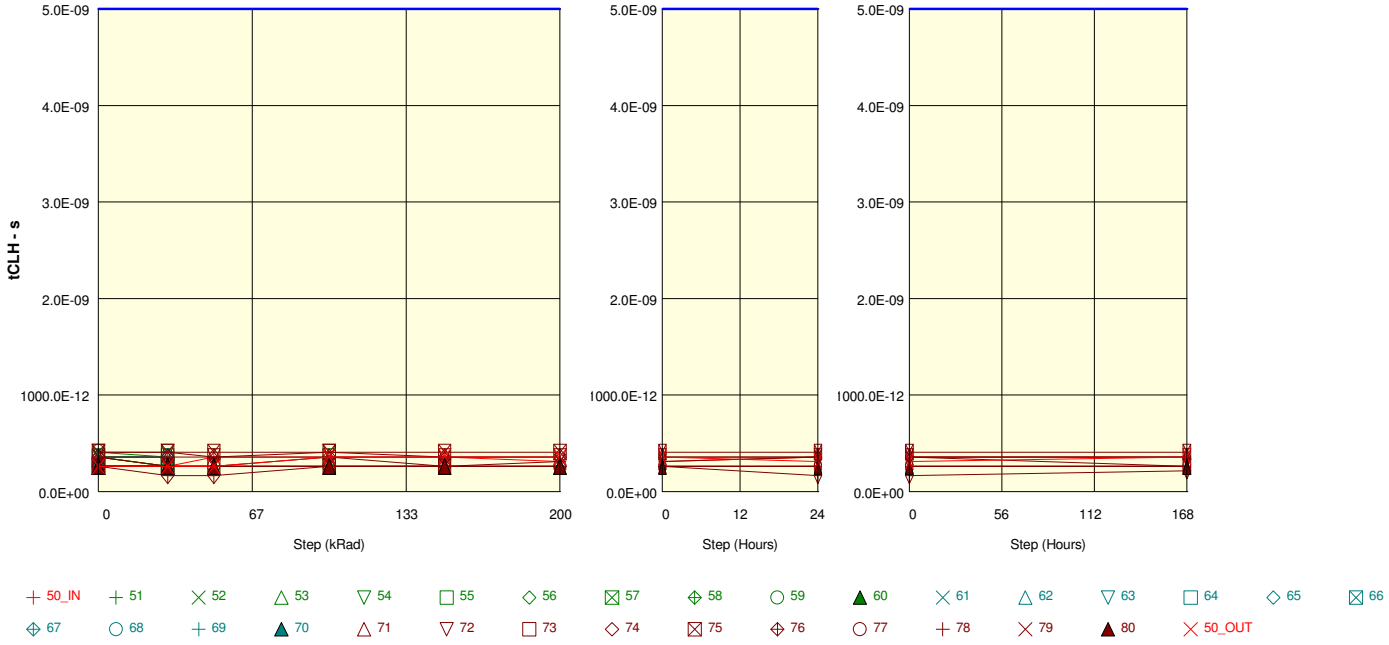
tCLS	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12
50_OUT_REF	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12
ON_HDC samples								
61	-234.4E-12	-234.4E-12	-234.4E-12					
62	-234.4E-12	-234.4E-12						
63	-390.6E-12	-390.6E-12						
64	-312.5E-12	-312.5E-12						
65	-312.5E-12	-312.5E-12						
66	-234.4E-12	-234.4E-12						
67	-312.5E-12	-312.5E-12						
68	-390.6E-12	-390.6E-12			-390.6E-12			
69	-312.5E-12	-312.5E-12						
70	-234.4E-12	-234.4E-12						
Statistics								
Min	-390.6E-12	-390.6E-12	-234.4E-12	-	-390.6E-12	-	-	-
Max	-234.4E-12	-234.4E-12	-234.4E-12	-	-390.6E-12	-	-	-
Average	-296.9E-12	-296.9E-12	-234.4E-12	-	-390.6E-12	-	-	-
Std Deviation	58.5E-12	58.5E-12	0.0E+00	-	0.0E+00	-	-	-

Measurements

tCLS	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12
50_OUT_REF	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12
OFF samples								
71	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12
72	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12
73	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12			-234.4E-12
74	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12
75	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12
76	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12
77	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12
78	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12
79	-312.5E-12	-312.5E-12	-312.5E-12	-312.5E-12	-312.5E-12	-390.6E-12	-312.5E-12	-312.5E-12
80	-312.5E-12	-312.5E-12	-312.5E-12	-312.5E-12	-312.5E-12	-312.5E-12	-312.5E-12	-312.5E-12
Statistics								
Min	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12	-390.6E-12
Max	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12	-234.4E-12
Average	-296.9E-12	-296.9E-12	-296.9E-12	-296.9E-12	-296.9E-12	-312.5E-12	-303.8E-12	-296.9E-12
Std Deviation	68.1E-12	68.1E-12	68.1E-12	68.1E-12	68.1E-12	73.7E-12	68.4E-12	68.1E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : CLE Hold Time : tCLH
Test conditions :
Unit : s
Spec Limit Max : 5.0E-09
Spec limits are represented in bold lines on the graphic.



Measurements

tCLH	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	361.3E-12	263.7E-12	361.3E-12	361.3E-12	361.3E-12	312.5E-12	361.3E-12	361.3E-12
50_OUT_REF	263.7E-12	263.7E-12	263.7E-12	361.3E-12	361.3E-12	361.3E-12	312.5E-12	361.3E-12
ON_LDC samples								
51	263.7E-12	263.7E-12						
52	361.3E-12	263.7E-12						
53	361.3E-12	263.7E-12						
54	263.7E-12	263.7E-12						
55	361.3E-12	361.3E-12						
56	263.7E-12	263.7E-12						
57	263.7E-12	263.7E-12		361.3E-12				
58	361.3E-12	361.3E-12						
59	410.2E-12	361.3E-12						
60	263.7E-12	263.7E-12						
Statistics								
Min	263.7E-12	263.7E-12	-	361.3E-12	-	-	-	-
Max	410.2E-12	361.3E-12	-	361.3E-12	-	-	-	-
Average	317.4E-12	293.0E-12	-	361.3E-12	-	-	-	-
Std Deviation	55.5E-12	44.8E-12	-	0.0E+00	-	-	-	-

Measurements

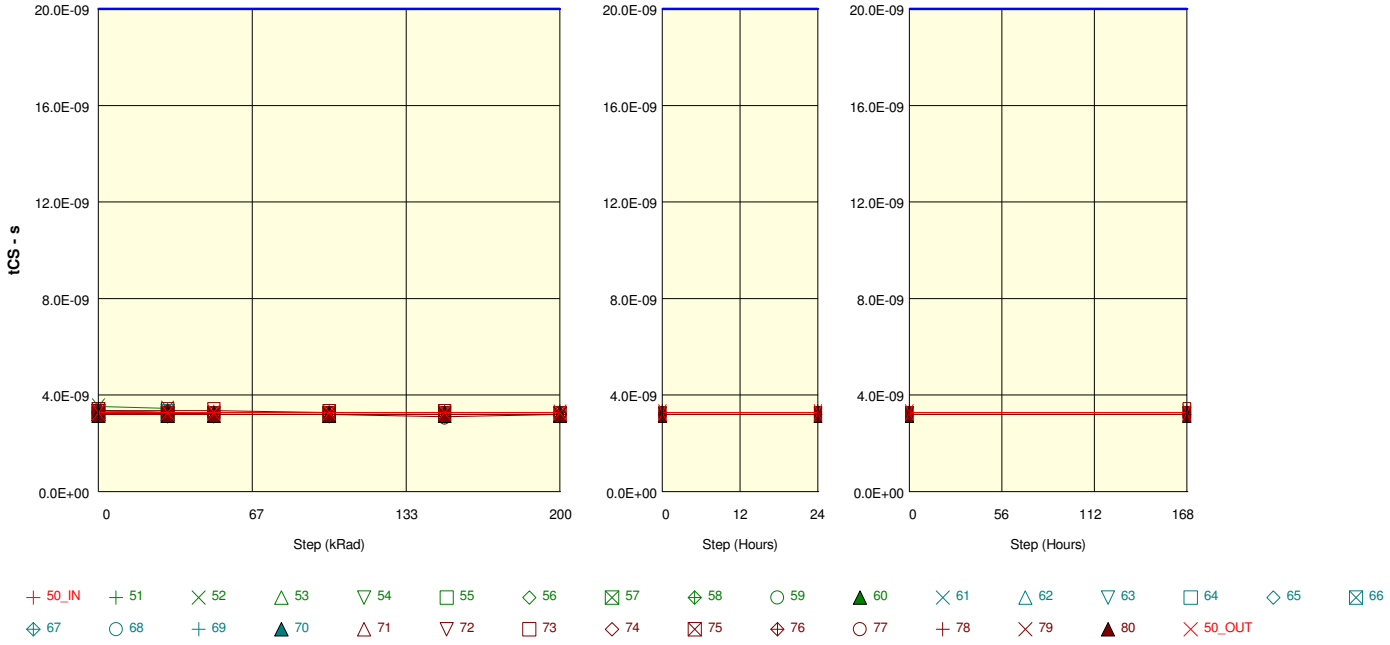
tCLH	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	361.3E-12	263.7E-12	361.3E-12	361.3E-12	361.3E-12	312.5E-12	361.3E-12	361.3E-12
50_OUT_REF	263.7E-12	263.7E-12	263.7E-12	361.3E-12	361.3E-12	361.3E-12	312.5E-12	361.3E-12
ON_HDC samples								
61	263.7E-12	263.7E-12	263.7E-12					
62	263.7E-12	263.7E-12						
63	263.7E-12	263.7E-12						
64	263.7E-12	263.7E-12						
65	361.3E-12	361.3E-12						
66	263.7E-12	263.7E-12						
67	361.3E-12	361.3E-12						
68	361.3E-12	361.3E-12			312.5E-12			
69	263.7E-12	263.7E-12						
70	263.7E-12	263.7E-12						
Statistics								
Min	263.7E-12	263.7E-12	263.7E-12	-	312.5E-12	-	-	-
Max	361.3E-12	361.3E-12	263.7E-12	-	312.5E-12	-	-	-
Average	293.0E-12	293.0E-12	263.7E-12	-	312.5E-12	-	-	-
Std Deviation	44.8E-12	44.8E-12	0.0E+00	-	0.0E+00	-	-	-

Measurements

tCLH	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	361.3E-12	263.7E-12	361.3E-12	361.3E-12	361.3E-12	312.5E-12	361.3E-12	361.3E-12
50_OUT_REF	263.7E-12	263.7E-12	263.7E-12	361.3E-12	361.3E-12	361.3E-12	312.5E-12	361.3E-12
OFF samples								
71	263.7E-12	263.7E-12	263.7E-12	263.7E-12	263.7E-12	263.7E-12	263.7E-12	263.7E-12
72	410.2E-12	410.2E-12	361.3E-12	410.2E-12	361.3E-12	361.3E-12	361.3E-12	361.3E-12
73	263.7E-12	263.7E-12	263.7E-12	263.7E-12	263.7E-12			263.7E-12
74	361.3E-12	361.3E-12	361.3E-12	361.3E-12	361.3E-12	361.3E-12	361.3E-12	361.3E-12
75	410.2E-12	410.2E-12	410.2E-12	410.2E-12	410.2E-12	410.2E-12	410.2E-12	410.2E-12
76	263.7E-12	166.0E-12	166.0E-12	263.7E-12	263.7E-12	263.7E-12	166.0E-12	214.8E-12
77	263.7E-12	263.7E-12	263.7E-12	263.7E-12	263.7E-12	263.7E-12	263.7E-12	263.7E-12
78	263.7E-12	263.7E-12	263.7E-12	263.7E-12	263.7E-12	263.7E-12	263.7E-12	263.7E-12
79	361.3E-12	263.7E-12	263.7E-12	361.3E-12	263.7E-12	312.5E-12	361.3E-12	263.7E-12
80	263.7E-12	263.7E-12	263.7E-12	263.7E-12	263.7E-12	263.7E-12	263.7E-12	263.7E-12
Statistics								
Min	263.7E-12	166.0E-12	166.0E-12	263.7E-12	263.7E-12	263.7E-12	166.0E-12	214.8E-12
Max	410.2E-12	410.2E-12	410.2E-12	410.2E-12	410.2E-12	410.2E-12	410.2E-12	410.2E-12
Average	312.5E-12	293.0E-12	288.1E-12	312.5E-12	297.9E-12	307.1E-12	301.7E-12	293.0E-12
Std Deviation	61.8E-12	73.1E-12	66.4E-12	61.8E-12	53.7E-12	53.7E-12	72.0E-12	58.6E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : CE/ Setup Time : tCS
Test conditions :
Unit : s
Spec Limit Max : 20.0E-09
Spec limits are represented in bold lines on the graphic.



