Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

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

PARAMETERS	SYMBOLS	TEST CONDITIONS	MIN	MAX	UNITS	PINT OUT LIST
Retention Check	Func_READ_ChkBrd_Retention	Read with $55 $AA on Block#0			Pass/Fail	
Input Leakage Current Low	ILIL	Vin=0V . VCC= VCCmax (3.6V)	-10.0	10.0	µA	ALE;CE#;CLE;RE#;WE#;WP#;IO[0];IO[1];IO[2];IO[3];IO[4];IO[5];IO[6];IO[7]
Input Leakage Current High	ILIH	Vin= VCC= VCCmax (3.6V)	-10.0	10.0	µA	ALE;CE#;CLE;RE#;WE#;WP#;IO[0];IO[1];IO[2];IO[3];IO[4];IO[5];IO[6];IO[7]
Output Low Voltage	VOL	IOL=2.1mA. Vcc = 3.3V		400.0	mV	IO[0];IO[1];IO[2];IO[3];IO[4];IO[5];IO[6];IO[7]
Output High Voltage	VOH	IOH=-400uA Vcc = 3.3V	2.400		V	IO[0];IO[1];IO[2];IO[3];IO[4];IO[5];IO[6];IO[7]
Output Leakage Current Low	ILOL	Vout=0V . Vcc = 3.6V DQ are disabled	-10.0	10.0	µA	IO[0];IO[1];IO[2];IO[3];IO[4];IO[5];IO[6];IO[7]
Output Leakage Current High	ILOH	Vout=VCCmax. Vcc = 3.6V DQ are disabled	-10.0	10.0	µA	IO[0];IO[1];IO[2];IO[3];IO[4];IO[5];IO[6];IO[7]
Input Low Voltage	VIL	Vcc = 3.3V	0.660		V	CONTROL;IO
Input High Voltage	VIH	Vcc = 3.3V		2.640	V	CONTROL;IO
Operating Current. Page Read	ICC1	trc=25ns CE/=Vil. Iout=0mA		35.0	mA	
Operating Current. Program	ICC2			35.0	mA	
Operating Current. Erase	ICC3			35.0	mA	
Standby Current CMOS	ISB2_VCC	CE/=VCC-0.2V . WP/=0V/VCC		50.0	µA	
Standby Current TTL	ISB1_VCC	CE/=VIH . WP/=0V/VCC		1.0	mA	
Program Time	tProg	PROGRAM PAGE operation time. internal ECC disabled. GO NOGO		700.0	µs	
Block Erase Time	tBers	BLOCK ERASE operation time . GO NOGO		10.0	ms	
CLE Setup Time	tCLS			10.0	ns	

PARAMETERS	SYMBOLS	TEST CONDITIONS	MIN	MAX	UNITS	PINT OUT LIST
CLE Hold Time	tCLH			5.0	ns	
CE/ Setup Time	tCS			15.0	ns	
CE/ Hold Time	tCH_GONOGO	GO NOGO		5.0	ns	
WE/ Pulse Width	tWP_Search			12.0	ns	
ALE Setup Time	tALS			10.0	ns	
ALE Hold Time	tALH			5.0	ns	
Data Setup Time	tDS			10.0	ns	
Data Hold Time	tDH			5.0	ns	
Write Cycle Time	tWC			25.0	ns	
WE/ High Hold Time	tWH_GONOGO	GO NOGO		10.0	ns	
ALE to RE/ Delay	tAR_GONOGO	GO NOGO		10.0	ns	
CLE to RE/ Delay	tCLR_GONOGO	GO NOGO		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	
RE/ High Hold Time	tREH_GONOGO	GO NOGO		10.0	ns	
WP/ High to WE/ Low	tWW_GONOGO	GO NOGO		100.0	ns	
Checkerboard	Func_ChkBrd	Erase memory Write . Read pattern Checkerboard Block#0			Pass/Fail	
SLC-March	Func_SLC_March	Erase memory Write . Read with SLC March Algorithm Block#0			Pass/Fail	

Table 1 : Measured electrical parameters

A summary of the failed parameters is provided in the following table. The behavior of each parameter is recorded for both bias On and bias Off samples.
Parameters not listed remained within specification limits all along testing.
Detail test results are presented in the following section.

Parameters	Failure Level between :		Annealing Recovery [Note 1]				
			NA	No	Partial	Complete	Rebound
VOLIO[0]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
VOLIO[1]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
VOLIO[2]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
VOLIO[3]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
VOLIO[4]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
VOLIO[5]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				

Parameters	Failure Level between :		Annealing Recovery [Note 1]				
			NA	No	Partial	Complete	Rebound
VOLIO[6]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
VOLIO[7]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
VOHIO[0]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
VOHIO[1]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
VOHIO[2]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
VOHIO[3]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
VOHIO[4]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
VOHIO[5]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
VOHIO[6]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				

Parameters	Failure Level between :		Annealing Recovery [Note 1]				
			NA	No	Partial	Complete	Rebound
VOHIO[7]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
ILOLIO[0]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
ILOLIO[1]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
ILOLIO[2]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
ILOLIO[3]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
ILOLIO[4]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
ILOLIO[5]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
ILOLIO[6]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
ILOLIO[7]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				

Parameters	Failure Level between :		Annealing Recovery [Note 1]				
			NA	No	Partial	Complete	Rebound
ILOHIO[0]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
ILOHIO[1]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
ILOHIO[2]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
ILOHIO[3]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
ILOHIO[4]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
ILOHIO[5]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
ILOHIO[6]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
ILOHIO[7]	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
VILCONTROL	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				

Parameters	Failure Level between :		Annealing Recovery [Note 1]				
			NA	No	Partial	Complete	Rebound
VILIO	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
VIHCONTROL	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
VIHIO	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
ICC2	LDC samples	30 & 50 kRad(Si)				X	
	HDC samples	30 & 50 kRad(Si)				X	
	OFF samples	No Failure	X				
ICC3	LDC samples	30 & 50 kRad(Si)				X	
	HDC samples	No Failure	X				
	OFF samples	No Failure	X				
ISB2_VCC	LDC samples	0 & 30 kRad(Si)			X		
	HDC samples	0 & 30 kRad(Si)				X	
	OFF samples	30 & 50 kRad(Si)				X	
tProg	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				

Parameters	Failure Level between :		Annealing Recovery [Note 1]				
			NA	No	Partial	Complete	Rebound
tBers	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)				X	
	OFF samples	No Failure	X				
tCLS	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
tCLH	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
tCS	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
tCH_GONOGO	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
tWP_Search	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
tALS	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
tALH	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
tDS	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				

Parameters	Failure Level between :		Annealing Recovery [Note 1]				
			NA	No	Partial	Complete	Rebound
tDH	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
tWC	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
tWH_GONOGO	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
tAR_GONOGO	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
tCLR_GONOGO	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
tRP	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
tRC	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
tREA	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
tWB	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				

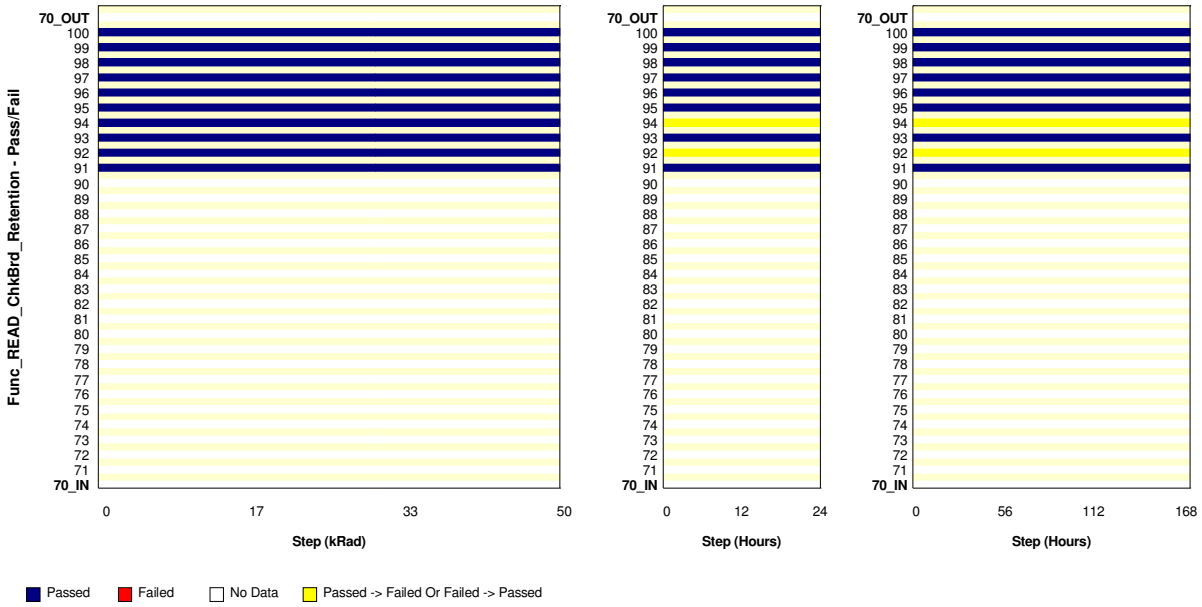
Parameters	Failure Level between :		Annealing Recovery [Note 1]				
			NA	No	Partial	Complete	Rebound
tCEA	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
tREH_GONOGO	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
tWW_GONOGO	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
Func_ChkBrd	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	X				
Func_SLC_March	LDC samples	0 & 30 kRad(Si)				X	
	HDC samples	0 & 30 kRad(Si)			X		
	OFF samples	No Failure	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

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Retention Check : Func_READ_ChkBrd_Retention
Test conditions : Read with $55 $AA on Block#0
Unit : Pass/Fail
No spec limit specified.

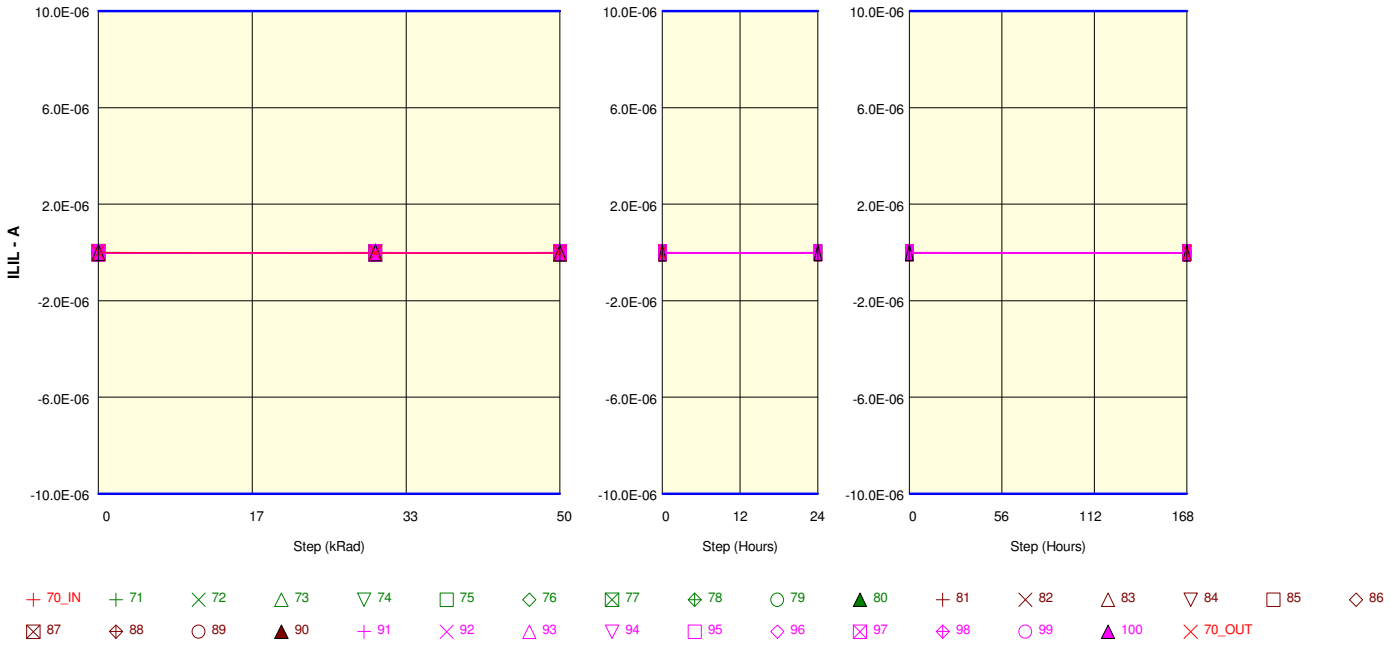


Measurements

Func_READ_ChkBrd_Retention	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF					
70_OUT_REF					
OFF samples					
91	PASS	PASS	PASS	PASS	PASS
92	PASS	PASS	PASS	FAIL	PASS
93	PASS	PASS	PASS	PASS	PASS
94	PASS	PASS	PASS	FAIL	PASS
95	PASS	PASS	PASS	PASS	PASS
96	PASS	PASS	PASS	PASS	PASS
97	PASS	PASS	PASS	PASS	PASS
98	PASS	PASS	PASS	PASS	PASS
99	PASS	PASS	PASS	PASS	PASS
100	PASS	PASS	PASS	PASS	PASS

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current Low : ILILALE
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

ILILALE	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-22.0E-09	-9.7E-09	-3.6E-09	-11.3E-09	-24.2E-09
70_OUT_REF	-11.3E-09	-20.4E-09	-22.0E-09		-23.5E-09
LDC samples					
71	-11.3E-09	-6.7E-09	-11.3E-09	-9.0E-09	-11.3E-09
72	-9.0E-09	-17.4E-09	-8.2E-09	-12.0E-09	-24.2E-09
73	-16.6E-09	-15.1E-09	-8.2E-09	936.3E-12	-12.0E-09
74	2.5E-09	-17.4E-09	-10.5E-09	-24.2E-09	-18.1E-09
75	-14.3E-09	-9.0E-09	-9.7E-09	-18.9E-09	-7.5E-09
76	-24.2E-09	-8.2E-09	-10.5E-09	-12.0E-09	-15.1E-09
77	-3.6E-09	-2.1E-09	-15.8E-09	-3.6E-09	-9.7E-09
78	-8.2E-09	-23.5E-09	-13.6E-09	-15.1E-09	-8.2E-09
79	-17.4E-09	-12.0E-09	-18.1E-09	-13.6E-09	-4.4E-09
80	-8.2E-09	-17.4E-09	-6.7E-09	-2.1E-09	-9.7E-09
Statistics					
Min	-24.2E-09	-23.5E-09	-18.1E-09	-24.2E-09	-24.2E-09
Max	2.5E-09	-2.1E-09	-6.7E-09	936.3E-12	-4.4E-09
Average	-11.0E-09	-12.9E-09	-11.3E-09	-11.0E-09	-12.0E-09
Std Deviation	7.2E-09	6.1E-09	3.4E-09	7.4E-09	5.5E-09

Measurements

ILILALE	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-22.0E-09	-9.7E-09	-3.6E-09	-11.3E-09	-24.2E-09
70_OUT_REF	-11.3E-09	-20.4E-09	-22.0E-09		-23.5E-09
HDC samples					
81	4.8E-09	-17.4E-09	-2.9E-09	-4.4E-09	-12.8E-09
82	-11.3E-09	-6.7E-09	-15.8E-09	-13.6E-09	-8.2E-09
83	-17.4E-09	-19.7E-09	-2.1E-09	-6.7E-09	-5.9E-09
84	-12.8E-09	-15.1E-09	-15.8E-09	-7.5E-09	-9.7E-09
85	3.2E-09	-9.0E-09	-12.0E-09	-12.8E-09	-11.3E-09
86	-12.0E-09	-7.5E-09	-22.7E-09	-7.5E-09	-14.3E-09
87	-25.0E-09	-9.0E-09	-12.0E-09	-12.0E-09	-4.4E-09
88	-9.7E-09	-2.1E-09	-10.5E-09	-15.8E-09	-11.3E-09
89	-12.8E-09	-16.6E-09	-15.1E-09	-17.4E-09	-3.6E-09
90	-5.9E-09	-18.1E-09	-14.3E-09	-5.9E-09	-11.3E-09
Statistics					
Min	-25.0E-09	-19.7E-09	-22.7E-09	-17.4E-09	-14.3E-09
Max	4.8E-09	-2.1E-09	-2.1E-09	-4.4E-09	-3.6E-09

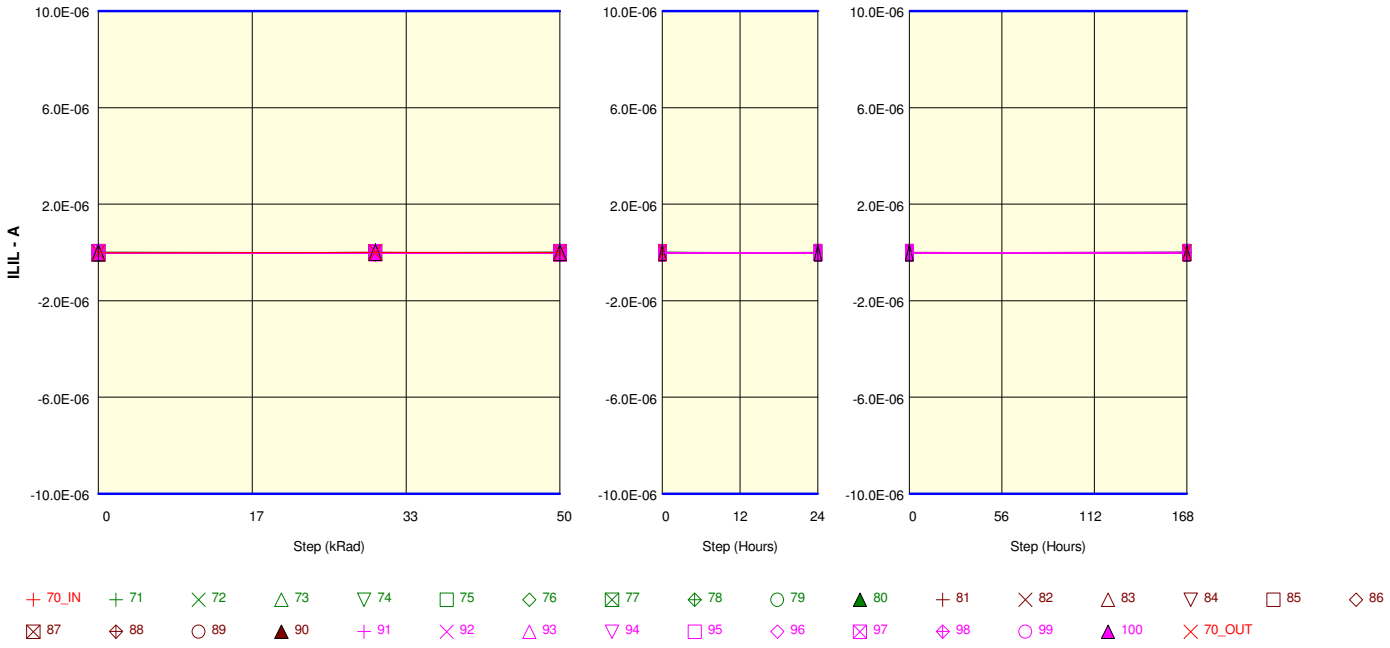
ILILALE	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-9.9E-09	-12.1E-09	-12.3E-09	-10.4E-09	-9.3E-09
Std Deviation	8.4E-09	5.7E-09	5.8E-09	4.3E-09	3.4E-09

Measurements

ILILALE	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-22.0E-09	-9.7E-09	-3.6E-09	-11.3E-09	-24.2E-09
70_OUT_REF	-11.3E-09	-20.4E-09	-22.0E-09		-23.5E-09
OFF samples					
91	-9.7E-09	-17.4E-09	-28.1E-09	-8.2E-09	-8.2E-09
92	-10.5E-09	-6.7E-09	-12.0E-09	-4.4E-09	-18.1E-09
93	-13.6E-09	-10.5E-09	-14.3E-09	-3.6E-09	-19.7E-09
94	-9.7E-09	-14.3E-09	-6.7E-09	-18.1E-09	-9.7E-09
95	-15.1E-09	-14.3E-09	-7.5E-09	-9.0E-09	-15.1E-09
96	-12.8E-09	-7.5E-09	-11.3E-09	-10.5E-09	-11.3E-09
97	-11.3E-09	-9.7E-09	-2.9E-09	-14.3E-09	-15.8E-09
98	-12.8E-09	-13.6E-09	-7.5E-09	-14.3E-09	-18.9E-09
99	-6.7E-09	-23.5E-09	-21.2E-09	-16.6E-09	-12.8E-09
100	-3.6E-09	-11.3E-09	-12.0E-09	-2.9E-09	-16.6E-09
Statistics					
Min	-15.1E-09	-23.5E-09	-28.1E-09	-18.1E-09	-19.7E-09
Max	-3.6E-09	-6.7E-09	-2.9E-09	-2.9E-09	-8.2E-09
Average	-10.6E-09	-12.9E-09	-12.3E-09	-10.2E-09	-14.6E-09
Std Deviation	3.2E-09	4.7E-09	7.1E-09	5.2E-09	3.8E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current Low : ILILCE#
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

ILILCE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-5.9E-09	-11.3E-09	-10.5E-09	-5.2E-09	-10.5E-09
70_OUT_REF	-15.8E-09	936.3E-12	4.0E-09		-5.9E-09
LDC samples					
71	-3.6E-09	-6.7E-09	-14.3E-09	1.7E-09	-3.6E-09
72	-9.0E-09	-12.8E-09	5.5E-09	-24.2E-09	-22.7E-09
73	-9.0E-09	-2.9E-09	-9.0E-09	-12.8E-09	-4.4E-09
74	-5.9E-09	-13.6E-09	-9.7E-09	-1.4E-09	-3.6E-09
75	-7.5E-09	-1.4E-09	-16.6E-09	-12.0E-09	-5.2E-09
76	-4.4E-09	-15.8E-09	-8.2E-09	-20.4E-09	-589.6E-12
77	3.2E-09	-9.0E-09	-2.1E-09	-5.9E-09	-3.6E-09
78	-3.6E-09	-12.8E-09	2.5E-09	-9.0E-09	-10.5E-09
79	7.8E-09	-14.3E-09	-7.5E-09	-9.0E-09	6.3E-09
80	-15.8E-09	-2.1E-09	-8.2E-09	-18.1E-09	-10.5E-09
Statistics					
Min	-15.8E-09	-15.8E-09	-16.6E-09	-24.2E-09	-22.7E-09
Max	7.8E-09	-1.4E-09	5.5E-09	1.7E-09	6.3E-09
Average	-4.8E-09	-9.1E-09	-6.8E-09	-11.1E-09	-5.9E-09
Std Deviation	6.3E-09	5.2E-09	6.6E-09	7.8E-09	7.2E-09

Measurements

ILILCE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-5.9E-09	-11.3E-09	-10.5E-09	-5.2E-09	-10.5E-09
70_OUT_REF	-15.8E-09	936.3E-12	4.0E-09		-5.9E-09
HDC samples					
81	-12.0E-09	-589.6E-12	-7.5E-09	-10.5E-09	-8.2E-09
82	-14.3E-09	-6.7E-09	-9.7E-09	-8.2E-09	-9.0E-09
83	-11.3E-09	-8.2E-09	-10.5E-09	-18.9E-09	-9.0E-09
84	-15.1E-09	-8.2E-09	-7.5E-09	-12.0E-09	-11.3E-09
85	-10.5E-09	-5.9E-09	-2.9E-09	-3.6E-09	-2.1E-09
86	-11.3E-09	-3.6E-09	-14.3E-09	-17.4E-09	-4.4E-09
87	-9.7E-09	-5.9E-09	-11.3E-09	1.7E-09	-14.3E-09
88	-15.8E-09	-24.2E-09	-9.0E-09	-6.7E-09	-1.4E-09
89	-5.2E-09	-2.1E-09	-4.4E-09	-12.8E-09	-7.5E-09
90	-9.7E-09	-1.4E-09	3.2E-09	-6.7E-09	-16.6E-09
Statistics					
Min	-15.8E-09	-24.2E-09	-14.3E-09	-18.9E-09	-16.6E-09
Max	-5.2E-09	-589.6E-12	3.2E-09	1.7E-09	-1.4E-09

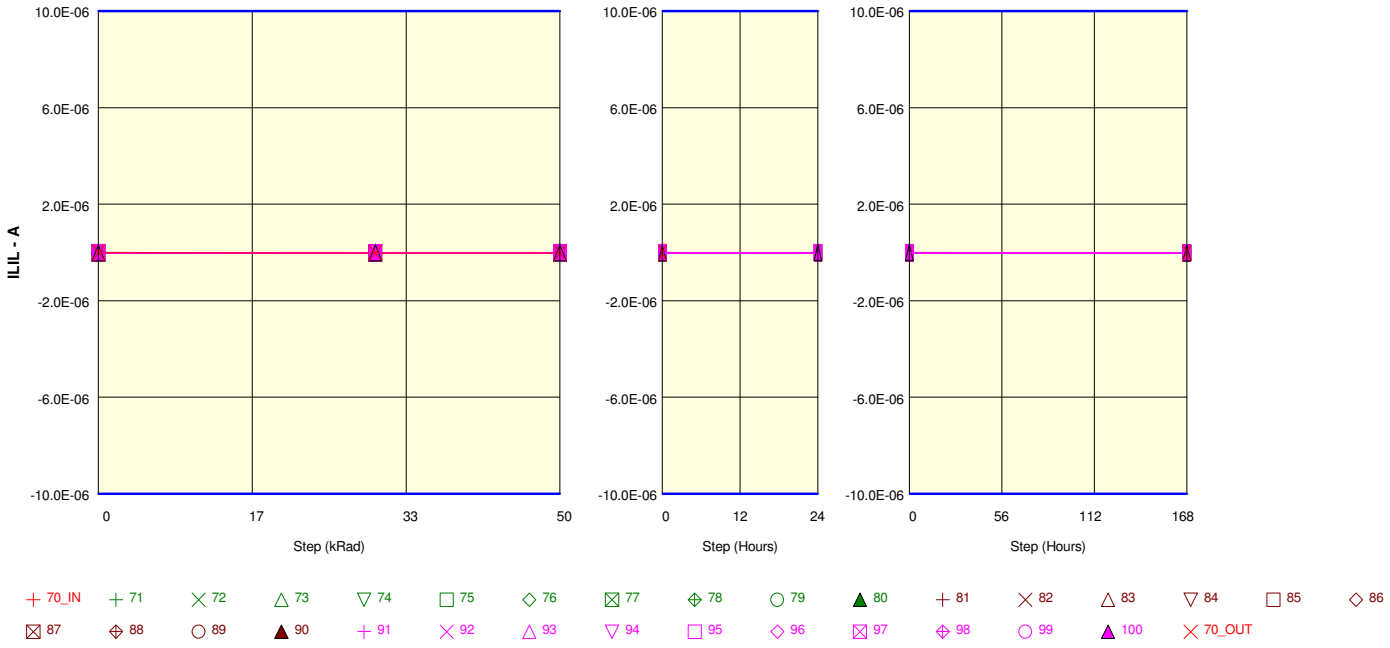
ILILCE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-11.5E-09	-6.7E-09	-7.4E-09	-9.5E-09	-8.4E-09
Std Deviation	3.0E-09	6.4E-09	4.7E-09	5.9E-09	4.7E-09

Measurements

ILILCE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-5.9E-09	-11.3E-09	-10.5E-09	-5.2E-09	-10.5E-09
70_OUT_REF	-15.8E-09	936.3E-12	4.0E-09		-5.9E-09
OFF samples					
91	-9.0E-09	-5.2E-09	-16.6E-09	-18.1E-09	-7.5E-09
92	-9.7E-09	-12.0E-09	936.3E-12	-9.0E-09	-15.1E-09
93	-15.1E-09	-19.7E-09	-19.7E-09	-14.3E-09	-10.5E-09
94	-15.8E-09	-12.0E-09	-9.7E-09	-1.4E-09	-7.5E-09
95	-3.6E-09	-12.8E-09	-11.3E-09	-7.5E-09	-12.0E-09
96	-8.2E-09	-15.8E-09	-17.4E-09	173.3E-12	-3.6E-09
97	-2.9E-09	-7.5E-09	-18.9E-09	-9.7E-09	7.0E-09
98	1.7E-09	-589.6E-12	-12.8E-09	-14.3E-09	-4.4E-09
99	-3.6E-09	-20.4E-09	-8.2E-09	-18.1E-09	-2.9E-09
100	-12.8E-09	3.2E-09	-7.5E-09	-12.8E-09	-18.9E-09
Statistics					
Min	-15.8E-09	-20.4E-09	-19.7E-09	-18.1E-09	-18.9E-09
Max	1.7E-09	3.2E-09	936.3E-12	173.3E-12	7.0E-09
Average	-7.9E-09	-10.3E-09	-12.1E-09	-10.5E-09	-7.5E-09
Std Deviation	5.5E-09	7.4E-09	6.0E-09	6.0E-09	6.9E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current Low : ILILCLE
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

ILILCLE	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-15.1E-09	-12.8E-09	-14.3E-09	-16.6E-09	-17.4E-09
70_OUT_REF	-12.0E-09	-24.2E-09	-22.7E-09		-15.1E-09
LDC samples					
71	-2.9E-09	-3.6E-09	-9.7E-09	-10.5E-09	-22.7E-09
72	-18.1E-09	-20.4E-09	-9.7E-09	-10.5E-09	-20.4E-09
73	-13.6E-09	-11.3E-09	-19.7E-09	-22.7E-09	-8.2E-09
74	-10.5E-09	-25.8E-09	-15.8E-09	-9.7E-09	-13.6E-09
75	-23.5E-09	-14.3E-09	-18.1E-09	-30.3E-09	-15.1E-09
76	-25.8E-09	-18.1E-09	-24.2E-09	-15.8E-09	-28.8E-09
77	-2.9E-09	-18.9E-09	-26.5E-09	-2.9E-09	-18.9E-09
78	-22.7E-09	-15.8E-09	-15.8E-09	-12.8E-09	-15.8E-09
79	-8.2E-09	-12.8E-09	-15.8E-09	-14.3E-09	-20.4E-09
80	-8.2E-09	-19.7E-09	-18.9E-09	-19.7E-09	-28.1E-09
Statistics					
Min	-25.8E-09	-25.8E-09	-26.5E-09	-30.3E-09	-28.8E-09
Max	-2.9E-09	-3.6E-09	-9.7E-09	-2.9E-09	-8.2E-09
Average	-13.6E-09	-16.1E-09	-17.5E-09	-14.9E-09	-19.2E-09
Std Deviation	8.0E-09	5.7E-09	5.1E-09	7.3E-09	6.1E-09

Measurements

ILILCLE	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-15.1E-09	-12.8E-09	-14.3E-09	-16.6E-09	-17.4E-09
70_OUT_REF	-12.0E-09	-24.2E-09	-22.7E-09		-15.1E-09
HDC samples					
81	-17.4E-09	-22.7E-09	-14.3E-09	-18.1E-09	-16.6E-09
82	-14.3E-09	-12.8E-09	-21.2E-09	-22.7E-09	-8.2E-09
83	-23.5E-09	-15.8E-09	-5.2E-09	-9.7E-09	-22.7E-09
84	-8.2E-09	-18.1E-09	-10.5E-09	-9.0E-09	-23.5E-09
85	-23.5E-09	-13.6E-09	-5.2E-09	-12.0E-09	-16.6E-09
86	-2.1E-09	-17.4E-09	-12.8E-09	-18.1E-09	-15.8E-09
87	-15.1E-09	-18.9E-09	-9.0E-09	-18.1E-09	-21.2E-09
88	-21.2E-09	-5.9E-09	-1.4E-09	-9.0E-09	-9.0E-09
89	-18.1E-09	-9.0E-09	-9.7E-09	3.2E-09	-16.6E-09
90	-21.2E-09	-16.6E-09	-18.9E-09	-16.6E-09	-21.2E-09
Statistics					
Min	-23.5E-09	-22.7E-09	-21.2E-09	-22.7E-09	-23.5E-09
Max	-2.1E-09	-5.9E-09	-1.4E-09	3.2E-09	-8.2E-09

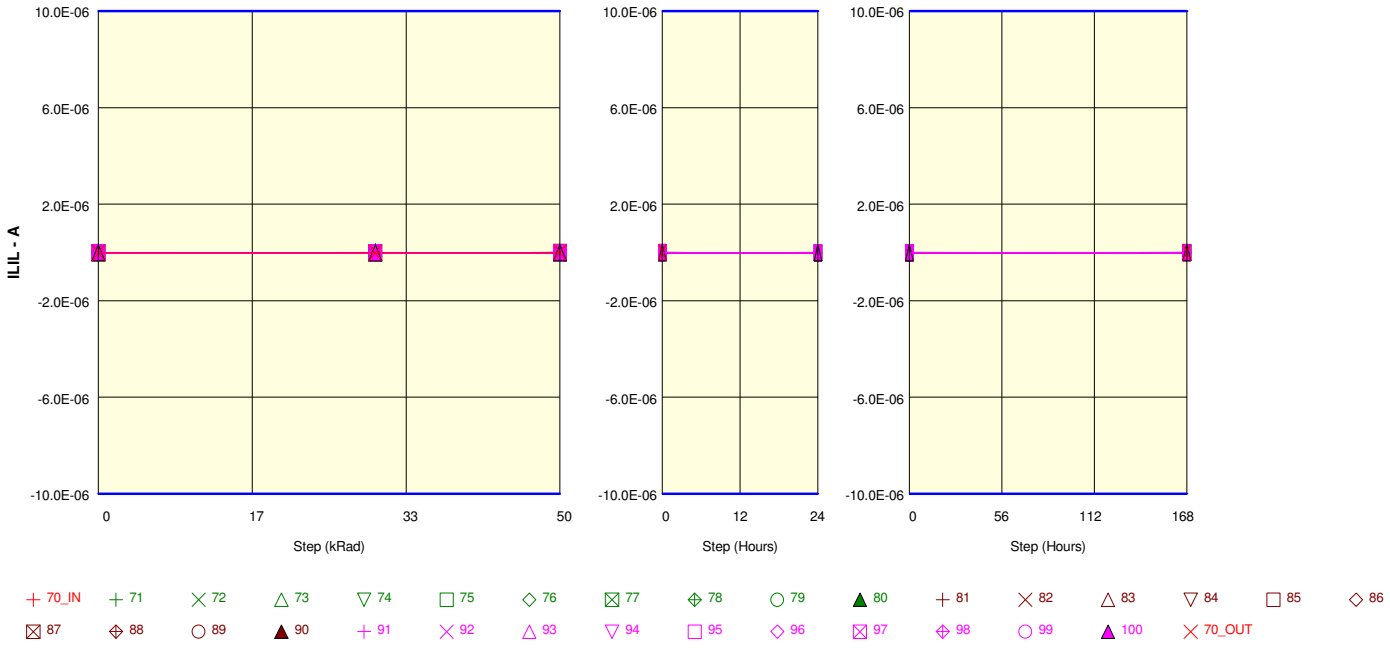
ILILCLE	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-16.5E-09	-15.1E-09	-10.8E-09	-13.0E-09	-17.1E-09
Std Deviation	6.5E-09	4.7E-09	5.9E-09	7.0E-09	5.0E-09

Measurements

ILILCLE	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-15.1E-09	-12.8E-09	-14.3E-09	-16.6E-09	-17.4E-09
70_OUT_REF	-12.0E-09	-24.2E-09	-22.7E-09		-15.1E-09
OFF samples					
91	-14.3E-09	-9.7E-09	-19.7E-09	-19.7E-09	-11.3E-09
92	-15.8E-09	-2.9E-09	-18.1E-09	-15.8E-09	-9.7E-09
93	-14.3E-09	-3.6E-09	-9.7E-09	-20.4E-09	-7.5E-09
94	-9.0E-09	-20.4E-09	-15.8E-09	2.5E-09	-17.4E-09
95	-5.2E-09	-17.4E-09	173.3E-12	-16.6E-09	-21.2E-09
96	-23.5E-09	-12.8E-09	-25.0E-09	-9.7E-09	-15.1E-09
97	-18.1E-09	-9.7E-09	-10.5E-09	-12.0E-09	-24.2E-09
98	-11.3E-09	-16.6E-09	-18.9E-09	-12.0E-09	-18.1E-09
99	-16.6E-09	-13.6E-09	-11.3E-09	-5.2E-09	-9.0E-09
100	-18.9E-09	-18.1E-09	-20.4E-09	-4.4E-09	-18.9E-09
Statistics					
Min	-23.5E-09	-20.4E-09	-25.0E-09	-20.4E-09	-24.2E-09
Max	-5.2E-09	-2.9E-09	173.3E-12	2.5E-09	-7.5E-09
Average	-14.7E-09	-12.5E-09	-14.9E-09	-11.3E-09	-15.2E-09
Std Deviation	5.0E-09	5.7E-09	6.8E-09	6.9E-09	5.4E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current Low : ILILRE#
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

ILILRE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-5.2E-09	-13.6E-09	-1.4E-09	-10.5E-09	-17.4E-09
70_OUT_REF	-16.6E-09	-17.4E-09	-4.4E-09		-3.6E-09
LDC samples					
71	-25.8E-09	-12.8E-09	-17.4E-09	-6.7E-09	-18.9E-09
72	-19.7E-09	-16.6E-09	-3.6E-09	-8.2E-09	-8.2E-09
73	-5.2E-09	-22.7E-09	-15.8E-09	-12.8E-09	-3.6E-09
74	-12.0E-09	-5.9E-09	-2.9E-09	-12.0E-09	-4.4E-09
75	-18.9E-09	-16.6E-09	-5.2E-09	-9.7E-09	173.3E-12
76	-15.1E-09	-10.5E-09	-15.1E-09	173.3E-12	-2.9E-09
77	-7.5E-09	-15.8E-09	-11.3E-09	-11.3E-09	-8.2E-09
78	-14.3E-09	-14.3E-09	936.3E-12	-3.6E-09	-4.4E-09
79	-4.4E-09	-6.7E-09	-13.6E-09	-589.6E-12	-3.6E-09
80	-14.3E-09	-3.6E-09	-10.5E-09	-4.4E-09	-9.7E-09
Statistics					
Min	-25.8E-09	-22.7E-09	-17.4E-09	-12.8E-09	-18.9E-09
Max	-4.4E-09	-3.6E-09	936.3E-12	173.3E-12	173.3E-12
Average	-13.7E-09	-12.6E-09	-9.4E-09	-6.9E-09	-6.4E-09
Std Deviation	6.4E-09	5.6E-09	6.0E-09	4.4E-09	5.0E-09

Measurements

ILILRE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-5.2E-09	-13.6E-09	-1.4E-09	-10.5E-09	-17.4E-09
70_OUT_REF	-16.6E-09	-17.4E-09	-4.4E-09		-3.6E-09
HDC samples					
81	-13.6E-09	-22.0E-09	-11.3E-09	-5.2E-09	-9.7E-09
82	-12.0E-09	-19.7E-09	-12.0E-09	-18.9E-09	-15.8E-09
83	-11.3E-09	-1.4E-09	-12.0E-09	-15.1E-09	-5.2E-09
84	-9.0E-09	-23.5E-09	-2.1E-09	-15.1E-09	-22.0E-09
85	-12.0E-09	-13.6E-09	-12.0E-09	-12.0E-09	-5.9E-09
86	-20.4E-09	-3.6E-09	-5.2E-09	-10.5E-09	-12.8E-09
87	-9.0E-09	-13.6E-09	-2.1E-09	-11.3E-09	-15.1E-09
88	-5.2E-09	-9.7E-09	-11.3E-09	-14.3E-09	2.5E-09
89	-18.1E-09	-22.0E-09	-8.2E-09	-14.3E-09	-15.8E-09
90	-12.8E-09	-17.4E-09	-13.6E-09	-17.4E-09	-9.7E-09
Statistics					
Min	-20.4E-09	-23.5E-09	-13.6E-09	-18.9E-09	-22.0E-09
Max	-5.2E-09	-1.4E-09	-2.1E-09	-5.2E-09	2.5E-09

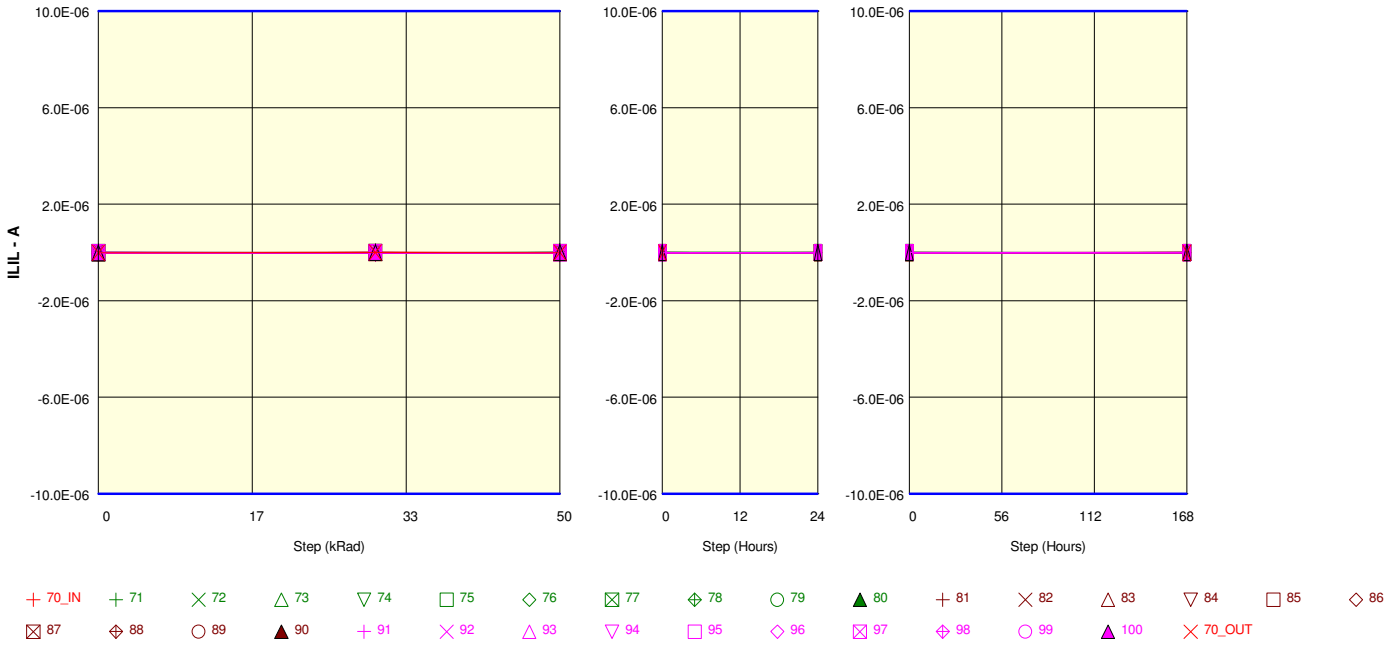
ILILRE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-12.3E-09	-14.6E-09	-9.0E-09	-13.4E-09	-11.0E-09
Std Deviation	4.2E-09	7.4E-09	4.1E-09	3.7E-09	6.6E-09

Measurements

ILILRE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-5.2E-09	-13.6E-09	-1.4E-09	-10.5E-09	-17.4E-09
70_OUT_REF	-16.6E-09	-17.4E-09	-4.4E-09		-3.6E-09
OFF samples					
91	-5.2E-09	-19.7E-09	-17.4E-09	-9.7E-09	-20.4E-09
92	-17.4E-09	-12.8E-09	-7.5E-09	-2.9E-09	-15.8E-09
93	-12.8E-09	-14.3E-09	-9.7E-09	-12.0E-09	-5.2E-09
94	-2.1E-09	-10.5E-09	2.5E-09	-19.7E-09	-15.8E-09
95	-22.0E-09	-12.8E-09	-10.5E-09	-6.7E-09	-10.5E-09
96	-6.7E-09	-8.2E-09	-15.1E-09	-9.0E-09	-2.9E-09
97	-9.0E-09	-17.4E-09	-6.7E-09	-10.5E-09	-16.6E-09
98	-22.0E-09	-17.4E-09	-15.1E-09	-589.6E-12	-8.2E-09
99	-15.1E-09	-13.6E-09	-14.3E-09	-5.2E-09	-7.5E-09
100	-5.9E-09	-13.6E-09	-9.0E-09	-13.6E-09	173.3E-12
Statistics					
Min	-22.0E-09	-19.7E-09	-17.4E-09	-19.7E-09	-20.4E-09
Max	-2.1E-09	-8.2E-09	2.5E-09	-589.6E-12	173.3E-12
Average	-11.8E-09	-14.0E-09	-10.3E-09	-9.0E-09	-10.3E-09
Std Deviation	6.7E-09	3.2E-09	5.5E-09	5.2E-09	6.4E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current Low : ILILWE#
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

ILILWE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-15.1E-09	6.3E-09	-4.4E-09	-10.5E-09	-3.6E-09
70_OUT_REF	-11.3E-09	-1.4E-09	-5.9E-09		-16.6E-09
LDC samples					
71	-10.5E-09	-6.7E-09	5.5E-09	5.5E-09	-13.6E-09
72	936.3E-12	-9.7E-09	-11.3E-09	-15.1E-09	-4.4E-09
73	-6.7E-09	-5.9E-09	2.5E-09	-11.3E-09	-2.9E-09
74	3.2E-09	173.3E-12	-11.3E-09	-7.5E-09	4.8E-09
75	-3.6E-09	173.3E-12	4.0E-09	-5.2E-09	-10.5E-09
76	7.0E-09	-18.1E-09	173.3E-12	-2.9E-09	3.2E-09
77	-8.2E-09	-4.4E-09	-11.3E-09	-4.4E-09	-9.7E-09
78	-2.1E-09	-12.8E-09	-2.9E-09	-8.2E-09	-3.6E-09
79	-5.9E-09	-5.9E-09	4.0E-09	-4.4E-09	-6.7E-09
80	-2.1E-09	-2.1E-09	-6.7E-09	-5.2E-09	-1.4E-09
Statistics					
Min	-10.5E-09	-18.1E-09	-11.3E-09	-15.1E-09	-13.6E-09
Max	7.0E-09	173.3E-12	5.5E-09	5.5E-09	4.8E-09
Average	-2.8E-09	-6.5E-09	-2.7E-09	-5.9E-09	-4.5E-09
Std Deviation	5.1E-09	5.5E-09	6.5E-09	5.2E-09	5.6E-09

Measurements

ILILWE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-15.1E-09	6.3E-09	-4.4E-09	-10.5E-09	-3.6E-09
70_OUT_REF	-11.3E-09	-1.4E-09	-5.9E-09		-16.6E-09
HDC samples					
81	-13.6E-09	936.3E-12	1.7E-09	-15.1E-09	-10.5E-09
82	-14.3E-09	-10.5E-09	-8.2E-09	-3.6E-09	-12.0E-09
83	3.2E-09	-18.1E-09	-16.6E-09	-11.3E-09	7.0E-09
84	-6.7E-09	-18.9E-09	-9.7E-09	-1.4E-09	-6.7E-09
85	-17.4E-09	-2.1E-09	-6.7E-09	-13.6E-09	-5.2E-09
86	-11.3E-09	-4.4E-09	-6.7E-09	4.0E-09	-4.4E-09
87	-21.2E-09	173.3E-12	-4.4E-09	-5.9E-09	-17.4E-09
88	-5.9E-09	-15.8E-09	-16.6E-09	-12.8E-09	4.0E-09
89	-18.1E-09	-9.7E-09	-17.4E-09	-7.5E-09	-589.6E-12
90	-24.2E-09	-7.5E-09	-5.2E-09	-6.7E-09	-4.4E-09
Statistics					
Min	-24.2E-09	-18.9E-09	-17.4E-09	-15.1E-09	-17.4E-09
Max	3.2E-09	936.3E-12	1.7E-09	4.0E-09	7.0E-09

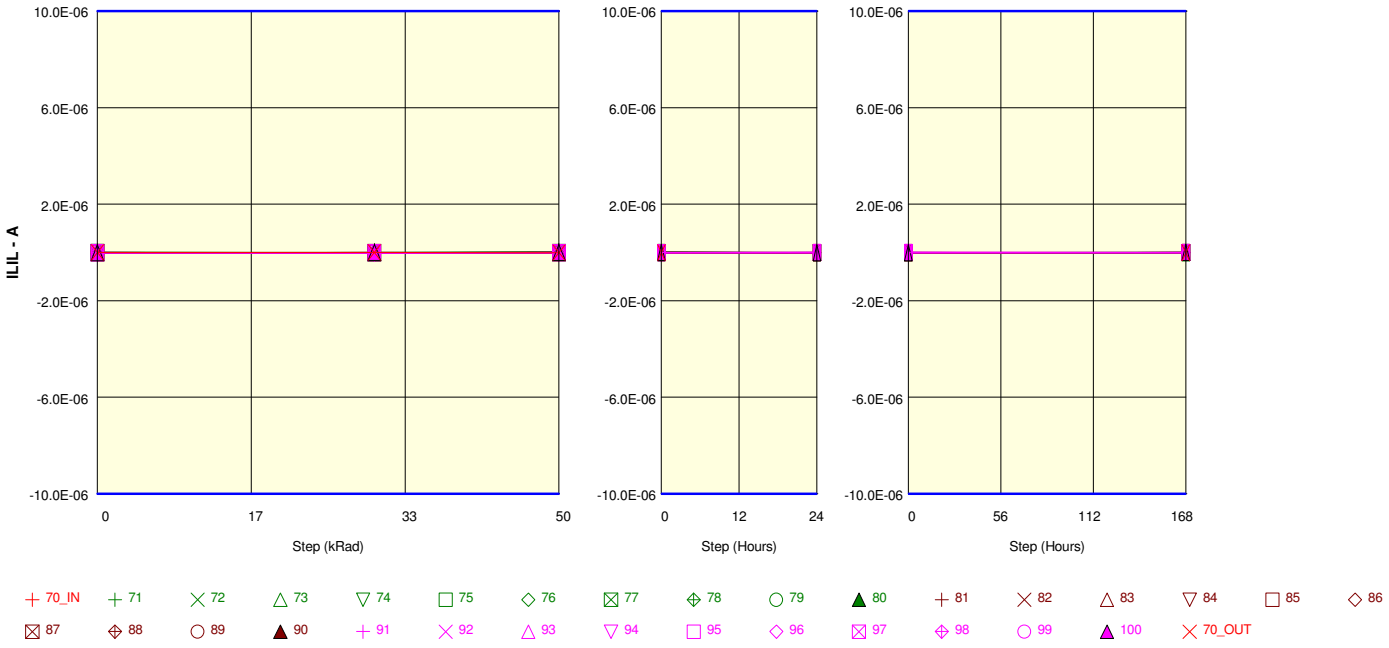
ILILWE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-12.9E-09	-8.6E-09	-9.0E-09	-7.4E-09	-5.0E-09
Std Deviation	7.7E-09	7.0E-09	5.9E-09	5.7E-09	6.9E-09

Measurements

ILILWE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-15.1E-09	6.3E-09	-4.4E-09	-10.5E-09	-3.6E-09
70_OUT_REF	-11.3E-09	-1.4E-09	-5.9E-09		-16.6E-09
OFF samples					
91	-2.9E-09	936.3E-12	-10.5E-09	-7.5E-09	-2.9E-09
92	-9.7E-09	-6.7E-09	-15.1E-09	-12.8E-09	-12.0E-09
93	5.5E-09	-8.2E-09	-15.8E-09	3.2E-09	3.2E-09
94	-5.2E-09	-5.9E-09	4.0E-09	-6.7E-09	4.8E-09
95	-9.0E-09	3.2E-09	-7.5E-09	-5.9E-09	-11.3E-09
96	-2.1E-09	-12.0E-09	-8.2E-09	-2.1E-09	-18.9E-09
97	-9.0E-09	-4.4E-09	-17.4E-09	-7.5E-09	-13.6E-09
98	-9.7E-09	-7.5E-09	-2.9E-09	-10.5E-09	-11.3E-09
99	-11.3E-09	-2.9E-09	-1.4E-09	-5.9E-09	2.5E-09
100	-15.1E-09	-8.2E-09	-6.7E-09	-589.6E-12	936.3E-12
Statistics					
Min	-15.1E-09	-12.0E-09	-17.4E-09	-12.8E-09	-18.9E-09
Max	5.5E-09	3.2E-09	4.0E-09	3.2E-09	4.8E-09
Average	-6.8E-09	-5.2E-09	-8.1E-09	-5.6E-09	-5.9E-09
Std Deviation	5.5E-09	4.3E-09	6.5E-09	4.5E-09	8.0E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current Low : ILILWP#
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

ILILWP#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-7.5E-09	-11.3E-09	-3.6E-09	-5.2E-09	-2.1E-09
70_OUT_REF	173.3E-12	-1.4E-09	-5.9E-09		-9.7E-09
LDC samples					
71	-589.6E-12	-9.7E-09	-9.7E-09	-8.2E-09	-5.2E-09
72	-10.5E-09	-6.7E-09	7.8E-09	-5.2E-09	2.5E-09
73	-589.6E-12	2.5E-09	10.9E-09	-5.2E-09	-2.1E-09
74	-1.4E-09	173.3E-12	7.8E-09	-5.9E-09	6.3E-09
75	5.5E-09	-17.4E-09	-10.5E-09	-9.0E-09	-12.0E-09
76	936.3E-12	-589.6E-12	10.1E-09	4.8E-09	-9.0E-09
77	-1.4E-09	-13.6E-09	-2.9E-09	-6.7E-09	-10.5E-09
78	-9.7E-09	4.0E-09	4.8E-09	-6.7E-09	-12.0E-09
79	-5.2E-09	-5.9E-09	-5.2E-09	-9.0E-09	-15.1E-09
80	-9.0E-09	-1.4E-09	-14.3E-09	-2.9E-09	-8.2E-09
Statistics					
Min	-10.5E-09	-17.4E-09	-14.3E-09	-9.0E-09	-15.1E-09
Max	5.5E-09	4.0E-09	10.9E-09	4.8E-09	6.3E-09
Average	-3.2E-09	-4.9E-09	-131.9E-12	-5.4E-09	-6.5E-09
Std Deviation	5.0E-09	6.7E-09	9.0E-09	3.8E-09	6.5E-09

Measurements

ILILWP#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-7.5E-09	-11.3E-09	-3.6E-09	-5.2E-09	-2.1E-09
70_OUT_REF	173.3E-12	-1.4E-09	-5.9E-09		-9.7E-09
HDC samples					
81	-5.9E-09	-7.5E-09	-12.8E-09	-3.6E-09	-10.5E-09
82	-3.6E-09	-6.7E-09	-1.4E-09	-11.3E-09	-3.6E-09
83	-14.3E-09	-9.0E-09	-2.9E-09	-12.8E-09	-6.7E-09
84	-6.7E-09	-589.6E-12	-8.2E-09	-13.6E-09	4.8E-09
85	1.7E-09	-9.7E-09	-16.6E-09	-12.8E-09	-2.9E-09
86	-9.7E-09	-10.5E-09	-10.5E-09	-15.8E-09	-589.6E-12
87	-11.3E-09	-9.0E-09	6.3E-09	-589.6E-12	-9.0E-09
88	-9.0E-09	-18.1E-09	-3.6E-09	173.3E-12	173.3E-12
89	-14.3E-09	-2.1E-09	-10.5E-09	-589.6E-12	-2.1E-09
90	-4.4E-09	-15.8E-09	-5.9E-09	-15.8E-09	-1.4E-09
Statistics					
Min	-14.3E-09	-18.1E-09	-16.6E-09	-15.8E-09	-10.5E-09
Max	1.7E-09	-589.6E-12	6.3E-09	173.3E-12	4.8E-09

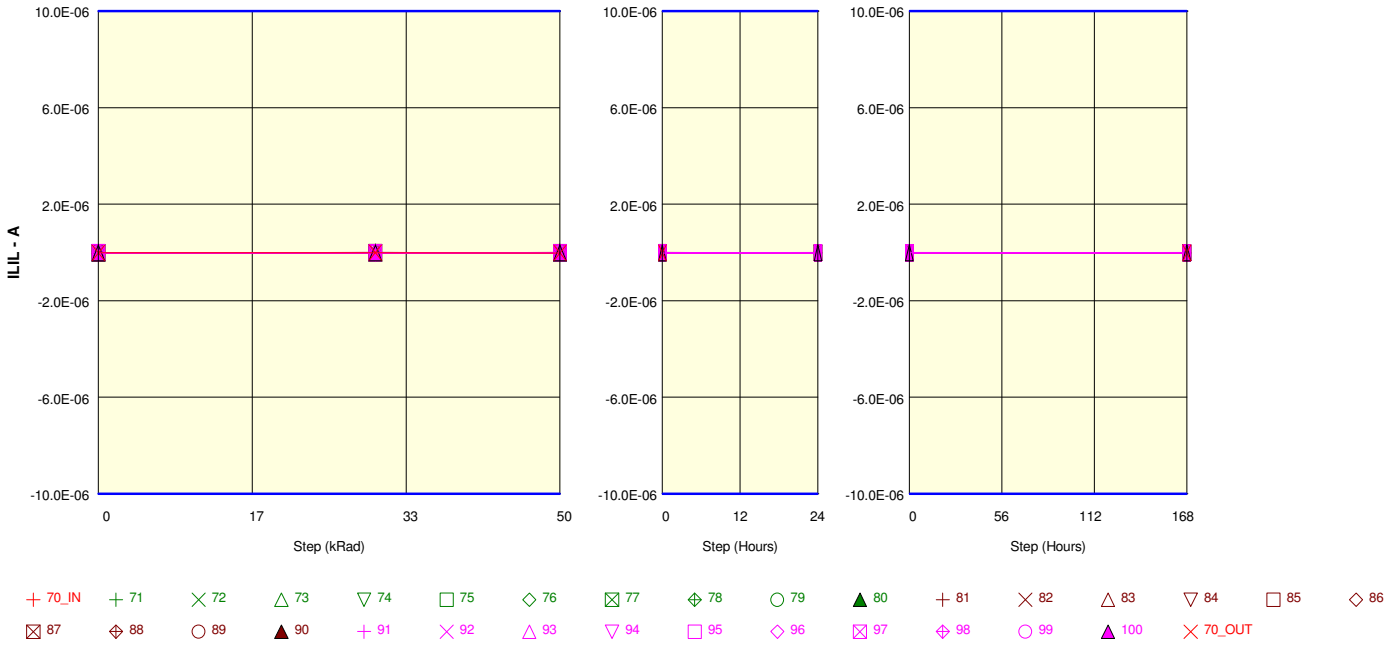
ILILWP#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-7.8E-09	-8.9E-09	-6.6E-09	-8.7E-09	-3.2E-09
Std Deviation	4.8E-09	5.1E-09	6.2E-09	6.3E-09	4.3E-09

Measurements

ILILWP#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-7.5E-09	-11.3E-09	-3.6E-09	-5.2E-09	-2.1E-09
70_OUT_REF	173.3E-12	-1.4E-09	-5.9E-09		-9.7E-09
OFF samples					
91	-11.3E-09	-5.2E-09	-5.2E-09	-10.5E-09	-5.2E-09
92	-1.4E-09	-12.8E-09	173.3E-12	-1.4E-09	-9.7E-09
93	936.3E-12	-15.1E-09	173.3E-12	-3.6E-09	-1.4E-09
94	-5.2E-09	-18.9E-09	-11.3E-09	-1.4E-09	-3.6E-09
95	-10.5E-09	-5.9E-09	-14.3E-09	4.0E-09	-2.1E-09
96	936.3E-12	-5.9E-09	4.0E-09	5.5E-09	3.2E-09
97	-12.8E-09	-4.4E-09	-5.9E-09	936.3E-12	-2.9E-09
98	-1.4E-09	-9.7E-09	-3.6E-09	-3.6E-09	-15.8E-09
99	-9.0E-09	-14.3E-09	936.3E-12	-2.1E-09	4.8E-09
100	-11.3E-09	-2.1E-09	-2.1E-09	-9.7E-09	936.3E-12
Statistics					
Min	-12.8E-09	-18.9E-09	-14.3E-09	-10.5E-09	-15.8E-09
Max	936.3E-12	-2.1E-09	4.0E-09	5.5E-09	4.8E-09
Average	-6.1E-09	-9.4E-09	-3.7E-09	-2.2E-09	-3.2E-09
Std Deviation	5.2E-09	5.3E-09	5.4E-09	4.9E-09	5.8E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current Low : ILILIO[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

ILILIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-18.1E-09	-22.0E-09	-18.1E-09	-9.7E-09	-12.8E-09
70_OUT_REF	-18.1E-09	-6.7E-09	-22.0E-09		-18.1E-09
LDC samples					
71	-12.8E-09	-9.7E-09	-22.7E-09	-23.5E-09	-24.2E-09
72	-26.5E-09	-2.9E-09	-11.3E-09	-18.1E-09	-20.4E-09
73	-22.7E-09	-13.6E-09	-9.7E-09	-15.1E-09	-15.1E-09
74	-19.7E-09	-20.4E-09	-15.1E-09	-15.1E-09	-13.6E-09
75	-22.7E-09	-5.9E-09	-11.3E-09	-10.5E-09	-18.9E-09
76	-14.3E-09	-15.8E-09	-14.3E-09	-18.1E-09	-20.4E-09
77	-15.1E-09	-2.9E-09	-17.4E-09	-5.9E-09	-16.6E-09
78	-17.4E-09	-14.3E-09	-22.0E-09	-13.6E-09	-9.0E-09
79	-4.4E-09	-3.6E-09	-13.6E-09	-5.2E-09	-13.6E-09
80	-17.4E-09	-11.3E-09	-18.9E-09	-15.1E-09	-23.5E-09
Statistics					
Min	-26.5E-09	-20.4E-09	-22.7E-09	-23.5E-09	-24.2E-09
Max	-4.4E-09	-2.9E-09	-9.7E-09	-5.2E-09	-9.0E-09
Average	-17.3E-09	-10.1E-09	-15.6E-09	-14.0E-09	-17.5E-09
Std Deviation	5.9E-09	5.8E-09	4.3E-09	5.3E-09	4.6E-09

Measurements

ILILIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-18.1E-09	-22.0E-09	-18.1E-09	-9.7E-09	-12.8E-09
70_OUT_REF	-18.1E-09	-6.7E-09	-22.0E-09		-18.1E-09
HDC samples					
81	-10.5E-09	-13.6E-09	-15.1E-09	-15.8E-09	-12.8E-09
82	-18.9E-09	-18.1E-09	-10.5E-09	-20.4E-09	-13.6E-09
83	-15.8E-09	-15.8E-09	-6.7E-09	-12.8E-09	-15.1E-09
84	-13.6E-09	-13.6E-09	-12.8E-09	-19.7E-09	-6.7E-09
85	-9.7E-09	-9.0E-09	-1.4E-09	-5.9E-09	-28.1E-09
86	-25.0E-09	-16.6E-09	-18.1E-09	-12.0E-09	-22.7E-09
87	-8.2E-09	-4.4E-09	-15.8E-09	-14.3E-09	-11.3E-09
88	-21.2E-09	-16.6E-09	-21.2E-09	-21.2E-09	-5.9E-09
89	-11.3E-09	-11.3E-09	-2.1E-09	-11.3E-09	-13.6E-09
90	-15.1E-09	-16.6E-09	-20.4E-09	-21.2E-09	-7.5E-09
Statistics					
Min	-25.0E-09	-18.1E-09	-21.2E-09	-21.2E-09	-28.1E-09
Max	-8.2E-09	-4.4E-09	-1.4E-09	-5.9E-09	-5.9E-09

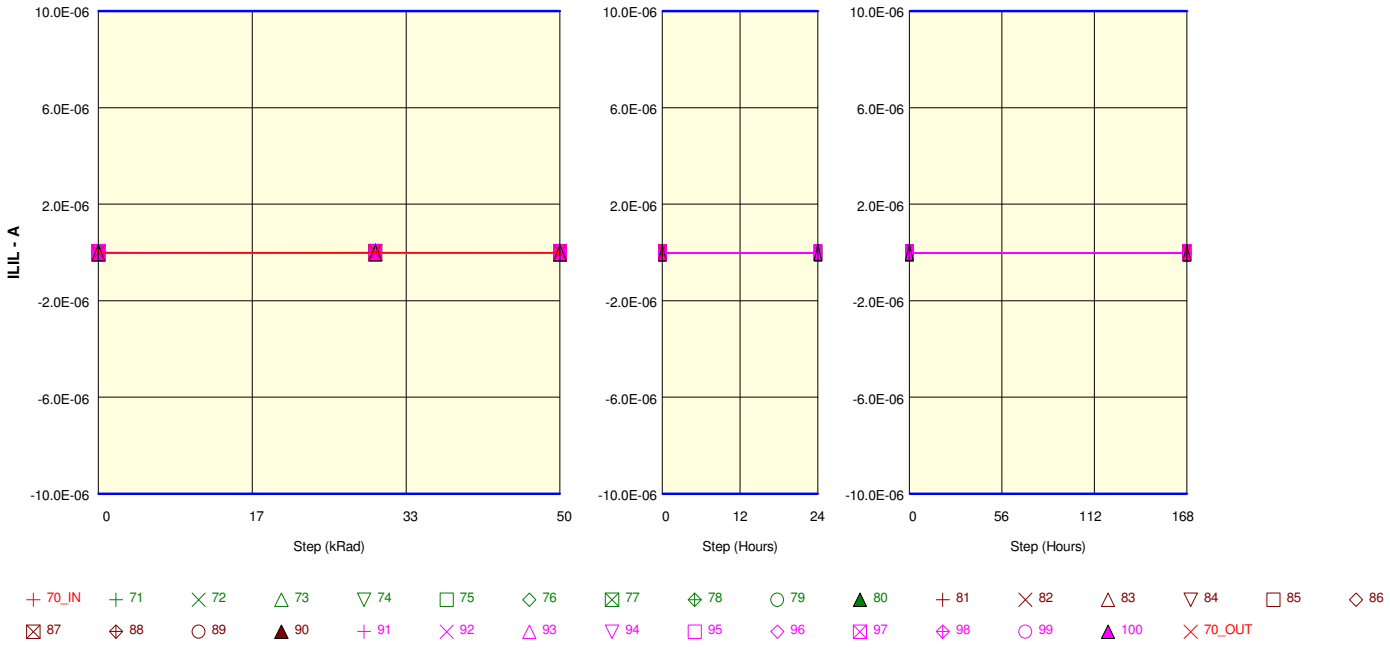
ILILIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-14.9E-09	-13.6E-09	-12.4E-09	-15.5E-09	-13.7E-09
Std Deviation	5.1E-09	4.1E-09	6.8E-09	4.9E-09	6.7E-09

Measurements

ILILIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-18.1E-09	-22.0E-09	-18.1E-09	-9.7E-09	-12.8E-09
70_OUT_REF	-18.1E-09	-6.7E-09	-22.0E-09		-18.1E-09
OFF samples					
91	-12.0E-09	-12.0E-09	-9.0E-09	-22.0E-09	-589.6E-12
92	-5.2E-09	-7.5E-09	-11.3E-09	-2.1E-09	-15.8E-09
93	-15.1E-09	-21.2E-09	-9.0E-09	-22.7E-09	-18.1E-09
94	-16.6E-09	-15.8E-09	-12.0E-09	-10.5E-09	-15.1E-09
95	-4.4E-09	-2.1E-09	-12.0E-09	-28.8E-09	-17.4E-09
96	-15.1E-09	-7.5E-09	-4.4E-09	-12.8E-09	-12.8E-09
97	-5.2E-09	-19.7E-09	-23.5E-09	-11.3E-09	-25.0E-09
98	-7.5E-09	-22.7E-09	-21.2E-09	-7.5E-09	-9.7E-09
99	-18.1E-09	-1.4E-09	-18.9E-09	-4.4E-09	-12.8E-09
100	-18.1E-09	-16.6E-09	-22.7E-09	-12.0E-09	-15.1E-09
Statistics					
Min	-18.1E-09	-22.7E-09	-23.5E-09	-28.8E-09	-25.0E-09
Max	-4.4E-09	-1.4E-09	-4.4E-09	-2.1E-09	-589.6E-12
Average	-11.7E-09	-12.6E-09	-14.4E-09	-13.4E-09	-14.2E-09
Std Deviation	5.4E-09	7.4E-09	6.3E-09	8.1E-09	6.0E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current Low : ILILIO[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

ILILIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-22.0E-09	-10.5E-09	-10.5E-09	-24.2E-09	-8.2E-09
70_OUT_REF	-17.4E-09	173.3E-12	-589.6E-12		-22.7E-09
LDC samples					
71	-22.7E-09	-21.2E-09	-15.1E-09	-7.5E-09	-13.6E-09
72	-8.2E-09	-9.0E-09	-7.5E-09	-13.6E-09	-13.6E-09
73	-11.3E-09	-12.0E-09	-12.0E-09	-22.0E-09	-19.7E-09
74	-9.0E-09	-12.8E-09	-17.4E-09	-17.4E-09	-18.9E-09
75	-16.6E-09	-5.2E-09	-20.4E-09	-8.2E-09	-10.5E-09
76	-2.1E-09	-15.8E-09	-13.6E-09	-23.5E-09	-17.4E-09
77	-9.7E-09	-8.2E-09	-15.1E-09	-15.8E-09	-9.0E-09
78	-2.9E-09	-6.7E-09	-5.9E-09	-14.3E-09	-15.1E-09
79	-6.7E-09	-25.0E-09	-5.9E-09	-20.4E-09	-4.4E-09
80	-9.0E-09	-6.7E-09	-13.6E-09	-18.1E-09	-18.1E-09
Statistics					
Min	-22.7E-09	-25.0E-09	-20.4E-09	-23.5E-09	-19.7E-09
Max	-2.1E-09	-5.2E-09	-5.9E-09	-7.5E-09	-4.4E-09
Average	-9.8E-09	-12.3E-09	-12.6E-09	-16.1E-09	-14.0E-09
Std Deviation	5.8E-09	6.3E-09	4.6E-09	5.1E-09	4.6E-09

Measurements

ILILIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-22.0E-09	-10.5E-09	-10.5E-09	-24.2E-09	-8.2E-09
70_OUT_REF	-17.4E-09	173.3E-12	-589.6E-12		-22.7E-09
HDC samples					
81	-9.0E-09	-6.7E-09	-7.5E-09	-5.2E-09	-21.2E-09
82	-10.5E-09	-3.6E-09	-22.7E-09	-6.7E-09	-15.1E-09
83	-6.7E-09	-7.5E-09	-589.6E-12	-18.9E-09	-21.2E-09
84	-10.5E-09	-4.4E-09	-14.3E-09	-13.6E-09	-9.7E-09
85	4.0E-09	-2.9E-09	-11.3E-09	-20.4E-09	-22.0E-09
86	-20.4E-09	-20.4E-09	-13.6E-09	-22.0E-09	-16.6E-09
87	-13.6E-09	-21.2E-09	-4.4E-09	-13.6E-09	-5.9E-09
88	-22.7E-09	-13.6E-09	-15.1E-09	-9.0E-09	-18.1E-09
89	-2.1E-09	-13.6E-09	-11.3E-09	-6.7E-09	-19.7E-09
90	-14.3E-09	-2.9E-09	-19.7E-09	-7.5E-09	-25.0E-09
Statistics					
Min	-22.7E-09	-21.2E-09	-22.7E-09	-22.0E-09	-25.0E-09
Max	4.0E-09	-2.9E-09	-589.6E-12	-5.2E-09	-5.9E-09

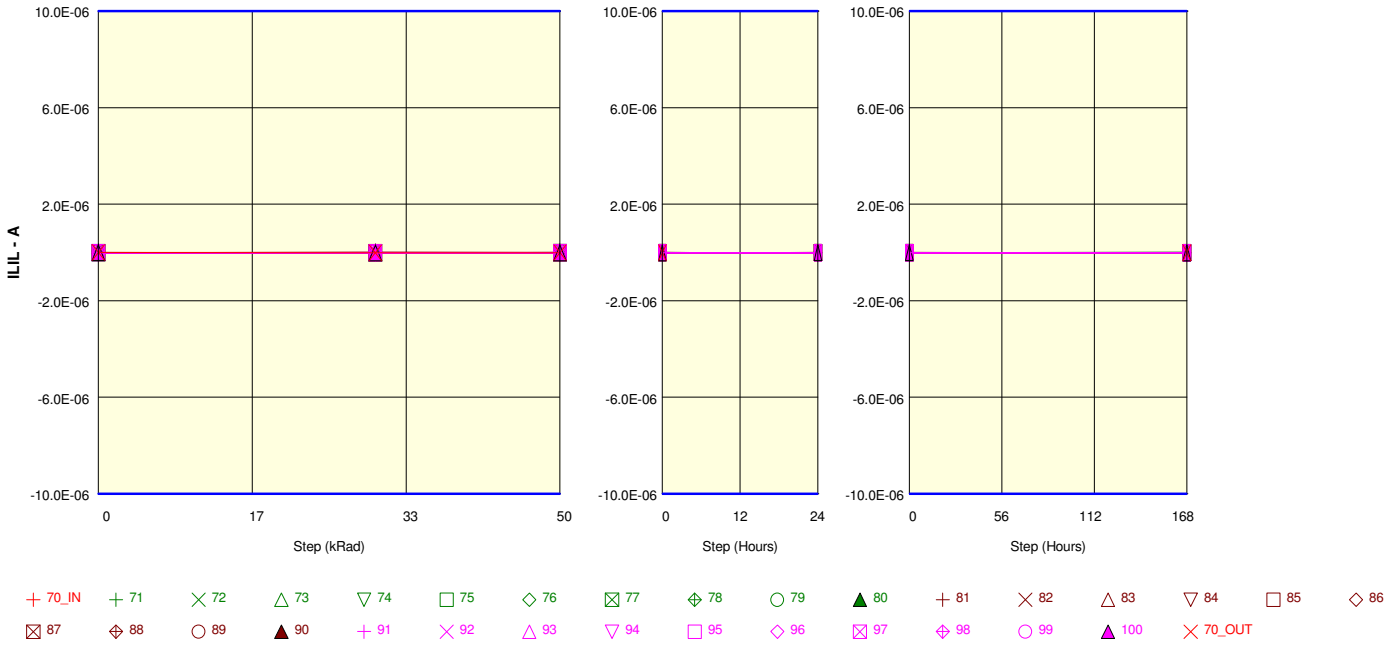
ILILIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-10.6E-09	-9.7E-09	-12.0E-09	-12.3E-09	-17.5E-09
Std Deviation	7.5E-09	6.7E-09	6.3E-09	6.0E-09	5.6E-09

Measurements

ILILIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-22.0E-09	-10.5E-09	-10.5E-09	-24.2E-09	-8.2E-09
70_OUT_REF	-17.4E-09	173.3E-12	-589.6E-12		-22.7E-09
OFF samples					
91	-22.0E-09	-9.0E-09	-25.8E-09	-24.2E-09	-12.8E-09
92	-9.7E-09	-7.5E-09	-6.7E-09	-18.1E-09	-13.6E-09
93	-16.6E-09	-15.8E-09	-13.6E-09	-15.8E-09	-5.9E-09
94	-14.3E-09	-7.5E-09	-12.8E-09	-15.1E-09	-5.2E-09
95	-12.0E-09	-24.2E-09	-5.9E-09	-19.7E-09	-10.5E-09
96	-15.1E-09	-13.6E-09	-4.4E-09	-15.1E-09	-15.1E-09
97	-9.0E-09	-22.0E-09	-15.8E-09	-19.7E-09	-2.9E-09
98	-12.0E-09	-8.2E-09	-6.7E-09	-8.2E-09	-3.6E-09
99	-6.7E-09	-5.2E-09	-21.2E-09	-12.0E-09	-11.3E-09
100	-12.8E-09	-15.8E-09	-10.5E-09	1.7E-09	-22.7E-09
Statistics					
Min	-22.0E-09	-24.2E-09	-25.8E-09	-24.2E-09	-22.7E-09
Max	-6.7E-09	-5.2E-09	-4.4E-09	1.7E-09	-2.9E-09
Average	-13.0E-09	-12.9E-09	-12.3E-09	-14.6E-09	-10.4E-09
Std Deviation	4.1E-09	6.2E-09	6.7E-09	6.9E-09	5.8E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current Low : ILILIO[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

ILILIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-18.1E-09	-7.5E-09	-5.9E-09	-5.2E-09	-9.7E-09
70_OUT_REF	-2.1E-09	-11.3E-09	-8.2E-09		-11.3E-09
LDC samples					
71	-19.7E-09	-23.5E-09	-7.5E-09	-11.3E-09	-12.0E-09
72	-8.2E-09	-9.0E-09	-20.4E-09	-4.4E-09	-14.3E-09
73	-5.2E-09	-5.9E-09	-9.0E-09	-15.1E-09	6.3E-09
74	1.7E-09	-8.2E-09	-7.5E-09	-14.3E-09	-10.5E-09
75	-9.7E-09	-13.6E-09	-2.9E-09	-4.4E-09	-26.5E-09
76	-13.6E-09	-5.9E-09	-15.1E-09	173.3E-12	-16.6E-09
77	-21.2E-09	-14.3E-09	2.5E-09	-10.5E-09	-4.4E-09
78	-8.2E-09	-4.4E-09	-13.6E-09	-7.5E-09	-9.7E-09
79	-5.9E-09	-6.7E-09	-4.4E-09	-11.3E-09	-4.4E-09
80	-8.2E-09	-15.1E-09	-7.5E-09	-6.7E-09	-15.1E-09
Statistics					
Min	-21.2E-09	-23.5E-09	-20.4E-09	-15.1E-09	-26.5E-09
Max	1.7E-09	-4.4E-09	2.5E-09	173.3E-12	6.3E-09
Average	-9.8E-09	-10.7E-09	-8.5E-09	-8.5E-09	-10.7E-09
Std Deviation	6.5E-09	5.6E-09	6.2E-09	4.6E-09	8.3E-09

Measurements

ILILIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-18.1E-09	-7.5E-09	-5.9E-09	-5.2E-09	-9.7E-09
70_OUT_REF	-2.1E-09	-11.3E-09	-8.2E-09		-11.3E-09
HDC samples					
81	-4.4E-09	-13.6E-09	-12.8E-09	-22.0E-09	-13.6E-09
82	-5.9E-09	-18.1E-09	-23.5E-09	-9.7E-09	-12.8E-09
83	-8.2E-09	-15.1E-09	-12.8E-09	-5.2E-09	-12.8E-09
84	-22.0E-09	-18.9E-09	-14.3E-09	-2.9E-09	-18.1E-09
85	-9.0E-09	5.5E-09	-2.1E-09	-14.3E-09	-16.6E-09
86	-21.2E-09	-3.6E-09	-1.4E-09	-11.3E-09	-4.4E-09
87	-9.0E-09	-24.2E-09	-11.3E-09	-2.9E-09	-9.0E-09
88	-9.0E-09	-11.3E-09	-13.6E-09	-8.2E-09	-15.1E-09
89	-589.6E-12	1.7E-09	1.7E-09	-12.0E-09	-15.8E-09
90	-11.3E-09	-5.9E-09	-10.5E-09	-18.1E-09	-9.7E-09
Statistics					
Min	-22.0E-09	-24.2E-09	-23.5E-09	-22.0E-09	-18.1E-09
Max	-589.6E-12	5.5E-09	1.7E-09	-2.9E-09	-4.4E-09

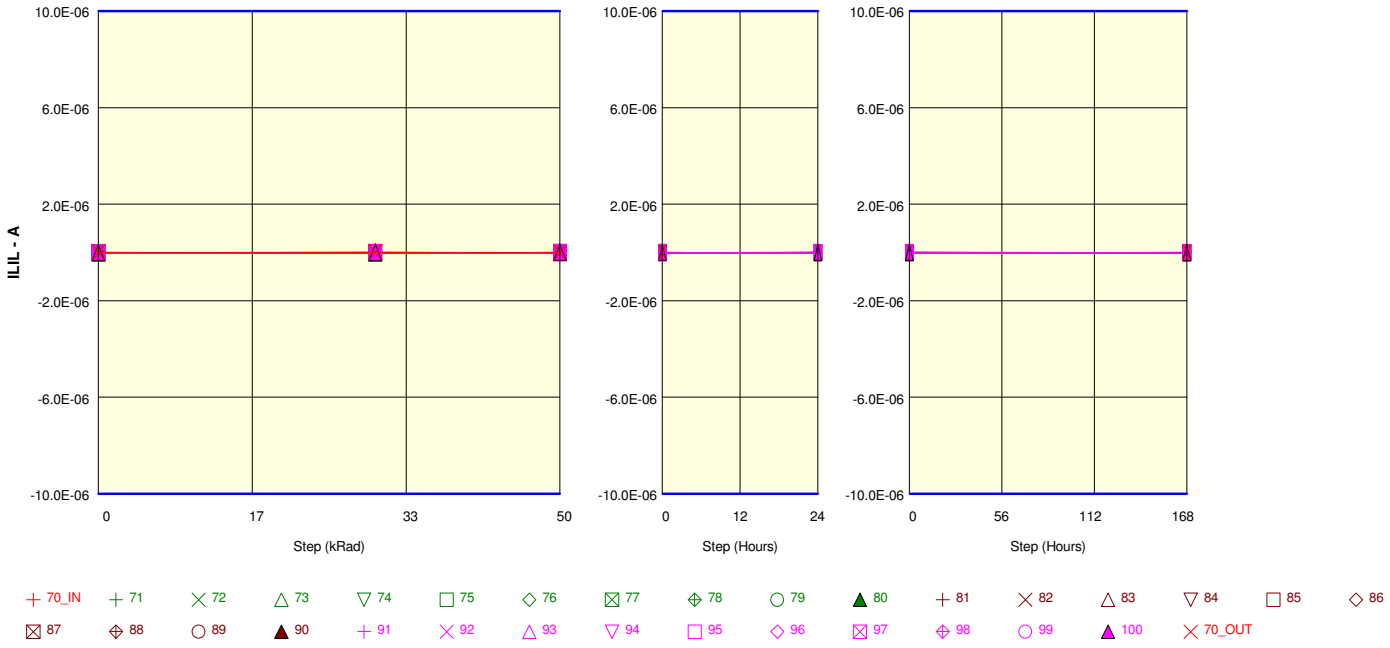
ILILIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-10.1E-09	-10.4E-09	-10.1E-09	-10.7E-09	-12.8E-09
Std Deviation	6.4E-09	9.1E-09	7.1E-09	6.0E-09	3.9E-09

Measurements

ILILIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-18.1E-09	-7.5E-09	-5.9E-09	-5.2E-09	-9.7E-09
70_OUT_REF	-2.1E-09	-11.3E-09	-8.2E-09		-11.3E-09
OFF samples					
91	-8.2E-09	-4.4E-09	-14.3E-09	-5.9E-09	-14.3E-09
92	-5.9E-09	-2.9E-09	-2.1E-09	-22.7E-09	-8.2E-09
93	-5.9E-09	-9.7E-09	-3.6E-09	-17.4E-09	-12.0E-09
94	-12.8E-09	-10.5E-09	-3.6E-09	-4.4E-09	-2.9E-09
95	-1.4E-09	-15.8E-09	-6.7E-09	-10.5E-09	-15.1E-09
96	-15.8E-09	-1.4E-09	-18.9E-09	-11.3E-09	-12.8E-09
97	-12.0E-09	-9.0E-09	-12.8E-09	-12.8E-09	-12.0E-09
98	-7.5E-09	-4.4E-09	-4.4E-09	-8.2E-09	-18.1E-09
99	-11.3E-09	-9.7E-09	-5.9E-09	-7.5E-09	-7.5E-09
100	-7.5E-09	-23.5E-09	-18.9E-09	-6.7E-09	-16.6E-09
Statistics					
Min	-15.8E-09	-23.5E-09	-18.9E-09	-22.7E-09	-18.1E-09
Max	-1.4E-09	-1.4E-09	-2.1E-09	-4.4E-09	-2.9E-09
Average	-8.8E-09	-9.1E-09	-9.1E-09	-10.7E-09	-12.0E-09
Std Deviation	4.0E-09	6.3E-09	6.2E-09	5.4E-09	4.4E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current Low : ILILIO[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

ILILIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-4.4E-09	-10.5E-09	-10.5E-09	-9.7E-09	-6.7E-09
70_OUT_REF	4.8E-09	-589.6E-12	-10.5E-09		-6.7E-09
LDC samples					
71	-3.6E-09	-9.7E-09	-18.1E-09	-5.9E-09	-9.0E-09
72	936.3E-12	-17.4E-09	-11.3E-09	-15.8E-09	-5.9E-09
73	-1.4E-09	-18.1E-09	-3.6E-09	173.3E-12	-5.9E-09
74	-20.4E-09	-5.2E-09	-13.6E-09	-6.7E-09	-11.3E-09
75	-12.0E-09	-14.3E-09	-4.4E-09	-5.9E-09	-14.3E-09
76	-6.7E-09	-16.6E-09	-11.3E-09	936.3E-12	-10.5E-09
77	-7.5E-09	-5.2E-09	-4.4E-09	4.8E-09	-15.8E-09
78	-5.9E-09	-7.5E-09	-11.3E-09	7.8E-09	-7.5E-09
79	-11.3E-09	-10.5E-09	-8.2E-09	-9.7E-09	-11.3E-09
80	-6.7E-09	-6.7E-09	3.2E-09	-3.6E-09	936.3E-12
Statistics					
Min	-20.4E-09	-18.1E-09	-18.1E-09	-15.8E-09	-15.8E-09
Max	936.3E-12	-5.2E-09	3.2E-09	7.8E-09	936.3E-12
Average	-7.5E-09	-11.1E-09	-8.3E-09	-3.4E-09	-9.1E-09
Std Deviation	5.7E-09	4.8E-09	5.8E-09	6.7E-09	4.6E-09

Measurements

ILILIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-4.4E-09	-10.5E-09	-10.5E-09	-9.7E-09	-6.7E-09
70_OUT_REF	4.8E-09	-589.6E-12	-10.5E-09		-6.7E-09
HDC samples					
81	-5.2E-09	-6.7E-09	-8.2E-09	-8.2E-09	-15.1E-09
82	-5.2E-09	-3.6E-09	-6.7E-09	-11.3E-09	-9.7E-09
83	-17.4E-09	-10.5E-09	2.5E-09	-11.3E-09	-8.2E-09
84	-10.5E-09	-5.9E-09	-9.0E-09	-14.3E-09	-18.1E-09
85	-5.9E-09	-12.0E-09	-9.0E-09	-13.6E-09	3.2E-09
86	-10.5E-09	-3.6E-09	-2.1E-09	-5.9E-09	-1.4E-09
87	173.3E-12	-12.0E-09	173.3E-12	-5.9E-09	-15.1E-09
88	-5.9E-09	-14.3E-09	1.7E-09	-7.5E-09	4.0E-09
89	-5.9E-09	-589.6E-12	-16.6E-09	1.7E-09	-12.8E-09
90	-10.5E-09	-10.5E-09	-9.0E-09	-6.7E-09	-11.3E-09
Statistics					
Min	-17.4E-09	-14.3E-09	-16.6E-09	-14.3E-09	-18.1E-09
Max	173.3E-12	-589.6E-12	2.5E-09	1.7E-09	4.0E-09

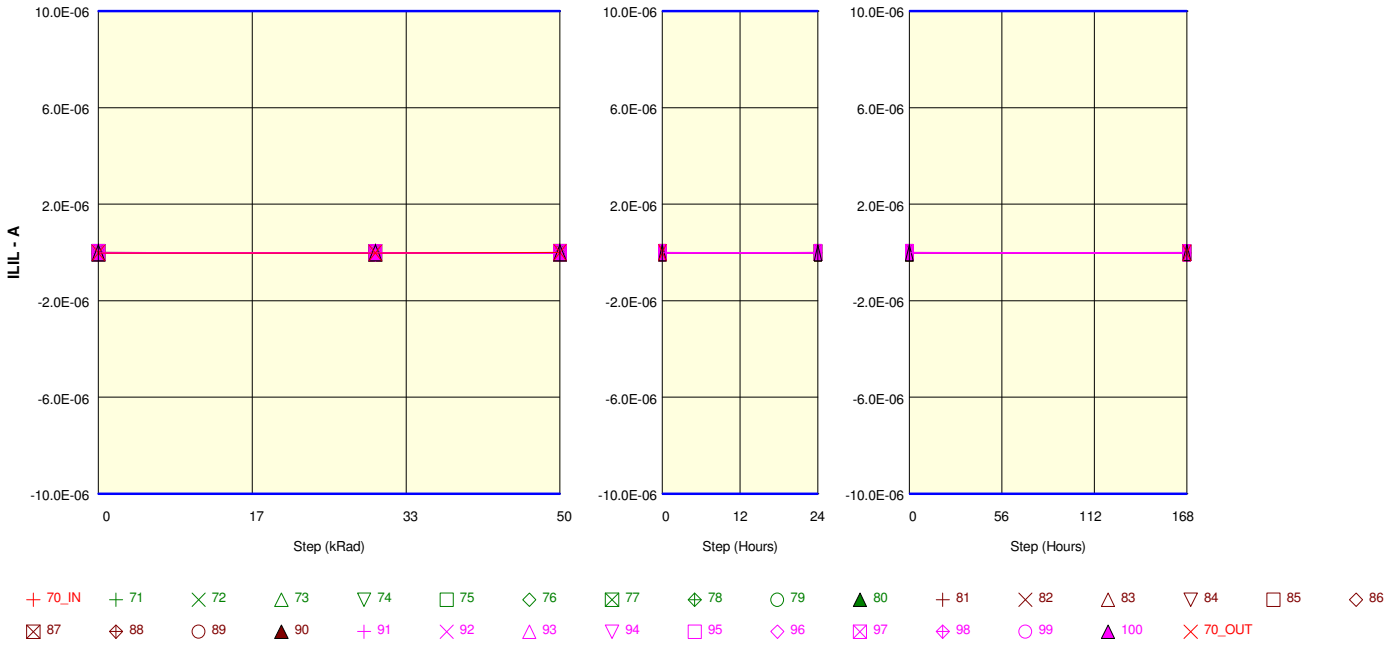
ILILIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-7.7E-09	-8.0E-09	-5.6E-09	-8.3E-09	-8.4E-09
Std Deviation	4.5E-09	4.3E-09	5.7E-09	4.4E-09	7.4E-09

Measurements

ILILIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-4.4E-09	-10.5E-09	-10.5E-09	-9.7E-09	-6.7E-09
70_OUT_REF	4.8E-09	-589.6E-12	-10.5E-09		-6.7E-09
OFF samples					
91	-9.0E-09	-4.4E-09	-18.9E-09	-9.0E-09	-3.6E-09
92	-9.0E-09	5.5E-09	-7.5E-09	-3.6E-09	-11.3E-09
93	-589.6E-12	-6.7E-09	4.0E-09	-9.0E-09	-4.4E-09
94	-11.3E-09	-2.9E-09	-5.2E-09	-15.8E-09	-12.0E-09
95	-9.0E-09	-589.6E-12	-12.0E-09	-4.4E-09	4.0E-09
96	-13.6E-09	-12.0E-09	-6.7E-09	-5.9E-09	-12.8E-09
97	-6.7E-09	-15.8E-09	-14.3E-09	-1.4E-09	-11.3E-09
98	-14.3E-09	2.5E-09	-16.6E-09	-15.8E-09	-6.7E-09
99	-18.9E-09	-9.7E-09	-15.1E-09	-2.1E-09	-5.2E-09
100	-10.5E-09	-3.6E-09	-5.9E-09	-3.6E-09	-2.1E-09
Statistics					
Min	-18.9E-09	-15.8E-09	-18.9E-09	-15.8E-09	-12.8E-09
Max	-589.6E-12	5.5E-09	4.0E-09	-1.4E-09	4.0E-09
Average	-10.3E-09	-4.8E-09	-9.8E-09	-7.1E-09	-6.5E-09
Std Deviation	4.6E-09	6.2E-09	6.5E-09	5.0E-09	5.1E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current Low : ILILIO[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

ILILIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-9.7E-09	-8.2E-09	-10.5E-09	-7.5E-09	-26.5E-09
70_OUT_REF	-22.7E-09	-24.2E-09	-589.6E-12		-15.1E-09
LDC samples					
71	-23.5E-09	-15.1E-09	-14.3E-09	-9.0E-09	936.3E-12
72	-28.1E-09	-6.7E-09	-13.6E-09	-25.8E-09	-22.7E-09
73	-27.3E-09	-24.2E-09	-20.4E-09	-3.6E-09	-13.6E-09
74	-9.7E-09	-6.7E-09	-11.3E-09	-8.2E-09	-18.1E-09
75	-6.7E-09	-11.3E-09	-13.6E-09	-13.6E-09	-7.5E-09
76	-18.1E-09	-11.3E-09	-11.3E-09	-18.1E-09	-15.1E-09
77	-2.9E-09	-14.3E-09	-20.4E-09	-12.8E-09	-12.8E-09
78	-9.7E-09	-21.2E-09	-25.8E-09	-5.9E-09	-23.5E-09
79	-11.3E-09	-11.3E-09	-16.6E-09	-22.0E-09	-15.1E-09
80	173.3E-12	-18.1E-09	-15.8E-09	-12.8E-09	-8.2E-09
Statistics					
Min	-28.1E-09	-24.2E-09	-25.8E-09	-25.8E-09	-23.5E-09
Max	173.3E-12	-6.7E-09	-11.3E-09	-3.6E-09	936.3E-12
Average	-13.7E-09	-14.0E-09	-16.3E-09	-13.2E-09	-13.6E-09
Std Deviation	9.5E-09	5.5E-09	4.4E-09	6.7E-09	7.0E-09

Measurements

ILILIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-9.7E-09	-8.2E-09	-10.5E-09	-7.5E-09	-26.5E-09
70_OUT_REF	-22.7E-09	-24.2E-09	-589.6E-12		-15.1E-09
HDC samples					
81	-10.5E-09	-6.7E-09	-3.6E-09	-25.0E-09	-18.9E-09
82	-19.7E-09	-11.3E-09	-12.0E-09	1.7E-09	-12.0E-09
83	-2.1E-09	-12.0E-09	-15.8E-09	-20.4E-09	-13.6E-09
84	-9.7E-09	-19.7E-09	-5.2E-09	-4.4E-09	-21.2E-09
85	-10.5E-09	-19.7E-09	-17.4E-09	-15.1E-09	-11.3E-09
86	-13.6E-09	-6.7E-09	-13.6E-09	-26.5E-09	-18.1E-09
87	-15.1E-09	-24.2E-09	-5.2E-09	-9.0E-09	-15.8E-09
88	-21.2E-09	-12.0E-09	-2.1E-09	-12.8E-09	-9.0E-09
89	-11.3E-09	-9.7E-09	-8.2E-09	-12.0E-09	-18.9E-09
90	-12.8E-09	-19.7E-09	-6.7E-09	-12.0E-09	-4.4E-09
Statistics					
Min	-21.2E-09	-24.2E-09	-17.4E-09	-26.5E-09	-21.2E-09
Max	-2.1E-09	-6.7E-09	-2.1E-09	1.7E-09	-4.4E-09

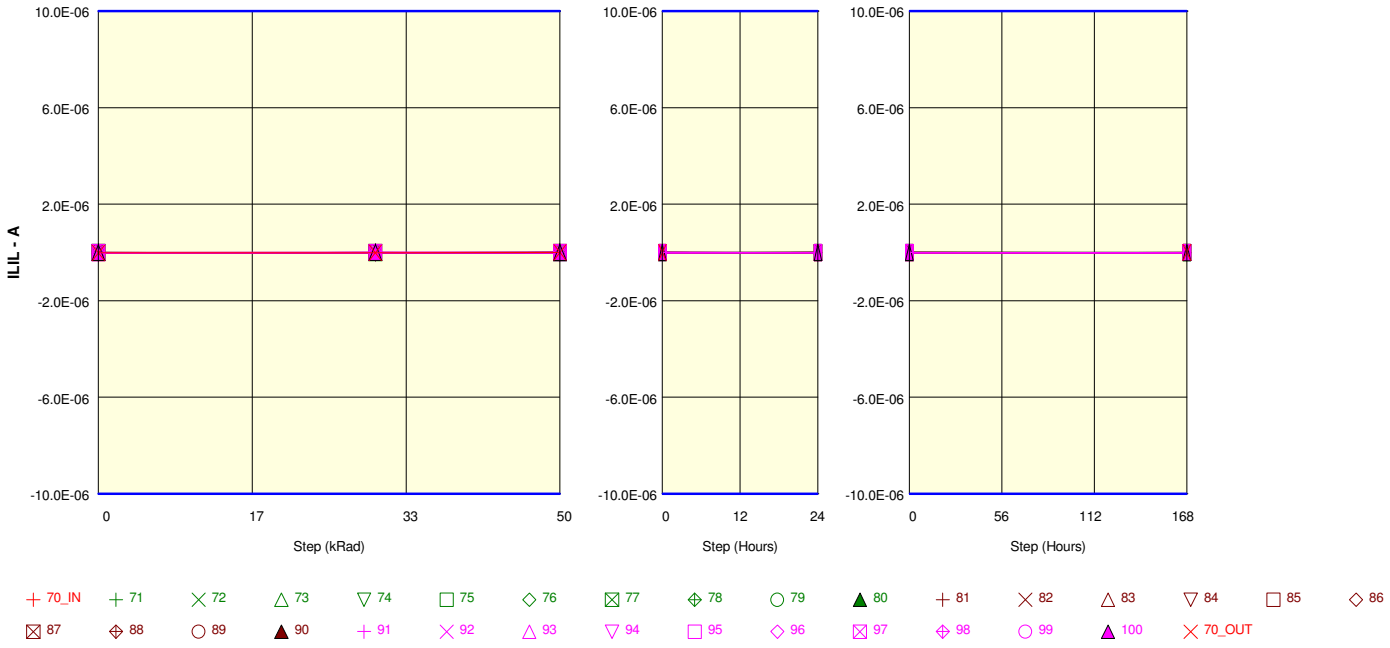
ILILIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-12.6E-09	-14.2E-09	-9.0E-09	-13.6E-09	-14.3E-09
Std Deviation	5.1E-09	5.8E-09	5.1E-09	8.3E-09	5.0E-09

Measurements

ILILIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-9.7E-09	-8.2E-09	-10.5E-09	-7.5E-09	-26.5E-09
70_OUT_REF	-22.7E-09	-24.2E-09	-589.6E-12		-15.1E-09
OFF samples					
91	-9.0E-09	-19.7E-09	-18.1E-09	-18.1E-09	-15.1E-09
92	-5.2E-09	-25.0E-09	-9.7E-09	173.3E-12	-25.8E-09
93	-2.1E-09	-9.0E-09	-1.4E-09	-4.4E-09	-18.9E-09
94	-14.3E-09	-5.9E-09	-18.1E-09	-6.7E-09	-10.5E-09
95	-2.1E-09	-16.6E-09	-14.3E-09	-2.9E-09	-11.3E-09
96	-12.0E-09	-12.0E-09	-10.5E-09	-17.4E-09	-2.1E-09
97	-25.8E-09	-7.5E-09	-8.2E-09	-8.2E-09	-19.7E-09
98	-12.0E-09	-11.3E-09	-7.5E-09	-3.6E-09	-9.0E-09
99	-6.7E-09	-19.7E-09	-4.4E-09	-9.0E-09	-24.2E-09
100	-10.5E-09	-13.6E-09	-12.0E-09	-18.9E-09	-8.2E-09
Statistics					
Min	-25.8E-09	-25.0E-09	-18.1E-09	-18.9E-09	-25.8E-09
Max	-2.1E-09	-5.9E-09	-1.4E-09	173.3E-12	-2.1E-09
Average	-10.0E-09	-14.0E-09	-10.4E-09	-8.9E-09	-14.5E-09
Std Deviation	6.6E-09	5.8E-09	5.2E-09	6.5E-09	7.2E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current Low : ILILIO[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

ILILIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-5.2E-09	-6.7E-09	-1.4E-09	-12.8E-09	-18.1E-09
70_OUT_REF	-15.1E-09	-9.7E-09	173.3E-12		4.0E-09
LDC samples					
71	-18.9E-09	-4.4E-09	4.0E-09	-5.9E-09	-17.4E-09
72	-11.3E-09	-10.5E-09	-10.5E-09	-14.3E-09	-13.6E-09
73	-2.1E-09	-15.1E-09	-10.5E-09	173.3E-12	-13.6E-09
74	-5.2E-09	2.5E-09	-12.8E-09	-4.4E-09	-589.6E-12
75	936.3E-12	-9.0E-09	-9.7E-09	-2.9E-09	-2.9E-09
76	-5.9E-09	-10.5E-09	6.3E-09	2.5E-09	-9.7E-09
77	-2.1E-09	-589.6E-12	3.2E-09	-18.1E-09	-4.4E-09
78	-8.2E-09	-4.4E-09	-8.2E-09	-1.4E-09	3.2E-09
79	-3.6E-09	-8.2E-09	-2.1E-09	-10.5E-09	-10.5E-09
80	-3.6E-09	1.7E-09	-7.5E-09	6.3E-09	-2.1E-09
Statistics					
Min	-18.9E-09	-15.1E-09	-12.8E-09	-18.1E-09	-17.4E-09
Max	936.3E-12	2.5E-09	6.3E-09	6.3E-09	3.2E-09
Average	-6.0E-09	-5.9E-09	-4.8E-09	-4.9E-09	-7.2E-09
Std Deviation	5.4E-09	5.5E-09	6.7E-09	7.2E-09	6.4E-09

Measurements

ILILIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-5.2E-09	-6.7E-09	-1.4E-09	-12.8E-09	-18.1E-09
70_OUT_REF	-15.1E-09	-9.7E-09	173.3E-12		4.0E-09
HDC samples					
81	-5.2E-09	936.3E-12	5.5E-09	-10.5E-09	-5.2E-09
82	-7.5E-09	-12.8E-09	-14.3E-09	6.3E-09	-3.6E-09
83	3.2E-09	-5.9E-09	-2.1E-09	-13.6E-09	-1.4E-09
84	-15.8E-09	-4.4E-09	-5.9E-09	-6.7E-09	-589.6E-12
85	-4.4E-09	-8.2E-09	-4.4E-09	-4.4E-09	-9.0E-09
86	-2.9E-09	936.3E-12	-8.2E-09	-6.7E-09	-14.3E-09
87	-10.5E-09	-8.2E-09	-3.6E-09	-9.0E-09	-2.9E-09
88	2.5E-09	-5.9E-09	3.2E-09	1.7E-09	-5.2E-09
89	-5.9E-09	-9.0E-09	1.7E-09	-10.5E-09	3.2E-09
90	-589.6E-12	-1.4E-09	-5.9E-09	1.7E-09	-1.4E-09
Statistics					
Min	-15.8E-09	-12.8E-09	-14.3E-09	-13.6E-09	-14.3E-09
Max	3.2E-09	936.3E-12	5.5E-09	6.3E-09	3.2E-09

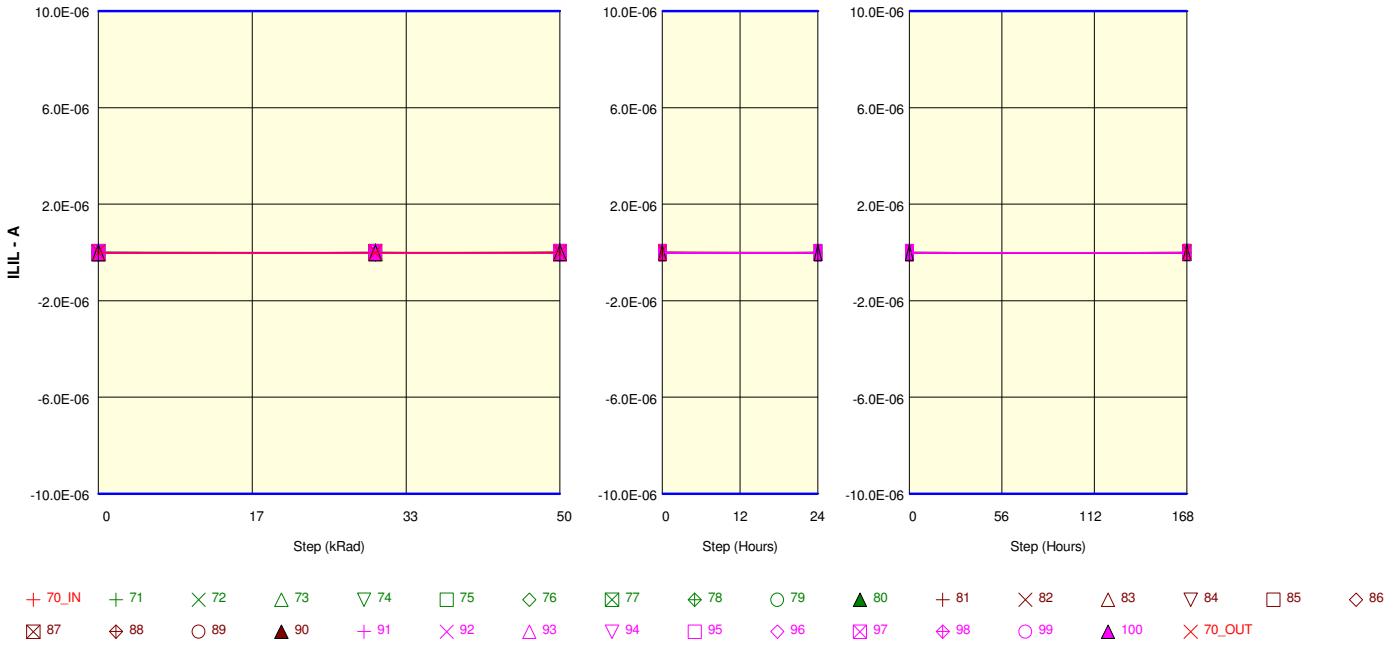
ILILIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-4.7E-09	-5.4E-09	-3.4E-09	-5.2E-09	-4.0E-09
Std Deviation	5.5E-09	4.3E-09	5.5E-09	6.1E-09	4.6E-09

Measurements

ILILIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-5.2E-09	-6.7E-09	-1.4E-09	-12.8E-09	-18.1E-09
70_OUT_REF	-15.1E-09	-9.7E-09	173.3E-12		4.0E-09
OFF samples					
91	-11.3E-09	-15.1E-09	-7.5E-09	173.3E-12	-5.9E-09
92	-2.1E-09	-5.9E-09	-3.6E-09	-10.5E-09	-5.2E-09
93	-19.7E-09	-2.9E-09	-7.5E-09	-9.7E-09	-3.6E-09
94	173.3E-12	6.3E-09	5.5E-09	-4.4E-09	-4.4E-09
95	-9.0E-09	-2.1E-09	-15.1E-09	-1.4E-09	-2.9E-09
96	-8.2E-09	2.5E-09	-5.9E-09	-15.1E-09	-8.2E-09
97	-589.6E-12	-7.5E-09	173.3E-12	-4.4E-09	-2.1E-09
98	-13.6E-09	-3.6E-09	-3.6E-09	-9.7E-09	-8.2E-09
99	-13.6E-09	4.0E-09	-1.4E-09	-2.1E-09	-8.2E-09
100	-7.5E-09	-4.4E-09	-2.9E-09	-2.1E-09	-11.3E-09
Statistics					
Min	-19.7E-09	-15.1E-09	-15.1E-09	-15.1E-09	-11.3E-09
Max	173.3E-12	6.3E-09	5.5E-09	173.3E-12	-2.1E-09
Average	-8.5E-09	-2.9E-09	-4.2E-09	-5.9E-09	-6.0E-09
Std Deviation	6.0E-09	5.9E-09	5.2E-09	4.8E-09	2.8E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current Low : ILILIO[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

ILILIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	173.3E-12	-13.6E-09	-1.4E-09	-4.4E-09	-15.1E-09
70_OUT_REF	-5.9E-09	-8.2E-09	-12.0E-09		-12.0E-09
LDC samples					
71	-18.1E-09	-16.6E-09	-589.6E-12	-21.2E-09	-9.0E-09
72	-18.9E-09	-9.0E-09	2.5E-09	-12.0E-09	-7.5E-09
73	-14.3E-09	-589.6E-12	936.3E-12	173.3E-12	-5.2E-09
74	-10.5E-09	-2.9E-09	-6.7E-09	-12.0E-09	-4.4E-09
75	-11.3E-09	-2.1E-09	-11.3E-09	-12.8E-09	-5.2E-09
76	-2.9E-09	936.3E-12	-11.3E-09	-12.8E-09	-5.2E-09
77	5.5E-09	-4.4E-09	-7.5E-09	4.0E-09	2.5E-09
78	-2.1E-09	-3.6E-09	-20.4E-09	-2.9E-09	-6.7E-09
79	-11.3E-09	4.8E-09	-589.6E-12	4.8E-09	-8.2E-09
80	-8.2E-09	-7.5E-09	-4.4E-09	936.3E-12	-12.8E-09
Statistics					
Min	-18.9E-09	-16.6E-09	-20.4E-09	-21.2E-09	-12.8E-09
Max	5.5E-09	4.8E-09	2.5E-09	4.8E-09	2.5E-09
Average	-9.2E-09	-4.1E-09	-5.9E-09	-6.4E-09	-6.2E-09
Std Deviation	7.2E-09	5.6E-09	6.7E-09	8.4E-09	3.7E-09

Measurements

ILILIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	173.3E-12	-13.6E-09	-1.4E-09	-4.4E-09	-15.1E-09
70_OUT_REF	-5.9E-09	-8.2E-09	-12.0E-09		-12.0E-09
HDC samples					
81	-12.8E-09	-9.7E-09	-3.6E-09	-6.7E-09	-6.7E-09
82	-8.2E-09	-10.5E-09	4.8E-09	-3.6E-09	-9.0E-09
83	4.8E-09	-6.7E-09	-2.9E-09	-2.1E-09	-9.0E-09
84	-4.4E-09	-5.9E-09	-589.6E-12	-11.3E-09	-2.1E-09
85	-8.2E-09	-8.2E-09	-15.1E-09	-17.4E-09	-2.9E-09
86	-5.2E-09	-12.0E-09	-4.4E-09	-2.9E-09	-8.2E-09
87	-9.0E-09	1.7E-09	2.5E-09	3.2E-09	-7.5E-09
88	-4.4E-09	-8.2E-09	5.5E-09	-10.5E-09	-1.4E-09
89	-6.7E-09	-2.9E-09	-8.2E-09	-4.4E-09	-5.9E-09
90	936.3E-12	-11.3E-09	-4.4E-09	-8.2E-09	173.3E-12
Statistics					
Min	-12.8E-09	-12.0E-09	-15.1E-09	-17.4E-09	-9.0E-09
Max	4.8E-09	1.7E-09	5.5E-09	3.2E-09	173.3E-12

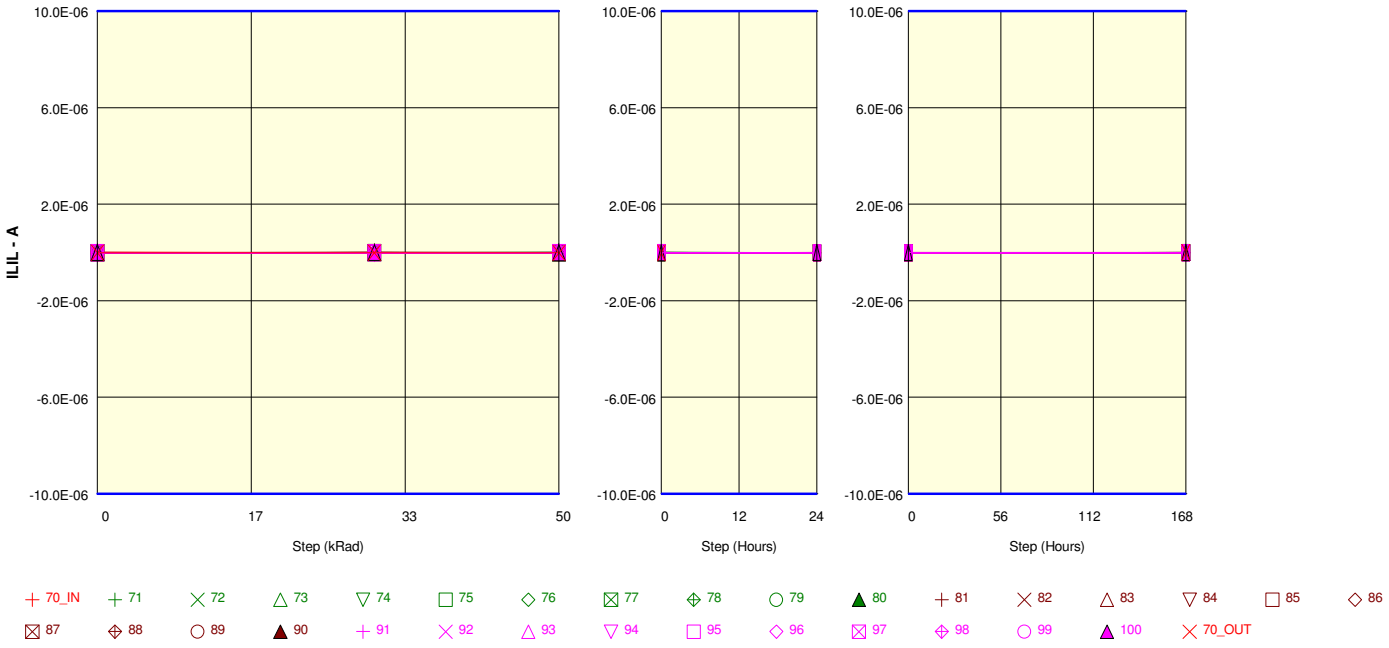
ILILIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-5.3E-09	-7.4E-09	-2.6E-09	-6.4E-09	-5.2E-09
Std Deviation	4.8E-09	4.0E-09	5.9E-09	5.5E-09	3.2E-09

Measurements

ILILIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	173.3E-12	-13.6E-09	-1.4E-09	-4.4E-09	-15.1E-09
70_OUT_REF	-5.9E-09	-8.2E-09	-12.0E-09		-12.0E-09
OFF samples					
91	-5.2E-09	-17.4E-09	-12.0E-09	-7.5E-09	-11.3E-09
92	1.7E-09	-1.4E-09	-5.2E-09	173.3E-12	-4.4E-09
93	-15.8E-09	-589.6E-12	-15.1E-09	-12.0E-09	-9.0E-09
94	-13.6E-09	-12.0E-09	-10.5E-09	-13.6E-09	1.7E-09
95	-9.0E-09	-7.5E-09	-12.0E-09	-12.8E-09	-5.2E-09
96	-1.4E-09	-1.4E-09	-11.3E-09	-1.4E-09	-7.5E-09
97	-589.6E-12	-7.5E-09	-4.4E-09	2.5E-09	-5.9E-09
98	-5.9E-09	-12.8E-09	-5.2E-09	-4.4E-09	173.3E-12
99	2.5E-09	-12.0E-09	-6.7E-09	-12.8E-09	173.3E-12
100	-12.8E-09	-17.4E-09	-5.9E-09	-8.2E-09	-1.4E-09
Statistics					
Min	-15.8E-09	-17.4E-09	-15.1E-09	-13.6E-09	-11.3E-09
Max	2.5E-09	-589.6E-12	-4.4E-09	2.5E-09	1.7E-09
Average	-6.0E-09	-9.0E-09	-8.8E-09	-7.0E-09	-4.3E-09
Std Deviation	6.3E-09	6.0E-09	3.6E-09	5.6E-09	4.1E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current Low : ILILIO[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

ILILIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	5.5E-09	-9.7E-09	-12.0E-09	-11.3E-09	-9.7E-09
70_OUT_REF	-10.5E-09	-13.6E-09	-18.1E-09		-2.9E-09
LDC samples					
71	-5.2E-09	-8.2E-09	-6.7E-09	-6.7E-09	-5.9E-09
72	-20.4E-09	-18.1E-09	-1.4E-09	-12.0E-09	4.8E-09
73	-8.2E-09	-12.0E-09	5.5E-09	-15.8E-09	-2.9E-09
74	-12.8E-09	-18.9E-09	-9.7E-09	-10.5E-09	1.7E-09
75	-12.8E-09	-5.2E-09	-11.3E-09	-8.2E-09	-8.2E-09
76	-2.9E-09	-12.8E-09	-20.4E-09	-9.7E-09	-11.3E-09
77	-10.5E-09	-9.0E-09	-9.0E-09	-9.7E-09	-14.3E-09
78	-6.7E-09	-12.8E-09	-5.2E-09	-22.0E-09	-10.5E-09
79	-17.4E-09	2.5E-09	3.2E-09	-14.3E-09	-16.6E-09
80	-9.0E-09	-7.5E-09	-8.2E-09	-9.7E-09	-13.6E-09
Statistics					
Min	-20.4E-09	-18.9E-09	-20.4E-09	-22.0E-09	-16.6E-09
Max	-2.9E-09	2.5E-09	5.5E-09	-6.7E-09	4.8E-09
Average	-10.6E-09	-10.2E-09	-6.3E-09	-11.9E-09	-7.7E-09
Std Deviation	5.1E-09	6.0E-09	7.1E-09	4.2E-09	6.7E-09

Measurements

ILILIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	5.5E-09	-9.7E-09	-12.0E-09	-11.3E-09	-9.7E-09
70_OUT_REF	-10.5E-09	-13.6E-09	-18.1E-09		-2.9E-09
HDC samples					
81	-10.5E-09	-2.1E-09	-10.5E-09	-589.6E-12	1.7E-09
82	-16.6E-09	-12.0E-09	-14.3E-09	-9.7E-09	-9.7E-09
83	-15.1E-09	5.5E-09	2.5E-09	-20.4E-09	-2.9E-09
84	-13.6E-09	-14.3E-09	-12.8E-09	-20.4E-09	-12.0E-09
85	-15.8E-09	-5.9E-09	-9.0E-09	-11.3E-09	-6.7E-09
86	-11.3E-09	-1.4E-09	-6.7E-09	-4.4E-09	-12.0E-09
87	-7.5E-09	-2.1E-09	-18.1E-09	-10.5E-09	-18.1E-09
88	-3.6E-09	-13.6E-09	-14.3E-09	-7.5E-09	-10.5E-09
89	-1.4E-09	-2.9E-09	-10.5E-09	-12.8E-09	-7.5E-09
90	-13.6E-09	-12.8E-09	-12.0E-09	-5.9E-09	-2.9E-09
Statistics					
Min	-16.6E-09	-14.3E-09	-18.1E-09	-20.4E-09	-18.1E-09
Max	-1.4E-09	5.5E-09	2.5E-09	-589.6E-12	1.7E-09

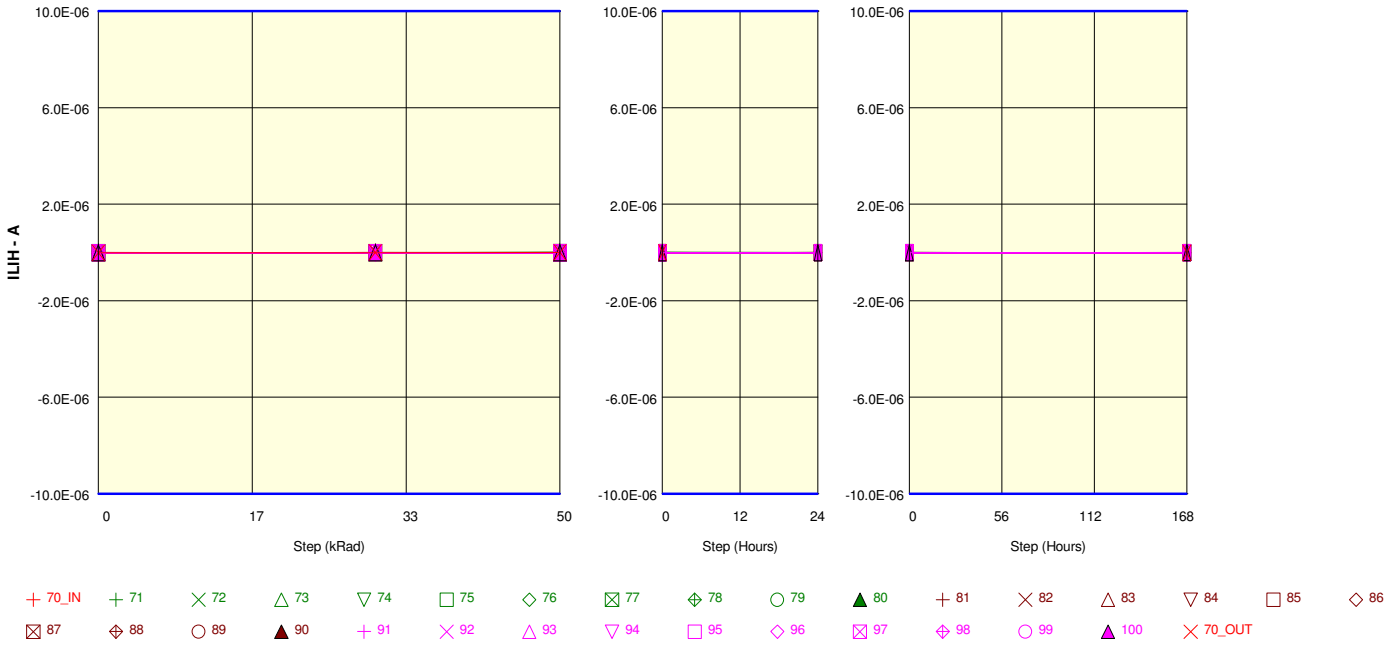
ILILIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-10.9E-09	-6.2E-09	-10.6E-09	-10.4E-09	-8.1E-09
Std Deviation	4.9E-09	6.3E-09	5.3E-09	6.1E-09	5.4E-09

Measurements

ILILIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	5.5E-09	-9.7E-09	-12.0E-09	-11.3E-09	-9.7E-09
70_OUT_REF	-10.5E-09	-13.6E-09	-18.1E-09		-2.9E-09
OFF samples					
91	-8.2E-09	-11.3E-09	-8.2E-09	-8.2E-09	-5.2E-09
92	-12.0E-09	-15.1E-09	-2.9E-09	-13.6E-09	-14.3E-09
93	-9.7E-09	-12.0E-09	3.2E-09	-15.1E-09	-10.5E-09
94	-13.6E-09	-10.5E-09	-8.2E-09	-15.1E-09	-13.6E-09
95	173.3E-12	-20.4E-09	-8.2E-09	-7.5E-09	-5.9E-09
96	-3.6E-09	-10.5E-09	-3.6E-09	-9.7E-09	-9.0E-09
97	-15.1E-09	-7.5E-09	-4.4E-09	-20.4E-09	-18.1E-09
98	-17.4E-09	-8.2E-09	-8.2E-09	-16.6E-09	-5.2E-09
99	-5.9E-09	-7.5E-09	-16.6E-09	-15.1E-09	-2.9E-09
100	-2.1E-09	-5.9E-09	-10.5E-09	173.3E-12	-5.2E-09
Statistics					
Min	-17.4E-09	-20.4E-09	-16.6E-09	-20.4E-09	-18.1E-09
Max	173.3E-12	-5.9E-09	3.2E-09	173.3E-12	-2.9E-09
Average	-8.8E-09	-10.9E-09	-6.8E-09	-12.1E-09	-9.0E-09
Std Deviation	5.5E-09	4.1E-09	5.0E-09	5.6E-09	4.8E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current High : ILIHALE
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

ILIHALE	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-6.7E-09	-17.4E-09	-14.3E-09	-11.3E-09	-17.4E-09
70_OUT_REF	-9.7E-09	-5.2E-09	3.2E-09		-16.6E-09
LDC samples					
71	-12.0E-09	-16.6E-09	-9.0E-09	-15.8E-09	-19.7E-09
72	-25.0E-09	-26.5E-09	-12.0E-09	-14.3E-09	-18.9E-09
73	-7.5E-09	-11.3E-09	-9.7E-09	-2.9E-09	-6.7E-09
74	-22.0E-09	-7.5E-09	-589.6E-12	-22.7E-09	-17.4E-09
75	-2.9E-09	-8.2E-09	-16.6E-09	-18.1E-09	-5.9E-09
76	-21.2E-09	-10.5E-09	-15.1E-09	-2.9E-09	-14.3E-09
77	-12.8E-09	-12.8E-09	-12.0E-09	-15.8E-09	-15.1E-09
78	-12.0E-09	-9.7E-09	5.5E-09	-2.9E-09	-5.2E-09
79	-8.2E-09	4.8E-09	-1.4E-09	-9.7E-09	-12.8E-09
80	-6.7E-09	-6.7E-09	-7.5E-09	-7.5E-09	-17.4E-09
Statistics					
Min	-25.0E-09	-26.5E-09	-16.6E-09	-22.7E-09	-19.7E-09
Max	-2.9E-09	4.8E-09	5.5E-09	-2.9E-09	-5.2E-09
Average	-13.0E-09	-10.5E-09	-7.8E-09	-11.3E-09	-13.3E-09
Std Deviation	7.0E-09	7.5E-09	6.7E-09	6.8E-09	5.2E-09

Measurements

ILIHALE	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-6.7E-09	-17.4E-09	-14.3E-09	-11.3E-09	-17.4E-09
70_OUT_REF	-9.7E-09	-5.2E-09	3.2E-09		-16.6E-09
HDC samples					
81	-7.5E-09	-15.8E-09	-5.2E-09	-15.1E-09	-11.3E-09
82	-12.8E-09	-10.5E-09	-16.6E-09	-9.7E-09	-18.1E-09
83	-13.6E-09	-5.9E-09	-12.8E-09	-9.0E-09	-15.1E-09
84	-24.2E-09	-2.1E-09	1.7E-09	-9.0E-09	-15.8E-09
85	-10.5E-09	-11.3E-09	-12.0E-09	-2.1E-09	-5.9E-09
86	-19.7E-09	-12.0E-09	-12.0E-09	-18.1E-09	-13.6E-09
87	-22.7E-09	-5.9E-09	-9.0E-09	-11.3E-09	-2.1E-09
88	-13.6E-09	-4.4E-09	-16.6E-09	936.3E-12	-5.2E-09
89	-22.0E-09	-2.1E-09	-11.3E-09	-17.4E-09	-10.5E-09
90	-4.4E-09	-9.0E-09	-12.8E-09	-7.5E-09	-11.3E-09
Statistics					
Min	-24.2E-09	-15.8E-09	-16.6E-09	-18.1E-09	-18.1E-09
Max	-4.4E-09	-2.1E-09	1.7E-09	936.3E-12	-2.1E-09

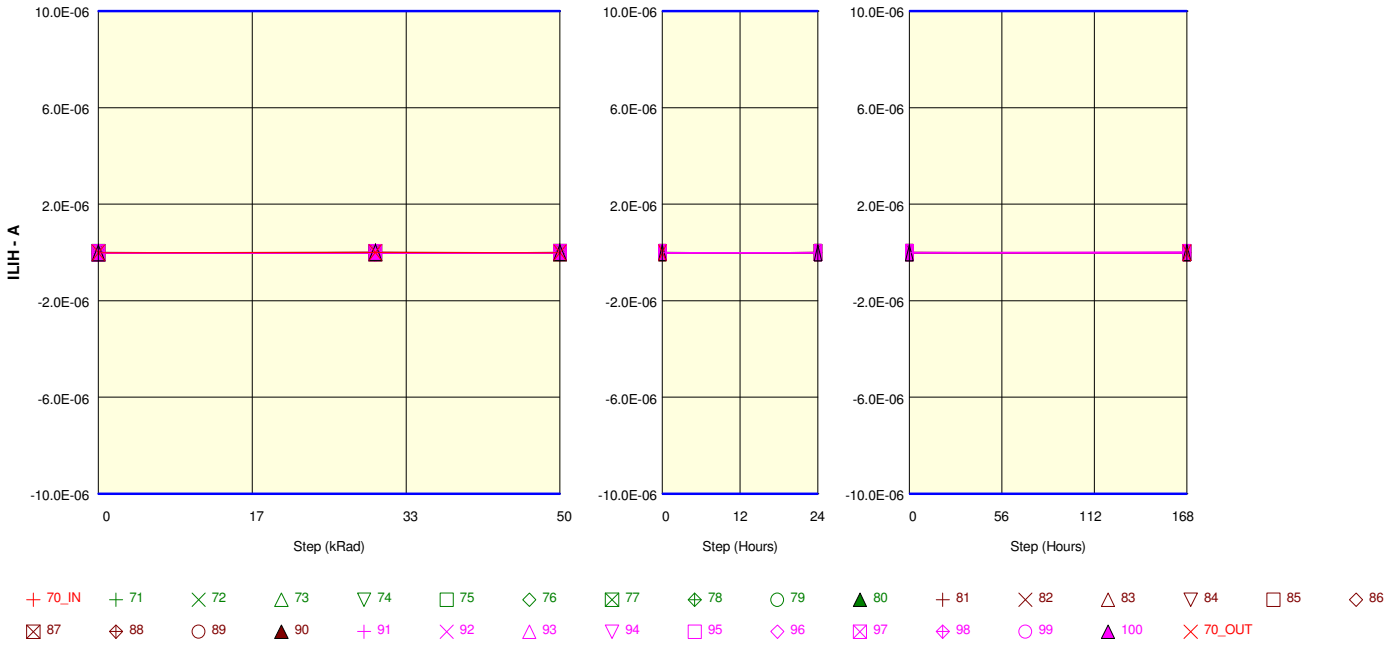
ILIHALE	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-15.1E-09	-7.9E-09	-10.7E-09	-9.8E-09	-10.9E-09
Std Deviation	6.4E-09	4.3E-09	5.2E-09	5.8E-09	4.9E-09

Measurements

ILIHALE	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-6.7E-09	-17.4E-09	-14.3E-09	-11.3E-09	-17.4E-09
70_OUT_REF	-9.7E-09	-5.2E-09	3.2E-09		-16.6E-09
OFF samples					
91	-6.7E-09	-6.7E-09	-9.7E-09	-5.9E-09	-5.2E-09
92	-12.8E-09	-13.6E-09	-10.5E-09	-12.0E-09	-8.2E-09
93	-9.0E-09	-4.4E-09	-14.3E-09	-20.4E-09	-19.7E-09
94	-24.2E-09	-14.3E-09	-3.6E-09	-13.6E-09	-18.9E-09
95	-12.8E-09	-7.5E-09	-13.6E-09	-5.2E-09	-11.3E-09
96	2.5E-09	-7.5E-09	-9.0E-09	-9.0E-09	-12.8E-09
97	-13.6E-09	-13.6E-09	-13.6E-09	-5.9E-09	-2.9E-09
98	-2.9E-09	-18.1E-09	-11.3E-09	-11.3E-09	-7.5E-09
99	-19.7E-09	-12.0E-09	-19.7E-09	-12.0E-09	-5.2E-09
100	-9.7E-09	-12.8E-09	-14.3E-09	-12.8E-09	-8.2E-09
Statistics					
Min	-24.2E-09	-18.1E-09	-19.7E-09	-20.4E-09	-19.7E-09
Max	2.5E-09	-4.4E-09	-3.6E-09	-5.2E-09	-2.9E-09
Average	-10.9E-09	-11.0E-09	-12.0E-09	-10.8E-09	-10.0E-09
Std Deviation	7.3E-09	4.1E-09	4.0E-09	4.4E-09	5.4E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current High : ILIHCE#
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

ILIHCE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-16.6E-09	-15.8E-09	-15.8E-09	-9.7E-09	-9.7E-09
70_OUT_REF	-12.0E-09	173.3E-12	-7.5E-09		-13.6E-09
LDC samples					
71	-9.0E-09	-6.7E-09	-5.9E-09	2.5E-09	-15.1E-09
72	936.3E-12	-18.9E-09	-2.9E-09	-5.9E-09	-589.6E-12
73	-17.4E-09	-12.8E-09	-5.9E-09	-15.1E-09	-18.9E-09
74	-5.9E-09	-15.1E-09	-8.2E-09	-8.2E-09	-6.7E-09
75	-589.6E-12	-7.5E-09	-1.4E-09	-9.0E-09	-9.7E-09
76	-8.2E-09	-6.7E-09	-3.6E-09	-17.4E-09	-5.2E-09
77	-3.6E-09	-14.3E-09	-6.7E-09	-4.4E-09	-6.7E-09
78	-7.5E-09	1.7E-09	-5.9E-09	-3.6E-09	-5.9E-09
79	-14.3E-09	-5.2E-09	-3.6E-09	-12.0E-09	-4.4E-09
80	-2.9E-09	-5.9E-09	-1.4E-09	-19.7E-09	-11.3E-09
Statistics					
Min	-17.4E-09	-18.9E-09	-8.2E-09	-19.7E-09	-18.9E-09
Max	936.3E-12	1.7E-09	-1.4E-09	2.5E-09	-589.6E-12
Average	-6.8E-09	-9.1E-09	-4.6E-09	-9.3E-09	-8.4E-09
Std Deviation	5.5E-09	5.7E-09	2.2E-09	6.5E-09	5.1E-09

Measurements

ILIHCE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-16.6E-09	-15.8E-09	-15.8E-09	-9.7E-09	-9.7E-09
70_OUT_REF	-12.0E-09	173.3E-12	-7.5E-09		-13.6E-09
HDC samples					
81	-20.4E-09	-9.7E-09	173.3E-12	-19.7E-09	-5.9E-09
82	-18.9E-09	-5.9E-09	-13.6E-09	-4.4E-09	-9.0E-09
83	-9.7E-09	-9.7E-09	-11.3E-09	-19.7E-09	-5.2E-09
84	-8.2E-09	-18.1E-09	-3.6E-09	-589.6E-12	-8.2E-09
85	-18.9E-09	-10.5E-09	-9.7E-09	-2.9E-09	-9.7E-09
86	-8.2E-09	8.6E-09	-10.5E-09	1.7E-09	1.7E-09
87	-18.1E-09	-9.0E-09	-3.6E-09	-2.9E-09	-19.7E-09
88	-5.9E-09	-5.2E-09	-3.6E-09	-6.7E-09	-13.6E-09
89	-7.5E-09	-18.9E-09	-12.0E-09	-7.5E-09	-2.9E-09
90	-18.1E-09	-2.9E-09	-19.7E-09	-2.1E-09	-1.4E-09
Statistics					
Min	-20.4E-09	-18.9E-09	-19.7E-09	-19.7E-09	-19.7E-09
Max	-5.9E-09	8.6E-09	173.3E-12	1.7E-09	1.7E-09

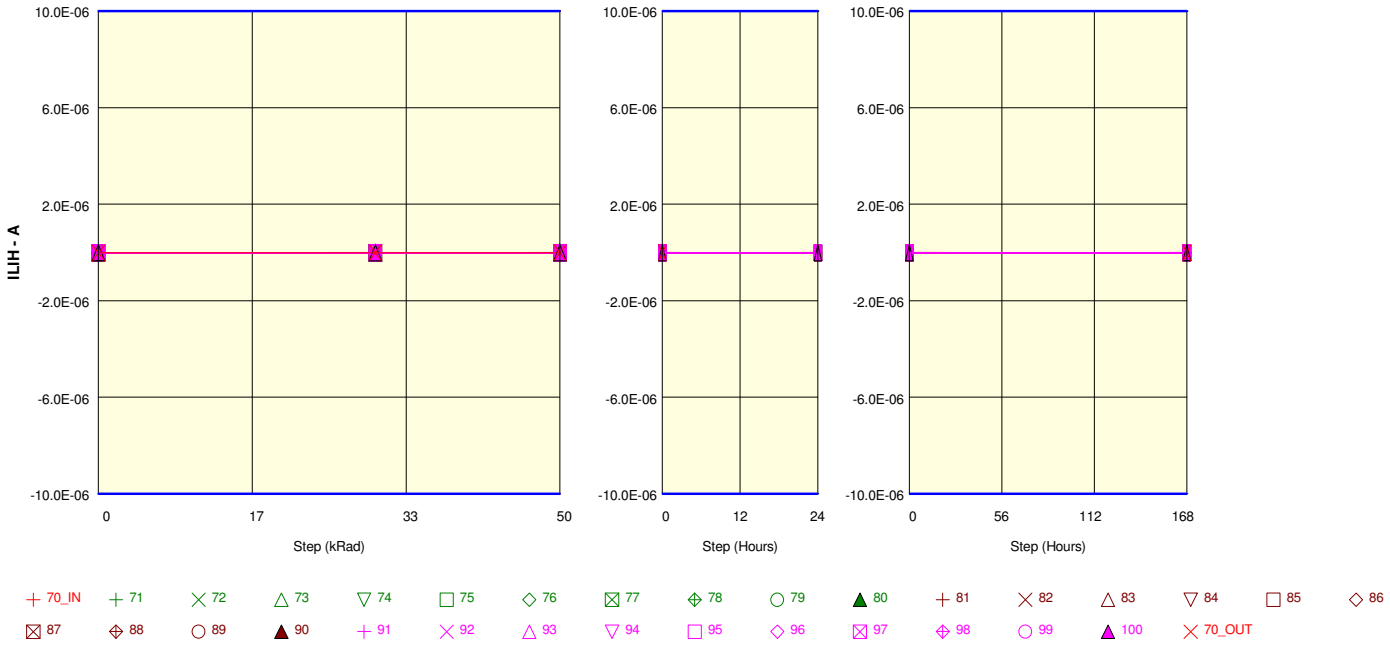
ILIHCE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-13.4E-09	-8.1E-09	-8.8E-09	-6.5E-09	-7.4E-09
Std Deviation	5.6E-09	7.4E-09	5.7E-09	7.1E-09	5.9E-09

Measurements

ILIHCE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-16.6E-09	-15.8E-09	-15.8E-09	-9.7E-09	-9.7E-09
70_OUT_REF	-12.0E-09	173.3E-12	-7.5E-09		-13.6E-09
OFF samples					
91	-6.7E-09	-6.7E-09	-2.1E-09	-13.6E-09	-11.3E-09
92	-8.2E-09	-8.2E-09	-7.5E-09	-16.6E-09	-589.6E-12
93	-5.9E-09	-12.8E-09	-5.9E-09	-589.6E-12	-5.2E-09
94	-12.8E-09	-1.4E-09	-18.1E-09	-589.6E-12	-5.2E-09
95	-15.8E-09	-8.2E-09	-3.6E-09	-18.1E-09	-12.8E-09
96	-13.6E-09	-15.1E-09	-6.7E-09	-19.7E-09	-4.4E-09
97	-15.1E-09	-5.9E-09	-6.7E-09	-2.1E-09	-4.4E-09
98	4.0E-09	-4.4E-09	-11.3E-09	173.3E-12	5.5E-09
99	-2.9E-09	-7.5E-09	-14.3E-09	-5.2E-09	6.3E-09
100	-15.8E-09	3.2E-09	-7.5E-09	-17.4E-09	-9.0E-09
Statistics					
Min	-15.8E-09	-15.1E-09	-18.1E-09	-19.7E-09	-12.8E-09
Max	4.0E-09	3.2E-09	-2.1E-09	173.3E-12	6.3E-09
Average	-9.3E-09	-6.7E-09	-8.4E-09	-9.4E-09	-4.1E-09
Std Deviation	6.2E-09	5.0E-09	4.6E-09	8.0E-09	6.0E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current High : ILIHCLE
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

ILIHCLE	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-25.0E-09	-5.2E-09	-18.9E-09	-7.5E-09	-9.7E-09
70_OUT_REF	-15.1E-09	-11.3E-09	-11.3E-09		-17.4E-09
LDC samples					
71	-22.0E-09	-9.0E-09	-25.8E-09	-15.8E-09	-19.7E-09
72	-13.6E-09	-8.2E-09	-10.5E-09	-16.6E-09	-22.0E-09
73	-6.7E-09	-23.5E-09	-8.2E-09	-6.7E-09	-28.8E-09
74	-18.9E-09	-17.4E-09	-15.8E-09	-11.3E-09	-8.2E-09
75	-13.6E-09	-6.7E-09	-20.4E-09	-16.6E-09	-8.2E-09
76	-14.3E-09	-15.8E-09	-5.9E-09	-9.7E-09	-23.5E-09
77	-19.7E-09	-3.6E-09	-15.8E-09	-16.6E-09	-13.6E-09
78	-15.8E-09	-22.0E-09	-14.3E-09	-19.7E-09	-12.8E-09
79	-7.5E-09	-589.6E-12	-10.5E-09	-23.5E-09	-2.1E-09
80	-18.9E-09	-18.1E-09	-2.1E-09	-18.1E-09	-16.6E-09
Statistics					
Min	-22.0E-09	-23.5E-09	-25.8E-09	-23.5E-09	-28.8E-09
Max	-6.7E-09	-589.6E-12	-2.1E-09	-6.7E-09	-2.1E-09
Average	-15.1E-09	-12.5E-09	-12.9E-09	-15.5E-09	-15.5E-09
Std Deviation	4.8E-09	7.5E-09	6.6E-09	4.7E-09	7.7E-09

Measurements

ILIHCLE	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-25.0E-09	-5.2E-09	-18.9E-09	-7.5E-09	-9.7E-09
70_OUT_REF	-15.1E-09	-11.3E-09	-11.3E-09		-17.4E-09
HDC samples					
81	-22.0E-09	-26.5E-09	-5.9E-09	-5.9E-09	-13.6E-09
82	-5.2E-09	-20.4E-09	-5.2E-09	-1.4E-09	-9.7E-09
83	-16.6E-09	-20.4E-09	-15.1E-09	-1.4E-09	-6.7E-09
84	-18.1E-09	-7.5E-09	-9.7E-09	-15.8E-09	-17.4E-09
85	-18.9E-09	-18.1E-09	-15.1E-09	-25.0E-09	-18.9E-09
86	-24.2E-09	-5.2E-09	-13.6E-09	-22.0E-09	-15.8E-09
87	-27.3E-09	-10.5E-09	-2.1E-09	-17.4E-09	-16.6E-09
88	-28.8E-09	-5.9E-09	-18.9E-09	-17.4E-09	-10.5E-09
89	-15.1E-09	-6.7E-09	-19.7E-09	-8.2E-09	-13.6E-09
90	-18.1E-09	-17.4E-09	-10.5E-09	-9.0E-09	-11.3E-09
Statistics					
Min	-28.8E-09	-26.5E-09	-19.7E-09	-25.0E-09	-18.9E-09
Max	-5.2E-09	-5.2E-09	-2.1E-09	-1.4E-09	-6.7E-09

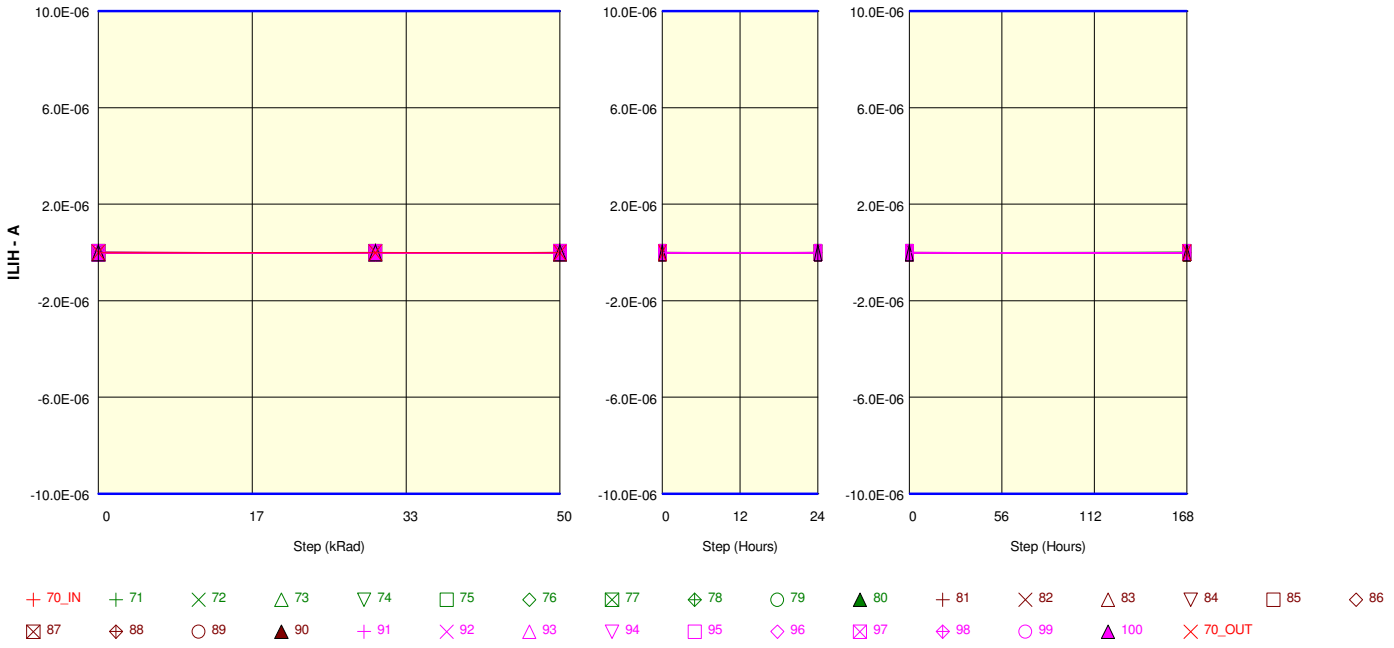
ILIHCLE	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-19.4E-09	-13.9E-09	-11.6E-09	-12.3E-09	-13.4E-09
Std Deviation	6.4E-09	7.2E-09	5.6E-09	7.9E-09	3.7E-09

Measurements

ILIHCLE	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-25.0E-09	-5.2E-09	-18.9E-09	-7.5E-09	-9.7E-09
70_OUT_REF	-15.1E-09	-11.3E-09	-11.3E-09		-17.4E-09
OFF samples					
91	-13.6E-09	-15.8E-09	-9.0E-09	-12.0E-09	-21.2E-09
92	-25.0E-09	-20.4E-09	-22.0E-09	-5.9E-09	-17.4E-09
93	-9.0E-09	-20.4E-09	-12.0E-09	-16.6E-09	-16.6E-09
94	-20.4E-09	-12.0E-09	-9.0E-09	-16.6E-09	-7.5E-09
95	-14.3E-09	-22.0E-09	-15.1E-09	-9.0E-09	-9.0E-09
96	-16.6E-09	-12.8E-09	-14.3E-09	-5.2E-09	-12.0E-09
97	-8.2E-09	-6.7E-09	-19.7E-09	-18.1E-09	-9.7E-09
98	-16.6E-09	-27.3E-09	-14.3E-09	-18.9E-09	-589.6E-12
99	-16.6E-09	-14.3E-09	-18.1E-09	-15.1E-09	-23.5E-09
100	-9.0E-09	-16.6E-09	-11.3E-09	-12.0E-09	-6.7E-09
Statistics					
Min	-25.0E-09	-27.3E-09	-22.0E-09	-18.9E-09	-23.5E-09
Max	-8.2E-09	-6.7E-09	-9.0E-09	-5.2E-09	-589.6E-12
Average	-14.9E-09	-16.8E-09	-14.5E-09	-12.9E-09	-12.4E-09
Std Deviation	5.1E-09	5.6E-09	4.2E-09	4.7E-09	6.8E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current High : ILIHRE#
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

ILIHRE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-10.5E-09	-9.7E-09	-11.3E-09	-7.5E-09	-5.9E-09
70_OUT_REF	-5.9E-09	-9.7E-09	-11.3E-09		-6.7E-09
LDC samples					
71	-2.9E-09	-6.7E-09	-6.7E-09	-5.9E-09	-2.9E-09
72	-14.3E-09	-8.2E-09	-12.8E-09	-11.3E-09	-2.9E-09
73	-5.9E-09	-9.7E-09	-9.7E-09	-22.7E-09	-15.1E-09
74	3.2E-09	-12.0E-09	-12.0E-09	-2.9E-09	-11.3E-09
75	-11.3E-09	-13.6E-09	-1.4E-09	-6.7E-09	-9.7E-09
76	-7.5E-09	-15.1E-09	-18.9E-09	-13.6E-09	5.5E-09
77	-12.8E-09	3.2E-09	-11.3E-09	-12.0E-09	-5.2E-09
78	3.2E-09	-16.6E-09	-24.2E-09	-5.9E-09	-16.6E-09
79	-2.9E-09	-4.4E-09	-18.1E-09	-5.9E-09	-15.8E-09
80	-17.4E-09	-20.4E-09	-589.6E-12	-17.4E-09	-12.8E-09
Statistics					
Min	-17.4E-09	-20.4E-09	-24.2E-09	-22.7E-09	-16.6E-09
Max	3.2E-09	3.2E-09	-589.6E-12	-2.9E-09	5.5E-09
Average	-6.8E-09	-10.4E-09	-11.6E-09	-10.4E-09	-8.7E-09
Std Deviation	6.8E-09	6.4E-09	7.2E-09	5.9E-09	6.8E-09

Measurements

ILIHRE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-10.5E-09	-9.7E-09	-11.3E-09	-7.5E-09	-5.9E-09
70_OUT_REF	-5.9E-09	-9.7E-09	-11.3E-09		-6.7E-09
HDC samples					
81	-7.5E-09	-18.1E-09	-24.2E-09	-589.6E-12	-16.6E-09
82	-11.3E-09	-5.2E-09	-5.9E-09	-21.2E-09	-3.6E-09
83	-9.0E-09	-9.0E-09	-12.8E-09	-18.1E-09	-11.3E-09
84	-12.8E-09	-7.5E-09	1.7E-09	-3.6E-09	-9.0E-09
85	-10.5E-09	936.3E-12	-22.0E-09	-8.2E-09	-9.7E-09
86	-8.2E-09	-4.4E-09	-8.2E-09	-14.3E-09	-5.9E-09
87	5.5E-09	-20.4E-09	-9.7E-09	-22.0E-09	-15.8E-09
88	-7.5E-09	-8.2E-09	173.3E-12	173.3E-12	-8.2E-09
89	936.3E-12	-18.1E-09	-16.6E-09	-15.1E-09	-12.0E-09
90	-13.6E-09	-15.8E-09	-7.5E-09	-15.1E-09	-589.6E-12
Statistics					
Min	-13.6E-09	-20.4E-09	-24.2E-09	-22.0E-09	-16.6E-09
Max	5.5E-09	936.3E-12	1.7E-09	173.3E-12	-589.6E-12

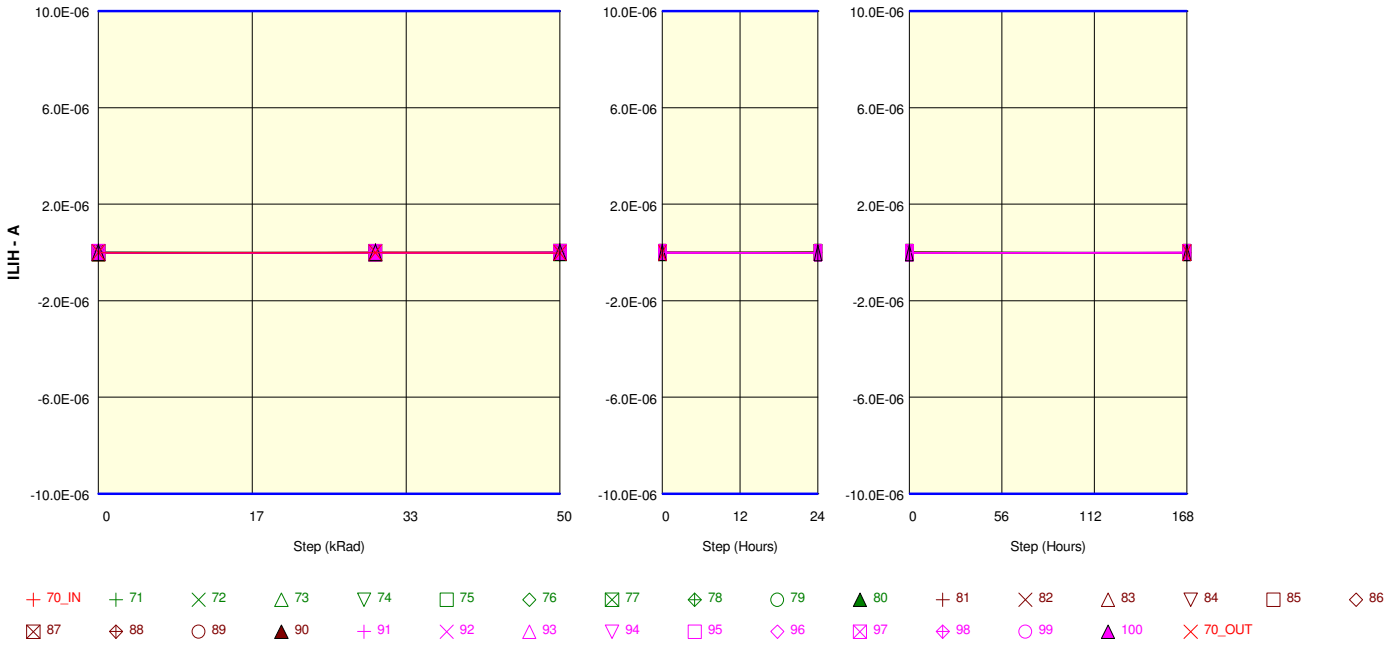
ILIHRE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-7.4E-09	-10.6E-09	-10.5E-09	-11.8E-09	-9.3E-09
Std Deviation	5.8E-09	6.8E-09	8.1E-09	7.8E-09	4.8E-09