Measurements

tCS	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.2E-09	3.2E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09
50_OUT_REF	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09
ON_LDC samples								
51	3.4E-09	3.3E-09						
52	3.5E-09	3.4E-09						
53	3.3E-09	3.3E-09						
54	3.3E-09	3.3E-09						
55	3.2E-09	3.2E-09						
56	3.3E-09	3.3E-09						
57	3.2E-09	3.2E-09		3.2E-09				
58	3.2E-09	3.2E-09						
59	3.3E-09	3.3E-09						
60	3.3E-09	3.2E-09						
Statistics								
Min	3.2E-09	3.2E-09	-	3.2E-09	-	-	-	-
Max	3.5E-09	3.4E-09	-	3.2E-09	-	-	-	-
Average	3.3E-09	3.3E-09	-	3.2E-09	-	-	-	-
Std Deviation	94.3E-12	72.4E-12	-	0.0E+00	-	-	-	-

Measurements

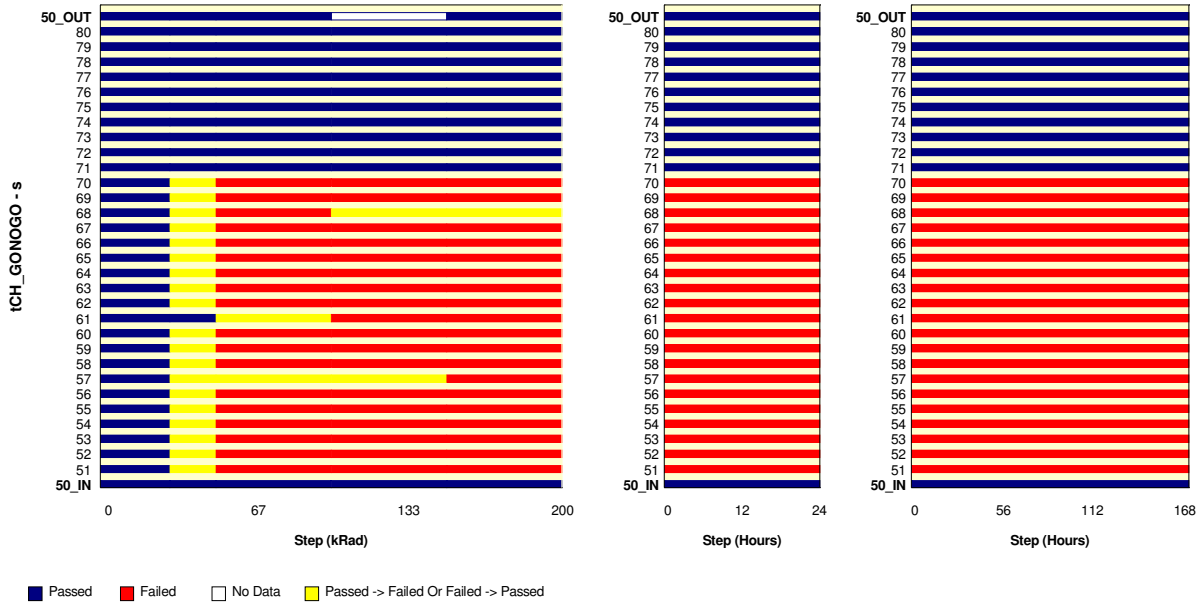
tCS	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.2E-09	3.2E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09
50_OUT_REF	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09
ON_HDC samples								
61	3.3E-09	3.2E-09	3.2E-09					
62	3.4E-09	3.3E-09						
63	3.3E-09	3.3E-09						
64	3.4E-09	3.3E-09						
65	3.3E-09	3.2E-09						
66	3.3E-09	3.3E-09						
67	3.3E-09	3.3E-09						
68	3.2E-09	3.2E-09			3.2E-09			
69	3.3E-09	3.3E-09						
70	3.3E-09	3.3E-09						
Statistics								
Min	3.2E-09	3.2E-09	3.2E-09	-	3.2E-09	-	-	-
Max	3.4E-09	3.3E-09	3.2E-09	-	3.2E-09	-	-	-
Average	3.3E-09	3.3E-09	3.2E-09	-	3.2E-09	-	-	-
Std Deviation	44.7E-12	38.1E-12	0.0E+00	-	0.0E+00	-	-	-

Measurements

tCS	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.2E-09	3.2E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09
50_OUT_REF	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09
OFF samples								
71	3.3E-09	3.3E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09
72	3.3E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09
73	3.4E-09	3.4E-09	3.4E-09	3.3E-09	3.3E-09			3.4E-09
74	3.3E-09	3.3E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09
75	3.3E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09
76	3.3E-09	3.3E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09
77	3.3E-09	3.2E-09	3.2E-09	3.2E-09	3.1E-09	3.2E-09	3.2E-09	3.2E-09
78	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09
79	3.3E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09
80	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09
Statistics								
Min	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.1E-09	3.2E-09	3.2E-09	3.2E-09
Max	3.4E-09	3.4E-09	3.4E-09	3.3E-09	3.3E-09	3.2E-09	3.2E-09	3.4E-09
Average	3.3E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09
Std Deviation	44.7E-12	55.7E-12	49.8E-12	24.9E-12	37.1E-12	34.6E-18	34.6E-18	49.8E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : CE/ Hold Time : tCH_GONOGO
Test conditions :
Unit : s
Spec Limit Max : 5.0E-09
Spec limits are represented in bold lines on the graphic.



Measurements

tCH_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_LDC samples								
51	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
52	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
53	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
54	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
55	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
56	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
57	PASS	PASS	FAIL	PASS	FAIL	FAIL	FAIL	FAIL
58	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
59	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
60	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

Measurements

tCH_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_HDC samples								
61	PASS	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL
62	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
63	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
64	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
65	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
66	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
67	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
68	PASS	PASS	FAIL	FAIL	PASS	FAIL	FAIL	FAIL
69	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
70	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

Measurements

tCH_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
OFF samples								
71	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
72	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
73	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
74	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

tCH_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
75	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
76	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
77	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
78	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
79	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
80	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

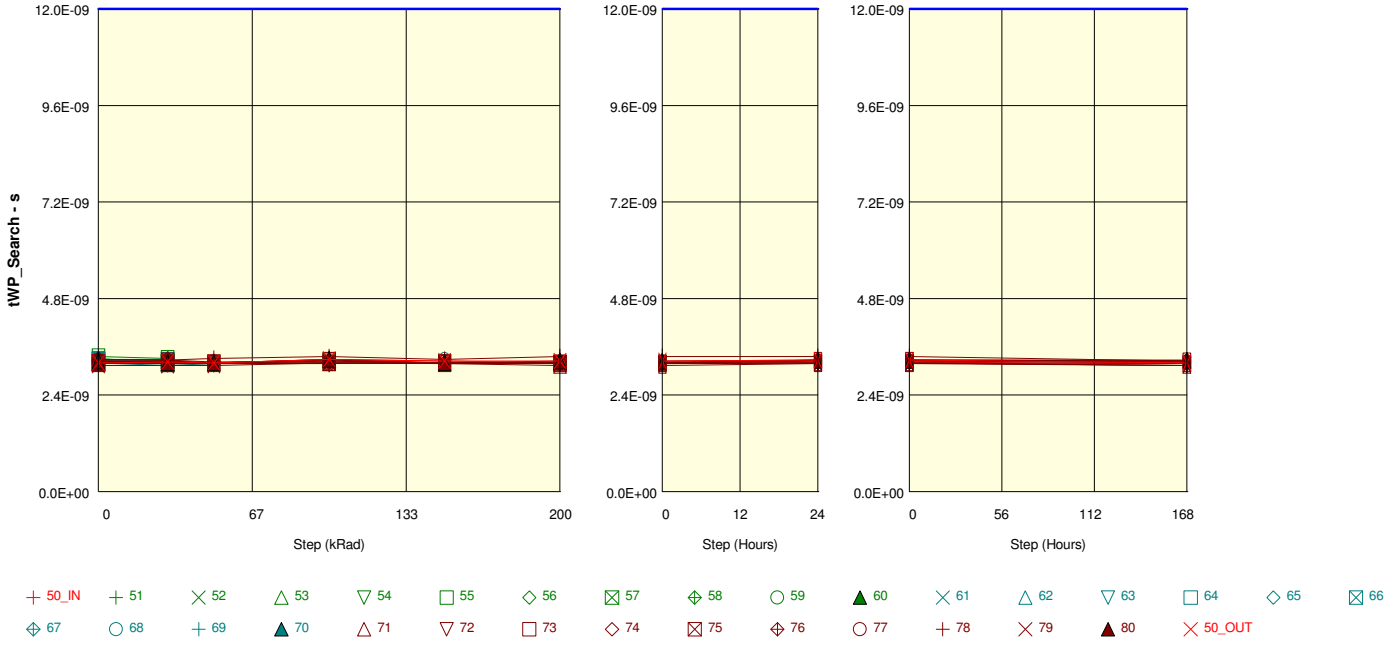
Parameter : WE/ Pulse Width : tWP_Search

Test conditions :

Unit : s

Spec Limit Max : 12.0E-09

Spec limits are represented in bold lines on the graphic.



Measurements

tWP_Search	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.2E-09	3.2E-09	3.2E-09	3.3E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09
50_OUT_REF	3.2E-09	3.2E-09	3.2E-09	3.3E-09	3.2E-09	3.2E-09	3.3E-09	3.2E-09
ON_LDC samples								
51	3.2E-09	3.2E-09						
52	3.3E-09	3.2E-09						
53	3.2E-09	3.2E-09						
54	3.2E-09	3.2E-09						
55	3.4E-09	3.3E-09						
56	3.2E-09	3.2E-09						
57	3.2E-09	3.2E-09		3.2E-09				
58	3.3E-09	3.2E-09						
59	3.2E-09	3.2E-09						
60	3.2E-09	3.2E-09						
Statistics								
Min	3.2E-09	3.2E-09	-	3.2E-09	-	-	-	-
Max	3.4E-09	3.3E-09	-	3.2E-09	-	-	-	-
Average	3.2E-09	3.2E-09	-	3.2E-09	-	-	-	-
Std Deviation	51.8E-12	39.6E-12	-	0.0E+00	-	-	-	-

Measurements

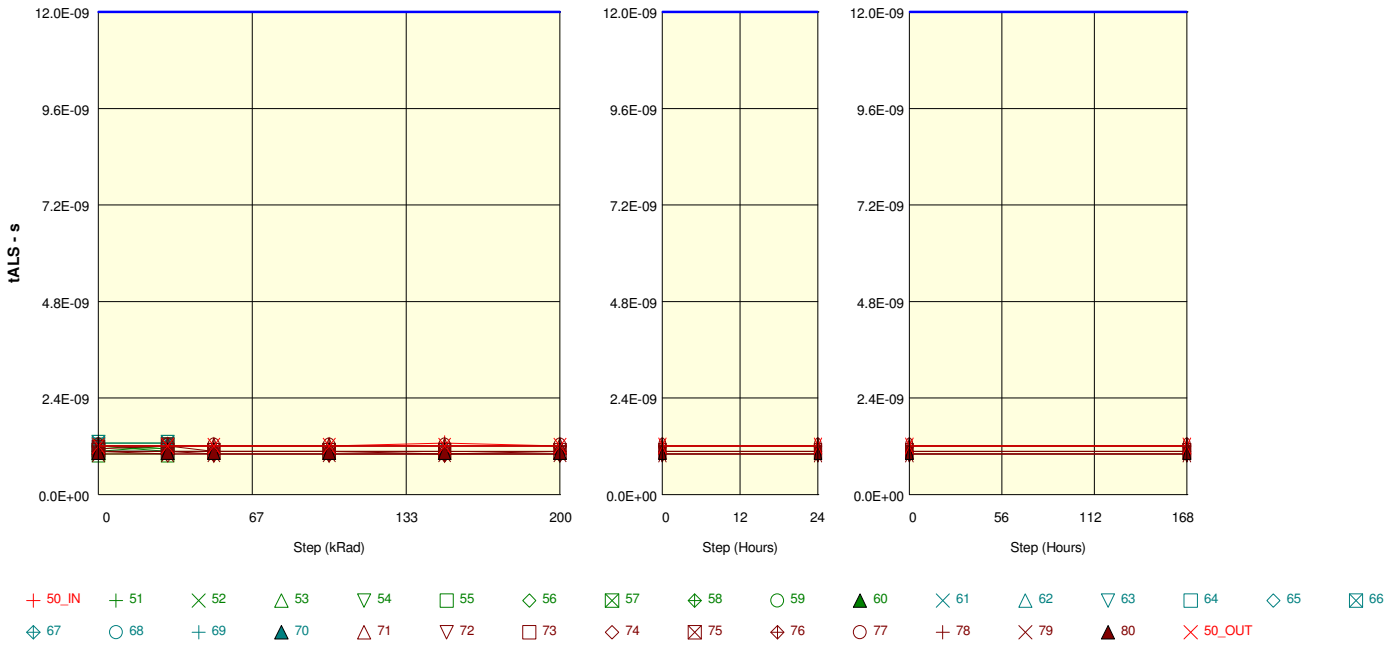
tWP_Search	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.2E-09	3.2E-09	3.2E-09	3.3E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09
50_OUT_REF	3.2E-09	3.2E-09	3.2E-09	3.3E-09	3.2E-09	3.2E-09	3.3E-09	3.2E-09
ON_HDC samples								
61	3.2E-09	3.1E-09	3.2E-09					
62	3.3E-09	3.3E-09						
63	3.2E-09	3.3E-09						
64	3.3E-09	3.2E-09						
65	3.2E-09	3.2E-09						
66	3.3E-09	3.3E-09						
67	3.3E-09	3.3E-09						
68	3.2E-09	3.2E-09			3.3E-09			
69	3.2E-09	3.2E-09						
70	3.2E-09	3.2E-09						
Statistics								
Min	3.2E-09	3.1E-09	3.2E-09	-	3.3E-09	-	-	-
Max	3.3E-09	3.3E-09	3.2E-09	-	3.3E-09	-	-	-
Average	3.2E-09	3.2E-09	3.2E-09	-	3.3E-09	-	-	-
Std Deviation	30.2E-12	44.2E-12	0.0E+00	-	0.0E+00	-	-	-

Measurements

tWP_Search	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	3.2E-09	3.2E-09	3.2E-09	3.3E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09
50_OUT_REF	3.2E-09	3.2E-09	3.2E-09	3.3E-09	3.2E-09	3.2E-09	3.3E-09	3.2E-09
OFF samples								
71	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.1E-09	3.2E-09	3.1E-09
72	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.1E-09
73	3.2E-09	3.2E-09	3.2E-09	3.3E-09	3.2E-09	3.2E-09	3.3E-09	3.2E-09
74	3.3E-09	3.3E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.3E-09	3.2E-09
75	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09
76	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09
77	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09
78	3.3E-09	3.3E-09	3.3E-09	3.4E-09	3.3E-09	3.4E-09	3.4E-09	3.2E-09
79	3.1E-09	3.1E-09	3.1E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.1E-09
80	3.2E-09	3.2E-09	3.2E-09	3.3E-09	3.2E-09	3.2E-09	3.3E-09	3.3E-09
Statistics								
Min	3.1E-09	3.1E-09	3.1E-09	3.2E-09	3.2E-09	3.1E-09	3.2E-09	3.1E-09
Max	3.3E-09	3.3E-09	3.3E-09	3.4E-09	3.3E-09	3.4E-09	3.4E-09	3.3E-09
Average	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09	3.2E-09
Std Deviation	46.1E-12	40.8E-12	42.8E-12	51.1E-12	29.2E-12	54.9E-12	48.6E-12	49.1E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : ALE Setup Time : tALS
Test conditions :
Unit : s
Spec Limit Max : 12.0E-09
Spec limits are represented in bold lines on the graphic.



Measurements

tALS	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.3E-09	1.2E-09	1.2E-09	1.2E-09
50_OUT_REF	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09
ON_LDC samples								
51	1.2E-09	1.1E-09						
52	1.2E-09	1.1E-09						
53	1.2E-09	1.2E-09						
54	1.3E-09	1.3E-09						
55	1.0E-09	1.0E-09						
56	1.2E-09	1.2E-09						
57	1.1E-09	1.2E-09		1.1E-09				
58	1.2E-09	1.2E-09						
59	1.2E-09	1.2E-09						
60	1.2E-09	1.2E-09						
Statistics								
Min	1.0E-09	1.0E-09	-	1.1E-09	-	-	-	-
Max	1.3E-09	1.3E-09	-	1.1E-09	-	-	-	-
Average	1.2E-09	1.2E-09	-	1.1E-09	-	-	-	-
Std Deviation	74.8E-12	75.1E-12	-	0.0E+00	-	-	-	-

Measurements

tALS	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.3E-09	1.2E-09	1.2E-09	1.2E-09
50_OUT_REF	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09
ON_HDC samples								
61	1.1E-09	1.1E-09	1.1E-09					
62	1.2E-09	1.2E-09						
63	1.2E-09	1.2E-09						
64	1.1E-09	1.1E-09						
65	1.1E-09	1.1E-09						
66	1.3E-09	1.3E-09						
67	1.2E-09	1.2E-09						
68	1.1E-09	1.1E-09			1.1E-09			
69	1.2E-09	1.2E-09						
70	1.1E-09	1.1E-09						
Statistics								
Min	1.1E-09	1.1E-09	1.1E-09	-	1.1E-09	-	-	-
Max	1.3E-09	1.3E-09	1.1E-09	-	1.1E-09	-	-	-
Average	1.2E-09	1.2E-09	1.1E-09	-	1.1E-09	-	-	-
Std Deviation	76.3E-12	76.3E-12	0.0E+00	-	0.0E+00	-	-	-

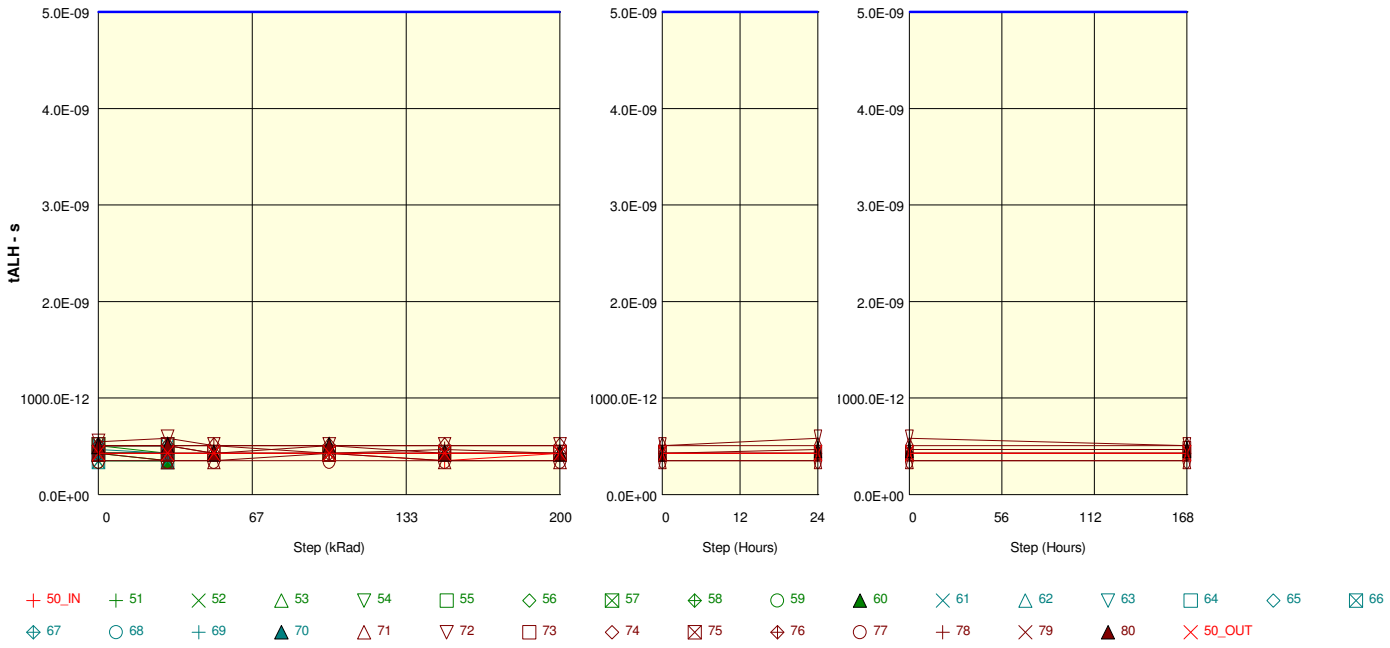
Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Measurements

tALS	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.3E-09	1.2E-09	1.2E-09	1.2E-09
50_OUT_REF	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09
OFF samples								
71	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09
72	1.1E-09	1.1E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09
73	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09			1.1E-09
74	1.1E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09
75	1.1E-09	1.2E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09
76	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.0E-09	1.1E-09	1.1E-09	1.1E-09
77	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09
78	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09
79	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09
80	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09
Statistics								
Min	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09
Max	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09
Average	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09
Std Deviation	68.5E-12	80.6E-12	79.8E-12	79.8E-12	83.9E-12	83.8E-12	83.8E-12	79.8E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : ALE Hold Time : tALH
Test conditions :
Unit : s
Spec Limit Max : 5.0E-09
Spec limits are represented in bold lines on the graphic.



Measurements

tALH	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	429.7E-12	429.7E-12	429.7E-12	429.7E-12	351.6E-12	429.7E-12	429.7E-12	429.7E-12
50_OUT_REF	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12
ON_LDC samples								
51	429.7E-12	429.7E-12						
52	351.6E-12	351.6E-12						
53	429.7E-12	429.7E-12						
54	429.7E-12	429.7E-12						
55	507.8E-12	507.8E-12						
56	429.7E-12	429.7E-12						
57	507.8E-12	429.7E-12		429.7E-12				
58	429.7E-12	429.7E-12						
59	351.6E-12	351.6E-12						
60	429.7E-12	351.6E-12						
Statistics								
Min	351.6E-12	351.6E-12	-	429.7E-12	-	-	-	-
Max	507.8E-12	507.8E-12	-	429.7E-12	-	-	-	-
Average	429.7E-12	414.1E-12	-	429.7E-12	-	-	-	-
Std Deviation	49.4E-12	46.9E-12	-	0.0E+00	-	-	-	-

Measurements

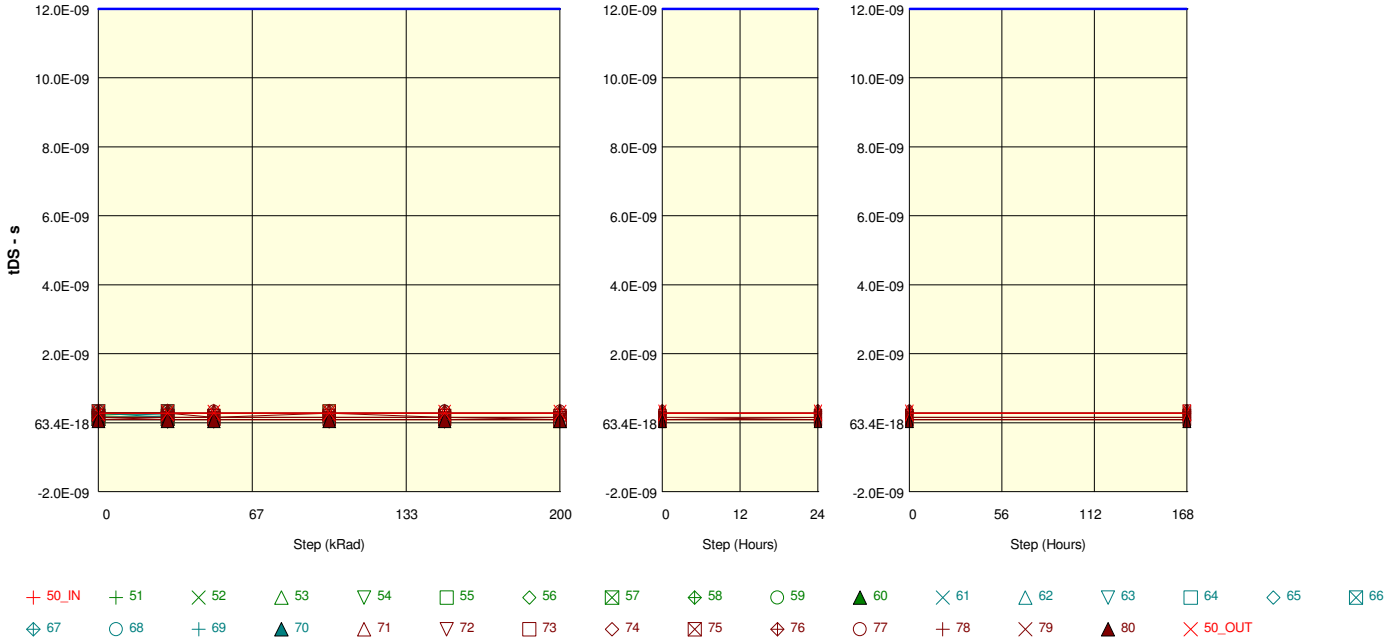
tALH	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	429.7E-12	429.7E-12	429.7E-12	429.7E-12	351.6E-12	429.7E-12	429.7E-12	429.7E-12
50_OUT_REF	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12
ON_HDC samples								
61	468.8E-12	429.7E-12	429.7E-12					
62	507.8E-12	507.8E-12						
63	507.8E-12	507.8E-12						
64	429.7E-12	429.7E-12						
65	507.8E-12	507.8E-12						
66	351.6E-12	351.6E-12						
67	429.7E-12	429.7E-12						
68	429.7E-12	429.7E-12			429.7E-12			
69	429.7E-12	429.7E-12						
70	429.7E-12	429.7E-12						
Statistics								
Min	351.6E-12	351.6E-12	429.7E-12	-	429.7E-12	-	-	-
Max	507.8E-12	507.8E-12	429.7E-12	-	429.7E-12	-	-	-
Average	449.2E-12	445.3E-12	429.7E-12	-	429.7E-12	-	-	-
Std Deviation	47.0E-12	46.9E-12	0.0E+00	-	0.0E+00	-	-	-

Measurements

tALH	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	429.7E-12	429.7E-12	429.7E-12	429.7E-12	351.6E-12	429.7E-12	429.7E-12	429.7E-12
50_OUT_REF	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12
OFF samples								
71	429.7E-12	351.6E-12	351.6E-12	429.7E-12	351.6E-12	351.6E-12	351.6E-12	351.6E-12
72	546.9E-12	585.9E-12	507.8E-12	507.8E-12	507.8E-12	507.8E-12	585.9E-12	507.8E-12
73	507.8E-12	507.8E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12		468.8E-12
74	507.8E-12	507.8E-12	507.8E-12	507.8E-12	507.8E-12	507.8E-12	507.8E-12	507.8E-12
75	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12
76	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12
77	351.6E-12	351.6E-12	351.6E-12	351.6E-12	351.6E-12	351.6E-12	351.6E-12	351.6E-12
78	507.8E-12	507.8E-12	507.8E-12	429.7E-12	468.8E-12	429.7E-12	429.7E-12	429.7E-12
79	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12	429.7E-12
80	507.8E-12	507.8E-12	429.7E-12	507.8E-12	429.7E-12	429.7E-12	468.8E-12	468.8E-12
Statistics								
Min	351.6E-12	351.6E-12	351.6E-12	351.6E-12	351.6E-12	351.6E-12	351.6E-12	351.6E-12
Max	546.9E-12	585.9E-12	507.8E-12	507.8E-12	507.8E-12	507.8E-12	585.9E-12	507.8E-12
Average	464.8E-12	460.9E-12	437.5E-12	445.3E-12	433.6E-12	429.7E-12	442.7E-12	437.5E-12
Std Deviation	56.5E-12	71.6E-12	54.7E-12	46.9E-12	50.8E-12	49.4E-12	68.9E-12	51.8E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Data Setup Time : tDS
Test conditions :
Unit : s
Spec Limit Max : 12.0E-09
Spec limits are represented in bold lines on the graphic.



Measurements

tDS	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12
50_OUT_REF	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12
ON_LDC samples								
51	283.2E-12	283.2E-12						
52	156.3E-12	156.3E-12						
53	283.2E-12	283.2E-12						
54	283.2E-12	283.2E-12						
55	156.3E-12	156.3E-12						
56	156.3E-12	156.3E-12						
57	156.3E-12	156.3E-12		283.2E-12				
58	156.3E-12	156.3E-12						
59	219.7E-12	283.2E-12						
60	283.2E-12	283.2E-12						
Statistics								
Min	156.3E-12	156.3E-12	-	283.2E-12	-	-	-	-
Max	283.2E-12	283.2E-12	-	283.2E-12	-	-	-	-
Average	213.4E-12	219.7E-12	-	283.2E-12	-	-	-	-
Std Deviation	59.9E-12	63.5E-12	-	0.0E+00	-	-	-	-

Measurements

tDS	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12
50_OUT_REF	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12
ON_HDC samples								
61	92.8E-12	92.8E-12	92.8E-12					
62	156.3E-12	156.3E-12						
63	92.8E-12	92.8E-12						
64	283.2E-12	283.2E-12						
65	283.2E-12	283.2E-12						
66	156.3E-12	156.3E-12						
67	92.8E-12	92.8E-12						
68	283.2E-12	219.7E-12			283.2E-12			
69	283.2E-12	156.3E-12						
70	156.3E-12	156.3E-12						
Statistics								
Min	92.8E-12	92.8E-12	92.8E-12	-	283.2E-12	-	-	-
Max	283.2E-12	283.2E-12	92.8E-12	-	283.2E-12	-	-	-
Average	188.0E-12	168.9E-12	92.8E-12	-	283.2E-12	-	-	-
Std Deviation	81.5E-12	68.4E-12	0.0E+00	-	0.0E+00	-	-	-

Measurements

tDS	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12
50_OUT_REF	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12
OFF samples								
71	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12
72	92.8E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12
73	283.2E-12	283.2E-12	156.3E-12	283.2E-12	156.3E-12	156.3E-12		283.2E-12
74	156.3E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12
75	156.3E-12	156.3E-12	156.3E-12	156.3E-12	156.3E-12	92.8E-12	156.3E-12	156.3E-12
76	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12
77	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12
78	156.3E-12	156.3E-12	156.3E-12	156.3E-12	156.3E-12	156.3E-12	156.3E-12	156.3E-12
79	92.8E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12
80	92.8E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12
Statistics								
Min	92.8E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12	92.8E-12
Max	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12	283.2E-12
Average	188.0E-12	181.6E-12	168.9E-12	181.6E-12	168.9E-12	162.6E-12	170.4E-12	181.6E-12
Std Deviation	81.5E-12	86.1E-12	79.3E-12	86.1E-12	79.3E-12	82.5E-12	83.5E-12	86.1E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