Measurements

ILIHRE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-10.5E-09	-9.7E-09	-11.3E-09	-7.5E-09	-5.9E-09
70_OUT_REF	-5.9E-09	-9.7E-09	-11.3E-09		-6.7E-09
OFF samples					
91	-6.7E-09	-23.5E-09	-12.0E-09	-28.1E-09	-16.6E-09
92	-3.6E-09	-3.6E-09	173.3E-12	-12.8E-09	-9.0E-09
93	-14.3E-09	-7.5E-09	-4.4E-09	-2.9E-09	-4.4E-09
94	7.0E-09	-22.0E-09	-8.2E-09	-9.0E-09	-18.1E-09
95	-15.8E-09	-12.0E-09	-9.7E-09	936.3E-12	-7.5E-09
96	-9.7E-09	-4.4E-09	-13.6E-09	-589.6E-12	-5.2E-09
97	-12.8E-09	-18.9E-09	-5.2E-09	-12.0E-09	-3.6E-09
98	-9.7E-09	-3.6E-09	-9.7E-09	-9.0E-09	-17.4E-09
99	-11.3E-09	-4.4E-09	-9.7E-09	-5.2E-09	-4.4E-09
100	-15.1E-09	-13.6E-09	-17.4E-09	-12.8E-09	-25.8E-09
Statistics					
Min	-15.8E-09	-23.5E-09	-17.4E-09	-28.1E-09	-25.8E-09
Max	7.0E-09	-3.6E-09	173.3E-12	936.3E-12	-3.6E-09
Average	-9.2E-09	-11.3E-09	-9.0E-09	-9.1E-09	-11.2E-09
Std Deviation	6.5E-09	7.4E-09	4.7E-09	7.9E-09	7.3E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current High : ILIHWE#
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

ILIHWE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-13.6E-09	-2.1E-09	-7.5E-09	4.0E-09	-6.7E-09
70_OUT_REF	-3.6E-09	-6.7E-09	-21.2E-09		-12.8E-09
LDC samples					
71	7.8E-09	-6.7E-09	-13.6E-09	-7.5E-09	-4.4E-09
72	-2.1E-09	-589.6E-12	6.3E-09	-2.1E-09	-4.4E-09
73	-12.0E-09	-10.5E-09	-5.2E-09	936.3E-12	4.8E-09
74	-5.9E-09	-11.3E-09	-14.3E-09	-8.2E-09	-12.8E-09
75	-6.7E-09	-12.0E-09	-2.9E-09	-2.9E-09	-3.6E-09
76	-15.8E-09	-10.5E-09	1.7E-09	5.5E-09	-4.4E-09
77	-12.8E-09	-11.3E-09	-10.5E-09	9.3E-09	-2.9E-09
78	-4.4E-09	-2.1E-09	-7.5E-09	173.3E-12	-9.0E-09
79	-12.8E-09	-15.1E-09	-14.3E-09	-10.5E-09	-4.4E-09
80	9.3E-09	936.3E-12	-4.4E-09	-11.3E-09	-11.3E-09
Statistics					
Min	-15.8E-09	-15.1E-09	-14.3E-09	-11.3E-09	-12.8E-09
Max	9.3E-09	936.3E-12	6.3E-09	9.3E-09	4.8E-09
Average	-5.5E-09	-7.9E-09	-6.5E-09	-2.6E-09	-5.2E-09
Std Deviation	8.2E-09	5.2E-09	6.6E-09	6.5E-09	4.7E-09

Measurements

ILIHWE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-13.6E-09	-2.1E-09	-7.5E-09	4.0E-09	-6.7E-09
70_OUT_REF	-3.6E-09	-6.7E-09	-21.2E-09		-12.8E-09
HDC samples					
81	-3.6E-09	-5.9E-09	-8.2E-09	-7.5E-09	-4.4E-09
82	-5.9E-09	1.7E-09	-2.9E-09	-12.8E-09	2.5E-09
83	-7.5E-09	-3.6E-09	-4.4E-09	-9.0E-09	173.3E-12
84	-9.0E-09	-14.3E-09	-3.6E-09	2.5E-09	-16.6E-09
85	-15.1E-09	6.3E-09	7.0E-09	-5.2E-09	-5.2E-09
86	-9.0E-09	-9.0E-09	2.5E-09	7.8E-09	-9.0E-09
87	-10.5E-09	-22.0E-09	-2.1E-09	-2.9E-09	-6.7E-09
88	-6.7E-09	-3.6E-09	-3.6E-09	-2.9E-09	-11.3E-09
89	-13.6E-09	173.3E-12	4.0E-09	-3.6E-09	-12.0E-09
90	-1.4E-09	-10.5E-09	1.7E-09	4.8E-09	-8.2E-09
Statistics					
Min	-15.1E-09	-22.0E-09	-8.2E-09	-12.8E-09	-16.6E-09
Max	-1.4E-09	6.3E-09	7.0E-09	7.8E-09	2.5E-09

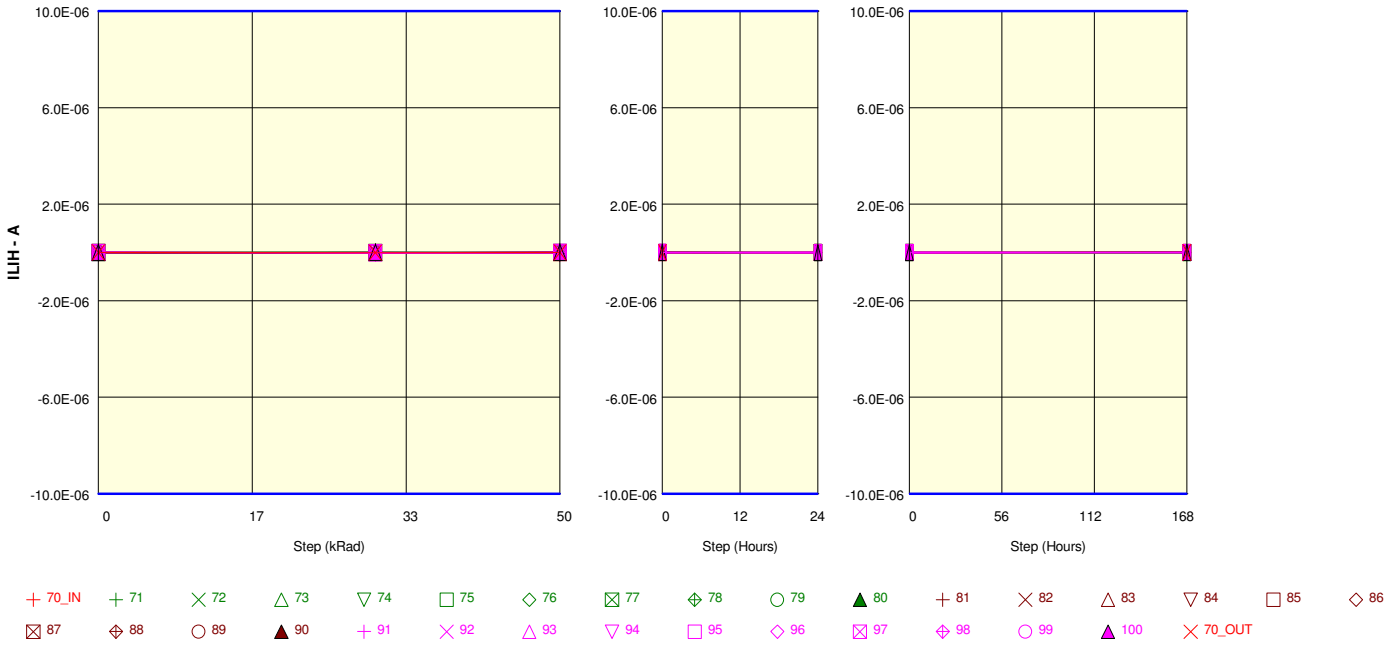
ILIHWE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-8.2E-09	-6.1E-09	-971.1E-12	-2.9E-09	-7.1E-09
Std Deviation	4.0E-09	7.8E-09	4.4E-09	6.0E-09	5.4E-09

Measurements

ILIHWE#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-13.6E-09	-2.1E-09	-7.5E-09	4.0E-09	-6.7E-09
70_OUT_REF	-3.6E-09	-6.7E-09	-21.2E-09		-12.8E-09
OFF samples					
91	-589.6E-12	173.3E-12	-5.2E-09	-9.0E-09	173.3E-12
92	-12.8E-09	-17.4E-09	-11.3E-09	-6.7E-09	-589.6E-12
93	3.2E-09	-11.3E-09	4.0E-09	-14.3E-09	5.5E-09
94	-4.4E-09	173.3E-12	-8.2E-09	-13.6E-09	-5.2E-09
95	-4.4E-09	-9.0E-09	-6.7E-09	-9.7E-09	-9.0E-09
96	936.3E-12	-5.2E-09	-5.2E-09	4.0E-09	-15.8E-09
97	-589.6E-12	-9.7E-09	-4.4E-09	-12.0E-09	-589.6E-12
98	-18.9E-09	173.3E-12	-5.2E-09	-7.5E-09	-14.3E-09
99	173.3E-12	-9.7E-09	-7.5E-09	-7.5E-09	-9.7E-09
100	1.7E-09	-589.6E-12	5.5E-09	-18.9E-09	-7.5E-09
Statistics					
Min	-18.9E-09	-17.4E-09	-11.3E-09	-18.9E-09	-15.8E-09
Max	3.2E-09	173.3E-12	5.5E-09	4.0E-09	5.5E-09
Average	-3.6E-09	-6.2E-09	-4.4E-09	-9.5E-09	-5.7E-09
Std Deviation	6.7E-09	5.8E-09	5.0E-09	5.8E-09	6.5E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current High : ILIHWP#
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

ILIHWP#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-9.7E-09	4.0E-09	3.2E-09	-5.2E-09	-2.9E-09
70_OUT_REF	1.7E-09	-8.2E-09	4.0E-09		-1.4E-09
LDC samples					
71	-14.3E-09	-8.2E-09	173.3E-12	936.3E-12	-589.6E-12
72	-12.0E-09	4.8E-09	-15.1E-09	-4.4E-09	-3.6E-09
73	173.3E-12	7.0E-09	-9.0E-09	-5.9E-09	-8.2E-09
74	-4.4E-09	-2.9E-09	173.3E-12	1.7E-09	-12.8E-09
75	9.3E-09	-2.9E-09	-4.4E-09	-589.6E-12	2.5E-09
76	-589.6E-12	-4.4E-09	7.0E-09	-12.8E-09	-5.9E-09
77	173.3E-12	7.0E-09	7.0E-09	173.3E-12	-12.0E-09
78	-9.0E-09	-6.7E-09	936.3E-12	2.5E-09	7.0E-09
79	-9.7E-09	-4.4E-09	2.5E-09	936.3E-12	-2.9E-09
80	-15.1E-09	-1.4E-09	-2.1E-09	2.5E-09	-1.4E-09
Statistics					
Min	-15.1E-09	-8.2E-09	-15.1E-09	-12.8E-09	-12.8E-09
Max	9.3E-09	7.0E-09	7.0E-09	2.5E-09	7.0E-09
Average	-5.5E-09	-1.2E-09	-1.3E-09	-1.5E-09	-3.8E-09
Std Deviation	7.4E-09	5.3E-09	6.5E-09	4.6E-09	5.9E-09

Measurements

ILIHWP#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-9.7E-09	4.0E-09	3.2E-09	-5.2E-09	-2.9E-09
70_OUT_REF	1.7E-09	-8.2E-09	4.0E-09		-1.4E-09
HDC samples					
81	4.8E-09	-3.6E-09	-3.6E-09	-5.9E-09	7.0E-09
82	-15.1E-09	-11.3E-09	-2.1E-09	-2.9E-09	-2.1E-09
83	-2.9E-09	4.0E-09	-17.4E-09	-5.2E-09	9.3E-09
84	8.6E-09	-5.9E-09	-15.1E-09	-1.4E-09	5.5E-09
85	-3.6E-09	-7.5E-09	5.5E-09	-3.6E-09	-9.0E-09
86	-4.4E-09	-4.4E-09	10.9E-09	-2.1E-09	936.3E-12
87	2.5E-09	-2.9E-09	-8.2E-09	3.2E-09	3.2E-09
88	-5.9E-09	-6.7E-09	-3.6E-09	4.0E-09	3.2E-09
89	1.7E-09	-6.7E-09	3.2E-09	6.3E-09	1.7E-09
90	-2.1E-09	-14.3E-09	3.2E-09	-15.8E-09	936.3E-12
Statistics					
Min	-15.1E-09	-14.3E-09	-17.4E-09	-15.8E-09	-9.0E-09
Max	8.6E-09	4.0E-09	10.9E-09	6.3E-09	9.3E-09

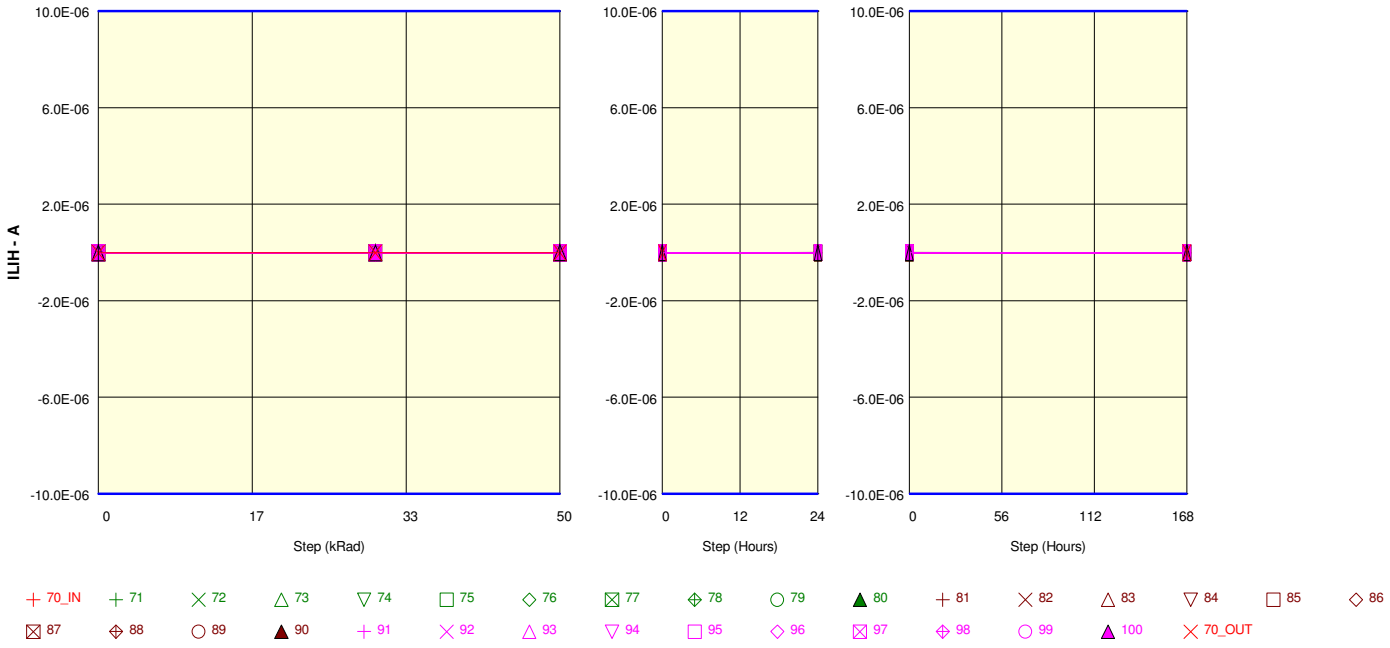
ILIHWP#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-1.7E-09	-5.9E-09	-2.7E-09	-2.3E-09	2.1E-09
Std Deviation	6.2E-09	4.7E-09	8.5E-09	5.9E-09	4.8E-09

Measurements

ILIHWP#	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-9.7E-09	4.0E-09	3.2E-09	-5.2E-09	-2.9E-09
70_OUT_REF	1.7E-09	-8.2E-09	4.0E-09		-1.4E-09
OFF samples					
91	-7.5E-09	173.3E-12	-2.9E-09	1.7E-09	4.0E-09
92	7.8E-09	-7.5E-09	-12.8E-09	3.2E-09	-19.7E-09
93	936.3E-12	-12.8E-09	173.3E-12	-3.6E-09	-2.1E-09
94	-589.6E-12	-4.4E-09	-7.5E-09	-3.6E-09	1.7E-09
95	936.3E-12	-6.7E-09	12.4E-09	10.1E-09	7.0E-09
96	4.8E-09	-12.8E-09	-15.8E-09	5.5E-09	-9.0E-09
97	936.3E-12	-10.5E-09	-7.5E-09	-9.0E-09	936.3E-12
98	5.5E-09	-11.3E-09	3.2E-09	2.5E-09	1.7E-09
99	173.3E-12	4.8E-09	4.8E-09	-11.3E-09	-10.5E-09
100	-4.4E-09	4.0E-09	173.3E-12	-6.7E-09	-589.6E-12
Statistics					
Min	-7.5E-09	-12.8E-09	-15.8E-09	-11.3E-09	-19.7E-09
Max	7.8E-09	4.8E-09	12.4E-09	10.1E-09	7.0E-09
Average	860.0E-12	-5.7E-09	-2.6E-09	-1.1E-09	-2.6E-09
Std Deviation	4.3E-09	6.3E-09	8.1E-09	6.5E-09	7.6E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current High : ILIHIO[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

ILIHIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-4.4E-09	-24.2E-09	-11.3E-09	-15.1E-09	-8.2E-09
70_OUT_REF	-19.7E-09	-13.6E-09	-10.5E-09		-12.0E-09
LDC samples					
71	-10.5E-09	-17.4E-09	-10.5E-09	-25.0E-09	-16.6E-09
72	-22.0E-09	-14.3E-09	-4.4E-09	-10.5E-09	-15.8E-09
73	-7.5E-09	-13.6E-09	-6.7E-09	-12.8E-09	-13.6E-09
74	-12.8E-09	-12.0E-09	-9.0E-09	-23.5E-09	-10.5E-09
75	-5.9E-09	-12.0E-09	-26.5E-09	-9.0E-09	-15.1E-09
76	-12.0E-09	-15.8E-09	-15.8E-09	-2.9E-09	-18.9E-09
77	-5.9E-09	-10.5E-09	-18.1E-09	-12.8E-09	-26.5E-09
78	-20.4E-09	-21.2E-09	-8.2E-09	-13.6E-09	-25.8E-09
79	-3.6E-09	-18.1E-09	-16.6E-09	-18.9E-09	-15.8E-09
80	-21.2E-09	-22.0E-09	-5.2E-09	-12.8E-09	-9.0E-09
Statistics					
Min	-22.0E-09	-22.0E-09	-26.5E-09	-25.0E-09	-26.5E-09
Max	-3.6E-09	-10.5E-09	-4.4E-09	-2.9E-09	-9.0E-09
Average	-12.2E-09	-15.7E-09	-12.1E-09	-14.2E-09	-16.8E-09
Std Deviation	6.5E-09	3.7E-09	6.7E-09	6.3E-09	5.4E-09

Measurements

ILIHIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-4.4E-09	-24.2E-09	-11.3E-09	-15.1E-09	-8.2E-09
70_OUT_REF	-19.7E-09	-13.6E-09	-10.5E-09		-12.0E-09
HDC samples					
81	-28.1E-09	-22.0E-09	-5.2E-09	-21.2E-09	-17.4E-09
82	-22.0E-09	-11.3E-09	-9.7E-09	-2.9E-09	-18.1E-09
83	-17.4E-09	-6.7E-09	-15.1E-09	-4.4E-09	-17.4E-09
84	-25.8E-09	-22.7E-09	-21.2E-09	-7.5E-09	-9.0E-09
85	-6.7E-09	-6.7E-09	-10.5E-09	-17.4E-09	-10.5E-09
86	-22.7E-09	-15.1E-09	-18.9E-09	-21.2E-09	-13.6E-09
87	-11.3E-09	-11.3E-09	-18.1E-09	-18.1E-09	-16.6E-09
88	-13.6E-09	-19.7E-09	-15.1E-09	-9.0E-09	-12.0E-09
89	-12.0E-09	-26.5E-09	-22.7E-09	-10.5E-09	-12.8E-09
90	-5.9E-09	-5.9E-09	-19.7E-09	-4.4E-09	-3.6E-09
Statistics					
Min	-28.1E-09	-26.5E-09	-22.7E-09	-21.2E-09	-18.1E-09
Max	-5.9E-09	-5.9E-09	-5.2E-09	-2.9E-09	-3.6E-09

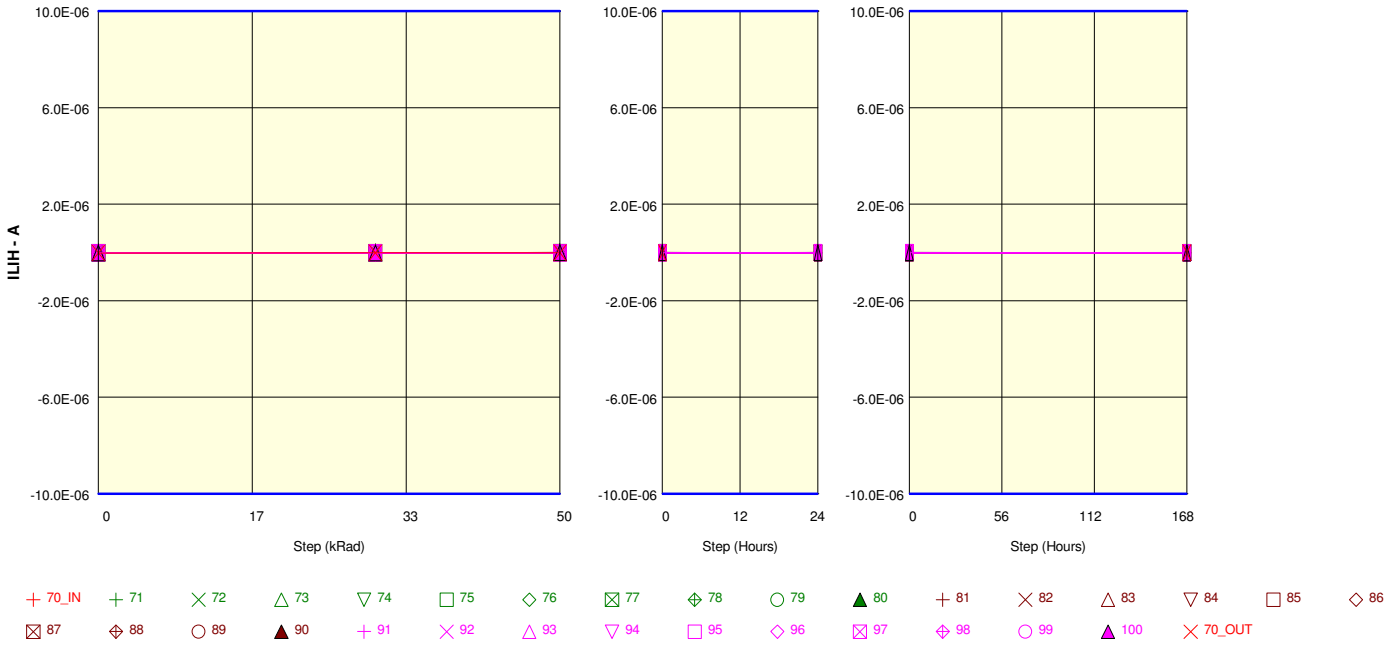
ILIHIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-16.5E-09	-14.8E-09	-15.6E-09	-11.7E-09	-13.1E-09
Std Deviation	7.4E-09	7.1E-09	5.3E-09	6.8E-09	4.3E-09

Measurements

ILIHIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-4.4E-09	-24.2E-09	-11.3E-09	-15.1E-09	-8.2E-09
70_OUT_REF	-19.7E-09	-13.6E-09	-10.5E-09		-12.0E-09
OFF samples					
91	-12.8E-09	-22.0E-09	-14.3E-09	-8.2E-09	-4.4E-09
92	-15.8E-09	-18.1E-09	-26.5E-09	-22.7E-09	-15.1E-09
93	-18.9E-09	-18.9E-09	-16.6E-09	-8.2E-09	-22.0E-09
94	-13.6E-09	-9.7E-09	-21.2E-09	-16.6E-09	-10.5E-09
95	-5.9E-09	-19.7E-09	-10.5E-09	-9.0E-09	-19.7E-09
96	-12.0E-09	-15.8E-09	-26.5E-09	-8.2E-09	-18.1E-09
97	-19.7E-09	-19.7E-09	-12.8E-09	-6.7E-09	-13.6E-09
98	-10.5E-09	-7.5E-09	-8.2E-09	-21.2E-09	-5.9E-09
99	-21.2E-09	-6.7E-09	-9.7E-09	-5.2E-09	-14.3E-09
100	-21.2E-09	-18.1E-09	-9.0E-09	-7.5E-09	-7.5E-09
Statistics					
Min	-21.2E-09	-22.0E-09	-26.5E-09	-22.7E-09	-22.0E-09
Max	-5.9E-09	-6.7E-09	-8.2E-09	-5.2E-09	-4.4E-09
Average	-15.2E-09	-15.6E-09	-15.5E-09	-11.3E-09	-13.1E-09
Std Deviation	4.8E-09	5.3E-09	6.6E-09	6.0E-09	5.6E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current High : ILIHIO[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

ILIHIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-10.5E-09	-18.9E-09	-18.9E-09	-19.7E-09	-12.8E-09
70_OUT_REF	-22.0E-09	-14.3E-09	-13.6E-09		-11.3E-09
LDC samples					
71	-18.1E-09	-20.4E-09	-21.2E-09	-1.4E-09	-15.8E-09
72	-5.2E-09	-11.3E-09	-12.0E-09	-6.7E-09	-7.5E-09
73	-9.0E-09	-19.7E-09	-8.2E-09	-15.8E-09	-22.7E-09
74	-17.4E-09	-13.6E-09	-23.5E-09	-9.0E-09	-12.0E-09
75	-14.3E-09	-16.6E-09	-2.1E-09	-15.8E-09	-5.2E-09
76	-9.0E-09	-28.8E-09	-20.4E-09	-17.4E-09	-20.4E-09
77	-20.4E-09	-23.5E-09	-10.5E-09	-8.2E-09	-11.3E-09
78	-12.8E-09	-13.6E-09	-12.0E-09	-20.4E-09	-14.3E-09
79	-15.1E-09	-9.7E-09	-9.0E-09	-1.4E-09	-13.6E-09
80	-5.2E-09	-18.9E-09	-7.5E-09	-7.5E-09	-9.7E-09
Statistics					
Min	-20.4E-09	-28.8E-09	-23.5E-09	-20.4E-09	-22.7E-09
Max	-5.2E-09	-9.7E-09	-2.1E-09	-1.4E-09	-5.2E-09
Average	-12.6E-09	-17.6E-09	-12.6E-09	-10.4E-09	-13.3E-09
Std Deviation	5.1E-09	5.6E-09	6.5E-09	6.3E-09	5.2E-09

Measurements

ILIHIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-10.5E-09	-18.9E-09	-18.9E-09	-19.7E-09	-12.8E-09
70_OUT_REF	-22.0E-09	-14.3E-09	-13.6E-09		-11.3E-09
HDC samples					
81	-16.6E-09	-12.0E-09	-5.9E-09	-18.9E-09	-15.1E-09
82	-11.3E-09	-9.0E-09	-16.6E-09	-19.7E-09	-13.6E-09
83	-8.2E-09	-11.3E-09	-18.1E-09	-18.9E-09	-17.4E-09
84	-3.6E-09	-22.0E-09	-8.2E-09	-13.6E-09	-15.8E-09
85	-20.4E-09	-17.4E-09	-3.6E-09	-6.7E-09	-20.4E-09
86	-21.2E-09	-16.6E-09	-15.8E-09	-20.4E-09	-5.2E-09
87	-18.9E-09	-4.4E-09	-13.6E-09	-18.1E-09	-5.9E-09
88	-9.7E-09	-12.8E-09	-2.1E-09	-18.1E-09	-19.7E-09
89	-9.0E-09	-11.3E-09	-9.0E-09	-15.8E-09	-7.5E-09
90	-10.5E-09	-4.4E-09	-1.4E-09	-18.1E-09	-13.6E-09
Statistics					
Min	-21.2E-09	-22.0E-09	-18.1E-09	-20.4E-09	-20.4E-09
Max	-3.6E-09	-4.4E-09	-1.4E-09	-6.7E-09	-5.2E-09

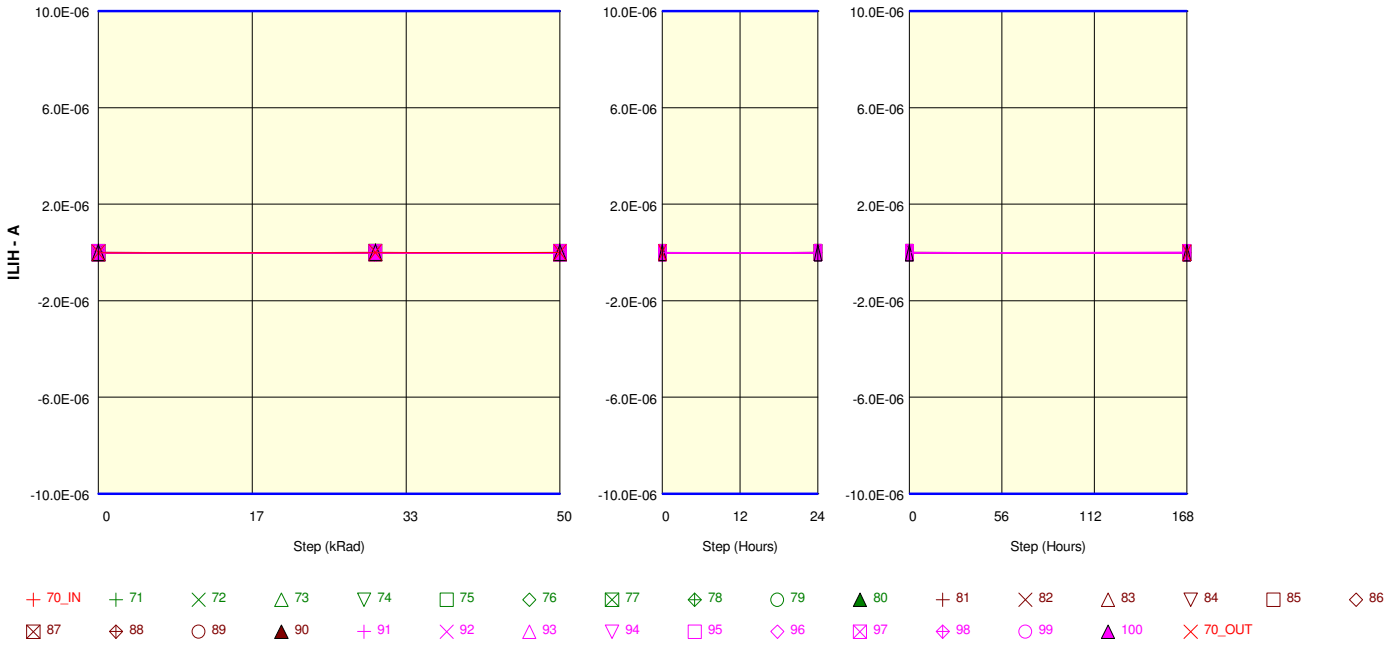
ILIHIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-12.9E-09	-12.1E-09	-9.4E-09	-16.8E-09	-13.4E-09
Std Deviation	5.6E-09	5.2E-09	5.9E-09	3.9E-09	5.2E-09

Measurements

ILIHIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-10.5E-09	-18.9E-09	-18.9E-09	-19.7E-09	-12.8E-09
70_OUT_REF	-22.0E-09	-14.3E-09	-13.6E-09		-11.3E-09
OFF samples					
91	-11.3E-09	-24.2E-09	-12.8E-09	-8.2E-09	-9.0E-09
92	-7.5E-09	-9.7E-09	-12.8E-09	-9.0E-09	-2.9E-09
93	-10.5E-09	-20.4E-09	-12.8E-09	-22.7E-09	-16.6E-09
94	-17.4E-09	-18.1E-09	-11.3E-09	-12.0E-09	-10.5E-09
95	-11.3E-09	-12.0E-09	-15.1E-09	-4.4E-09	-6.7E-09
96	-3.6E-09	-7.5E-09	-6.7E-09	-8.2E-09	-9.0E-09
97	-14.3E-09	-12.8E-09	-16.6E-09	-1.4E-09	-11.3E-09
98	-9.0E-09	-20.4E-09	-10.5E-09	-9.7E-09	-15.1E-09
99	-18.9E-09	-9.0E-09	-7.5E-09	-6.7E-09	-11.3E-09
100	-15.1E-09	-22.0E-09	-8.2E-09	-5.9E-09	-24.2E-09
Statistics					
Min	-18.9E-09	-24.2E-09	-16.6E-09	-22.7E-09	-24.2E-09
Max	-3.6E-09	-7.5E-09	-6.7E-09	-1.4E-09	-2.9E-09
Average	-11.9E-09	-15.6E-09	-11.4E-09	-8.8E-09	-11.7E-09
Std Deviation	4.4E-09	5.8E-09	3.1E-09	5.4E-09	5.6E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current High : ILIHIO[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

ILIHIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-15.1E-09	-589.6E-12	-8.2E-09	-19.7E-09	-18.1E-09
70_OUT_REF	-12.0E-09	-5.2E-09	-1.4E-09		-20.4E-09
LDC samples					
71	-11.3E-09	-9.7E-09	-14.3E-09	-17.4E-09	-2.1E-09
72	-9.7E-09	-15.8E-09	-1.4E-09	-8.2E-09	-9.7E-09
73	-9.0E-09	-8.2E-09	-9.7E-09	-7.5E-09	-11.3E-09
74	-18.9E-09	-3.6E-09	173.3E-12	-9.7E-09	-18.9E-09
75	173.3E-12	-12.8E-09	-5.9E-09	-11.3E-09	-18.9E-09
76	-22.7E-09	-9.0E-09	-11.3E-09	-2.9E-09	-15.1E-09
77	-7.5E-09	-2.1E-09	-6.7E-09	-5.9E-09	-15.8E-09
78	-22.7E-09	-18.1E-09	-8.2E-09	-3.6E-09	-12.8E-09
79	-9.0E-09	-18.9E-09	-10.5E-09	-11.3E-09	-3.6E-09
80	-9.7E-09	-9.0E-09	-18.9E-09	-10.5E-09	-9.0E-09
Statistics					
Min	-22.7E-09	-18.9E-09	-18.9E-09	-17.4E-09	-18.9E-09
Max	173.3E-12	-2.1E-09	173.3E-12	-2.9E-09	-2.1E-09
Average	-12.0E-09	-10.7E-09	-8.7E-09	-8.8E-09	-11.7E-09
Std Deviation	6.9E-09	5.4E-09	5.4E-09	4.0E-09	5.5E-09

Measurements

ILIHIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-15.1E-09	-589.6E-12	-8.2E-09	-19.7E-09	-18.1E-09
70_OUT_REF	-12.0E-09	-5.2E-09	-1.4E-09		-20.4E-09
HDC samples					
81	2.5E-09	-4.4E-09	-11.3E-09	173.3E-12	-13.6E-09
82	-15.1E-09	-3.6E-09	-14.3E-09	-5.2E-09	-15.1E-09
83	-7.5E-09	-9.7E-09	-3.6E-09	-6.7E-09	-5.9E-09
84	-10.5E-09	-589.6E-12	-6.7E-09	-5.2E-09	-13.6E-09
85	-13.6E-09	-16.6E-09	-12.8E-09	4.8E-09	-12.8E-09
86	-5.2E-09	-5.9E-09	-5.2E-09	-13.6E-09	-18.1E-09
87	-14.3E-09	-5.2E-09	-3.6E-09	173.3E-12	-8.2E-09
88	-9.0E-09	-7.5E-09	-14.3E-09	-12.0E-09	-4.4E-09
89	173.3E-12	-5.2E-09	-9.0E-09	-15.1E-09	-10.5E-09
90	-9.7E-09	-7.5E-09	-8.2E-09	-14.3E-09	-16.6E-09
Statistics					
Min	-15.1E-09	-16.6E-09	-14.3E-09	-15.1E-09	-18.1E-09
Max	2.5E-09	-589.6E-12	-3.6E-09	4.8E-09	-4.4E-09

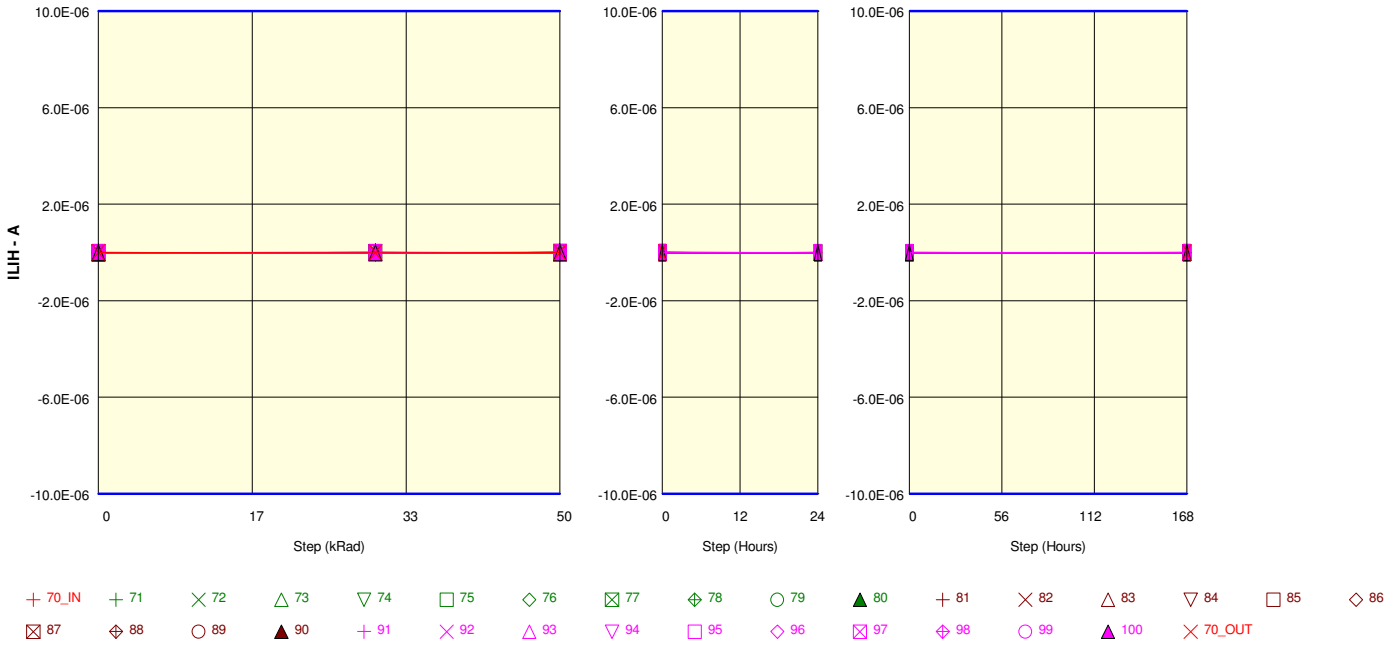
ILIHIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-8.2E-09	-6.6E-09	-8.9E-09	-6.7E-09	-11.9E-09
Std Deviation	5.6E-09	4.1E-09	3.9E-09	6.6E-09	4.3E-09

Measurements

ILIHIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-15.1E-09	-589.6E-12	-8.2E-09	-19.7E-09	-18.1E-09
70_OUT_REF	-12.0E-09	-5.2E-09	-1.4E-09		-20.4E-09
OFF samples					
91	-14.3E-09	-3.6E-09	-18.9E-09	-2.9E-09	-11.3E-09
92	-3.6E-09	-9.0E-09	-12.0E-09	-13.6E-09	-10.5E-09
93	936.3E-12	-5.9E-09	-12.8E-09	-15.8E-09	-17.4E-09
94	-2.9E-09	-10.5E-09	-9.7E-09	-12.0E-09	-5.2E-09
95	-6.7E-09	-6.7E-09	-18.9E-09	-3.6E-09	-18.1E-09
96	1.7E-09	-12.0E-09	-11.3E-09	-1.4E-09	-3.6E-09
97	-17.4E-09	-17.4E-09	-5.9E-09	-5.9E-09	-7.5E-09
98	-9.0E-09	-16.6E-09	-15.8E-09	-10.5E-09	6.3E-09
99	-2.1E-09	-12.0E-09	-12.0E-09	-3.6E-09	-5.9E-09
100	-4.4E-09	-2.1E-09	-5.9E-09	-13.6E-09	-12.8E-09
Statistics					
Min	-17.4E-09	-17.4E-09	-18.9E-09	-15.8E-09	-18.1E-09
Max	1.7E-09	-2.1E-09	-5.9E-09	-1.4E-09	6.3E-09
Average	-5.8E-09	-9.6E-09	-12.3E-09	-8.3E-09	-8.6E-09
Std Deviation	5.9E-09	4.9E-09	4.3E-09	5.1E-09	6.8E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current High : ILIHIO[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

ILIHIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-16.6E-09	-12.0E-09	-9.7E-09	-10.5E-09	-5.9E-09
70_OUT_REF	-2.9E-09	-7.5E-09	173.3E-12		-6.7E-09
LDC samples					
71	-3.6E-09	3.2E-09	-4.4E-09	-1.4E-09	-589.6E-12
72	-19.7E-09	-15.8E-09	-12.0E-09	-3.6E-09	-5.9E-09
73	-589.6E-12	-10.5E-09	-12.8E-09	-12.8E-09	-1.4E-09
74	-5.2E-09	-15.1E-09	2.5E-09	-8.2E-09	-12.0E-09
75	-18.9E-09	-7.5E-09	-21.2E-09	-12.0E-09	-1.4E-09
76	-12.0E-09	5.5E-09	-9.7E-09	-2.9E-09	-9.0E-09
77	-589.6E-12	-5.2E-09	-1.4E-09	-5.2E-09	-9.0E-09
78	-7.5E-09	-5.2E-09	-8.2E-09	-17.4E-09	-7.5E-09
79	-4.4E-09	-6.7E-09	-6.7E-09	-12.0E-09	-5.9E-09
80	-9.7E-09	173.3E-12	-15.1E-09	-2.9E-09	-19.7E-09
Statistics					
Min	-19.7E-09	-15.8E-09	-21.2E-09	-17.4E-09	-19.7E-09
Max	-589.6E-12	5.5E-09	2.5E-09	-1.4E-09	-589.6E-12
Average	-8.2E-09	-5.7E-09	-8.9E-09	-7.8E-09	-7.2E-09
Std Deviation	6.5E-09	6.8E-09	6.5E-09	5.2E-09	5.5E-09

Measurements

ILIHIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-16.6E-09	-12.0E-09	-9.7E-09	-10.5E-09	-5.9E-09
70_OUT_REF	-2.9E-09	-7.5E-09	173.3E-12		-6.7E-09
HDC samples					
81	-10.5E-09	-6.7E-09	-6.7E-09	-3.6E-09	-7.5E-09
82	-13.6E-09	-12.8E-09	-6.7E-09	-7.5E-09	-9.0E-09
83	-19.7E-09	-3.6E-09	936.3E-12	-5.2E-09	-9.0E-09
84	-15.1E-09	-13.6E-09	-9.7E-09	-15.8E-09	-12.8E-09
85	-12.8E-09	-7.5E-09	5.5E-09	-11.3E-09	1.7E-09
86	-11.3E-09	-1.4E-09	-3.6E-09	-13.6E-09	-4.4E-09
87	-12.0E-09	-3.6E-09	173.3E-12	-10.5E-09	-9.7E-09
88	-12.0E-09	-2.9E-09	-5.9E-09	936.3E-12	-4.4E-09
89	-5.9E-09	-4.4E-09	173.3E-12	-7.5E-09	-18.9E-09
90	-12.8E-09	-4.4E-09	173.3E-12	-20.4E-09	-11.3E-09
Statistics					
Min	-19.7E-09	-13.6E-09	-9.7E-09	-20.4E-09	-18.9E-09
Max	-5.9E-09	-1.4E-09	5.5E-09	936.3E-12	1.7E-09

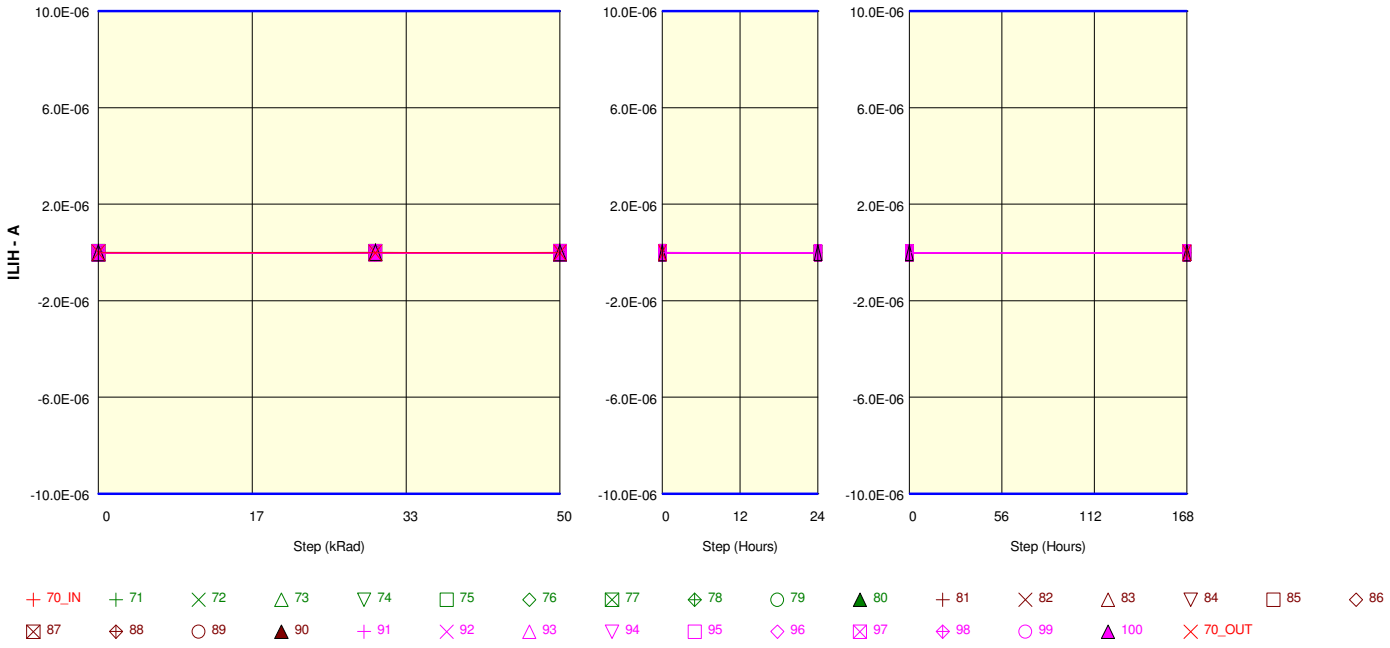
ILIHIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-12.6E-09	-6.1E-09	-2.6E-09	-9.4E-09	-8.5E-09
Std Deviation	3.3E-09	3.9E-09	4.5E-09	5.9E-09	5.2E-09

Measurements

ILIHIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-16.6E-09	-12.0E-09	-9.7E-09	-10.5E-09	-5.9E-09
70_OUT_REF	-2.9E-09	-7.5E-09	173.3E-12		-6.7E-09
OFF samples					
91	1.7E-09	-13.6E-09	-7.5E-09	-5.2E-09	-12.0E-09
92	-8.2E-09	-13.6E-09	-9.0E-09	-15.1E-09	-5.2E-09
93	-5.2E-09	-12.8E-09	3.2E-09	-9.7E-09	-14.3E-09
94	-9.7E-09	-9.7E-09	2.5E-09	4.0E-09	-5.2E-09
95	-6.7E-09	-5.2E-09	-2.1E-09	-9.7E-09	173.3E-12
96	-9.0E-09	-2.1E-09	-9.0E-09	-1.4E-09	-5.9E-09
97	-3.6E-09	-8.2E-09	-589.6E-12	-12.0E-09	-589.6E-12
98	4.0E-09	-14.3E-09	-9.7E-09	4.0E-09	-15.1E-09
99	-14.3E-09	-7.5E-09	-11.3E-09	-9.0E-09	-7.5E-09
100	-7.5E-09	-17.4E-09	-13.6E-09	-6.7E-09	-8.2E-09
Statistics					
Min	-14.3E-09	-17.4E-09	-13.6E-09	-15.1E-09	-15.1E-09
Max	4.0E-09	-2.1E-09	3.2E-09	4.0E-09	173.3E-12
Average	-5.9E-09	-10.4E-09	-5.7E-09	-6.1E-09	-7.4E-09
Std Deviation	5.1E-09	4.5E-09	5.6E-09	6.1E-09	4.9E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current High : ILIHIO[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

ILIHIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-12.8E-09	-10.5E-09	-2.1E-09	-15.1E-09	-13.6E-09
70_OUT_REF	-10.5E-09	-15.8E-09	-12.0E-09		-16.6E-09
LDC samples					
71	-5.9E-09	-5.2E-09	-7.5E-09	-16.6E-09	-26.5E-09
72	-12.8E-09	-13.6E-09	-17.4E-09	-17.4E-09	-5.9E-09
73	-7.5E-09	-18.9E-09	-11.3E-09	-4.4E-09	-9.7E-09
74	173.3E-12	-15.1E-09	-19.7E-09	-12.8E-09	-12.0E-09
75	-7.5E-09	-11.3E-09	-5.2E-09	-17.4E-09	-15.1E-09
76	-24.2E-09	-20.4E-09	-8.2E-09	-21.2E-09	-12.0E-09
77	-589.6E-12	-2.1E-09	-12.0E-09	-18.9E-09	-21.2E-09
78	-20.4E-09	-18.1E-09	-15.8E-09	-5.9E-09	-11.3E-09
79	-11.3E-09	-10.5E-09	-10.5E-09	-9.0E-09	-12.8E-09
80	-18.1E-09	-2.9E-09	-15.8E-09	-18.9E-09	-22.7E-09
Statistics					
Min	-24.2E-09	-20.4E-09	-19.7E-09	-21.2E-09	-26.5E-09
Max	173.3E-12	-2.1E-09	-5.2E-09	-4.4E-09	-5.9E-09
Average	-10.8E-09	-11.8E-09	-12.3E-09	-14.2E-09	-14.9E-09
Std Deviation	7.8E-09	6.3E-09	4.5E-09	5.6E-09	6.1E-09

Measurements

ILIHIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-12.8E-09	-10.5E-09	-2.1E-09	-15.1E-09	-13.6E-09
70_OUT_REF	-10.5E-09	-15.8E-09	-12.0E-09		-16.6E-09
HDC samples					
81	-15.8E-09	-22.0E-09	-9.0E-09	-5.9E-09	-3.6E-09
82	-6.7E-09	-8.2E-09	-5.9E-09	-17.4E-09	-18.9E-09
83	-8.2E-09	-5.2E-09	-1.4E-09	-6.7E-09	-13.6E-09
84	-10.5E-09	-11.3E-09	-11.3E-09	-15.8E-09	-22.0E-09
85	-13.6E-09	-2.1E-09	-3.6E-09	-12.8E-09	-12.8E-09
86	-8.2E-09	-17.4E-09	-20.4E-09	-12.8E-09	-5.9E-09
87	-10.5E-09	-20.4E-09	-14.3E-09	-20.4E-09	-17.4E-09
88	-14.3E-09	-9.7E-09	-3.6E-09	-18.1E-09	-13.6E-09
89	-6.7E-09	-21.2E-09	-6.7E-09	-5.2E-09	-12.8E-09
90	-9.7E-09	-9.0E-09	-16.6E-09	-18.9E-09	-10.5E-09
Statistics					
Min	-15.8E-09	-22.0E-09	-20.4E-09	-20.4E-09	-22.0E-09
Max	-6.7E-09	-2.1E-09	-1.4E-09	-5.2E-09	-3.6E-09

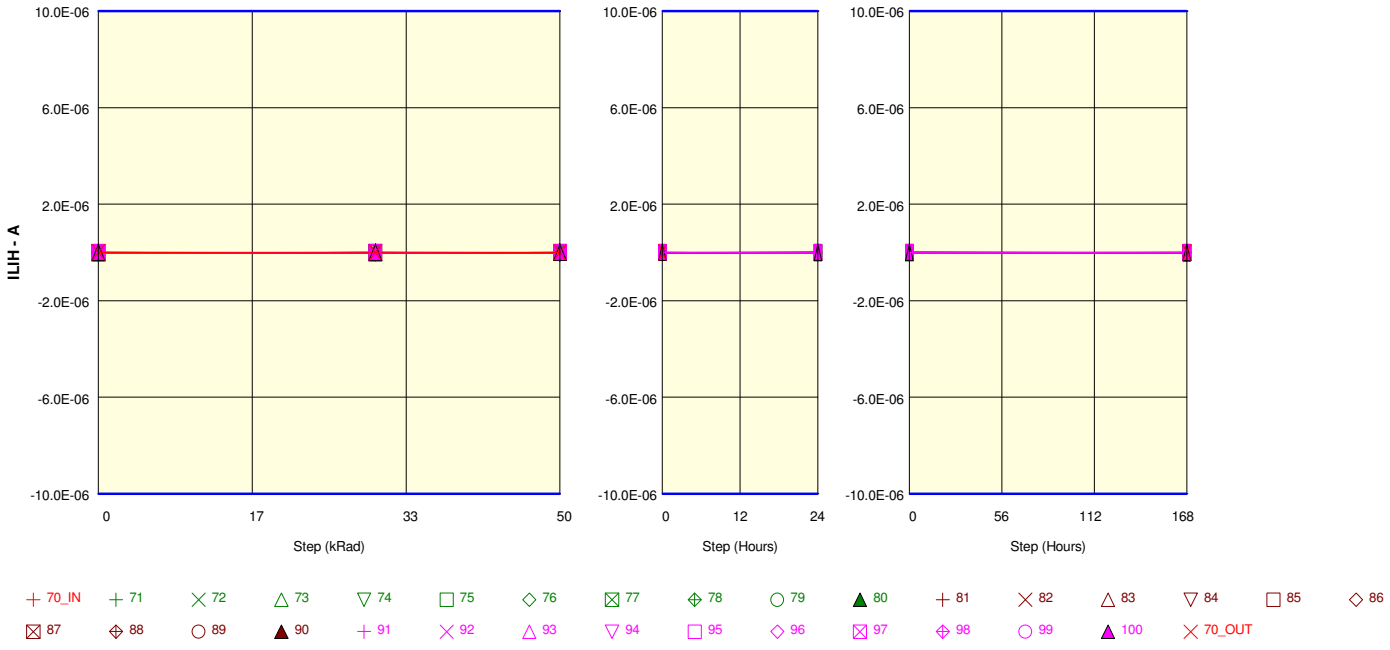
ILIHIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-10.4E-09	-12.6E-09	-9.3E-09	-13.4E-09	-13.1E-09
Std Deviation	3.0E-09	6.7E-09	5.9E-09	5.4E-09	5.3E-09

Measurements

ILIHIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-12.8E-09	-10.5E-09	-2.1E-09	-15.1E-09	-13.6E-09
70_OUT_REF	-10.5E-09	-15.8E-09	-12.0E-09		-16.6E-09
OFF samples					
91	-16.6E-09	-5.9E-09	-15.8E-09	-12.8E-09	-5.2E-09
92	-1.4E-09	-3.6E-09	-16.6E-09	-17.4E-09	-15.1E-09
93	-12.0E-09	-10.5E-09	-13.6E-09	-15.1E-09	-10.5E-09
94	-12.0E-09	-12.0E-09	-4.4E-09	-13.6E-09	-9.0E-09
95	-15.8E-09	-12.0E-09	-18.9E-09	-12.8E-09	-12.8E-09
96	-8.2E-09	-25.8E-09	-4.4E-09	-15.8E-09	-15.1E-09
97	-20.4E-09	-12.8E-09	-9.7E-09	-15.8E-09	-9.7E-09
98	-4.4E-09	-25.8E-09	-14.3E-09	-11.3E-09	-7.5E-09
99	-5.9E-09	-13.6E-09	-12.8E-09	-19.7E-09	-10.5E-09
100	-13.6E-09	-3.6E-09	-10.5E-09	-5.9E-09	-15.8E-09
Statistics					
Min	-20.4E-09	-25.8E-09	-18.9E-09	-19.7E-09	-15.8E-09
Max	-1.4E-09	-3.6E-09	-4.4E-09	-5.9E-09	-5.2E-09
Average	-11.0E-09	-12.6E-09	-12.1E-09	-14.0E-09	-11.1E-09
Std Deviation	5.7E-09	7.5E-09	4.6E-09	3.6E-09	3.4E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current High : ILIHIO[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

ILIHIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-16.6E-09	-11.3E-09	-5.9E-09	8.6E-09	-15.1E-09
70_OUT_REF	2.5E-09	-3.6E-09	1.7E-09		-6.7E-09
LDC samples					
71	-13.6E-09	3.2E-09	-13.6E-09	-14.3E-09	-5.9E-09
72	-7.5E-09	-12.8E-09	936.3E-12	-12.0E-09	-8.2E-09
73	-13.6E-09	-10.5E-09	-5.2E-09	-6.7E-09	-11.3E-09
74	4.0E-09	-4.4E-09	-15.8E-09	-2.1E-09	-9.7E-09
75	5.5E-09	-11.3E-09	-1.4E-09	4.0E-09	-589.6E-12
76	-16.6E-09	-9.0E-09	936.3E-12	7.0E-09	-13.6E-09
77	-7.5E-09	-6.7E-09	-1.4E-09	-5.9E-09	-11.3E-09
78	4.8E-09	-3.6E-09	-1.4E-09	-15.8E-09	-1.4E-09
79	-2.1E-09	-12.0E-09	-15.8E-09	2.5E-09	-2.1E-09
80	-3.6E-09	936.3E-12	173.3E-12	-589.6E-12	-10.5E-09
Statistics					
Min	-16.6E-09	-12.8E-09	-15.8E-09	-15.8E-09	-13.6E-09
Max	5.5E-09	3.2E-09	936.3E-12	7.0E-09	-589.6E-12
Average	-5.0E-09	-6.6E-09	-5.2E-09	-4.4E-09	-7.5E-09
Std Deviation	7.7E-09	5.3E-09	6.7E-09	7.5E-09	4.4E-09

Measurements

ILIHIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-16.6E-09	-11.3E-09	-5.9E-09	8.6E-09	-15.1E-09
70_OUT_REF	2.5E-09	-3.6E-09	1.7E-09		-6.7E-09
HDC samples					
81	-7.5E-09	-7.5E-09	-5.9E-09	-3.6E-09	-10.5E-09
82	936.3E-12	-8.2E-09	-589.6E-12	-1.4E-09	-7.5E-09
83	-8.2E-09	936.3E-12	-5.2E-09	-6.7E-09	-12.8E-09
84	-8.2E-09	-1.4E-09	-12.0E-09	-15.1E-09	-6.7E-09
85	-12.0E-09	-15.1E-09	-6.7E-09	-5.2E-09	-4.4E-09
86	-8.2E-09	3.2E-09	-6.7E-09	-3.6E-09	-8.2E-09
87	-9.0E-09	-5.2E-09	-3.6E-09	-15.8E-09	936.3E-12
88	-5.2E-09	-11.3E-09	-5.2E-09	3.2E-09	-2.9E-09
89	-14.3E-09	-10.5E-09	-9.0E-09	-1.4E-09	-2.9E-09
90	-9.7E-09	936.3E-12	-4.4E-09	-1.4E-09	-10.5E-09
Statistics					
Min	-14.3E-09	-15.1E-09	-12.0E-09	-15.8E-09	-12.8E-09
Max	936.3E-12	3.2E-09	-589.6E-12	3.2E-09	936.3E-12

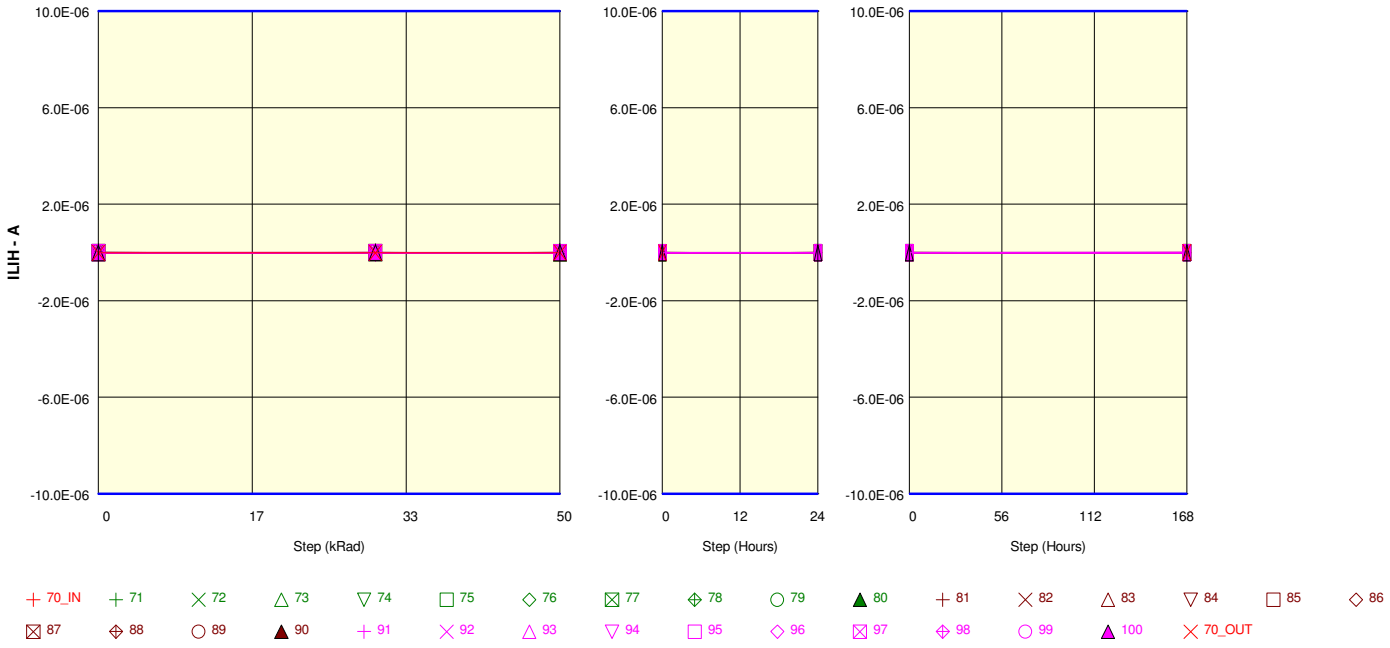
ILIHIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-8.1E-09	-5.4E-09	-5.9E-09	-5.1E-09	-6.5E-09
Std Deviation	3.9E-09	5.8E-09	2.9E-09	5.8E-09	4.0E-09

Measurements

ILIHIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-16.6E-09	-11.3E-09	-5.9E-09	8.6E-09	-15.1E-09
70_OUT_REF	2.5E-09	-3.6E-09	1.7E-09		-6.7E-09
OFF samples					
91	-11.3E-09	-12.8E-09	-11.3E-09	6.3E-09	-8.2E-09
92	173.3E-12	-10.5E-09	-2.1E-09	-8.2E-09	5.5E-09
93	3.2E-09	-589.6E-12	-589.6E-12	-9.7E-09	173.3E-12
94	-4.4E-09	-8.2E-09	-15.1E-09	-5.2E-09	-2.1E-09
95	-6.7E-09	7.0E-09	-4.4E-09	-4.4E-09	-8.2E-09
96	-4.4E-09	2.5E-09	-589.6E-12	-3.6E-09	-14.3E-09
97	-8.2E-09	-4.4E-09	-5.9E-09	-5.2E-09	-9.0E-09
98	-10.5E-09	-17.4E-09	-9.0E-09	-5.2E-09	-5.2E-09
99	-17.4E-09	-2.9E-09	-2.1E-09	-4.4E-09	-14.3E-09
100	-1.4E-09	-1.4E-09	4.0E-09	-1.4E-09	-2.9E-09
Statistics					
Min	-17.4E-09	-17.4E-09	-15.1E-09	-9.7E-09	-14.3E-09
Max	3.2E-09	7.0E-09	4.0E-09	6.3E-09	5.5E-09
Average	-6.1E-09	-4.9E-09	-4.7E-09	-4.1E-09	-5.9E-09
Std Deviation	5.8E-09	7.0E-09	5.4E-09	4.1E-09	5.9E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current High : ILIHIO[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

ILIHIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	4.8E-09	-5.9E-09	1.7E-09	-8.2E-09	936.3E-12
70_OUT_REF	-15.1E-09	-18.9E-09	-5.9E-09		4.0E-09
LDC samples					
71	-7.5E-09	-6.7E-09	-6.7E-09	-4.4E-09	-9.7E-09
72	-4.4E-09	-5.2E-09	-3.6E-09	-10.5E-09	-9.0E-09
73	-5.9E-09	4.8E-09	-9.7E-09	-12.8E-09	-8.2E-09
74	-12.8E-09	3.2E-09	936.3E-12	-13.6E-09	-5.9E-09
75	-2.1E-09	-9.0E-09	-12.8E-09	173.3E-12	173.3E-12
76	-7.5E-09	-12.0E-09	-2.9E-09	-10.5E-09	-5.2E-09
77	936.3E-12	-8.2E-09	-12.0E-09	-9.7E-09	-19.7E-09
78	-2.1E-09	-17.4E-09	-9.0E-09	-2.9E-09	-12.8E-09
79	-6.7E-09	-11.3E-09	-11.3E-09	-7.5E-09	-10.5E-09
80	-589.6E-12	-18.9E-09	2.5E-09	-15.1E-09	-11.3E-09
Statistics					
Min	-12.8E-09	-18.9E-09	-12.8E-09	-15.1E-09	-19.7E-09
Max	936.3E-12	4.8E-09	2.5E-09	173.3E-12	173.3E-12
Average	-4.9E-09	-8.1E-09	-6.5E-09	-8.7E-09	-9.2E-09
Std Deviation	3.8E-09	7.3E-09	5.2E-09	4.7E-09	4.9E-09

Measurements

ILIHIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	4.8E-09	-5.9E-09	1.7E-09	-8.2E-09	936.3E-12
70_OUT_REF	-15.1E-09	-18.9E-09	-5.9E-09		4.0E-09
HDC samples					
81	-11.3E-09	-7.5E-09	-8.2E-09	-5.2E-09	-4.4E-09
82	-5.9E-09	-18.1E-09	-11.3E-09	-11.3E-09	-9.7E-09
83	-6.7E-09	-6.7E-09	-6.7E-09	-6.7E-09	-7.5E-09
84	-20.4E-09	-1.4E-09	-25.0E-09	-7.5E-09	-12.8E-09
85	936.3E-12	4.8E-09	-5.9E-09	-589.6E-12	1.7E-09
86	936.3E-12	-9.0E-09	173.3E-12	-15.1E-09	-3.6E-09
87	-14.3E-09	-8.2E-09	-18.9E-09	-13.6E-09	-2.1E-09
88	-8.2E-09	-6.7E-09	-6.7E-09	-589.6E-12	-5.2E-09
89	2.5E-09	-2.9E-09	-4.4E-09	-2.1E-09	-15.1E-09
90	-9.7E-09	-10.5E-09	173.3E-12	173.3E-12	-3.6E-09
Statistics					
Min	-20.4E-09	-18.1E-09	-25.0E-09	-15.1E-09	-15.1E-09
Max	2.5E-09	4.8E-09	173.3E-12	173.3E-12	1.7E-09

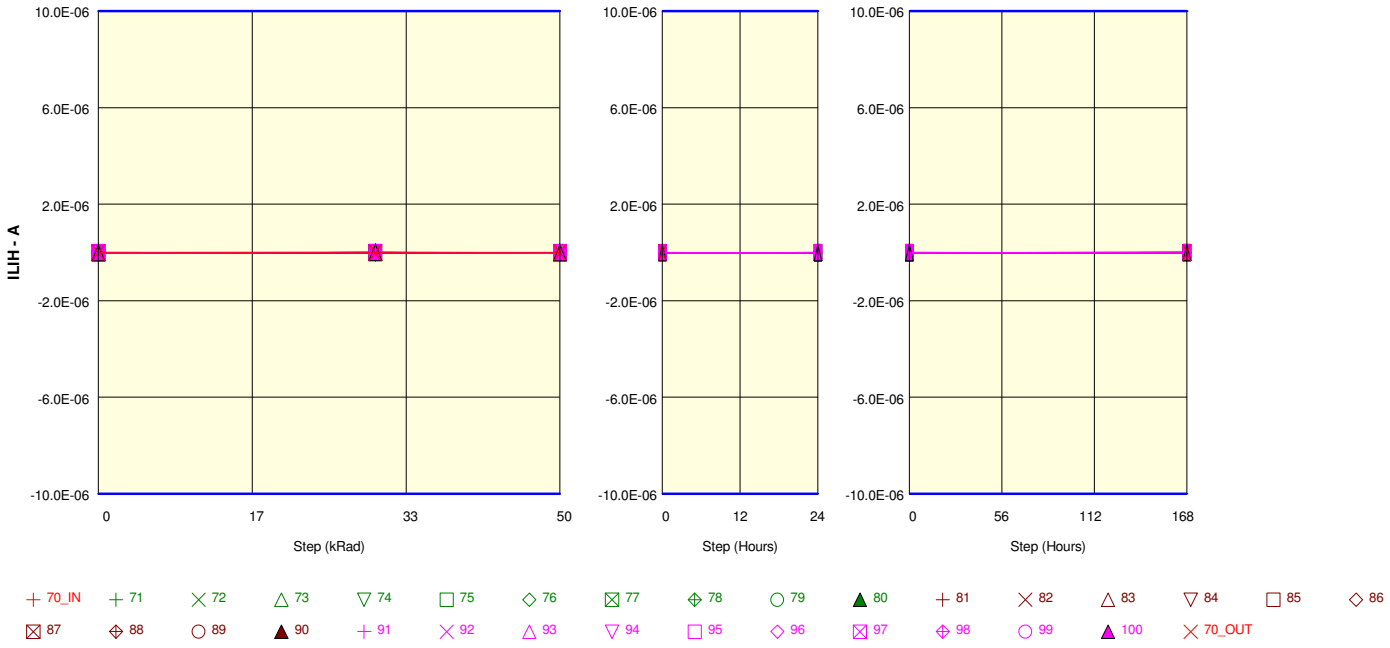
ILIHIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-7.2E-09	-6.6E-09	-8.7E-09	-6.2E-09	-6.2E-09
Std Deviation	6.9E-09	5.7E-09	7.5E-09	5.3E-09	4.8E-09

Measurements

ILIHIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	4.8E-09	-5.9E-09	1.7E-09	-8.2E-09	936.3E-12
70_OUT_REF	-15.1E-09	-18.9E-09	-5.9E-09		4.0E-09
OFF samples					
91	-6.7E-09	-9.7E-09	1.7E-09	-2.9E-09	-5.9E-09
92	-7.5E-09	-4.4E-09	-3.6E-09	-5.9E-09	-5.9E-09
93	936.3E-12	-1.4E-09	-2.9E-09	-11.3E-09	-9.0E-09
94	-2.1E-09	-6.7E-09	-8.2E-09	-12.0E-09	-10.5E-09
95	-2.1E-09	4.8E-09	-6.7E-09	-9.7E-09	-10.5E-09
96	-9.0E-09	-6.7E-09	-3.6E-09	-4.4E-09	-9.0E-09
97	-11.3E-09	-6.7E-09	-6.7E-09	-2.9E-09	-11.3E-09
98	-9.7E-09	-12.0E-09	-11.3E-09	4.0E-09	7.8E-09
99	-3.6E-09	-589.6E-12	-19.7E-09	-11.3E-09	-6.7E-09
100	-15.8E-09	-6.7E-09	-11.3E-09	-15.1E-09	-12.0E-09
Statistics					
Min	-15.8E-09	-12.0E-09	-19.7E-09	-15.1E-09	-12.0E-09
Max	936.3E-12	4.8E-09	1.7E-09	4.0E-09	7.8E-09
Average	-6.7E-09	-5.0E-09	-7.2E-09	-7.2E-09	-7.3E-09
Std Deviation	4.8E-09	4.6E-09	5.6E-09	5.5E-09	5.4E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Input Leakage Current High : ILIHIO[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

ILIHIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	1.7E-09	6.3E-09	-15.8E-09	-19.7E-09	-10.5E-09
70_OUT_REF	-10.5E-09	-11.3E-09	-6.7E-09		-14.3E-09
LDC samples					
71	-9.7E-09	-9.7E-09	-14.3E-09	-12.8E-09	-7.5E-09
72	-19.7E-09	4.0E-09	-7.5E-09	-3.6E-09	-15.1E-09
73	-8.2E-09	936.3E-12	-11.3E-09	-13.6E-09	-12.0E-09
74	-6.7E-09	-16.6E-09	-16.6E-09	-3.6E-09	173.3E-12
75	-15.1E-09	173.3E-12	-1.4E-09	-11.3E-09	7.8E-09
76	936.3E-12	-8.2E-09	-19.7E-09	-14.3E-09	6.3E-09
77	-4.4E-09	-8.2E-09	-9.0E-09	-19.7E-09	-2.1E-09
78	-2.1E-09	-13.6E-09	-2.9E-09	-17.4E-09	-3.6E-09
79	-13.6E-09	-2.1E-09	-7.5E-09	-7.5E-09	-10.5E-09
80	-4.4E-09	-7.5E-09	-6.7E-09	-10.5E-09	-13.6E-09
Statistics					
Min	-19.7E-09	-16.6E-09	-19.7E-09	-19.7E-09	-15.1E-09
Max	936.3E-12	4.0E-09	-1.4E-09	-3.6E-09	7.8E-09
Average	-8.3E-09	-6.1E-09	-9.7E-09	-11.4E-09	-5.0E-09
Std Deviation	6.0E-09	6.3E-09	5.5E-09	5.1E-09	7.7E-09

Measurements

ILIHIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	1.7E-09	6.3E-09	-15.8E-09	-19.7E-09	-10.5E-09
70_OUT_REF	-10.5E-09	-11.3E-09	-6.7E-09		-14.3E-09
HDC samples					
81	-4.4E-09	-10.5E-09	-8.2E-09	-10.5E-09	-15.1E-09
82	-11.3E-09	-5.9E-09	-3.6E-09	-5.2E-09	-2.9E-09
83	-14.3E-09	-2.9E-09	-2.9E-09	-16.6E-09	-9.7E-09
84	-5.9E-09	-8.2E-09	-6.7E-09	-2.1E-09	-9.7E-09
85	-17.4E-09	4.8E-09	-5.9E-09	-3.6E-09	-9.7E-09
86	-15.1E-09	3.2E-09	-10.5E-09	-1.4E-09	-6.7E-09
87	-9.0E-09	-9.7E-09	-4.4E-09	-14.3E-09	-6.7E-09
88	-5.2E-09	-5.9E-09	-14.3E-09	-2.1E-09	-6.7E-09
89	-5.2E-09	-15.1E-09	-6.7E-09	-5.2E-09	-5.9E-09
90	-1.4E-09	-9.0E-09	-12.0E-09	-6.7E-09	-6.7E-09
Statistics					
Min	-17.4E-09	-15.1E-09	-14.3E-09	-16.6E-09	-15.1E-09
Max	-1.4E-09	4.8E-09	-2.9E-09	-1.4E-09	-2.9E-09