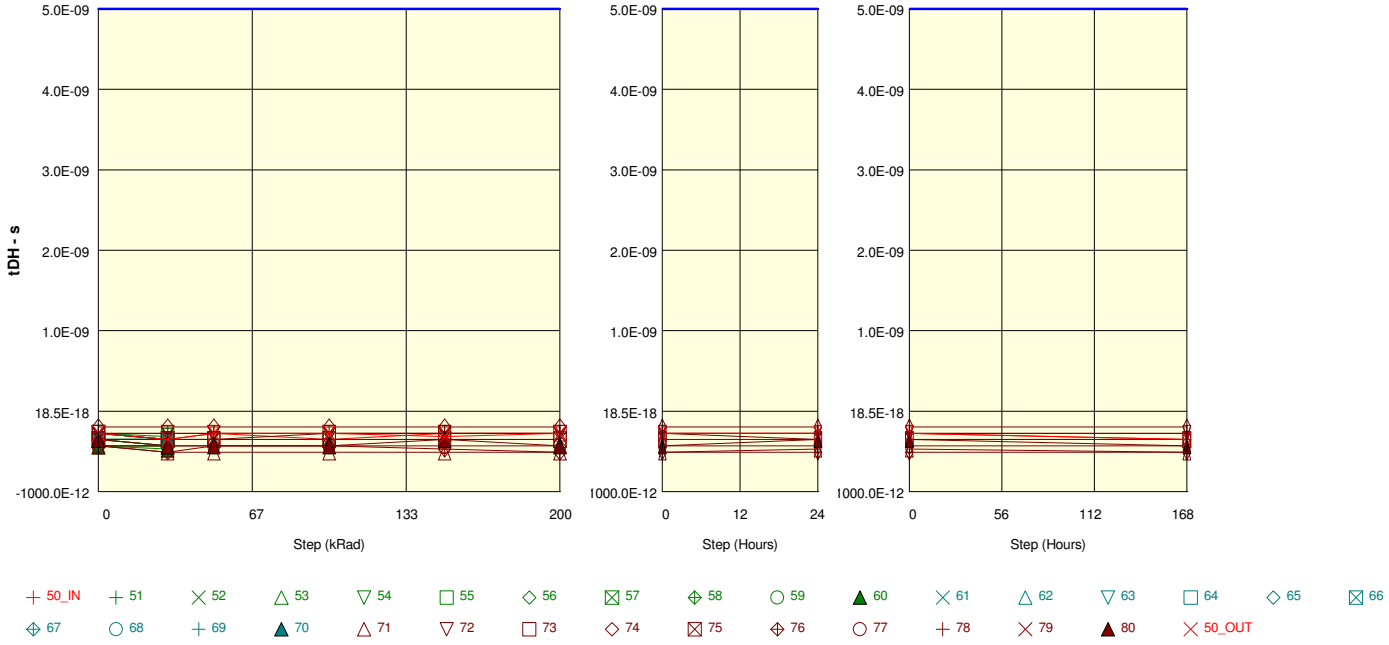
Parameter : Data Hold Time : tDH

Test conditions :

Unit : s

Spec Limit Max : 5.0E-09

Spec limits are represented in bold lines on the graphic.



Measurements

tDH	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-273.4E-12	-351.6E-12	-273.4E-12	-351.6E-12	-273.4E-12	-273.4E-12	-273.4E-12	-351.6E-12
50_OUT_REF	-273.4E-12	-351.6E-12	-273.4E-12	-273.4E-12	-312.5E-12	-273.4E-12	-273.4E-12	-351.6E-12
ON_LDC samples								
51	-351.6E-12	-351.6E-12						
52	-351.6E-12	-351.6E-12						
53	-429.7E-12	-429.7E-12						
54	-429.7E-12	-429.7E-12						
55	-351.6E-12	-351.6E-12						
56	-351.6E-12	-429.7E-12						
57	-273.4E-12	-312.5E-12		-351.6E-12				
58	-351.6E-12	-429.7E-12						
59	-429.7E-12	-429.7E-12						
60	-429.7E-12	-468.8E-12						
Statistics								
Min	-429.7E-12	-468.8E-12	-	-351.6E-12	-	-	-	-
Max	-273.4E-12	-312.5E-12	-	-351.6E-12	-	-	-	-
Average	-375.0E-12	-398.4E-12	-	-351.6E-12	-	-	-	-
Std Deviation	50.0E-12	48.8E-12	-	0.0E+00	-	-	-	-

Measurements

tDH	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-273.4E-12	-351.6E-12	-273.4E-12	-351.6E-12	-273.4E-12	-273.4E-12	-273.4E-12	-351.6E-12
50_OUT_REF	-273.4E-12	-351.6E-12	-273.4E-12	-273.4E-12	-312.5E-12	-273.4E-12	-273.4E-12	-351.6E-12
ON_HDC samples								
61	-273.4E-12	-351.6E-12	-351.6E-12					
62	-351.6E-12	-351.6E-12						
63	-351.6E-12	-351.6E-12						
64	-273.4E-12	-351.6E-12						
65	-351.6E-12	-351.6E-12						
66	-351.6E-12	-351.6E-12						
67	-351.6E-12	-351.6E-12						
68	-351.6E-12	-351.6E-12			-351.6E-12			
69	-351.6E-12	-351.6E-12						
70	-351.6E-12	-429.7E-12						
Statistics								
Min	-351.6E-12	-429.7E-12	-351.6E-12	-	-351.6E-12	-	-	-
Max	-273.4E-12	-351.6E-12	-351.6E-12	-	-351.6E-12	-	-	-
Average	-335.9E-12	-359.4E-12	-351.6E-12	-	-351.6E-12	-	-	-
Std Deviation	31.2E-12	23.4E-12	0.0E+00	-	0.0E+00	-	-	-

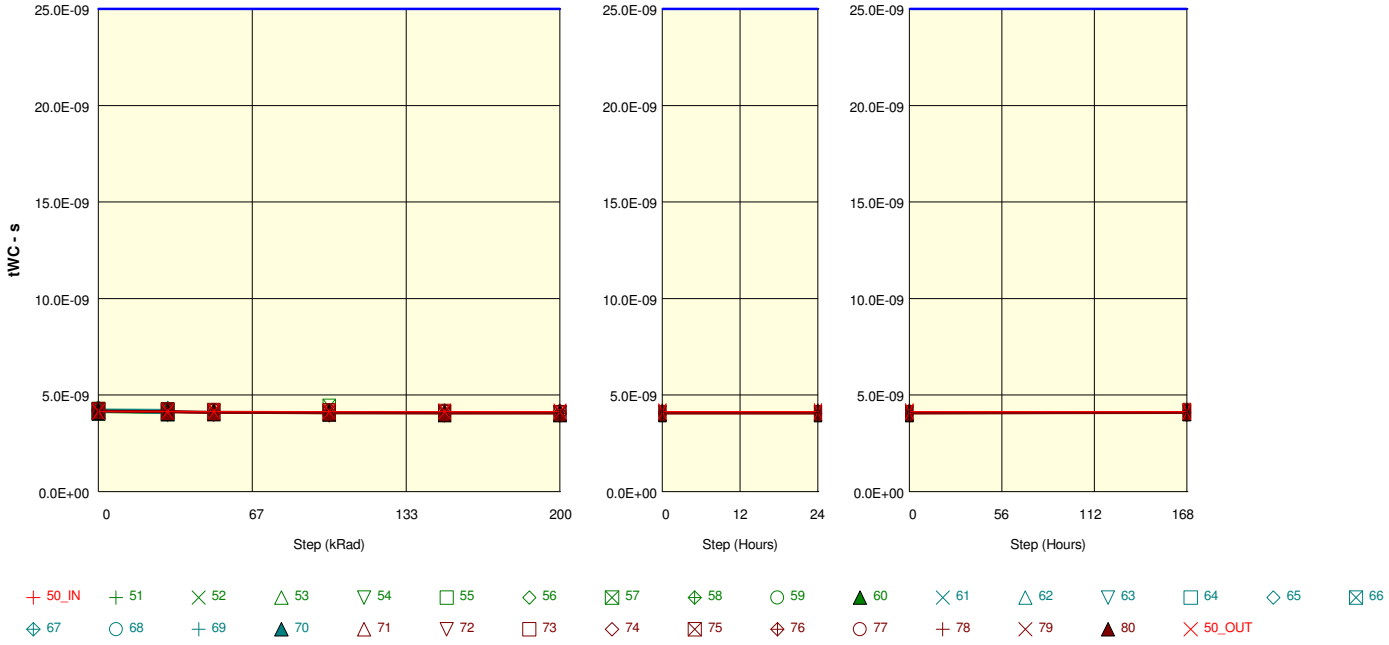
Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Measurements

tDH	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	-273.4E-12	-351.6E-12	-273.4E-12	-351.6E-12	-273.4E-12	-273.4E-12	-273.4E-12	-351.6E-12
50_OUT_REF	-273.4E-12	-351.6E-12	-273.4E-12	-273.4E-12	-312.5E-12	-273.4E-12	-273.4E-12	-351.6E-12
OFF samples								
71	-429.7E-12	-507.8E-12	-507.8E-12	-507.8E-12	-507.8E-12	-507.8E-12	-468.8E-12	-507.8E-12
72	-273.4E-12	-273.4E-12	-273.4E-12	-273.4E-12	-273.4E-12	-273.4E-12	-273.4E-12	-273.4E-12
73	-351.6E-12	-351.6E-12	-351.6E-12	-351.6E-12	-351.6E-12	-351.6E-12		-351.6E-12
74	-195.3E-12	-195.3E-12	-195.3E-12	-195.3E-12	-195.3E-12	-195.3E-12	-195.3E-12	-195.3E-12
75	-273.4E-12	-351.6E-12	-351.6E-12	-273.4E-12	-273.4E-12	-273.4E-12	-351.6E-12	-351.6E-12
76	-429.7E-12	-507.8E-12	-429.7E-12	-429.7E-12	-468.8E-12	-507.8E-12	-507.8E-12	-507.8E-12
77	-429.7E-12	-429.7E-12	-429.7E-12	-429.7E-12	-429.7E-12	-429.7E-12	-429.7E-12	-429.7E-12
78	-273.4E-12	-273.4E-12	-273.4E-12	-273.4E-12	-273.4E-12	-273.4E-12	-273.4E-12	-273.4E-12
79	-351.6E-12	-351.6E-12	-351.6E-12	-351.6E-12	-351.6E-12	-351.6E-12	-351.6E-12	-351.6E-12
80	-351.6E-12	-429.7E-12	-429.7E-12	-429.7E-12	-351.6E-12	-429.7E-12	-351.6E-12	-429.7E-12
Statistics								
Min	-429.7E-12	-507.8E-12	-507.8E-12	-507.8E-12	-507.8E-12	-507.8E-12	-507.8E-12	-507.8E-12
Max	-195.3E-12	-195.3E-12	-195.3E-12	-195.3E-12	-195.3E-12	-195.3E-12	-195.3E-12	-195.3E-12
Average	-335.9E-12	-367.2E-12	-359.4E-12	-351.6E-12	-347.7E-12	-359.4E-12	-355.9E-12	-367.2E-12
Std Deviation	76.5E-12	97.6E-12	88.7E-12	92.4E-12	93.2E-12	101.6E-12	94.7E-12	97.6E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Write Cycle Time : tWC
Test conditions :
Unit : s
Spec Limit Max : 25.0E-09
Spec limits are represented in bold lines on the graphic.



Measurements

tWC	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09
50_OUT_REF	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09
ON_LDC samples								
51	4.2E-09	4.2E-09						
52	4.2E-09	4.1E-09						
53	4.1E-09	4.1E-09						
54	4.1E-09	4.1E-09						
55	4.2E-09	4.2E-09						
56	4.2E-09	4.2E-09						
57	4.2E-09	4.1E-09		4.4E-09				
58	4.2E-09	4.2E-09						
59	4.2E-09	4.2E-09						
60	4.2E-09	4.2E-09						
Statistics								
Min	4.1E-09	4.1E-09	-	4.4E-09	-	-	-	-
Max	4.2E-09	4.2E-09	-	4.4E-09	-	-	-	-
Average	4.2E-09	4.1E-09	-	4.4E-09	-	-	-	-
Std Deviation	42.8E-12	45.7E-12	-	0.0E+00	-	-	-	-

Measurements

tWC	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09
50_OUT_REF	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09
ON_HDC samples								
61	4.2E-09	4.2E-09	4.1E-09					
62	4.2E-09	4.1E-09						
63	4.2E-09	4.1E-09						
64	4.2E-09	4.1E-09						
65	4.2E-09	4.2E-09						
66	4.1E-09	4.1E-09						
67	4.3E-09	4.3E-09						
68	4.2E-09	4.1E-09			4.1E-09			
69	4.1E-09	4.1E-09						
70	4.1E-09	4.1E-09						
Statistics								
Min	4.1E-09	4.1E-09	4.1E-09	-	4.1E-09	-	-	-
Max	4.3E-09	4.3E-09	4.1E-09	-	4.1E-09	-	-	-
Average	4.2E-09	4.1E-09	4.1E-09	-	4.1E-09	-	-	-
Std Deviation	48.7E-12	55.3E-12	0.0E+00	-	0.0E+00	-	-	-