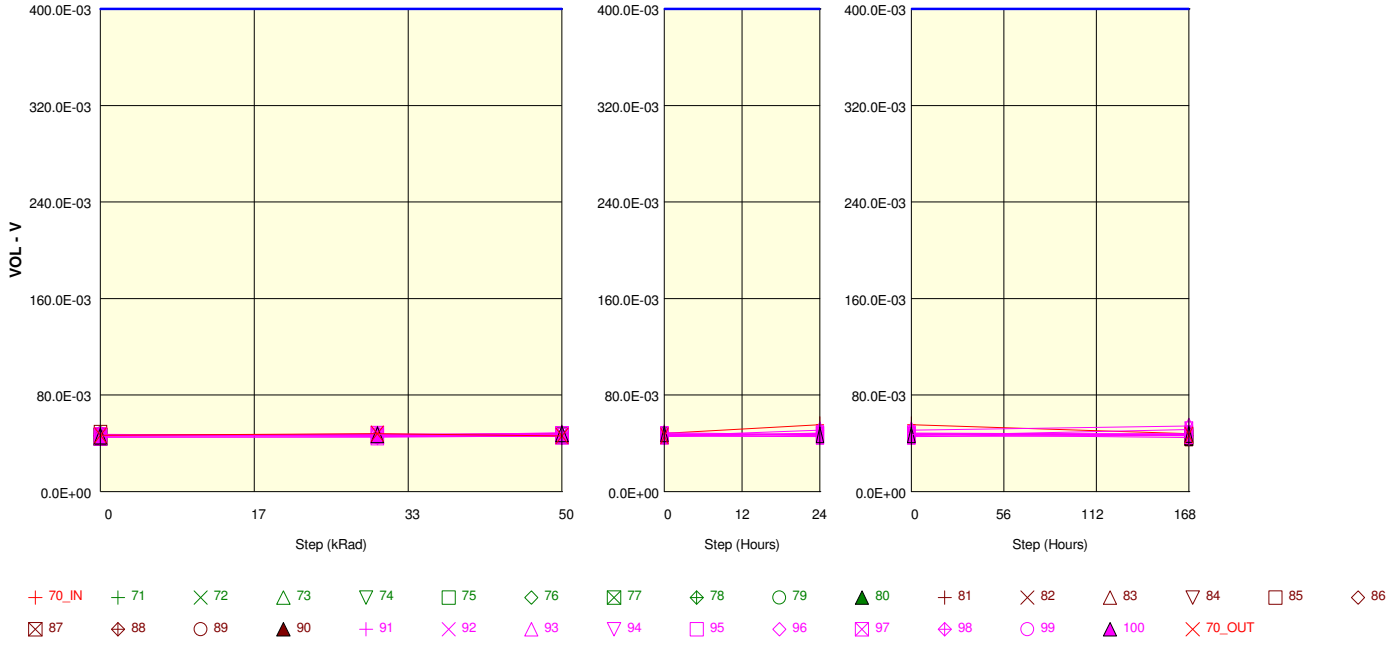
ILIHIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-8.9E-09	-5.9E-09	-7.5E-09	-6.8E-09	-8.0E-09
Std Deviation	5.1E-09	5.8E-09	3.6E-09	5.1E-09	3.1E-09

Measurements

ILIHIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	1.7E-09	6.3E-09	-15.8E-09	-19.7E-09	-10.5E-09
70_OUT_REF	-10.5E-09	-11.3E-09	-6.7E-09		-14.3E-09
OFF samples					
91	-11.3E-09	-13.6E-09	-3.6E-09	-9.7E-09	1.7E-09
92	-4.4E-09	4.8E-09	-12.0E-09	-2.1E-09	-7.5E-09
93	-17.4E-09	1.7E-09	-15.1E-09	-7.5E-09	-12.0E-09
94	-5.2E-09	-2.1E-09	-18.9E-09	-13.6E-09	-2.1E-09
95	-5.9E-09	-10.5E-09	-8.2E-09	3.2E-09	936.3E-12
96	-14.3E-09	-589.6E-12	-9.0E-09	-11.3E-09	-5.9E-09
97	-2.9E-09	1.7E-09	-15.1E-09	-5.9E-09	-1.4E-09
98	-5.9E-09	4.0E-09	-5.9E-09	-4.4E-09	-4.4E-09
99	1.7E-09	-4.4E-09	-12.0E-09	-10.5E-09	-12.8E-09
100	-15.1E-09	-2.9E-09	-11.3E-09	-13.6E-09	-7.5E-09
Statistics					
Min	-17.4E-09	-13.6E-09	-18.9E-09	-13.6E-09	-12.8E-09
Max	1.7E-09	4.8E-09	-3.6E-09	3.2E-09	1.7E-09
Average	-8.1E-09	-2.2E-09	-11.1E-09	-7.5E-09	-5.1E-09
Std Deviation	5.8E-09	5.7E-09	4.4E-09	5.1E-09	4.7E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Low Voltage : VOLIO[0]
Test conditions : IOL=2.1mA. Vcc = 3.3V
Unit : V
Spec Limit Max : 400.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

VOLIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	46.4E-03	47.0E-03	48.4E-03	55.6E-03	48.1E-03
70_OUT_REF	46.7E-03	48.1E-03	46.3E-03		47.0E-03
LDC samples					
71	46.9E-03				45.7E-03
72	46.0E-03				46.7E-03
73	45.5E-03				48.1E-03
74	45.7E-03				45.4E-03
75	45.8E-03				45.0E-03
76	46.9E-03				46.9E-03
77	45.7E-03		46.6E-03		46.6E-03
78	46.3E-03				46.7E-03
79	45.2E-03				46.1E-03
80	46.9E-03				45.2E-03
Statistics					
Min	45.2E-03	-	46.6E-03	-	45.0E-03
Max	46.9E-03	-	46.6E-03	-	48.1E-03
Average	46.1E-03	-	46.6E-03	-	46.2E-03
Std Deviation	591.1E-06	-	0.0E+00	-	899.7E-06

Measurements

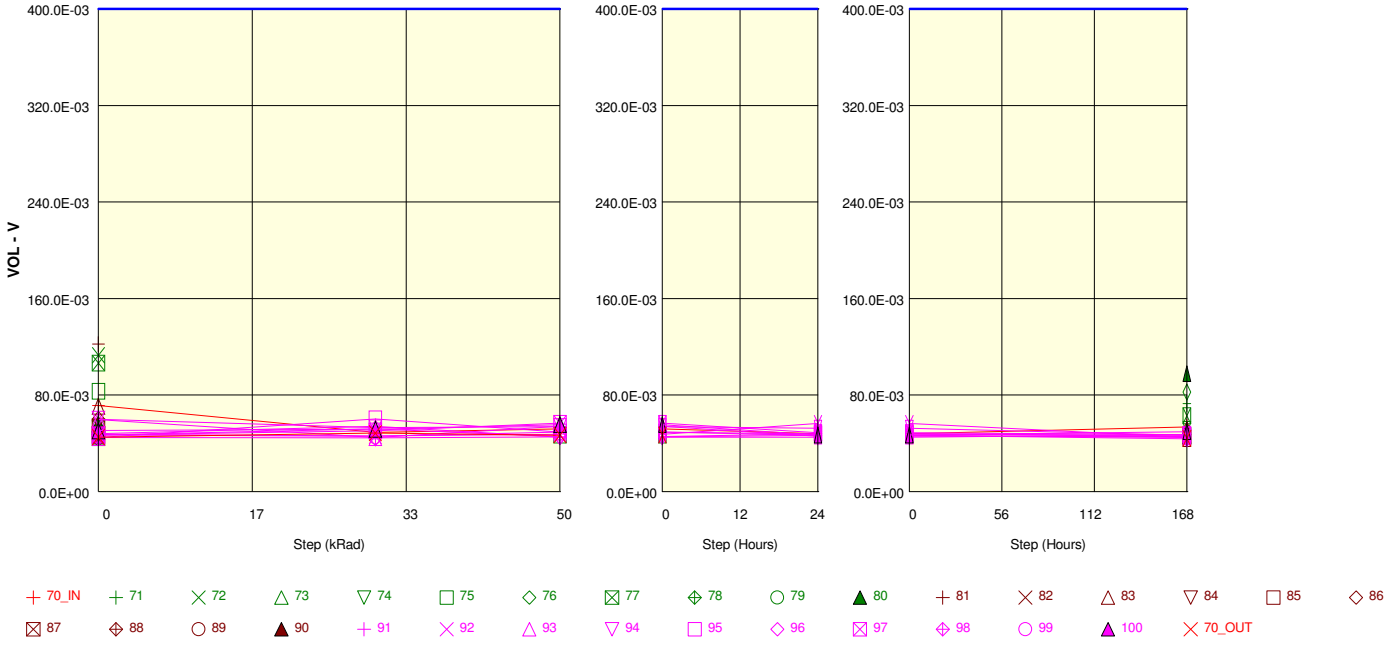
VOLIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	46.4E-03	47.0E-03	48.4E-03	55.6E-03	48.1E-03
70_OUT_REF	46.7E-03	48.1E-03	46.3E-03		47.0E-03
HDC samples					
81	46.6E-03				45.4E-03
82	47.0E-03				45.5E-03
83	45.4E-03				47.5E-03
84	45.7E-03				
85	48.3E-03				44.4E-03
86	46.1E-03				46.6E-03
87	45.7E-03				46.3E-03
88	46.6E-03				46.1E-03
89	47.0E-03				47.8E-03
90	45.2E-03				45.0E-03
Statistics					
Min	45.2E-03	-	-	-	44.4E-03
Max	48.3E-03	-	-	-	47.8E-03
Average	46.3E-03	-	-	-	46.1E-03
Std Deviation	893.0E-06	-	-	-	1.0E-03

Measurements

VOLIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	46.4E-03	47.0E-03	48.4E-03	55.6E-03	48.1E-03
70_OUT_REF	46.7E-03	48.1E-03	46.3E-03		47.0E-03
OFF samples					
91	47.5E-03	46.3E-03	48.9E-03	47.3E-03	46.6E-03
92	46.6E-03	47.5E-03	46.3E-03	47.6E-03	46.4E-03
93	47.3E-03	46.7E-03	46.0E-03	45.8E-03	46.6E-03
94	46.1E-03	46.9E-03	47.5E-03	47.2E-03	44.7E-03
95	45.0E-03	45.4E-03	46.1E-03	48.1E-03	47.0E-03
96	47.2E-03	46.4E-03	45.7E-03	48.6E-03	47.5E-03
97	46.6E-03	47.6E-03	47.5E-03	46.4E-03	51.5E-03
98	45.4E-03	45.7E-03	46.1E-03	51.2E-03	54.4E-03
99	46.1E-03	46.4E-03	46.4E-03	47.6E-03	48.1E-03
100	46.1E-03	47.2E-03	47.9E-03	47.2E-03	47.5E-03
Statistics					
Min	45.0E-03	45.4E-03	45.7E-03	45.8E-03	44.7E-03
Max	47.5E-03	47.6E-03	48.9E-03	51.2E-03	54.4E-03
Average	46.4E-03	46.6E-03	46.8E-03	47.7E-03	48.0E-03
Std Deviation	768.5E-06	702.0E-06	993.8E-06	1.4E-03	2.7E-03

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Low Voltage : VOLIO[1]
Test conditions : IOL=2.1mA. Vcc = 3.3V
Unit : V
Spec Limit Max : 400.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

VOLIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	71.3E-03	49.0E-03	52.1E-03	48.1E-03	53.4E-03
70_OUT_REF	45.2E-03	48.6E-03	46.9E-03		44.3E-03
LDC samples					
71	45.8E-03				73.0E-03
72	113.1E-03				46.6E-03
73	44.9E-03				46.1E-03
74	52.1E-03				51.6E-03
75	83.3E-03				46.7E-03
76	47.2E-03				82.6E-03
77	106.5E-03		47.0E-03		62.9E-03
78	47.5E-03				47.2E-03
79	48.7E-03				47.2E-03
80	56.2E-03				97.7E-03
Statistics					
Min	44.9E-03	-	47.0E-03	-	46.1E-03
Max	113.1E-03	-	47.0E-03	-	97.7E-03
Average	64.5E-03	-	47.0E-03	-	60.2E-03
Std Deviation	25.1E-03	-	0.0E+00	-	17.5E-03

Measurements

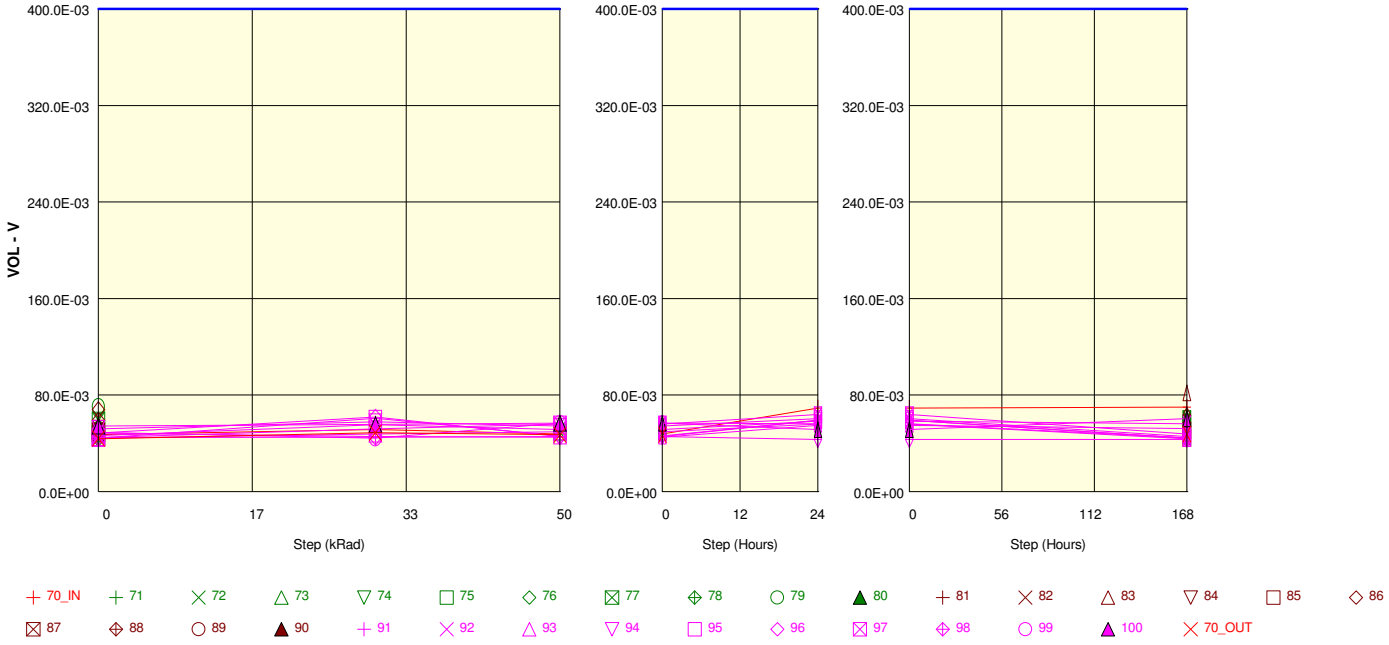
VOLIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	71.3E-03	49.0E-03	52.1E-03	48.1E-03	53.4E-03
70_OUT_REF	45.2E-03	48.6E-03	46.9E-03		44.3E-03
HDC samples					
81	122.3E-03				50.5E-03
82	48.7E-03				45.5E-03
83	70.7E-03				47.6E-03
84	47.2E-03				
85	53.6E-03				45.8E-03
86	46.0E-03				51.2E-03
87	46.9E-03				44.1E-03
88	60.0E-03				47.3E-03
89	45.4E-03				47.0E-03
90	46.1E-03				46.7E-03
Statistics					
Min	45.4E-03	-	-	-	44.1E-03
Max	122.3E-03	-	-	-	51.2E-03
Average	58.7E-03	-	-	-	47.3E-03
Std Deviation	22.5E-03	-	-	-	2.1E-03

Measurements

VOLIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	71.3E-03	49.0E-03	52.1E-03	48.1E-03	53.4E-03
70_OUT_REF	45.2E-03	48.6E-03	46.9E-03		44.3E-03
OFF samples					
91	48.1E-03	54.2E-03	45.4E-03	45.4E-03	47.3E-03
92	47.5E-03	46.3E-03	47.5E-03	56.6E-03	45.0E-03
93	59.8E-03	44.7E-03	54.2E-03	46.0E-03	45.7E-03
94	60.0E-03	53.0E-03	53.9E-03	52.5E-03	46.7E-03
95	44.9E-03	60.3E-03	49.3E-03	47.8E-03	46.7E-03
96	47.0E-03	52.2E-03	45.8E-03	48.1E-03	45.8E-03
97	47.0E-03	50.4E-03	56.8E-03	48.9E-03	47.3E-03
98	44.7E-03	44.6E-03	45.5E-03	46.7E-03	43.8E-03
99	47.0E-03	46.0E-03	49.5E-03	46.7E-03	44.7E-03
100	50.5E-03	51.8E-03	55.6E-03	47.0E-03	49.8E-03
Statistics					
Min	44.7E-03	44.6E-03	45.4E-03	45.4E-03	43.8E-03
Max	60.0E-03	60.3E-03	56.8E-03	56.6E-03	49.8E-03
Average	49.7E-03	50.3E-03	50.3E-03	48.6E-03	46.3E-03
Std Deviation	5.4E-03	4.8E-03	4.2E-03	3.3E-03	1.6E-03

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Low Voltage : VOLIO[2]
Test conditions : IOL=2.1mA. Vcc = 3.3V
Unit : V
Spec Limit Max : 400.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

VOLIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	47.2E-03	51.5E-03	47.8E-03	69.3E-03	69.9E-03
70_OUT_REF	44.0E-03	48.9E-03	47.2E-03		47.8E-03
LDC samples					
71	44.0E-03				54.5E-03
72	60.5E-03				59.5E-03
73	44.9E-03				46.0E-03
74	47.2E-03				45.4E-03
75	48.1E-03				57.3E-03
76	48.6E-03				60.0E-03
77	59.2E-03		49.3E-03		60.5E-03
78	44.0E-03				53.6E-03
79	70.5E-03				61.4E-03
80	51.0E-03				55.0E-03
Statistics					
Min	44.0E-03	-	49.3E-03	-	45.4E-03
Max	70.5E-03	-	49.3E-03	-	61.4E-03
Average	51.8E-03	-	49.3E-03	-	55.3E-03
Std Deviation	8.4E-03	-	0.0E+00	-	5.5E-03

Measurements

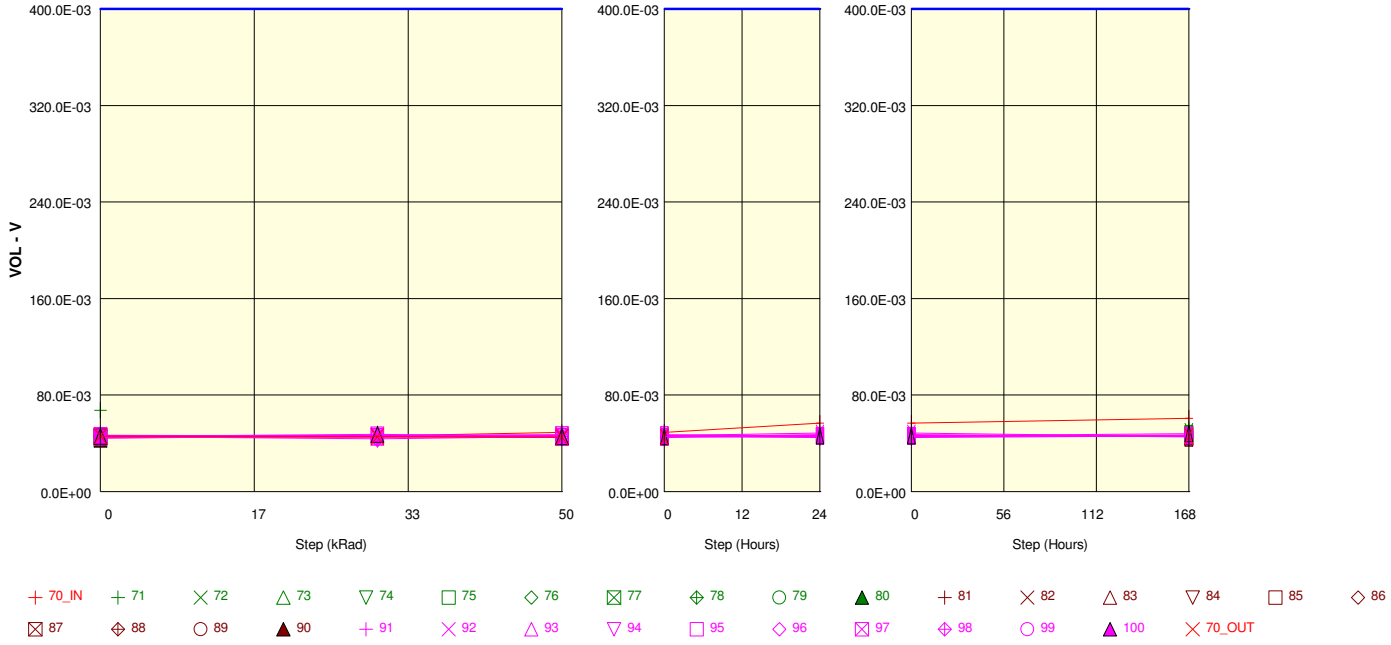
VOLIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	47.2E-03	51.5E-03	47.8E-03	69.3E-03	69.9E-03
70_OUT_REF	44.0E-03	48.9E-03	47.2E-03		47.8E-03
HDC samples					
81	55.9E-03				54.1E-03
82	47.3E-03				50.7E-03
83	54.4E-03				82.0E-03
84	50.4E-03				
85	50.4E-03				51.0E-03
86	68.1E-03				56.3E-03
87	44.9E-03				44.0E-03
88	59.2E-03				63.5E-03
89	46.6E-03				46.7E-03
90	50.2E-03				56.3E-03
Statistics					
Min	44.9E-03	-	-	-	44.0E-03
Max	68.1E-03	-	-	-	82.0E-03
Average	52.7E-03	-	-	-	56.1E-03
Std Deviation	6.6E-03	-	-	-	10.6E-03

Measurements

VOLIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	47.2E-03	51.5E-03	47.8E-03	69.3E-03	69.9E-03
70_OUT_REF	44.0E-03	48.9E-03	47.2E-03		47.8E-03
OFF samples					
91	48.6E-03	45.8E-03	45.4E-03	54.8E-03	52.4E-03
92	46.6E-03	55.4E-03	51.6E-03	58.5E-03	56.3E-03
93	44.3E-03	47.8E-03	49.6E-03	55.9E-03	44.0E-03
94	52.2E-03	57.9E-03	54.4E-03	60.5E-03	45.7E-03
95	44.3E-03	60.9E-03	46.1E-03	59.2E-03	44.4E-03
96	48.7E-03	61.7E-03	45.7E-03	59.2E-03	44.3E-03
97	44.9E-03	52.1E-03	56.0E-03	64.0E-03	47.8E-03
98	44.9E-03	45.2E-03	45.8E-03	43.2E-03	43.4E-03
99	49.2E-03	44.3E-03	56.8E-03	56.2E-03	44.6E-03
100	54.4E-03	55.7E-03	56.8E-03	51.5E-03	60.6E-03
Statistics					
Min	44.3E-03	44.3E-03	45.4E-03	43.2E-03	43.4E-03
Max	54.4E-03	61.7E-03	56.8E-03	64.0E-03	60.6E-03
Average	47.8E-03	52.7E-03	50.8E-03	56.3E-03	48.3E-03
Std Deviation	3.3E-03	6.2E-03	4.7E-03	5.4E-03	5.7E-03

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Low Voltage : VOLIO[3]
Test conditions : IOL=2.1mA. Vcc = 3.3V
Unit : V
Spec Limit Max : 400.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

VOLIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	46.7E-03	46.3E-03	49.2E-03	56.8E-03	60.8E-03
70_OUT_REF	46.0E-03	45.7E-03	45.2E-03		46.1E-03
LDC samples					
71	67.5E-03				51.2E-03
72	46.4E-03				50.1E-03
73	44.1E-03				46.6E-03
74	45.4E-03				46.6E-03
75	44.9E-03				48.6E-03
76	45.2E-03				48.7E-03
77	45.7E-03		45.8E-03		47.8E-03
78	46.0E-03				48.3E-03
79	44.4E-03				46.0E-03
80	47.2E-03				45.5E-03
Statistics					
Min	44.1E-03	-	45.8E-03	-	45.5E-03
Max	67.5E-03	-	45.8E-03	-	51.2E-03
Average	47.7E-03	-	45.8E-03	-	47.9E-03
Std Deviation	6.7E-03	-	0.0E+00	-	1.7E-03

Measurements

VOLIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	46.7E-03	46.3E-03	49.2E-03	56.8E-03	60.8E-03
70_OUT_REF	46.0E-03	45.7E-03	45.2E-03		46.1E-03
HDC samples					
81	45.8E-03				47.0E-03
82	47.0E-03				45.8E-03
83	45.4E-03				45.5E-03
84	44.0E-03				
85	45.4E-03				44.6E-03
86	44.9E-03				46.1E-03
87	46.0E-03				44.3E-03
88	44.3E-03				44.9E-03
89	46.4E-03				46.0E-03
90	43.5E-03				45.5E-03
Statistics					
Min	43.5E-03	-	-	-	44.3E-03
Max	47.0E-03	-	-	-	47.0E-03
Average	45.3E-03	-	-	-	45.5E-03
Std Deviation	1.1E-03	-	-	-	796.0E-06

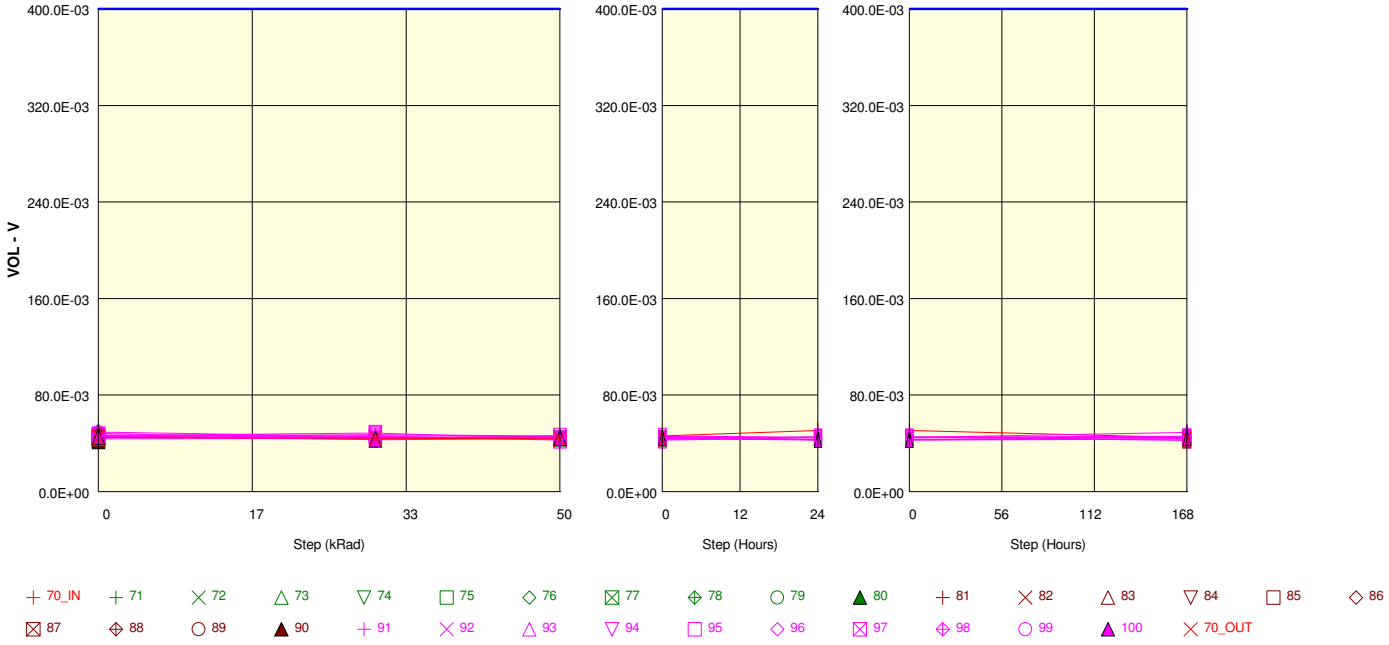
Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Measurements

VOLIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	46.7E-03	46.3E-03	49.2E-03	56.8E-03	60.8E-03
70_OUT_REF	46.0E-03	45.7E-03	45.2E-03		46.1E-03
OFF samples					
91	45.4E-03	46.3E-03	45.8E-03	44.9E-03	46.3E-03
92	44.4E-03	46.3E-03	46.4E-03	48.7E-03	45.8E-03
93	46.4E-03	45.2E-03	46.3E-03	45.8E-03	46.6E-03
94	44.6E-03	46.0E-03	46.0E-03	46.4E-03	46.7E-03
95	45.4E-03	45.8E-03	44.7E-03	46.7E-03	46.1E-03
96	44.7E-03	45.5E-03	45.5E-03	47.2E-03	45.5E-03
97	46.6E-03	46.9E-03	47.3E-03	46.1E-03	46.7E-03
98	45.8E-03	43.7E-03	45.8E-03	45.7E-03	46.9E-03
99	45.0E-03	45.5E-03	46.4E-03	46.7E-03	46.1E-03
100	45.8E-03	47.5E-03	45.7E-03	46.3E-03	48.1E-03
Statistics					
Min	44.4E-03	43.7E-03	44.7E-03	44.9E-03	45.5E-03
Max	46.6E-03	47.5E-03	47.3E-03	48.7E-03	48.1E-03
Average	45.4E-03	45.9E-03	46.0E-03	46.5E-03	46.5E-03
Std Deviation	699.9E-06	974.8E-06	650.2E-06	969.3E-06	679.7E-06

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Low Voltage : VOLIO[4]
Test conditions : IOL=2.1mA. Vcc = 3.3V
Unit : V
Spec Limit Max : 400.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

VOLIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	46.3E-03	44.0E-03	46.1E-03	50.5E-03	44.9E-03
70_OUT_REF	44.7E-03	44.3E-03	43.7E-03		42.8E-03
LDC samples					
71	42.3E-03				44.3E-03
72	46.6E-03				45.7E-03
73	44.4E-03				45.0E-03
74	42.5E-03				44.3E-03
75	45.4E-03				45.0E-03
76	46.0E-03				44.3E-03
77	45.0E-03		43.8E-03		43.2E-03
78	44.3E-03				44.3E-03
79	44.0E-03				43.4E-03
80	45.2E-03				44.7E-03
Statistics					
Min	42.3E-03	-	43.8E-03	-	43.2E-03
Max	46.6E-03	-	43.8E-03	-	45.7E-03
Average	44.6E-03	-	43.8E-03	-	44.4E-03
Std Deviation	1.3E-03	-	0.0E+00	-	710.5E-06

Measurements

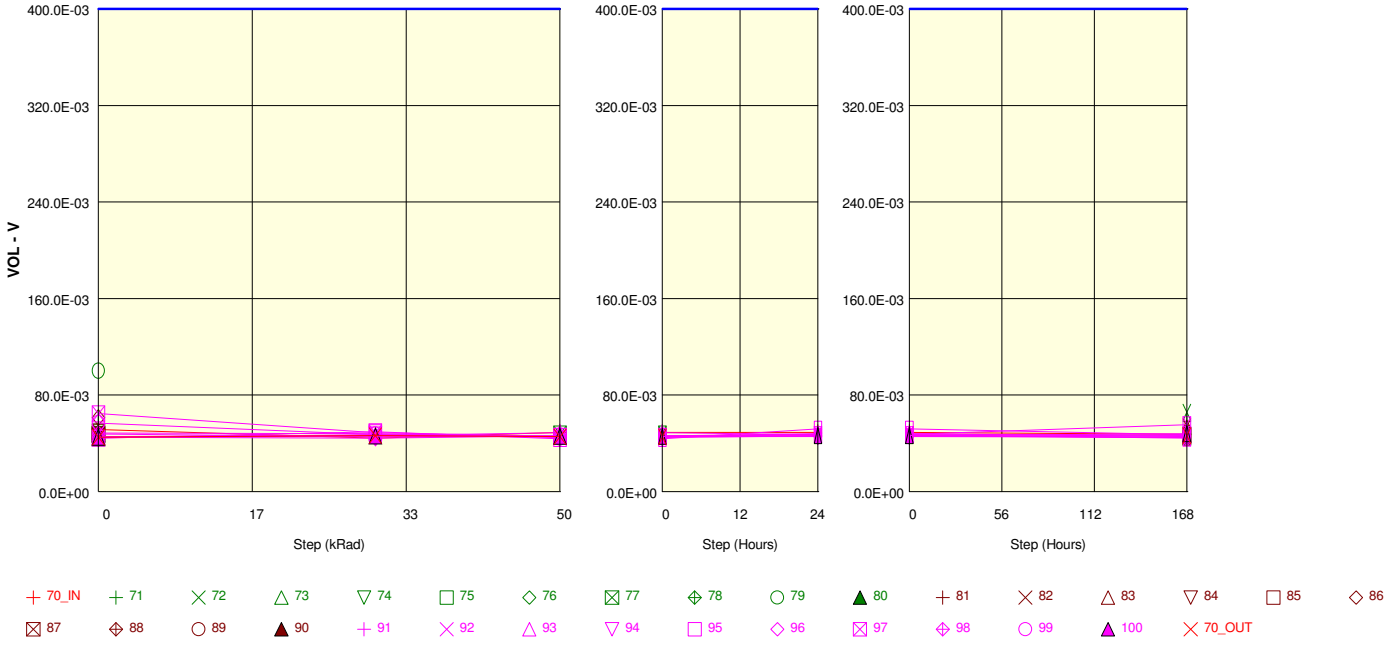
VOLIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	46.3E-03	44.0E-03	46.1E-03	50.5E-03	44.9E-03
70_OUT_REF	44.7E-03	44.3E-03	43.7E-03		42.8E-03
HDC samples					
81	46.6E-03				44.7E-03
82	45.2E-03				43.2E-03
83	43.1E-03				46.9E-03
84	43.8E-03				
85	45.4E-03				42.8E-03
86	43.8E-03				44.1E-03
87	43.7E-03				44.4E-03
88	48.1E-03				44.1E-03
89	43.2E-03				45.8E-03
90	42.1E-03				44.4E-03
Statistics					
Min	42.1E-03	-	-	-	42.8E-03
Max	48.1E-03	-	-	-	46.9E-03
Average	44.5E-03	-	-	-	44.5E-03
Std Deviation	1.7E-03	-	-	-	1.2E-03

Measurements

VOLIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	46.3E-03	44.0E-03	46.1E-03	50.5E-03	44.9E-03
70_OUT_REF	44.7E-03	44.3E-03	43.7E-03		42.8E-03
OFF samples					
91	44.0E-03	44.1E-03	45.4E-03	44.9E-03	44.9E-03
92	44.9E-03	45.0E-03	43.7E-03	45.0E-03	42.6E-03
93	44.7E-03	46.1E-03	45.8E-03	44.9E-03	49.0E-03
94	46.6E-03	48.6E-03	43.7E-03	45.5E-03	44.3E-03
95	47.0E-03	46.0E-03	42.8E-03	44.6E-03	44.9E-03
96	49.3E-03	45.7E-03	43.5E-03	45.4E-03	46.0E-03
97	45.7E-03	47.3E-03	46.1E-03	44.7E-03	45.5E-03
98	44.9E-03	44.7E-03	44.4E-03	43.1E-03	43.7E-03
99	48.4E-03	43.1E-03	44.1E-03	42.9E-03	43.5E-03
100	45.5E-03	43.4E-03	44.7E-03	43.1E-03	44.7E-03
Statistics					
Min	44.0E-03	43.1E-03	42.8E-03	42.9E-03	42.6E-03
Max	49.3E-03	48.6E-03	46.1E-03	45.5E-03	49.0E-03
Average	46.1E-03	45.4E-03	44.4E-03	44.4E-03	44.9E-03
Std Deviation	1.6E-03	1.6E-03	1.0E-03	947.7E-06	1.7E-03

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Low Voltage : VOLIO[5]
Test conditions : IOL=2.1mA. Vcc = 3.3V
Unit : V
Spec Limit Max : 400.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

VOLIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	51.6E-03	44.4E-03	49.0E-03	49.0E-03	47.5E-03
70_OUT_REF	45.2E-03	46.4E-03	45.7E-03		46.4E-03
LDC samples					
71	56.0E-03				58.2E-03
72	49.6E-03				66.0E-03
73	44.6E-03				45.5E-03
74	45.0E-03				46.1E-03
75	47.3E-03				47.2E-03
76	47.0E-03				47.2E-03
77	47.6E-03		47.9E-03		46.7E-03
78	44.7E-03				48.3E-03
79	100.3E-03				46.0E-03
80	48.3E-03				47.2E-03
Statistics					
Min	44.6E-03	-	47.9E-03	-	45.5E-03
Max	100.3E-03	-	47.9E-03	-	66.0E-03
Average	53.1E-03	-	47.9E-03	-	49.8E-03
Std Deviation	16.1E-03	-	0.0E+00	-	6.4E-03

Measurements

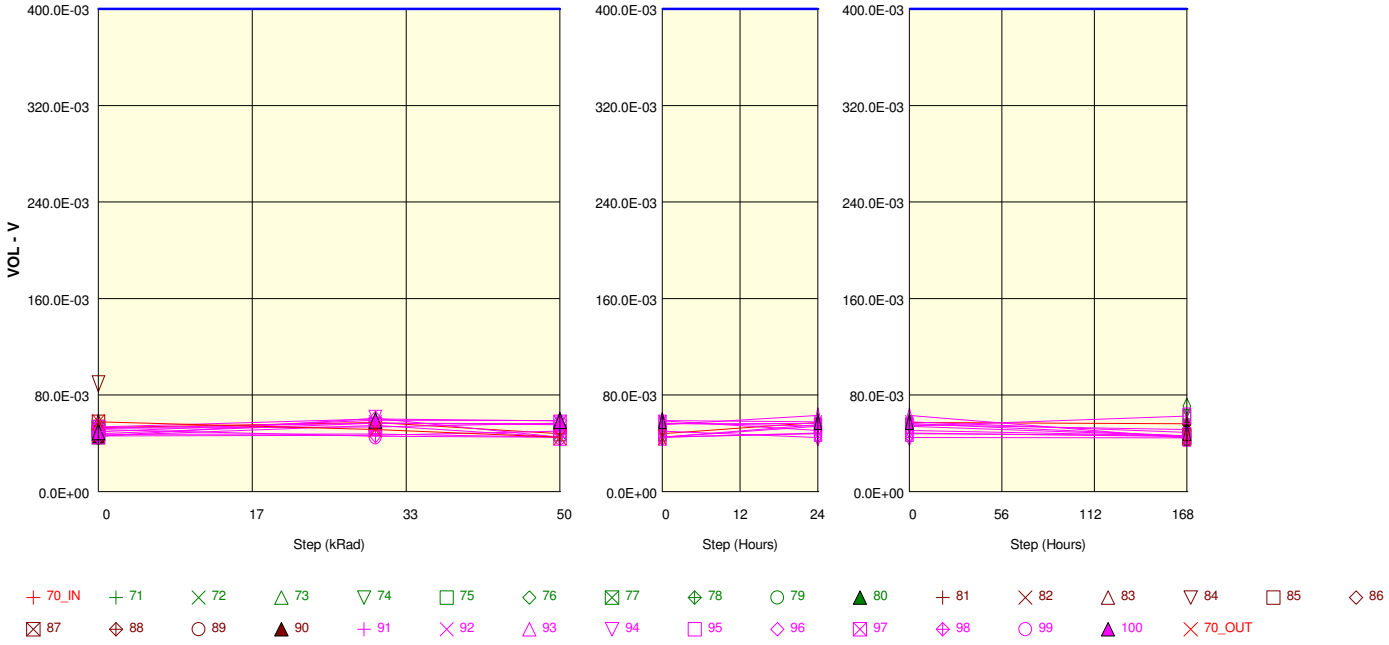
VOLIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	51.6E-03	44.4E-03	49.0E-03	49.0E-03	47.5E-03
70_OUT_REF	45.2E-03	46.4E-03	45.7E-03		46.4E-03
HDC samples					
81	51.5E-03				46.1E-03
82	49.5E-03				53.9E-03
83	45.0E-03				47.5E-03
84	45.7E-03				
85	49.5E-03				46.6E-03
86	61.4E-03				52.7E-03
87	47.2E-03				45.2E-03
88	48.3E-03				47.3E-03
89	44.4E-03				49.0E-03
90	45.7E-03				47.3E-03
Statistics					
Min	44.4E-03	-	-	-	45.2E-03
Max	61.4E-03	-	-	-	53.9E-03
Average	48.8E-03	-	-	-	48.4E-03
Std Deviation	4.7E-03	-	-	-	2.8E-03

Measurements

VOLIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	51.6E-03	44.4E-03	49.0E-03	49.0E-03	47.5E-03
70_OUT_REF	45.2E-03	46.4E-03	45.7E-03		46.4E-03
OFF samples					
91	45.4E-03	46.6E-03	46.3E-03	46.3E-03	46.6E-03
92	48.6E-03	47.9E-03	45.5E-03	47.6E-03	46.7E-03
93	45.8E-03	46.4E-03	48.9E-03	47.2E-03	44.3E-03
94	44.6E-03	47.2E-03	45.8E-03	45.7E-03	45.2E-03
95	44.3E-03	49.8E-03	44.0E-03	51.9E-03	47.3E-03
96	47.8E-03	45.5E-03	46.3E-03	47.9E-03	45.7E-03
97	64.6E-03	48.9E-03	46.0E-03	47.5E-03	55.6E-03
98	45.0E-03	44.4E-03	46.1E-03	46.1E-03	45.4E-03
99	57.0E-03	47.3E-03	44.7E-03	46.1E-03	44.9E-03
100	45.2E-03	46.0E-03	45.8E-03	46.4E-03	48.1E-03
Statistics					
Min	44.3E-03	44.4E-03	44.0E-03	45.7E-03	44.3E-03
Max	64.6E-03	49.8E-03	48.9E-03	51.9E-03	55.6E-03
Average	48.8E-03	47.0E-03	45.9E-03	47.3E-03	47.0E-03
Std Deviation	6.3E-03	1.5E-03	1.2E-03	1.7E-03	3.1E-03

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Low Voltage : VOLIO[6]
Test conditions : IOL=2.1mA. Vcc = 3.3V
Unit : V
Spec Limit Max : 400.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

VOLIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	53.1E-03	57.3E-03	48.3E-03	57.3E-03	56.2E-03
70_OUT_REF	57.7E-03	51.6E-03	45.2E-03		45.7E-03
LDC samples					
71	45.5E-03				55.3E-03
72	51.5E-03				45.4E-03
73	46.1E-03				47.2E-03
74	48.3E-03				53.7E-03
75	52.1E-03				45.5E-03
76	51.3E-03				71.0E-03
77	52.7E-03		49.0E-03		61.4E-03
78	46.3E-03				45.7E-03
79	49.6E-03				49.9E-03
80	49.2E-03				52.4E-03
Statistics					
Min	45.5E-03	-	49.0E-03	-	45.4E-03
Max	52.7E-03	-	49.0E-03	-	71.0E-03
Average	49.2E-03	-	49.0E-03	-	52.7E-03
Std Deviation	2.5E-03	-	0.0E+00	-	7.8E-03

Measurements

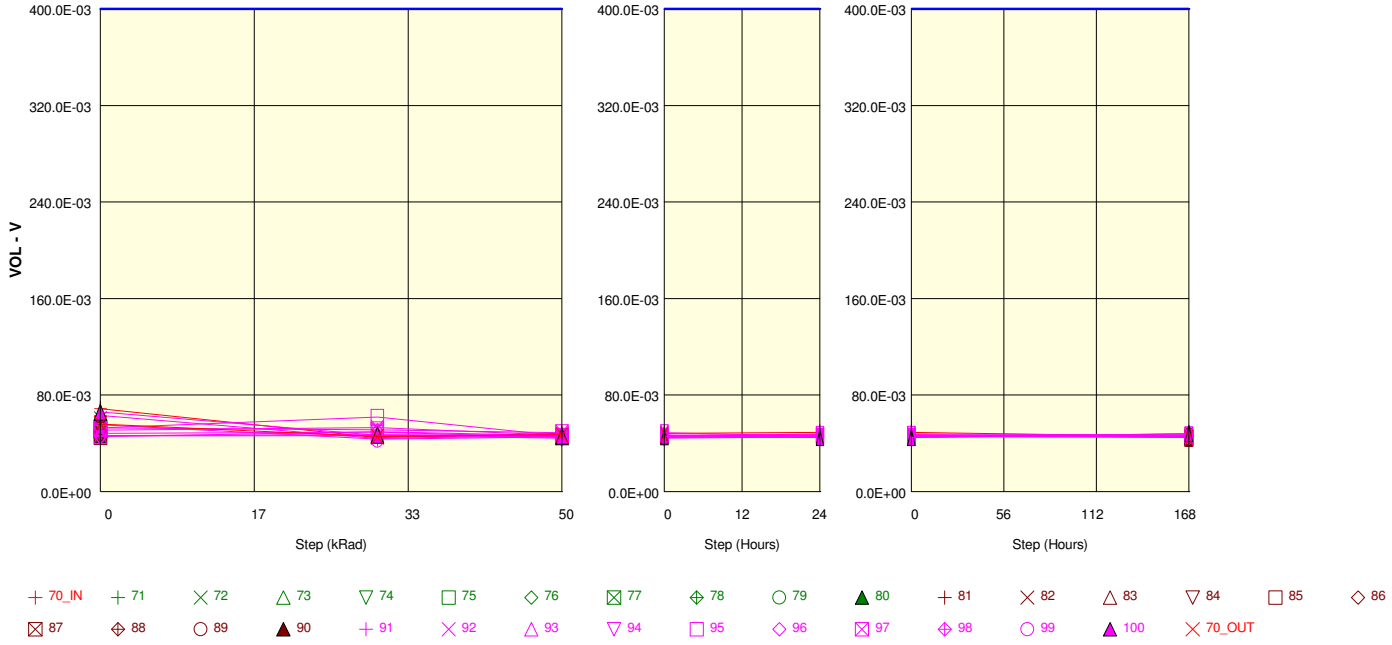
VOLIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	53.1E-03	57.3E-03	48.3E-03	57.3E-03	56.2E-03
70_OUT_REF	57.7E-03	51.6E-03	45.2E-03		45.7E-03
HDC samples					
81	57.3E-03				55.4E-03
82	47.6E-03				46.4E-03
83	57.4E-03				56.2E-03
84	89.5E-03				
85	57.0E-03				46.1E-03
86	48.6E-03				56.0E-03
87	48.4E-03				44.9E-03
88	52.2E-03				47.3E-03
89	45.7E-03				46.1E-03
90	47.0E-03				49.0E-03
Statistics					
Min	45.7E-03	-	-	-	44.9E-03
Max	89.5E-03	-	-	-	56.2E-03
Average	55.1E-03	-	-	-	49.7E-03
Std Deviation	12.2E-03	-	-	-	4.5E-03

Measurements

VOLIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	53.1E-03	57.3E-03	48.3E-03	57.3E-03	56.2E-03
70_OUT_REF	57.7E-03	51.6E-03	45.2E-03		45.7E-03
OFF samples					
91	47.5E-03	47.8E-03	45.2E-03	55.4E-03	51.6E-03
92	48.3E-03	57.0E-03	56.5E-03	56.6E-03	46.3E-03
93	52.5E-03	57.0E-03	55.4E-03	63.1E-03	44.3E-03
94	46.0E-03	60.9E-03	45.0E-03	54.2E-03	46.3E-03
95	46.3E-03	55.0E-03	45.0E-03	48.3E-03	46.6E-03
96	53.6E-03	60.3E-03	58.6E-03	50.7E-03	46.3E-03
97	52.7E-03	53.7E-03	57.0E-03	54.5E-03	62.7E-03
98	46.3E-03	46.9E-03	50.1E-03	44.7E-03	44.6E-03
99	51.5E-03	46.0E-03	45.4E-03	48.6E-03	45.8E-03
100	49.6E-03	59.1E-03	58.9E-03	58.0E-03	49.2E-03
Statistics					
Min	46.0E-03	46.0E-03	45.0E-03	44.7E-03	44.3E-03
Max	53.6E-03	60.9E-03	58.9E-03	63.1E-03	62.7E-03
Average	49.4E-03	54.4E-03	51.7E-03	53.4E-03	48.4E-03
Std Deviation	2.8E-03	5.3E-03	5.8E-03	5.1E-03	5.2E-03

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Low Voltage : VOLIO[7]
Test conditions : IOL=2.1mA. Vcc = 3.3V
Unit : V
Spec Limit Max : 400.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

VOLIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	68.7E-03	44.9E-03	48.4E-03	49.0E-03	45.8E-03
70_OUT_REF	55.9E-03	45.7E-03	47.2E-03		44.4E-03
LDC samples					
71	45.7E-03				46.0E-03
72	60.2E-03				45.2E-03
73	56.5E-03				44.9E-03
74	49.0E-03				43.8E-03
75	51.0E-03				45.8E-03
76	51.6E-03				46.3E-03
77	51.2E-03		45.4E-03		45.0E-03
78	47.9E-03				47.8E-03
79	57.3E-03				46.1E-03
80	47.2E-03				45.0E-03
Statistics					
Min	45.7E-03	-	45.4E-03	-	43.8E-03
Max	60.2E-03	-	45.4E-03	-	47.8E-03
Average	51.7E-03	-	45.4E-03	-	45.6E-03
Std Deviation	4.5E-03	-	0.0E+00	-	1.0E-03

Measurements

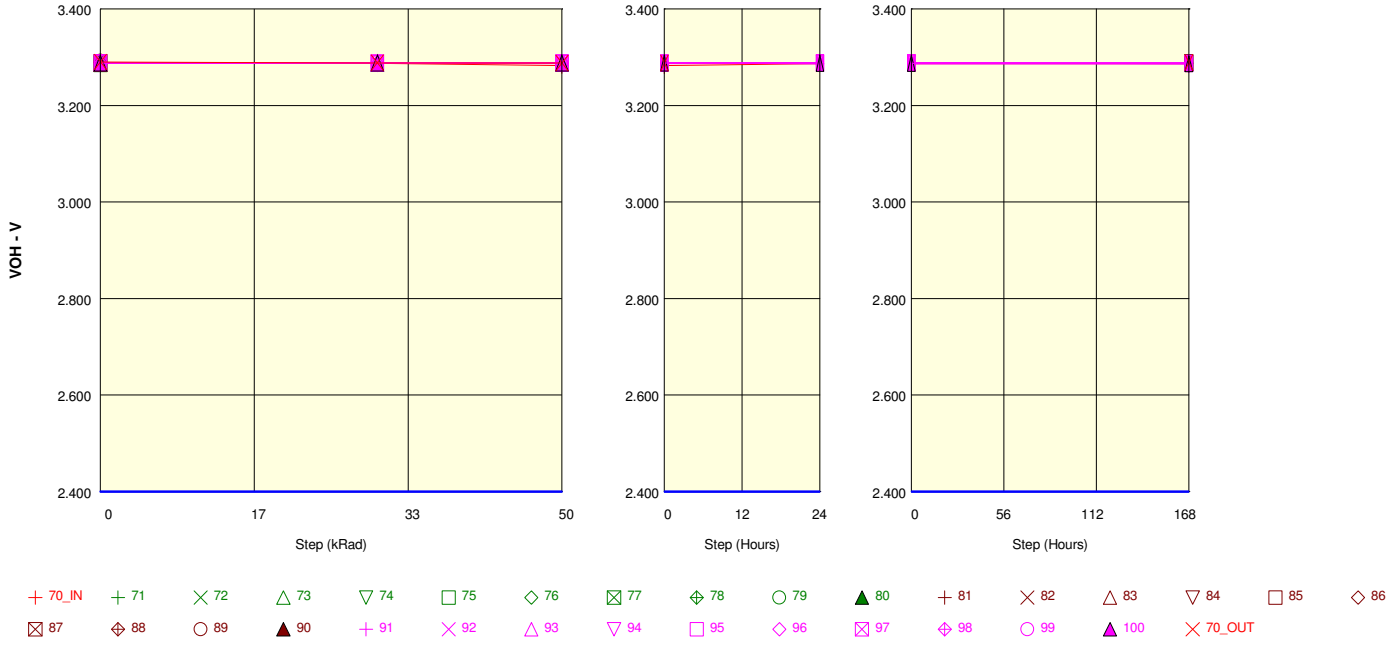
VOLIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	68.7E-03	44.9E-03	48.4E-03	49.0E-03	45.8E-03
70_OUT_REF	55.9E-03	45.7E-03	47.2E-03		44.4E-03
HDC samples					
81	50.4E-03				47.2E-03
82	56.2E-03				44.7E-03
83	59.5E-03				45.8E-03
84	50.8E-03				
85	45.5E-03				44.7E-03
86	49.0E-03				46.0E-03
87	48.6E-03				44.0E-03
88	58.3E-03				46.7E-03
89	48.6E-03				47.2E-03
90	51.6E-03				46.0E-03
Statistics					
Min	45.5E-03	-	-	-	44.0E-03
Max	59.5E-03	-	-	-	47.2E-03
Average	51.9E-03	-	-	-	45.8E-03
Std Deviation	4.4E-03	-	-	-	1.1E-03

Measurements

VOLIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	68.7E-03	44.9E-03	48.4E-03	49.0E-03	45.8E-03
70_OUT_REF	55.9E-03	45.7E-03	47.2E-03		44.4E-03
OFF samples					
91	63.4E-03	44.1E-03	46.9E-03	46.7E-03	46.3E-03
92	51.0E-03	53.0E-03	46.9E-03	47.3E-03	45.0E-03
93	46.4E-03	47.3E-03	46.9E-03	44.7E-03	48.3E-03
94	48.4E-03	49.5E-03	44.7E-03	45.7E-03	44.7E-03
95	52.8E-03	61.7E-03	46.1E-03	47.6E-03	47.0E-03
96	45.7E-03	49.8E-03	46.6E-03	46.6E-03	46.0E-03
97	52.8E-03	51.3E-03	48.9E-03	46.0E-03	47.0E-03
98	46.1E-03	46.6E-03	44.4E-03	45.5E-03	46.6E-03
99	55.4E-03	43.5E-03	45.5E-03	46.3E-03	45.7E-03
100	66.0E-03	46.7E-03	45.8E-03	44.9E-03	47.9E-03
Statistics					
Min	45.7E-03	43.5E-03	44.4E-03	44.7E-03	44.7E-03
Max	66.0E-03	61.7E-03	48.9E-03	47.6E-03	48.3E-03
Average	52.8E-03	49.4E-03	46.3E-03	46.1E-03	46.5E-03
Std Deviation	6.7E-03	5.0E-03	1.2E-03	916.6E-06	1.1E-03

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output High Voltage : VOHIO[0]
Test conditions : IOH=-400uA Vcc = 3.3V
Unit : V
Spec Limit Min : 2.400
Spec limits are represented in bold lines on the graphic.



Measurements

VOHIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.287	3.287	3.282	3.287	3.286
70_OUT_REF	3.290	3.288	3.288		3.289
LDC samples					
71	3.288				3.288
72	3.287				3.288
73	3.288				3.289
74	3.288				3.287
75	3.288				3.289
76	3.287				3.289
77	3.287				3.288
78	3.288				3.288
79	3.288				3.287
80	3.288				3.288
Statistics					
Min	3.287	-	-	-	3.287
Max	3.288	-	-	-	3.289
Average	3.288	-	-	-	3.288
Std Deviation	0.001	-	-	-	0.001

Measurements

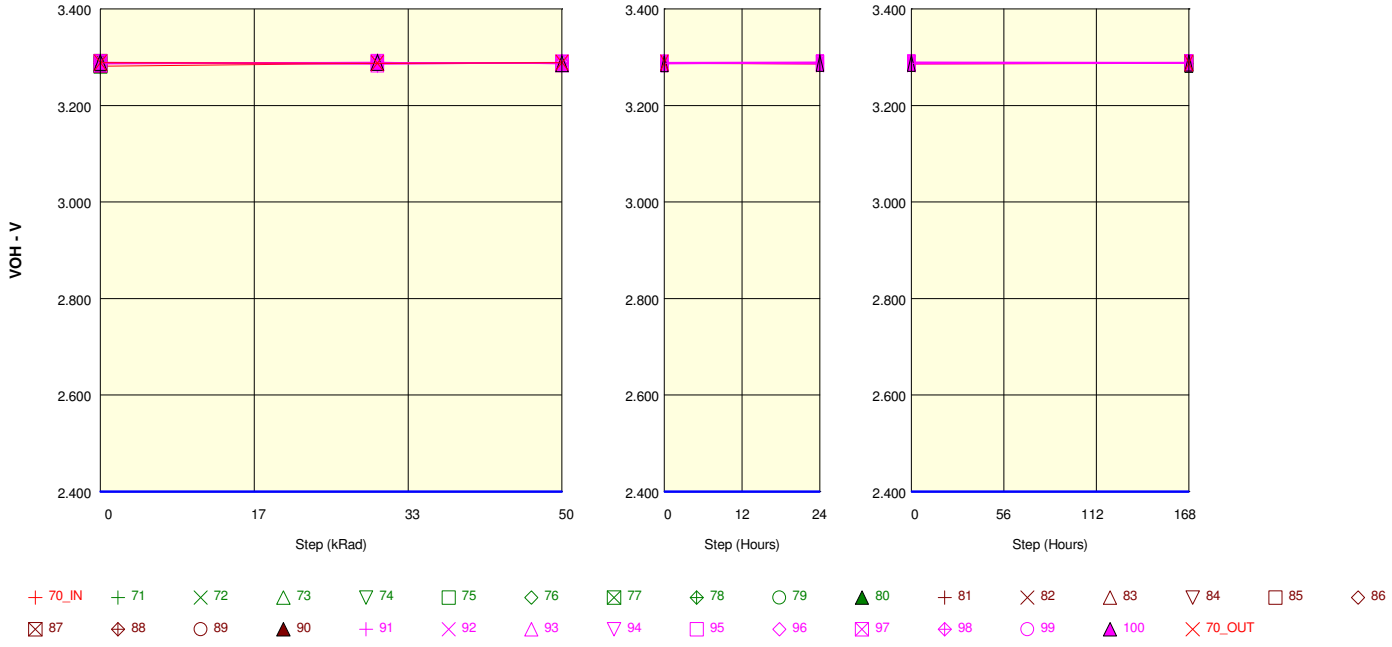
VOHIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.287	3.287	3.282	3.287	3.286
70_OUT_REF	3.290	3.288	3.288		3.289
HDC samples					
81	3.287				3.289
82	3.288				3.288
83	3.287				3.289
84	3.288				
85	3.287				3.287
86	3.287				3.287
87	3.288				3.289
88	3.289				3.287
89	3.290				3.289
90	3.289				3.289
Statistics					
Min	3.287	-	-	-	3.287
Max	3.290	-	-	-	3.289
Average	3.288	-	-	-	3.288
Std Deviation	0.001	-	-	-	0.001

Measurements

VOHIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.287	3.287	3.282	3.287	3.286
70_OUT_REF	3.290	3.288	3.288		3.289
OFF samples					
91	3.288	3.287	3.286	3.287	3.289
92	3.288	3.288	3.288	3.287	3.287
93	3.289	3.287	3.287	3.288	3.288
94	3.287	3.288	3.287	3.288	3.287
95	3.288	3.287	3.287	3.288	3.287
96	3.287	3.288	3.287	3.288	3.288
97	3.288	3.288	3.289	3.289	3.288
98	3.287	3.287	3.289	3.286	3.285
99	3.288	3.288	3.287	3.288	3.286
100	3.288	3.288	3.288	3.287	3.286
Statistics					
Min	3.287	3.287	3.286	3.286	3.285
Max	3.289	3.288	3.289	3.289	3.289
Average	3.288	3.288	3.287	3.288	3.287
Std Deviation	0.001	0.000	0.001	0.001	0.001

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output High Voltage : VOHIO[1]
Test conditions : IOH=-400uA Vcc = 3.3V
Unit : V
Spec Limit Min : 2.400
Spec limits are represented in bold lines on the graphic.



Measurements

VOHIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.281	3.287	3.287	3.286	3.287
70_OUT_REF	3.289	3.288	3.289		3.288
LDC samples					
71	3.289				3.285
72	3.286				3.286
73	3.288				3.287
74	3.287				3.287
75	3.284				3.289
76	3.287				3.286
77	3.284				3.286
78	3.287				3.287
79	3.289				3.287
80	3.286				3.285
Statistics					
Min	3.284	-	-	-	3.285
Max	3.289	-	-	-	3.289
Average	3.286	-	-	-	3.286
Std Deviation	0.002	-	-	-	0.001

Measurements

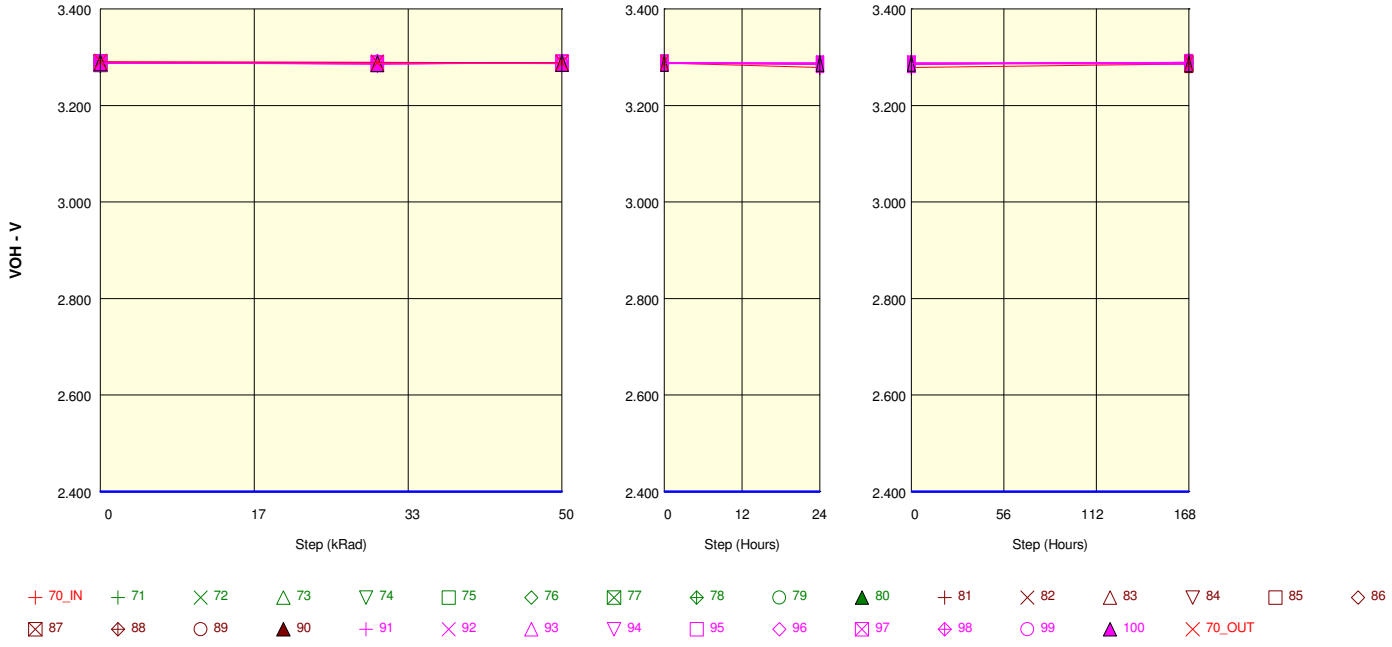
VOHIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.281	3.287	3.287	3.286	3.287
70_OUT_REF	3.289	3.288	3.289		3.288
HDC samples					
81	3.285				3.286
82	3.289				3.289
83	3.285				3.288
84	3.289				
85	3.288				3.287
86	3.289				3.287
87	3.289				3.289
88	3.287				3.288
89	3.289				3.289
90	3.287				3.288
Statistics					
Min	3.285	-	-	-	3.286
Max	3.289	-	-	-	3.289
Average	3.288	-	-	-	3.288
Std Deviation	0.002	-	-	-	0.001

Measurements

VOHIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.281	3.287	3.287	3.286	3.287
70_OUT_REF	3.289	3.288	3.289		3.288
OFF samples					
91	3.287	3.288	3.288	3.289	3.288
92	3.289	3.287	3.288	3.286	3.288
93	3.286	3.289	3.286	3.287	3.287
94	3.287	3.286	3.288	3.288	3.289
95	3.289	3.286	3.288	3.288	3.288
96	3.289	3.288	3.290	3.290	3.289
97	3.288	3.289	3.287	3.288	3.289
98	3.289	3.289	3.289	3.287	3.288
99	3.288	3.289	3.288	3.288	3.288
100	3.289	3.289	3.286	3.287	3.288
Statistics					
Min	3.286	3.286	3.286	3.286	3.287
Max	3.289	3.289	3.290	3.290	3.289
Average	3.288	3.288	3.288	3.288	3.288
Std Deviation	0.001	0.001	0.001	0.001	0.001

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output High Voltage : VOHIO[2]
Test conditions : IOH=-400uA Vcc = 3.3V
Unit : V
Spec Limit Min : 2.400
Spec limits are represented in bold lines on the graphic.



Measurements

VOHIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.290	3.288	3.288	3.279	3.286
70_OUT_REF	3.291	3.289	3.289		3.287
LDC samples					
71	3.290				3.287
72	3.286				3.286
73	3.290				3.286
74	3.289				3.288
75	3.289				3.287
76	3.287				3.285
77	3.287				3.285
78	3.288				3.288
79	3.286				3.286
80	3.287				3.287
Statistics					
Min	3.286	-	-	-	3.285
Max	3.290	-	-	-	3.288
Average	3.288	-	-	-	3.287
Std Deviation	0.001	-	-	-	0.001

Measurements

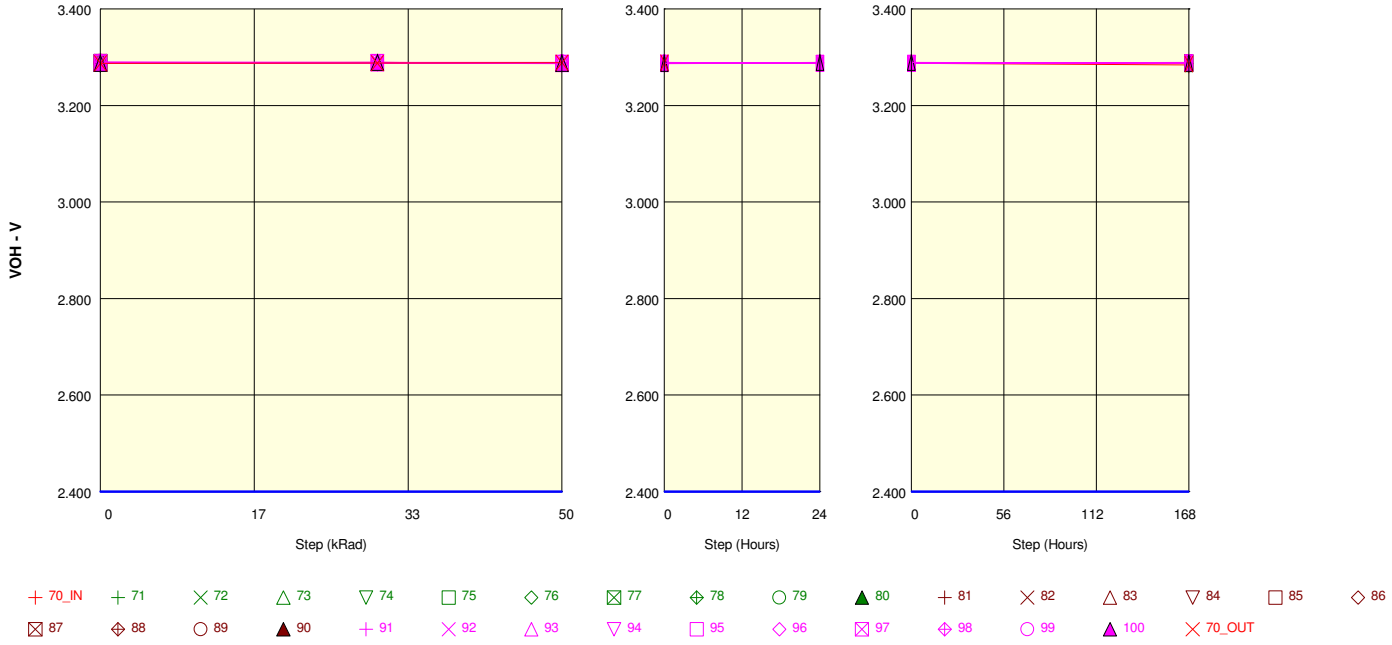
VOHIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.290	3.288	3.288	3.279	3.286
70_OUT_REF	3.291	3.289	3.289		3.287
HDC samples					
81	3.287				3.287
82	3.289				3.287
83	3.287				3.284
84	3.288				
85	3.288				3.286
86	3.285				3.288
87	3.288				3.288
88	3.285				3.286
89	3.290				3.290
90	3.287				3.287
Statistics					
Min	3.285	-	-	-	3.284
Max	3.290	-	-	-	3.290
Average	3.287	-	-	-	3.287
Std Deviation	0.001	-	-	-	0.001

Measurements

VOHIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.290	3.288	3.288	3.279	3.286
70_OUT_REF	3.291	3.289	3.289		3.287
OFF samples					
91	3.287	3.288	3.289	3.288	3.286
92	3.288	3.289	3.288	3.287	3.286
93	3.289	3.288	3.287	3.287	3.289
94	3.289	3.286	3.288	3.286	3.289
95	3.288	3.286	3.289	3.286	3.289
96	3.289	3.285	3.289	3.286	3.289
97	3.288	3.287	3.287	3.285	3.290
98	3.290	3.290	3.288	3.288	3.289
99	3.288	3.288	3.286	3.287	3.288
100	3.288	3.286	3.287	3.287	3.286
Statistics					
Min	3.287	3.285	3.286	3.285	3.286
Max	3.290	3.290	3.289	3.288	3.290
Average	3.288	3.287	3.288	3.286	3.288
Std Deviation	0.001	0.001	0.001	0.001	0.001

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output High Voltage : VOHIO[3]
Test conditions : IOH=-400uA Vcc = 3.3V
Unit : V
Spec Limit Min : 2.400
Spec limits are represented in bold lines on the graphic.



Measurements

VOHIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.289	3.289	3.288	3.287	3.284
70_OUT_REF	3.287	3.288	3.289		3.286
LDC samples					
71	3.284				3.288
72	3.286				3.287
73	3.290				3.288
74	3.289				3.287
75	3.287				3.289
76	3.287				3.287
77	3.289				3.286
78	3.288				3.287
79	3.288				3.289
80	3.287				3.288
Statistics					
Min	3.284	-	-	-	3.286
Max	3.290	-	-	-	3.289
Average	3.287	-	-	-	3.288
Std Deviation	0.002	-	-	-	0.001

Measurements

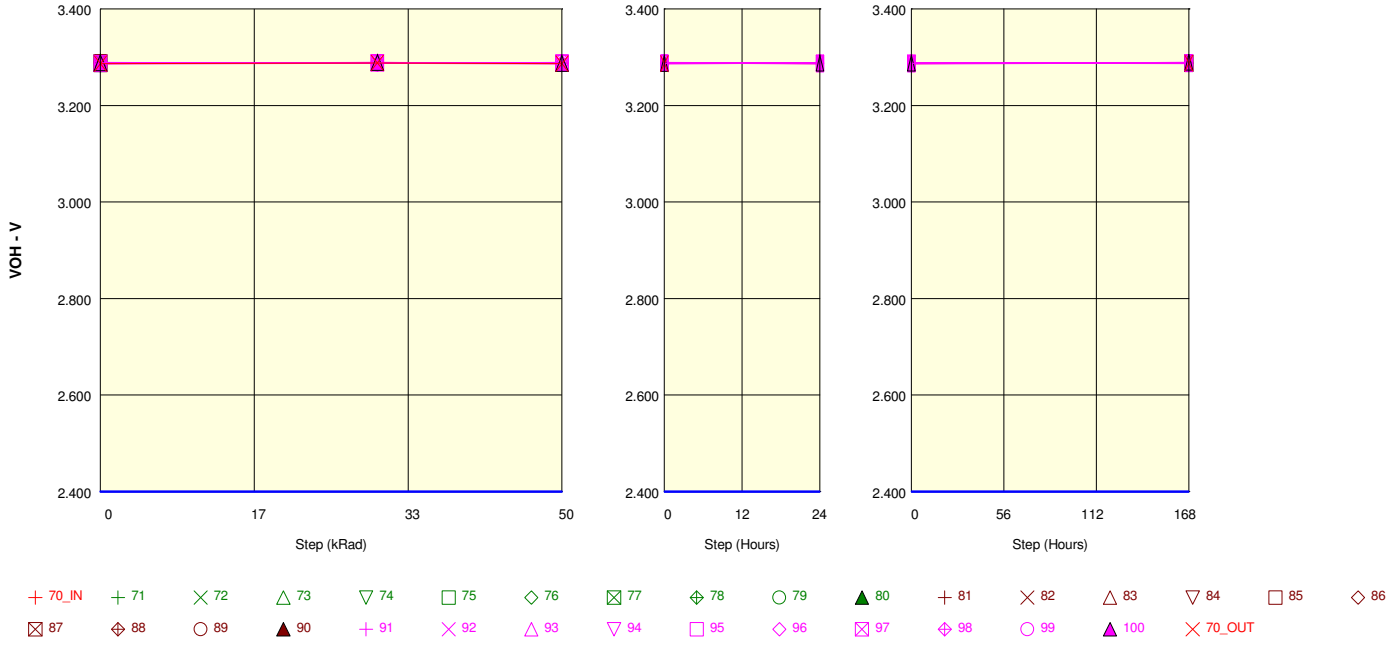
VOHIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.289	3.289	3.288	3.287	3.284
70_OUT_REF	3.287	3.288	3.289		3.286
HDC samples					
81	3.290				3.287
82	3.290				3.289
83	3.288				3.287
84	3.288				
85	3.289				3.289
86	3.289				3.287
87	3.288				3.289
88	3.289				3.287
89	3.289				3.287
90	3.289				3.288
Statistics					
Min	3.288	-	-	-	3.287
Max	3.290	-	-	-	3.289
Average	3.289	-	-	-	3.288
Std Deviation	0.001	-	-	-	0.001

Measurements

VOHIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.289	3.289	3.288	3.287	3.284
70_OUT_REF	3.287	3.288	3.289		3.286
OFF samples					
91	3.289	3.288	3.289	3.289	3.289
92	3.289	3.289	3.287	3.287	3.288
93	3.288	3.288	3.286	3.288	3.287
94	3.288	3.289	3.287	3.287	3.288
95	3.287	3.289	3.287	3.287	3.287
96	3.288	3.289	3.288	3.288	3.288
97	3.289	3.289	3.287	3.287	3.288
98	3.288	3.289	3.288	3.289	3.288
99	3.290	3.289	3.289	3.287	3.289
100	3.287	3.289	3.287	3.289	3.287
Statistics					
Min	3.287	3.288	3.286	3.287	3.287
Max	3.290	3.289	3.289	3.289	3.289
Average	3.288	3.289	3.288	3.288	3.288
Std Deviation	0.001	0.000	0.001	0.001	0.001

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output High Voltage : VOHIO[4]
Test conditions : IOH=-400uA Vcc = 3.3V
Unit : V
Spec Limit Min : 2.400
Spec limits are represented in bold lines on the graphic.