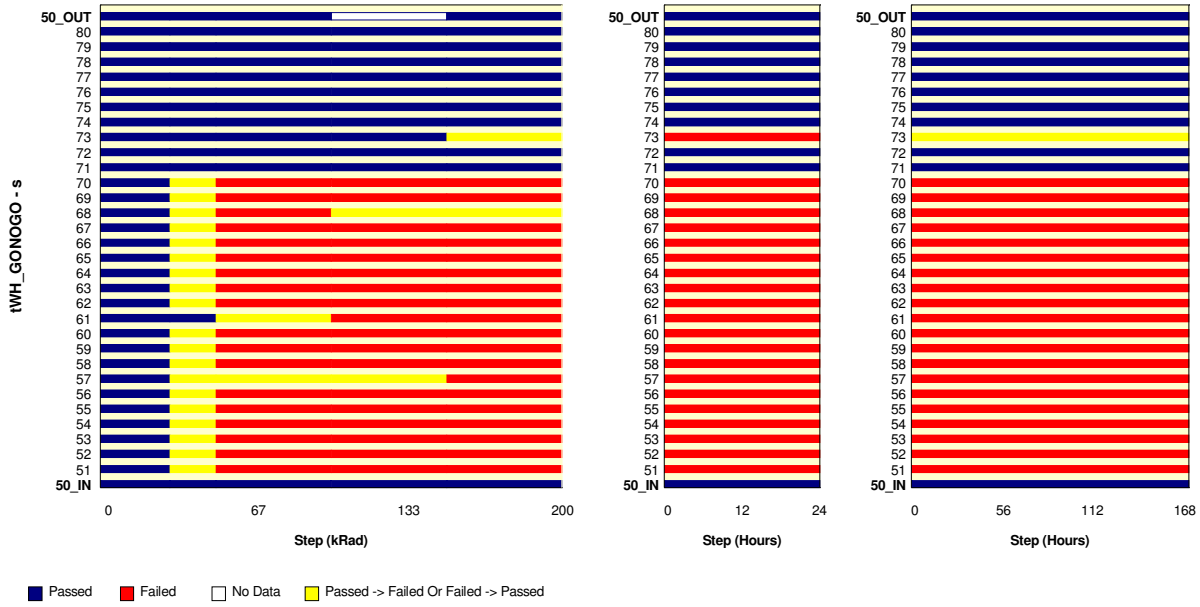
Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Measurements

tWC	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09
50_OUT_REF	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09
OFF samples								
71	4.2E-09	4.2E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09
72	4.1E-09	4.1E-09	4.1E-09	4.0E-09	4.1E-09	4.0E-09	4.0E-09	4.1E-09
73	4.2E-09	4.2E-09	4.2E-09	4.1E-09	4.1E-09			4.2E-09
74	4.2E-09	4.2E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09
75	4.2E-09	4.2E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09
76	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.0E-09	4.1E-09	4.1E-09	4.1E-09
77	4.2E-09	4.2E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09
78	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09
79	4.2E-09	4.2E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09
80	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.0E-09	4.0E-09	4.0E-09	4.1E-09
Statistics								
Min	4.1E-09	4.1E-09	4.1E-09	4.0E-09	4.0E-09	4.0E-09	4.0E-09	4.1E-09
Max	4.2E-09	4.2E-09	4.2E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.2E-09
Average	4.2E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09	4.1E-09
Std Deviation	29.8E-12	34.4E-12	31.2E-12	34.8E-12	27.9E-12	21.8E-12	22.1E-12	32.5E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : WE/ High Hold Time : tWH_GONOGO
Test conditions :
Unit : s
Spec Limit Max : 10.0E-09
Spec limits are represented in bold lines on the graphic.



Measurements

tWH_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_LDC samples								
51	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
52	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
53	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
54	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
55	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
56	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
57	PASS	PASS	FAIL	PASS	FAIL	FAIL	FAIL	FAIL
58	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
59	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
60	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

Measurements

tWH_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_HDC samples								
61	PASS	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL
62	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
63	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
64	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
65	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
66	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
67	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
68	PASS	PASS	FAIL	FAIL	PASS	FAIL	FAIL	FAIL
69	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
70	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

Measurements

tWH_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
OFF samples								
71	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
72	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
73	PASS	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS
74	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

tWH_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
75	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
76	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
77	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
78	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
79	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
80	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

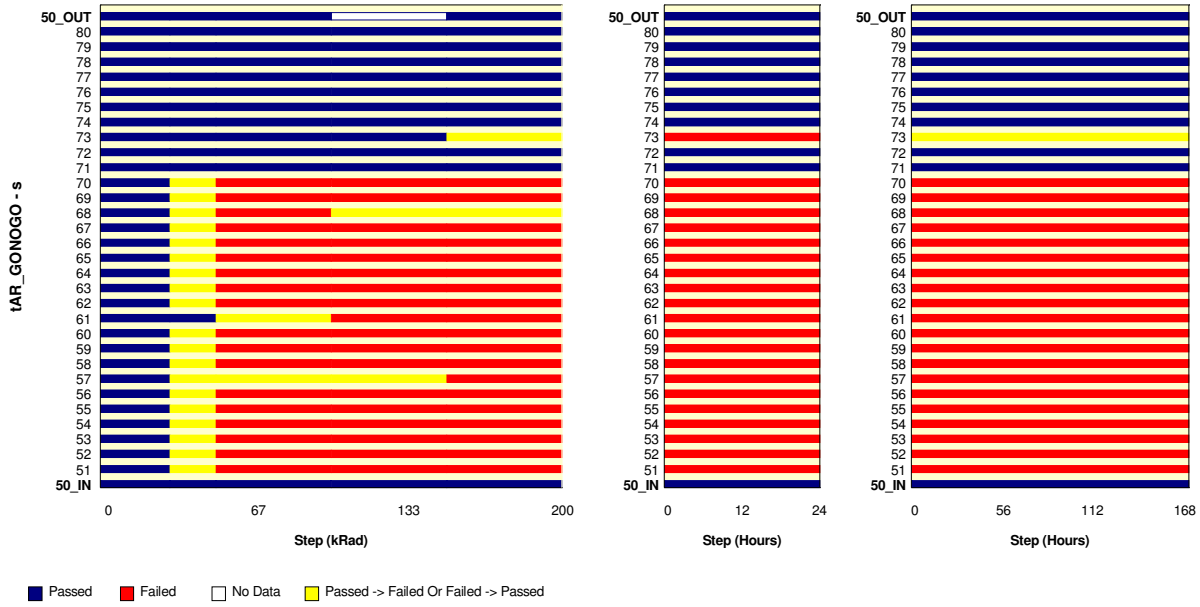
Parameter : ALE to RE/ Delay : tAR_GONOGO

Test conditions :

Unit : s

Spec Limit Max : 10.0E-09

Spec limits are represented in bold lines on the graphic.



Measurements

tAR_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_LDC samples								
51	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
52	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
53	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
54	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
55	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
56	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
57	PASS	PASS	FAIL	PASS	FAIL	FAIL	FAIL	FAIL
58	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
59	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
60	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

Measurements

tAR_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_HDC samples								
61	PASS	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL
62	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
63	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
64	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
65	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
66	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
67	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
68	PASS	PASS	FAIL	FAIL	PASS	FAIL	FAIL	FAIL
69	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
70	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

Measurements

tAR_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
OFF samples								
71	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
72	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
73	PASS	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS
74	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

tAR_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
75	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
76	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
77	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
78	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
79	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
80	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

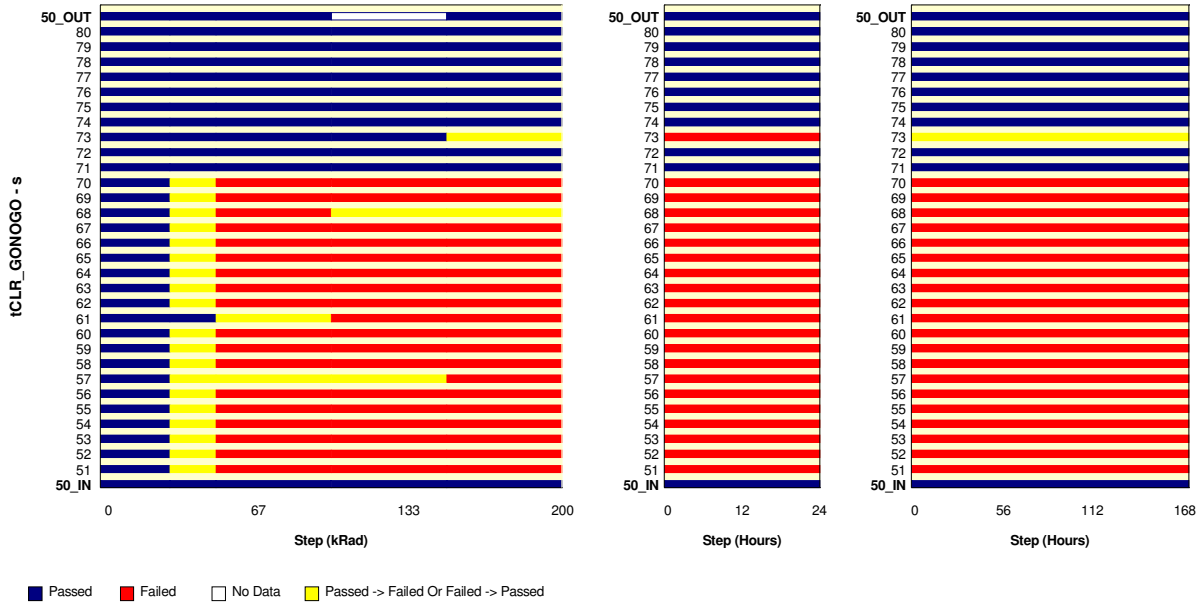
Parameter : CLE to RE/ Delay : tCLR_GONOGO

Test conditions :

Unit : s

Spec Limit Max : 10.0E-09

Spec limits are represented in bold lines on the graphic.



Measurements

tCLR_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_LDC samples								
51	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
52	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
53	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
54	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
55	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
56	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
57	PASS	PASS	FAIL	PASS	FAIL	FAIL	FAIL	FAIL
58	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
59	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
60	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

Measurements

tCLR_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_HDC samples								
61	PASS	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL
62	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
63	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
64	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
65	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
66	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
67	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
68	PASS	PASS	FAIL	FAIL	PASS	FAIL	FAIL	FAIL
69	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
70	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

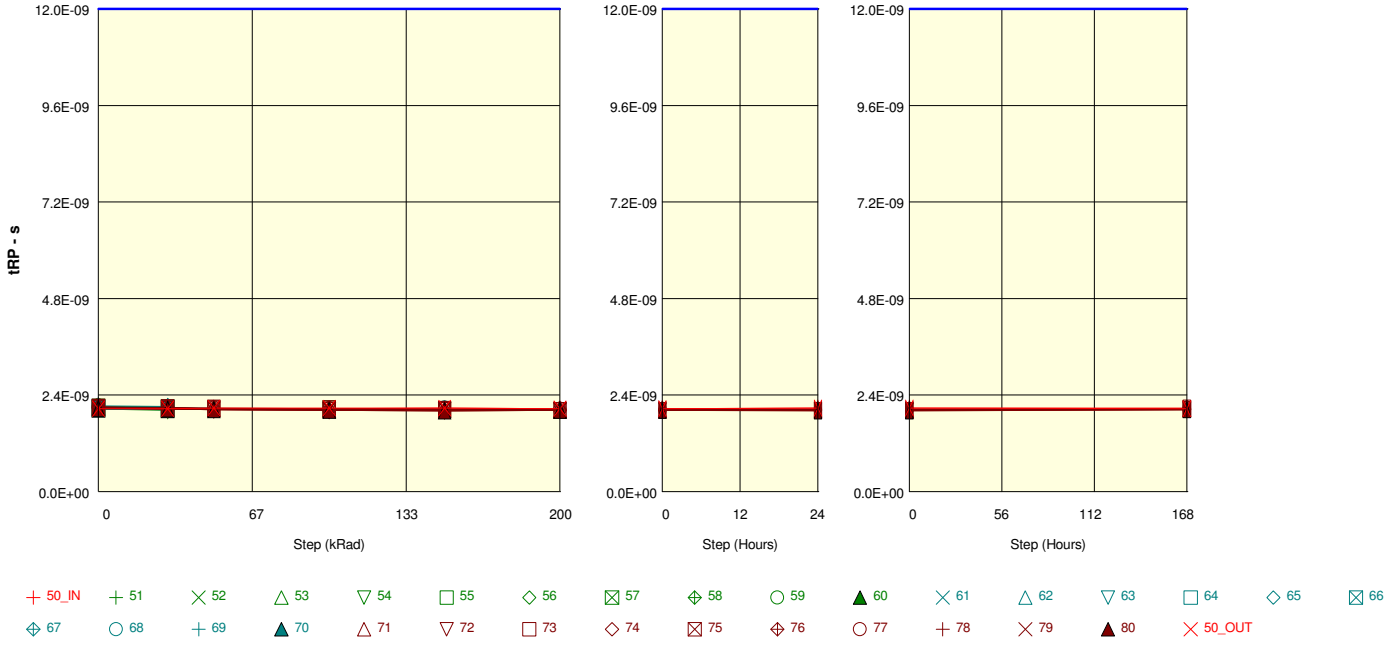
Measurements

tCLR_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
OFF samples								
71	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
72	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
73	PASS	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS
74	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

tCLR_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
75	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
76	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
77	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
78	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
79	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
80	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : RE/ Pulse Width : tRP
Test conditions :
Unit : s
Spec Limit Max : 12.0E-09
Spec limits are represented in bold lines on the graphic.