Measurements

VOHIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.287	3.289	3.288	3.287	3.289
70_OUT_REF	3.287	3.288	3.287		3.288
LDC samples					
71	3.289				3.288
72	3.288				3.288
73	3.289				3.288
74	3.288				3.289
75	3.287				3.288
76	3.286				3.287
77	3.287				3.288
78	3.288				3.288
79	3.286				3.287
80	3.287				3.287
Statistics					
Min	3.286	-	-	-	3.287
Max	3.289	-	-	-	3.289
Average	3.287	-	-	-	3.288
Std Deviation	0.001	-	-	-	0.001

Measurements

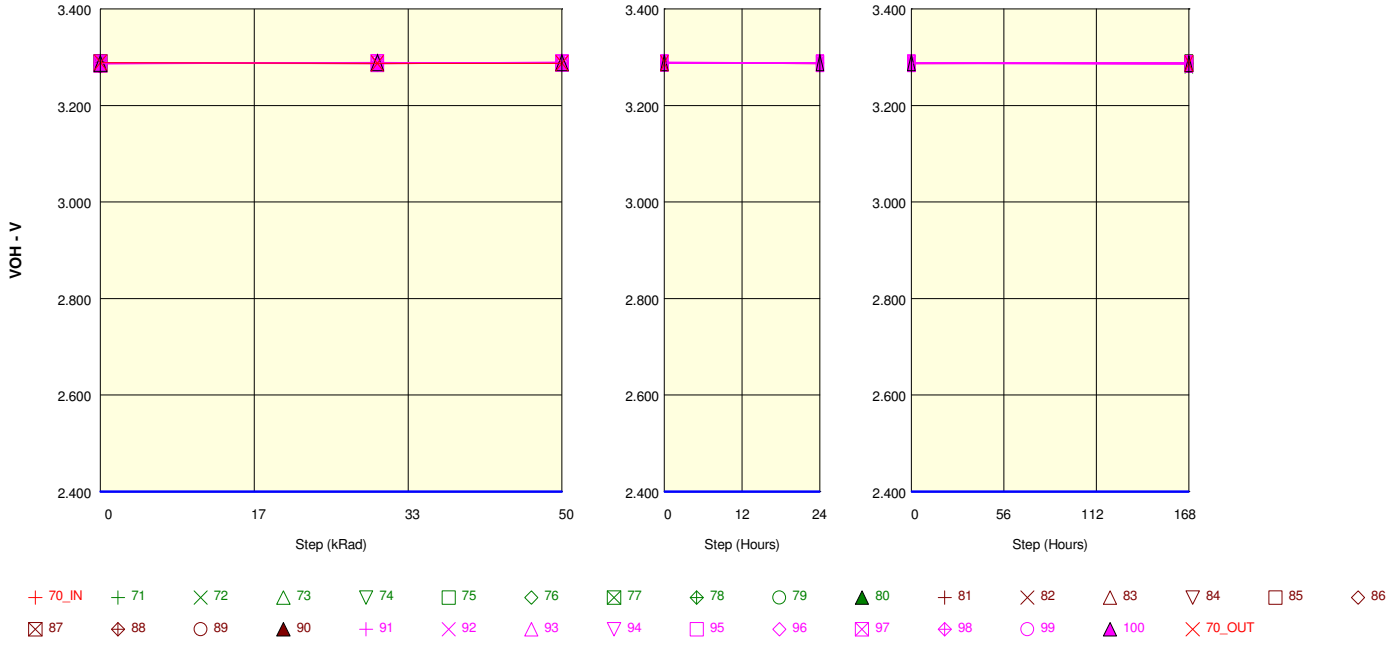
VOHIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.287	3.289	3.288	3.287	3.289
70_OUT_REF	3.287	3.288	3.287		3.288
HDC samples					
81	3.289				3.286
82	3.289				3.287
83	3.288				3.288
84	3.288				
85	3.288				3.289
86	3.289				3.288
87	3.288				3.287
88	3.288				3.289
89	3.289				3.289
90	3.287				3.287
Statistics					
Min	3.287	-	-	-	3.286
Max	3.289	-	-	-	3.289
Average	3.288	-	-	-	3.288
Std Deviation	0.001	-	-	-	0.001

Measurements

VOHIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.287	3.289	3.288	3.287	3.289
70_OUT_REF	3.287	3.288	3.287		3.288
OFF samples					
91	3.287	3.287	3.288	3.288	3.288
92	3.289	3.287	3.286	3.288	3.288
93	3.287	3.288	3.288	3.288	3.286
94	3.287	3.288	3.287	3.287	3.289
95	3.286	3.289	3.288	3.286	3.288
96	3.288	3.288	3.287	3.288	3.289
97	3.287	3.287	3.288	3.288	3.288
98	3.288	3.289	3.287	3.288	3.288
99	3.286	3.287	3.289	3.288	3.288
100	3.289	3.289	3.287	3.287	3.290
Statistics					
Min	3.286	3.287	3.286	3.286	3.286
Max	3.289	3.289	3.289	3.288	3.290
Average	3.287	3.288	3.287	3.288	3.288
Std Deviation	0.001	0.001	0.001	0.001	0.001

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output High Voltage : VOHIO[5]
Test conditions : IOH=-400uA Vcc = 3.3V
Unit : V
Spec Limit Min : 2.400
Spec limits are represented in bold lines on the graphic.



Measurements

VOHIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.288	3.286	3.288	3.286	3.288
70_OUT_REF	3.289	3.287	3.287		3.287
LDC samples					
71	3.287				3.285
72	3.286				3.283
73	3.287				3.286
74	3.289				3.288
75	3.287				3.288
76	3.288				3.288
77	3.288				3.286
78	3.288				3.288
79	3.285				3.287
80	3.286				3.287
Statistics					
Min	3.285	-	-	-	3.283
Max	3.289	-	-	-	3.288
Average	3.287	-	-	-	3.286
Std Deviation	0.001	-	-	-	0.002

Measurements

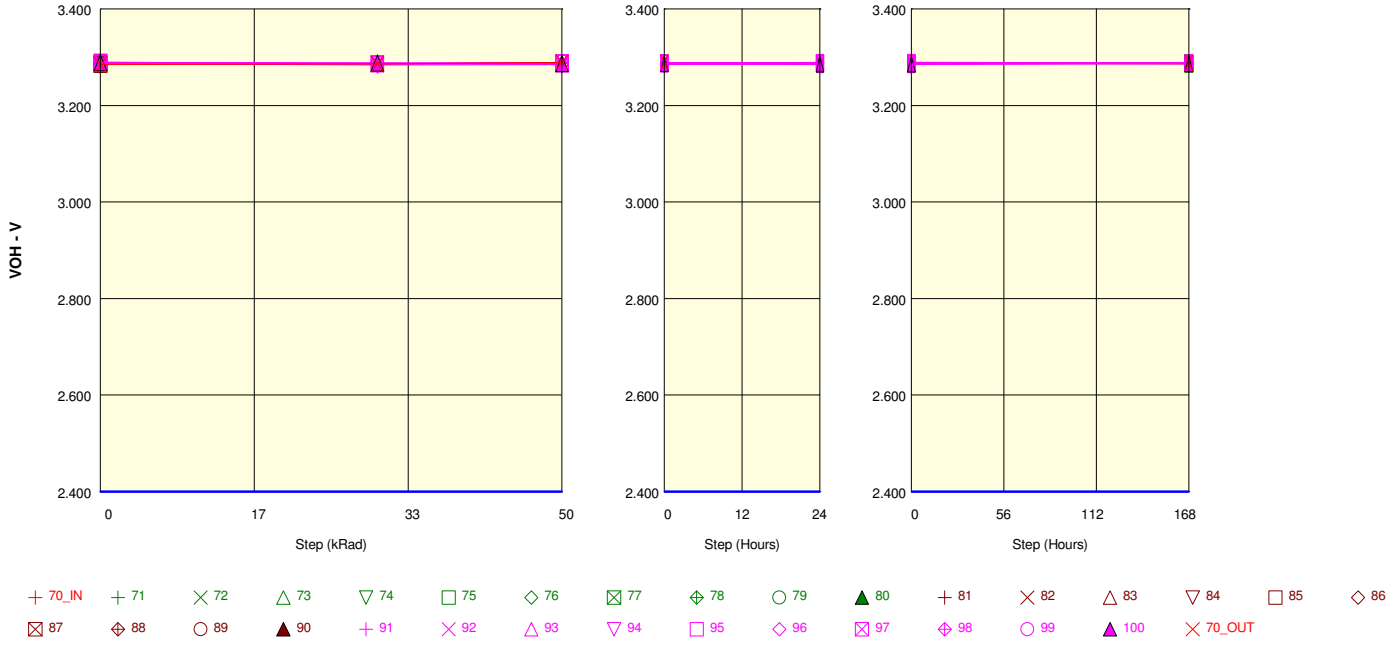
VOHIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.288	3.286	3.288	3.286	3.288
70_OUT_REF	3.289	3.287	3.287		3.287
HDC samples					
81	3.288				3.287
82	3.288				3.287
83	3.286				3.288
84	3.288				
85	3.287				3.287
86	3.284				3.286
87	3.288				3.287
88	3.287				3.288
89	3.288				3.286
90	3.289				3.287
Statistics					
Min	3.284	-	-	-	3.286
Max	3.289	-	-	-	3.288
Average	3.287	-	-	-	3.287
Std Deviation	0.001	-	-	-	0.001

Measurements

VOHIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.288	3.286	3.288	3.286	3.288
70_OUT_REF	3.289	3.287	3.287		3.287
OFF samples					
91	3.287	3.289	3.287	3.288	3.287
92	3.287	3.287	3.288	3.286	3.288
93	3.287	3.289	3.288	3.286	3.285
94	3.288	3.288	3.288	3.288	3.287
95	3.288	3.287	3.288	3.287	3.286
96	3.288	3.287	3.290	3.288	3.287
97	3.286	3.289	3.288	3.287	3.286
98	3.287	3.287	3.288	3.289	3.289
99	3.287	3.287	3.287	3.287	3.288
100	3.287	3.289	3.288	3.288	3.286
Statistics					
Min	3.286	3.287	3.287	3.286	3.285
Max	3.288	3.289	3.290	3.289	3.289
Average	3.287	3.288	3.288	3.287	3.287
Std Deviation	0.001	0.001	0.001	0.001	0.001

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output High Voltage : VOHIO[6]
Test conditions : IOH=-400uA Vcc = 3.3V
Unit : V
Spec Limit Min : 2.400
Spec limits are represented in bold lines on the graphic.



Measurements

VOHIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.287	3.287	3.287	3.287	3.286
70_OUT_REF	3.285	3.286	3.289		3.288
LDC samples					
71	3.287				3.285
72	3.286				3.289
73	3.289				3.287
74	3.288				3.286
75	3.286				3.289
76	3.289				3.285
77	3.286				3.285
78	3.288				3.288
79	3.287				3.287
80	3.288				3.287
Statistics					
Min	3.286	-	-	-	3.285
Max	3.289	-	-	-	3.289
Average	3.287	-	-	-	3.287
Std Deviation	0.001	-	-	-	0.001

Measurements

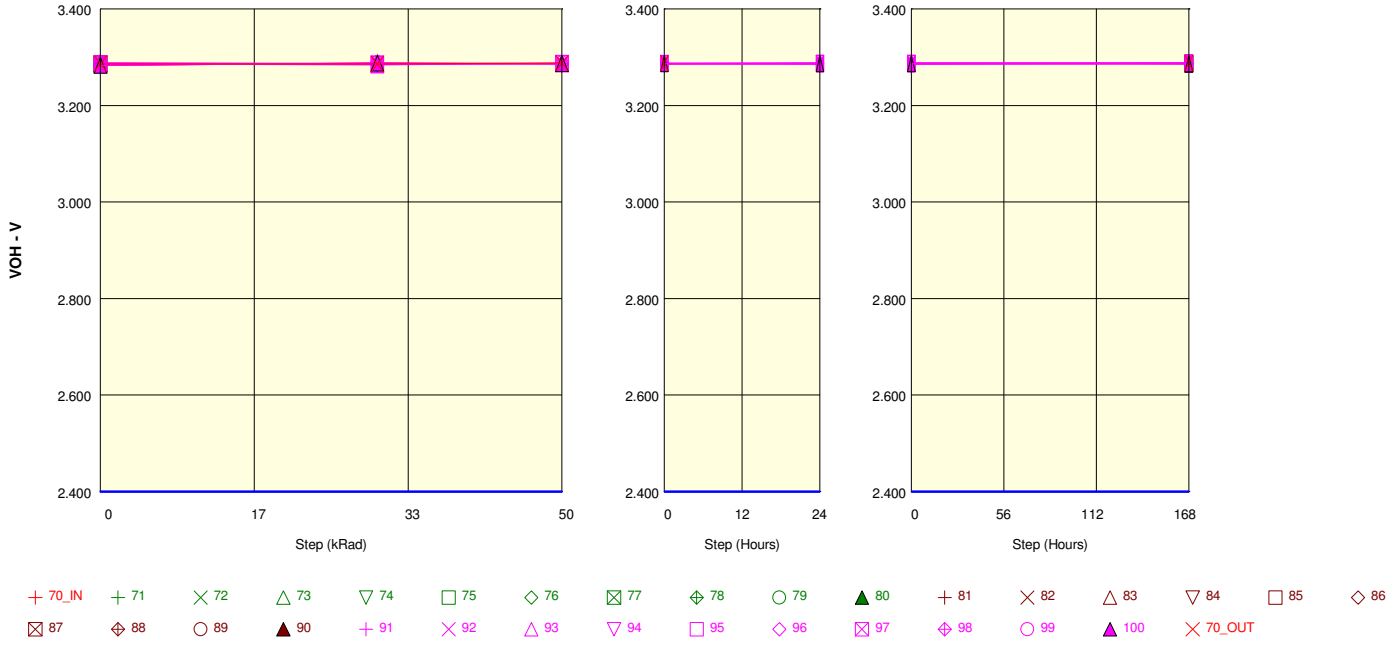
VOHIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.287	3.287	3.287	3.287	3.286
70_OUT_REF	3.285	3.286	3.289		3.288
HDC samples					
81	3.285				3.287
82	3.286				3.289
83	3.285				3.288
84	3.284				
85	3.285				3.288
86	3.287				3.285
87	3.289				3.287
88	3.287				3.289
89	3.288				3.289
90	3.289				3.287
Statistics					
Min	3.284	-	-	-	3.285
Max	3.289	-	-	-	3.289
Average	3.286	-	-	-	3.287
Std Deviation	0.002	-	-	-	0.001

Measurements

VOHIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.287	3.287	3.287	3.287	3.286
70_OUT_REF	3.285	3.286	3.289		3.288
OFF samples					
91	3.289	3.288	3.289	3.286	3.287
92	3.289	3.285	3.287	3.288	3.289
93	3.287	3.287	3.286	3.285	3.288
94	3.290	3.286	3.289	3.288	3.287
95	3.289	3.286	3.288	3.289	3.289
96	3.287	3.284	3.285	3.287	3.289
97	3.288	3.286	3.288	3.287	3.287
98	3.288	3.288	3.287	3.289	3.289
99	3.289	3.288	3.289	3.289	3.287
100	3.289	3.288	3.286	3.286	3.287
Statistics					
Min	3.287	3.284	3.285	3.285	3.287
Max	3.290	3.288	3.289	3.289	3.289
Average	3.288	3.287	3.287	3.287	3.288
Std Deviation	0.001	0.001	0.001	0.002	0.001

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output High Voltage : VOHIO[7]
Test conditions : IOH=-400uA Vcc = 3.3V
Unit : V
Spec Limit Min : 2.400
Spec limits are represented in bold lines on the graphic.



Measurements

VOHIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.283	3.288	3.286	3.287	3.286
70_OUT_REF	3.286	3.286	3.288		3.288
LDC samples					
71	3.286				3.287
72	3.283				3.288
73	3.285				3.286
74	3.285				3.285
75	3.286				3.288
76	3.286				3.287
77	3.286				3.288
78	3.287				3.287
79	3.283				3.286
80	3.287				3.286
Statistics					
Min	3.283	-	-	-	3.285
Max	3.287	-	-	-	3.288
Average	3.285	-	-	-	3.287
Std Deviation	0.001	-	-	-	0.001

Measurements

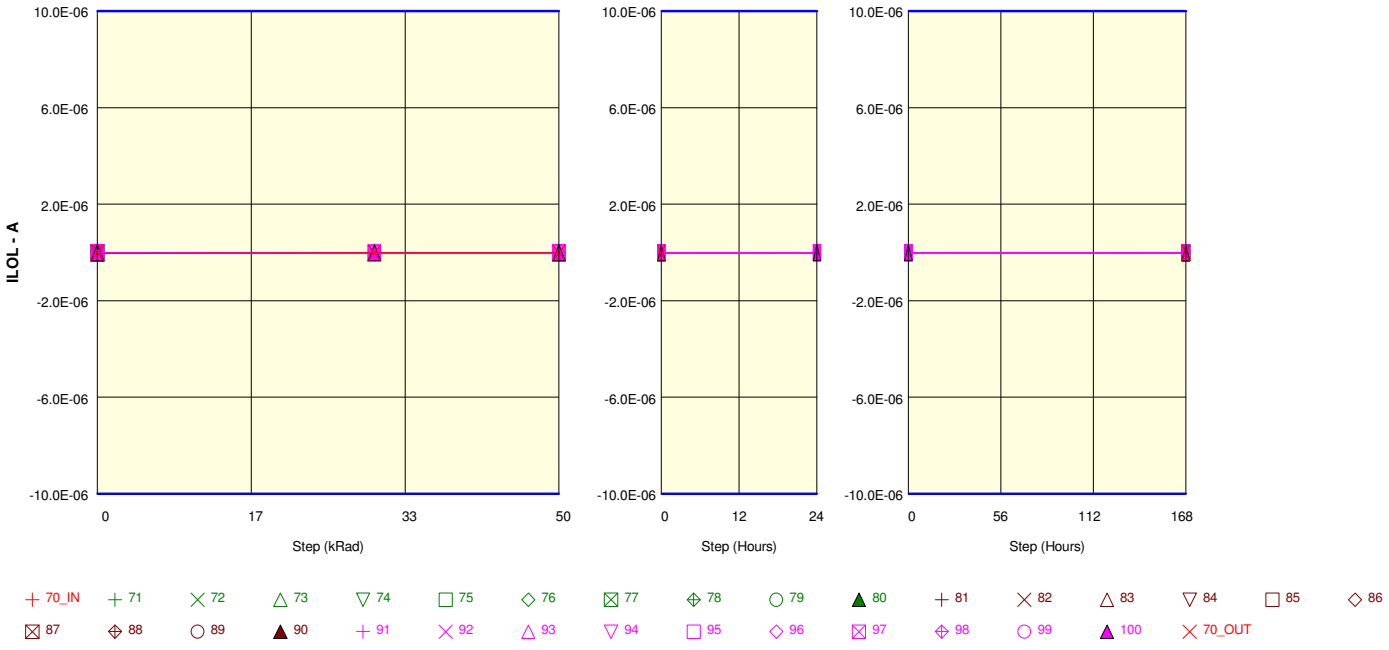
VOHIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.283	3.288	3.286	3.287	3.286
70_OUT_REF	3.286	3.286	3.288		3.288
HDC samples					
81	3.286				3.287
82	3.285				3.289
83	3.286				3.285
84	3.285				
85	3.287				3.287
86	3.286				3.287
87	3.286				3.287
88	3.284				3.286
89	3.287				3.287
90	3.287				3.285
Statistics					
Min	3.284	-	-	-	3.285
Max	3.287	-	-	-	3.289
Average	3.286	-	-	-	3.287
Std Deviation	0.001	-	-	-	0.001

Measurements

VOHIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.283	3.288	3.286	3.287	3.286
70_OUT_REF	3.286	3.286	3.288		3.288
OFF samples					
91	3.284	3.287	3.286	3.287	3.287
92	3.287	3.287	3.287	3.287	3.288
93	3.289	3.286	3.286	3.286	3.286
94	3.286	3.286	3.287	3.288	3.289
95	3.286	3.284	3.287	3.288	3.288
96	3.287	3.287	3.286	3.286	3.288
97	3.287	3.285	3.287	3.288	3.287
98	3.286	3.287	3.286	3.287	3.287
99	3.286	3.287	3.287	3.285	3.287
100	3.283	3.288	3.287	3.287	3.286
Statistics					
Min	3.283	3.284	3.286	3.285	3.286
Max	3.289	3.288	3.287	3.288	3.289
Average	3.286	3.286	3.287	3.287	3.287
Std Deviation	0.002	0.001	0.000	0.001	0.001

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Leakage Current Low : ILOLIO[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

ILOLIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-17.4E-09	-19.7E-09	-12.0E-09	-9.0E-09	-25.0E-09
70_OUT_REF	-29.6E-09	-12.8E-09	-13.6E-09		-20.4E-09
LDC samples					
71	-5.9E-09				-10.5E-09
72	-17.4E-09				-15.1E-09
73	-23.5E-09				-9.7E-09
74	-25.0E-09				-16.6E-09
75	-14.3E-09				-15.8E-09
76	-22.0E-09				-11.3E-09
77	-17.4E-09				-5.2E-09
78	-13.6E-09				-21.2E-09
79	-19.7E-09				-18.9E-09
80	-15.1E-09				-2.1E-09
Statistics					
Min	-25.0E-09	-	-	-	-21.2E-09
Max	-5.9E-09	-	-	-	-2.1E-09
Average	-17.4E-09	-	-	-	-12.6E-09
Std Deviation	5.3E-09	-	-	-	5.7E-09

Measurements

ILOLIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-17.4E-09	-19.7E-09	-12.0E-09	-9.0E-09	-25.0E-09
70_OUT_REF	-29.6E-09	-12.8E-09	-13.6E-09		-20.4E-09
HDC samples					
81	-22.7E-09				-15.8E-09
82	-13.6E-09				-22.0E-09
83	-15.8E-09				-21.2E-09
84	-20.4E-09				
85	-21.2E-09				-22.0E-09
86	-12.0E-09				-13.6E-09
87	-2.1E-09				-22.0E-09
88	-15.1E-09				-15.8E-09
89	-21.2E-09				-10.5E-09
90	-5.2E-09				-10.5E-09
Statistics					
Min	-22.7E-09	-	-	-	-22.0E-09
Max	-2.1E-09	-	-	-	-10.5E-09

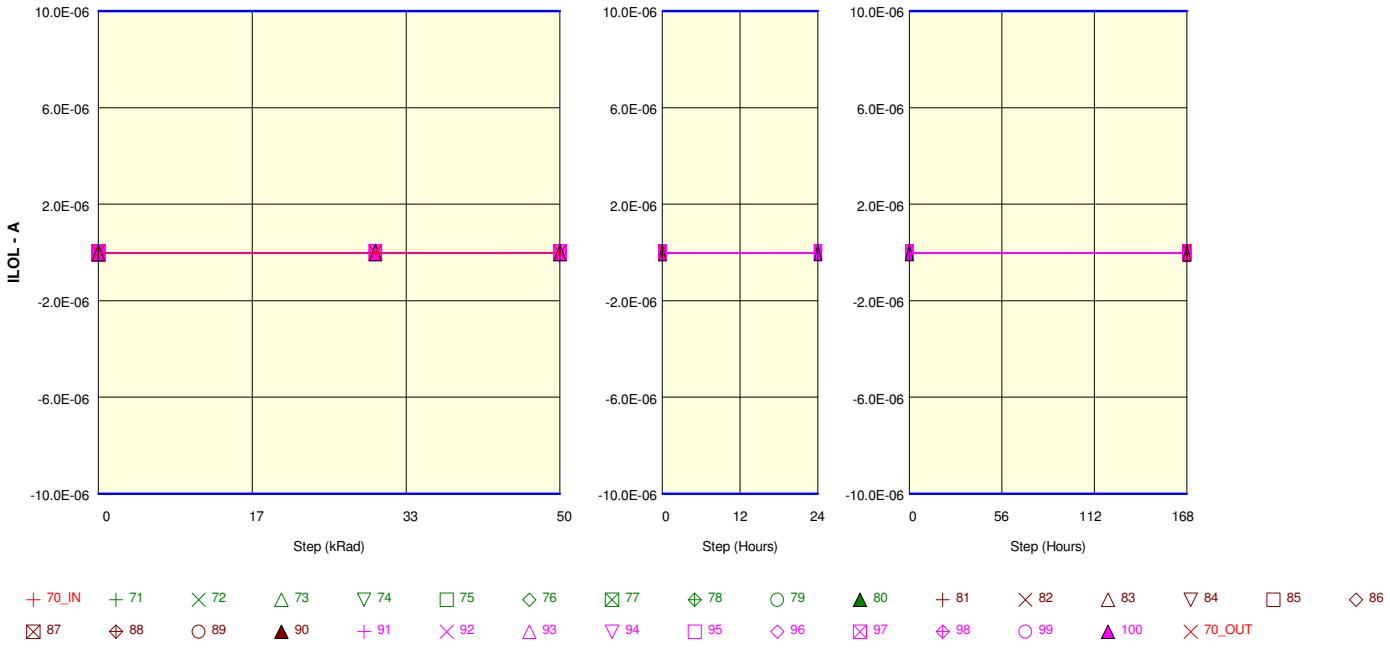
ILOLIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-14.9E-09	-	-	-	-17.0E-09
Std Deviation	6.6E-09	-	-	-	4.6E-09

Measurements

ILOLIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-17.4E-09	-19.7E-09	-12.0E-09	-9.0E-09	-25.0E-09
70_OUT_REF	-29.6E-09	-12.8E-09	-13.6E-09		-20.4E-09
OFF samples					
91	-17.4E-09	-20.4E-09	-14.3E-09	-9.7E-09	-15.8E-09
92	-16.6E-09	-25.0E-09	-16.6E-09	-5.9E-09	-589.6E-12
93	-4.4E-09	-5.2E-09	-18.1E-09	-17.4E-09	-14.3E-09
94	-11.3E-09	-24.2E-09	-12.8E-09	-19.7E-09	-12.0E-09
95	-12.0E-09	-25.8E-09	-9.7E-09	-9.0E-09	-16.6E-09
96	-24.2E-09	-18.1E-09	-21.2E-09	-1.4E-09	-18.9E-09
97	-12.8E-09	-22.0E-09	-29.6E-09	-11.3E-09	-9.7E-09
98	-20.4E-09	-8.2E-09	-13.6E-09	-6.7E-09	-17.4E-09
99	-6.7E-09	-21.2E-09	-11.3E-09	-11.3E-09	-17.4E-09
100	-10.5E-09	-15.1E-09	-18.1E-09	-18.1E-09	-19.7E-09
Statistics					
Min	-24.2E-09	-25.8E-09	-29.6E-09	-19.7E-09	-19.7E-09
Max	-4.4E-09	-5.2E-09	-9.7E-09	-1.4E-09	-589.6E-12
Average	-13.6E-09	-18.5E-09	-16.5E-09	-11.0E-09	-14.2E-09
Std Deviation	5.8E-09	6.7E-09	5.5E-09	5.6E-09	5.4E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Leakage Current Low : ILOLIO[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

ILOLIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-22.7E-09	-15.1E-09	-18.1E-09	-19.7E-09	-14.3E-09
70_OUT_REF	-7.5E-09	-13.6E-09	-8.2E-09		-5.9E-09
LDC samples					
71	-7.5E-09				-25.8E-09
72	-22.0E-09				-9.7E-09
73	-19.7E-09				5.5E-09
74	-15.8E-09				-12.0E-09
75	-12.0E-09				-9.7E-09
76	-25.8E-09				-6.7E-09
77	-14.3E-09				-9.7E-09
78	-13.6E-09				-15.1E-09
79	-12.0E-09				-15.1E-09
80	-13.6E-09				-14.3E-09
Statistics					
Min	-25.8E-09	-	-	-	-25.8E-09
Max	-7.5E-09	-	-	-	5.5E-09
Average	-15.6E-09	-	-	-	-11.3E-09
Std Deviation	5.1E-09	-	-	-	7.5E-09

Measurements

ILOLIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-22.7E-09	-15.1E-09	-18.1E-09	-19.7E-09	-14.3E-09
70_OUT_REF	-7.5E-09	-13.6E-09	-8.2E-09		-5.9E-09
HDC samples					
81	-12.8E-09				-19.7E-09
82	-12.0E-09				-10.5E-09
83	-16.6E-09				-16.6E-09
84	-15.8E-09				
85	-9.0E-09				-10.5E-09
86	-14.3E-09				-14.3E-09
87	-10.5E-09				-5.2E-09
88	-17.4E-09				-9.0E-09
89	-9.7E-09				-6.7E-09
90	-6.7E-09				-16.6E-09
Statistics					
Min	-17.4E-09	-	-	-	-19.7E-09
Max	-6.7E-09	-	-	-	-5.2E-09

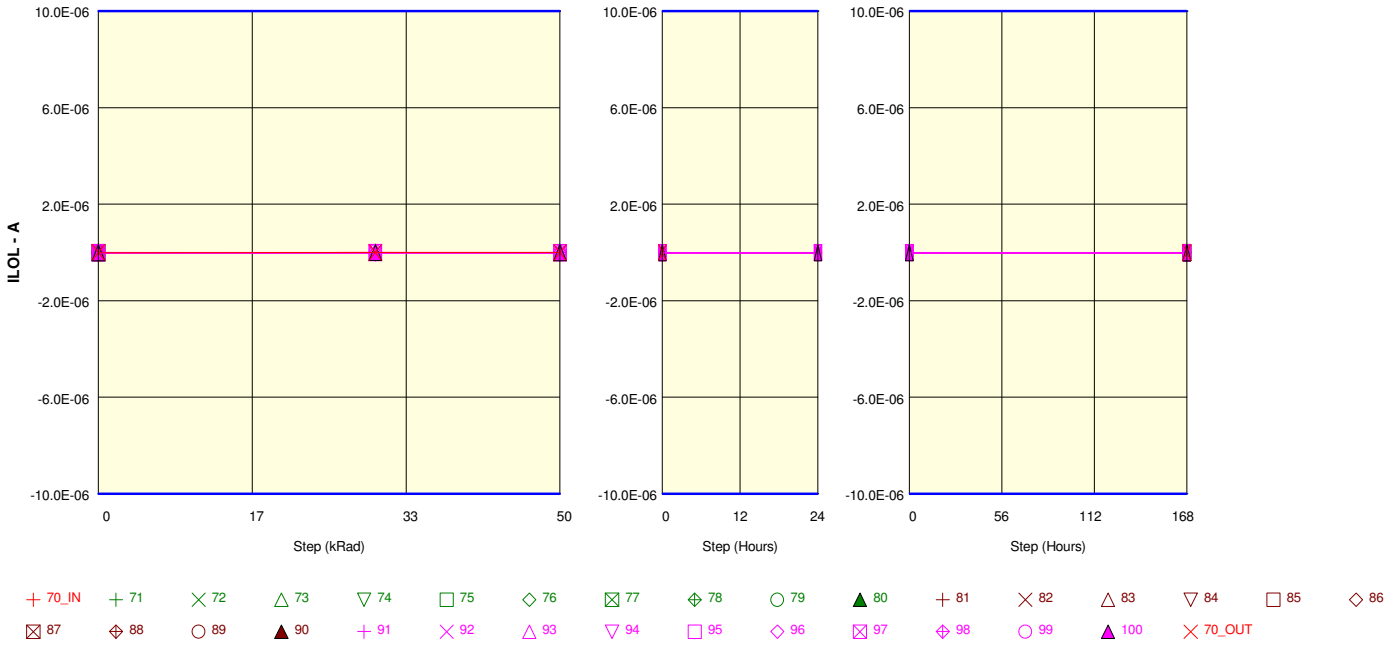
ILOLIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-12.5E-09	-	-	-	-12.1E-09
Std Deviation	3.4E-09	-	-	-	4.7E-09

Measurements

ILOLIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-22.7E-09	-15.1E-09	-18.1E-09	-19.7E-09	-14.3E-09
70_OUT_REF	-7.5E-09	-13.6E-09	-8.2E-09		-5.9E-09
OFF samples					
91	-10.5E-09	-15.1E-09	-4.4E-09	-15.1E-09	-15.1E-09
92	-9.0E-09	-25.0E-09	-18.1E-09	-9.0E-09	-4.4E-09
93	-14.3E-09	-15.8E-09	-8.2E-09	-10.5E-09	-15.1E-09
94	-15.8E-09	-4.4E-09	-13.6E-09	-8.2E-09	-12.8E-09
95	-29.6E-09	-20.4E-09	-9.7E-09	-4.4E-09	-11.3E-09
96	-5.9E-09	-12.8E-09	-22.0E-09	-16.6E-09	-10.5E-09
97	-4.4E-09	-13.6E-09	-8.2E-09	-12.8E-09	-1.4E-09
98	-8.2E-09	-5.2E-09	-12.0E-09	-8.2E-09	-15.1E-09
99	-4.4E-09	-21.2E-09	-10.5E-09	-8.2E-09	-21.2E-09
100	-19.7E-09	-8.2E-09	-11.3E-09	-9.0E-09	-27.3E-09
Statistics					
Min	-29.6E-09	-25.0E-09	-22.0E-09	-16.6E-09	-27.3E-09
Max	-4.4E-09	-4.4E-09	-4.4E-09	-4.4E-09	-1.4E-09
Average	-12.2E-09	-14.2E-09	-11.8E-09	-10.2E-09	-13.4E-09
Std Deviation	7.5E-09	6.5E-09	4.8E-09	3.5E-09	7.1E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Leakage Current Low : ILOLIO[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

ILOLIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-5.2E-09	-11.3E-09	-9.7E-09	-18.1E-09	-8.2E-09
70_OUT_REF	-4.4E-09	173.3E-12	173.3E-12		-5.2E-09
LDC samples					
71	-24.2E-09				-12.0E-09
72	-9.0E-09				-589.6E-12
73	-3.6E-09				-12.8E-09
74	-9.7E-09				-7.5E-09
75	-8.2E-09				-8.2E-09
76	-12.8E-09				-9.7E-09
77	-8.2E-09				-1.4E-09
78	-20.4E-09				-18.9E-09
79	-14.3E-09				-9.7E-09
80	-7.5E-09				-19.7E-09
Statistics					
Min	-24.2E-09	-	-	-	-19.7E-09
Max	-3.6E-09	-	-	-	-589.6E-12
Average	-11.8E-09	-	-	-	-10.1E-09
Std Deviation	6.0E-09	-	-	-	6.0E-09

Measurements

ILOLIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-5.2E-09	-11.3E-09	-9.7E-09	-18.1E-09	-8.2E-09
70_OUT_REF	-4.4E-09	173.3E-12	173.3E-12		-5.2E-09
HDC samples					
81	-11.3E-09				-15.8E-09
82	3.2E-09				-12.8E-09
83	-4.4E-09				-17.4E-09
84	-15.1E-09				
85	-10.5E-09				-3.6E-09
86	-10.5E-09				-13.6E-09
87	-589.6E-12				-14.3E-09
88	-13.6E-09				-15.8E-09
89	-15.8E-09				-2.9E-09
90	-20.4E-09				-10.5E-09
Statistics					
Min	-20.4E-09	-	-	-	-17.4E-09
Max	3.2E-09	-	-	-	-2.9E-09

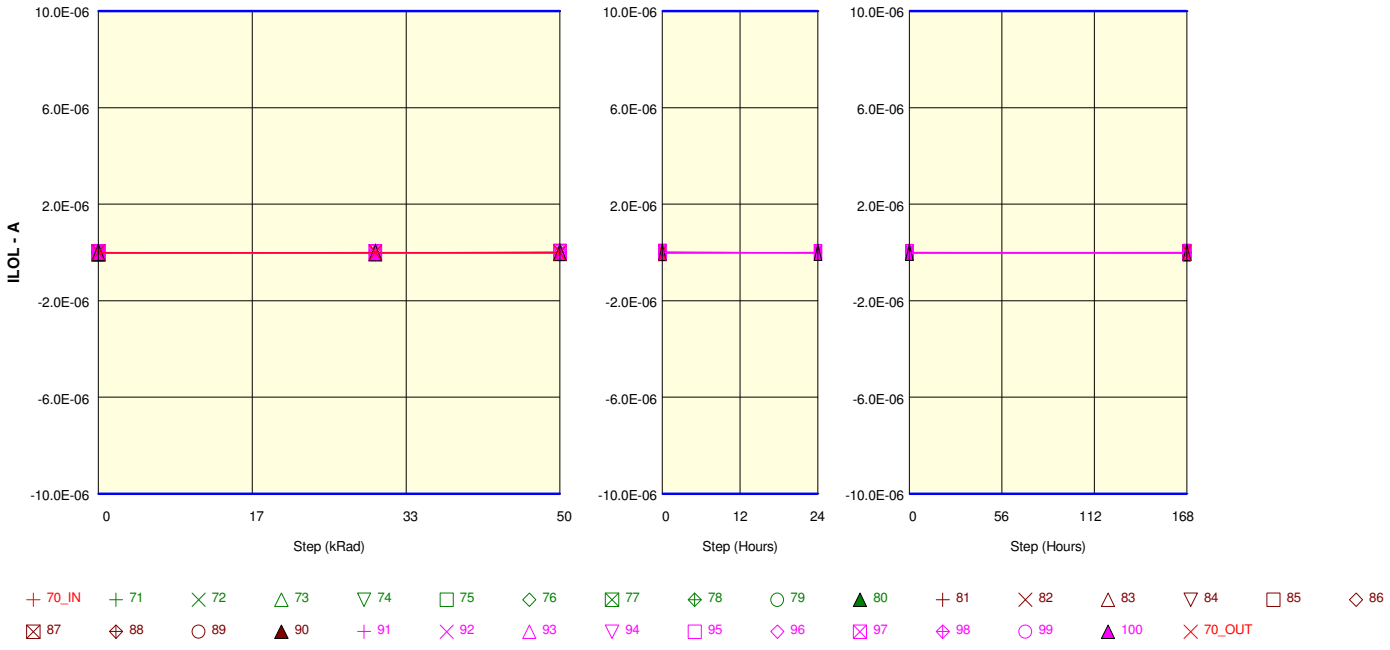
ILOLIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-9.9E-09	-	-	-	-11.9E-09
Std Deviation	6.9E-09	-	-	-	5.0E-09

Measurements

ILOLIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-5.2E-09	-11.3E-09	-9.7E-09	-18.1E-09	-8.2E-09
70_OUT_REF	-4.4E-09	173.3E-12	173.3E-12		-5.2E-09
OFF samples					
91	-3.6E-09	-9.7E-09	1.7E-09	-23.5E-09	-16.6E-09
92	-9.0E-09	-2.1E-09	-8.2E-09	-16.6E-09	-11.3E-09
93	-12.0E-09	-15.1E-09	-12.0E-09	-4.4E-09	-5.9E-09
94	-16.6E-09	-7.5E-09	-12.8E-09	-5.9E-09	-8.2E-09
95	-9.7E-09	-5.2E-09	-9.7E-09	-12.8E-09	-10.5E-09
96	3.2E-09	-9.0E-09	-13.6E-09	-8.2E-09	-12.8E-09
97	936.3E-12	-2.9E-09	2.5E-09	-5.2E-09	-13.6E-09
98	-10.5E-09	-15.1E-09	-15.8E-09	-15.8E-09	-17.4E-09
99	-4.4E-09	-1.4E-09	-17.4E-09	-2.9E-09	-13.6E-09
100	-13.6E-09	-8.2E-09	-9.7E-09	-17.4E-09	-12.0E-09
Statistics					
Min	-16.6E-09	-15.1E-09	-17.4E-09	-23.5E-09	-17.4E-09
Max	3.2E-09	-1.4E-09	2.5E-09	-2.9E-09	-5.9E-09
Average	-7.5E-09	-7.6E-09	-9.5E-09	-11.3E-09	-12.2E-09
Std Deviation	6.1E-09	4.7E-09	6.4E-09	6.6E-09	3.3E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Leakage Current Low : ILOLIO[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

ILOLIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-5.9E-09	-7.5E-09	-15.1E-09	2.5E-09	936.3E-12
70_OUT_REF	-6.7E-09	-4.4E-09	-16.6E-09		-16.6E-09
LDC samples					
71	2.5E-09				-12.0E-09
72	-12.8E-09				173.3E-12
73	-15.8E-09				-6.7E-09
74	-8.2E-09				-7.5E-09
75	-15.1E-09				-2.9E-09
76	-5.9E-09				-2.1E-09
77	-9.7E-09				4.0E-09
78	-24.2E-09				-8.2E-09
79	-6.7E-09				-18.1E-09
80	-10.5E-09				-10.5E-09
Statistics					
Min	-24.2E-09	-	-	-	-18.1E-09
Max	2.5E-09	-	-	-	4.0E-09
Average	-10.7E-09	-	-	-	-6.4E-09
Std Deviation	6.7E-09	-	-	-	6.1E-09

Measurements

ILOLIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-5.9E-09	-7.5E-09	-15.1E-09	2.5E-09	936.3E-12
70_OUT_REF	-6.7E-09	-4.4E-09	-16.6E-09		-16.6E-09
HDC samples					
81	-9.7E-09				936.3E-12
82	3.2E-09				-5.2E-09
83	-11.3E-09				-7.5E-09
84	-17.4E-09				
85	-10.5E-09				-2.1E-09
86	936.3E-12				-9.7E-09
87	-6.7E-09				8.6E-09
88	-9.0E-09				-9.0E-09
89	-5.2E-09				-8.2E-09
90	-10.5E-09				-16.6E-09
Statistics					
Min	-17.4E-09	-	-	-	-16.6E-09
Max	3.2E-09	-	-	-	8.6E-09

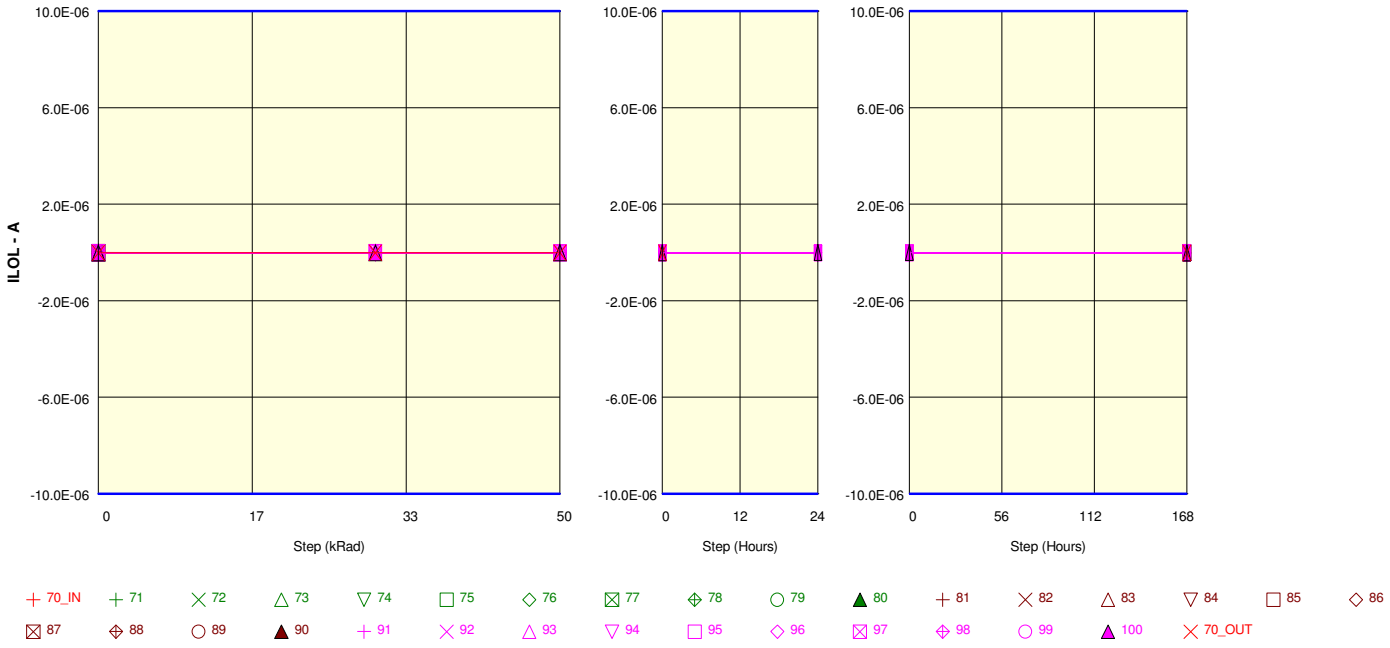
ILOLIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-7.6E-09	-	-	-	-5.4E-09
Std Deviation	5.7E-09	-	-	-	6.8E-09

Measurements

ILOLIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-5.9E-09	-7.5E-09	-15.1E-09	2.5E-09	936.3E-12
70_OUT_REF	-6.7E-09	-4.4E-09	-16.6E-09		-16.6E-09
OFF samples					
91	-15.1E-09	4.0E-09	-2.1E-09	1.7E-09	-15.8E-09
92	-2.1E-09	-8.2E-09	-13.6E-09	3.2E-09	-589.6E-12
93	-4.4E-09	4.0E-09	-9.7E-09	-7.5E-09	-11.3E-09
94	-21.2E-09	-6.7E-09	-10.5E-09	1.7E-09	-16.6E-09
95	-6.7E-09	-11.3E-09	-2.9E-09	-5.9E-09	-2.1E-09
96	-12.0E-09	-10.5E-09	-4.4E-09	-3.6E-09	-18.9E-09
97	-10.5E-09	-11.3E-09	11.6E-09	-4.4E-09	-12.0E-09
98	-4.4E-09	-4.4E-09	-9.0E-09	-11.3E-09	-7.5E-09
99	-10.5E-09	-14.3E-09	6.3E-09	-15.8E-09	-5.9E-09
100	173.3E-12	-11.3E-09	-589.6E-12	-3.6E-09	-5.9E-09
Statistics					
Min	-21.2E-09	-14.3E-09	-13.6E-09	-15.8E-09	-18.9E-09
Max	173.3E-12	4.0E-09	11.6E-09	3.2E-09	-589.6E-12
Average	-8.7E-09	-7.0E-09	-3.5E-09	-4.6E-09	-9.7E-09
Std Deviation	6.1E-09	6.1E-09	7.5E-09	5.7E-09	5.9E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Leakage Current Low : ILOLIO[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

ILOLIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-24.2E-09	-12.0E-09	-9.0E-09	-14.3E-09	-25.0E-09
70_OUT_REF	-15.1E-09	-12.0E-09	-12.0E-09		-18.1E-09
LDC samples					
71	-7.5E-09				-16.6E-09
72	-26.5E-09				-13.6E-09
73	-15.8E-09				-16.6E-09
74	-9.7E-09				-12.8E-09
75	-12.8E-09				-16.6E-09
76	-27.3E-09				-17.4E-09
77	-12.0E-09				-23.5E-09
78	-24.2E-09				-19.7E-09
79	-22.7E-09				-14.3E-09
80	-2.1E-09				-12.8E-09
Statistics					
Min	-27.3E-09	-	-	-	-23.5E-09
Max	-2.1E-09	-	-	-	-12.8E-09
Average	-16.1E-09	-	-	-	-16.4E-09
Std Deviation	8.3E-09	-	-	-	3.2E-09

Measurements

ILOLIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-24.2E-09	-12.0E-09	-9.0E-09	-14.3E-09	-25.0E-09
70_OUT_REF	-15.1E-09	-12.0E-09	-12.0E-09		-18.1E-09
HDC samples					
81	-9.0E-09				-12.0E-09
82	-14.3E-09				-9.7E-09
83	-24.2E-09				-16.6E-09
84	-8.2E-09				
85	-2.9E-09				-17.4E-09
86	-12.0E-09				-11.3E-09
87	-15.1E-09				-24.2E-09
88	-9.0E-09				-23.5E-09
89	-15.1E-09				-3.6E-09
90	-18.1E-09				-22.0E-09
Statistics					
Min	-24.2E-09	-	-	-	-24.2E-09
Max	-2.9E-09	-	-	-	-3.6E-09

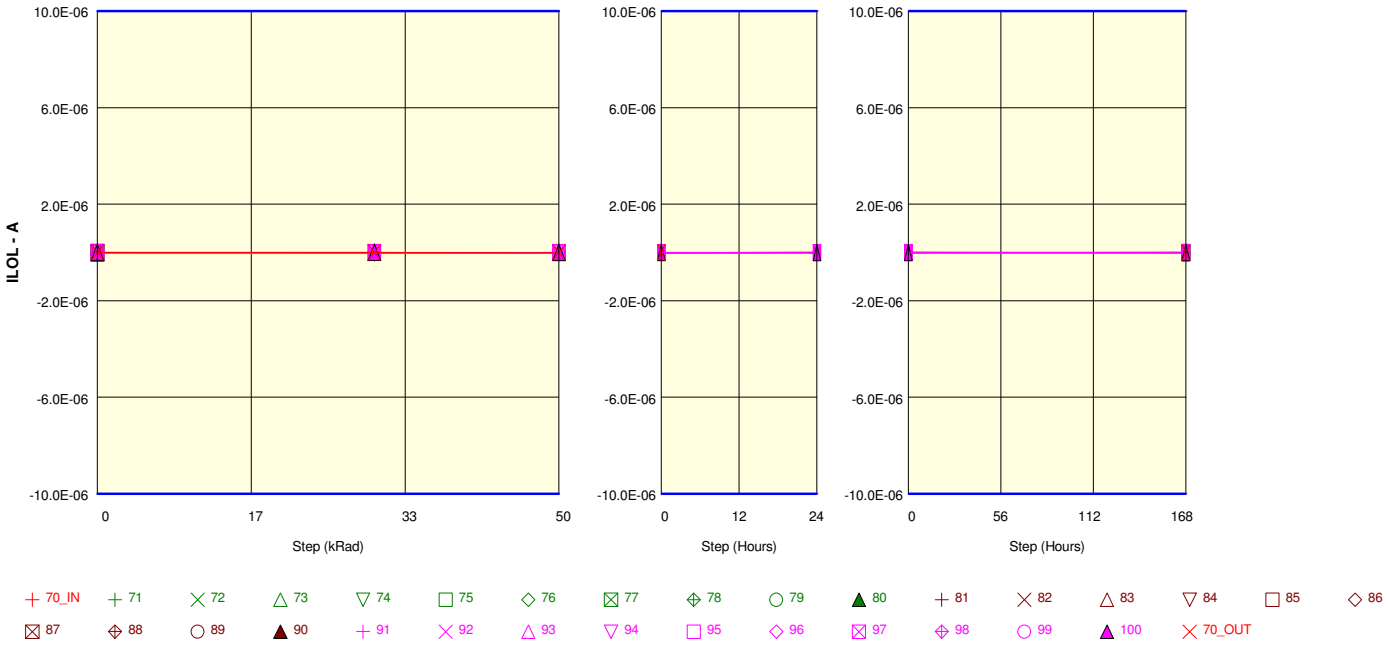
ILOLIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-12.8E-09	-	-	-	-15.6E-09
Std Deviation	5.7E-09	-	-	-	6.6E-09

Measurements

ILOLIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-24.2E-09	-12.0E-09	-9.0E-09	-14.3E-09	-25.0E-09
70_OUT_REF	-15.1E-09	-12.0E-09	-12.0E-09		-18.1E-09
OFF samples					
91	-22.7E-09	-25.0E-09	-13.6E-09	-12.8E-09	-9.0E-09
92	-14.3E-09	-15.1E-09	-13.6E-09	-22.0E-09	-9.0E-09
93	-12.8E-09	-9.0E-09	-13.6E-09	-9.7E-09	-11.3E-09
94	-12.8E-09	-8.2E-09	-16.6E-09	-15.8E-09	-20.4E-09
95	-20.4E-09	-6.7E-09	-13.6E-09	-15.8E-09	-14.3E-09
96	-6.7E-09	-11.3E-09	-24.2E-09	-9.0E-09	-9.0E-09
97	-2.9E-09	-3.6E-09	-16.6E-09	-8.2E-09	173.3E-12
98	-2.1E-09	-22.7E-09	-9.0E-09	-15.1E-09	936.3E-12
99	-27.3E-09	-9.7E-09	-15.1E-09	-18.1E-09	-20.4E-09
100	-25.0E-09	-18.1E-09	-12.0E-09	-3.6E-09	-22.0E-09
Statistics					
Min	-27.3E-09	-25.0E-09	-24.2E-09	-22.0E-09	-22.0E-09
Max	-2.1E-09	-3.6E-09	-9.0E-09	-3.6E-09	936.3E-12
Average	-14.7E-09	-12.9E-09	-14.8E-09	-13.0E-09	-11.4E-09
Std Deviation	8.6E-09	6.7E-09	3.8E-09	5.1E-09	7.7E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Leakage Current Low : ILOLIO[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

ILOLIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-6.7E-09	-13.6E-09	-5.9E-09	1.7E-09	936.3E-12
70_OUT_REF	-2.1E-09	-2.1E-09	-5.2E-09		-10.5E-09
LDC samples					
71	4.0E-09				-5.9E-09
72	-4.4E-09				-8.2E-09
73	-8.2E-09				-11.3E-09
74	-4.4E-09				-15.8E-09
75	7.0E-09				7.8E-09
76	-9.0E-09				-8.2E-09
77	-15.1E-09				-12.0E-09
78	936.3E-12				-7.5E-09
79	936.3E-12				-1.4E-09
80	-14.3E-09				-15.1E-09
Statistics					
Min	-15.1E-09	-	-	-	-15.8E-09
Max	7.0E-09	-	-	-	7.8E-09
Average	-4.3E-09	-	-	-	-7.8E-09
Std Deviation	7.1E-09	-	-	-	6.6E-09

Measurements

ILOLIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-6.7E-09	-13.6E-09	-5.9E-09	1.7E-09	936.3E-12
70_OUT_REF	-2.1E-09	-2.1E-09	-5.2E-09		-10.5E-09
HDC samples					
81	-9.7E-09				-5.9E-09
82	-14.3E-09				3.2E-09
83	-589.6E-12				4.8E-09
84	-3.6E-09				
85	-13.6E-09				6.3E-09
86	-9.0E-09				-18.1E-09
87	2.5E-09				-4.4E-09
88	-9.0E-09				-7.5E-09
89	-4.4E-09				-10.5E-09
90	-11.3E-09				-1.4E-09
Statistics					
Min	-14.3E-09	-	-	-	-18.1E-09
Max	2.5E-09	-	-	-	6.3E-09

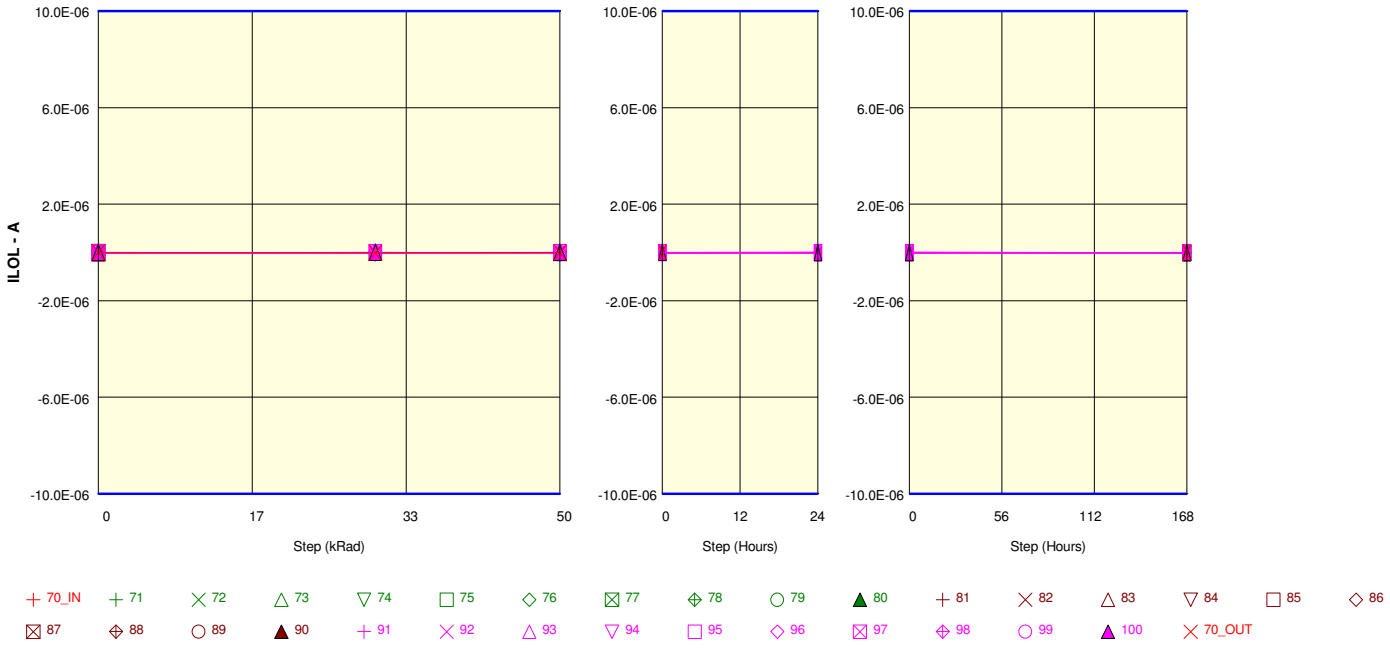
ILOLIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-7.3E-09	-	-	-	-3.7E-09
Std Deviation	5.3E-09	-	-	-	7.4E-09

Measurements

ILOLIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-6.7E-09	-13.6E-09	-5.9E-09	1.7E-09	936.3E-12
70_OUT_REF	-2.1E-09	-2.1E-09	-5.2E-09		-10.5E-09
OFF samples					
91	-10.5E-09	-4.4E-09	-12.8E-09	-6.7E-09	-10.5E-09
92	-2.9E-09	-5.2E-09	-1.4E-09	936.3E-12	-2.1E-09
93	-5.9E-09	-9.0E-09	-2.1E-09	4.0E-09	-5.9E-09
94	-1.4E-09	-16.6E-09	-12.8E-09	4.0E-09	-12.8E-09
95	936.3E-12	4.8E-09	-4.4E-09	-7.5E-09	-4.4E-09
96	-589.6E-12	3.2E-09	-6.7E-09	6.3E-09	-5.9E-09
97	-6.7E-09	-4.4E-09	-14.3E-09	-7.5E-09	-5.9E-09
98	-12.8E-09	-12.0E-09	-15.1E-09	-9.0E-09	7.8E-09
99	-6.7E-09	-9.0E-09	-7.5E-09	-9.0E-09	-5.9E-09
100	-589.6E-12	1.7E-09	-2.1E-09	-12.0E-09	-1.4E-09
Statistics					
Min	-12.8E-09	-16.6E-09	-15.1E-09	-12.0E-09	-12.8E-09
Max	936.3E-12	4.8E-09	-1.4E-09	6.3E-09	7.8E-09
Average	-4.7E-09	-5.1E-09	-7.9E-09	-3.6E-09	-4.7E-09
Std Deviation	4.3E-09	6.5E-09	5.1E-09	6.3E-09	5.3E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Leakage Current Low : ILOLIO[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

ILOLIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-589.6E-12	-10.5E-09	-10.5E-09	-9.7E-09	-19.7E-09
70_OUT_REF	-3.6E-09	-15.1E-09	-1.4E-09		-10.5E-09
LDC samples					
71	-11.3E-09				-1.4E-09
72	-2.9E-09				-18.9E-09
73	-4.4E-09				-9.7E-09
74	-5.2E-09				-2.9E-09
75	-2.9E-09				-22.0E-09
76	-14.3E-09				-2.1E-09
77	-7.5E-09				-9.7E-09
78	-5.9E-09				936.3E-12
79	-3.6E-09				-4.4E-09
80	-14.3E-09				-5.9E-09
Statistics					
Min	-14.3E-09	-	-	-	-22.0E-09
Max	-2.9E-09	-	-	-	936.3E-12
Average	-7.2E-09	-	-	-	-7.6E-09
Std Deviation	4.3E-09	-	-	-	7.2E-09

Measurements

ILOLIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-589.6E-12	-10.5E-09	-10.5E-09	-9.7E-09	-19.7E-09
70_OUT_REF	-3.6E-09	-15.1E-09	-1.4E-09		-10.5E-09
HDC samples					
81	-13.6E-09				-6.7E-09
82	-1.4E-09				-8.2E-09
83	-15.8E-09				-10.5E-09
84	-11.3E-09				
85	-11.3E-09				-9.0E-09
86	-15.1E-09				-12.0E-09
87	4.0E-09				-18.1E-09
88	-6.7E-09				-589.6E-12
89	173.3E-12				-6.7E-09
90	-1.4E-09				-6.7E-09
Statistics					
Min	-15.8E-09	-	-	-	-18.1E-09
Max	4.0E-09	-	-	-	-589.6E-12

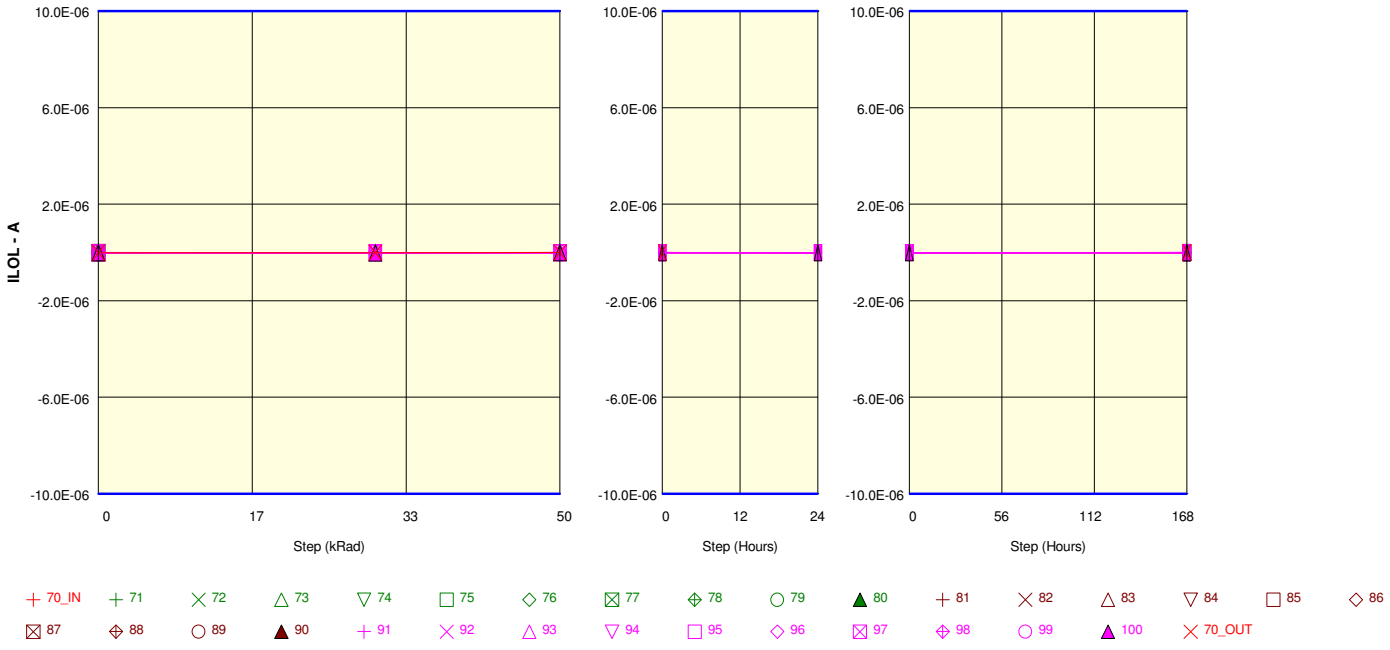
ILOLIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-7.2E-09	-	-	-	-8.7E-09
Std Deviation	6.8E-09	-	-	-	4.5E-09

Measurements

ILOLIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-589.6E-12	-10.5E-09	-10.5E-09	-9.7E-09	-19.7E-09
70_OUT_REF	-3.6E-09	-15.1E-09	-1.4E-09		-10.5E-09
OFF samples					
91	-6.7E-09	-11.3E-09	-2.1E-09	-12.8E-09	-15.8E-09
92	-6.7E-09	-15.1E-09	-13.6E-09	-1.4E-09	-9.0E-09
93	-3.6E-09	-6.7E-09	-5.9E-09	-12.0E-09	-16.6E-09
94	-9.7E-09	-8.2E-09	-9.7E-09	-2.1E-09	-9.7E-09
95	-16.6E-09	-7.5E-09	-2.9E-09	6.3E-09	-5.9E-09
96	-5.9E-09	-2.1E-09	-5.2E-09	-8.2E-09	-17.4E-09
97	-10.5E-09	4.0E-09	-10.5E-09	-9.7E-09	-18.9E-09
98	-2.9E-09	-11.3E-09	-12.8E-09	-3.6E-09	-2.9E-09
99	-5.9E-09	-18.9E-09	-18.1E-09	-3.6E-09	-10.5E-09
100	-5.2E-09	2.5E-09	-7.5E-09	-13.6E-09	-5.9E-09
Statistics					
Min	-16.6E-09	-18.9E-09	-18.1E-09	-13.6E-09	-18.9E-09
Max	-2.9E-09	4.0E-09	-2.1E-09	6.3E-09	-2.9E-09
Average	-7.4E-09	-7.5E-09	-8.8E-09	-6.1E-09	-11.3E-09
Std Deviation	3.8E-09	6.9E-09	4.8E-09	6.0E-09	5.3E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Leakage Current Low : ILOLIO[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

ILOLIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-15.1E-09	-16.6E-09	-9.7E-09	-10.5E-09	-21.2E-09
70_OUT_REF	-13.6E-09	-6.7E-09	-2.1E-09		-1.4E-09
LDC samples					
71	-9.0E-09				-3.6E-09
72	-14.3E-09				-2.1E-09
73	-9.0E-09				-16.6E-09
74	-15.8E-09				2.5E-09
75	-14.3E-09				-13.6E-09
76	-5.9E-09				-12.8E-09
77	-2.9E-09				-14.3E-09
78	7.8E-09				-6.7E-09
79	-7.5E-09				-9.7E-09
80	-3.6E-09				936.3E-12
Statistics					
Min	-15.8E-09	-	-	-	-16.6E-09
Max	7.8E-09	-	-	-	2.5E-09
Average	-7.5E-09	-	-	-	-7.6E-09
Std Deviation	6.6E-09	-	-	-	6.4E-09

Measurements

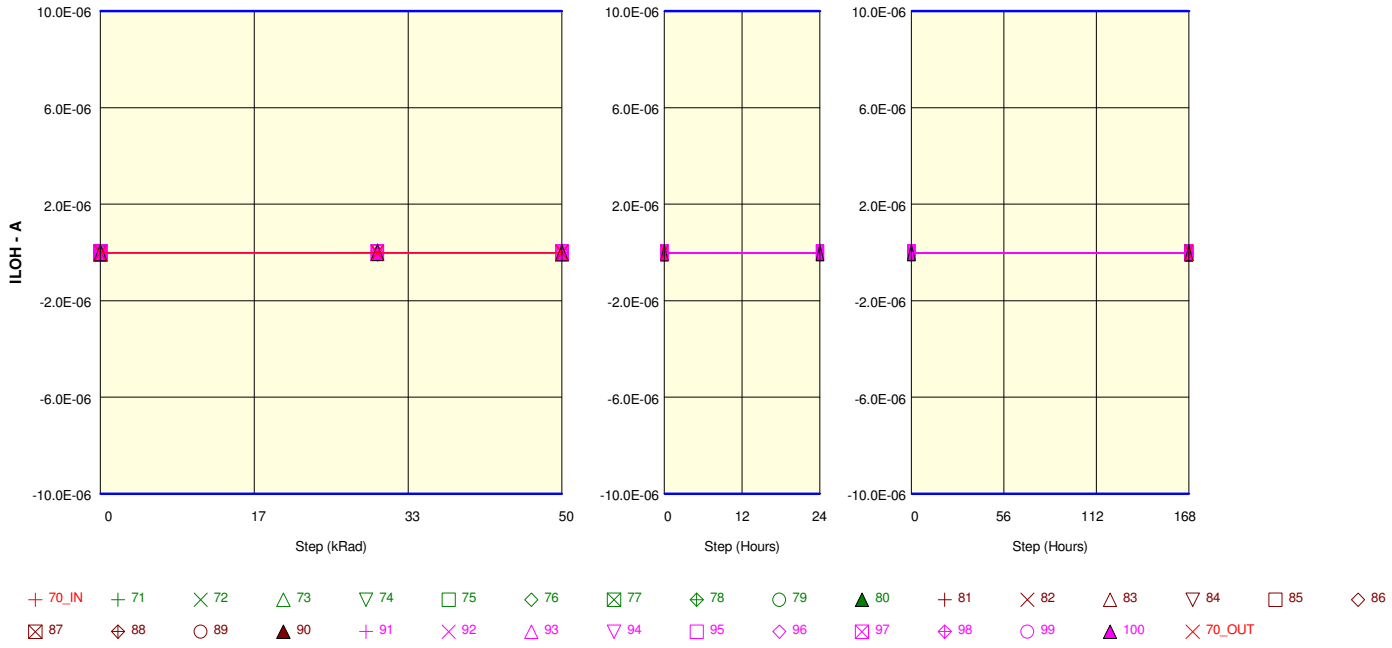
ILOLIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-15.1E-09	-16.6E-09	-9.7E-09	-10.5E-09	-21.2E-09
70_OUT_REF	-13.6E-09	-6.7E-09	-2.1E-09		-1.4E-09
HDC samples					
81	-12.0E-09				936.3E-12
82	-5.2E-09				-14.3E-09
83	-15.8E-09				-7.5E-09
84	-5.2E-09				
85	-8.2E-09				-15.8E-09
86	-17.4E-09				-14.3E-09
87	-1.4E-09				-4.4E-09
88	173.3E-12				-7.5E-09
89	936.3E-12				-5.2E-09
90	-12.0E-09				4.0E-09
Statistics					
Min	-17.4E-09	-	-	-	-15.8E-09
Max	936.3E-12	-	-	-	4.0E-09

ILOLIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-7.6E-09	-	-	-	-7.1E-09
Std Deviation	6.2E-09	-	-	-	6.5E-09

Measurements

ILOLIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-15.1E-09	-16.6E-09	-9.7E-09	-10.5E-09	-21.2E-09
70_OUT_REF	-13.6E-09	-6.7E-09	-2.1E-09		-1.4E-09
OFF samples					
91	-589.6E-12	-4.4E-09	-7.5E-09	-4.4E-09	-2.1E-09
92	-5.2E-09	-7.5E-09	-1.4E-09	-12.8E-09	173.3E-12
93	-12.0E-09	-12.8E-09	3.2E-09	-6.7E-09	-11.3E-09
94	-9.7E-09	-16.6E-09	-5.9E-09	-11.3E-09	-12.0E-09
95	-14.3E-09	-10.5E-09	-14.3E-09	-14.3E-09	-4.4E-09
96	-11.3E-09	-9.7E-09	-15.1E-09	-16.6E-09	-8.2E-09
97	-6.7E-09	-5.9E-09	-11.3E-09	-9.0E-09	-9.7E-09
98	-8.2E-09	-10.5E-09	-11.3E-09	-4.4E-09	-2.9E-09
99	173.3E-12	-12.0E-09	173.3E-12	-12.8E-09	1.7E-09
100	-11.3E-09	-26.5E-09	-18.9E-09	-20.4E-09	-14.3E-09
Statistics					
Min	-14.3E-09	-26.5E-09	-18.9E-09	-20.4E-09	-14.3E-09
Max	173.3E-12	-4.4E-09	3.2E-09	-4.4E-09	1.7E-09
Average	-7.9E-09	-11.7E-09	-8.2E-09	-11.3E-09	-6.3E-09
Std Deviation	4.6E-09	6.0E-09	6.9E-09	5.0E-09	5.3E-09

Parameter : Output Leakage Current High : ILOHIO[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

ILOHIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-10.5E-09	-6.7E-09	-14.3E-09	-13.6E-09	-27.3E-09
70_OUT_REF	-17.4E-09	-10.5E-09	-11.3E-09		-13.6E-09
LDC samples					
71	-5.2E-09				-16.6E-09
72	-24.2E-09				-15.1E-09
73	-10.5E-09				-5.9E-09
74	-9.0E-09				-9.7E-09
75	-22.7E-09				-18.1E-09
76	-15.8E-09				-22.0E-09
77	-15.8E-09				-15.8E-09
78	-13.6E-09				-11.3E-09
79	-5.9E-09				-7.5E-09
80	-20.4E-09				-17.4E-09
Statistics					
Min	-24.2E-09	-	-	-	-22.0E-09
Max	-5.2E-09	-	-	-	-5.9E-09
Average	-14.3E-09	-	-	-	-13.9E-09
Std Deviation	6.4E-09	-	-	-	4.9E-09

Measurements

ILOHIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-10.5E-09	-6.7E-09	-14.3E-09	-13.6E-09	-27.3E-09
70_OUT_REF	-17.4E-09	-10.5E-09	-11.3E-09		-13.6E-09
HDC samples					
81	-12.8E-09				-16.6E-09
82	-9.7E-09				-12.0E-09
83	-589.6E-12				-11.3E-09
84	-18.1E-09				
85	-9.0E-09				-14.3E-09
86	-21.2E-09				-14.3E-09
87	-19.7E-09				-18.1E-09
88	-8.2E-09				-13.6E-09
89	-12.8E-09				-22.7E-09
90	-18.1E-09				-21.2E-09
Statistics					
Min	-21.2E-09	-	-	-	-22.7E-09
Max	-589.6E-12	-	-	-	-11.3E-09

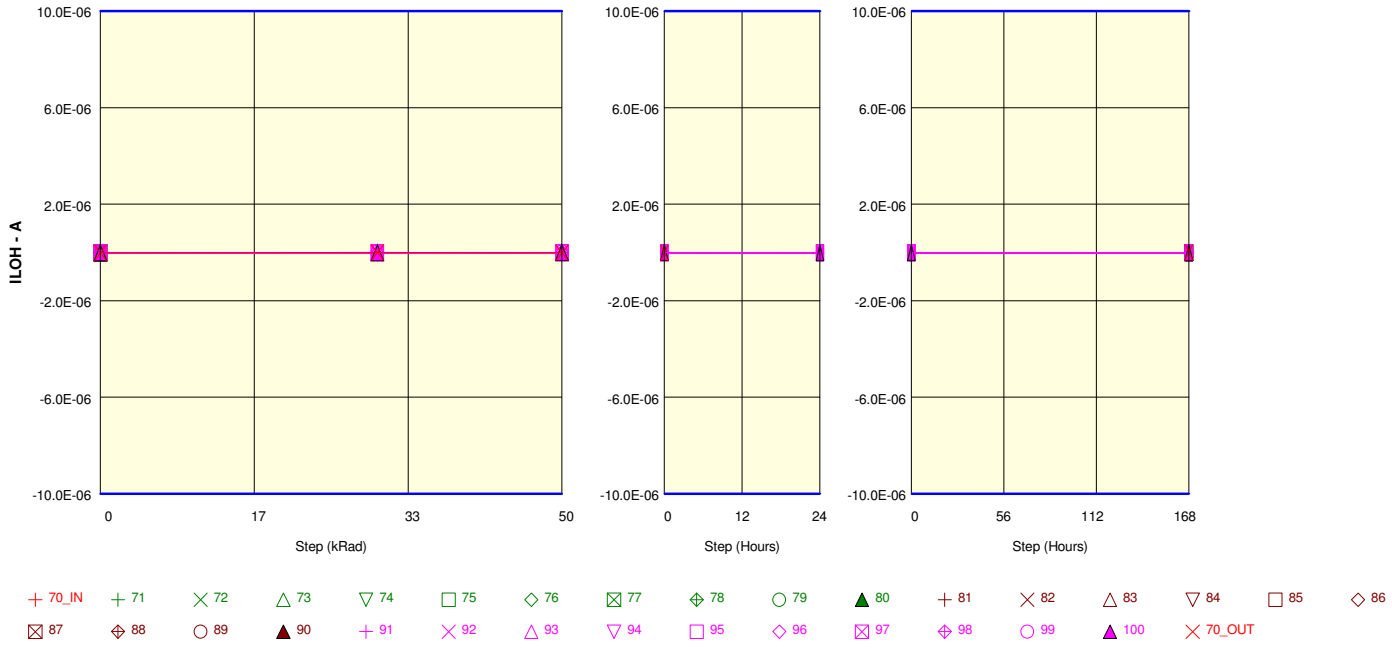
ILOHIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-13.0E-09	-	-	-	-16.0E-09
Std Deviation	6.1E-09	-	-	-	3.8E-09

Measurements

ILOHIO[0]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-10.5E-09	-6.7E-09	-14.3E-09	-13.6E-09	-27.3E-09
70_OUT_REF	-17.4E-09	-10.5E-09	-11.3E-09		-13.6E-09
OFF samples					
91	-10.5E-09	-11.3E-09	-4.4E-09	-14.3E-09	-20.4E-09
92	-17.4E-09	-17.4E-09	-13.6E-09	-5.2E-09	-9.7E-09
93	-17.4E-09	-5.9E-09	-9.7E-09	-16.6E-09	-5.2E-09
94	-15.8E-09	-10.5E-09	-6.7E-09	-24.2E-09	-24.2E-09
95	-15.1E-09	-18.9E-09	-15.1E-09	-12.8E-09	-15.1E-09
96	-15.8E-09	-21.2E-09	-1.4E-09	-12.0E-09	-15.1E-09
97	-10.5E-09	-7.5E-09	-23.5E-09	-22.0E-09	-13.6E-09
98	-9.7E-09	-18.9E-09	-12.0E-09	-11.3E-09	-9.0E-09
99	-20.4E-09	-5.2E-09	-18.9E-09	-12.8E-09	-19.7E-09
100	-13.6E-09	-2.1E-09	-21.2E-09	-9.0E-09	-18.9E-09
Statistics					
Min	-20.4E-09	-21.2E-09	-23.5E-09	-24.2E-09	-24.2E-09
Max	-9.7E-09	-2.1E-09	-1.4E-09	-5.2E-09	-5.2E-09
Average	-14.6E-09	-11.9E-09	-12.6E-09	-14.0E-09	-15.1E-09
Std Deviation	3.3E-09	6.4E-09	6.9E-09	5.4E-09	5.6E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Leakage Current High : ILOHIO[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

ILOHIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-7.5E-09	-5.9E-09	-15.8E-09	-10.5E-09	-23.5E-09
70_OUT_REF	-18.1E-09	-2.1E-09	-18.1E-09		-2.1E-09
LDC samples					
71	-10.5E-09				-13.6E-09
72	-5.2E-09				-4.4E-09
73	-17.4E-09				-6.7E-09
74	-15.8E-09				-15.8E-09
75	-12.0E-09				-5.9E-09
76	-22.7E-09				-15.1E-09
77	-19.7E-09				-15.1E-09
78	-7.5E-09				-12.0E-09
79	-15.1E-09				-12.0E-09
80	-19.7E-09				-10.5E-09
Statistics					
Min	-22.7E-09	-	-	-	-15.8E-09
Max	-5.2E-09	-	-	-	-4.4E-09
Average	-14.6E-09	-	-	-	-11.1E-09
Std Deviation	5.4E-09	-	-	-	3.9E-09

Measurements

ILOHIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-7.5E-09	-5.9E-09	-15.8E-09	-10.5E-09	-23.5E-09
70_OUT_REF	-18.1E-09	-2.1E-09	-18.1E-09		-2.1E-09
HDC samples					
81	-1.4E-09				-12.0E-09
82	936.3E-12				-12.8E-09
83	-15.8E-09				-14.3E-09
84	-11.3E-09				
85	-9.7E-09				-12.0E-09
86	-5.9E-09				173.3E-12
87	-6.7E-09				-16.6E-09
88	-4.4E-09				-15.1E-09
89	-14.3E-09				-8.2E-09
90	-14.3E-09				-15.8E-09
Statistics					
Min	-15.8E-09	-	-	-	-16.6E-09
Max	936.3E-12	-	-	-	173.3E-12

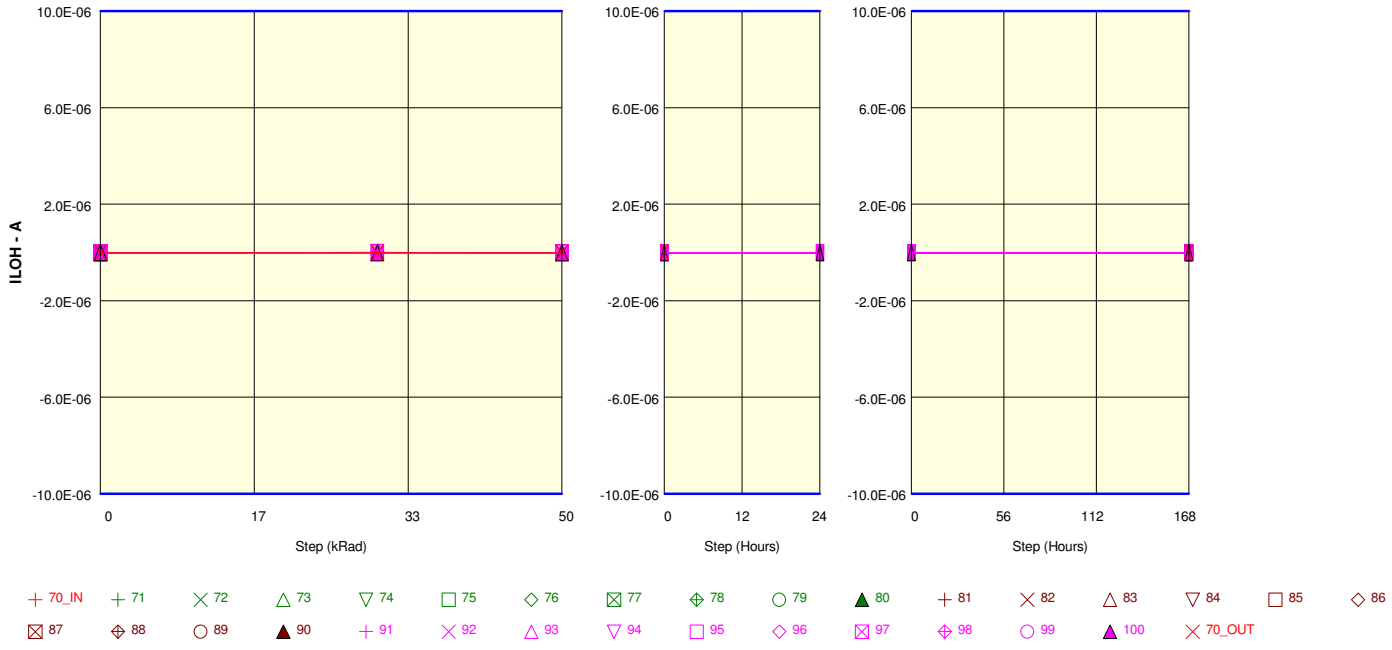
ILOHIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-8.3E-09	-	-	-	-11.9E-09
Std Deviation	5.5E-09	-	-	-	4.9E-09

Measurements

ILOHIO[1]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-7.5E-09	-5.9E-09	-15.8E-09	-10.5E-09	-23.5E-09
70_OUT_REF	-18.1E-09	-2.1E-09	-18.1E-09		-2.1E-09
OFF samples					
91	-22.0E-09	-6.7E-09	-7.5E-09	-21.2E-09	-19.7E-09
92	-15.1E-09	-12.8E-09	-15.1E-09	-12.8E-09	-5.9E-09
93	-9.0E-09	-5.2E-09	-17.4E-09	-15.8E-09	-13.6E-09
94	-10.5E-09	-12.0E-09	-13.6E-09	-6.7E-09	-16.6E-09
95	-12.0E-09	-15.8E-09	-11.3E-09	-15.1E-09	-5.2E-09
96	-14.3E-09	-6.7E-09	-10.5E-09	-22.0E-09	-8.2E-09
97	-8.2E-09	-24.2E-09	-15.8E-09	-8.2E-09	-15.8E-09
98	-11.3E-09	-15.1E-09	-7.5E-09	-21.2E-09	-15.1E-09
99	-13.6E-09	-16.6E-09	-8.2E-09	-22.7E-09	-10.5E-09
100	-15.1E-09	-19.7E-09	3.2E-09	-17.4E-09	-7.5E-09
Statistics					
Min	-22.0E-09	-24.2E-09	-17.4E-09	-22.7E-09	-19.7E-09
Max	-8.2E-09	-5.2E-09	3.2E-09	-6.7E-09	-5.2E-09
Average	-13.1E-09	-13.5E-09	-10.4E-09	-16.3E-09	-11.8E-09
Std Deviation	3.7E-09	5.8E-09	5.6E-09	5.4E-09	4.8E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Leakage Current High : ILOHIO[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

ILOHIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-4.4E-09	936.3E-12	-18.9E-09	-22.0E-09	-12.8E-09
70_OUT_REF	-11.3E-09	-17.4E-09	-5.2E-09		-24.2E-09
LDC samples					
71	-5.2E-09				-6.7E-09
72	-14.3E-09				173.3E-12
73	-7.5E-09				-2.1E-09
74	-8.2E-09				-15.1E-09
75	-17.4E-09				-9.0E-09
76	-8.2E-09				-9.7E-09
77	-8.2E-09				-6.7E-09
78	-12.0E-09				-2.9E-09
79	-17.4E-09				-5.9E-09
80	-18.1E-09				-12.0E-09
Statistics					
Min	-18.1E-09	-	-	-	-15.1E-09
Max	-5.2E-09	-	-	-	173.3E-12
Average	-11.7E-09	-	-	-	-7.0E-09
Std Deviation	4.6E-09	-	-	-	4.4E-09

Measurements

ILOHIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-4.4E-09	936.3E-12	-18.9E-09	-22.0E-09	-12.8E-09
70_OUT_REF	-11.3E-09	-17.4E-09	-5.2E-09		-24.2E-09
HDC samples					
81	-12.0E-09				-2.1E-09
82	-1.4E-09				-8.2E-09
83	-9.0E-09				-5.9E-09
84	-11.3E-09				
85	-14.3E-09				-15.8E-09
86	-8.2E-09				173.3E-12
87	-16.6E-09				-9.0E-09
88	-15.8E-09				-1.4E-09
89	-9.7E-09				-20.4E-09
90	-2.1E-09				-10.5E-09
Statistics					
Min	-16.6E-09	-	-	-	-20.4E-09
Max	-1.4E-09	-	-	-	173.3E-12

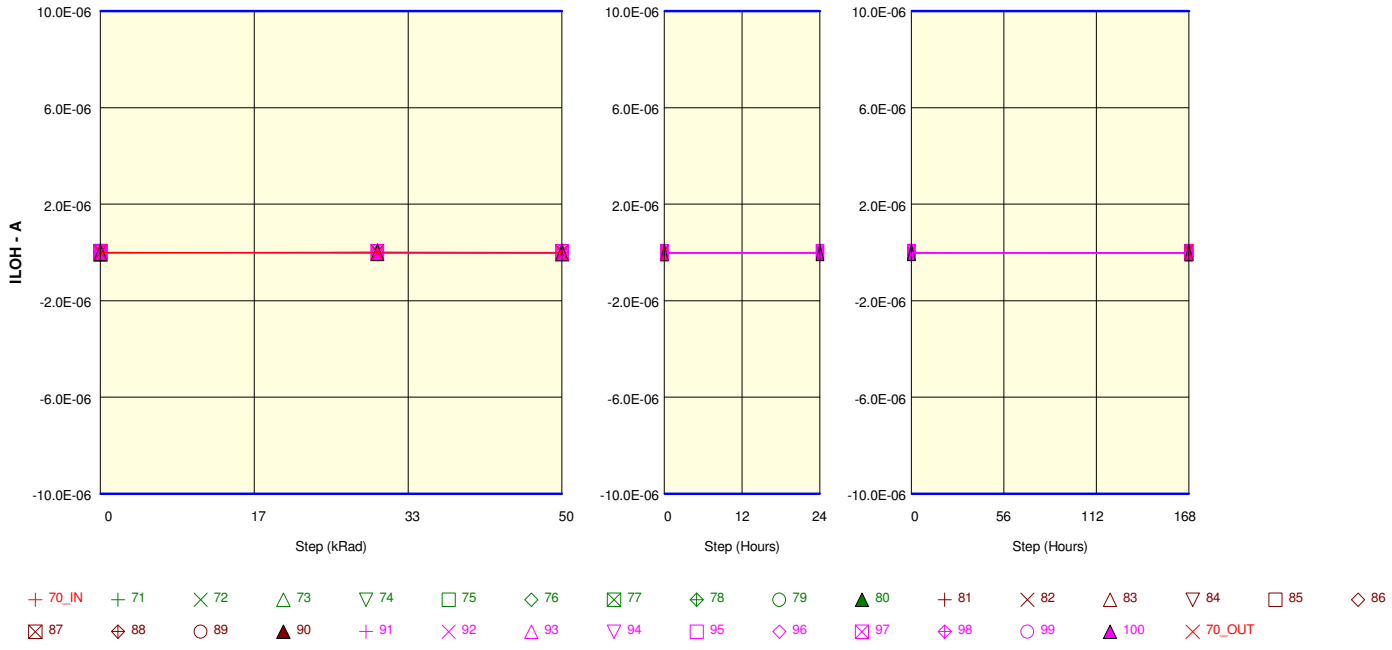
ILOHIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-10.1E-09	-	-	-	-8.1E-09
Std Deviation	4.9E-09	-	-	-	6.4E-09

Measurements

ILOHIO[2]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-4.4E-09	936.3E-12	-18.9E-09	-22.0E-09	-12.8E-09
70_OUT_REF	-11.3E-09	-17.4E-09	-5.2E-09		-24.2E-09
OFF samples					
91	-12.8E-09	-15.8E-09	-7.5E-09	-12.0E-09	-9.7E-09
92	-9.0E-09	-12.0E-09	-19.7E-09	-18.9E-09	-3.6E-09
93	-21.2E-09	-18.1E-09	-6.7E-09	-13.6E-09	-12.8E-09
94	-19.7E-09	173.3E-12	-12.0E-09	-5.9E-09	-5.2E-09
95	-15.1E-09	-3.6E-09	-10.5E-09	-16.6E-09	-5.2E-09
96	-4.4E-09	-12.8E-09	-18.9E-09	-9.7E-09	-8.2E-09
97	-7.5E-09	-2.9E-09	-12.8E-09	-9.7E-09	-4.4E-09
98	-14.3E-09	3.2E-09	-16.6E-09	-4.4E-09	-15.8E-09
99	-18.1E-09	-4.4E-09	-3.6E-09	936.3E-12	-2.9E-09
100	-589.6E-12	-10.5E-09	-18.9E-09	-1.4E-09	-3.6E-09
Statistics					
Min	-21.2E-09	-18.1E-09	-19.7E-09	-18.9E-09	-15.8E-09
Max	-589.6E-12	3.2E-09	-3.6E-09	936.3E-12	-2.9E-09
Average	-12.3E-09	-7.7E-09	-12.7E-09	-9.1E-09	-7.2E-09
Std Deviation	6.4E-09	6.8E-09	5.4E-09	6.1E-09	4.2E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Leakage Current High : ILOHIO[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

ILOHIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	936.3E-12	-4.4E-09	-7.5E-09	-14.3E-09	-3.6E-09
70_OUT_REF	2.5E-09	-3.6E-09	-11.3E-09		3.2E-09
LDC samples					
71	-13.6E-09				-4.4E-09
72	-3.6E-09				-9.0E-09
73	-18.1E-09				-17.4E-09
74	936.3E-12				-3.6E-09
75	3.2E-09				-8.2E-09
76	-1.4E-09				173.3E-12
77	-16.6E-09				-6.7E-09
78	-12.0E-09				2.5E-09
79	-5.9E-09				-1.4E-09
80	-3.6E-09				-8.2E-09
Statistics					
Min	-18.1E-09	-	-	-	-17.4E-09
Max	3.2E-09	-	-	-	2.5E-09
Average	-7.1E-09	-	-	-	-5.6E-09
Std Deviation	7.1E-09	-	-	-	5.4E-09

Measurements

ILOHIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	936.3E-12	-4.4E-09	-7.5E-09	-14.3E-09	-3.6E-09
70_OUT_REF	2.5E-09	-3.6E-09	-11.3E-09		3.2E-09
HDC samples					
81	-5.9E-09				-15.8E-09
82	-15.1E-09				-2.1E-09
83	-14.3E-09				-5.2E-09
84	936.3E-12				
85	-17.4E-09				-2.1E-09
86	-14.3E-09				-589.6E-12
87	-8.2E-09				-12.8E-09
88	-15.1E-09				-7.5E-09
89	-5.2E-09				173.3E-12
90	-15.8E-09				-7.5E-09
Statistics					
Min	-17.4E-09	-	-	-	-15.8E-09
Max	936.3E-12	-	-	-	173.3E-12

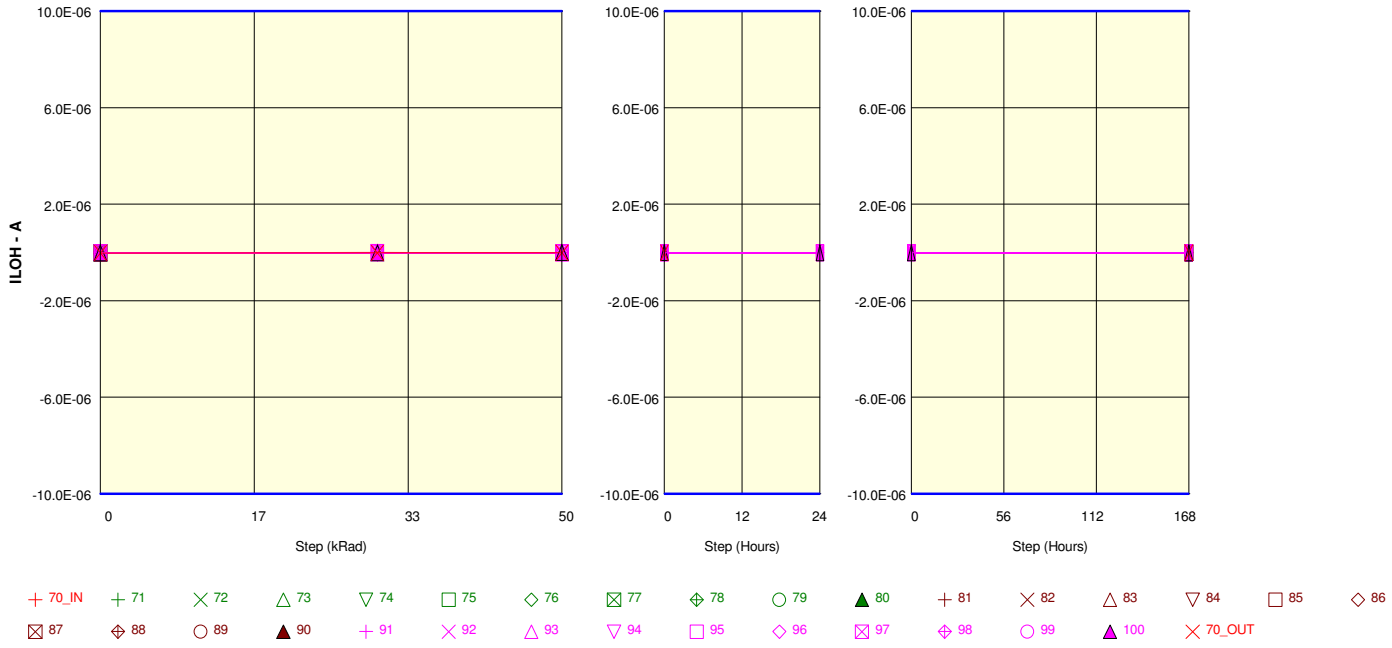
ILOHIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-11.0E-09	-	-	-	-5.9E-09
Std Deviation	5.7E-09	-	-	-	5.2E-09

Measurements

ILOHIO[3]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	936.3E-12	-4.4E-09	-7.5E-09	-14.3E-09	-3.6E-09
70_OUT_REF	2.5E-09	-3.6E-09	-11.3E-09		3.2E-09
OFF samples					
91	2.5E-09	-9.7E-09	-5.9E-09	-11.3E-09	-12.0E-09
92	-8.2E-09	7.0E-09	936.3E-12	-7.5E-09	-13.6E-09
93	-6.7E-09	936.3E-12	-15.8E-09	-589.6E-12	-10.5E-09
94	-18.9E-09	-2.1E-09	936.3E-12	-2.9E-09	-9.0E-09
95	-14.3E-09	-10.5E-09	-4.4E-09	-3.6E-09	-19.7E-09
96	-2.9E-09	-11.3E-09	-12.8E-09	-10.5E-09	-18.1E-09
97	-2.9E-09	-1.4E-09	-9.0E-09	-13.6E-09	936.3E-12
98	-9.7E-09	2.5E-09	-8.2E-09	4.0E-09	-11.3E-09
99	-3.6E-09	-2.9E-09	-5.9E-09	-4.4E-09	-7.5E-09
100	2.5E-09	-5.2E-09	-12.0E-09	-5.2E-09	-8.2E-09
Statistics					
Min	-18.9E-09	-11.3E-09	-15.8E-09	-13.6E-09	-19.7E-09
Max	2.5E-09	7.0E-09	936.3E-12	4.0E-09	936.3E-12
Average	-6.2E-09	-3.3E-09	-7.2E-09	-5.5E-09	-10.9E-09
Std Deviation	6.5E-09	5.7E-09	5.3E-09	5.0E-09	5.5E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Leakage Current High : ILOHIO[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

ILOHIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-6.7E-09	-589.6E-12	-12.8E-09	-16.6E-09	-18.9E-09
70_OUT_REF	-25.8E-09	-16.6E-09	-14.3E-09		-13.6E-09
LDC samples					
71	-17.4E-09				-10.5E-09
72	-23.5E-09				-14.3E-09
73	-19.7E-09				-4.4E-09
74	-22.0E-09				-16.6E-09
75	-8.2E-09				-16.6E-09
76	-10.5E-09				-6.7E-09
77	-18.1E-09				-23.5E-09
78	-15.8E-09				-15.1E-09
79	-12.0E-09				-9.7E-09
80	-16.6E-09				-8.2E-09
Statistics					
Min	-23.5E-09	-	-	-	-23.5E-09
Max	-8.2E-09	-	-	-	-4.4E-09
Average	-16.4E-09	-	-	-	-12.6E-09
Std Deviation	4.7E-09	-	-	-	5.4E-09

Measurements

ILOHIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-6.7E-09	-589.6E-12	-12.8E-09	-16.6E-09	-18.9E-09
70_OUT_REF	-25.8E-09	-16.6E-09	-14.3E-09		-13.6E-09
HDC samples					
81	-10.5E-09				-19.7E-09
82	-12.0E-09				-19.7E-09
83	-9.7E-09				-9.0E-09
84	-9.7E-09				
85	-12.8E-09				-22.0E-09
86	-10.5E-09				-15.1E-09
87	-9.7E-09				-11.3E-09
88	-23.5E-09				-10.5E-09
89	-20.4E-09				-10.5E-09
90	-589.6E-12				-15.1E-09
Statistics					
Min	-23.5E-09	-	-	-	-22.0E-09
Max	-589.6E-12	-	-	-	-9.0E-09

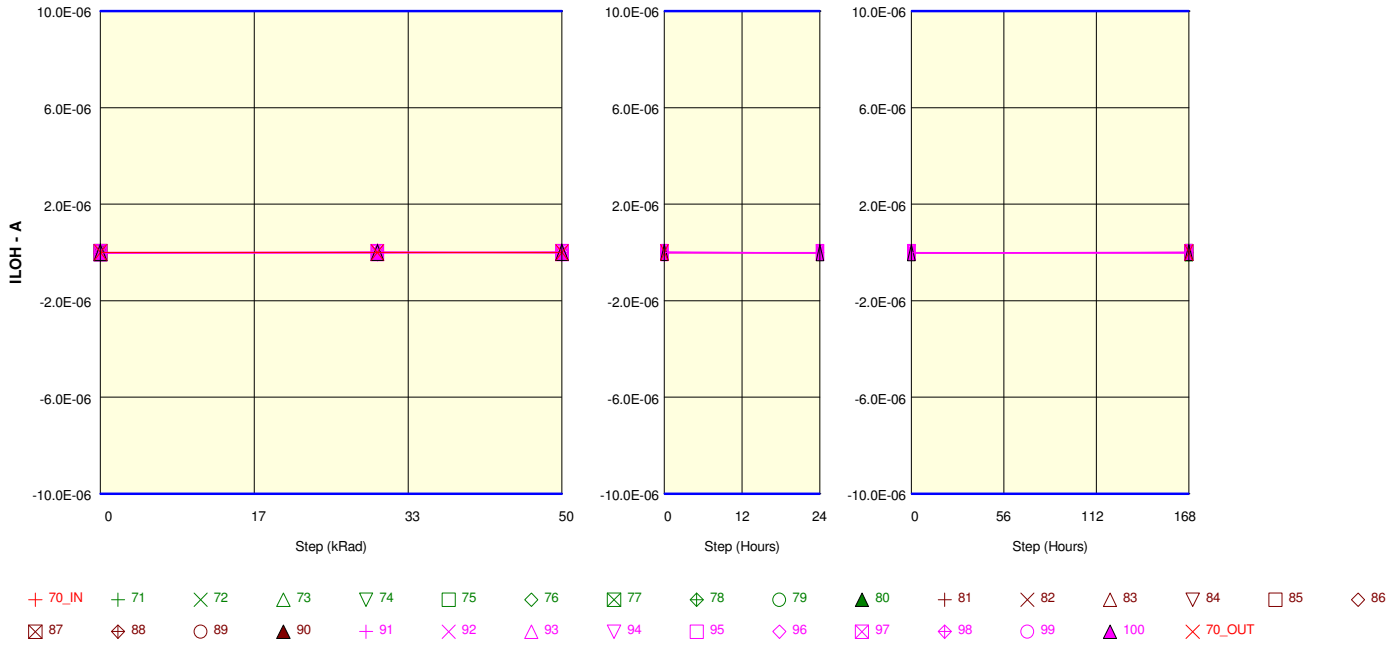
ILOHIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-12.0E-09	-	-	-	-14.7E-09
Std Deviation	5.9E-09	-	-	-	4.5E-09

Measurements

ILOHIO[4]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-6.7E-09	-589.6E-12	-12.8E-09	-16.6E-09	-18.9E-09
70_OUT_REF	-25.8E-09	-16.6E-09	-14.3E-09		-13.6E-09
OFF samples					
91	-12.0E-09	-15.8E-09	-17.4E-09	-9.7E-09	-20.4E-09
92	-10.5E-09	-5.2E-09	-23.5E-09	-12.0E-09	-13.6E-09
93	-8.2E-09	-12.8E-09	-17.4E-09	-25.0E-09	-15.1E-09
94	-24.2E-09	-10.5E-09	-10.5E-09	-12.8E-09	-14.3E-09
95	-7.5E-09	-15.1E-09	-12.8E-09	-10.5E-09	-13.6E-09
96	-15.1E-09	-12.0E-09	-12.8E-09	-7.5E-09	-25.0E-09
97	-13.6E-09	-2.9E-09	-19.7E-09	-6.7E-09	-9.7E-09
98	-16.6E-09	-20.4E-09	-12.8E-09	-15.1E-09	-13.6E-09
99	-17.4E-09	-15.8E-09	-12.8E-09	-9.0E-09	-8.2E-09
100	-15.8E-09	-15.8E-09	-8.2E-09	-19.7E-09	-17.4E-09
Statistics					
Min	-24.2E-09	-20.4E-09	-23.5E-09	-25.0E-09	-25.0E-09
Max	-7.5E-09	-2.9E-09	-8.2E-09	-6.7E-09	-8.2E-09
Average	-14.1E-09	-12.6E-09	-14.8E-09	-12.8E-09	-15.1E-09
Std Deviation	4.7E-09	5.0E-09	4.4E-09	5.4E-09	4.6E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Leakage Current High : ILOHIO[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

ILOHIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-5.2E-09	-2.9E-09	-4.4E-09	-17.4E-09	1.7E-09
70_OUT_REF	-1.4E-09	173.3E-12	2.5E-09		-6.7E-09
LDC samples					
71	173.3E-12				-14.3E-09
72	-11.3E-09				-9.0E-09
73	-9.0E-09				-11.3E-09
74	-9.7E-09				-2.1E-09
75	-8.2E-09				-5.9E-09
76	4.8E-09				-8.2E-09
77	-18.9E-09				-12.8E-09
78	-2.9E-09				-3.6E-09
79	-1.4E-09				-1.4E-09
80	-13.6E-09				-4.4E-09
Statistics					
Min	-18.9E-09	-	-	-	-14.3E-09
Max	4.8E-09	-	-	-	-1.4E-09
Average	-7.0E-09	-	-	-	-7.3E-09
Std Deviation	6.7E-09	-	-	-	4.3E-09

Measurements

ILOHIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-5.2E-09	-2.9E-09	-4.4E-09	-17.4E-09	1.7E-09
70_OUT_REF	-1.4E-09	173.3E-12	2.5E-09		-6.7E-09
HDC samples					
81	-5.2E-09				-5.9E-09
82	-589.6E-12				-11.3E-09
83	-9.0E-09				-3.6E-09
84	-5.2E-09				
85	-6.7E-09				936.3E-12
86	-5.2E-09				4.0E-09
87	-3.6E-09				-5.9E-09
88	-7.5E-09				-9.7E-09
89	-9.0E-09				-10.5E-09
90	3.2E-09				-5.9E-09
Statistics					
Min	-9.0E-09	-	-	-	-11.3E-09
Max	3.2E-09	-	-	-	4.0E-09

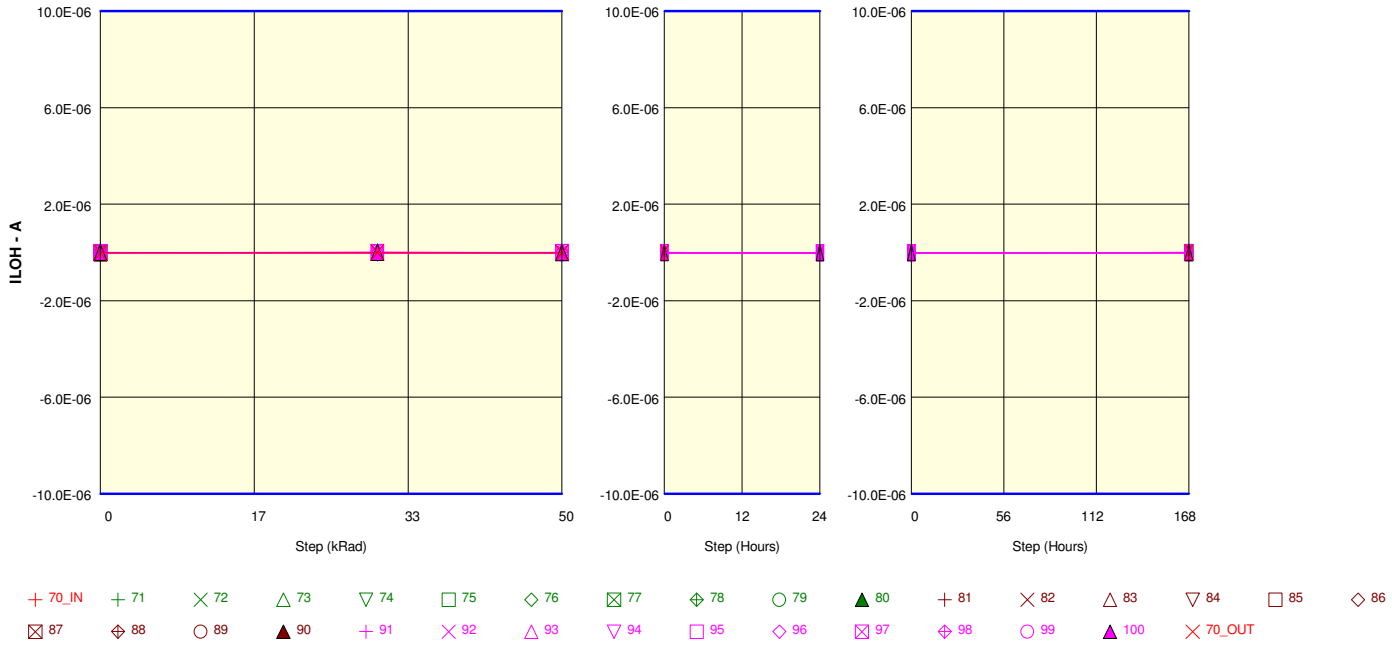
ILOHIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-4.9E-09	-	-	-	-5.3E-09
Std Deviation	3.6E-09	-	-	-	4.8E-09

Measurements

ILOHIO[5]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-5.2E-09	-2.9E-09	-4.4E-09	-17.4E-09	1.7E-09
70_OUT_REF	-1.4E-09	173.3E-12	2.5E-09		-6.7E-09
OFF samples					
91	-2.9E-09	-1.4E-09	-13.6E-09	-10.5E-09	-12.0E-09
92	173.3E-12	-2.1E-09	936.3E-12	4.0E-09	-5.9E-09
93	-1.4E-09	6.3E-09	-11.3E-09	-5.9E-09	-2.9E-09
94	-1.4E-09	-7.5E-09	-13.6E-09	-11.3E-09	-2.1E-09
95	-20.4E-09	-10.5E-09	7.0E-09	-8.2E-09	-5.9E-09
96	-3.6E-09	7.8E-09	-2.1E-09	-5.2E-09	-2.9E-09
97	-9.7E-09	-1.4E-09	6.3E-09	-5.2E-09	7.0E-09
98	-11.3E-09	-8.2E-09	-589.6E-12	-14.3E-09	-11.3E-09
99	-3.6E-09	-2.1E-09	2.5E-09	-5.2E-09	-6.7E-09
100	-3.6E-09	-6.7E-09	-589.6E-12	-14.3E-09	-5.9E-09
Statistics					
Min	-20.4E-09	-10.5E-09	-13.6E-09	-14.3E-09	-12.0E-09
Max	173.3E-12	7.8E-09	7.0E-09	4.0E-09	7.0E-09
Average	-5.8E-09	-2.6E-09	-2.5E-09	-7.6E-09	-4.9E-09
Std Deviation	6.0E-09	5.7E-09	7.3E-09	5.2E-09	5.1E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Leakage Current High : ILOHIO[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

ILOHIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-2.1E-09	-9.0E-09	2.5E-09	-7.5E-09	173.3E-12
70_OUT_REF	-15.1E-09	-3.6E-09	-7.5E-09		-5.2E-09
LDC samples					
71	-1.4E-09				-10.5E-09
72	-5.9E-09				173.3E-12
73	-5.2E-09				-1.4E-09
74	-8.2E-09				-10.5E-09
75	-9.7E-09				-12.0E-09
76	-1.4E-09				-18.1E-09
77	-9.7E-09				-14.3E-09
78	-6.7E-09				1.7E-09
79	-9.7E-09				-5.9E-09
80	3.2E-09				-8.2E-09
Statistics					
Min	-9.7E-09	-	-	-	-18.1E-09
Max	3.2E-09	-	-	-	1.7E-09
Average	-5.5E-09	-	-	-	-7.9E-09
Std Deviation	4.2E-09	-	-	-	6.2E-09

Measurements

ILOHIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-2.1E-09	-9.0E-09	2.5E-09	-7.5E-09	173.3E-12
70_OUT_REF	-15.1E-09	-3.6E-09	-7.5E-09		-5.2E-09
HDC samples					
81	-9.0E-09				-9.7E-09
82	-6.7E-09				-11.3E-09
83	5.5E-09				-5.9E-09
84	-15.8E-09				
85	-16.6E-09				-2.1E-09
86	936.3E-12				-6.7E-09
87	-11.3E-09				-5.2E-09
88	-12.0E-09				-4.4E-09
89	-10.5E-09				-13.6E-09
90	1.7E-09				-3.6E-09
Statistics					
Min	-16.6E-09	-	-	-	-13.6E-09
Max	5.5E-09	-	-	-	-2.1E-09

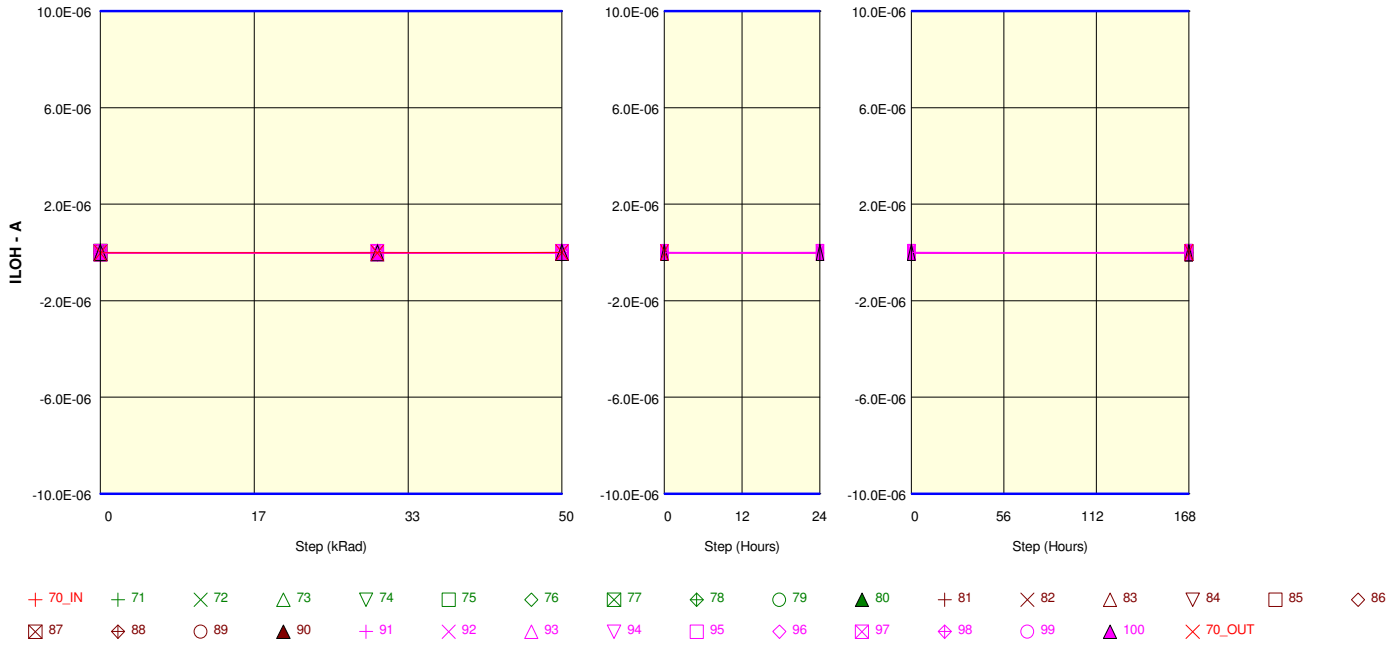
ILOHIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-7.4E-09	-	-	-	-6.9E-09
Std Deviation	7.2E-09	-	-	-	3.6E-09

Measurements

ILOHIO[6]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-2.1E-09	-9.0E-09	2.5E-09	-7.5E-09	173.3E-12
70_OUT_REF	-15.1E-09	-3.6E-09	-7.5E-09		-5.2E-09
OFF samples					
91	-8.2E-09	-14.3E-09	-14.3E-09	-7.5E-09	1.7E-09
92	-8.2E-09	-9.7E-09	-8.2E-09	-5.2E-09	-8.2E-09
93	173.3E-12	-8.2E-09	-5.2E-09	-17.4E-09	-4.4E-09
94	-6.7E-09	-13.6E-09	-1.4E-09	-11.3E-09	-3.6E-09
95	-9.0E-09	1.7E-09	173.3E-12	-14.3E-09	-10.5E-09
96	-7.5E-09	-2.9E-09	-11.3E-09	-15.1E-09	-14.3E-09
97	-3.6E-09	7.0E-09	-5.9E-09	-8.2E-09	-13.6E-09
98	-11.3E-09	-12.0E-09	-5.9E-09	-4.4E-09	-5.2E-09
99	-6.7E-09	-5.2E-09	-23.5E-09	-12.0E-09	-2.9E-09
100	-3.6E-09	-2.1E-09	-15.8E-09	-12.0E-09	-1.4E-09
Statistics					
Min	-11.3E-09	-14.3E-09	-23.5E-09	-17.4E-09	-14.3E-09
Max	173.3E-12	7.0E-09	173.3E-12	-4.4E-09	1.7E-09
Average	-6.5E-09	-5.9E-09	-9.1E-09	-10.7E-09	-6.2E-09
Std Deviation	3.1E-09	6.6E-09	6.8E-09	4.1E-09	5.0E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Output Leakage Current High : ILOHIO[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

ILOHIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-9.7E-09	-19.7E-09	-15.8E-09	-21.2E-09	-5.9E-09
70_OUT_REF	-15.1E-09	-15.1E-09	173.3E-12		-589.6E-12
LDC samples					
71	-12.0E-09				-22.7E-09
72	-7.5E-09				-14.3E-09
73	-589.6E-12				-18.9E-09
74	-1.4E-09				-4.4E-09
75	1.7E-09				-8.2E-09
76	-9.0E-09				-13.6E-09
77	-10.5E-09				-11.3E-09
78	-11.3E-09				-4.4E-09
79	-14.3E-09				-9.0E-09
80	-11.3E-09				-3.6E-09
Statistics					
Min	-14.3E-09	-	-	-	-22.7E-09
Max	1.7E-09	-	-	-	-3.6E-09
Average	-7.6E-09	-	-	-	-11.0E-09
Std Deviation	5.3E-09	-	-	-	6.1E-09

Measurements

ILOHIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-9.7E-09	-19.7E-09	-15.8E-09	-21.2E-09	-5.9E-09
70_OUT_REF	-15.1E-09	-15.1E-09	173.3E-12		-589.6E-12
HDC samples					
81	-11.3E-09				1.7E-09
82	-8.2E-09				-14.3E-09
83	-10.5E-09				4.0E-09
84	-1.4E-09				
85	-7.5E-09				-3.6E-09
86	-14.3E-09				-15.1E-09
87	-2.9E-09				-16.6E-09
88	-11.3E-09				-9.7E-09
89	1.7E-09				-11.3E-09
90	-5.2E-09				-22.0E-09
Statistics					
Min	-14.3E-09	-	-	-	-22.0E-09
Max	1.7E-09	-	-	-	4.0E-09

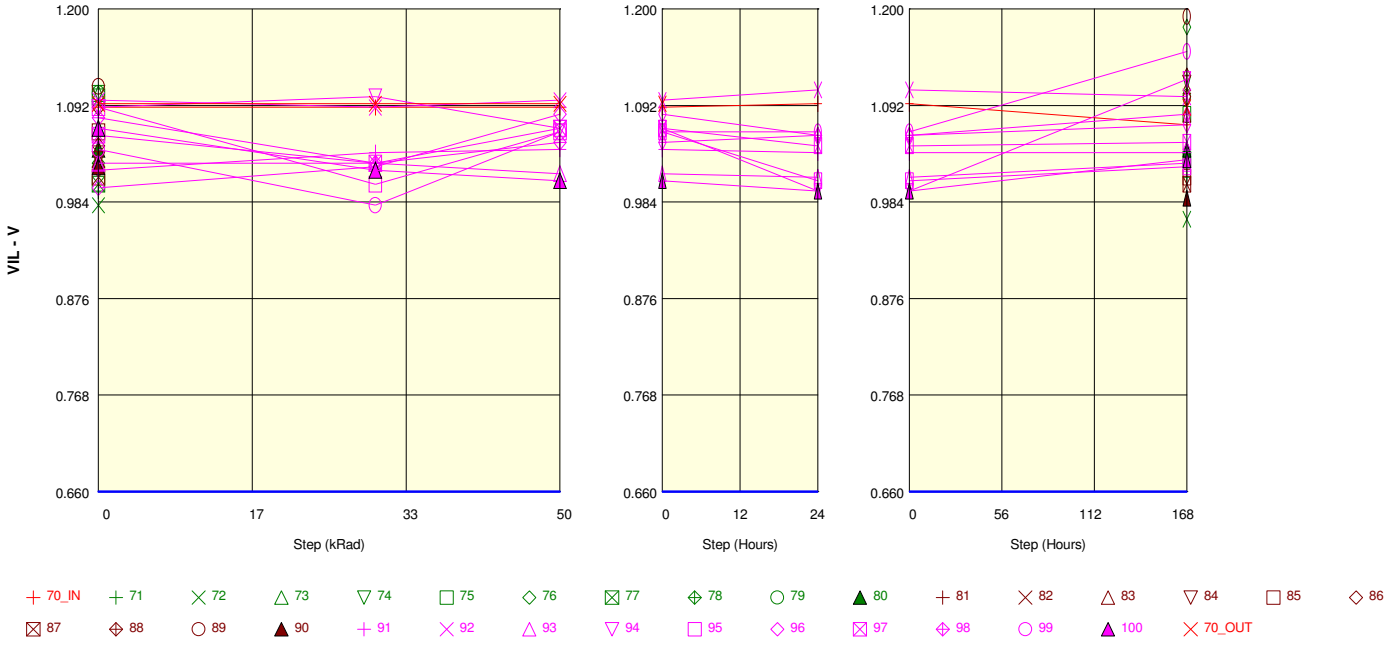
ILOHIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
Average	-7.1E-09	-	-	-	-9.7E-09
Std Deviation	4.8E-09	-	-	-	8.2E-09

Measurements

ILOHIO[7]	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-9.7E-09	-19.7E-09	-15.8E-09	-21.2E-09	-5.9E-09
70_OUT_REF	-15.1E-09	-15.1E-09	173.3E-12		-589.6E-12
OFF samples					
91	-9.7E-09	-22.7E-09	-9.7E-09	-10.5E-09	936.3E-12
92	-15.8E-09	-2.9E-09	-3.6E-09	-2.1E-09	-9.0E-09
93	-10.5E-09	-11.3E-09	-1.4E-09	4.0E-09	-12.8E-09
94	-1.4E-09	-11.3E-09	-11.3E-09	-5.9E-09	4.8E-09
95	-2.1E-09	-3.6E-09	-9.0E-09	-5.2E-09	-9.0E-09
96	-12.0E-09	-9.0E-09	-2.1E-09	-15.8E-09	3.2E-09
97	-10.5E-09	-12.0E-09	-2.1E-09	-1.4E-09	-1.4E-09
98	173.3E-12	-2.1E-09	1.7E-09	-20.4E-09	-12.0E-09
99	-9.0E-09	-2.1E-09	-10.5E-09	-10.5E-09	-4.4E-09
100	-3.6E-09	-18.1E-09	-9.0E-09	936.3E-12	-12.8E-09
Statistics					
Min	-15.8E-09	-22.7E-09	-11.3E-09	-20.4E-09	-12.8E-09
Max	173.3E-12	-2.1E-09	1.7E-09	4.0E-09	4.8E-09
Average	-7.5E-09	-9.5E-09	-5.7E-09	-6.7E-09	-5.2E-09
Std Deviation	5.1E-09	6.7E-09	4.4E-09	7.3E-09	6.4E-09

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	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	24 Hours	168 Hours
70_IN_REF	1.090	1.090	1.090	1.094	1.070
70_OUT_REF	1.094	1.094	1.094		1.090
LDC samples					
71	0.996				1.012
72	0.980				0.965
73	1.106				1.043
74	1.106				1.117
75	1.102				1.082
76	1.023				1.180
77	1.004				1.031
78	1.027				1.039
79	1.106				1.102
80	1.043				1.043
Statistics					
Min	0.980	-	-	-	0.965
Max	1.106	-	-	-	1.180
Average	1.049	-	-	-	1.061
Std Deviation	0.048	-	-	-	0.057

Measurements

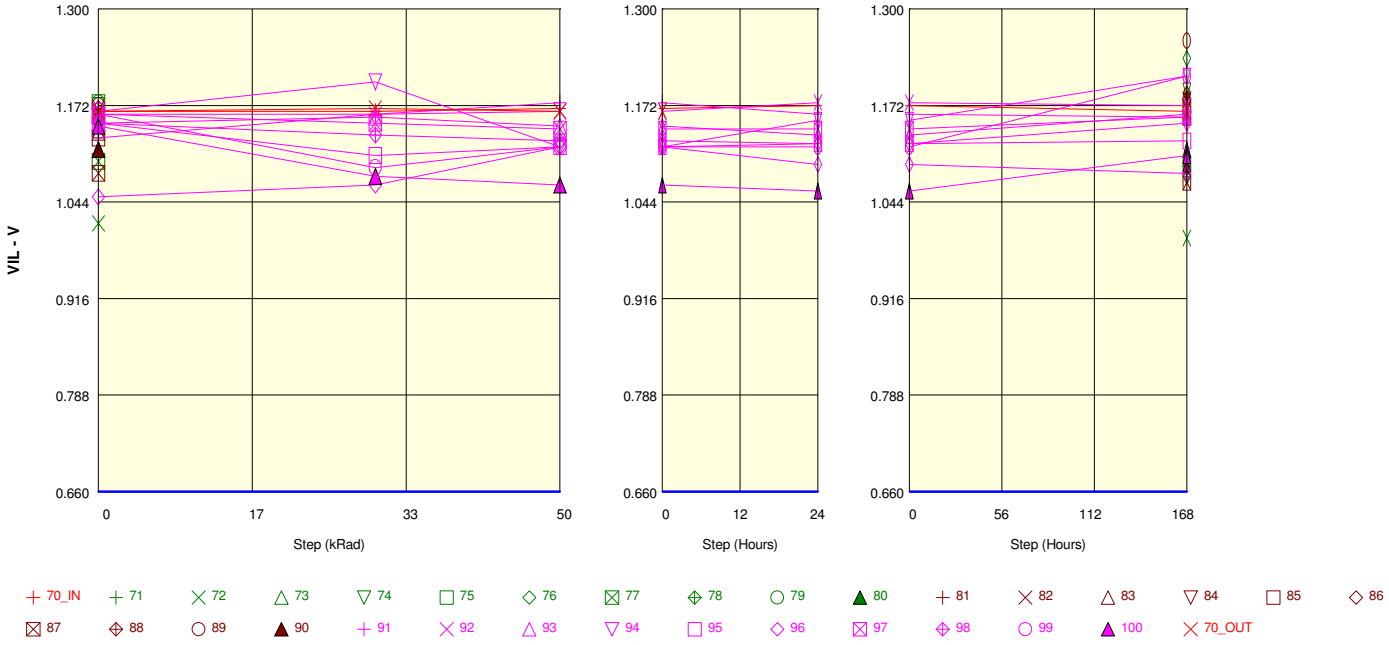
VILCONTROL	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	1.090	1.090	1.090	1.094	1.070
70_OUT_REF	1.094	1.094	1.094		1.090
HDC samples					
81	1.059				1.106
82	1.031				1.117
83	1.031				1.082
84	1.031				
85	1.063				1.012
86	1.090				1.102
87	1.012				1.004
88	1.047				1.125
89	1.113				1.191
90	1.023				0.988
Statistics					
Min	1.012	-	-	-	0.988
Max	1.113	-	-	-	1.191
Average	1.050	-	-	-	1.081
Std Deviation	0.030	-	-	-	0.063

Measurements

VILCONTROL	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	1.090	1.090	1.090	1.094	1.070
70_OUT_REF	1.094	1.094	1.094		1.090
OFF samples					
91	1.020	1.039	1.043	1.039	1.039
92	1.098	1.090	1.098	1.109	1.102
93	1.027	1.027	1.016	1.012	1.027
94	1.090	1.102	1.066	0.996	1.121
95	1.090	1.004	1.063	1.008	1.023
96	1.000	1.023	1.082	1.059	1.070
97	1.059	1.027	1.066	1.047	1.051
98	1.078	1.027	1.051	1.059	1.082
99	1.043	0.980	1.063	1.063	1.152
100	1.066	1.020	1.008	0.996	1.031
Statistics					
Min	1.000	0.980	1.008	0.996	1.023
Max	1.098	1.102	1.098	1.109	1.152
Average	1.057	1.034	1.055	1.039	1.070
Std Deviation	0.032	0.035	0.026	0.034	0.042

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	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	24 Hours	168 Hours
70_IN_REF	1.164	1.164	1.168	1.172	1.164
70_OUT_REF	1.164	1.168	1.164		1.164
LDC samples					
71	1.129				1.082
72	1.016				0.996
73	1.160				1.102
74	1.172				1.191
75	1.176				1.156
76	1.152				1.234
77	1.098				1.094
78	1.148				1.078
79	1.176				1.180
80	1.113				1.113
Statistics					
Min	1.016	-	-	-	0.996
Max	1.176	-	-	-	1.234
Average	1.134	-	-	-	1.123
Std Deviation	0.047	-	-	-	0.065

Measurements

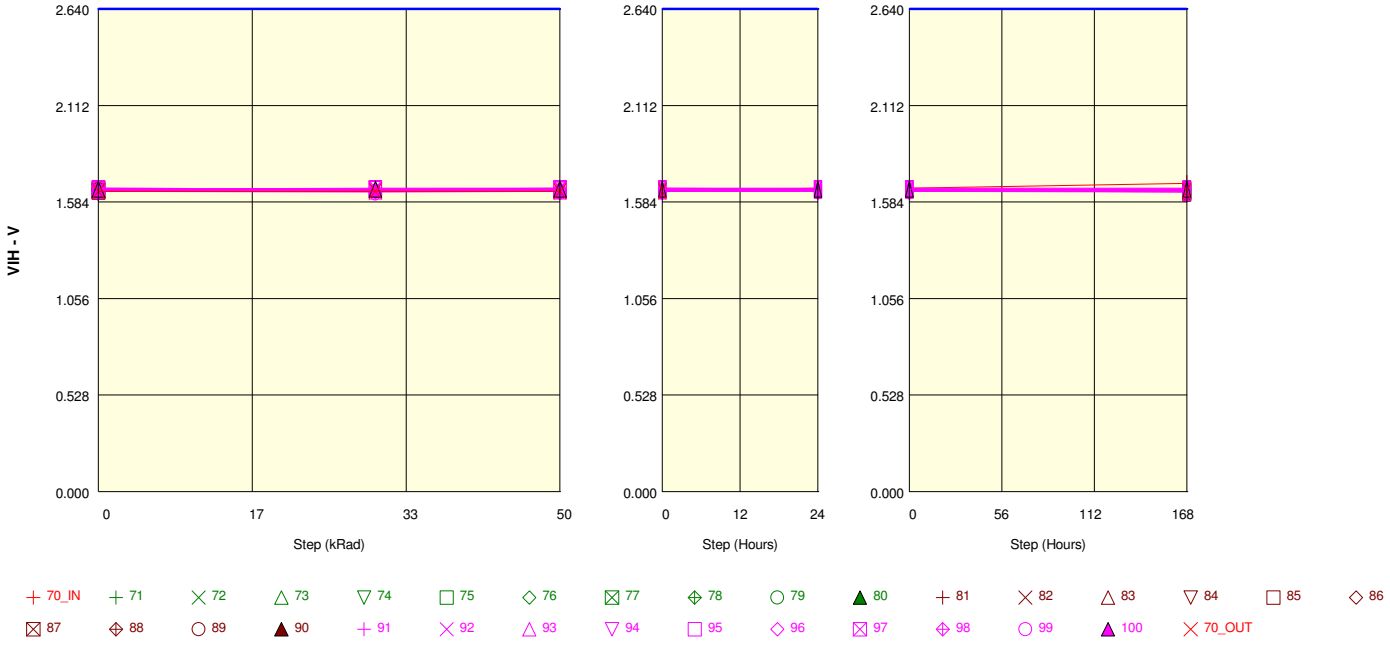
VILIO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	1.164	1.164	1.168	1.172	1.164
70_OUT_REF	1.164	1.168	1.164		1.164
HDC samples					
81	1.160				1.180
82	1.141				1.180
83	1.137				1.156
84	1.156				
85	1.129				1.172
86	1.156				1.180
87	1.082				1.070
88	1.168				1.188
89	1.172				1.258
90	1.113				1.094
Statistics					
Min	1.082	-	-	-	1.070
Max	1.172	-	-	-	1.258
Average	1.141	-	-	-	1.164
Std Deviation	0.026	-	-	-	0.052

Measurements

VILIO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	1.164	1.164	1.168	1.172	1.164
70_OUT_REF	1.164	1.168	1.164		1.164
OFF samples					
91	1.129	1.160	1.176	1.160	1.156
92	1.160	1.160	1.164	1.176	1.172
93	1.148	1.156	1.145	1.133	1.160
94	1.164	1.203	1.117	1.152	1.211
95	1.148	1.106	1.117	1.121	1.125
96	1.051	1.066	1.117	1.094	1.082
97	1.160	1.148	1.141	1.141	1.156
98	1.148	1.133	1.125	1.121	1.148
99	1.160	1.090	1.117	1.117	1.211
100	1.145	1.078	1.066	1.059	1.106
Statistics					
Min	1.051	1.066	1.066	1.059	1.082
Max	1.164	1.203	1.176	1.176	1.211
Average	1.141	1.130	1.129	1.127	1.153
Std Deviation	0.032	0.041	0.029	0.032	0.039

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	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	24 Hours	168 Hours
70_IN_REF	1.643	1.643	1.643	1.659	1.687
70_OUT_REF	1.643	1.643	1.643		1.643
LDC samples					
71	1.643				1.638
72	1.648				1.643
73	1.648				1.643
74	1.643				1.638
75	1.654				1.648
76	1.654				1.648
77	1.654				1.654
78	1.654				1.648
79	1.648				1.643
80	1.654				1.643
Statistics					
Min	1.643	-	-	-	1.638
Max	1.654	-	-	-	1.654
Average	1.650	-	-	-	1.645
Std Deviation	0.004	-	-	-	0.005

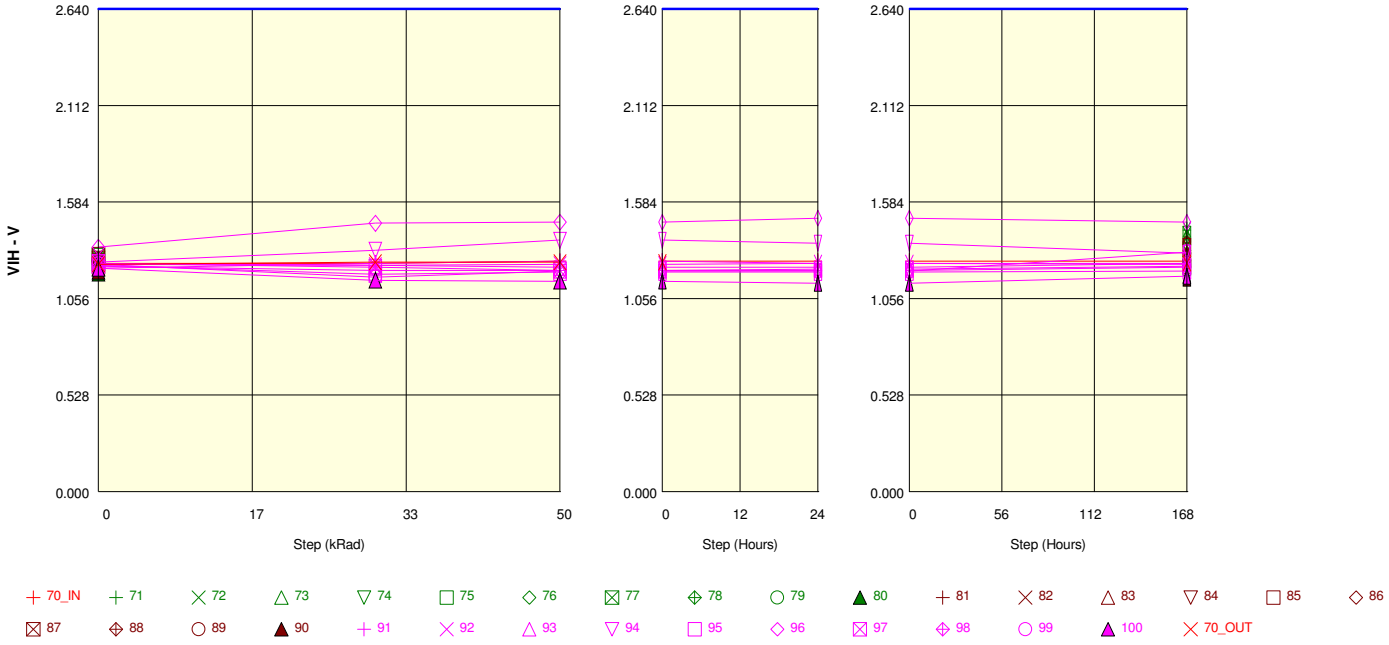
Measurements

VIHCONTROL	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	1.643	1.643	1.643	1.659	1.687
70_OUT_REF	1.643	1.643	1.643		1.643
HDC samples					
81	1.648				1.638
82	1.654				1.648
83	1.648				1.643
84	1.638				
85	1.643				1.632
86	1.654				1.654
87	1.643				1.638
88	1.638				1.627
89	1.648				1.648
90	1.654				1.648
Statistics					
Min	1.638	-	-	-	1.627
Max	1.654	-	-	-	1.654
Average	1.647	-	-	-	1.642
Std Deviation	0.006	-	-	-	0.008

Measurements

VIHCONTROL	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	1.643	1.643	1.643	1.659	1.687
70_OUT_REF	1.643	1.643	1.643		1.643
OFF samples					
91	1.659	1.654	1.659	1.654	1.654
92	1.654	1.648	1.654	1.654	1.648
93	1.648	1.643	1.643	1.648	1.638
94	1.659	1.654	1.654	1.654	1.648
95	1.648	1.654	1.648	1.648	1.648
96	1.648	1.643	1.643	1.643	1.643
97	1.654	1.659	1.659	1.659	1.659
98	1.654	1.648	1.648	1.654	1.654
99	1.643	1.638	1.643	1.643	1.638
100	1.654	1.654	1.654	1.654	1.654
Statistics					
Min	1.643	1.638	1.643	1.643	1.638
Max	1.659	1.659	1.659	1.659	1.659
Average	1.652	1.650	1.651	1.651	1.648
Std Deviation	0.005	0.006	0.006	0.005	0.007

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	24 Hours	168 Hours
70_IN_REF	1.249	1.249	1.260	1.260	1.260
70_OUT_REF	1.244	1.255	1.255		1.249
LDC samples					
71	1.222				1.430
72	1.266				1.435
73	1.255				1.402
74	1.266				1.277
75	1.260				1.227
76	1.244				1.353
77	1.288				1.408
78	1.244				1.353
79	1.260				1.255
80	1.195				1.184
Statistics					
Min	1.195	-	-	-	1.184
Max	1.288	-	-	-	1.435
Average	1.250	-	-	-	1.332
Std Deviation	0.025	-	-	-	0.086

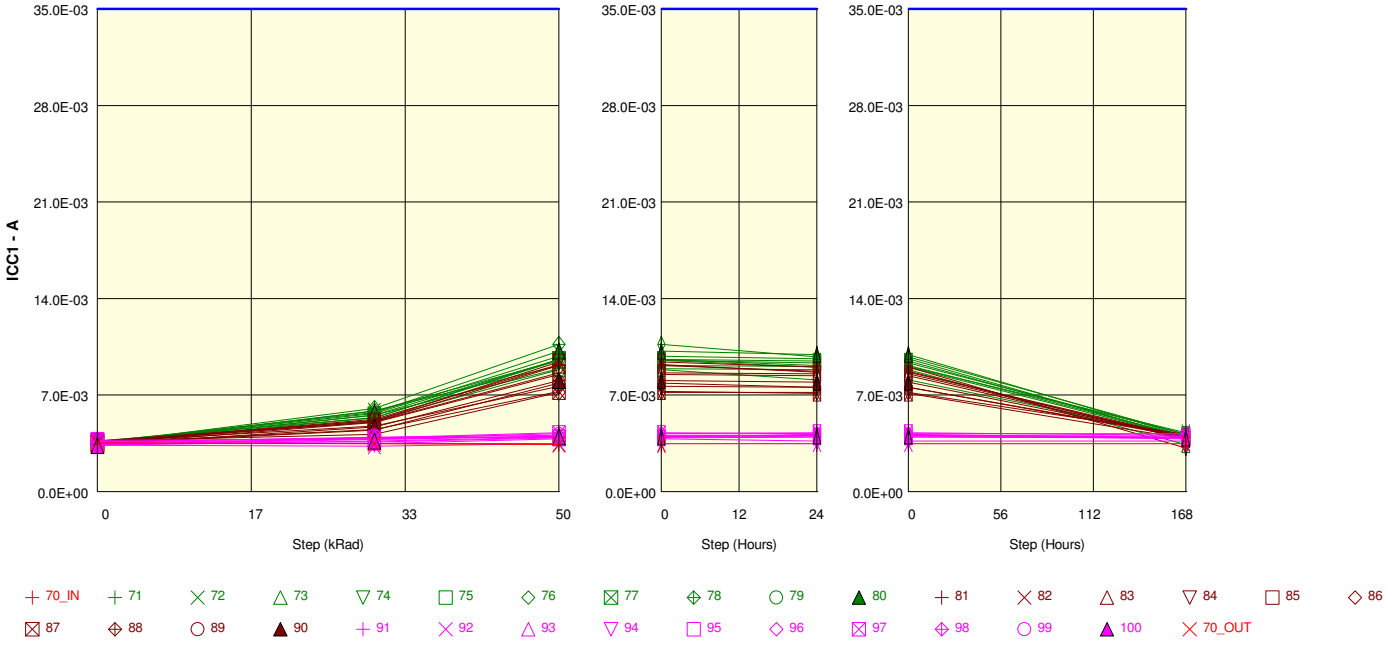
Measurements

VIHIO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	1.249	1.249	1.260	1.260	1.260
70_OUT_REF	1.244	1.255	1.255		1.249
HDC samples					
81	1.238				1.266
82	1.238				1.277
83	1.227				1.238
84	1.271				
85	1.238				1.266
86	1.260				1.266
87	1.293				1.342
88	1.266				1.288
89	1.266				1.353
90	1.206				1.167
Statistics					
Min	1.206	-	-	-	1.167
Max	1.293	-	-	-	1.353
Average	1.250	-	-	-	1.274
Std Deviation	0.024	-	-	-	0.052

Measurements

VIHIO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	1.249	1.249	1.260	1.260	1.260
70_OUT_REF	1.244	1.255	1.255		1.249
OFF samples					
91	1.222	1.249	1.260	1.249	1.244
92	1.249	1.238	1.244	1.249	1.249
93	1.244	1.238	1.227	1.227	1.249
94	1.255	1.320	1.375	1.359	1.304
95	1.238	1.189	1.200	1.200	1.206
96	1.337	1.468	1.473	1.495	1.473
97	1.249	1.227	1.211	1.216	1.233
98	1.233	1.211	1.211	1.211	1.227
99	1.244	1.173	1.206	1.206	1.309
100	1.222	1.156	1.151	1.140	1.178
Statistics					
Min	1.222	1.156	1.151	1.140	1.178
Max	1.337	1.468	1.473	1.495	1.473
Average	1.249	1.247	1.256	1.255	1.267
Std Deviation	0.031	0.086	0.091	0.096	0.078

Parameter : Operating Current. Page Read : ICC1
Test conditions : trc=25ns CE/=Vil. Iout=0mA
Unit : A
Spec Limit Max : 35.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

ICC1	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.5E-03	3.5E-03	3.5E-03	3.5E-03	3.5E-03
70_OUT_REF	3.5E-03	3.5E-03	3.4E-03		3.5E-03
LDC samples					
71	3.5E-03	5.7E-03	9.8E-03	9.6E-03	3.9E-03
72	3.4E-03	5.9E-03	9.2E-03	9.1E-03	4.3E-03
73	3.5E-03	5.6E-03	8.9E-03	8.9E-03	3.4E-03
74	3.5E-03	5.4E-03	9.6E-03	9.2E-03	4.0E-03
75	3.7E-03	5.4E-03	9.5E-03	9.3E-03	4.2E-03
76	3.5E-03	5.9E-03	9.5E-03	9.0E-03	4.0E-03
77	3.5E-03	5.6E-03	9.6E-03	9.5E-03	4.0E-03
78	3.5E-03	6.0E-03	10.7E-03	9.8E-03	4.2E-03
79	3.5E-03	5.2E-03	8.9E-03	8.1E-03	4.0E-03
80	3.6E-03	5.7E-03	10.2E-03	9.9E-03	4.0E-03
Statistics					
Min	3.4E-03	5.2E-03	8.9E-03	8.1E-03	3.4E-03
Max	3.7E-03	6.0E-03	10.7E-03	9.9E-03	4.3E-03
Average	3.5E-03	5.6E-03	9.6E-03	9.2E-03	4.0E-03
Std Deviation	68.2E-06	250.8E-06	530.7E-06	498.3E-06	217.0E-06

Measurements

ICC1	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.5E-03	3.5E-03	3.5E-03	3.5E-03	3.5E-03
70_OUT_REF	3.5E-03	3.5E-03	3.4E-03		3.5E-03
HDC samples					
81	3.5E-03	5.2E-03	9.2E-03	8.7E-03	4.0E-03
82	3.4E-03	5.0E-03	8.5E-03	8.4E-03	3.8E-03
83	3.5E-03	5.1E-03	9.2E-03	8.7E-03	3.8E-03
84	3.7E-03	5.1E-03	9.4E-03	9.0E-03	3.2E-03
85	3.6E-03	5.1E-03	8.6E-03	8.5E-03	3.9E-03
86	3.7E-03	4.2E-03	7.2E-03	7.2E-03	4.2E-03
87	3.5E-03	4.5E-03	7.3E-03	7.1E-03	3.8E-03
88	3.6E-03	4.8E-03	7.6E-03	7.6E-03	4.0E-03
89	3.5E-03	4.5E-03	7.9E-03	7.6E-03	4.0E-03
90	3.4E-03	4.7E-03	8.1E-03	7.9E-03	4.0E-03
Statistics					
Min	3.4E-03	4.2E-03	7.2E-03	7.1E-03	3.2E-03
Max	3.7E-03	5.2E-03	9.4E-03	9.0E-03	4.2E-03
Average	3.5E-03	4.8E-03	8.3E-03	8.1E-03	3.9E-03
Std Deviation	83.9E-06	335.2E-06	766.6E-06	648.4E-06	250.2E-06

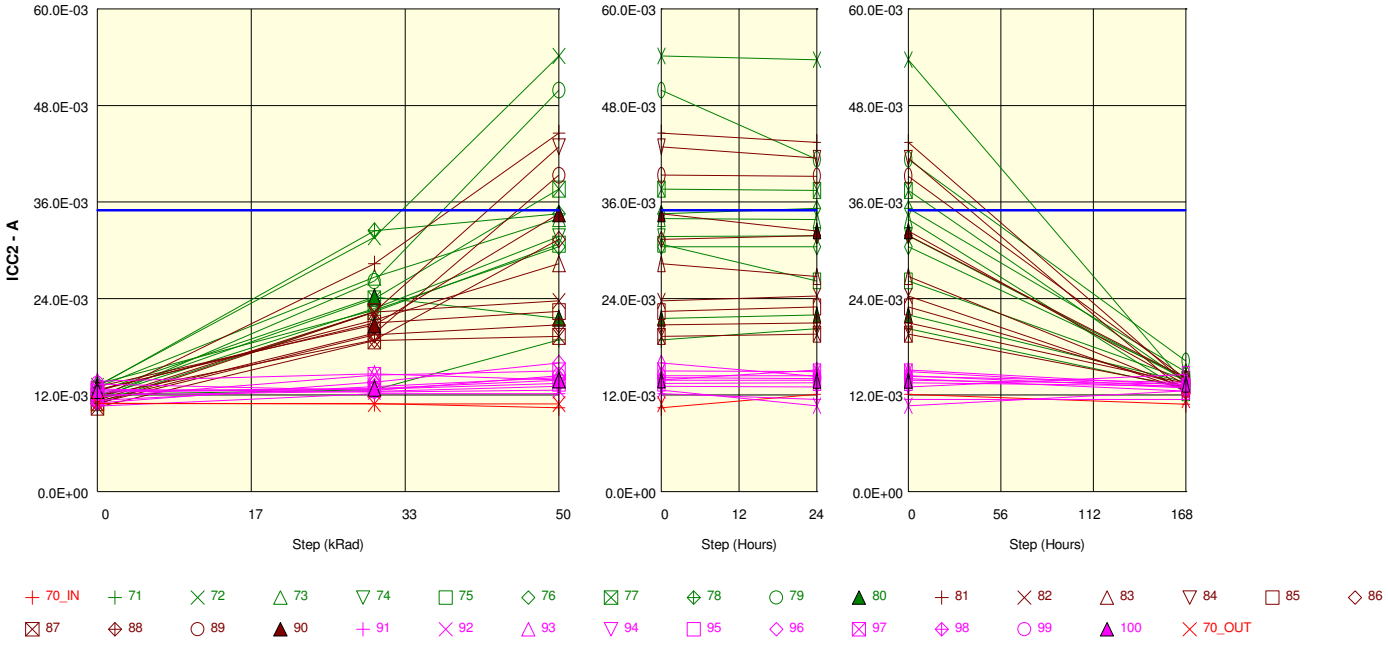
Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Measurements

ICC1	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.5E-03	3.5E-03	3.5E-03	3.5E-03	3.5E-03
70_OUT_REF	3.5E-03	3.5E-03	3.4E-03		3.5E-03
OFF samples					
91	3.6E-03	3.9E-03	4.3E-03	4.2E-03	4.2E-03
92	3.4E-03	3.3E-03	3.5E-03	3.5E-03	3.5E-03
93	3.4E-03	3.8E-03	4.0E-03	4.1E-03	4.0E-03
94	3.5E-03	3.5E-03	3.8E-03	3.7E-03	3.7E-03
95	3.6E-03	3.6E-03	3.9E-03	4.0E-03	3.9E-03
96	3.4E-03	3.9E-03	4.0E-03	4.2E-03	3.9E-03
97	3.7E-03	3.8E-03	4.2E-03	4.3E-03	4.1E-03
98	3.5E-03	3.8E-03	4.0E-03	4.1E-03	4.0E-03
99	3.6E-03	4.0E-03	4.1E-03	4.1E-03	3.8E-03
100	3.4E-03	3.7E-03	4.0E-03	4.0E-03	3.9E-03
Statistics					
Min	3.4E-03	3.3E-03	3.5E-03	3.5E-03	3.5E-03
Max	3.7E-03	4.0E-03	4.3E-03	4.3E-03	4.2E-03
Average	3.5E-03	3.7E-03	4.0E-03	4.0E-03	3.9E-03
Std Deviation	122.7E-06	205.1E-06	207.5E-06	235.1E-06	197.7E-06

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Operating Current. Program : ICC2
Test conditions :
Unit : A
Spec Limit Max : 35.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

ICC2	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	10.9E-03	10.9E-03	10.4E-03	12.1E-03	10.9E-03
70_OUT_REF	11.0E-03	10.9E-03	10.9E-03		11.4E-03
LDC samples					
71	12.1E-03	12.7E-03	18.9E-03	20.3E-03	12.9E-03
72	13.2E-03	31.6E-03	**54.1E-03**	**53.7E-03**	13.3E-03
73	13.0E-03	26.7E-03	33.9E-03	33.8E-03	12.3E-03
74	11.7E-03	22.8E-03	31.7E-03	31.8E-03	13.9E-03
75	11.1E-03	22.4E-03	30.8E-03	26.2E-03	13.9E-03
76	13.4E-03	22.5E-03	30.4E-03	30.4E-03	14.2E-03
77	11.9E-03	24.0E-03	**37.6E-03**	**37.4E-03**	13.6E-03
78	13.1E-03	32.4E-03	34.6E-03	**35.2E-03**	14.9E-03
79	11.4E-03	26.2E-03	**49.9E-03**	**41.3E-03**	16.2E-03
80	12.4E-03	24.2E-03	21.5E-03	22.0E-03	13.6E-03
Statistics					
Min	11.1E-03	12.7E-03	18.9E-03	20.3E-03	12.3E-03
Max	13.4E-03	32.4E-03	54.1E-03	53.7E-03	16.2E-03
Average	12.3E-03	24.5E-03	34.3E-03	33.2E-03	13.9E-03
Std Deviation	761.1E-06	5.2E-03	10.4E-03	9.3E-03	1.0E-03

Measurements

ICC2	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	10.9E-03	10.9E-03	10.4E-03	12.1E-03	10.9E-03
70_OUT_REF	11.0E-03	10.9E-03	10.9E-03		11.4E-03
HDC samples					
81	11.5E-03	28.3E-03	**44.6E-03**	**43.4E-03**	13.5E-03
82	10.9E-03	22.3E-03	23.7E-03	24.3E-03	12.6E-03
83	12.5E-03	21.3E-03	28.3E-03	26.7E-03	12.8E-03
84	11.4E-03	22.4E-03	**42.9E-03**	**41.4E-03**	12.3E-03
85	12.7E-03	21.0E-03	22.4E-03	23.0E-03	13.1E-03
86	11.9E-03	18.8E-03	31.4E-03	31.8E-03	14.1E-03
87	10.5E-03	18.8E-03	19.3E-03	19.6E-03	13.0E-03
88	11.0E-03	19.5E-03	20.7E-03	21.0E-03	13.5E-03
89	11.2E-03	19.7E-03	**39.3E-03**	**39.2E-03**	14.1E-03
90	13.1E-03	20.7E-03	34.5E-03	32.4E-03	13.3E-03
Statistics					
Min	10.5E-03	18.8E-03	19.3E-03	19.6E-03	12.3E-03
Max	13.1E-03	28.3E-03	44.6E-03	43.4E-03	14.1E-03
Average	11.7E-03	21.3E-03	30.7E-03	30.3E-03	13.2E-03
Std Deviation	805.7E-06	2.7E-03	8.8E-03	8.3E-03	565.1E-06

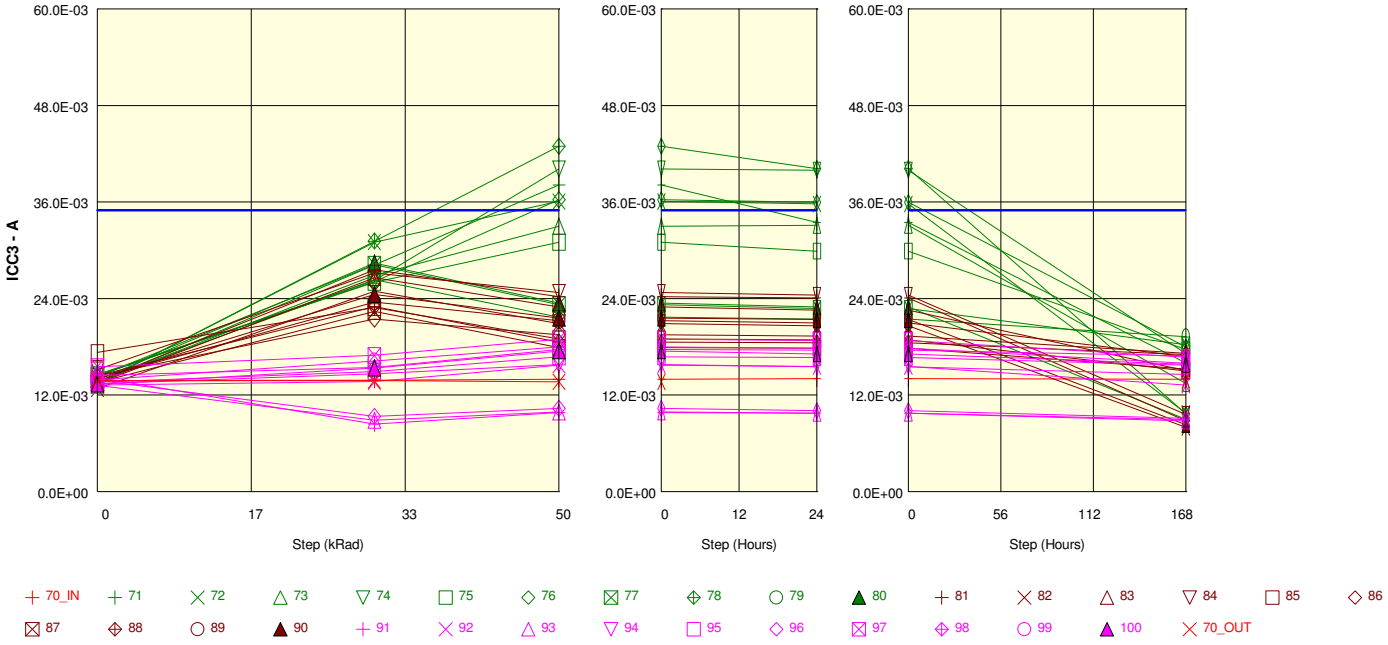
Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Measurements

ICC2	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	10.9E-03	10.9E-03	10.4E-03	12.1E-03	10.9E-03
70_OUT_REF	11.0E-03	10.9E-03	10.9E-03		11.4E-03
OFF samples					
91	10.6E-03	12.2E-03	12.2E-03	11.5E-03	11.5E-03
92	12.8E-03	12.4E-03	12.6E-03	10.7E-03	12.5E-03
93	13.7E-03	14.7E-03	13.9E-03	15.1E-03	13.2E-03
94	12.0E-03	12.4E-03	13.1E-03	13.0E-03	14.6E-03
95	12.4E-03	12.7E-03	13.5E-03	13.6E-03	13.2E-03
96	11.0E-03	13.6E-03	16.0E-03	14.3E-03	13.6E-03
97	11.7E-03	14.5E-03	15.0E-03	14.9E-03	13.0E-03
98	11.3E-03	13.1E-03	14.2E-03	14.0E-03	12.5E-03
99	13.4E-03	12.6E-03	14.4E-03	14.4E-03	12.9E-03
100	12.6E-03	12.8E-03	13.9E-03	13.8E-03	13.4E-03
Statistics					
Min	10.6E-03	12.2E-03	12.2E-03	10.7E-03	11.5E-03
Max	13.7E-03	14.7E-03	16.0E-03	15.1E-03	14.6E-03
Average	12.2E-03	13.1E-03	13.9E-03	13.5E-03	13.0E-03
Std Deviation	947.7E-06	828.4E-06	1.1E-03	1.4E-03	764.1E-06

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Operating Current. Erase : ICC3
Test conditions :
Unit : A
Spec Limit Max : 35.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

ICC3	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	13.8E-03	13.8E-03	14.0E-03	14.1E-03	14.0E-03
70_OUT_REF	13.8E-03	13.8E-03	13.7E-03		13.8E-03
LDC samples					
71	13.5E-03	28.2E-03	**38.1E-03**	33.5E-03	16.0E-03
72	13.4E-03	31.0E-03	**36.1E-03**	**35.8E-03**	9.7E-03
73	13.6E-03	26.9E-03	33.0E-03	33.1E-03	13.5E-03
74	14.4E-03	26.3E-03	**40.1E-03**	**39.9E-03**	17.2E-03
75	14.5E-03	26.0E-03	31.0E-03	29.9E-03	17.7E-03
76	14.4E-03	26.1E-03	**36.3E-03**	**36.0E-03**	18.0E-03
77	14.3E-03	28.2E-03	23.3E-03	22.8E-03	18.2E-03
78	13.4E-03	31.1E-03	**42.9E-03**	**40.2E-03**	9.7E-03
79	13.7E-03	26.3E-03	21.7E-03	21.5E-03	19.3E-03
80	13.9E-03	28.4E-03	23.4E-03	22.9E-03	9.0E-03
Statistics					
Min	13.4E-03	26.0E-03	21.7E-03	21.5E-03	9.0E-03
Max	14.5E-03	31.1E-03	42.9E-03	40.2E-03	19.3E-03
Average	13.9E-03	27.9E-03	32.6E-03	31.5E-03	14.8E-03
Std Deviation	437.3E-06	1.8E-03	7.2E-03	6.7E-03	3.8E-03

Measurements

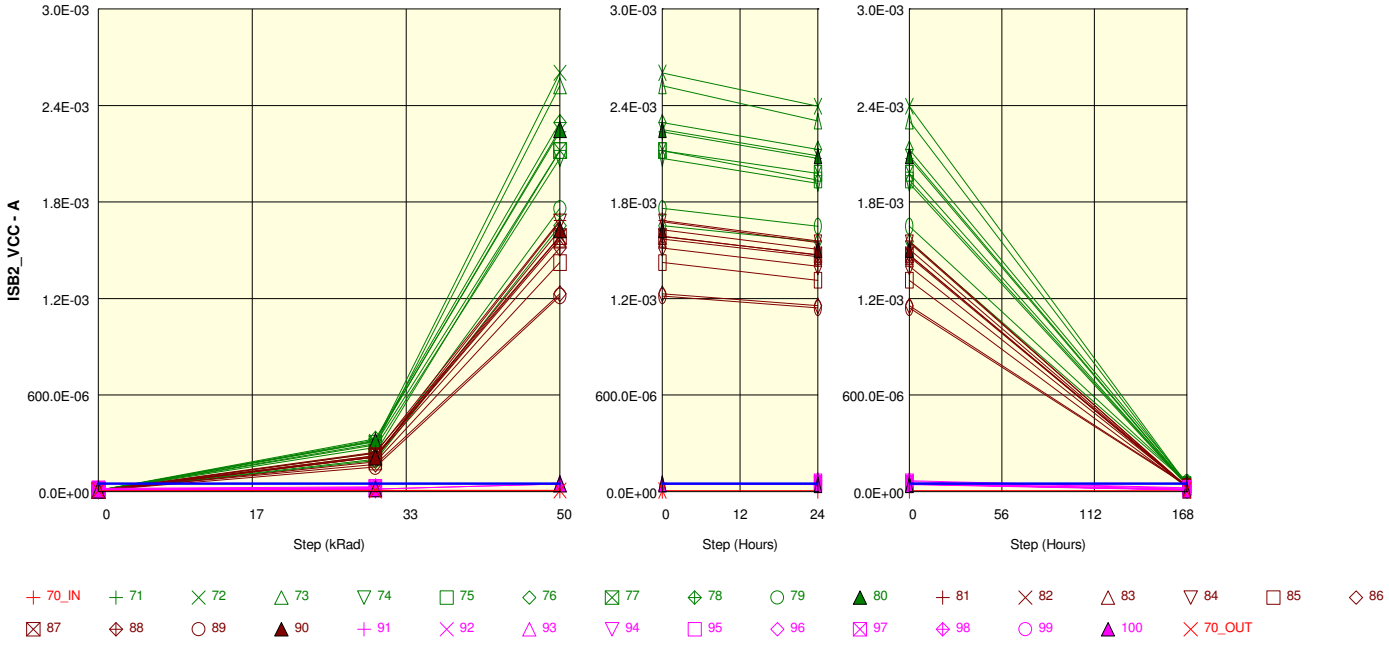
ICC3	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	13.8E-03	13.8E-03	14.0E-03	14.1E-03	14.0E-03
70_OUT_REF	13.8E-03	13.8E-03	13.7E-03		13.8E-03
HDC samples					
81	13.7E-03	27.6E-03	24.3E-03	24.1E-03	8.8E-03
82	12.8E-03	24.9E-03	20.9E-03	20.6E-03	8.0E-03
83	13.5E-03	26.6E-03	23.0E-03	22.5E-03	15.1E-03
84	15.1E-03	27.2E-03	24.7E-03	24.4E-03	9.6E-03
85	17.3E-03	22.9E-03	19.0E-03	18.9E-03	15.0E-03
86	14.4E-03	21.4E-03	19.5E-03	19.3E-03	17.2E-03
87	13.6E-03	22.4E-03	17.9E-03	17.8E-03	15.2E-03
88	14.4E-03	23.0E-03	18.6E-03	18.5E-03	17.0E-03
89	14.1E-03	23.6E-03	21.3E-03	20.9E-03	16.8E-03
90	14.0E-03	24.5E-03	21.6E-03	21.4E-03	8.3E-03
Statistics					
Min	12.8E-03	21.4E-03	17.9E-03	17.8E-03	8.0E-03
Max	17.3E-03	27.6E-03	24.7E-03	24.4E-03	17.2E-03
Average	14.3E-03	24.4E-03	21.1E-03	20.9E-03	13.1E-03
Std Deviation	1.2E-03	2.0E-03	2.2E-03	2.2E-03	3.7E-03

Measurements

ICC3	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	13.8E-03	13.8E-03	14.0E-03	14.1E-03	14.0E-03
70_OUT_REF	13.8E-03	13.8E-03	13.7E-03		13.8E-03
OFF samples					
91	14.2E-03	8.4E-03	9.8E-03	9.8E-03	9.0E-03
92	13.2E-03	13.7E-03	15.7E-03	15.6E-03	13.2E-03
93	13.2E-03	8.9E-03	9.9E-03	9.8E-03	8.8E-03
94	13.4E-03	14.7E-03	15.8E-03	15.5E-03	14.6E-03
95	13.6E-03	15.0E-03	16.7E-03	16.7E-03	15.7E-03
96	13.9E-03	9.4E-03	10.4E-03	10.1E-03	9.1E-03
97	15.5E-03	16.9E-03	19.0E-03	18.8E-03	16.7E-03
98	14.5E-03	15.4E-03	17.7E-03	17.6E-03	16.9E-03
99	13.9E-03	16.2E-03	18.0E-03	17.8E-03	16.0E-03
100	13.3E-03	15.4E-03	17.5E-03	17.1E-03	15.8E-03
Statistics					
Min	13.2E-03	8.4E-03	9.8E-03	9.8E-03	8.8E-03
Max	15.5E-03	16.9E-03	19.0E-03	18.8E-03	16.9E-03
Average	13.9E-03	13.4E-03	15.0E-03	14.9E-03	13.6E-03
Std Deviation	677.8E-06	3.1E-03	3.4E-03	3.4E-03	3.2E-03

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Standby Current CMOS : ISB2_VCC
Test conditions : CE/=VCC-0.2V . WP/=0V/VCC
Unit : A
Spec Limit Max : 50.0E-06
Spec limits are represented in bold lines on the graphic.



Measurements

ISB2_VCC	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	7.0E-06	6.7E-06	7.0E-06	7.2E-06	6.3E-06
70_OUT_REF	7.0E-06	7.6E-06	7.6E-06		7.0E-06
LDC samples					
71	6.7E-06	321.8E-06	2.2E-03	2.1E-03	42.6E-06
72	7.5E-06	310.2E-06	2.6E-03	2.4E-03	45.2E-06
73	7.3E-06	290.8E-06	2.5E-03	2.3E-03	42.9E-06
74	7.0E-06	275.3E-06	2.1E-03	1.9E-03	38.9E-06
75	7.2E-06	240.9E-06	2.1E-03	1.9E-03	43.9E-06
76	6.7E-06	193.5E-06	1.7E-03	1.6E-03	55.5E-06
77	7.2E-06	299.5E-06	2.1E-03	2.0E-03	43.3E-06
78	7.5E-06	327.6E-06	2.3E-03	2.1E-03	56.9E-06
79	7.0E-06	202.5E-06	1.8E-03	1.6E-03	58.4E-06
80	8.2E-06	313.9E-06	2.3E-03	2.1E-03	43.9E-06
Statistics					
Min	6.7E-06	193.5E-06	1.7E-03	1.6E-03	38.9E-06
Max	8.2E-06	327.6E-06	2.6E-03	2.4E-03	58.4E-06
Average	7.2E-06	277.6E-06	2.2E-03	2.0E-03	47.2E-06
Std Deviation	421.7E-09	46.4E-06	280.5E-06	247.1E-06	6.6E-06

Measurements

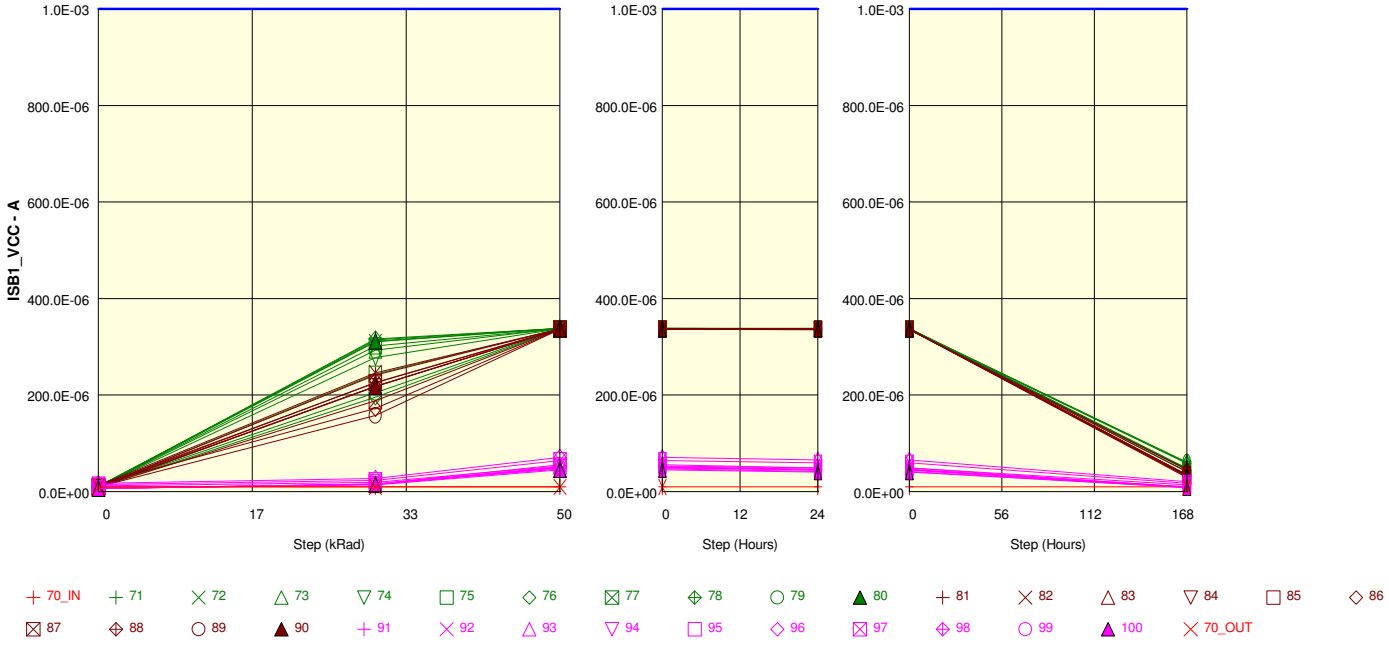
ISB2_VCC	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	7.0E-06	6.7E-06	7.0E-06	7.2E-06	6.3E-06
70_OUT_REF	7.0E-06	7.6E-06	7.6E-06		7.0E-06
HDC samples					
81	7.0E-06	239.3E-06	1.7E-03	1.6E-03	28.8E-06
82	9.5E-06	244.1E-06	1.6E-03	1.5E-03	32.0E-06
83	9.2E-06	223.4E-06	1.6E-03	1.5E-03	29.4E-06
84	6.9E-06	215.3E-06	1.7E-03	1.5E-03	32.2E-06
85	6.7E-06	185.7E-06	1.4E-03	1.3E-03	28.2E-06
86	13.1E-06	169.8E-06	1.2E-03	1.2E-03	42.9E-06
87	7.2E-06	224.0E-06	1.6E-03	1.5E-03	26.9E-06
88	7.0E-06	216.2E-06	1.5E-03	1.4E-03	31.9E-06
89	7.6E-06	155.2E-06	1.2E-03	1.1E-03	38.5E-06
90	6.6E-06	214.7E-06	1.6E-03	1.5E-03	31.0E-06
Statistics					
Min	6.6E-06	155.2E-06	1.2E-03	1.1E-03	26.9E-06
Max	13.1E-06	244.1E-06	1.7E-03	1.6E-03	42.9E-06
Average	8.1E-06	208.8E-06	1.5E-03	1.4E-03	32.2E-06
Std Deviation	1.9E-06	27.7E-06	161.1E-06	143.3E-06	4.7E-06

Measurements

ISB2_VCC	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	7.0E-06	6.7E-06	7.0E-06	7.2E-06	6.3E-06
70_OUT_REF	7.0E-06	7.6E-06	7.6E-06		7.0E-06
OFF samples					
91	9.7E-06	18.3E-06		49.7E-06	12.2E-06
92	10.1E-06	19.1E-06		51.6E-06	12.5E-06
93	9.9E-06	17.7E-06	49.7E-06	45.0E-06	12.1E-06
94	10.1E-06	18.3E-06		47.9E-06	12.7E-06
95	15.0E-06	22.7E-06		51.7E-06	16.4E-06
96	20.0E-06	31.0E-06		68.3E-06	24.0E-06
97	17.4E-06	26.4E-06		62.3E-06	20.3E-06
98	10.0E-06	18.2E-06		48.3E-06	12.0E-06
99	9.9E-06	17.6E-06		48.8E-06	12.8E-06
100	9.7E-06	17.2E-06	48.2E-06	43.6E-06	11.2E-06
Statistics					
Min	9.7E-06	17.2E-06	48.2E-06	43.6E-06	11.2E-06
Max	20.0E-06	31.0E-06	49.7E-06	68.3E-06	24.0E-06
Average	12.2E-06	20.6E-06	49.0E-06	51.7E-06	14.6E-06
Std Deviation	3.6E-06	4.4E-06	755.0E-09	7.3E-06	4.1E-06

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Standby Current TTL : ISB1_VCC
Test conditions : CE/=VIH . WP/=0V/VCC
Unit : A
Spec Limit Max : 1.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

ISB1_VCC	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	10.0E-06	9.9E-06	9.9E-06	10.1E-06	10.4E-06
70_OUT_REF	10.0E-06	10.0E-06	10.0E-06		9.8E-06
LDC samples					
71	9.9E-06	314.5E-06	338.0E-06	337.7E-06	46.1E-06
72	10.3E-06	310.2E-06	338.5E-06	338.2E-06	48.5E-06
73	10.0E-06	293.1E-06	338.3E-06	337.9E-06	46.3E-06
74	9.8E-06	277.8E-06	337.5E-06	337.3E-06	42.1E-06
75	10.0E-06	243.6E-06	337.6E-06	337.3E-06	47.1E-06
76	9.6E-06	196.1E-06	336.8E-06	336.6E-06	58.4E-06
77	10.0E-06	302.0E-06	337.8E-06	337.6E-06	46.1E-06
78	10.5E-06	316.5E-06	337.9E-06	337.7E-06	59.9E-06
79	10.0E-06	205.4E-06	337.1E-06	336.9E-06	61.1E-06
80	11.1E-06	311.8E-06	338.0E-06	337.8E-06	47.0E-06
Statistics					
Min	9.6E-06	196.1E-06	336.8E-06	336.6E-06	42.1E-06
Max	11.1E-06	316.5E-06	338.5E-06	338.2E-06	61.1E-06
Average	10.1E-06	277.1E-06	337.7E-06	337.5E-06	50.3E-06
Std Deviation	389.2E-09	43.5E-06	482.1E-09	453.5E-09	6.5E-06

Measurements

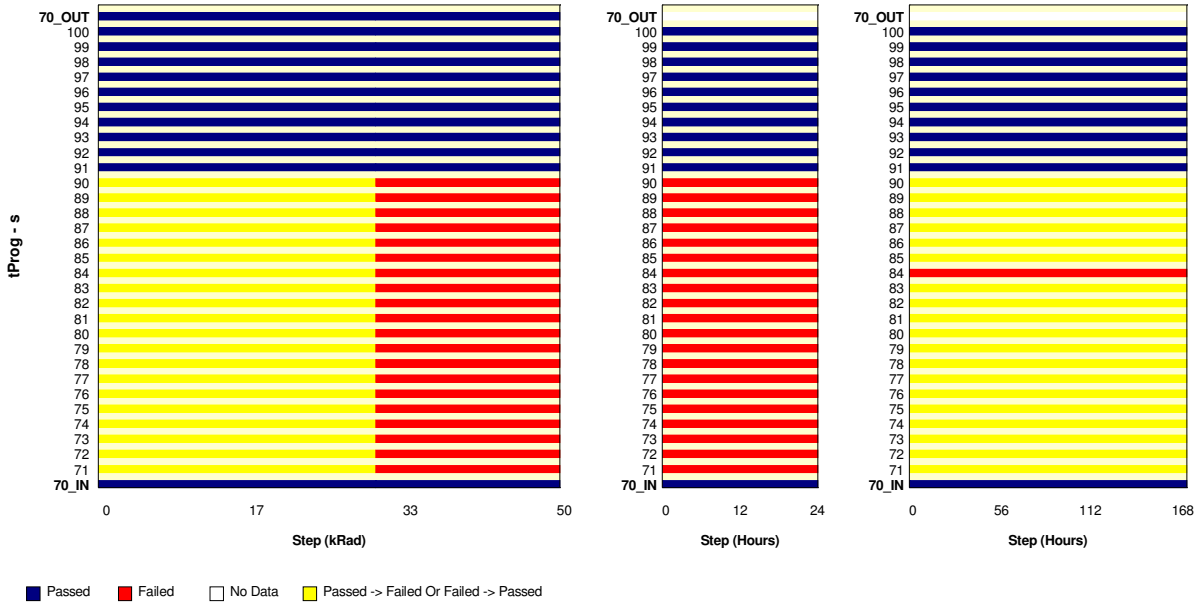
ISB1_VCC	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	10.0E-06	9.9E-06	9.9E-06	10.1E-06	10.4E-06
70_OUT_REF	10.0E-06	10.0E-06	10.0E-06		9.8E-06
HDC samples					
81	10.0E-06	241.7E-06	336.9E-06	336.8E-06	32.3E-06
82	12.4E-06	246.4E-06	336.7E-06	336.5E-06	35.1E-06
83	12.6E-06	225.9E-06	336.6E-06	336.4E-06	33.2E-06
84	9.9E-06	218.2E-06	336.9E-06	336.7E-06	35.0E-06
85	9.8E-06	188.3E-06	336.4E-06	336.2E-06	31.4E-06
86	15.8E-06	172.5E-06	335.8E-06	335.7E-06	45.8E-06
87	9.9E-06	226.3E-06	336.6E-06	336.5E-06	29.2E-06
88	9.9E-06	218.7E-06	336.6E-06	336.4E-06	34.9E-06
89	10.4E-06	158.0E-06	335.9E-06	335.8E-06	41.4E-06
90	9.7E-06	217.5E-06	336.7E-06	336.6E-06	33.7E-06
Statistics					
Min	9.7E-06	158.0E-06	335.8E-06	335.7E-06	29.2E-06
Max	15.8E-06	246.4E-06	336.9E-06	336.8E-06	45.8E-06
Average	11.1E-06	211.3E-06	336.5E-06	336.3E-06	35.2E-06
Std Deviation	1.9E-06	27.6E-06	369.7E-09	352.8E-09	4.6E-06

Measurements

ISB1_VCC	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	10.0E-06	9.9E-06	9.9E-06	10.1E-06	10.4E-06
70_OUT_REF	10.0E-06	10.0E-06	10.0E-06		9.8E-06
OFF samples					
91	6.9E-06	15.4E-06	51.9E-06	47.0E-06	9.6E-06
92	7.0E-06	16.0E-06	56.0E-06	49.0E-06	9.6E-06
93	7.0E-06	15.0E-06	47.5E-06	42.1E-06	9.3E-06
94	7.0E-06	15.6E-06	50.0E-06	44.7E-06	9.6E-06
95	12.1E-06	19.5E-06	53.1E-06	48.8E-06	13.7E-06
96	17.2E-06	27.6E-06	71.0E-06	65.8E-06	20.9E-06
97	14.6E-06	23.5E-06	64.9E-06	59.7E-06	17.4E-06
98	7.3E-06	15.6E-06	50.7E-06	45.9E-06	9.3E-06
99	7.0E-06	15.0E-06	49.6E-06	45.3E-06	9.9E-06
100	6.7E-06	14.2E-06	45.6E-06	40.9E-06	8.7E-06
Statistics					
Min	6.7E-06	14.2E-06	45.6E-06	40.9E-06	8.7E-06
Max	17.2E-06	27.6E-06	71.0E-06	65.8E-06	20.9E-06
Average	9.3E-06	17.7E-06	54.0E-06	48.9E-06	11.8E-06
Std Deviation	3.7E-06	4.2E-06	7.6E-06	7.4E-06	4.0E-06

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	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	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
LDC samples					
71	PASS	FAIL	FAIL	FAIL	PASS
72	PASS	FAIL	FAIL	FAIL	PASS
73	PASS	FAIL	FAIL	FAIL	PASS
74	PASS	FAIL	FAIL	FAIL	PASS
75	PASS	FAIL	FAIL	FAIL	PASS
76	PASS	FAIL	FAIL	FAIL	PASS
77	PASS	FAIL	FAIL	FAIL	PASS
78	PASS	FAIL	FAIL	FAIL	PASS
79	PASS	FAIL	FAIL	FAIL	PASS
80	PASS	FAIL	FAIL	FAIL	PASS

Measurements

tProg	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
HDC samples					
81	PASS	FAIL	FAIL	FAIL	PASS
82	PASS	FAIL	FAIL	FAIL	PASS
83	PASS	FAIL	FAIL	FAIL	PASS
84	PASS	FAIL	FAIL	FAIL	FAIL
85	PASS	FAIL	FAIL	FAIL	PASS
86	PASS	FAIL	FAIL	FAIL	PASS
87	PASS	FAIL	FAIL	FAIL	PASS
88	PASS	FAIL	FAIL	FAIL	PASS
89	PASS	FAIL	FAIL	FAIL	PASS
90	PASS	FAIL	FAIL	FAIL	PASS

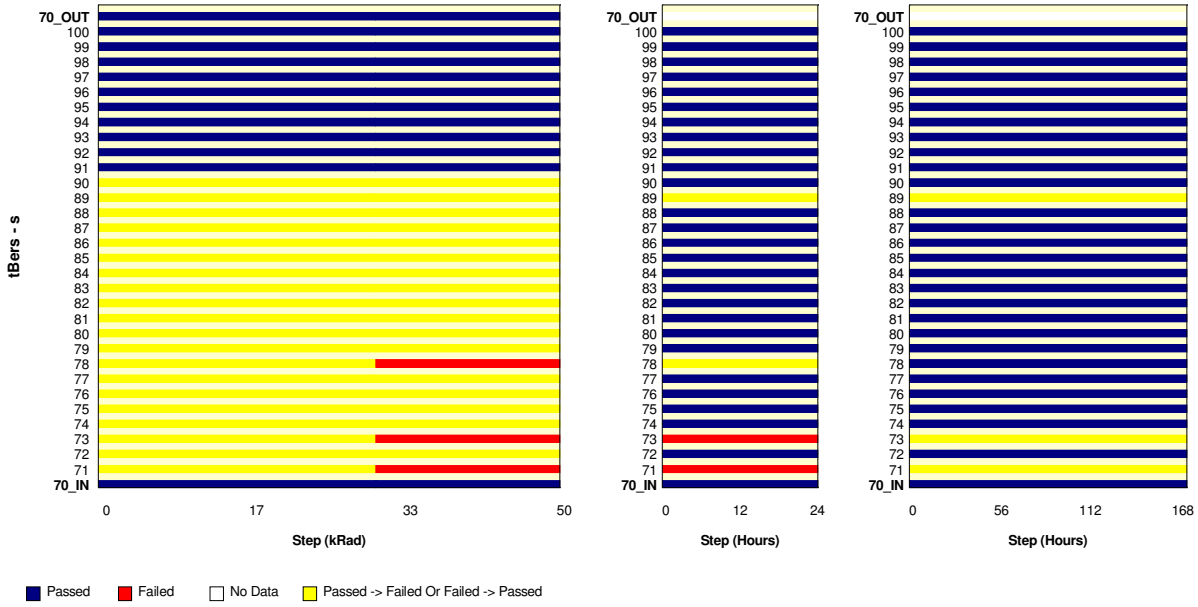
Measurements

tProg	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
OFF samples					
91	PASS	PASS	PASS	PASS	PASS
92	PASS	PASS	PASS	PASS	PASS
93	PASS	PASS	PASS	PASS	PASS
94	PASS	PASS	PASS	PASS	PASS

tProg	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
95	PASS	PASS	PASS	PASS	PASS
96	PASS	PASS	PASS	PASS	PASS
97	PASS	PASS	PASS	PASS	PASS
98	PASS	PASS	PASS	PASS	PASS
99	PASS	PASS	PASS	PASS	PASS
100	PASS	PASS	PASS	PASS	PASS

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Block Erase Time : tBers
Test conditions : BLOCK ERASE operation time . GO NOGO
Unit : s
Spec Limit Max : 10.0E-03
Spec limits are represented in bold lines on the graphic.



Measurements

tBers	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
LDC samples					
71	PASS	FAIL	FAIL	FAIL	PASS
72	PASS	FAIL	PASS	PASS	PASS
73	PASS	FAIL	FAIL	FAIL	PASS
74	PASS	FAIL	PASS	PASS	PASS
75	PASS	FAIL	PASS	PASS	PASS
76	PASS	FAIL	PASS	PASS	PASS
77	PASS	FAIL	PASS	PASS	PASS
78	PASS	FAIL	FAIL	PASS	PASS
79	PASS	FAIL	PASS	PASS	PASS
80	PASS	FAIL	PASS	PASS	PASS

Measurements

tBers	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
HDC samples					
81	PASS	FAIL	PASS	PASS	PASS
82	PASS	FAIL	PASS	PASS	PASS
83	PASS	FAIL	PASS	PASS	PASS
84	PASS	FAIL	PASS	PASS	PASS
85	PASS	FAIL	PASS	PASS	PASS
86	PASS	FAIL	PASS	PASS	PASS
87	PASS	FAIL	PASS	PASS	PASS
88	PASS	FAIL	PASS	PASS	PASS
89	PASS	FAIL	PASS	FAIL	PASS
90	PASS	FAIL	PASS	PASS	PASS

Measurements

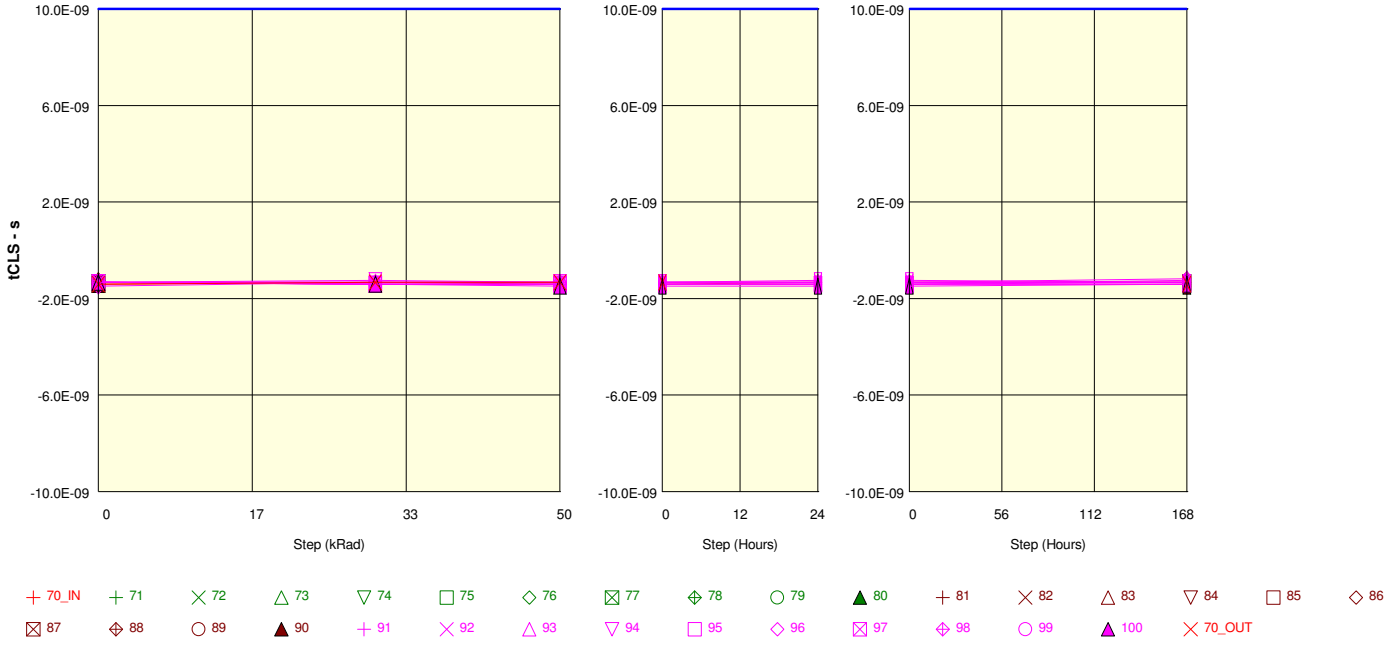
tBers	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
OFF samples					
91	PASS	PASS	PASS	PASS	PASS
92	PASS	PASS	PASS	PASS	PASS
93	PASS	PASS	PASS	PASS	PASS
94	PASS	PASS	PASS	PASS	PASS

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

tBers	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
95	PASS	PASS	PASS	PASS	PASS
96	PASS	PASS	PASS	PASS	PASS
97	PASS	PASS	PASS	PASS	PASS
98	PASS	PASS	PASS	PASS	PASS
99	PASS	PASS	PASS	PASS	PASS
100	PASS	PASS	PASS	PASS	PASS

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : CLE Setup Time : tCLS
Test conditions :
Unit : s
Spec Limit Max : 10.0E-09
Spec limits are represented in bold lines on the graphic.



Measurements

tCLS	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-1.4E-09	-1.3E-09	-1.4E-09	-1.3E-09	-1.3E-09
70_OUT_REF	-1.4E-09	-1.3E-09	-1.3E-09		-1.4E-09
LDC samples					
71	-1.4E-09				-1.4E-09
72	-1.4E-09				-1.5E-09
73	-1.3E-09				-1.4E-09
74	-1.3E-09				-1.3E-09
75	-1.3E-09				-1.4E-09
76	-1.4E-09				-1.3E-09
77	-1.4E-09				-1.3E-09
78	-1.4E-09				-1.5E-09
79	-1.3E-09				-1.3E-09
80	-1.4E-09				-1.4E-09
Statistics					
Min	-1.4E-09	-	-	-	-1.5E-09
Max	-1.3E-09	-	-	-	-1.3E-09
Average	-1.4E-09	-	-	-	-1.4E-09
Std Deviation	38.3E-12	-	-	-	58.5E-12

Measurements

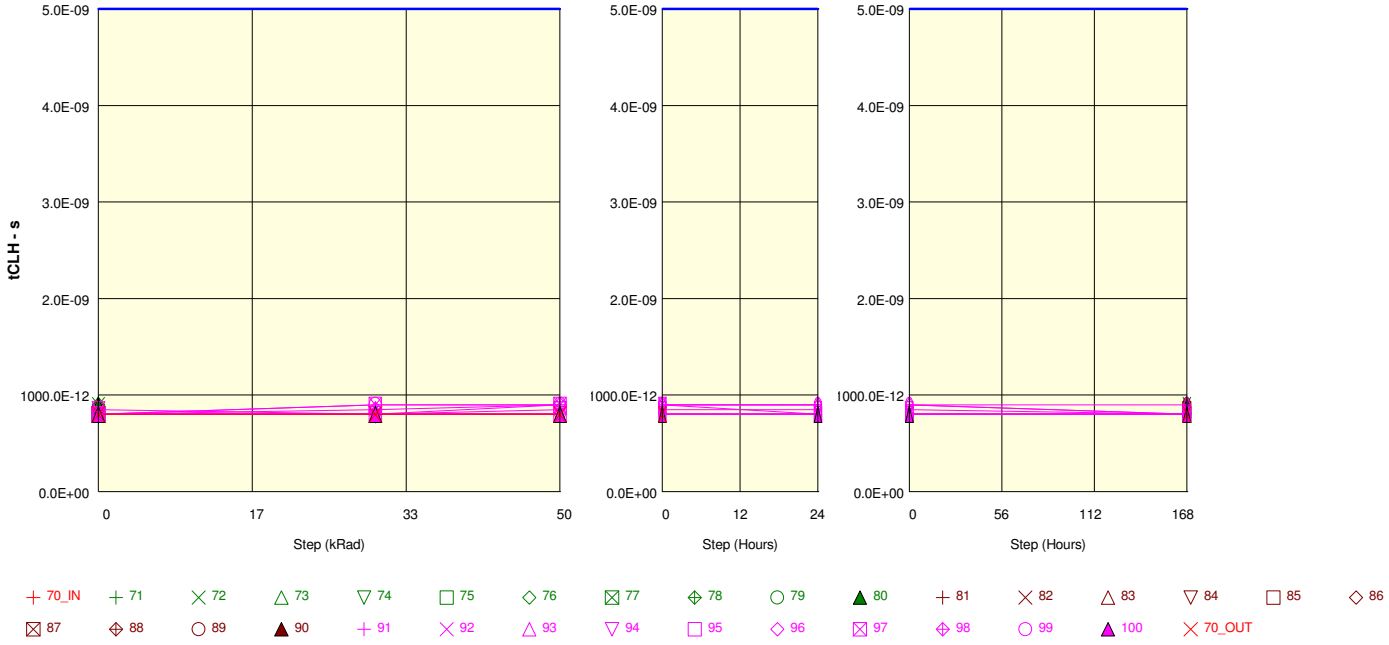
tCLS	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-1.4E-09	-1.3E-09	-1.4E-09	-1.3E-09	-1.3E-09
70_OUT_REF	-1.4E-09	-1.3E-09	-1.3E-09		-1.4E-09
HDC samples					
81	-1.3E-09				-1.3E-09
82	-1.3E-09				-1.3E-09
83	-1.3E-09				-1.4E-09
84	-1.3E-09				
85	-1.4E-09				-1.3E-09
86	-1.3E-09				-1.4E-09
87	-1.4E-09				-1.3E-09
88	-1.3E-09				-1.3E-09
89	-1.3E-09				-1.3E-09
90	-1.4E-09				-1.5E-09
Statistics					
Min	-1.4E-09	-	-	-	-1.5E-09
Max	-1.3E-09	-	-	-	-1.3E-09
Average	-1.3E-09	-	-	-	-1.4E-09
Std Deviation	46.9E-12	-	-	-	63.8E-12

Measurements

tCLS	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-1.4E-09	-1.3E-09	-1.4E-09	-1.3E-09	-1.3E-09
70_OUT_REF	-1.4E-09	-1.3E-09	-1.3E-09		-1.4E-09
OFF samples					
91	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09
92	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09
93	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09
94	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09
95	-1.3E-09	-1.4E-09	-1.4E-09	-1.4E-09	-1.4E-09
96	-1.5E-09	-1.3E-09	-1.3E-09	-1.3E-09	-1.2E-09
97	-1.3E-09	-1.4E-09	-1.4E-09	-1.4E-09	-1.4E-09
98	-1.3E-09	-1.4E-09	-1.4E-09	-1.4E-09	-1.3E-09
99	-1.3E-09	-1.4E-09	-1.4E-09	-1.4E-09	-1.3E-09
100	-1.3E-09	-1.4E-09	-1.5E-09	-1.5E-09	-1.4E-09
Statistics					
Min	-1.5E-09	-1.4E-09	-1.5E-09	-1.5E-09	-1.4E-09
Max	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09	-1.2E-09
Average	-1.3E-09	-1.4E-09	-1.4E-09	-1.4E-09	-1.3E-09
Std Deviation	46.9E-12	51.9E-12	51.9E-12	63.0E-12	69.9E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	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	24 Hours	168 Hours
70_IN_REF	800.8E-12	800.8E-12	800.8E-12	800.8E-12	800.8E-12
70_OUT_REF	800.8E-12	800.8E-12	800.8E-12		800.8E-12
LDC samples					
71	800.8E-12				898.4E-12
72	898.4E-12				898.4E-12
73	800.8E-12				800.8E-12
74	800.8E-12				800.8E-12
75	800.8E-12				800.8E-12
76	800.8E-12				800.8E-12
77	800.8E-12				849.6E-12
78	898.4E-12				898.4E-12
79	800.8E-12				800.8E-12
80	898.4E-12				898.4E-12
Statistics					
Min	800.8E-12	-	-	-	800.8E-12
Max	898.4E-12	-	-	-	898.4E-12
Average	830.1E-12	-	-	-	844.7E-12
Std Deviation	44.8E-12	-	-	-	46.1E-12

Measurements

tCLH	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	800.8E-12	800.8E-12	800.8E-12	800.8E-12	800.8E-12
70_OUT_REF	800.8E-12	800.8E-12	800.8E-12		800.8E-12
HDC samples					
81	849.6E-12				898.4E-12
82	800.8E-12				800.8E-12
83	800.8E-12				800.8E-12
84	800.8E-12				
85	800.8E-12				800.8E-12
86	800.8E-12				800.8E-12
87	800.8E-12				849.6E-12
88	800.8E-12				800.8E-12
89	849.6E-12				898.4E-12
90	800.8E-12				800.8E-12
Statistics					
Min	800.8E-12	-	-	-	800.8E-12
Max	849.6E-12	-	-	-	898.4E-12
Average	810.5E-12	-	-	-	827.9E-12
Std Deviation	19.5E-12	-	-	-	40.6E-12

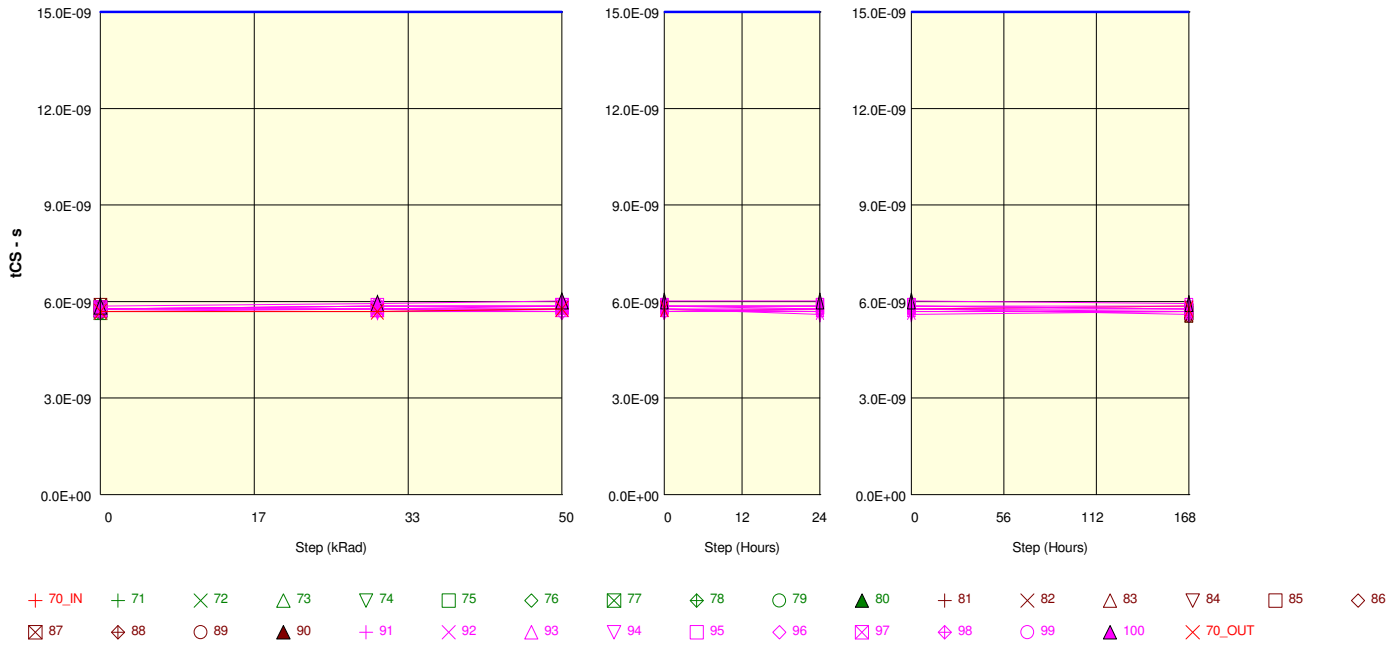
Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Measurements

tCLH	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	800.8E-12	800.8E-12	800.8E-12	800.8E-12	800.8E-12
70_OUT_REF	800.8E-12	800.8E-12	800.8E-12		800.8E-12
OFF samples					
91	800.8E-12	800.8E-12	898.4E-12	898.4E-12	800.8E-12
92	800.8E-12	800.8E-12	800.8E-12	800.8E-12	800.8E-12
93	800.8E-12	800.8E-12	800.8E-12	800.8E-12	800.8E-12
94	849.6E-12	800.8E-12	849.6E-12	849.6E-12	800.8E-12
95	800.8E-12	800.8E-12	800.8E-12	800.8E-12	800.8E-12
96	800.8E-12	800.8E-12	800.8E-12	800.8E-12	800.8E-12
97	800.8E-12	898.4E-12	898.4E-12	800.8E-12	800.8E-12
98	800.8E-12	849.6E-12	898.4E-12	898.4E-12	898.4E-12
99	800.8E-12	898.4E-12	898.4E-12	898.4E-12	800.8E-12
100	800.8E-12	800.8E-12	800.8E-12	800.8E-12	800.8E-12
Statistics					
Min	800.8E-12	800.8E-12	800.8E-12	800.8E-12	800.8E-12
Max	849.6E-12	898.4E-12	898.4E-12	898.4E-12	898.4E-12
Average	805.7E-12	825.2E-12	844.7E-12	835.0E-12	810.5E-12
Std Deviation	14.6E-12	39.4E-12	46.1E-12	43.9E-12	29.3E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : CE/ Setup Time : tCS
Test conditions :
Unit : s
Spec Limit Max : 15.0E-09
Spec limits are represented in bold lines on the graphic.



Measurements

tCS	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	5.7E-09	5.7E-09	5.7E-09	5.8E-09	5.9E-09
70_OUT_REF	5.7E-09	5.7E-09	5.8E-09		5.8E-09
LDC samples					
71	5.8E-09				5.6E-09
72	5.9E-09				5.8E-09
73	5.7E-09				5.6E-09
74	5.7E-09				5.6E-09
75	5.7E-09				5.7E-09
76	5.8E-09				5.7E-09
77	5.8E-09				5.7E-09
78	5.8E-09				5.8E-09
79	5.7E-09				5.7E-09
80	5.9E-09				5.9E-09
Statistics					
Min	5.7E-09	-	-	-	5.6E-09
Max	5.9E-09	-	-	-	5.9E-09
Average	5.8E-09	-	-	-	5.7E-09
Std Deviation	62.1E-12	-	-	-	78.3E-12

Measurements

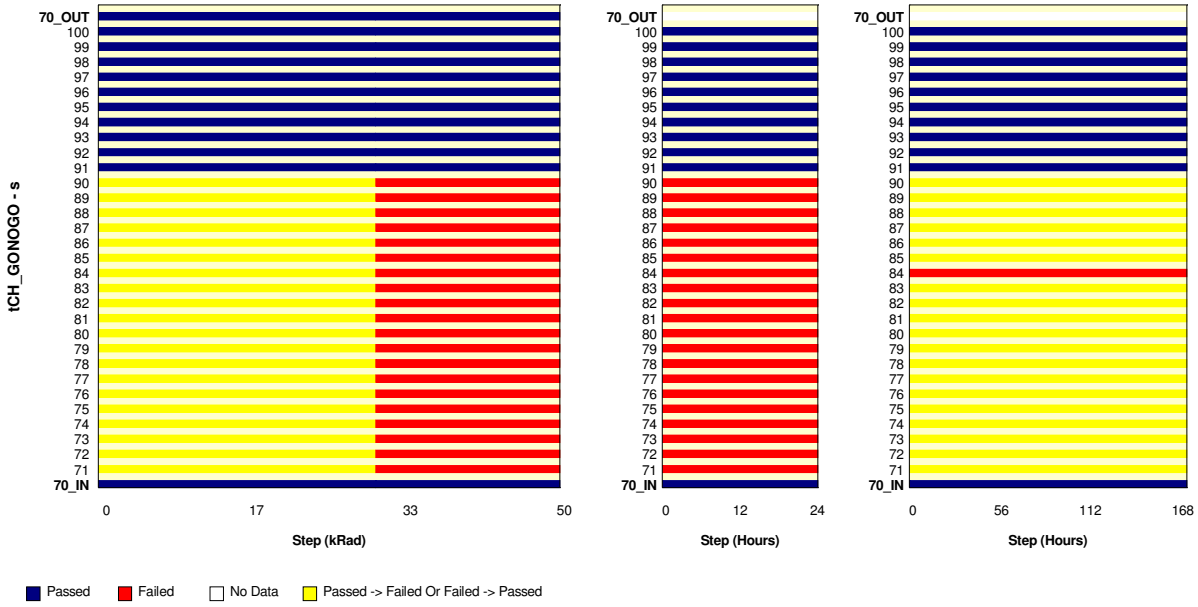
tCS	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	5.7E-09	5.7E-09	5.7E-09	5.8E-09	5.9E-09
70_OUT_REF	5.7E-09	5.7E-09	5.8E-09		5.8E-09
HDC samples					
81	5.8E-09				5.7E-09
82	5.8E-09				5.7E-09
83	5.8E-09				5.8E-09
84	5.8E-09				
85	5.8E-09				5.7E-09
86	5.7E-09				5.7E-09
87	5.9E-09				5.6E-09
88	5.8E-09				5.7E-09
89	5.8E-09				5.6E-09
90	5.8E-09				5.9E-09
Statistics					
Min	5.7E-09	-	-	-	5.6E-09
Max	5.9E-09	-	-	-	5.9E-09
Average	5.8E-09	-	-	-	5.7E-09
Std Deviation	37.1E-12	-	-	-	72.6E-12

Measurements

tCS	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	5.7E-09	5.7E-09	5.7E-09	5.8E-09	5.9E-09
70_OUT_REF	5.7E-09	5.7E-09	5.8E-09		5.8E-09
OFF samples					
91	5.7E-09	5.7E-09	5.7E-09	5.7E-09	5.7E-09
92	5.7E-09	5.8E-09	5.8E-09	5.7E-09	5.7E-09
93	5.8E-09	5.8E-09	5.8E-09	5.8E-09	5.8E-09
94	5.7E-09	5.7E-09	5.8E-09	5.6E-09	5.7E-09
95	5.8E-09	5.9E-09	5.9E-09	5.9E-09	5.9E-09
96	5.8E-09	5.8E-09	5.7E-09	5.8E-09	5.6E-09
97	5.8E-09	5.8E-09	5.9E-09	5.9E-09	5.8E-09
98	5.8E-09	5.9E-09	5.9E-09	5.9E-09	5.8E-09
99	5.8E-09	5.9E-09	5.9E-09	5.8E-09	5.7E-09
100	5.9E-09	5.9E-09	6.0E-09	6.0E-09	5.9E-09
Statistics					
Min	5.7E-09	5.7E-09	5.7E-09	5.6E-09	5.6E-09
Max	5.9E-09	5.9E-09	6.0E-09	6.0E-09	5.9E-09
Average	5.8E-09	5.8E-09	5.8E-09	5.8E-09	5.7E-09
Std Deviation	49.8E-12	74.7E-12	92.8E-12	110.1E-12	91.3E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : CE/ Hold Time : tCH_GONOGO
Test conditions : GO NOGO
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	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
LDC samples					
71	PASS	FAIL	FAIL	FAIL	PASS
72	PASS	FAIL	FAIL	FAIL	PASS
73	PASS	FAIL	FAIL	FAIL	PASS
74	PASS	FAIL	FAIL	FAIL	PASS
75	PASS	FAIL	FAIL	FAIL	PASS
76	PASS	FAIL	FAIL	FAIL	PASS
77	PASS	FAIL	FAIL	FAIL	PASS
78	PASS	FAIL	FAIL	FAIL	PASS
79	PASS	FAIL	FAIL	FAIL	PASS
80	PASS	FAIL	FAIL	FAIL	PASS

Measurements

tCH_GONOGO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
HDC samples					
81	PASS	FAIL	FAIL	FAIL	PASS
82	PASS	FAIL	FAIL	FAIL	PASS
83	PASS	FAIL	FAIL	FAIL	PASS
84	PASS	FAIL	FAIL	FAIL	FAIL
85	PASS	FAIL	FAIL	FAIL	PASS
86	PASS	FAIL	FAIL	FAIL	PASS
87	PASS	FAIL	FAIL	FAIL	PASS
88	PASS	FAIL	FAIL	FAIL	PASS
89	PASS	FAIL	FAIL	FAIL	PASS
90	PASS	FAIL	FAIL	FAIL	PASS

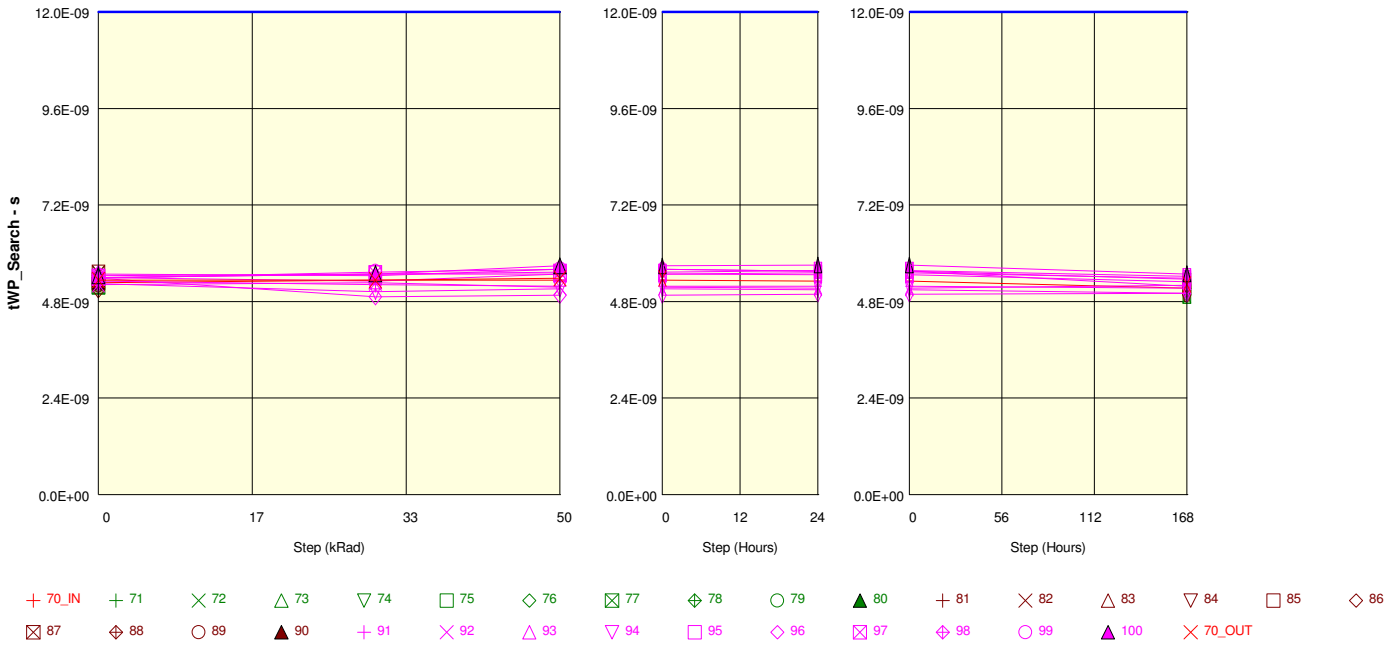
Measurements

tCH_GONOGO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
OFF samples					
91	PASS	PASS	PASS	PASS	PASS
92	PASS	PASS	PASS	PASS	PASS
93	PASS	PASS	PASS	PASS	PASS
94	PASS	PASS	PASS	PASS	PASS

tCH_GONOGO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
95	PASS	PASS	PASS	PASS	PASS
96	PASS	PASS	PASS	PASS	PASS
97	PASS	PASS	PASS	PASS	PASS
98	PASS	PASS	PASS	PASS	PASS
99	PASS	PASS	PASS	PASS	PASS
100	PASS	PASS	PASS	PASS	PASS

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	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	24 Hours	168 Hours
70_IN_REF	5.3E-09	5.3E-09	5.3E-09	5.3E-09	5.1E-09
70_OUT_REF	5.3E-09	5.3E-09	5.4E-09		5.2E-09
LDC samples					
71	5.3E-09				5.0E-09
72	5.5E-09				5.2E-09
73	5.2E-09				5.0E-09
74	5.2E-09				5.0E-09
75	5.2E-09				5.2E-09
76	5.3E-09				5.0E-09
77	5.2E-09				5.0E-09
78	5.3E-09				5.1E-09
79	5.2E-09				5.2E-09
80	5.5E-09				5.4E-09
Statistics					
Min	5.2E-09	-	-	-	5.0E-09
Max	5.5E-09	-	-	-	5.4E-09
Average	5.3E-09	-	-	-	5.1E-09
Std Deviation	101.2E-12	-	-	-	131.9E-12

Measurements

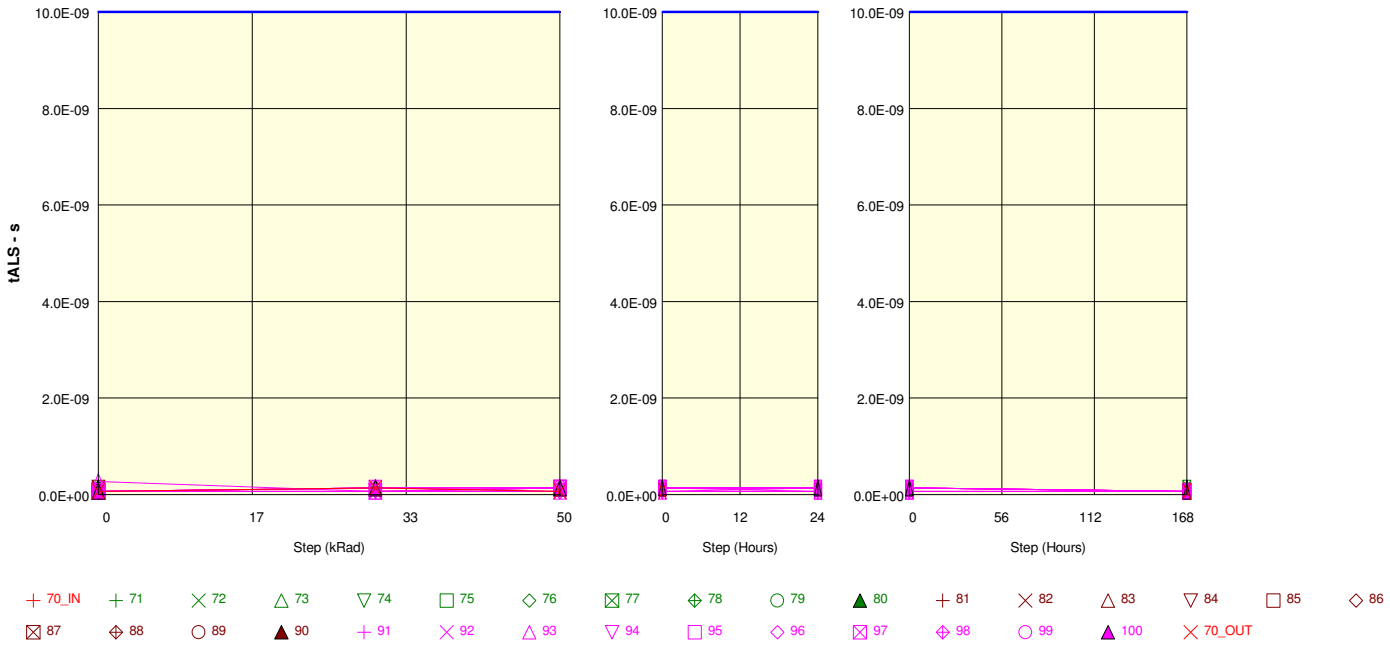
tWP_Search	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	5.3E-09	5.3E-09	5.3E-09	5.3E-09	5.1E-09
70_OUT_REF	5.3E-09	5.3E-09	5.4E-09		5.2E-09
HDC samples					
81	5.3E-09				5.2E-09
82	5.4E-09				5.2E-09
83	5.4E-09				5.2E-09
84	5.3E-09				
85	5.3E-09				5.1E-09
86	5.4E-09				5.2E-09
87	5.5E-09				5.3E-09
88	5.1E-09				5.2E-09
89	5.2E-09				5.0E-09
90	5.3E-09				5.3E-09
Statistics					
Min	5.1E-09	-	-	-	5.0E-09
Max	5.5E-09	-	-	-	5.3E-09
Average	5.3E-09	-	-	-	5.2E-09
Std Deviation	104.2E-12	-	-	-	93.3E-12

Measurements

tWP_Search	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	5.3E-09	5.3E-09	5.3E-09	5.3E-09	5.1E-09
70_OUT_REF	5.3E-09	5.3E-09	5.4E-09		5.2E-09
OFF samples					
91	5.3E-09	5.2E-09	5.2E-09	5.2E-09	5.1E-09
92	5.2E-09	5.3E-09	5.2E-09	5.1E-09	5.2E-09
93	5.4E-09	5.3E-09	5.5E-09	5.5E-09	5.3E-09
94	5.2E-09	5.0E-09	5.1E-09	5.1E-09	5.0E-09
95	5.4E-09	5.5E-09	5.5E-09	5.5E-09	5.4E-09
96	5.4E-09	4.9E-09	5.0E-09	5.0E-09	5.0E-09
97	5.4E-09	5.5E-09	5.5E-09	5.6E-09	5.4E-09
98	5.5E-09	5.4E-09	5.6E-09	5.6E-09	5.4E-09
99	5.4E-09	5.5E-09	5.6E-09	5.6E-09	5.2E-09
100	5.4E-09	5.5E-09	5.7E-09	5.7E-09	5.5E-09
Statistics					
Min	5.2E-09	4.9E-09	5.0E-09	5.0E-09	5.0E-09
Max	5.5E-09	5.5E-09	5.7E-09	5.7E-09	5.5E-09
Average	5.4E-09	5.3E-09	5.4E-09	5.4E-09	5.2E-09
Std Deviation	78.8E-12	198.3E-12	238.8E-12	238.8E-12	160.0E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : ALE Setup Time : tALS
Test conditions :
Unit : s
Spec Limit Max : 10.0E-09
Spec limits are represented in bold lines on the graphic.



Measurements

tALS	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	70.8E-12	70.8E-12	137.9E-12	137.9E-12	70.8E-12
70_OUT_REF	70.8E-12	137.9E-12	70.8E-12		70.8E-12
LDC samples					
71	70.8E-12				137.9E-12
72	70.8E-12				137.9E-12
73	70.8E-12				70.8E-12
74	70.8E-12				70.8E-12
75	70.8E-12				137.9E-12
76	70.8E-12				70.8E-12
77	70.8E-12				70.8E-12
78	137.9E-12				70.8E-12
79	70.8E-12				70.8E-12
80	70.8E-12				70.8E-12
Statistics					
Min	70.8E-12	-	-	-	70.8E-12
Max	137.9E-12	-	-	-	137.9E-12
Average	77.5E-12	-	-	-	90.9E-12
Std Deviation	20.1E-12	-	-	-	30.8E-12

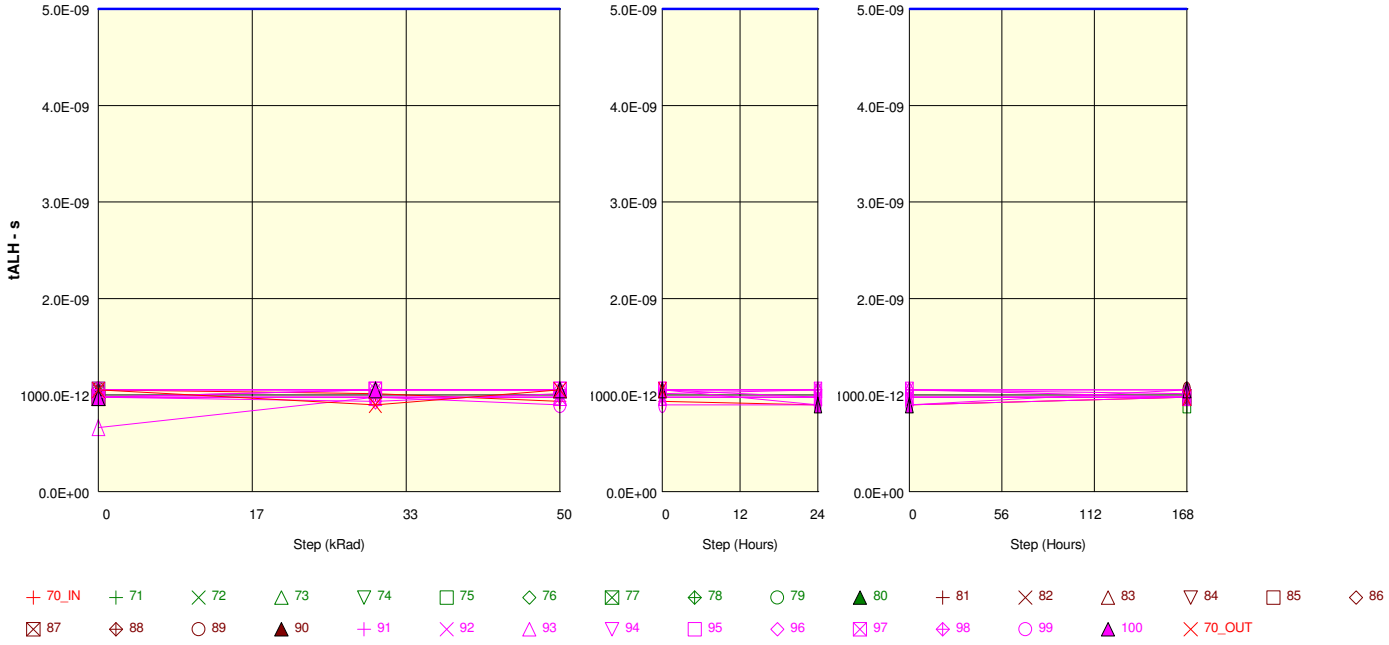
Measurements

tALS	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	70.8E-12	70.8E-12	137.9E-12	137.9E-12	70.8E-12
70_OUT_REF	70.8E-12	137.9E-12	70.8E-12		70.8E-12
HDC samples					
81	70.8E-12				70.8E-12
82	137.9E-12				70.8E-12
83	70.8E-12				70.8E-12
84	70.8E-12				
85	70.8E-12				70.8E-12
86	70.8E-12				70.8E-12
87	137.9E-12				70.8E-12
88	70.8E-12				70.8E-12
89	70.8E-12				70.8E-12
90	137.9E-12				137.9E-12
Statistics					
Min	70.8E-12	-	-	-	70.8E-12
Max	137.9E-12	-	-	-	137.9E-12
Average	90.9E-12	-	-	-	78.3E-12
Std Deviation	30.8E-12	-	-	-	21.1E-12

Measurements

tALS	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	70.8E-12	70.8E-12	137.9E-12	137.9E-12	70.8E-12
70_OUT_REF	70.8E-12	137.9E-12	70.8E-12		70.8E-12
OFF samples					
91	70.8E-12	70.8E-12	70.8E-12	70.8E-12	70.8E-12
92	70.8E-12	70.8E-12	70.8E-12	137.9E-12	70.8E-12
93	272.2E-12	70.8E-12	70.8E-12	70.8E-12	70.8E-12
94	70.8E-12	70.8E-12	137.9E-12	137.9E-12	70.8E-12
95	70.8E-12	137.9E-12	137.9E-12	137.9E-12	70.8E-12
96	70.8E-12	137.9E-12	70.8E-12	70.8E-12	70.8E-12
97	70.8E-12	70.8E-12	137.9E-12	70.8E-12	70.8E-12
98	70.8E-12	137.9E-12	137.9E-12	137.9E-12	70.8E-12
99	70.8E-12	137.9E-12	137.9E-12	137.9E-12	70.8E-12
100	70.8E-12	137.9E-12	137.9E-12	137.9E-12	70.8E-12
Statistics					
Min	70.8E-12	70.8E-12	70.8E-12	70.8E-12	70.8E-12
Max	272.2E-12	137.9E-12	137.9E-12	137.9E-12	70.8E-12
Average	90.9E-12	104.4E-12	111.1E-12	111.1E-12	70.8E-12
Std Deviation	60.4E-12	33.6E-12	32.9E-12	32.9E-12	1.1E-18

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	24 Hours	168 Hours
70_IN_REF	1.1E-09	1.0E-09	937.5E-12	898.4E-12	976.6E-12
70_OUT_REF	1.1E-09	898.4E-12	1.1E-09		976.6E-12
LDC samples					
71	1.1E-09				898.4E-12
72	1.1E-09				976.6E-12
73	976.6E-12				976.6E-12
74	976.6E-12				976.6E-12
75	976.6E-12				898.4E-12
76	1.1E-09				1.1E-09
77	1.1E-09				976.6E-12
78	1.1E-09				1.1E-09
79	976.6E-12				976.6E-12
80	1.1E-09				1.1E-09
Statistics					
Min	976.6E-12	-	-	-	898.4E-12
Max	1.1E-09	-	-	-	1.1E-09
Average	1.0E-09	-	-	-	984.4E-12
Std Deviation	38.3E-12	-	-	-	54.7E-12

Measurements

tALH	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	1.1E-09	1.0E-09	937.5E-12	898.4E-12	976.6E-12
70_OUT_REF	1.1E-09	898.4E-12	1.1E-09		976.6E-12
HDC samples					
81	1.0E-09				1.1E-09
82	976.6E-12				976.6E-12
83	1.1E-09				1.1E-09
84	976.6E-12				
85	976.6E-12				976.6E-12
86	976.6E-12				976.6E-12
87	976.6E-12				976.6E-12
88	976.6E-12				976.6E-12
89	1.1E-09				1.1E-09
90	976.6E-12				1.0E-09
Statistics					
Min	976.6E-12	-	-	-	976.6E-12
Max	1.1E-09	-	-	-	1.1E-09
Average	996.1E-12	-	-	-	1.0E-09
Std Deviation	31.5E-12	-	-	-	35.8E-12

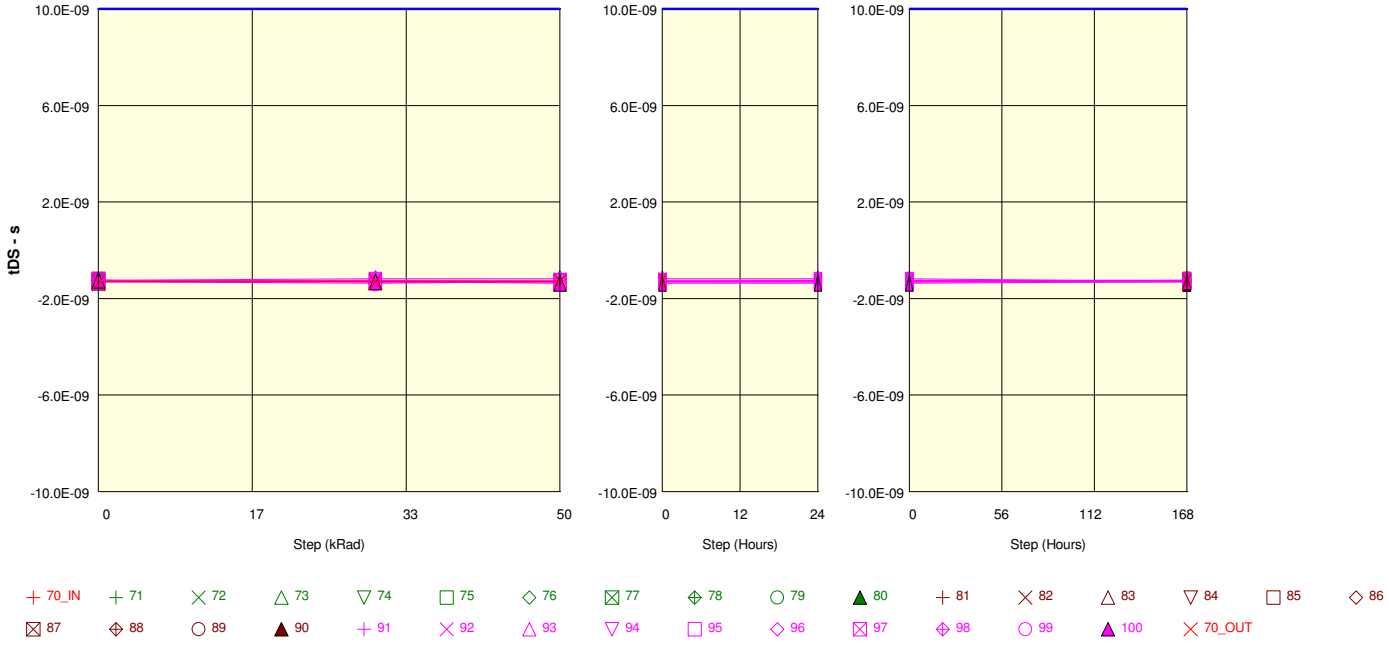
Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Measurements

tALH	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	1.1E-09	1.0E-09	937.5E-12	898.4E-12	976.6E-12
70_OUT_REF	1.1E-09	898.4E-12	1.1E-09		976.6E-12
OFF samples					
91	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09
92	976.6E-12	976.6E-12	976.6E-12	976.6E-12	976.6E-12
93	664.1E-12	976.6E-12	976.6E-12	976.6E-12	976.6E-12
94	976.6E-12	976.6E-12	976.6E-12	976.6E-12	976.6E-12
95	976.6E-12	1.1E-09	1.1E-09	976.6E-12	976.6E-12
96	976.6E-12	937.5E-12	1.0E-09	1.1E-09	1.0E-09
97	1.1E-09	1.1E-09	1.1E-09	1.1E-09	976.6E-12
98	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09
99	976.6E-12	976.6E-12	898.4E-12	898.4E-12	976.6E-12
100	976.6E-12	1.1E-09	1.1E-09	898.4E-12	1.1E-09
Statistics					
Min	664.1E-12	937.5E-12	898.4E-12	898.4E-12	976.6E-12
Max	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09
Average	968.8E-12	1.0E-09	1.0E-09	992.2E-12	1.0E-09
Std Deviation	107.4E-12	44.4E-12	50.8E-12	58.5E-12	35.2E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Data Setup Time : tDS
Test conditions :
Unit : s
Spec Limit Max : 10.0E-09
Spec limits are represented in bold lines on the graphic.



Measurements

tDS	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-1.2E-09	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09
70_OUT_REF	-1.3E-09	-1.3E-09	-1.3E-09		-1.3E-09
LDC samples					
71	-1.3E-09				-1.2E-09
72	-1.4E-09				-1.3E-09
73	-1.2E-09				-1.2E-09
74	-1.2E-09				-1.2E-09
75	-1.2E-09				-1.3E-09
76	-1.2E-09				-1.2E-09
77	-1.3E-09				-1.2E-09
78	-1.3E-09				-1.2E-09
79	-1.2E-09				-1.2E-09
80	-1.3E-09				-1.4E-09
Statistics					
Min	-1.4E-09	-	-	-	-1.4E-09
Max	-1.2E-09	-	-	-	-1.2E-09
Average	-1.3E-09	-	-	-	-1.3E-09
Std Deviation	42.1E-12	-	-	-	49.6E-12

Measurements

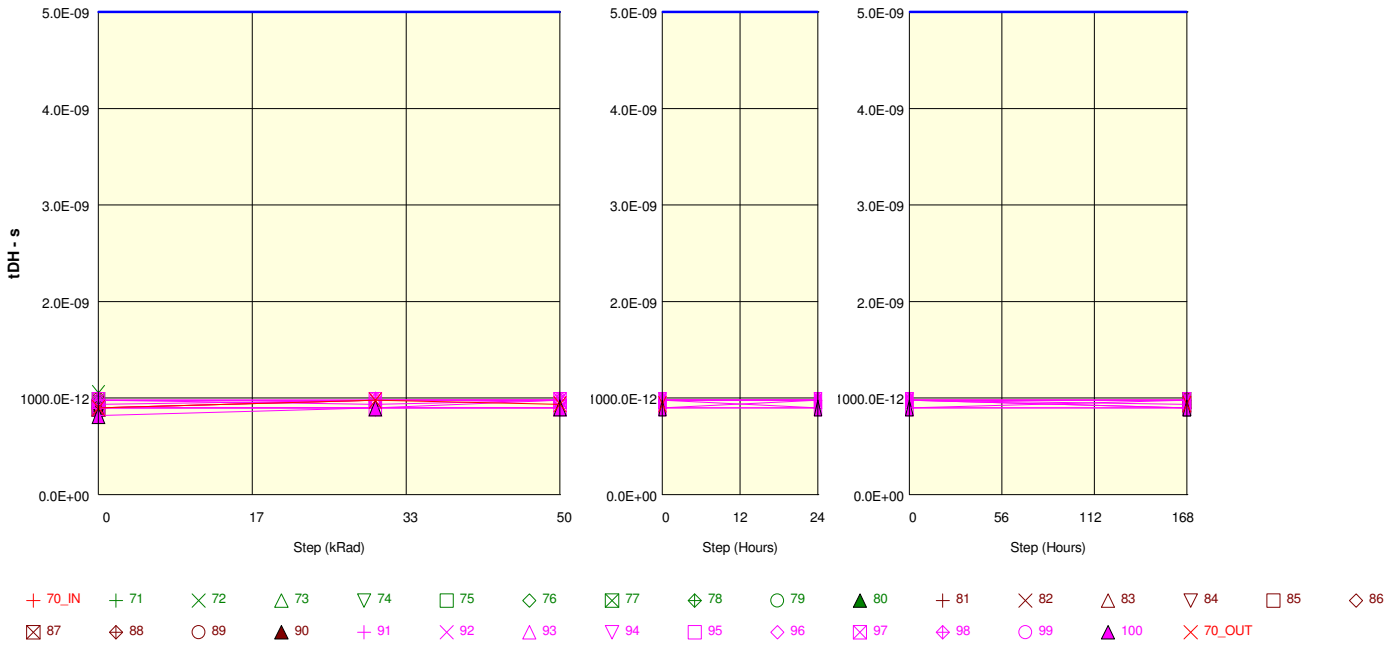
tDS	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-1.2E-09	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09
70_OUT_REF	-1.3E-09	-1.3E-09	-1.3E-09		-1.3E-09
HDC samples					
81	-1.2E-09				-1.3E-09
82	-1.2E-09				-1.3E-09
83	-1.3E-09				-1.3E-09
84	-1.2E-09				
85	-1.3E-09				-1.2E-09
86	-1.2E-09				-1.3E-09
87	-1.3E-09				-1.3E-09
88	-1.2E-09				-1.2E-09
89	-1.3E-09				-1.2E-09
90	-1.3E-09				-1.4E-09
Statistics					
Min	-1.3E-09	-	-	-	-1.4E-09
Max	-1.2E-09	-	-	-	-1.2E-09
Average	-1.3E-09	-	-	-	-1.3E-09
Std Deviation	31.8E-12	-	-	-	39.9E-12

Measurements

tDS	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	-1.2E-09	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09
70_OUT_REF	-1.3E-09	-1.3E-09	-1.3E-09		-1.3E-09
OFF samples					
91	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09
92	-1.2E-09	-1.2E-09	-1.2E-09	-1.2E-09	-1.2E-09
93	-1.2E-09	-1.3E-09	-1.3E-09	-1.3E-09	-1.2E-09
94	-1.3E-09	-1.2E-09	-1.3E-09	-1.2E-09	-1.2E-09
95	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09
96	-1.2E-09	-1.2E-09	-1.2E-09	-1.2E-09	-1.3E-09
97	-1.2E-09	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09
98	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09
99	-1.3E-09	-1.4E-09	-1.3E-09	-1.3E-09	-1.2E-09
100	-1.2E-09	-1.3E-09	-1.4E-09	-1.4E-09	-1.3E-09
Statistics					
Min	-1.3E-09	-1.4E-09	-1.4E-09	-1.4E-09	-1.3E-09
Max	-1.2E-09	-1.2E-09	-1.2E-09	-1.2E-09	-1.2E-09
Average	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09	-1.3E-09
Std Deviation	31.8E-12	49.6E-12	47.5E-12	49.6E-12	31.1E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	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	24 Hours	168 Hours
70_IN_REF	898.4E-12	976.6E-12	976.6E-12	976.6E-12	976.6E-12
70_OUT_REF	898.4E-12	976.6E-12	937.5E-12		937.5E-12
LDC samples					
71	976.6E-12				976.6E-12
72	1.1E-09				976.6E-12
73	898.4E-12				898.4E-12
74	898.4E-12				898.4E-12
75	898.4E-12				898.4E-12
76	976.6E-12				976.6E-12
77	976.6E-12				976.6E-12
78	976.6E-12				937.5E-12
79	898.4E-12				898.4E-12
80	976.6E-12				976.6E-12
Statistics					
Min	898.4E-12	-	-	-	898.4E-12
Max	1.1E-09	-	-	-	976.6E-12
Average	953.1E-12	-	-	-	941.4E-12
Std Deviation	50.0E-12	-	-	-	36.8E-12

Measurements

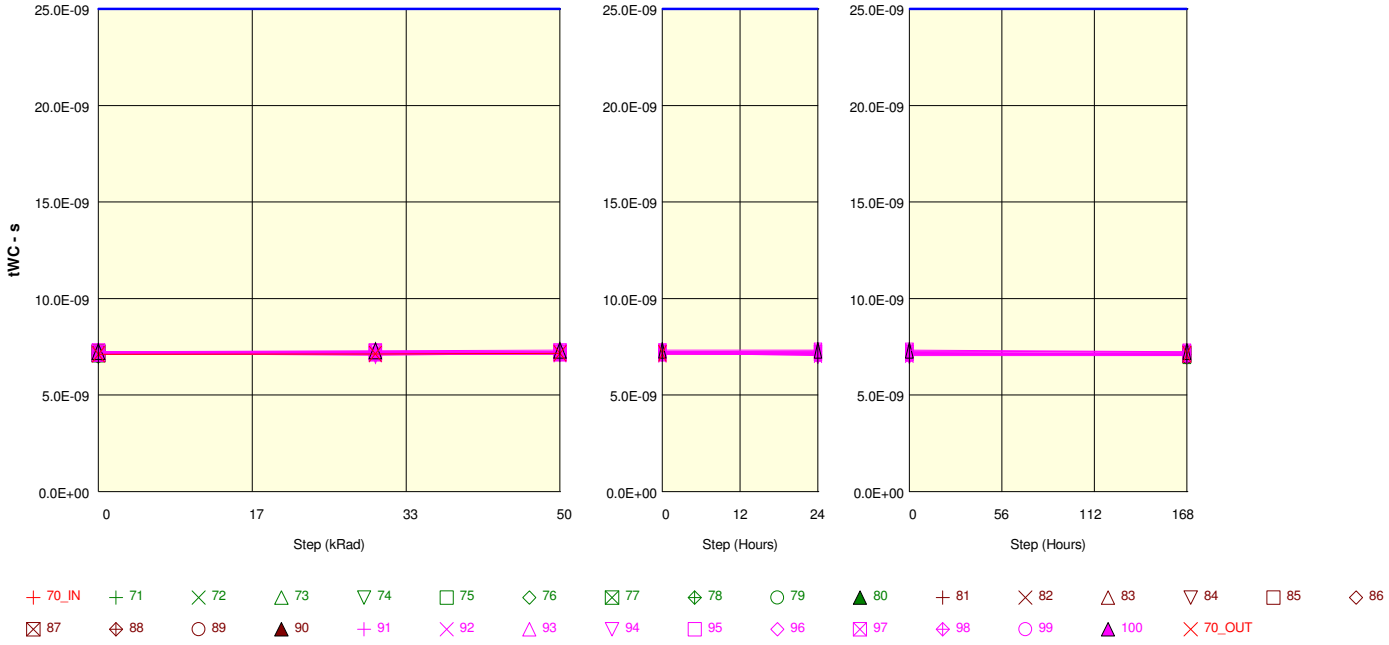
tDH	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	898.4E-12	976.6E-12	976.6E-12	976.6E-12	976.6E-12
70_OUT_REF	898.4E-12	976.6E-12	937.5E-12		937.5E-12
HDC samples					
81	898.4E-12				976.6E-12
82	898.4E-12				976.6E-12
83	898.4E-12				976.6E-12
84	898.4E-12				
85	898.4E-12				976.6E-12
86	976.6E-12				976.6E-12
87	898.4E-12				937.5E-12
88	898.4E-12				898.4E-12
89	976.6E-12				976.6E-12
90	898.4E-12				937.5E-12
Statistics					
Min	898.4E-12	-	-	-	898.4E-12
Max	976.6E-12	-	-	-	976.6E-12
Average	914.1E-12	-	-	-	959.2E-12
Std Deviation	31.2E-12	-	-	-	26.8E-12

Measurements

tDH	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	898.4E-12	976.6E-12	976.6E-12	976.6E-12	976.6E-12
70_OUT_REF	898.4E-12	976.6E-12	937.5E-12		937.5E-12
OFF samples					
91	976.6E-12	976.6E-12	976.6E-12	976.6E-12	976.6E-12
92	898.4E-12	898.4E-12	976.6E-12	898.4E-12	976.6E-12
93	976.6E-12	976.6E-12	976.6E-12	976.6E-12	976.6E-12
94	898.4E-12	898.4E-12	898.4E-12	976.6E-12	898.4E-12
95	898.4E-12	898.4E-12	898.4E-12	898.4E-12	898.4E-12
96	976.6E-12	937.5E-12	976.6E-12	976.6E-12	937.5E-12
97	976.6E-12	976.6E-12	976.6E-12	976.6E-12	976.6E-12
98	937.5E-12	976.6E-12	976.6E-12	976.6E-12	976.6E-12
99	898.4E-12	976.6E-12	976.6E-12	976.6E-12	898.4E-12
100	820.3E-12	898.4E-12	898.4E-12	898.4E-12	898.4E-12
Statistics					
Min	820.3E-12	898.4E-12	898.4E-12	898.4E-12	898.4E-12
Max	976.6E-12	976.6E-12	976.6E-12	976.6E-12	976.6E-12
Average	925.8E-12	941.4E-12	953.1E-12	953.1E-12	941.4E-12
Std Deviation	49.6E-12	36.8E-12	35.8E-12	35.8E-12	36.8E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	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	24 Hours	168 Hours
70_IN_REF	7.1E-09	7.1E-09	7.1E-09	7.1E-09	7.1E-09
70_OUT_REF	7.1E-09	7.1E-09	7.2E-09		7.1E-09
LDC samples					
71	7.2E-09				7.0E-09
72	7.2E-09				7.1E-09
73	7.1E-09				7.0E-09
74	7.1E-09				7.0E-09
75	7.2E-09				7.2E-09
76	7.2E-09				7.1E-09
77	7.1E-09				7.1E-09
78	7.2E-09				7.1E-09
79	7.1E-09				7.1E-09
80	7.3E-09				7.2E-09
Statistics					
Min	7.1E-09	-	-	-	7.0E-09
Max	7.3E-09	-	-	-	7.2E-09
Average	7.2E-09	-	-	-	7.1E-09
Std Deviation	58.8E-12	-	-	-	58.7E-12

Measurements

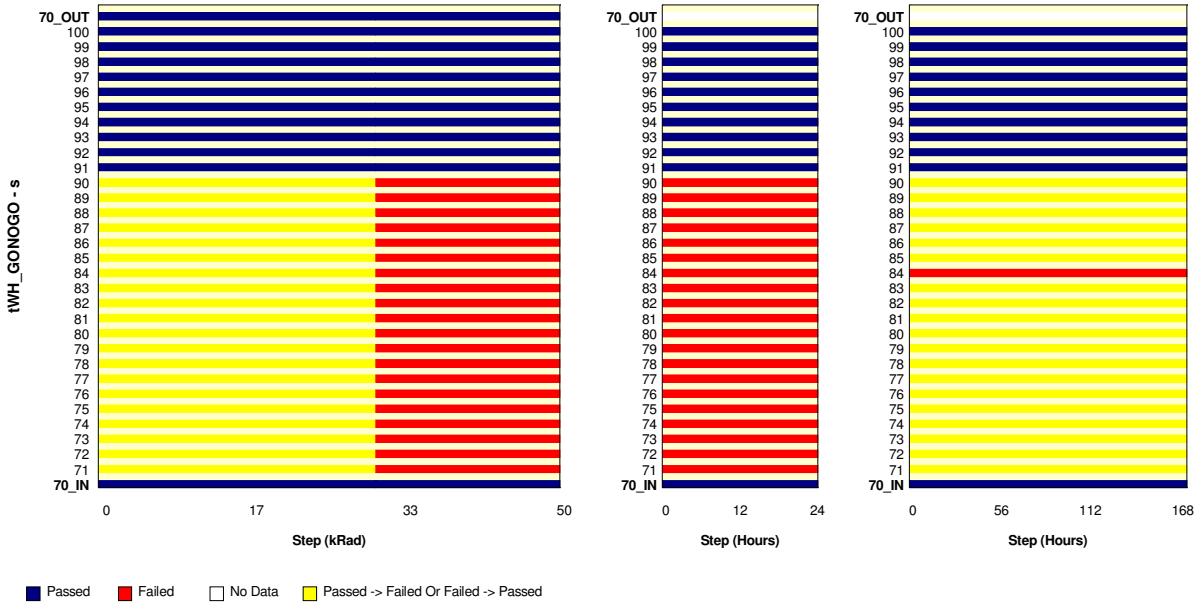
tWC	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	7.1E-09	7.1E-09	7.1E-09	7.1E-09	7.1E-09
70_OUT_REF	7.1E-09	7.1E-09	7.2E-09		7.1E-09
HDC samples					
81	7.2E-09				7.1E-09
82	7.2E-09				7.2E-09
83	7.3E-09				7.2E-09
84	7.2E-09				
85	7.2E-09				7.1E-09
86	7.3E-09				7.2E-09
87	7.2E-09				7.1E-09
88	7.1E-09				7.1E-09
89	7.1E-09				7.0E-09
90	7.1E-09				7.1E-09
Statistics					
Min	7.1E-09	-	-	-	7.0E-09
Max	7.3E-09	-	-	-	7.2E-09
Average	7.2E-09	-	-	-	7.1E-09
Std Deviation	47.3E-12	-	-	-	55.1E-12

Measurements

tWC	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	7.1E-09	7.1E-09	7.1E-09	7.1E-09	7.1E-09
70_OUT_REF	7.1E-09	7.1E-09	7.2E-09		7.1E-09
OFF samples					
91	7.2E-09	7.2E-09	7.2E-09	7.1E-09	7.1E-09
92	7.1E-09	7.1E-09	7.1E-09	7.1E-09	7.1E-09
93	7.2E-09	7.2E-09	7.2E-09	7.2E-09	7.1E-09
94	7.2E-09	7.1E-09	7.2E-09	7.2E-09	7.1E-09
95	7.2E-09	7.2E-09	7.2E-09	7.2E-09	7.2E-09
96	7.2E-09	7.2E-09	7.2E-09	7.0E-09	7.0E-09
97	7.3E-09	7.3E-09	7.3E-09	7.3E-09	7.2E-09
98	7.3E-09	7.2E-09	7.3E-09	7.3E-09	7.2E-09
99	7.2E-09	7.3E-09	7.2E-09	7.2E-09	7.1E-09
100	7.3E-09	7.3E-09	7.3E-09	7.3E-09	7.3E-09
Statistics					
Min	7.1E-09	7.1E-09	7.1E-09	7.0E-09	7.0E-09
Max	7.3E-09	7.3E-09	7.3E-09	7.3E-09	7.3E-09
Average	7.2E-09	7.2E-09	7.2E-09	7.2E-09	7.1E-09
Std Deviation	45.4E-12	66.6E-12	56.8E-12	80.0E-12	67.6E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : WE/ High Hold Time : tWH_GONOGO
Test conditions : GO NOGO
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	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
LDC samples					
71	PASS	FAIL	FAIL	FAIL	PASS
72	PASS	FAIL	FAIL	FAIL	PASS
73	PASS	FAIL	FAIL	FAIL	PASS
74	PASS	FAIL	FAIL	FAIL	PASS
75	PASS	FAIL	FAIL	FAIL	PASS
76	PASS	FAIL	FAIL	FAIL	PASS
77	PASS	FAIL	FAIL	FAIL	PASS
78	PASS	FAIL	FAIL	FAIL	PASS
79	PASS	FAIL	FAIL	FAIL	PASS
80	PASS	FAIL	FAIL	FAIL	PASS

Measurements

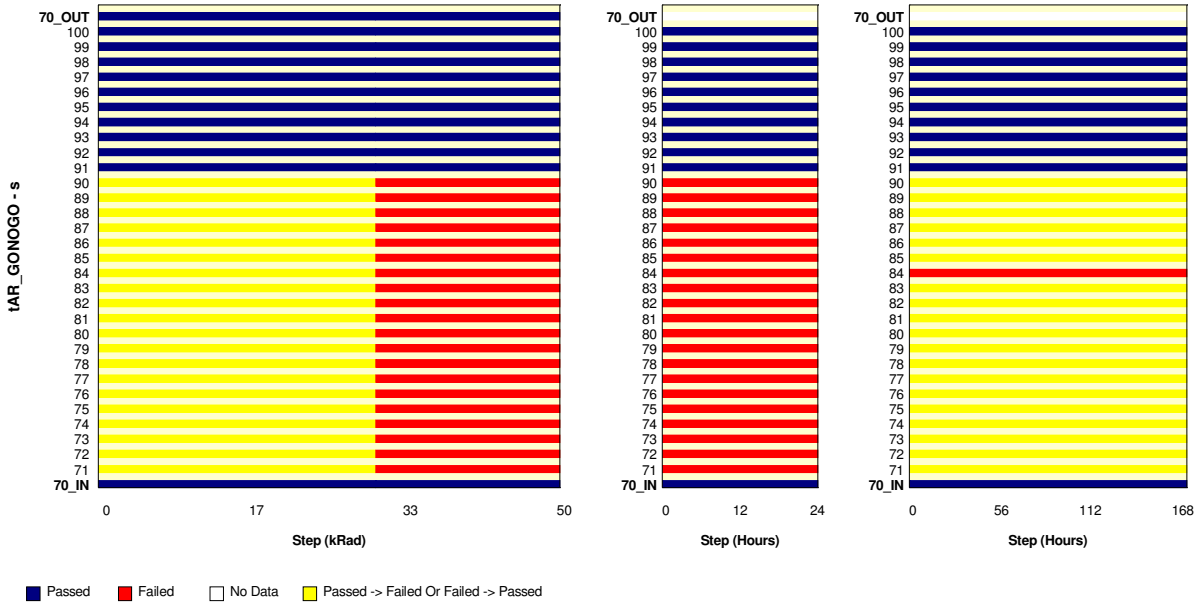
tWH_GONOGO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
HDC samples					
81	PASS	FAIL	FAIL	FAIL	PASS
82	PASS	FAIL	FAIL	FAIL	PASS
83	PASS	FAIL	FAIL	FAIL	PASS
84	PASS	FAIL	FAIL	FAIL	FAIL
85	PASS	FAIL	FAIL	FAIL	PASS
86	PASS	FAIL	FAIL	FAIL	PASS
87	PASS	FAIL	FAIL	FAIL	PASS
88	PASS	FAIL	FAIL	FAIL	PASS
89	PASS	FAIL	FAIL	FAIL	PASS
90	PASS	FAIL	FAIL	FAIL	PASS

Measurements

tWH_GONOGO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
OFF samples					
91	PASS	PASS	PASS	PASS	PASS
92	PASS	PASS	PASS	PASS	PASS
93	PASS	PASS	PASS	PASS	PASS
94	PASS	PASS	PASS	PASS	PASS

tWH_GONOGO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
95	PASS	PASS	PASS	PASS	PASS
96	PASS	PASS	PASS	PASS	PASS
97	PASS	PASS	PASS	PASS	PASS
98	PASS	PASS	PASS	PASS	PASS
99	PASS	PASS	PASS	PASS	PASS
100	PASS	PASS	PASS	PASS	PASS

Parameter : ALE to RE/ Delay : tAR_GONOGO
Test conditions : GO NOGO
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	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
LDC samples					
71	PASS	FAIL	FAIL	FAIL	PASS
72	PASS	FAIL	FAIL	FAIL	PASS
73	PASS	FAIL	FAIL	FAIL	PASS
74	PASS	FAIL	FAIL	FAIL	PASS
75	PASS	FAIL	FAIL	FAIL	PASS
76	PASS	FAIL	FAIL	FAIL	PASS
77	PASS	FAIL	FAIL	FAIL	PASS
78	PASS	FAIL	FAIL	FAIL	PASS
79	PASS	FAIL	FAIL	FAIL	PASS
80	PASS	FAIL	FAIL	FAIL	PASS

Measurements

tAR_GONOGO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
HDC samples					
81	PASS	FAIL	FAIL	FAIL	PASS
82	PASS	FAIL	FAIL	FAIL	PASS
83	PASS	FAIL	FAIL	FAIL	PASS
84	PASS	FAIL	FAIL	FAIL	FAIL
85	PASS	FAIL	FAIL	FAIL	PASS
86	PASS	FAIL	FAIL	FAIL	PASS
87	PASS	FAIL	FAIL	FAIL	PASS
88	PASS	FAIL	FAIL	FAIL	PASS
89	PASS	FAIL	FAIL	FAIL	PASS
90	PASS	FAIL	FAIL	FAIL	PASS

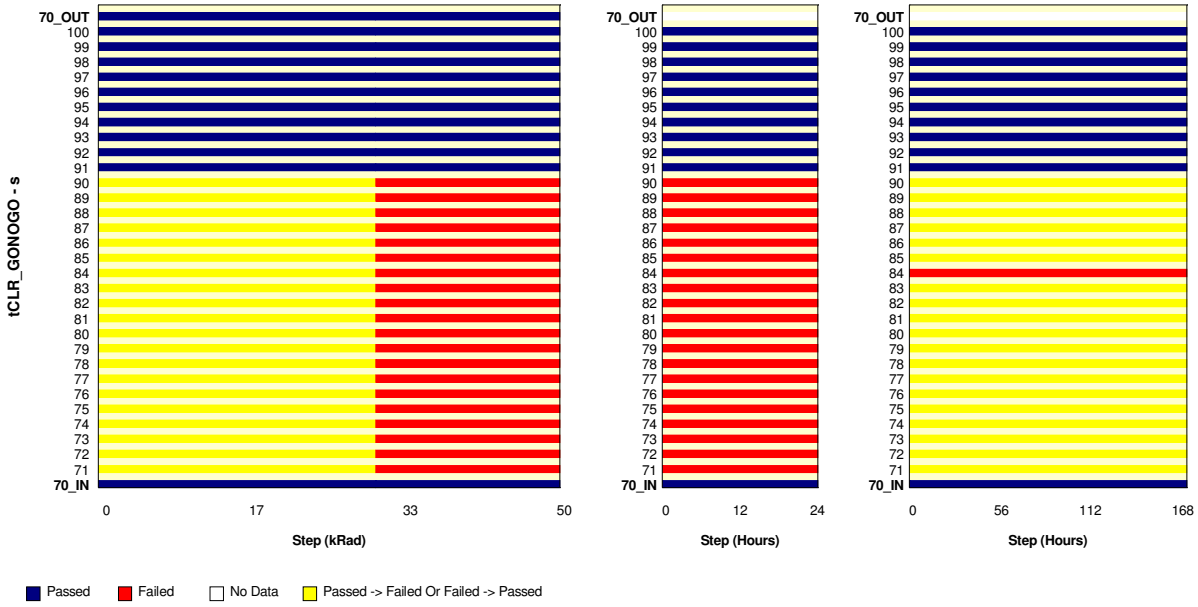
Measurements

tAR_GONOGO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
OFF samples					
91	PASS	PASS	PASS	PASS	PASS
92	PASS	PASS	PASS	PASS	PASS
93	PASS	PASS	PASS	PASS	PASS
94	PASS	PASS	PASS	PASS	PASS

tAR_GONOGO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
95	PASS	PASS	PASS	PASS	PASS
96	PASS	PASS	PASS	PASS	PASS
97	PASS	PASS	PASS	PASS	PASS
98	PASS	PASS	PASS	PASS	PASS
99	PASS	PASS	PASS	PASS	PASS
100	PASS	PASS	PASS	PASS	PASS

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : CLE to RE/ Delay : tCLR_GONOGO
Test conditions : GO NOGO
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	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
LDC samples					
71	PASS	FAIL	FAIL	FAIL	PASS
72	PASS	FAIL	FAIL	FAIL	PASS
73	PASS	FAIL	FAIL	FAIL	PASS
74	PASS	FAIL	FAIL	FAIL	PASS
75	PASS	FAIL	FAIL	FAIL	PASS
76	PASS	FAIL	FAIL	FAIL	PASS
77	PASS	FAIL	FAIL	FAIL	PASS
78	PASS	FAIL	FAIL	FAIL	PASS
79	PASS	FAIL	FAIL	FAIL	PASS
80	PASS	FAIL	FAIL	FAIL	PASS

Measurements

tCLR_GONOGO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
HDC samples					
81	PASS	FAIL	FAIL	FAIL	PASS
82	PASS	FAIL	FAIL	FAIL	PASS
83	PASS	FAIL	FAIL	FAIL	PASS
84	PASS	FAIL	FAIL	FAIL	FAIL
85	PASS	FAIL	FAIL	FAIL	PASS
86	PASS	FAIL	FAIL	FAIL	PASS
87	PASS	FAIL	FAIL	FAIL	PASS
88	PASS	FAIL	FAIL	FAIL	PASS
89	PASS	FAIL	FAIL	FAIL	PASS
90	PASS	FAIL	FAIL	FAIL	PASS

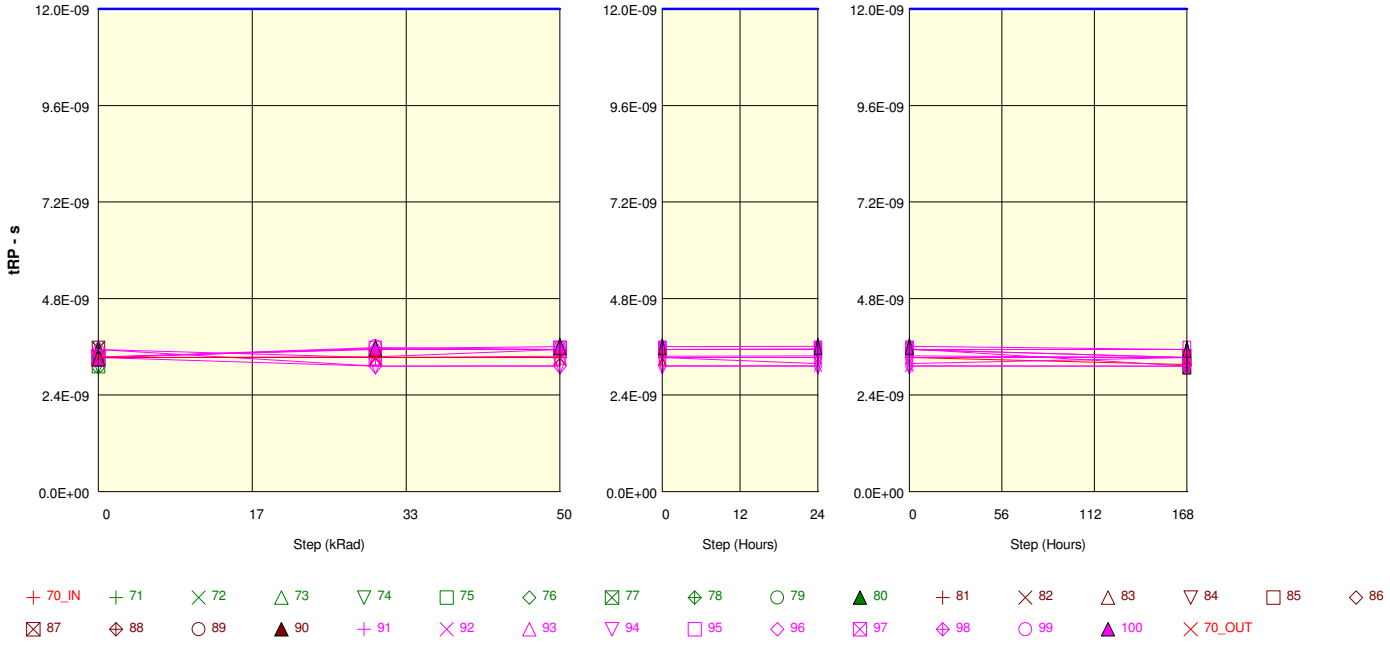
Measurements

tCLR_GONOGO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
OFF samples					
91	PASS	PASS	PASS	PASS	PASS
92	PASS	PASS	PASS	PASS	PASS
93	PASS	PASS	PASS	PASS	PASS
94	PASS	PASS	PASS	PASS	PASS

tCLR_GONOGO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
95	PASS	PASS	PASS	PASS	PASS
96	PASS	PASS	PASS	PASS	PASS
97	PASS	PASS	PASS	PASS	PASS
98	PASS	PASS	PASS	PASS	PASS
99	PASS	PASS	PASS	PASS	PASS
100	PASS	PASS	PASS	PASS	PASS

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	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	24 Hours	168 Hours
70_IN_REF	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.2E-09
70_OUT_REF	3.3E-09	3.3E-09	3.3E-09		3.3E-09
LDC samples					
71	3.5E-09				3.1E-09
72	3.5E-09				3.1E-09
73	3.3E-09				3.1E-09
74	3.1E-09				3.1E-09
75	3.2E-09				3.3E-09
76	3.3E-09				3.1E-09
77	3.3E-09				3.1E-09
78	3.4E-09				3.2E-09
79	3.2E-09				3.1E-09
80	3.5E-09				3.4E-09
Statistics					
Min	3.1E-09	-	-	-	3.1E-09
Max	3.5E-09	-	-	-	3.4E-09
Average	3.3E-09	-	-	-	3.2E-09
Std Deviation	153.7E-12	-	-	-	89.9E-12

Measurements

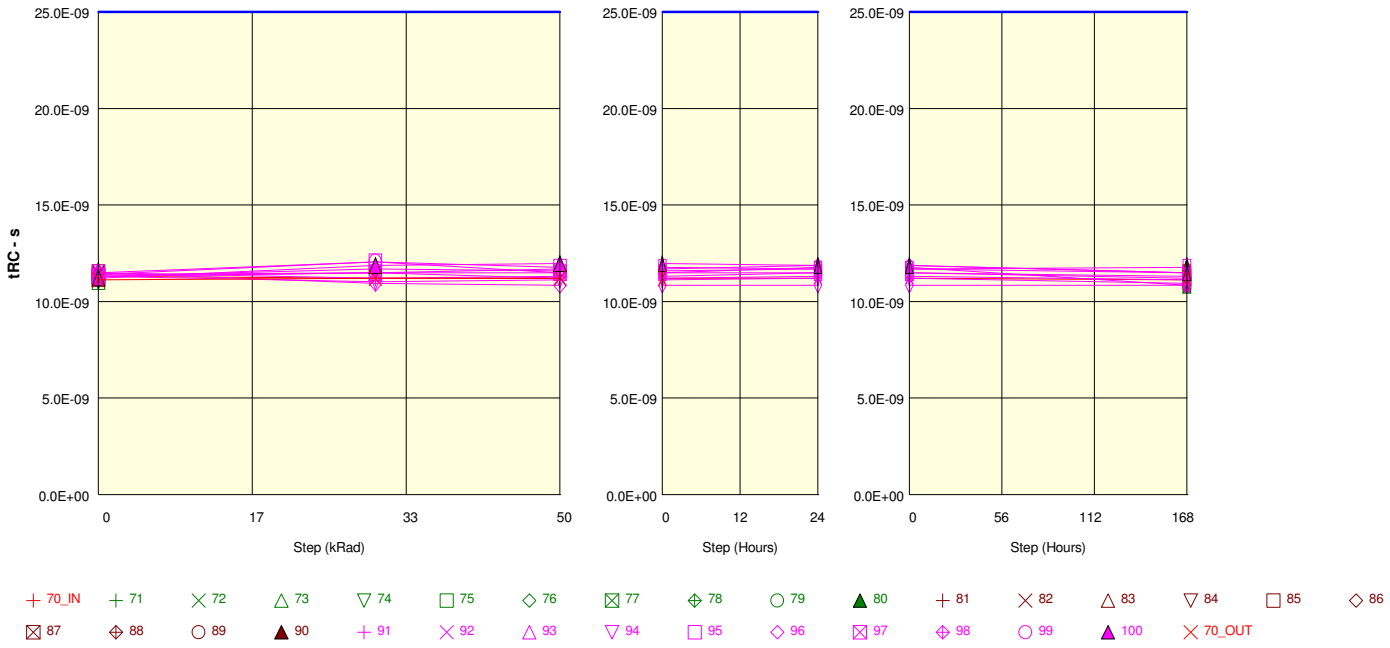
tRP	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.2E-09
70_OUT_REF	3.3E-09	3.3E-09	3.3E-09		3.3E-09
HDC samples					
81	3.3E-09				3.2E-09
82	3.3E-09				3.3E-09
83	3.4E-09				3.3E-09
84	3.3E-09				
85	3.3E-09				3.1E-09
86	3.3E-09				3.3E-09
87	3.5E-09				3.3E-09
88	3.3E-09				3.2E-09
89	3.3E-09				3.1E-09
90	3.4E-09				3.5E-09
Statistics					
Min	3.3E-09	-	-	-	3.1E-09
Max	3.5E-09	-	-	-	3.5E-09
Average	3.4E-09	-	-	-	3.3E-09
Std Deviation	61.4E-12	-	-	-	130.7E-12

Measurements

tRP	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.2E-09
70_OUT_REF	3.3E-09	3.3E-09	3.3E-09		3.3E-09
OFF samples					
91	3.5E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09
92	3.3E-09	3.3E-09	3.3E-09	3.2E-09	3.3E-09
93	3.3E-09	3.3E-09	3.4E-09	3.4E-09	3.3E-09
94	3.3E-09	3.1E-09	3.1E-09	3.1E-09	3.1E-09
95	3.3E-09	3.5E-09	3.5E-09	3.5E-09	3.5E-09
96	3.5E-09	3.1E-09	3.1E-09	3.1E-09	3.1E-09
97	3.3E-09	3.4E-09	3.5E-09	3.5E-09	3.3E-09
98	3.4E-09	3.5E-09	3.5E-09	3.5E-09	3.3E-09
99	3.3E-09	3.6E-09	3.5E-09	3.5E-09	3.1E-09
100	3.3E-09	3.6E-09	3.6E-09	3.6E-09	3.5E-09
Statistics					
Min	3.3E-09	3.1E-09	3.1E-09	3.1E-09	3.1E-09
Max	3.5E-09	3.6E-09	3.6E-09	3.6E-09	3.5E-09
Average	3.4E-09	3.4E-09	3.4E-09	3.4E-09	3.3E-09
Std Deviation	82.4E-12	163.6E-12	167.5E-12	180.7E-12	145.7E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	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	24 Hours	168 Hours
70_IN_REF	11.3E-09	11.2E-09	11.2E-09	11.2E-09	11.1E-09
70_OUT_REF	11.1E-09	11.2E-09	11.2E-09		11.2E-09
LDC samples					
71	11.5E-09				10.9E-09
72	11.5E-09				10.9E-09
73	11.2E-09				10.9E-09
74	11.0E-09				10.9E-09
75	11.0E-09				11.2E-09
76	11.5E-09				10.9E-09
77	11.3E-09				10.9E-09
78	11.3E-09				11.1E-09
79	11.2E-09				11.2E-09
80	11.6E-09				11.9E-09
Statistics					
Min	11.0E-09	-	-	-	10.9E-09
Max	11.6E-09	-	-	-	11.9E-09
Average	11.3E-09	-	-	-	11.1E-09
Std Deviation	187.7E-12	-	-	-	302.5E-12

Measurements

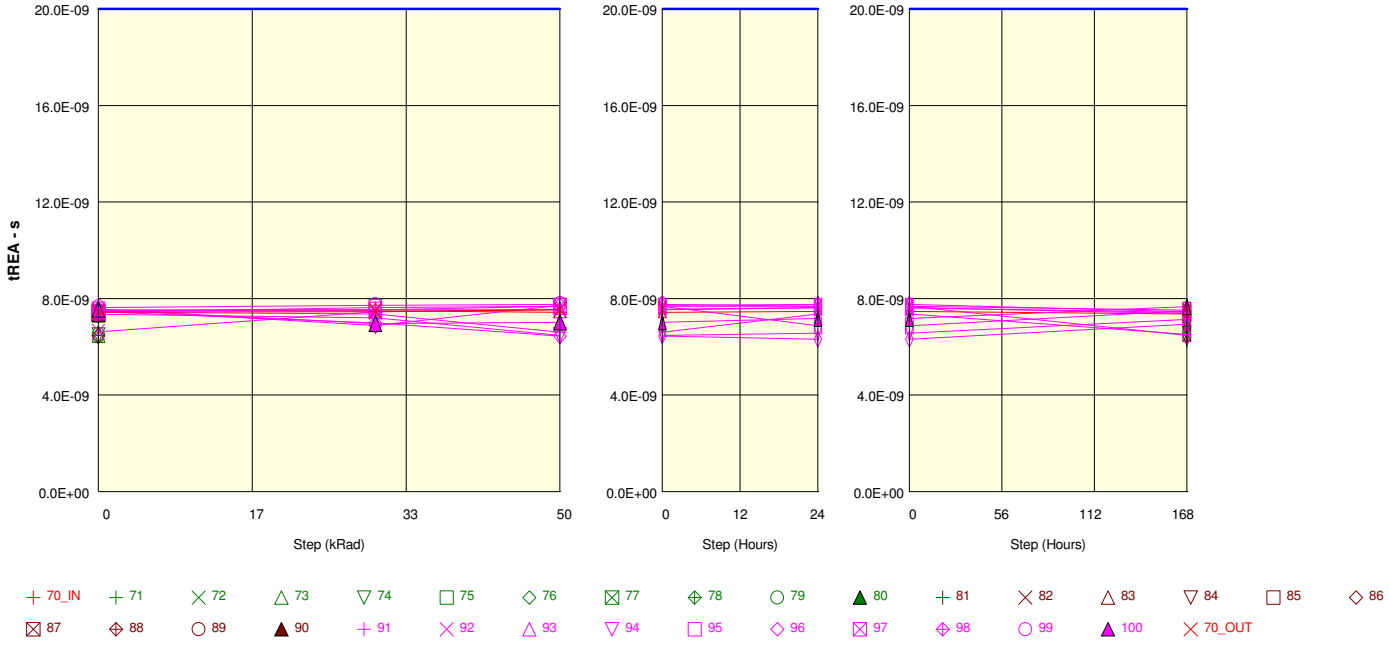
tRC	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	11.3E-09	11.2E-09	11.2E-09	11.2E-09	11.1E-09
70_OUT_REF	11.1E-09	11.2E-09	11.2E-09		11.2E-09
HDC samples					
81	11.4E-09				11.1E-09
82	11.4E-09				11.3E-09
83	11.5E-09				11.6E-09
84	11.2E-09				
85	11.2E-09				11.0E-09
86	11.2E-09				11.2E-09
87	11.5E-09				11.5E-09
88	11.2E-09				11.3E-09
89	11.3E-09				10.9E-09
90	11.4E-09				11.5E-09
Statistics					
Min	11.2E-09	-	-	-	10.9E-09
Max	11.5E-09	-	-	-	11.6E-09
Average	11.3E-09	-	-	-	11.3E-09
Std Deviation	110.0E-12	-	-	-	227.6E-12

Measurements

tRC	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	11.3E-09	11.2E-09	11.2E-09	11.2E-09	11.1E-09
70_OUT_REF	11.1E-09	11.2E-09	11.2E-09		11.2E-09
OFF samples					
91	11.5E-09	11.2E-09	11.3E-09	11.5E-09	11.2E-09
92	11.3E-09	11.5E-09	11.2E-09	11.3E-09	11.1E-09
93	11.4E-09	11.5E-09	11.7E-09	11.9E-09	11.5E-09
94	11.3E-09	11.0E-09	11.1E-09	11.2E-09	10.9E-09
95	11.5E-09	12.1E-09	11.8E-09	11.7E-09	11.8E-09
96	11.5E-09	10.9E-09	10.9E-09	10.9E-09	10.9E-09
97	11.3E-09	11.5E-09	11.5E-09	11.5E-09	11.3E-09
98	11.3E-09	11.7E-09	11.6E-09	11.7E-09	11.5E-09
99	11.4E-09	12.1E-09	11.5E-09	11.8E-09	10.9E-09
100	11.2E-09	11.9E-09	12.0E-09	11.9E-09	11.5E-09
Statistics					
Min	11.2E-09	10.9E-09	10.9E-09	10.9E-09	10.9E-09
Max	11.5E-09	12.1E-09	12.0E-09	11.9E-09	11.8E-09
Average	11.4E-09	11.5E-09	11.5E-09	11.5E-09	11.3E-09
Std Deviation	93.3E-12	371.7E-12	313.9E-12	307.7E-12	299.6E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	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	24 Hours	168 Hours
70_IN_REF	7.5E-09	7.5E-09	7.4E-09	7.5E-09	7.4E-09
70_OUT_REF	7.4E-09	7.5E-09	7.5E-09		7.4E-09
LDC samples					
71	7.4E-09				6.3E-09
72	7.5E-09				7.1E-09
73	6.5E-09				7.1E-09
74	6.5E-09				6.5E-09
75	7.4E-09				7.5E-09
76	7.4E-09				6.4E-09
77	7.4E-09				7.2E-09
78	7.4E-09				7.1E-09
79	6.5E-09				6.5E-09
80	7.5E-09				7.6E-09
Statistics					
Min	6.5E-09	-	-	-	6.3E-09
Max	7.5E-09	-	-	-	7.6E-09
Average	7.2E-09	-	-	-	6.9E-09
Std Deviation	436.1E-12	-	-	-	436.5E-12

Measurements

tREA	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	7.5E-09	7.5E-09	7.4E-09	7.5E-09	7.4E-09
70_OUT_REF	7.4E-09	7.5E-09	7.5E-09		7.4E-09
HDC samples					
81	7.4E-09				7.3E-09
82	7.4E-09				6.5E-09
83	7.4E-09				7.5E-09
84	7.4E-09				
85	7.4E-09				6.6E-09
86	7.5E-09				7.5E-09
87	7.4E-09				7.4E-09
88	6.5E-09				7.3E-09
89	7.3E-09				7.1E-09
90	7.4E-09				7.4E-09
Statistics					
Min	6.5E-09	-	-	-	6.5E-09
Max	7.5E-09	-	-	-	7.5E-09
Average	7.3E-09	-	-	-	7.2E-09
Std Deviation	281.9E-12	-	-	-	358.4E-12

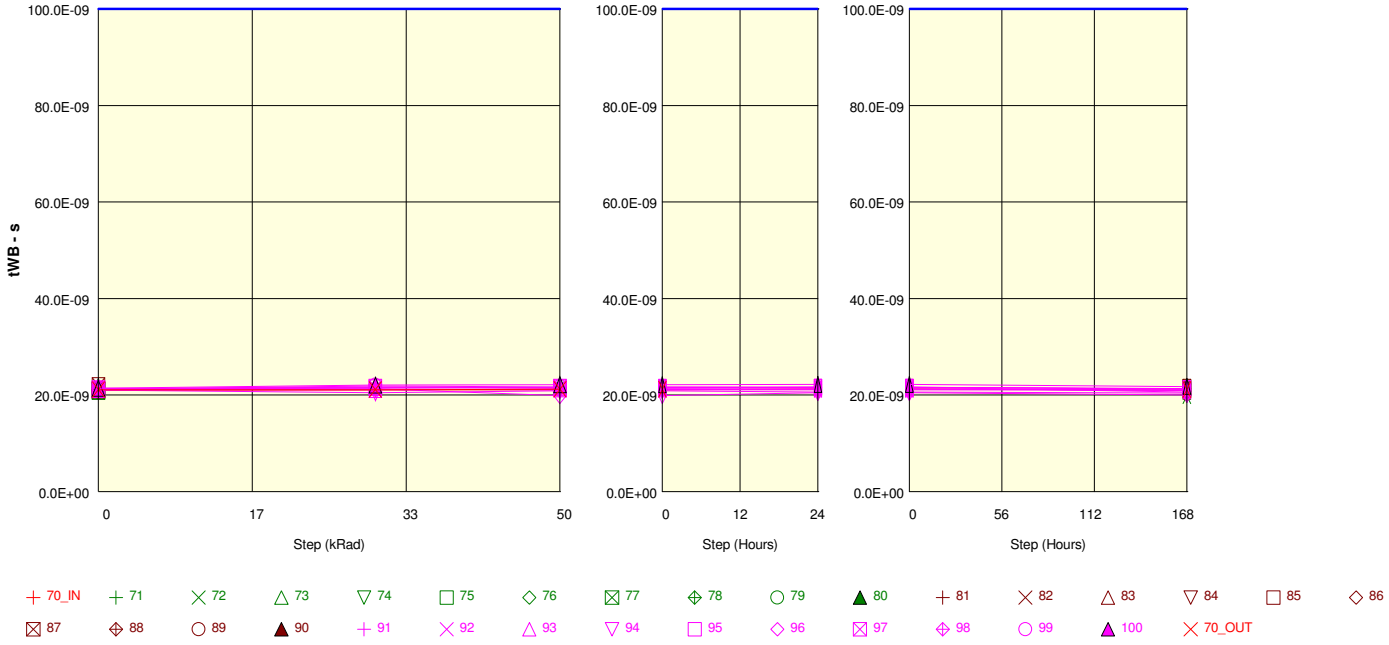
Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Measurements

tREA	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	7.5E-09	7.5E-09	7.4E-09	7.5E-09	7.4E-09
70_OUT_REF	7.4E-09	7.5E-09	7.5E-09		7.4E-09
OFF samples					
91	7.4E-09	7.4E-09	6.6E-09	7.4E-09	6.5E-09
92	6.6E-09	7.5E-09	7.6E-09	7.6E-09	7.4E-09
93	7.5E-09	7.5E-09	7.5E-09	7.6E-09	7.4E-09
94	7.3E-09	7.2E-09	6.5E-09	6.6E-09	7.1E-09
95	7.4E-09	7.6E-09	7.7E-09	6.9E-09	7.5E-09
96	7.5E-09	7.0E-09	6.5E-09	6.3E-09	6.9E-09
97	7.5E-09	7.5E-09	7.7E-09	7.7E-09	7.5E-09
98	7.6E-09	6.9E-09	7.7E-09	7.8E-09	7.5E-09
99	7.6E-09	7.7E-09	7.8E-09	7.7E-09	6.5E-09
100	7.6E-09	7.0E-09	7.0E-09	7.2E-09	7.7E-09
Statistics					
Min	6.6E-09	6.9E-09	6.5E-09	6.3E-09	6.5E-09
Max	7.6E-09	7.7E-09	7.8E-09	7.8E-09	7.7E-09
Average	7.4E-09	7.3E-09	7.2E-09	7.3E-09	7.2E-09
Std Deviation	272.1E-12	283.3E-12	524.0E-12	489.3E-12	402.5E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	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	24 Hours	168 Hours
70_IN_REF	21.0E-09	21.1E-09	21.1E-09	21.3E-09	21.0E-09
70_OUT_REF	21.1E-09	21.1E-09	21.2E-09		21.1E-09
LDC samples					
71	21.4E-09				20.8E-09
72	21.1E-09				19.9E-09
73	21.0E-09				20.8E-09
74	20.9E-09				20.6E-09
75	21.0E-09				21.2E-09
76	21.2E-09				20.2E-09
77	20.8E-09				21.5E-09
78	21.4E-09				21.4E-09
79	20.9E-09				20.9E-09
80	21.8E-09				21.8E-09
Statistics					
Min	20.8E-09	-	-	-	19.9E-09
Max	21.8E-09	-	-	-	21.8E-09
Average	21.1E-09	-	-	-	20.9E-09
Std Deviation	290.7E-12	-	-	-	553.8E-12

Measurements

tWB	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	21.0E-09	21.1E-09	21.1E-09	21.3E-09	21.0E-09
70_OUT_REF	21.1E-09	21.1E-09	21.2E-09		21.1E-09
HDC samples					
81	21.1E-09				20.9E-09
82	21.2E-09				20.8E-09
83	21.2E-09				21.2E-09
84	20.9E-09				
85	21.1E-09				21.0E-09
86	21.2E-09				21.1E-09
87	22.0E-09				21.7E-09
88	21.0E-09				20.8E-09
89	21.2E-09				20.4E-09
90	21.3E-09				21.6E-09
Statistics					
Min	20.9E-09	-	-	-	20.4E-09
Max	22.0E-09	-	-	-	21.7E-09
Average	21.2E-09	-	-	-	21.1E-09
Std Deviation	271.6E-12	-	-	-	379.2E-12

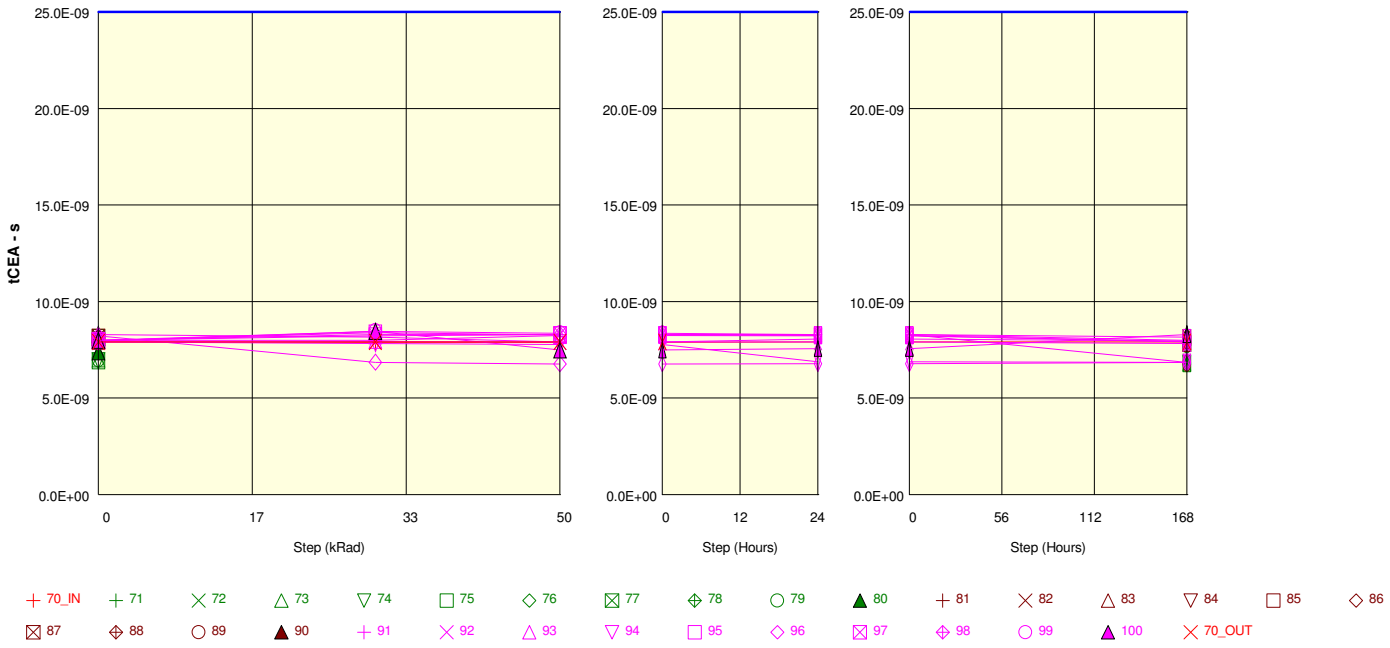
Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Measurements

tWB	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	21.0E-09	21.1E-09	21.1E-09	21.3E-09	21.0E-09
70_OUT_REF	21.1E-09	21.1E-09	21.2E-09		21.1E-09
OFF samples					
91	21.4E-09	21.2E-09	21.1E-09	21.1E-09	21.0E-09
92	21.2E-09	21.2E-09	21.2E-09	21.2E-09	21.0E-09
93	21.1E-09	21.1E-09	21.3E-09	21.3E-09	21.0E-09
94	21.0E-09	20.5E-09	20.9E-09	20.7E-09	20.5E-09
95	21.2E-09	21.7E-09	21.5E-09	21.6E-09	21.4E-09
96	21.3E-09	21.3E-09	19.9E-09	20.5E-09	20.1E-09
97	21.3E-09	21.5E-09	21.6E-09	21.6E-09	21.3E-09
98	21.4E-09	21.6E-09	21.5E-09	21.6E-09	21.2E-09
99	21.2E-09	21.9E-09	21.7E-09	21.6E-09	20.6E-09
100	21.4E-09	22.1E-09	22.2E-09	22.2E-09	21.8E-09
Statistics					
Min	21.0E-09	20.5E-09	19.9E-09	20.5E-09	20.1E-09
Max	21.4E-09	22.1E-09	22.2E-09	22.2E-09	21.8E-09
Average	21.3E-09	21.4E-09	21.3E-09	21.4E-09	21.0E-09
Std Deviation	119.5E-12	418.5E-12	574.6E-12	480.9E-12	467.2E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	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	24 Hours	168 Hours
70_IN_REF	7.9E-09	7.9E-09	7.9E-09	7.9E-09	7.9E-09
70_OUT_REF	7.9E-09	7.9E-09	7.9E-09		7.9E-09
LDC samples					
71	8.0E-09				6.8E-09
72	8.0E-09				6.9E-09
73	7.0E-09				6.8E-09
74	6.9E-09				6.8E-09
75	6.9E-09				7.8E-09
76	8.0E-09				6.8E-09
77	8.1E-09				6.8E-09
78	8.2E-09				7.8E-09
79	7.0E-09				7.7E-09
80	7.4E-09				8.2E-09
Statistics					
Min	6.9E-09	-	-	-	6.8E-09
Max	8.2E-09	-	-	-	8.2E-09
Average	7.6E-09	-	-	-	7.2E-09
Std Deviation	529.5E-12	-	-	-	547.3E-12

Measurements

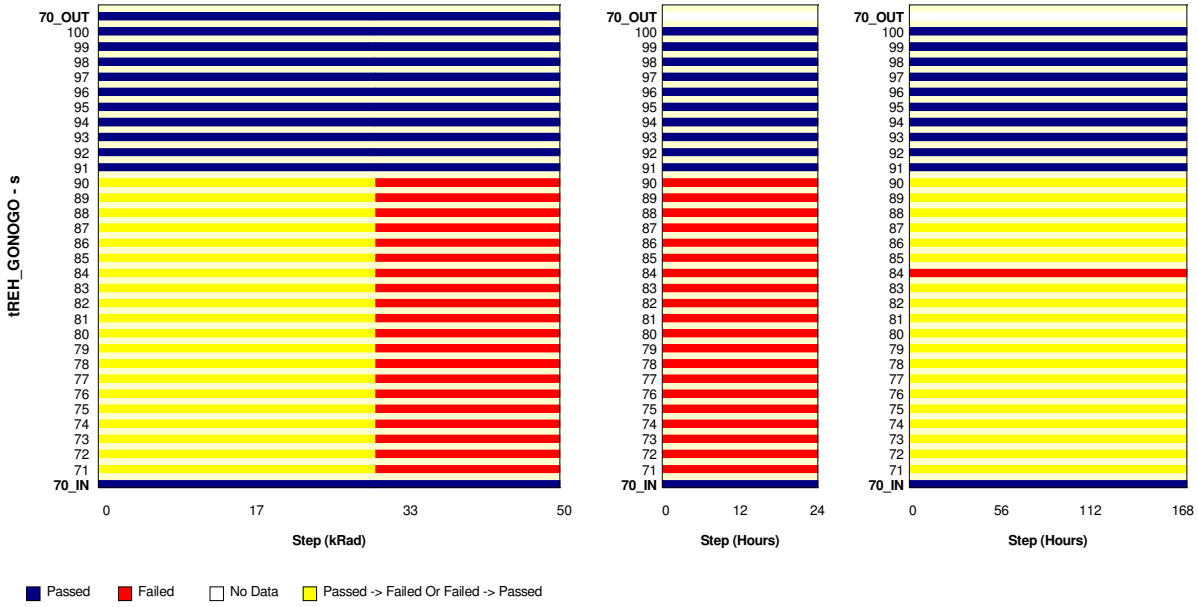
tCEA	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	7.9E-09	7.9E-09	7.9E-09	7.9E-09	7.9E-09
70_OUT_REF	7.9E-09	7.9E-09	7.9E-09		7.9E-09
HDC samples					
81	7.9E-09				7.8E-09
82	8.0E-09				7.8E-09
83	8.1E-09				7.9E-09
84	7.9E-09				
85	7.9E-09				7.8E-09
86	7.9E-09				7.9E-09
87	8.2E-09				8.1E-09
88	7.9E-09				7.8E-09
89	7.9E-09				6.8E-09
90	8.3E-09				8.4E-09
Statistics					
Min	7.9E-09	-	-	-	6.8E-09
Max	8.3E-09	-	-	-	8.4E-09
Average	8.0E-09	-	-	-	7.8E-09
Std Deviation	131.0E-12	-	-	-	404.5E-12

Measurements

tCEA	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	7.9E-09	7.9E-09	7.9E-09	7.9E-09	7.9E-09
70_OUT_REF	7.9E-09	7.9E-09	7.9E-09		7.9E-09
OFF samples					
91	8.3E-09	8.2E-09	7.9E-09	8.1E-09	8.0E-09
92	7.9E-09	7.9E-09	7.9E-09	7.9E-09	7.8E-09
93	8.0E-09	8.0E-09	8.2E-09	8.2E-09	7.9E-09
94	7.9E-09	7.8E-09	7.8E-09	6.9E-09	6.9E-09
95	8.0E-09	8.4E-09	8.3E-09	8.3E-09	8.1E-09
96	8.2E-09	6.9E-09	6.8E-09	6.8E-09	6.9E-09
97	8.0E-09	8.2E-09	8.3E-09	8.2E-09	7.9E-09
98	8.0E-09	8.3E-09	8.3E-09	8.3E-09	8.0E-09
99	8.0E-09	8.5E-09	8.4E-09	8.3E-09	6.9E-09
100	8.0E-09	8.5E-09	7.5E-09	7.6E-09	8.3E-09
Statistics					
Min	7.9E-09	6.9E-09	6.8E-09	6.8E-09	6.9E-09
Max	8.3E-09	8.5E-09	8.4E-09	8.3E-09	8.3E-09
Average	8.0E-09	8.1E-09	7.9E-09	7.9E-09	7.7E-09
Std Deviation	122.1E-12	450.4E-12	471.3E-12	556.5E-12	540.8E-12

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : RE/ High Hold Time : tREH_GONOGO
Test conditions : GO NOGO
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	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
LDC samples					
71	PASS	FAIL	FAIL	FAIL	PASS
72	PASS	FAIL	FAIL	FAIL	PASS
73	PASS	FAIL	FAIL	FAIL	PASS
74	PASS	FAIL	FAIL	FAIL	PASS
75	PASS	FAIL	FAIL	FAIL	PASS
76	PASS	FAIL	FAIL	FAIL	PASS
77	PASS	FAIL	FAIL	FAIL	PASS
78	PASS	FAIL	FAIL	FAIL	PASS
79	PASS	FAIL	FAIL	FAIL	PASS
80	PASS	FAIL	FAIL	FAIL	PASS

Measurements

tREH_GONOGO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
HDC samples					
81	PASS	FAIL	FAIL	FAIL	PASS
82	PASS	FAIL	FAIL	FAIL	PASS
83	PASS	FAIL	FAIL	FAIL	PASS
84	PASS	FAIL	FAIL	FAIL	FAIL
85	PASS	FAIL	FAIL	FAIL	PASS
86	PASS	FAIL	FAIL	FAIL	PASS
87	PASS	FAIL	FAIL	FAIL	PASS
88	PASS	FAIL	FAIL	FAIL	PASS
89	PASS	FAIL	FAIL	FAIL	PASS
90	PASS	FAIL	FAIL	FAIL	PASS

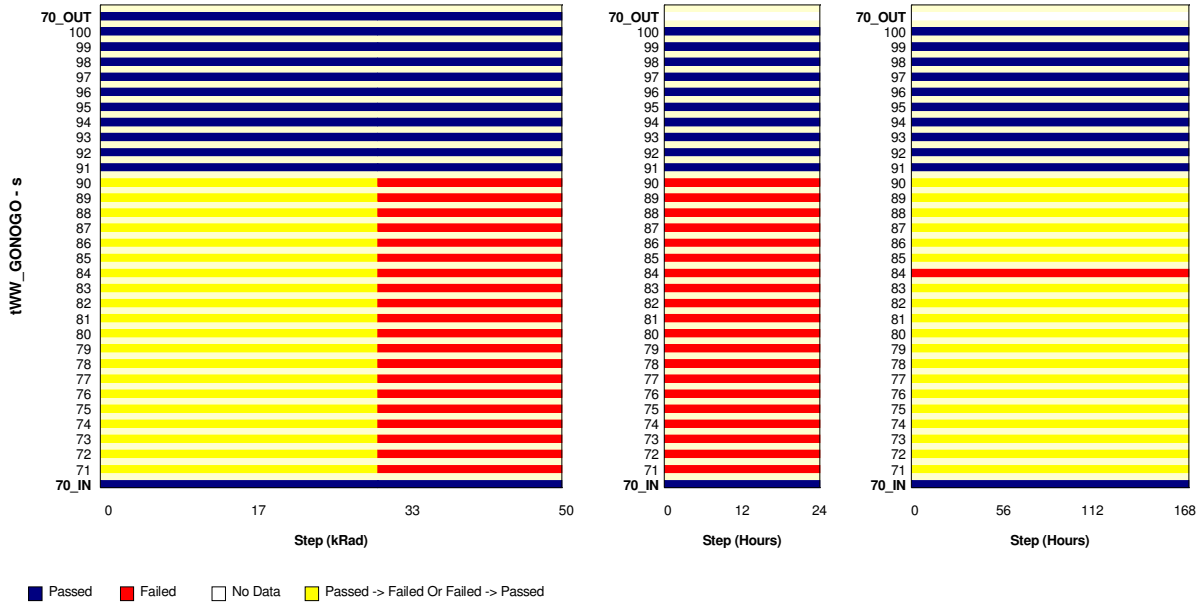
Measurements

tREH_GONOGO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
OFF samples					
91	PASS	PASS	PASS	PASS	PASS
92	PASS	PASS	PASS	PASS	PASS
93	PASS	PASS	PASS	PASS	PASS
94	PASS	PASS	PASS	PASS	PASS

tREH_GONOGO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
95	PASS	PASS	PASS	PASS	PASS
96	PASS	PASS	PASS	PASS	PASS
97	PASS	PASS	PASS	PASS	PASS
98	PASS	PASS	PASS	PASS	PASS
99	PASS	PASS	PASS	PASS	PASS
100	PASS	PASS	PASS	PASS	PASS

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : WP/ High to WE/ Low : tWW_GONOGO
Test conditions : GO NOGO
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	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
LDC samples					
71	PASS	FAIL	FAIL	FAIL	PASS
72	PASS	FAIL	FAIL	FAIL	PASS
73	PASS	FAIL	FAIL	FAIL	PASS
74	PASS	FAIL	FAIL	FAIL	PASS
75	PASS	FAIL	FAIL	FAIL	PASS
76	PASS	FAIL	FAIL	FAIL	PASS
77	PASS	FAIL	FAIL	FAIL	PASS
78	PASS	FAIL	FAIL	FAIL	PASS
79	PASS	FAIL	FAIL	FAIL	PASS
80	PASS	FAIL	FAIL	FAIL	PASS

Measurements

tWW_GONOGO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
HDC samples					
81	PASS	FAIL	FAIL	FAIL	PASS
82	PASS	FAIL	FAIL	FAIL	PASS
83	PASS	FAIL	FAIL	FAIL	PASS
84	PASS	FAIL	FAIL	FAIL	FAIL
85	PASS	FAIL	FAIL	FAIL	PASS
86	PASS	FAIL	FAIL	FAIL	PASS
87	PASS	FAIL	FAIL	FAIL	PASS
88	PASS	FAIL	FAIL	FAIL	PASS
89	PASS	FAIL	FAIL	FAIL	PASS
90	PASS	FAIL	FAIL	FAIL	PASS

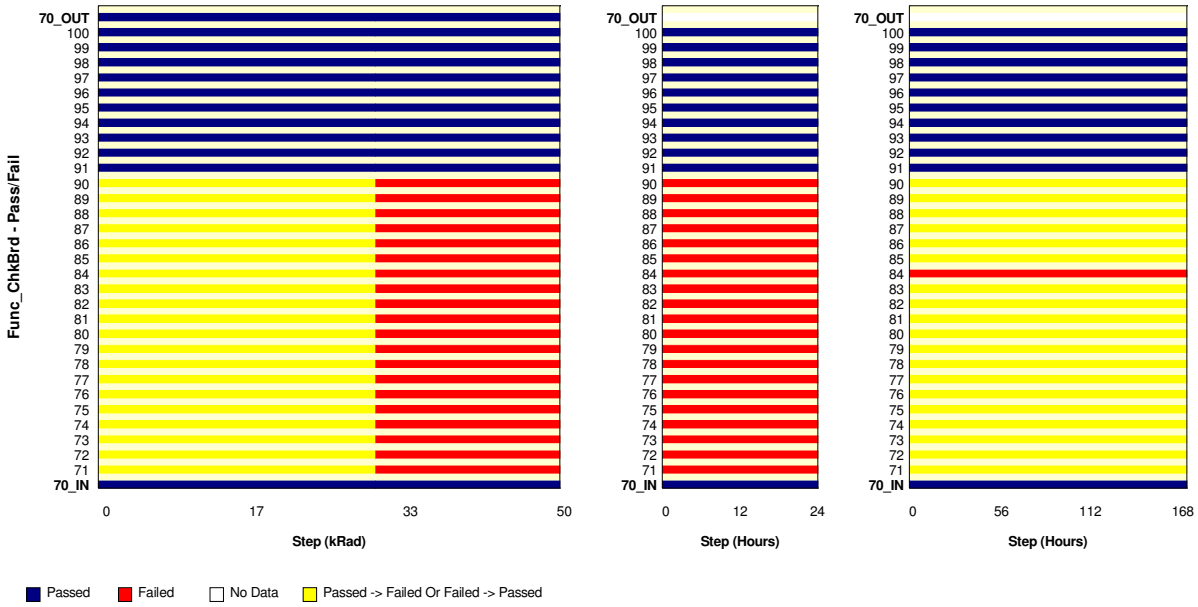
Measurements

tWW_GONOGO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
OFF samples					
91	PASS	PASS	PASS	PASS	PASS
92	PASS	PASS	PASS	PASS	PASS
93	PASS	PASS	PASS	PASS	PASS
94	PASS	PASS	PASS	PASS	PASS

tWW_GONOGO	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
95	PASS	PASS	PASS	PASS	PASS
96	PASS	PASS	PASS	PASS	PASS
97	PASS	PASS	PASS	PASS	PASS
98	PASS	PASS	PASS	PASS	PASS
99	PASS	PASS	PASS	PASS	PASS
100	PASS	PASS	PASS	PASS	PASS

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : Checkerboard : Func_ChkBrd
Test conditions : Erase memory Write . Read pattern Checkerboard Block#0
Unit : Pass/Fail
No spec limit specified.



Measurements

Func_ChkBrd	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
LDC samples					
71	PASS	FAIL	FAIL	FAIL	PASS
72	PASS	FAIL	FAIL	FAIL	PASS
73	PASS	FAIL	FAIL	FAIL	PASS
74	PASS	FAIL	FAIL	FAIL	PASS
75	PASS	FAIL	FAIL	FAIL	PASS
76	PASS	FAIL	FAIL	FAIL	PASS
77	PASS	FAIL	FAIL	FAIL	PASS
78	PASS	FAIL	FAIL	FAIL	PASS
79	PASS	FAIL	FAIL	FAIL	PASS
80	PASS	FAIL	FAIL	FAIL	PASS

Measurements

Func_ChkBrd	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
HDC samples					
81	PASS	FAIL	FAIL	FAIL	PASS
82	PASS	FAIL	FAIL	FAIL	PASS
83	PASS	FAIL	FAIL	FAIL	PASS
84	PASS	FAIL	FAIL	FAIL	FAIL
85	PASS	FAIL	FAIL	FAIL	PASS
86	PASS	FAIL	FAIL	FAIL	PASS
87	PASS	FAIL	FAIL	FAIL	PASS
88	PASS	FAIL	FAIL	FAIL	PASS
89	PASS	FAIL	FAIL	FAIL	PASS
90	PASS	FAIL	FAIL	FAIL	PASS

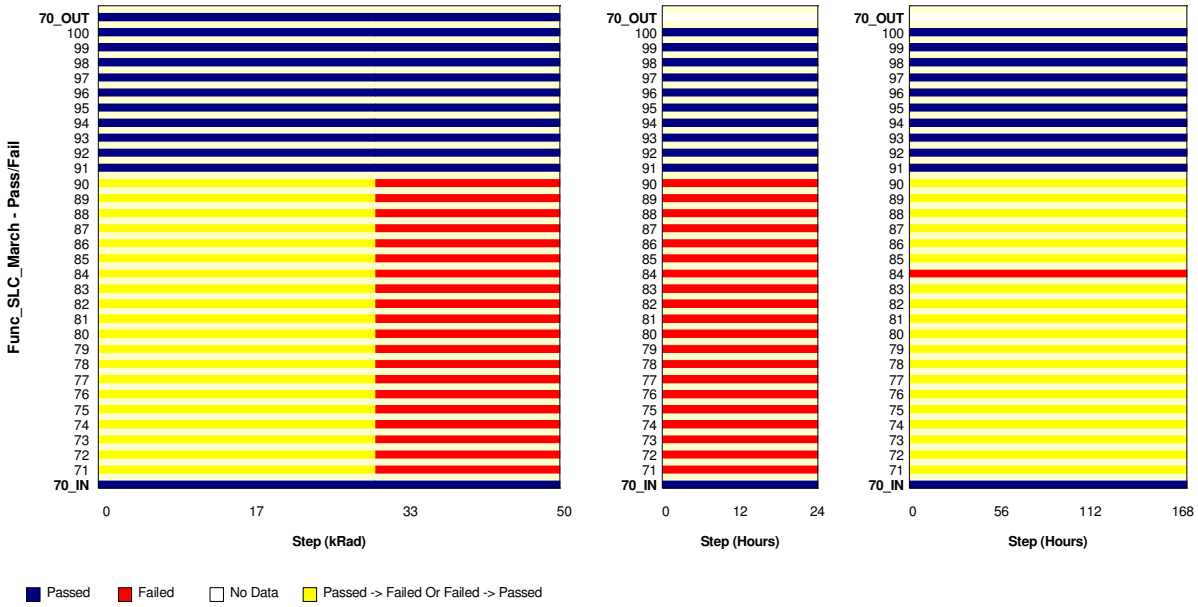
Measurements

Func_ChkBrd	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
OFF samples					
91	PASS	PASS	PASS	PASS	PASS
92	PASS	PASS	PASS	PASS	PASS
93	PASS	PASS	PASS	PASS	PASS
94	PASS	PASS	PASS	PASS	PASS
95	PASS	PASS	PASS	PASS	PASS

Func_ChkBrd	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
96	PASS	PASS	PASS	PASS	PASS
97	PASS	PASS	PASS	PASS	PASS
98	PASS	PASS	PASS	PASS	PASS
99	PASS	PASS	PASS	PASS	PASS
100	PASS	PASS	PASS	PASS	PASS

Hirex Engineering	Total Ionizing Dose Test Report		Ref.:	HRX/TID/01410
	W29N01GVSIAA	WINBOND	Issue:	Draft

Parameter : SLC-March : Func_SLC_March
Test conditions : Erase memory Write . Read with SLC March Algorithm Block#0
Unit : Pass/Fail
No spec limit specified.



Measurements

Func_SLC_March	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
LDC samples					
71	PASS	FAIL	FAIL	FAIL	PASS
72	PASS	FAIL	FAIL	FAIL	PASS
73	PASS	FAIL	FAIL	FAIL	PASS
74	PASS	FAIL	FAIL	FAIL	PASS
75	PASS	FAIL	FAIL	FAIL	PASS
76	PASS	FAIL	FAIL	FAIL	PASS
77	PASS	FAIL	FAIL	FAIL	PASS
78	PASS	FAIL	FAIL	FAIL	PASS
79	PASS	FAIL	FAIL	FAIL	PASS
80	PASS	FAIL	FAIL	FAIL	PASS

Measurements

Func_SLC_March	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
HDC samples					
81	PASS	FAIL	FAIL	FAIL	PASS
82	PASS	FAIL	FAIL	FAIL	PASS
83	PASS	FAIL	FAIL	FAIL	PASS
84	PASS	FAIL	FAIL	FAIL	FAIL
85	PASS	FAIL	FAIL	FAIL	PASS
86	PASS	FAIL	FAIL	FAIL	PASS
87	PASS	FAIL	FAIL	FAIL	PASS
88	PASS	FAIL	FAIL	FAIL	PASS
89	PASS	FAIL	FAIL	FAIL	PASS
90	PASS	FAIL	FAIL	FAIL	PASS

Measurements

Func_SLC_March	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
70_IN_REF	PASS	PASS	PASS	PASS	PASS
70_OUT_REF	PASS	PASS	PASS		PASS
OFF samples					
91	PASS	PASS	PASS	PASS	PASS
92	PASS	PASS	PASS	PASS	PASS
93	PASS	PASS	PASS	PASS	PASS
94	PASS	PASS	PASS	PASS	PASS
95	PASS	PASS	PASS	PASS	PASS

Func_SLC_March	0 kRad	30 kRad	50 kRad	24 Hours	168 Hours
96	PASS	PASS	PASS	PASS	PASS
97	PASS	PASS	PASS	PASS	PASS
98	PASS	PASS	PASS	PASS	PASS
99	PASS	PASS	PASS	PASS	PASS
100	PASS	PASS	PASS	PASS	PASS