Measurements

tRP	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09
50_OUT_REF	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09
ON_LDC samples								
51	2.1E-09	2.1E-09						
52	2.1E-09	2.1E-09						
53	2.1E-09	2.1E-09						
54	2.1E-09	2.0E-09						
55	2.1E-09	2.1E-09						
56	2.1E-09	2.1E-09						
57	2.1E-09	2.1E-09		2.1E-09				
58	2.1E-09	2.1E-09						
59	2.1E-09	2.1E-09						
60	2.1E-09	2.1E-09						
Statistics								
Min	2.1E-09	2.0E-09	-	2.1E-09	-	-	-	-
Max	2.1E-09	2.1E-09	-	2.1E-09	-	-	-	-
Average	2.1E-09	2.1E-09	-	2.1E-09	-	-	-	-
Std Deviation	21.6E-12	23.7E-12	-	0.0E+00	-	-	-	-

Measurements

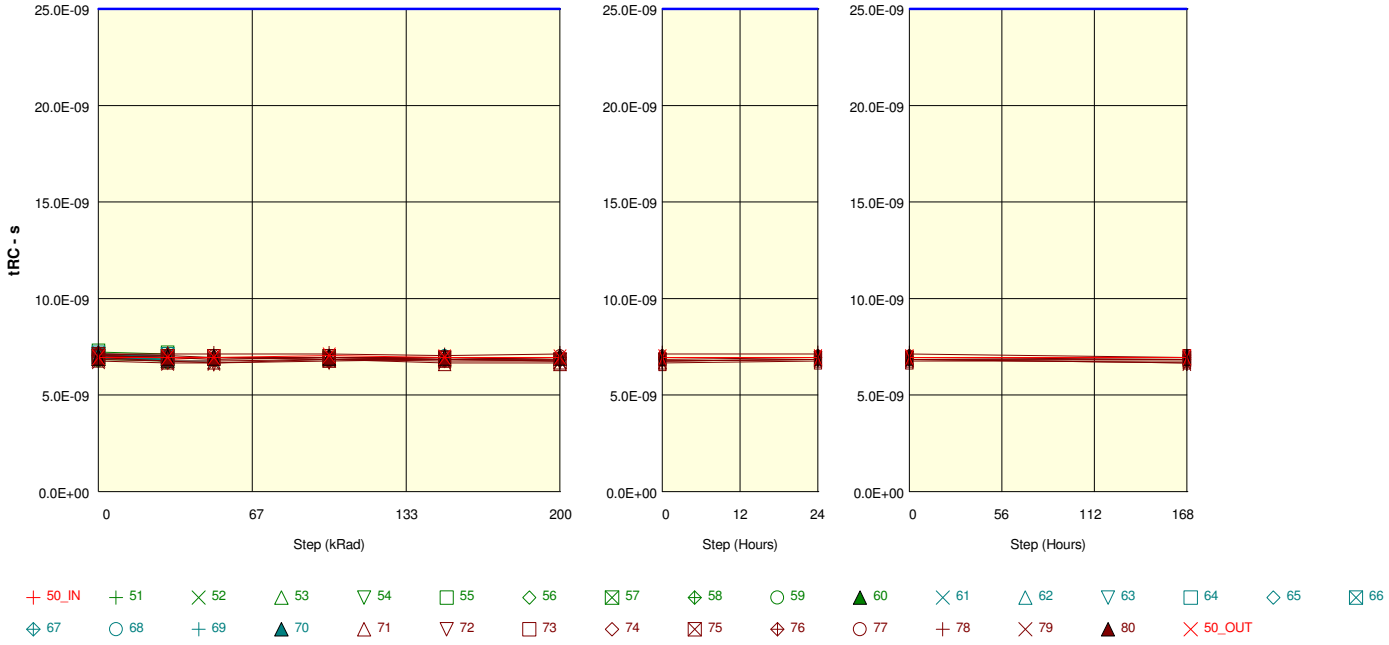
tRP	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09
50_OUT_REF	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09
ON_HDC samples								
61	2.1E-09	2.1E-09	2.1E-09					
62	2.1E-09	2.1E-09						
63	2.1E-09	2.1E-09						
64	2.1E-09	2.1E-09						
65	2.1E-09	2.1E-09						
66	2.1E-09	2.1E-09						
67	2.1E-09	2.1E-09						
68	2.1E-09	2.1E-09			2.1E-09			
69	2.1E-09	2.0E-09						
70	2.1E-09	2.0E-09						
Statistics								
Min	2.1E-09	2.0E-09	2.1E-09	-	2.1E-09	-	-	-
Max	2.1E-09	2.1E-09	2.1E-09	-	2.1E-09	-	-	-
Average	2.1E-09	2.1E-09	2.1E-09	-	2.1E-09	-	-	-
Std Deviation	23.7E-12	26.1E-12	0.0E+00	-	0.0E+00	-	-	-

Measurements

tRP	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09
50_OUT_REF	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09
OFF samples								
71	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.0E-09	2.0E-09	2.0E-09	2.1E-09
72	2.1E-09	2.1E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09
73	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09			2.1E-09
74	2.1E-09	2.1E-09	2.1E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.1E-09
75	2.1E-09	2.1E-09	2.1E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.1E-09
76	2.1E-09	2.1E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09
77	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.0E-09	2.0E-09	2.0E-09	2.1E-09
78	2.1E-09	2.1E-09	2.1E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09
79	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09
80	2.1E-09	2.1E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09
Statistics								
Min	2.1E-09	2.1E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09
Max	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09
Average	2.1E-09	2.1E-09	2.1E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.1E-09
Std Deviation	13.8E-12	14.3E-12	14.3E-12	13.8E-12	14.4E-12	9.4E-12	11.7E-12	15.1E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Read Cycle Time : tRC
Test conditions :
Unit : s
Spec Limit Max : 25.0E-09
Spec limits are represented in bold lines on the graphic.



Measurements

tRC	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	7.0E-09	6.9E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09
50_OUT_REF	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09
ON_LDC samples								
51	7.0E-09	6.8E-09						
52	7.1E-09	7.0E-09						
53	7.0E-09	6.9E-09						
54	7.0E-09	7.0E-09						
55	7.2E-09	7.1E-09						
56	7.0E-09	7.0E-09						
57	7.0E-09	7.0E-09		7.0E-09				
58	7.0E-09	7.0E-09						
59	6.9E-09	6.8E-09						
60	7.0E-09	6.9E-09						
Statistics								
Min	6.9E-09	6.8E-09	-	7.0E-09	-	-	-	-
Max	7.2E-09	7.1E-09	-	7.0E-09	-	-	-	-
Average	7.0E-09	6.9E-09	-	7.0E-09	-	-	-	-
Std Deviation	102.0E-12	115.9E-12	-	0.0E+00	-	-	-	-

Measurements

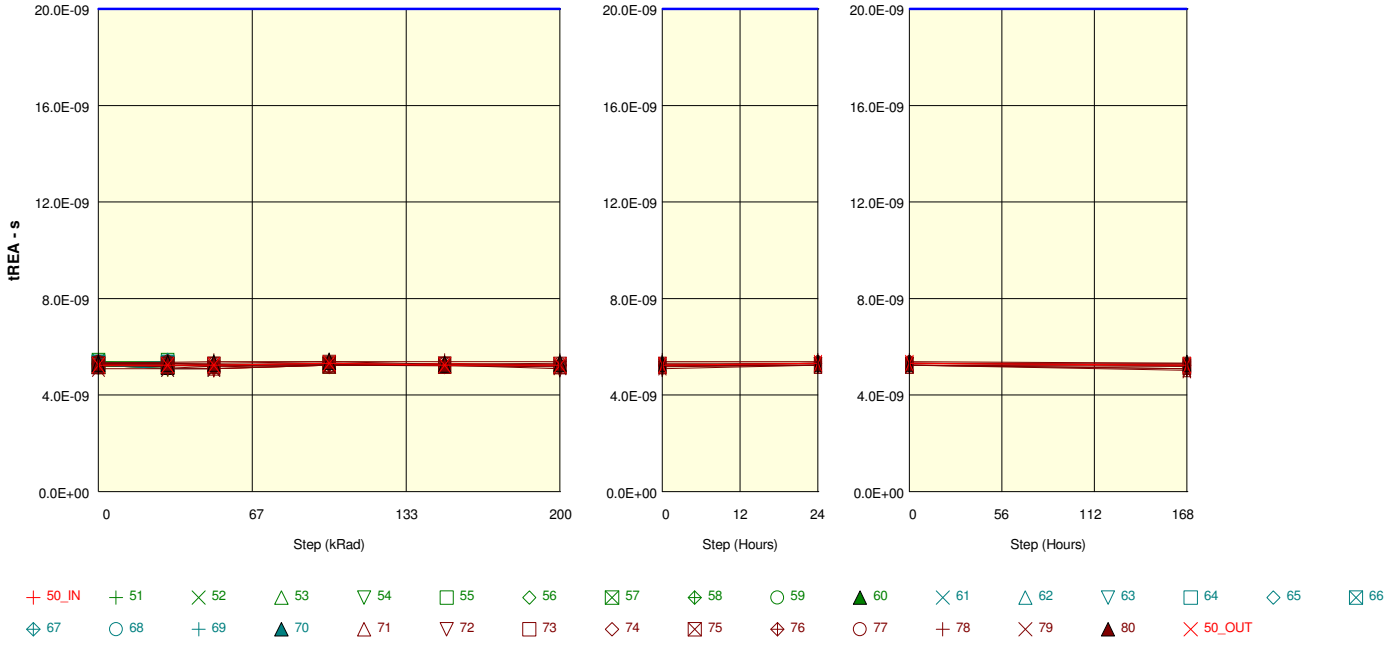
tRC	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	7.0E-09	6.9E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09
50_OUT_REF	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09
ON_HDC samples								
61	7.0E-09	6.8E-09	6.8E-09					
62	7.0E-09	7.0E-09						
63	7.0E-09	7.0E-09						
64	7.0E-09	7.0E-09						
65	7.0E-09	7.0E-09						
66	7.1E-09	7.0E-09						
67	7.1E-09	7.0E-09						
68	7.0E-09	6.9E-09			7.0E-09			
69	7.0E-09	6.9E-09						
70	7.0E-09	6.9E-09						
Statistics								
Min	7.0E-09	6.8E-09	6.8E-09	-	7.0E-09	-	-	-
Max	7.1E-09	7.0E-09	6.8E-09	-	7.0E-09	-	-	-
Average	7.0E-09	6.9E-09	6.8E-09	-	7.0E-09	-	-	-
Std Deviation	69.4E-12	90.9E-12	0.0E+00	-	0.0E+00	-	-	-

Measurements

tRC	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	7.0E-09	6.9E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09
50_OUT_REF	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09
OFF samples								
71	6.9E-09	6.8E-09	6.8E-09	6.9E-09	6.7E-09	6.7E-09	6.8E-09	6.8E-09
72	7.0E-09	6.8E-09	6.7E-09	6.8E-09	6.9E-09	6.8E-09	6.9E-09	6.7E-09
73	7.0E-09	7.0E-09	7.0E-09	7.0E-09	6.9E-09			7.0E-09
74	7.1E-09	7.0E-09	7.0E-09	7.0E-09	6.9E-09	6.9E-09	7.0E-09	7.0E-09
75	7.0E-09	7.0E-09	7.0E-09	6.9E-09	6.9E-09	6.8E-09	6.9E-09	6.9E-09
76	7.0E-09	7.0E-09	6.9E-09	7.0E-09	6.9E-09	7.0E-09	7.0E-09	6.9E-09
77	7.0E-09	7.0E-09	7.0E-09	6.9E-09	6.9E-09	7.0E-09	7.0E-09	7.0E-09
78	7.1E-09	7.1E-09	7.1E-09	7.1E-09	7.0E-09	7.1E-09	7.1E-09	7.0E-09
79	6.8E-09	6.7E-09	6.7E-09	6.9E-09	6.8E-09	6.8E-09	6.9E-09	6.7E-09
80	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09
Statistics								
Min	6.8E-09	6.7E-09	6.7E-09	6.8E-09	6.7E-09	6.7E-09	6.8E-09	6.7E-09
Max	7.1E-09	7.1E-09	7.1E-09	7.1E-09	7.0E-09	7.1E-09	7.1E-09	7.0E-09
Average	7.0E-09	6.9E-09	6.9E-09	6.9E-09	6.9E-09	6.9E-09	6.9E-09	6.9E-09
Std Deviation	111.3E-12	132.5E-12	137.9E-12	94.6E-12	92.8E-12	134.4E-12	97.8E-12	109.8E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : RE/ Access Time : tREA
Test conditions :
Unit : s
Spec Limit Max : 20.0E-09
Spec limits are represented in bold lines on the graphic.



Measurements

tREA	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	5.2E-09	5.1E-09	5.1E-09	5.2E-09	5.3E-09	5.2E-09	5.2E-09	5.2E-09
50_OUT_REF	5.2E-09	5.2E-09	5.2E-09	5.3E-09	5.2E-09	5.2E-09	5.3E-09	5.2E-09
ON_LDC samples								
51	5.2E-09	5.1E-09						
52	5.4E-09	5.3E-09						
53	5.2E-09	5.2E-09						
54	5.3E-09	5.2E-09						
55	5.4E-09	5.4E-09						
56	5.3E-09	5.3E-09						
57	5.2E-09	5.2E-09		5.2E-09				
58	5.3E-09	5.3E-09						
59	5.2E-09	5.2E-09						
60	5.2E-09	5.2E-09						
Statistics								
Min	5.2E-09	5.1E-09	-	5.2E-09	-	-	-	-
Max	5.4E-09	5.4E-09	-	5.2E-09	-	-	-	-
Average	5.3E-09	5.2E-09	-	5.2E-09	-	-	-	-
Std Deviation	63.4E-12	78.0E-12	-	0.0E+00	-	-	-	-

Measurements

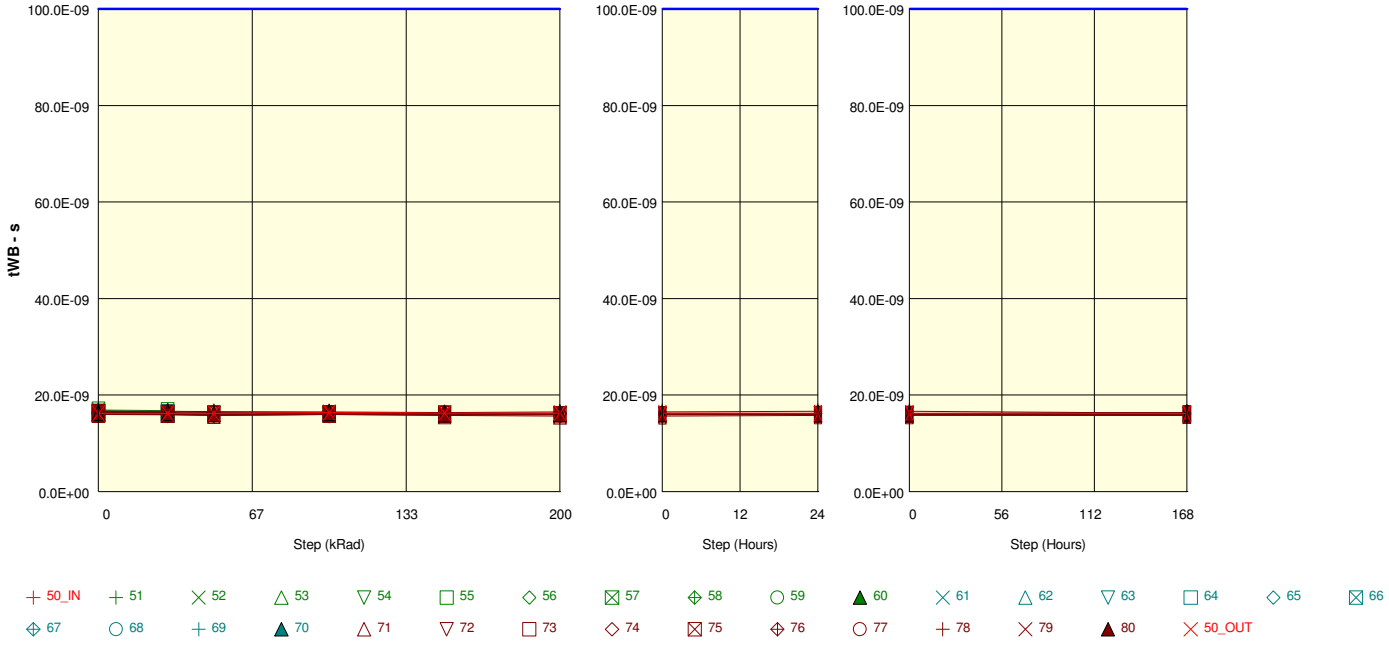
tREA	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	5.2E-09	5.1E-09	5.1E-09	5.2E-09	5.3E-09	5.2E-09	5.2E-09	5.2E-09
50_OUT_REF	5.2E-09	5.2E-09	5.2E-09	5.3E-09	5.2E-09	5.2E-09	5.3E-09	5.2E-09
ON_HDC samples								
61	5.2E-09	5.1E-09	5.1E-09					
62	5.3E-09	5.3E-09						
63	5.2E-09	5.3E-09						
64	5.3E-09	5.3E-09						
65	5.2E-09	5.2E-09						
66	5.3E-09	5.3E-09						
67	5.3E-09	5.4E-09						
68	5.2E-09	5.2E-09			5.2E-09			
69	5.2E-09	5.2E-09						
70	5.2E-09	5.2E-09						
Statistics								
Min	5.2E-09	5.1E-09	5.1E-09	-	5.2E-09	-	-	-
Max	5.3E-09	5.4E-09	5.1E-09	-	5.2E-09	-	-	-
Average	5.3E-09	5.3E-09	5.1E-09	-	5.2E-09	-	-	-
Std Deviation	37.1E-12	82.5E-12	0.0E+00	-	0.0E+00	-	-	-

Measurements

tREA	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	5.2E-09	5.1E-09	5.1E-09	5.2E-09	5.3E-09	5.2E-09	5.2E-09	5.2E-09
50_OUT_REF	5.2E-09	5.2E-09	5.2E-09	5.3E-09	5.2E-09	5.2E-09	5.3E-09	5.2E-09
OFF samples								
71	5.2E-09	5.2E-09	5.2E-09	5.2E-09	5.2E-09	5.2E-09	5.2E-09	5.1E-09
72	5.2E-09	5.2E-09	5.1E-09	5.2E-09	5.2E-09	5.1E-09	5.2E-09	5.1E-09
73	5.2E-09	5.2E-09	5.2E-09	5.3E-09	5.2E-09			5.2E-09
74	5.3E-09	5.3E-09	5.3E-09	5.3E-09	5.2E-09	5.2E-09	5.3E-09	5.2E-09
75	5.3E-09	5.2E-09	5.2E-09	5.3E-09	5.2E-09	5.2E-09	5.2E-09	5.2E-09
76	5.3E-09	5.2E-09	5.2E-09	5.3E-09	5.2E-09	5.2E-09	5.3E-09	5.2E-09
77	5.3E-09	5.3E-09	5.2E-09	5.2E-09	5.2E-09	5.2E-09	5.3E-09	5.2E-09
78	5.3E-09	5.4E-09	5.4E-09	5.4E-09	5.4E-09	5.4E-09	5.4E-09	5.3E-09
79	5.1E-09	5.1E-09	5.1E-09	5.2E-09	5.2E-09	5.2E-09	5.2E-09	5.0E-09
80	5.3E-09	5.3E-09	5.3E-09	5.4E-09	5.3E-09	5.3E-09	5.3E-09	5.3E-09
Statistics								
Min	5.1E-09	5.1E-09	5.1E-09	5.2E-09	5.2E-09	5.1E-09	5.2E-09	5.0E-09
Max	5.3E-09	5.4E-09	5.4E-09	5.4E-09	5.4E-09	5.4E-09	5.4E-09	5.3E-09
Average	5.3E-09	5.3E-09	5.2E-09	5.3E-09	5.3E-09	5.2E-09	5.3E-09	5.2E-09
Std Deviation	69.5E-12	75.8E-12	88.9E-12	57.7E-12	46.7E-12	80.7E-12	50.5E-12	93.0E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : WE High to Busy : tWB
Test conditions :
Unit : s
Spec Limit Max : 100.0E-09
Spec limits are represented in bold lines on the graphic.



Measurements

tWB	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	16.2E-09	16.1E-09	16.1E-09	16.3E-09	16.3E-09	16.3E-09	16.2E-09	16.2E-09
50_OUT_REF	16.2E-09	16.2E-09	16.2E-09	16.4E-09	16.3E-09	16.3E-09	16.3E-09	16.2E-09
ON_LDC samples								
51	16.3E-09	16.0E-09						
52	16.8E-09	16.4E-09						
53	16.3E-09	16.0E-09						
54	16.3E-09	16.1E-09						
55	16.9E-09	16.8E-09						
56	16.4E-09	16.4E-09						
57	16.3E-09	16.1E-09		16.2E-09				
58	16.5E-09	16.4E-09						
59	16.2E-09	16.0E-09						
60	16.2E-09	16.0E-09						
Statistics								
Min	16.2E-09	16.0E-09	-	16.2E-09	-	-	-	-
Max	16.9E-09	16.8E-09	-	16.2E-09	-	-	-	-
Average	16.4E-09	16.2E-09	-	16.2E-09	-	-	-	-
Std Deviation	242.2E-12	240.6E-12	-	0.0E+00	-	-	-	-

Measurements

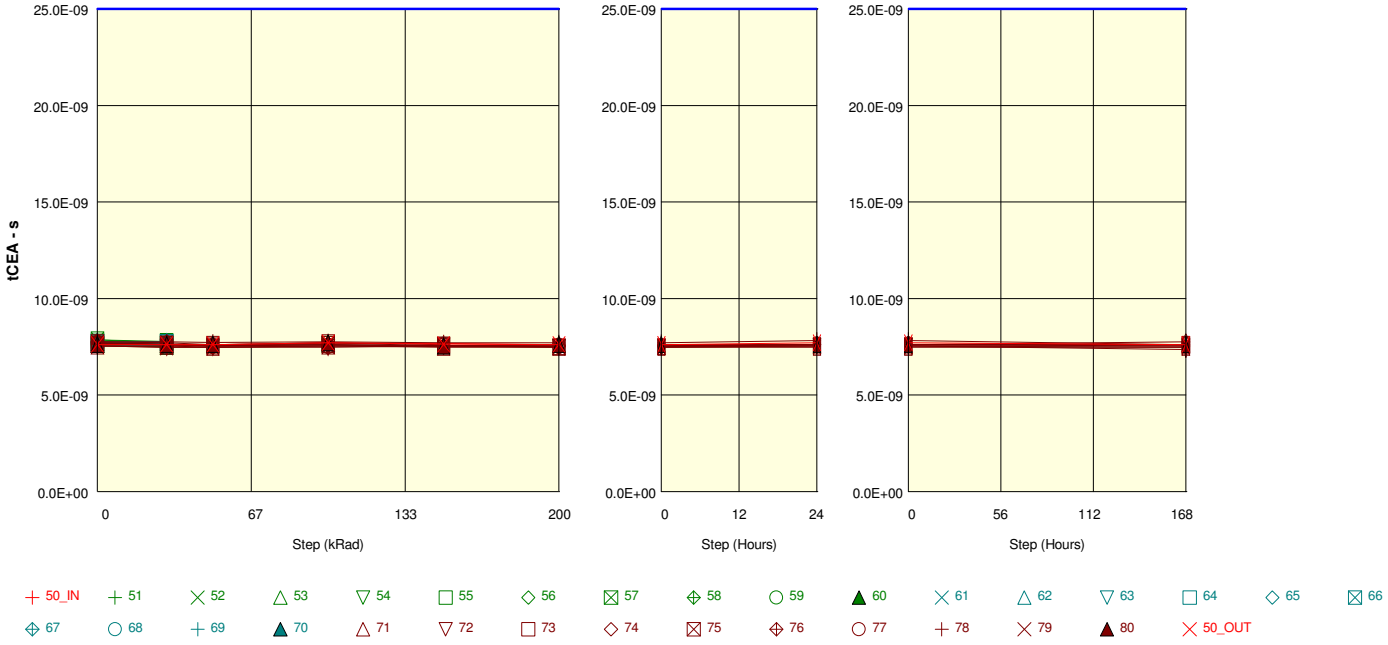
tWB	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	16.2E-09	16.1E-09	16.1E-09	16.3E-09	16.3E-09	16.3E-09	16.2E-09	16.2E-09
50_OUT_REF	16.2E-09	16.2E-09	16.2E-09	16.4E-09	16.3E-09	16.3E-09	16.3E-09	16.2E-09
ON_HDC samples								
61	16.3E-09	16.0E-09	16.0E-09					
62	16.4E-09	16.4E-09						
63	16.4E-09	16.4E-09						
64	16.4E-09	16.3E-09						
65	16.4E-09	16.3E-09						
66	16.4E-09	16.2E-09						
67	16.7E-09	16.6E-09						
68	16.3E-09	16.0E-09			16.2E-09			
69	16.3E-09	16.1E-09						
70	16.2E-09	16.1E-09						
Statistics								
Min	16.2E-09	16.0E-09	16.0E-09	-	16.2E-09	-	-	-
Max	16.7E-09	16.6E-09	16.0E-09	-	16.2E-09	-	-	-
Average	16.4E-09	16.3E-09	16.0E-09	-	16.2E-09	-	-	-
Std Deviation	125.5E-12	177.4E-12	0.0E+00	-	0.0E+00	-	-	-

Measurements

tWB	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	16.2E-09	16.1E-09	16.1E-09	16.3E-09	16.3E-09	16.3E-09	16.2E-09	16.2E-09
50_OUT_REF	16.2E-09	16.2E-09	16.2E-09	16.4E-09	16.3E-09	16.3E-09	16.3E-09	16.2E-09
OFF samples								
71	16.0E-09	16.0E-09	15.8E-09	16.0E-09	15.8E-09	15.7E-09	15.8E-09	15.8E-09
72	16.3E-09	16.0E-09	16.0E-09	16.0E-09	16.1E-09	16.0E-09	16.0E-09	16.0E-09
73	16.2E-09	16.2E-09	16.1E-09	16.2E-09	16.0E-09			16.2E-09
74	16.6E-09	16.5E-09	16.4E-09	16.3E-09	16.1E-09	16.1E-09	16.2E-09	16.4E-09
75	16.4E-09	16.3E-09	16.1E-09	16.1E-09	16.0E-09	15.9E-09	16.0E-09	16.0E-09
76	16.3E-09	16.2E-09	15.9E-09	16.1E-09	16.0E-09	16.0E-09	16.1E-09	16.0E-09
77	16.4E-09	16.2E-09	16.1E-09	16.0E-09	15.9E-09	16.0E-09	16.0E-09	16.2E-09
78	16.6E-09	16.6E-09	16.6E-09	16.5E-09	16.4E-09	16.5E-09	16.6E-09	16.3E-09
79	16.0E-09	15.9E-09	15.8E-09	16.0E-09	16.0E-09	16.0E-09	16.0E-09	15.8E-09
80	16.4E-09	16.4E-09	16.2E-09	16.4E-09	16.1E-09	16.2E-09	16.2E-09	16.3E-09
Statistics								
Min	16.0E-09	15.9E-09	15.8E-09	16.0E-09	15.8E-09	15.7E-09	15.8E-09	15.8E-09
Max	16.6E-09	16.6E-09	16.6E-09	16.5E-09	16.4E-09	16.5E-09	16.6E-09	16.4E-09
Average	16.3E-09	16.2E-09	16.1E-09	16.2E-09	16.0E-09	16.1E-09	16.1E-09	16.1E-09
Std Deviation	207.3E-12	218.7E-12	234.7E-12	176.6E-12	160.2E-12	222.4E-12	219.7E-12	200.1E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : CE/ Access Time : tCEA
Test conditions :
Unit : s
Spec Limit Max : 25.0E-09
Spec limits are represented in bold lines on the graphic.



Measurements

tCEA	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	7.6E-09	7.5E-09	7.5E-09	7.7E-09	7.7E-09	7.6E-09	7.6E-09	7.6E-09
50_OUT_REF	7.6E-09	7.6E-09	7.6E-09	7.7E-09	7.6E-09	7.6E-09	7.7E-09	7.6E-09
ON_LDC samples								
51	7.6E-09	7.5E-09						
52	7.9E-09	7.7E-09						
53	7.6E-09	7.5E-09						
54	7.7E-09	7.6E-09						
55	7.9E-09	7.8E-09						
56	7.8E-09	7.7E-09						
57	7.6E-09	7.5E-09		7.6E-09				
58	7.7E-09	7.6E-09						
59	7.6E-09	7.5E-09						
60	7.7E-09	7.5E-09						
Statistics								
Min	7.6E-09	7.5E-09	-	7.6E-09	-	-	-	-
Max	7.9E-09	7.8E-09	-	7.6E-09	-	-	-	-
Average	7.7E-09	7.6E-09	-	7.6E-09	-	-	-	-
Std Deviation	89.3E-12	89.4E-12	-	0.0E+00	-	-	-	-

Measurements

tCEA	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	7.6E-09	7.5E-09	7.5E-09	7.7E-09	7.7E-09	7.6E-09	7.6E-09	7.6E-09
50_OUT_REF	7.6E-09	7.6E-09	7.6E-09	7.7E-09	7.6E-09	7.6E-09	7.7E-09	7.6E-09
ON_HDC samples								
61	7.6E-09	7.6E-09	7.5E-09					
62	7.7E-09	7.7E-09						
63	7.7E-09	7.7E-09						
64	7.7E-09	7.7E-09						
65	7.7E-09	7.7E-09						
66	7.7E-09	7.7E-09						
67	7.8E-09	7.8E-09						
68	7.6E-09	7.5E-09			7.6E-09			
69	7.7E-09	7.7E-09						
70	7.6E-09	7.6E-09						
Statistics								
Min	7.6E-09	7.5E-09	7.5E-09	-	7.6E-09	-	-	-
Max	7.8E-09	7.8E-09	7.5E-09	-	7.6E-09	-	-	-
Average	7.7E-09	7.7E-09	7.5E-09	-	7.6E-09	-	-	-
Std Deviation	49.9E-12	63.9E-12	0.0E+00	-	0.0E+00	-	-	-

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Measurements

tCEA	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	7.6E-09	7.5E-09	7.5E-09	7.7E-09	7.7E-09	7.6E-09	7.6E-09	7.6E-09
50_OUT_REF	7.6E-09	7.6E-09	7.6E-09	7.7E-09	7.6E-09	7.6E-09	7.7E-09	7.6E-09
OFF samples								
71	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09
72	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.4E-09
73	7.6E-09	7.6E-09	7.6E-09	7.7E-09	7.6E-09			7.6E-09
74	7.8E-09	7.7E-09	7.6E-09	7.6E-09	7.5E-09	7.5E-09	7.6E-09	7.8E-09
75	7.7E-09	7.7E-09	7.5E-09	7.6E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09
76	7.7E-09	7.6E-09	7.5E-09	7.6E-09	7.5E-09	7.5E-09	7.6E-09	7.5E-09
77	7.7E-09	7.6E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.6E-09	7.6E-09
78	7.8E-09	7.8E-09	7.7E-09	7.8E-09	7.7E-09	7.7E-09	7.8E-09	7.6E-09
79	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09
80	7.6E-09	7.6E-09	7.6E-09	7.7E-09	7.5E-09	7.6E-09	7.6E-09	7.6E-09
Statistics								
Min	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.4E-09
Max	7.8E-09	7.8E-09	7.7E-09	7.8E-09	7.7E-09	7.7E-09	7.8E-09	7.8E-09
Average	7.7E-09	7.6E-09	7.6E-09	7.6E-09	7.6E-09	7.6E-09	7.6E-09	7.6E-09
Std Deviation	80.5E-12	85.4E-12	80.5E-12	86.2E-12	57.1E-12	70.6E-12	92.3E-12	106.6E-12

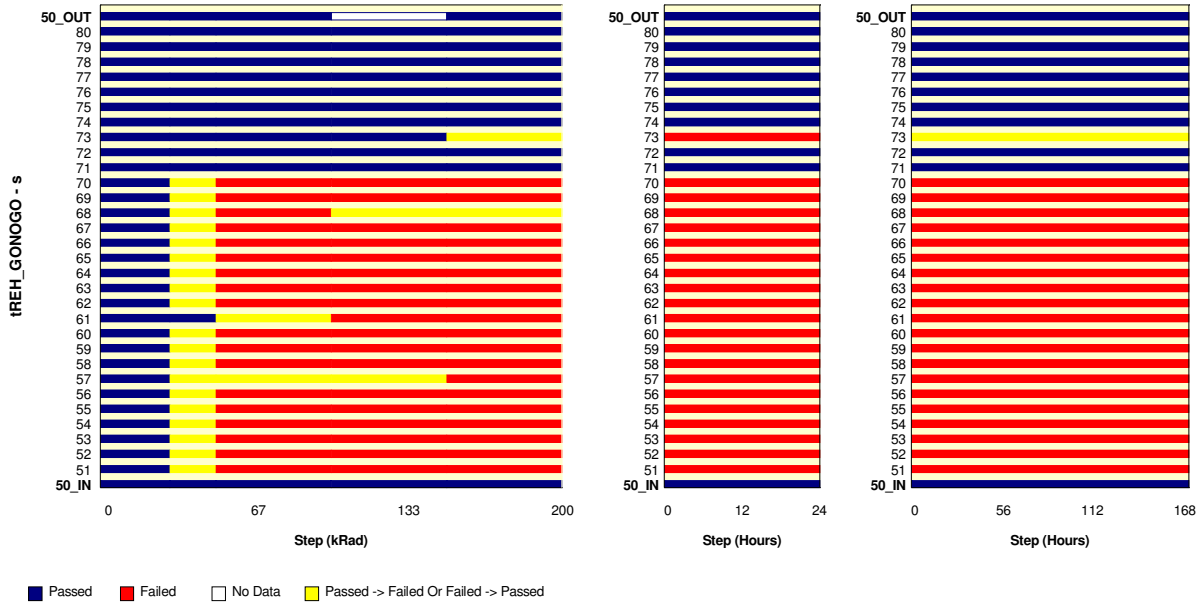
Parameter : RE/ High Hold Time : tREH_GONOGO

Test conditions :

Unit : s

Spec Limit Max : 10.0E-09

Spec limits are represented in bold lines on the graphic.



Measurements

tREH_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_LDC samples								
51	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
52	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
53	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
54	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
55	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
56	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
57	PASS	PASS	FAIL	PASS	FAIL	FAIL	FAIL	FAIL
58	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
59	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
60	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

Measurements

tREH_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_HDC samples								
61	PASS	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL
62	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
63	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
64	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
65	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
66	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
67	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
68	PASS	PASS	FAIL	FAIL	PASS	FAIL	FAIL	FAIL
69	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
70	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

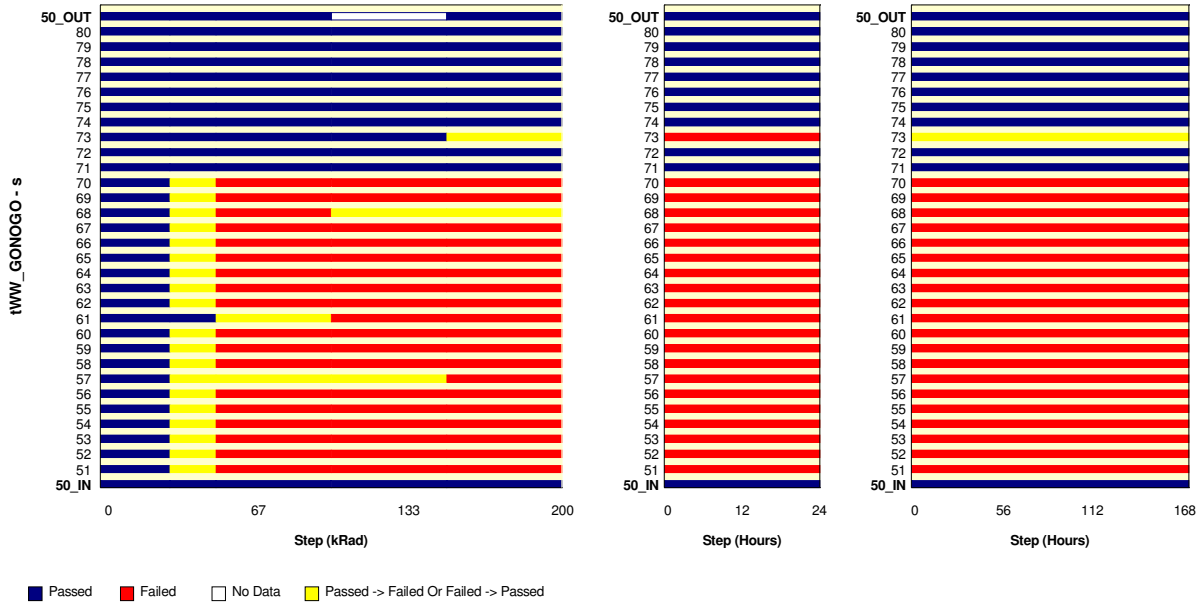
Measurements

tREH_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
OFF samples								
71	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
72	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
73	PASS	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS
74	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

tREH_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
75	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
76	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
77	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
78	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
79	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
80	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : WP/ High to WE/ Low : tWW_GONOGO
Test conditions :
Unit : s
Spec Limit Max : 100.0E-09
Spec limits are represented in bold lines on the graphic.



Measurements

tWW_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_LDC samples								
51	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
52	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
53	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
54	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
55	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
56	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
57	PASS	PASS	FAIL	PASS	FAIL	FAIL	FAIL	FAIL
58	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
59	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
60	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

Measurements

tWW_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_HDC samples								
61	PASS	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL
62	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
63	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
64	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
65	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
66	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
67	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
68	PASS	PASS	FAIL	FAIL	PASS	FAIL	FAIL	FAIL
69	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
70	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

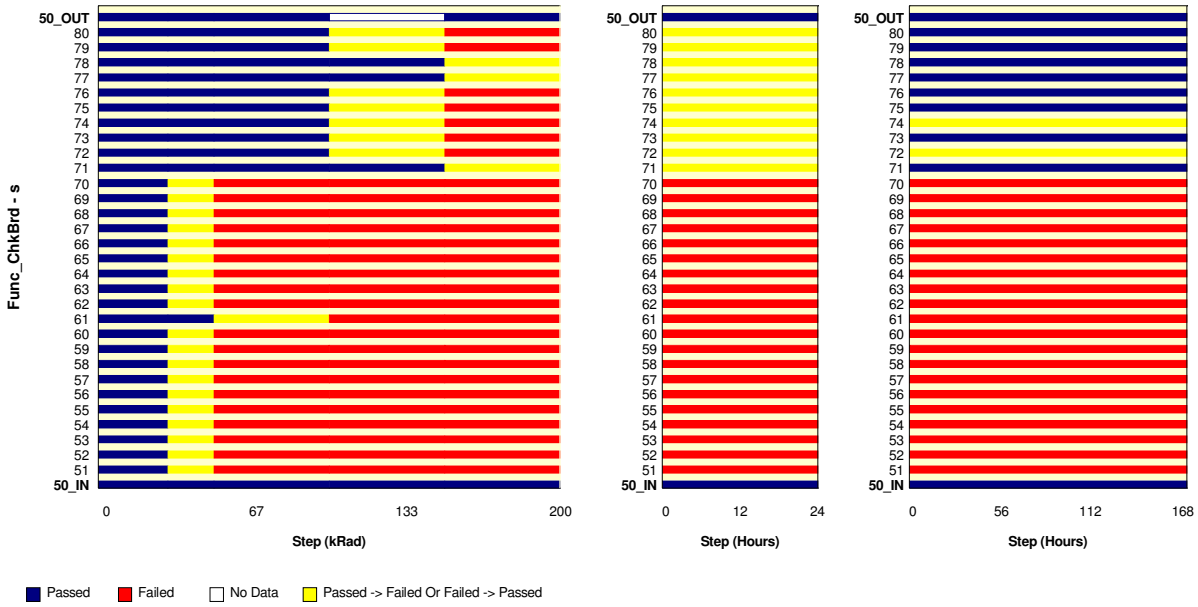
Measurements

tWW_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
OFF samples								
71	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
72	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
73	PASS	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS
74	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

tWW_GONOGO	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
75	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
76	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
77	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
78	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
79	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
80	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Pattern FCT Checkerboard : Func_ChkBrd
Test conditions : Erase memory Write . Read with pattern Checkerboard Block#0
Unit : s
No spec limit specified.



Measurements

Func_ChkBrd	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_LDC samples								
51	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
52	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
53	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
54	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
55	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
56	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
57	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
58	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
59	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
60	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

Measurements

Func_ChkBrd	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_HDC samples								
61	PASS	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL
62	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
63	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
64	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
65	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
66	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
67	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
68	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
69	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
70	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

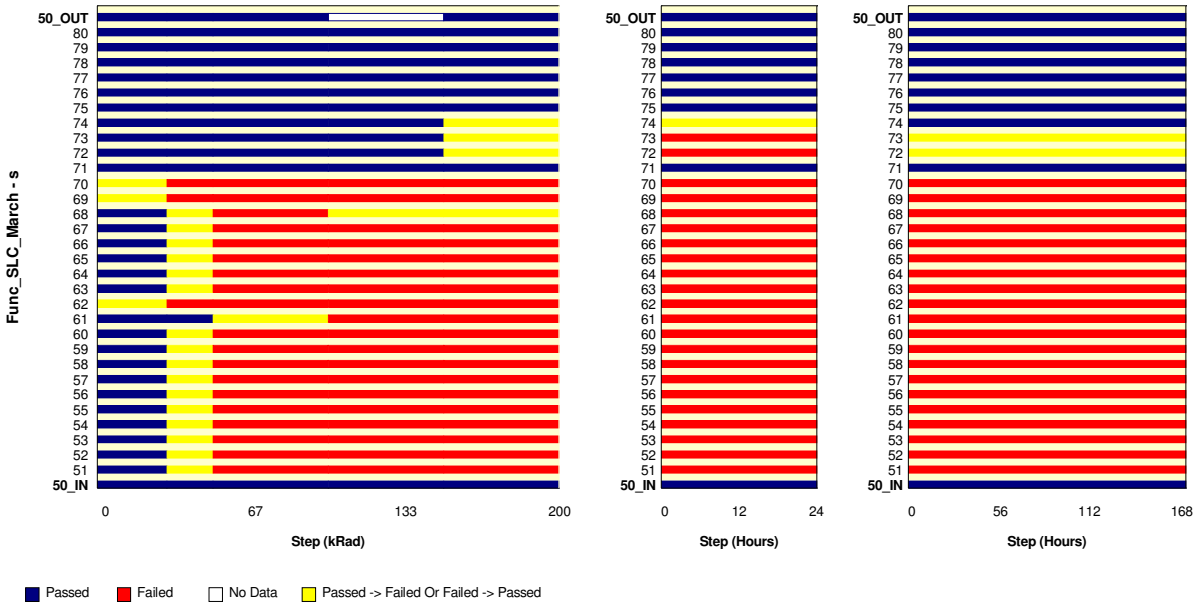
Measurements

Func_ChkBrd	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
OFF samples								
71	PASS	PASS	PASS	PASS	PASS	FAIL	PASS	PASS
72	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS	FAIL
73	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS	PASS
74	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS	FAIL
75	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS	PASS

Func_ChkBrd	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
76	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS	PASS
77	PASS	PASS	PASS	PASS	PASS	FAIL	PASS	PASS
78	PASS	PASS	PASS	PASS	PASS	FAIL	PASS	PASS
79	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS	PASS
80	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS	PASS

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01379
	TC58NVG2G0HTAI0	TOSHIBA	Issue:	Draft

Parameter : Pattern FCT SLC-March : Func_SLC_March
Test conditions : Erase memory Write . Read with SLC March Algorithm Block#0
Unit : s
No spec limit specified.



Measurements

Func_SLC_March	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_LDC samples								
51	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
52	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
53	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
54	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
55	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
56	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
57	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
58	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
59	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
60	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

Measurements

Func_SLC_March	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ON_HDC samples								
61	PASS	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL
62	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
63	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
64	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
65	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
66	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
67	PASS	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
68	PASS	PASS	FAIL	FAIL	PASS	FAIL	FAIL	FAIL
69	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
70	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

Measurements

Func_SLC_March	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
50_IN_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
50_OUT_REF	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
OFF samples								
71	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
72	PASS	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS
73	PASS	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS
74	PASS	PASS	PASS	PASS	PASS	FAIL	PASS	PASS
75	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Func_SLC_March	0 kRad	30 kRad	50 kRad	100 kRad	150 kRad	200 kRad	24 Hours	168 Hours
76	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
77	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
78	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
79	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
80	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS