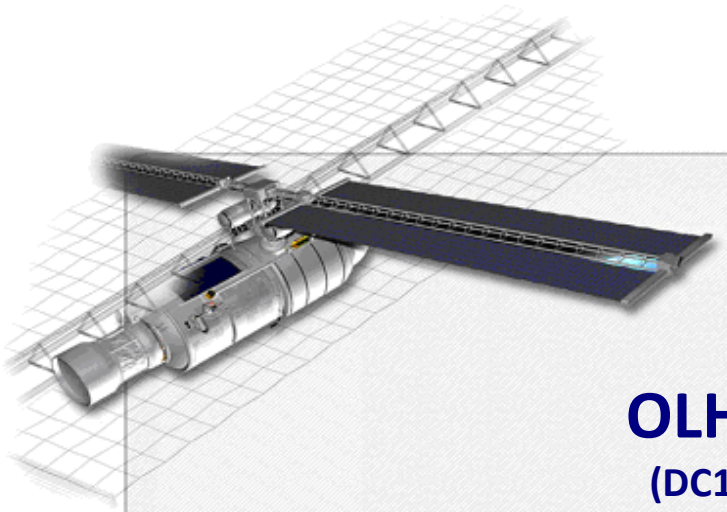
TOTAL IONIZING DOSE TEST REPORT



OLH400

(DC1048)

High Speed
Low Input-Current Optocoupler
From ISOLINK

TRAD/TE/OLH400/XXX1/ESA/YP/1104		Labège, April 30th, 2012
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Issue : 0		
To: Marc POIZAT	Project/Program:	ESA Contract N°4000102571/10/NL/AF-Radiation Characterization of Laplace RH optocouplers, sensors and detectors

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1 INTRODUCTION

This report includes the test results of OLH400, a High Speed Hermetic Low Input-Current Optocoupler from ISOLINK to evaluate Total Ionizing Dose (TID) effects under ^{60}Co irradiation. Between November 2011 and February 2012, TRAD characterized this device for TID sensitivity at the UCL Facility, Belgium using their Gamma irradiation Facility.
The objectives of the test are:

- to detect and measure the degradation of device parameters as a function of TID,
- to determine if device parameters are within specified limits after exposure to final TID level.

2 DOCUMENTS

2.1 Applicable Documents

AD	1.	ESA contract	N°4000102571/10/NL/AF-Radiation Characterization of Laplace RH optocouplers, sensors and detectors
AD	2.	Irradiation Test Plan	ITP-TE-OLH400-ISO-ESA-1115,Issue 2 dated 21/06/2011

2.2 Reference Documents

RD	1.	Datasheet OLH400	High Speed Hermetic Low Input-Current Optocoupler dated 27/03/2002

3 DEVICE INFORMATION

3.1 Device description

The OLH400 is a High Speed Hermetic Low Input-Current Optocoupler. The OLH 400 has high current transfer ratio at very low input currents making it ideal for applications such as MOS, CMOS, and low power logic interfacing or RS232C data transmission systems. Each OLH 400 has a light emitting diode and an integrated photodiode-darlington detector IC mounted and coupled in a custom hermetic TO5 package providing 1000 Vdc electrical isolation between input and output.

Type	OLH400
Manufacturer	ISOLINK
Function	Optocoupler
Package	TO5
Date Code	1048
Sample size	16 parts (15 + 1 control sample)

3.2 Procurement information

75 parts OLH400 were delivered by ISOLINK through its French representative EUROMIP.

3.3 External view

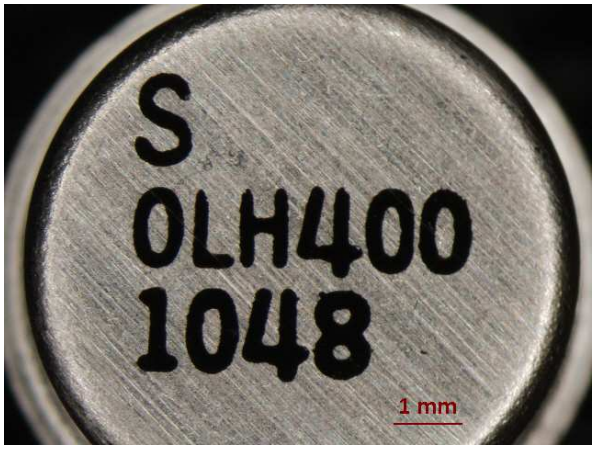


Figure 1: package marking

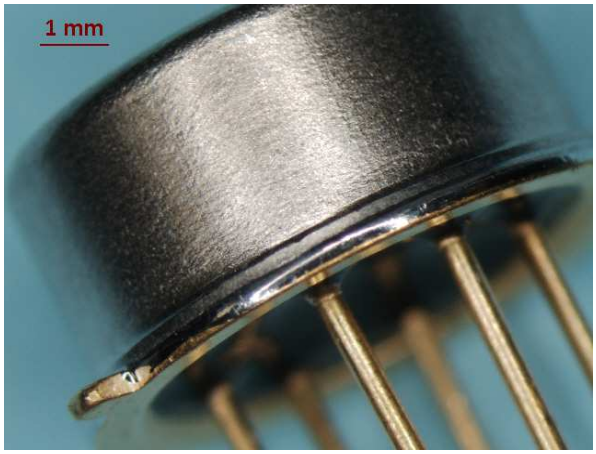


Figure 2: package view

3.4 Internal view

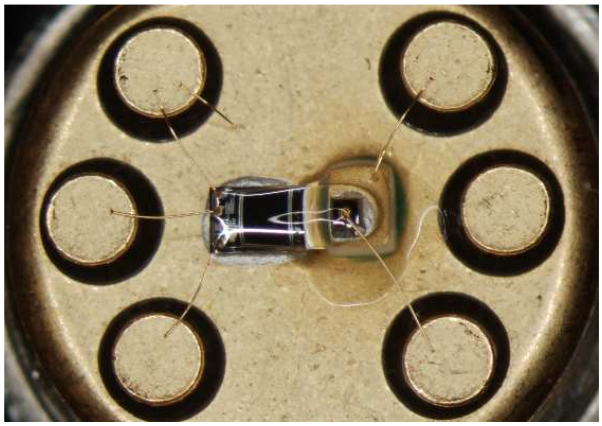
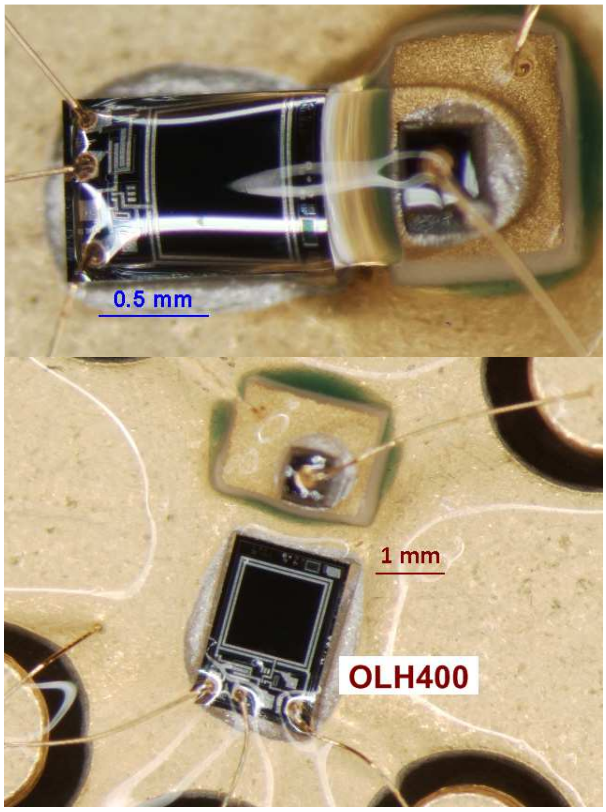


Figure 3: view of LED and integrated photodiode-darlington detector IC



3.5 Serialization

Each part is serialized to enable pre and post test identification and comparison.

Serial Number	Control sample	Test samples														
Serialization	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Ref	Bias1	Bias1	Bias1	Bias1	Bias1	Bias2	Bias2	Bias2	Bias2	Bias2	OFF	OFF	OFF	OFF	OFF

4 IRRADIATION MEANS AND CONDITIONS

4.1 UCL irradiation facility (Belgium)

Gamma irradiations are performed with Cobalt 60 source.
Gamma emitted radiation energies are 1.17 and 1.33 MeV.
Dose rates is equal 15 kRad(Si) / h at the source centre .
Moreover the irradiation chamber is a cylindrical room with a radius of 2m.
Then dose rate usable vary from 1.8 kRad(Si) / h to 80 Rad(Si) / h for normal irradiation positions and direct field.

4.2 Dose measurement

Alanine dosimeters are used for each test set up to control Total Ionizing Dose.

4.3 Experimental conditions

An Accumulated dose of 200 krad(Si) of ^{60}Co is required [AD2] for this TID (Total Ionizing Dose) evaluation test.

The test devices have been exposed to the following Dose rate:

	Step1	Step2	Step3	Step4	Step5	Step6	Step7	Step8
Accumulated dose krad(Si)	10	19	49	65	101	130	152	203
Dose rate (Si)/h	36	36	36	36	310	310	310	310

Two annealing steps are performed after Co60 irradiation:

Duration (h)	24	168
Temperature (°C)	25	100

5 ELECTRICAL TESTS

Electrical parameters to be measured in pre and post exposure tests are described in the following table. Electrical tests are performed on each part using the test set-up hereunder. All required data are recorded for each device. Test conditions and limits are given in the applicable irradiation test plan [AD2] and shown hereafter.

5.1 Test set-up

TEST BOARD	TRAD/CT1/E/OPTO/ZIP14/BR/1108
TEST PROGRAM	OLH400_TE_XXX1_B1_V10.llb

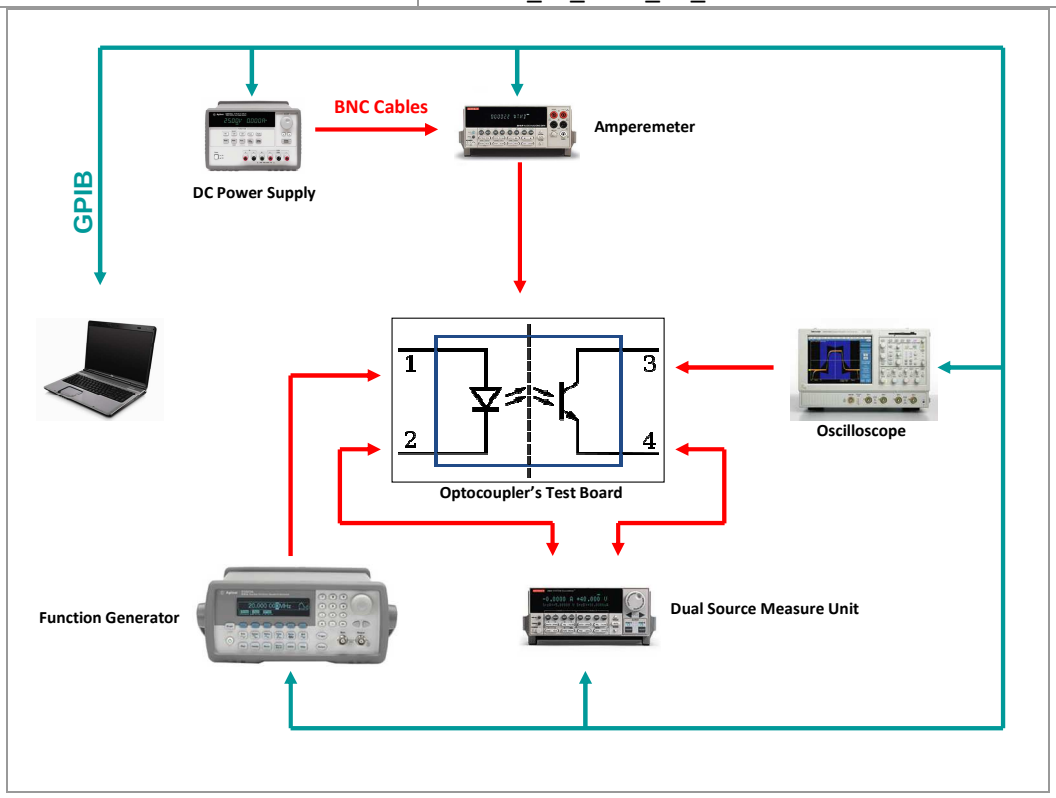


Figure 4: test principle

5.2 Test configuration

Samples were exposed to irradiation in three different modes - two on-modes (Figure 5 and Figure 6) and one off-mode (all terminal leads short-circuited) –

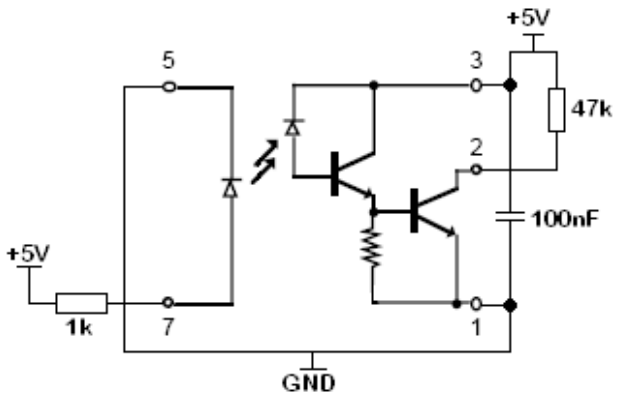


Figure 5: ON bias1

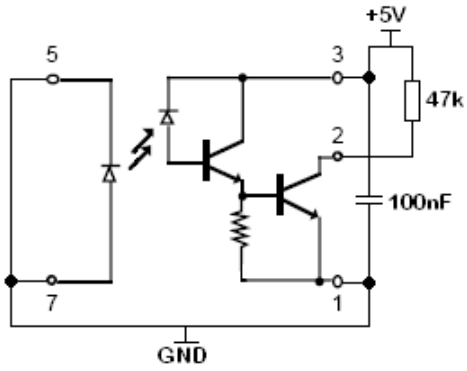


Figure 6: ON bias2

5.3 Electrical parameters

PARAMETER	SYMBOL	TEST CONDITION	MIN	MAX	UNIT
Logic Low Output Voltage	V_{OL1}	I_F=0.5 mA,I_{OL}=1.5mA,V_{CC}=4.5V		0.4	V
	V_{OL2}	I_F=5 mA,I_{OL}=10mA,V_{CC}=4.5V		0.4	V
Logic High Output Current	I_{OH}	I_F=0mA, V_O=V_{CC}=18v		250	µA
Logic Low Supply Current	I_{CCL}	I_F=1.6mA, V_{CC}=18V		2	mA
Logic High Supply Current	I_{CCH}	I_F=0mA, V_{CC}=18V		40	µA
Input Forward Voltage	V_F	I_F=1.6mA		2	V
Input Reverse Breakdown Voltage	B_{VR}	I_R=10 µA	3		V
Propagation Delay Time Logic High to Low	t_{PHL1}	I_F=0.5mA, R_L=4.7 KΩ, V_{CC}=5V		100	µs
	t_{PHL2}	I_F=5mA, R_L=680 Ω, V_{CC}=5V		10	µs
Propagation Delay Time Logic Low to High	t_{PLH1}	I_F=0.5mA, R_L=4.7 KΩ, V_{CC}=5V		60	µs
	t_{PlH2}	I_F=5mA, R_L=680 Ω, V_{CC}=5V		30	µs
Current Transfer Ratio	CTR1	I_F=1.6 mA, V_O=0.4V, V_{CC}=4.5V	300		%
	CTR2	I_F=0.16 mA, V_O=0.4V, V_{CC}=5V			%
	CTR3	I_F=0.32 mA, V_O=0.4V, V_{CC}=5V			%
	CTR4	I_F=1.6 mA, V_O=0.4V, V_{CC}=5V			%
	CTR5	I_F=16 mA, V_O=0.4V, V_{CC}=5V			%
	CTR6	I_F=1.6 mA, V_O=0.4V, V_{CC}=20V			%

Min/ Max values are those specified in the reference data-sheet [RD1].

Test measurements are performed at 25°C ± 10°C.

6 TEST HISTORY

Seven steps are defined [AD2]to determine the component degradation under ^{60}Co irradiation.

	Step1	Step2	Step3	Step4	Step5	Step6	Step7
Accumulated dose krad(Si)	10	20	50	100	120	150	200
Dose rate (Si)/h	36	36	36	36	310	310	310

Due to irradiation facility maintenance, between Step 3 and Step 4 (50 krad(Si) and 100 krad(Si)), tests were stop for 48 hours. Total Ionizing Dose was estimated at 65 krad(Si).
During this time period, parts were stocked in a cold chamber at -30°C.

7 SUMMARY RESULTS

Only parameters with applicable test limits are shown hereunder.

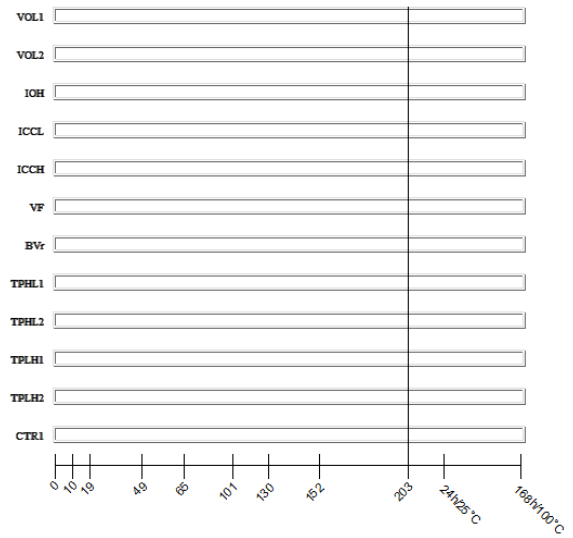


Figure 7: ON Bias 1

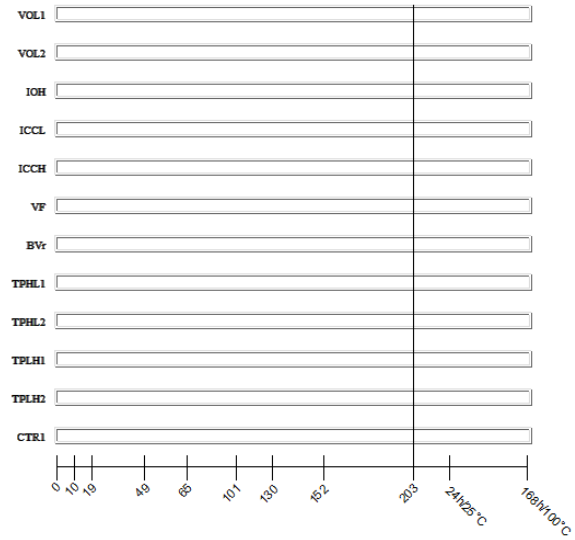


Figure 8 : ON Bias 2

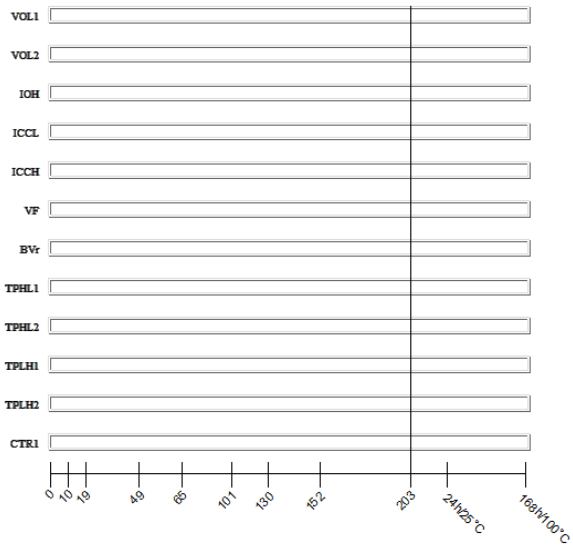
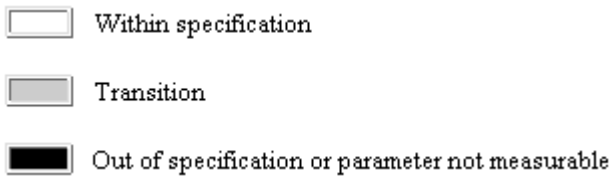


Figure 9: OFF Bias



All specified parameters [RD1] remain within the limits up to 203 kRad(Si).

8 CONCLUSION

Total Ionizing Dose steady-state irradiation test using Gamma ray was performed on OLH400 High Speed Hermetic Low Input-Current Optocoupler from ISOLINK up to 200krad(Si) under three bias conditions.

The results indicate that:

- All parameters are within specified values at total dose level.
- Average drift current transfer ratio function of the Bias condition and CTR configuration are described in the next Figure:

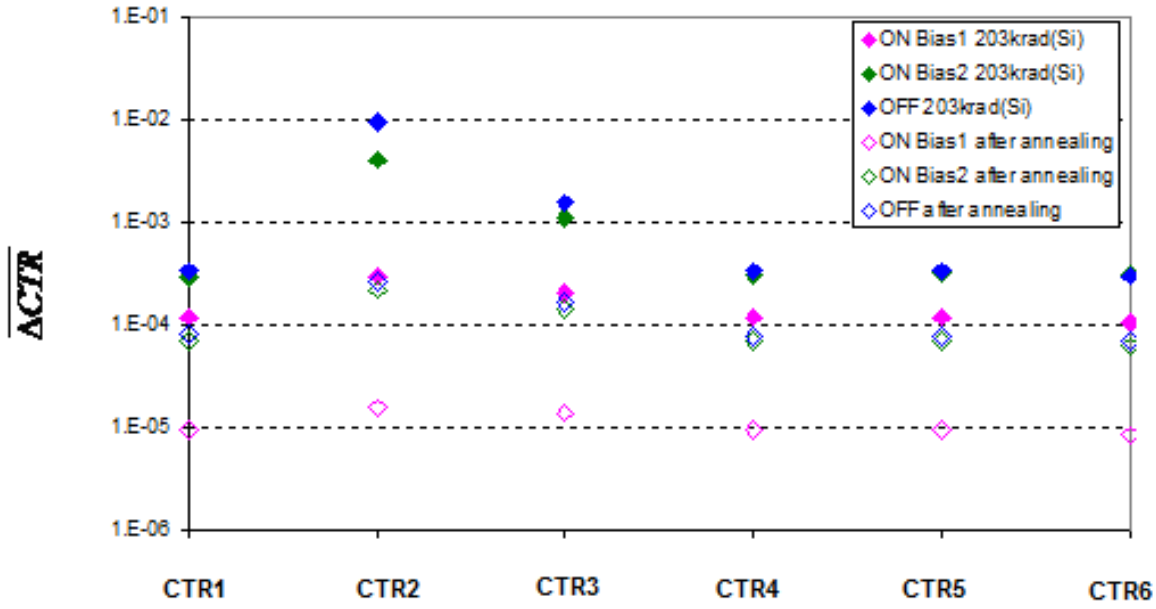


Figure 10: Average drift current transfer ratio function of the Bias condition and CTR configuration

- The least sensitive configuration at 203 krad(Si) total dose is the CTR6 condition (I_F=1.6 mA, V_O=0.4V, V_{CC}=20V)
- Conversely, CRT2 (IF=0.16 mA, VO=0.4V, VCC=5V) exhibits the greatest parameter degradation up to 203krad (Si) total dose.
- ON Bias1 configuration is the least sensitive configuration for all CTR conditions.
- OFF mode is the most sensitive configuration.
- Moreover CTR1 (I_F=1.6 mA, V_O=0.4V, V_{CC}=4.5V), which is the only CTR configuration for which specification limits are indicated in the data-sheet, remain within this limit at total dose level.

As shown in previous figure, after annealing, average drift Current Transfer Ratio decrease.

9 DETAILED TESTS RESULTS

The pre and post radiation test results are shown graphically in the following pages (9-2 to 9-35). The data is displayed in the following tables and graphs.

These graphs show parameter's shifts observed during the total ionizing dose sequence. The Control sample results are shown on each graph (black curve).

When available in the device data-sheet/specification, the maximum/minimum/typical values are also shown (red dotted line).

The tables include drift calculation between each measurement step and the "0" kRad(Si) step.

For CTR values, the formula used is:

$$\text{Drift} = \frac{1}{\text{measurement (X kRad(Si))}} - \frac{1}{\text{measurement (0 kRad(Si))}}$$

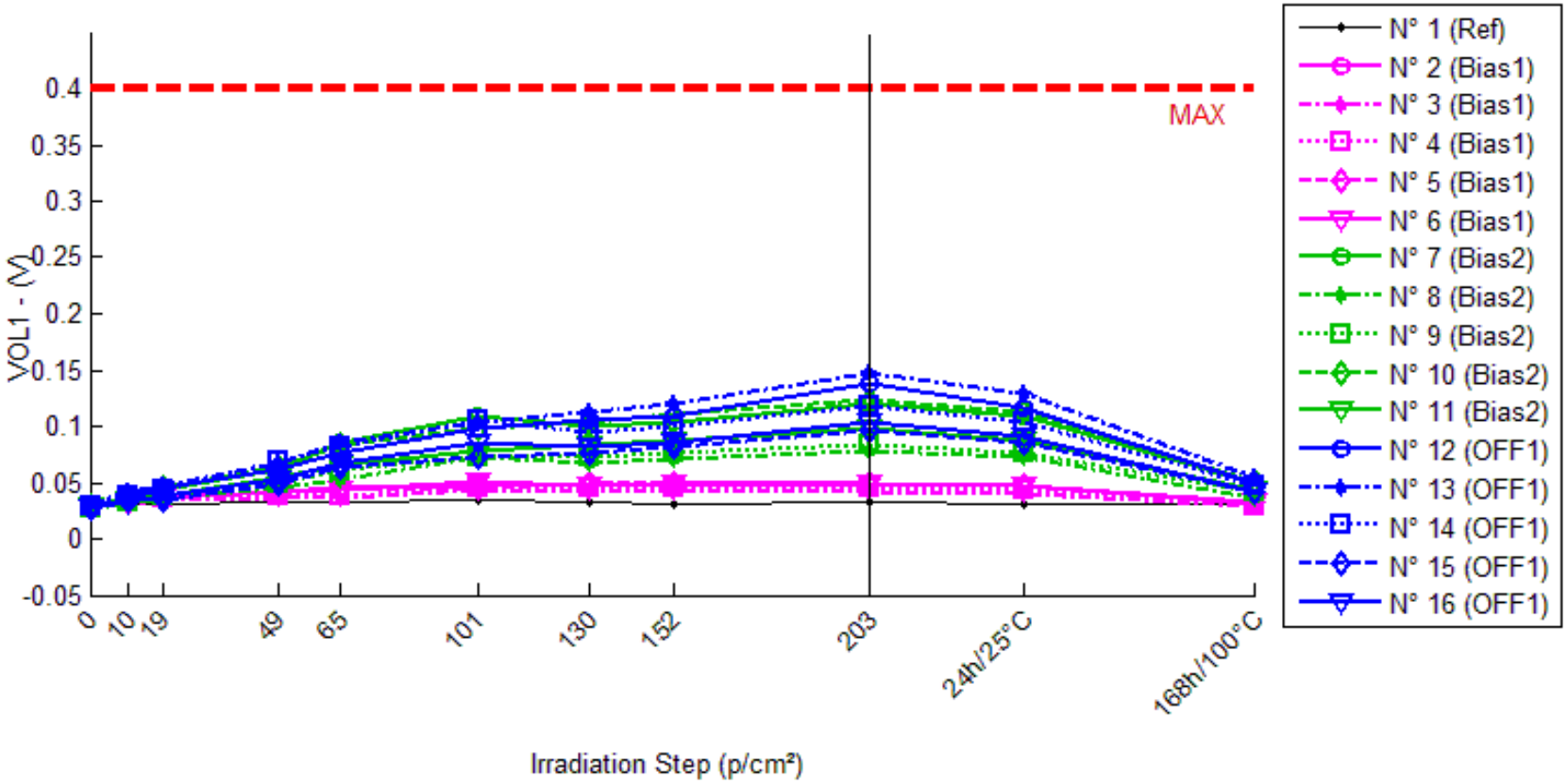
For other parameters, the formula used is:

Drift value= measurement (X kRad(Si)) - measurement (0 kRad(Si))

CONTENTS

1. VOL1

Ta=25°C; If = 0.5 mA; IOL = 1.5 mA; Vcc = 4.5 V



VOL1 . (V) **Max = 0.4**

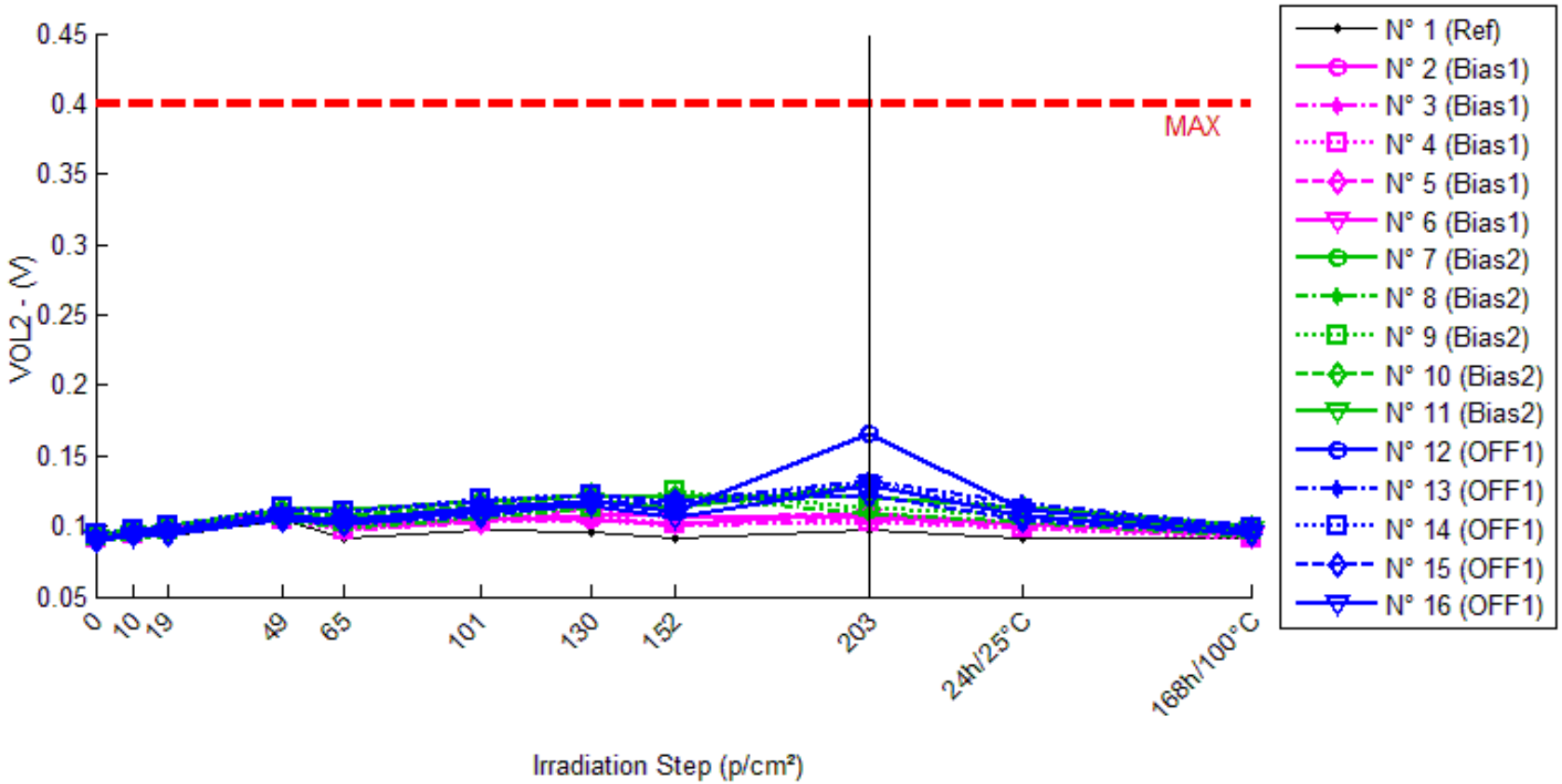
	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	0.031	0.031	0.031	0.033	0.032	0.035	0.032	0.031	0.032	0.031	0.031
N° 2 (Bias1)	0.029	0.034	0.036	0.042	0.046	0.048	0.047	0.048	0.050	0.047	0.031
N° 3 (Bias1)	0.028	0.031	0.035	0.037	0.037	0.044	0.041	0.041	0.042	0.040	0.029
N° 4 (Bias1)	0.029	0.032	0.037	0.039	0.039	0.046	0.045	0.045	0.045	0.043	0.030
N° 5 (Bias1)	0.030	0.033	0.038	0.042	0.044	0.045	0.049	0.049	0.050	0.047	0.032
N° 6 (Bias1)	0.030	0.033	0.037	0.042	0.044	0.051	0.048	0.049	0.049	0.047	0.032
N° 7 (Bias2)	0.030	0.037	0.044	0.062	0.086	0.109	0.100	0.104	0.120	0.109	0.049
N° 8 (Bias2)	0.027	0.031	0.037	0.045	0.053	0.072	0.068	0.071	0.078	0.072	0.037
N° 9 (Bias2)	0.028	0.033	0.038	0.049	0.061	0.072	0.072	0.077	0.084	0.077	0.041
N° 10 (Bias2)	0.030	0.037	0.046	0.064	0.083	0.098	0.103	0.111	0.124	0.113	0.051
N° 11 (Bias2)	0.029	0.034	0.038	0.055	0.066	0.078	0.083	0.088	0.099	0.087	0.044
N° 12 (OFF1)	0.029	0.035	0.045	0.062	0.077	0.098	0.105	0.109	0.138	0.116	0.050
N° 13 (OFF1)	0.031	0.042	0.047	0.068	0.086	0.104	0.113	0.120	0.147	0.129	0.054
N° 14 (OFF1)	0.030	0.039	0.044	0.070	0.081	0.105	0.095	0.100	0.119	0.104	0.047
N° 15 (OFF1)	0.027	0.034	0.035	0.049	0.063	0.072	0.077	0.081	0.096	0.086	0.042
N° 16 (OFF1)	0.028	0.033	0.039	0.053	0.067	0.086	0.081	0.086	0.103	0.091	0.042

Delta [VOL1]

	krad(Si)	0krad(Si)	9krad(Si)	9krad(Si)	5krad(Si)	01krad(Si)	30krad(Si)	52krad(Si)	03krad(Si)	4h/25°C	68h/100°C
°° 1 (Ref)	--	.639E-4	.910E-4	.170E-3	.726E-3	.925E-3	.871E-4	.219E-4	.198E-3	.482E-4	.123E-4
°° 2 (Bias1)	--	.687E-3	.456E-3	.211E-2	.684E-2	.874E-2	.809E-2	.867E-2	.021E-2	.730E-2	.824E-3
°° 3 (Bias1)	--	.680E-3	.163E-3	.886E-3	.647E-3	.564E-2	.311E-2	.312E-2	.385E-2	.173E-2	.481E-4
°° 4 (Bias1)	--	.005E-3	.298E-3	.067E-2	.057E-2	.743E-2	.622E-2	.615E-2	.653E-2	.442E-2	.296E-3
°° 5 (Bias1)	--	.475E-3	.841E-3	.217E-2	.360E-2	.543E-2	.926E-2	.899E-2	.974E-2	.691E-2	.579E-3
°° 6 (Bias1)	--	.287E-3	.776E-3	.193E-2	.439E-2	.104E-2	.855E-2	.949E-2	.949E-2	.707E-2	.892E-3
°° 7 (Bias2)	--	.709E-3	.407E-2	.118E-2	.541E-2	.895E-2	.001E-2	.354E-2	.930E-2	.857E-2	.816E-2
°° 8 (Bias2)	--	.956E-3	.864E-3	.802E-2	.641E-2	.493E-2	.122E-2	.396E-2	.121E-2	.503E-2	.032E-2
°° 9 (Bias2)	--	.831E-3	.485E-3	.095E-2	.309E-2	.343E-2	.421E-2	.850E-2	.580E-2	.882E-2	.231E-2
°° 10 (Bias2)	--	.716E-3	.569E-2	.428E-2	.272E-2	.769E-2	.265E-2	.080E-2	.371E-2	.279E-2	.042E-2
°° 11 (Bias2)	--	.893E-3	.413E-3	.622E-2	.761E-2	.960E-2	.399E-2	.930E-2	.040E-2	.793E-2	.490E-2
°° 12 (OFF1)	--	.149E-3	.526E-2	.305E-2	.766E-2	.888E-2	.603E-2	.020E-2	.092E-1	.663E-2	.059E-2
°° 13 (OFF1)	--	.069E-2	.565E-2	.654E-2	.477E-2	.343E-2	.242E-2	.881E-2	.157E-1	.836E-2	.301E-2
°° 14 (OFF1)	--	.116E-3	.485E-2	.074E-2	.186E-2	.532E-2	.517E-2	.066E-2	.972E-2	.463E-2	.752E-2
°° 15 (OFF1)	--	.205E-3	.492E-3	.213E-2	.583E-2	.511E-2	.993E-2	.413E-2	.921E-2	.925E-2	.449E-2
°° 16 (OFF1)	--	.149E-3	.124E-2	.497E-2	.898E-2	.795E-2	.372E-2	.800E-2	.549E-2	.364E-2	.483E-2
.verage (OFF1)	--	.427E-3	.107E-3	.115E-2	.281E-2	.766E-2	.705E-2	.728E-2	.796E-2	.548E-2	.508E-3
(OFF1)	--	.657E-4	.194E-4	.409E-3	.228E-3	.328E-3	.473E-3	.660E-3	.717E-3	.402E-3	.907E-4
.verage+3σ (OFF1)	--	.724E-3	.865E-3	.538E-2	.249E-2	.464E-2	.447E-2	.526E-2	.611E-2	.269E-2	.680E-3
.verage-3σ (OFF1)	--	.130E-3	.349E-3	.927E-3	.126E-3	.067E-2	.628E-3	.306E-3	.814E-3	.280E-3	.358E-4
.verage (Bias1)	--	.421E-3	.170E-2	.613E-2	.105E-2	.692E-2	.642E-2	.122E-2	.208E-2	.263E-2	.522E-2
(Bias1)	--	.236E-3	.960E-3	.793E-3	.257E-2	.566E-2	.444E-2	.580E-2	.916E-2	.720E-2	.131E-3
.verage+3σ (Bias1)	--	.129E-3	.058E-2	.651E-2	.876E-2	.039E-1	.974E-2	.086E-1	.296E-1	.142E-1	.761E-2
.verage-3σ (Bias1)	--	.714E-3	.824E-3	.751E-3	.336E-3	.952E-3	.309E-2	.382E-2	.462E-2	.103E-2	.829E-3
.verage (Bias2)	--	.661E-3	.290E-2	.149E-2	.582E-2	.414E-2	.545E-2	.036E-2	.185E-2	.650E-2	.809E-2
(Bias2)	--	.240E-3	.498E-3	.807E-3	.164E-3	.259E-2	.395E-2	.461E-2	.032E-2	.618E-2	.686E-3
.verage+3σ (Bias2)	--	.438E-2	.339E-2	.491E-2	.031E-2	.019E-1	.073E-1	.142E-1	.528E-1	.250E-1	.915E-2
.verage-3σ (Bias2)	--	.413E-4	.406E-3	.066E-3	.133E-2	.637E-2	.360E-2	.653E-2	.088E-2	.797E-2	.031E-3

2. VOL2

Ta=25°C; If = 5 mA; IOL = 10 mA; Vcc = 4.5 V



VOL2 . (V) **Max = 0.4**

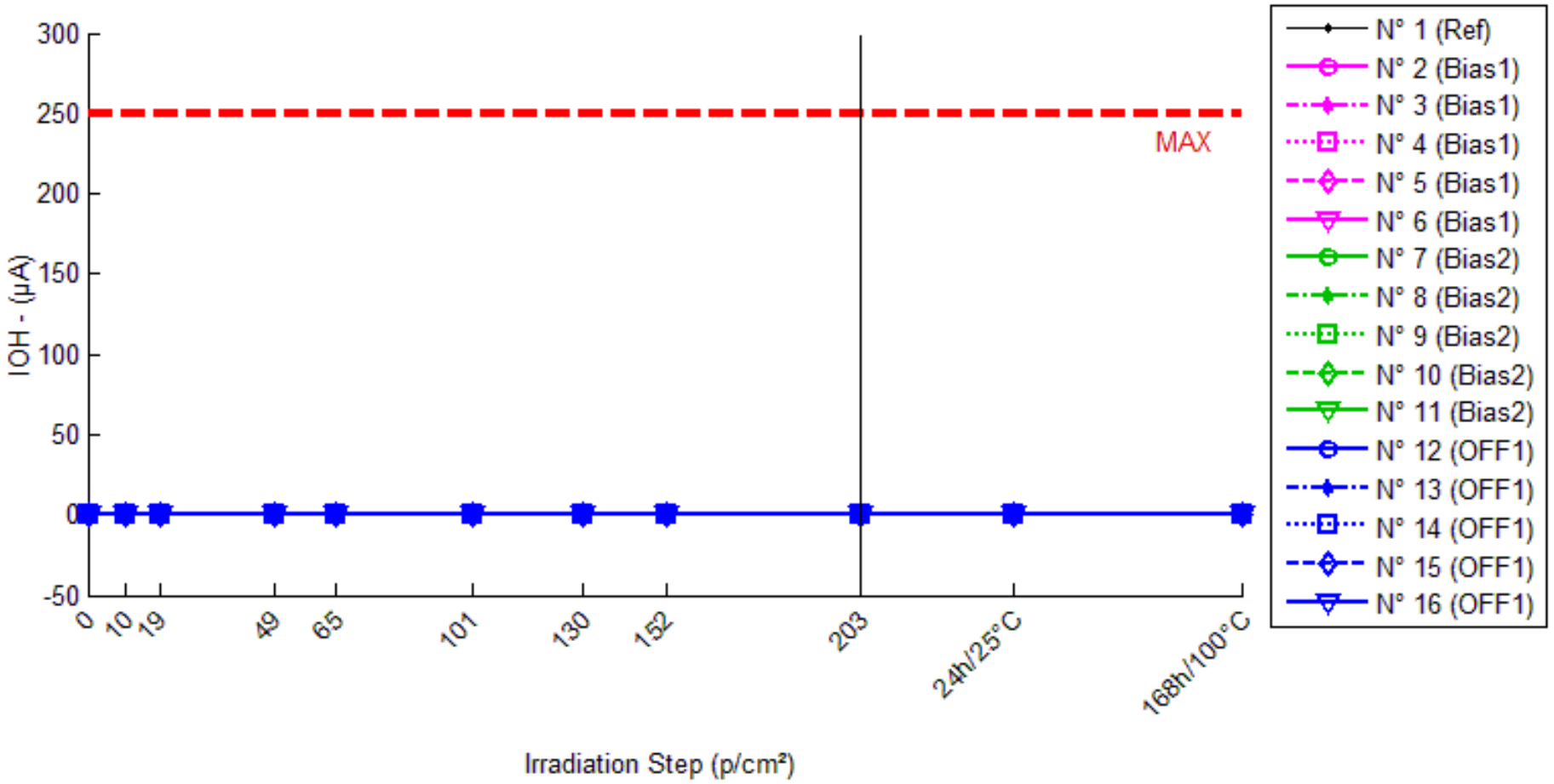
	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	0.091	0.093	0.093	0.105	0.092	0.097	0.096	0.092	0.097	0.092	0.091
N° 2 (Bias1)	0.092	0.096	0.097	0.109	0.100	0.105	0.104	0.102	0.109	0.102	0.093
N° 3 (Bias1)	0.093	0.095	0.097	0.107	0.097	0.103	0.105	0.100	0.104	0.099	0.093
N° 4 (Bias1)	0.092	0.094	0.097	0.105	0.097	0.103	0.107	0.101	0.103	0.099	0.092
N° 5 (Bias1)	0.093	0.095	0.098	0.109	0.100	0.103	0.113	0.106	0.109	0.102	0.094
N° 6 (Bias1)	0.092	0.095	0.096	0.108	0.099	0.105	0.108	0.108	0.106	0.101	0.093
N° 7 (Bias2)	0.094	0.097	0.100	0.112	0.112	0.118	0.122	0.120	0.120	0.114	0.100
N° 8 (Bias2)	0.090	0.092	0.094	0.104	0.099	0.106	0.114	0.122	0.109	0.103	0.093
N° 9 (Bias2)	0.093	0.096	0.097	0.107	0.103	0.110	0.114	0.125	0.114	0.107	0.097
N° 10 (Bias2)	0.092	0.095	0.098	0.109	0.108	0.115	0.122	0.121	0.121	0.113	0.099
N° 11 (Bias2)	0.092	0.094	0.096	0.107	0.103	0.111	0.118	0.114	0.129	0.108	0.097
N° 12 (OFF1)	0.091	0.094	0.097	0.107	0.104	0.114	0.118	0.110	0.166	0.112	0.097
N° 13 (OFF1)	0.093	0.098	0.099	0.110	0.110	0.118	0.122	0.117	0.132	0.116	0.100
N° 14 (OFF1)	0.094	0.098	0.100	0.114	0.110	0.119	0.122	0.115	0.129	0.112	0.099
N° 15 (OFF1)	0.090	0.094	0.094	0.105	0.101	0.107	0.116	0.117	0.122	0.105	0.095
N° 16 (OFF1)	0.090	0.093	0.095	0.106	0.102	0.110	0.115	0.106	0.130	0.107	0.095

Delta [VOL2]

	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	---	1.116E-3	1.089E-3	1.316E-2	7.438E-4	5.239E-3	4.285E-3	1.048E-3	5.321E-3	4.421E-4	-1.125E-4
N° 2 (Bias1)	---	3.236E-3	4.184E-3	1.668E-2	7.893E-3	1.240E-2	1.197E-2	9.983E-3	1.632E-2	9.180E-3	8.524E-4
N° 3 (Bias1)	---	2.000E-3	3.650E-3	1.397E-2	4.238E-3	1.058E-2	1.195E-2	7.197E-3	1.131E-2	6.162E-3	1.968E-4
N° 4 (Bias1)	---	2.151E-3	4.897E-3	1.338E-2	5.173E-3	1.175E-2	1.560E-2	9.659E-3	1.114E-2	7.459E-3	4.697E-4
N° 5 (Bias1)	---	2.420E-3	4.742E-3	1.568E-2	6.789E-3	1.054E-2	1.960E-2	1.323E-2	1.562E-2	8.759E-3	7.829E-4
N° 6 (Bias1)	---	2.236E-3	4.195E-3	1.588E-2	7.060E-3	1.277E-2	1.545E-2	1.560E-2	1.340E-2	8.646E-3	7.146E-4
N° 7 (Bias2)	---	3.152E-3	5.893E-3	1.805E-2	1.809E-2	2.424E-2	2.785E-2	2.550E-2	2.578E-2	2.005E-2	5.837E-3
N° 8 (Bias2)	---	2.193E-3	4.479E-3	1.401E-2	8.631E-3	1.617E-2	2.360E-2	3.229E-2	1.953E-2	1.260E-2	3.439E-3
N° 9 (Bias2)	---	2.526E-3	4.330E-3	1.396E-2	1.036E-2	1.686E-2	2.076E-2	3.164E-2	2.081E-2	1.369E-2	4.139E-3
N° 10 (Bias2)	---	3.198E-3	6.602E-3	1.740E-2	1.630E-2	2.343E-2	3.036E-2	2.919E-2	2.864E-2	2.127E-2	6.770E-3
N° 11 (Bias2)	---	2.427E-3	4.140E-3	1.465E-2	1.160E-2	1.887E-2	2.568E-2	2.249E-2	3.702E-2	1.571E-2	4.811E-3
N° 12 (OFF1)	---	2.976E-3	6.139E-3	1.625E-2	1.394E-2	2.335E-2	2.707E-2	1.976E-2	7.574E-2	2.120E-2	6.490E-3
N° 13 (OFF1)	---	5.330E-3	6.230E-3	1.717E-2	1.660E-2	2.476E-2	2.897E-2	2.403E-2	3.909E-2	2.317E-2	7.233E-3
N° 14 (OFF1)	---	4.273E-3	6.004E-3	2.033E-2	1.562E-2	2.463E-2	2.775E-2	2.118E-2	3.544E-2	1.834E-2	5.253E-3
N° 15 (OFF1)	---	4.048E-3	3.581E-3	1.460E-2	1.072E-2	1.675E-2	2.576E-2	2.628E-2	3.132E-2	1.494E-2	4.704E-3
N° 16 (OFF1)	---	2.814E-3	4.750E-3	1.557E-2	1.207E-2	2.007E-2	2.439E-2	1.595E-2	3.979E-2	1.641E-2	4.898E-3
Average (OFF1)	---	2.409E-3	4.334E-3	1.512E-2	6.231E-3	1.161E-2	1.492E-2	1.113E-2	1.356E-2	8.041E-3	6.033E-4
σ (OFF1)	---	4.868E-4	4.983E-4	1.385E-3	1.488E-3	1.025E-3	3.169E-3	3.292E-3	2.386E-3	1.230E-3	2.692E-4
Average+3σ (OFF1)	---	3.869E-3	5.828E-3	1.928E-2	1.069E-2	1.468E-2	2.442E-2	2.101E-2	2.071E-2	1.173E-2	1.411E-3
Average-3σ (OFF1)	---	9.486E-4	2.839E-3	1.097E-2	1.767E-3	8.534E-3	5.409E-3	1.259E-3	6.399E-3	4.352E-3	-2.042E-4
Average (Bias1)	---	2.699E-3	5.089E-3	1.561E-2	1.300E-2	1.991E-2	2.565E-2	2.822E-2	2.635E-2	1.666E-2	4.999E-3
σ (Bias1)	---	4.513E-4	1.094E-3	1.959E-3	4.025E-3	3.726E-3	3.714E-3	4.166E-3	7.011E-3	3.837E-3	1.327E-3
Average+3σ (Bias1)	---	4.053E-3	8.370E-3	2.149E-2	2.507E-2	3.109E-2	3.679E-2	4.072E-2	4.739E-2	2.817E-2	8.981E-3
Average-3σ (Bias1)	---	1.345E-3	1.808E-3	9.735E-3	9.209E-4	8.734E-3	1.451E-2	1.572E-2	5.321E-3	5.152E-3	1.017E-3
Average (Bias2)	---	3.888E-3	5.341E-3	1.678E-2	1.379E-2	2.191E-2	2.679E-2	2.144E-2	4.427E-2	1.881E-2	5.716E-3
σ (Bias2)	---	1.029E-3	1.153E-3	2.194E-3	2.431E-3	3.450E-3	1.773E-3	3.973E-3	1.791E-2	3.381E-3	1.096E-3
Average+3σ (Bias2)	---	6.976E-3	8.799E-3	2.337E-2	2.108E-2	3.226E-2	3.211E-2	3.336E-2	9.800E-2	2.895E-2	9.004E-3
Average-3σ (Bias2)	---	7.998E-4	1.883E-3	1.020E-2	6.498E-3	1.157E-2	2.147E-2	9.518E-3	-9.450E-3	8.669E-3	2.427E-3

3. IOH

Ta=25°C; If = 0; Vo = Vcc = 18 V



IOH . (µA) **Max = 250.0**

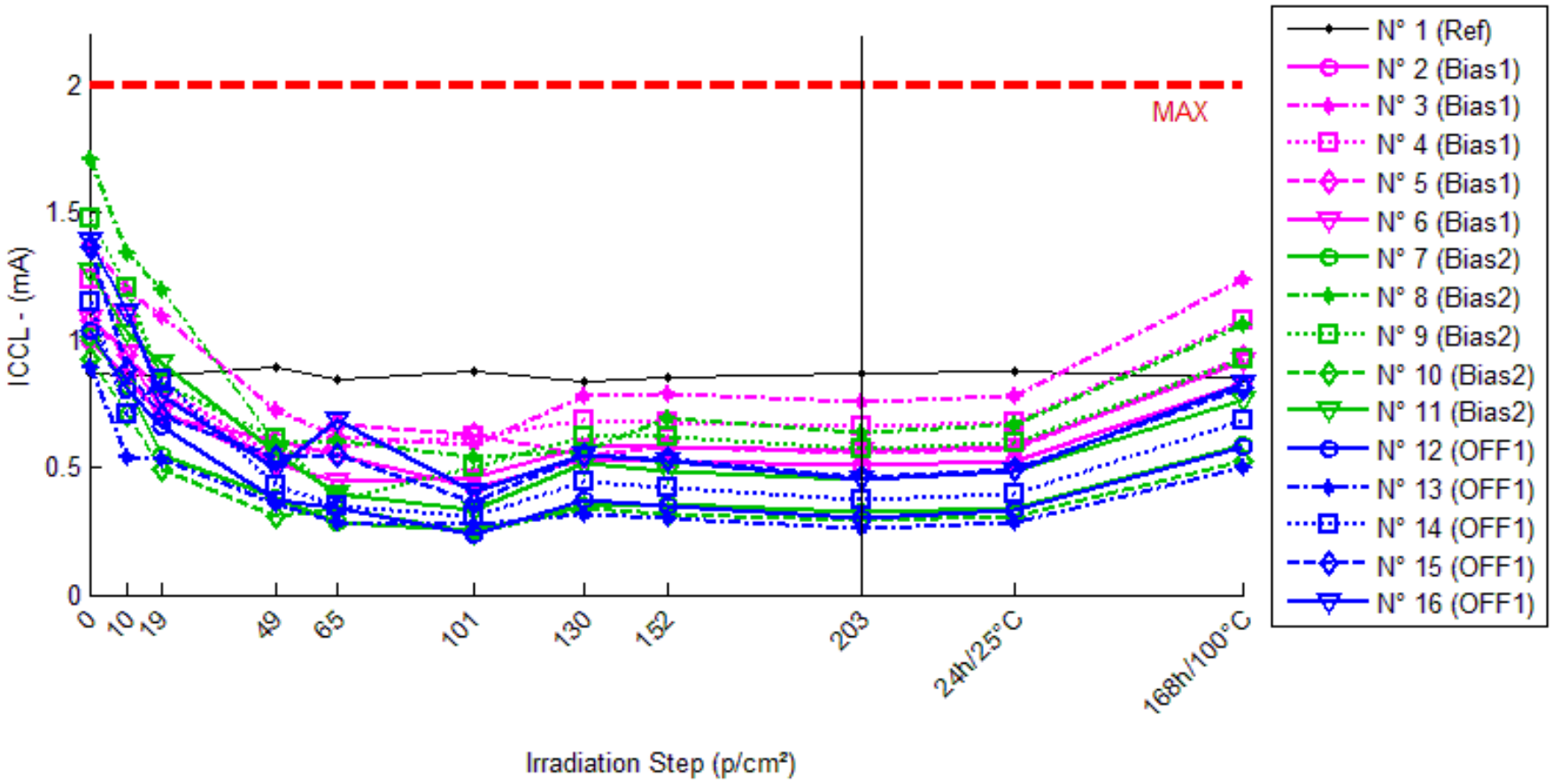
	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	3.110E-4	3.535E-4	2.010E-4	2.218E-4	1.957E-4	5.874E-4	1.896E-4	1.820E-4	1.770E-4	1.954E-4	3.146E-4
N° 2 (Bias1)	3.122E-4	3.742E-4	2.333E-4	2.877E-4	2.793E-4	8.198E-4	3.178E-4	3.412E-4	4.227E-4	4.314E-4	3.486E-4
N° 3 (Bias1)	3.129E-4	3.845E-4	2.379E-4	3.107E-4	2.887E-4	8.563E-4	3.257E-4	3.565E-4	4.316E-4	4.456E-4	3.148E-4
N° 4 (Bias1)	3.112E-4	3.929E-4	2.498E-4	2.967E-4	2.874E-4	8.914E-4	3.257E-4	3.569E-4	4.228E-4	4.431E-4	3.026E-4
N° 5 (Bias1)	3.152E-4	3.885E-4	2.418E-4	2.965E-4	2.903E-4	9.346E-4	3.277E-4	3.614E-4	4.290E-4	4.511E-4	2.836E-4
N° 6 (Bias1)	3.079E-4	3.966E-4	2.476E-4	2.939E-4	2.896E-4	8.461E-4	3.207E-4	3.544E-4	4.330E-4	4.451E-4	2.747E-4
N° 7 (Bias2)	3.029E-4	4.026E-4	2.548E-4	2.962E-4	3.108E-4	9.183E-4	3.770E-4	4.246E-4	5.643E-4	5.538E-4	2.758E-4
N° 8 (Bias2)	3.003E-4	3.988E-4	2.553E-4	3.051E-4	3.054E-4	9.644E-4	3.578E-4	4.052E-4	5.377E-4	5.312E-4	2.780E-4
N° 9 (Bias2)	3.028E-4	4.019E-4	2.599E-4	3.084E-4	3.164E-4	9.436E-4	3.776E-4	4.188E-4	5.570E-4	5.080E-4	2.693E-4
N° 10 (Bias2)	3.046E-4	4.030E-4	2.588E-4	3.001E-4	3.062E-4	9.879E-4	3.535E-4	4.010E-4	5.235E-4	4.894E-4	2.629E-4
N° 11 (Bias2)	3.002E-4	4.080E-4	2.588E-4	3.070E-4	3.092E-4	8.928E-4	3.733E-4	4.158E-4	5.736E-4	5.188E-4	2.645E-4
N° 12 (OFF1)	3.032E-4	4.063E-4	2.651E-4	3.242E-4	3.248E-4	8.765E-4	3.725E-4	4.151E-4	5.381E-4	5.281E-4	2.615E-4
N° 13 (OFF1)	3.043E-4	4.044E-4	2.676E-4	3.267E-4	3.303E-4	8.211E-4	3.848E-4	4.249E-4	5.434E-4	5.328E-4	2.613E-4
N° 14 (OFF1)	2.999E-4	4.073E-4	2.699E-4	3.314E-4	3.388E-4	8.145E-4	3.833E-4	4.333E-4	5.574E-4	5.490E-4	2.796E-4
N° 15 (OFF1)	3.042E-4	4.018E-4	2.679E-4	3.147E-4	3.140E-4	7.723E-4	3.609E-4	3.997E-4	5.188E-4	5.258E-4	7.310E-4
N° 16 (OFF1)	3.038E-4	4.054E-4	2.666E-4	3.128E-4	3.311E-4	9.226E-4	3.753E-4	4.192E-4	5.475E-4	5.553E-4	6.131E-4

Delta [IOH]

	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	---	4.250E-5	-1.101E-4	-8.917E-5	-1.153E-4	2.764E-4	-1.214E-4	-1.290E-4	-1.340E-4	-1.156E-4	3.608E-6
N° 2 (Bias1)	---	6.204E-5	-7.888E-5	-2.447E-5	-3.288E-5	5.076E-4	5.640E-6	2.898E-5	1.105E-4	1.192E-4	3.638E-5
N° 3 (Bias1)	---	7.151E-5	-7.508E-5	-2.269E-6	-2.426E-5	5.433E-4	1.279E-5	4.352E-5	1.186E-4	1.327E-4	1.835E-6
N° 4 (Bias1)	---	8.170E-5	-6.138E-5	-1.449E-5	-2.384E-5	5.802E-4	1.443E-5	4.572E-5	1.116E-4	1.319E-4	-8.655E-6
N° 5 (Bias1)	---	7.334E-5	-7.343E-5	-1.867E-5	-2.489E-5	6.194E-4	1.250E-5	4.623E-5	1.138E-4	1.359E-4	-3.157E-5
N° 6 (Bias1)	---	8.868E-5	-6.025E-5	-1.403E-5	-1.826E-5	5.382E-4	1.286E-5	4.652E-5	1.251E-4	1.373E-4	-3.319E-5
N° 7 (Bias2)	---	9.979E-5	-4.807E-5	-6.641E-6	7.991E-6	6.155E-4	7.413E-5	1.217E-4	2.615E-4	2.509E-4	-2.702E-5
N° 8 (Bias2)	---	9.852E-5	-4.503E-5	4.774E-6	5.112E-6	6.641E-4	5.751E-5	1.049E-4	2.374E-4	2.309E-4	-2.237E-5
N° 9 (Bias2)	---	9.915E-5	-4.292E-5	5.665E-6	1.366E-5	6.409E-4	7.485E-5	1.160E-4	2.543E-4	2.052E-4	-3.345E-5
N° 10 (Bias2)	---	9.840E-5	-4.583E-5	-4.566E-6	1.608E-6	6.832E-4	4.884E-5	9.633E-5	2.189E-4	1.847E-4	-4.173E-5
N° 11 (Bias2)	---	1.078E-4	-4.136E-5	6.803E-6	9.044E-6	5.926E-4	7.311E-5	1.156E-4	2.734E-4	2.186E-4	-3.573E-5
N° 12 (OFF1)	---	1.031E-4	-3.814E-5	2.097E-5	2.156E-5	5.733E-4	6.927E-5	1.119E-4	2.349E-4	2.249E-4	-4.173E-5
N° 13 (OFF1)	---	1.002E-4	-3.666E-5	2.241E-5	2.609E-5	5.168E-4	8.051E-5	1.206E-4	2.391E-4	2.286E-4	-4.296E-5
N° 14 (OFF1)	---	1.073E-4	-3.003E-5	3.150E-5	3.890E-5	5.146E-4	8.334E-5	1.333E-4	2.575E-4	2.491E-4	-2.030E-5
N° 15 (OFF1)	---	9.759E-5	-3.632E-5	1.045E-5	9.770E-6	4.680E-4	5.662E-5	9.548E-5	2.146E-4	2.215E-4	4.267E-4
N° 16 (OFF1)	---	1.015E-4	-3.725E-5	9.008E-6	2.727E-5	6.188E-4	7.147E-5	1.154E-4	2.437E-4	2.515E-4	3.093E-4
Average (OFF1)	---	7.545E-5	-6.980E-5	-1.479E-5	-2.483E-5	5.578E-4	1.164E-5	4.220E-5	1.159E-4	1.314E-4	-7.039E-6
σ (OFF1)	---	1.017E-5	8.451E-6	8.158E-6	5.228E-6	4.305E-5	3.441E-6	7.482E-6	6.009E-6	7.181E-6	2.851E-5
Average+3σ (OFF1)	---	1.060E-4	-4.445E-5	9.687E-6	-9.141E-6	6.869E-4	2.197E-5	6.464E-5	1.340E-4	1.529E-4	7.850E-5
Average-3σ (OFF1)	---	4.495E-5	-9.516E-5	-3.926E-5	-4.051E-5	4.286E-4	1.322E-6	1.975E-5	9.790E-5	1.098E-4	-9.258E-5
Average (Bias1)	---	1.007E-4	-4.464E-5	1.207E-6	7.482E-6	6.393E-4	6.569E-5	1.109E-4	2.491E-4	2.181E-4	-3.206E-5
σ (Bias1)	---	3.999E-6	2.604E-6	6.301E-6	4.499E-6	3.640E-5	1.184E-5	1.018E-5	2.136E-5	2.509E-5	7.554E-6
Average+3σ (Bias1)	---	1.127E-4	-3.683E-5	2.011E-5	2.098E-5	7.484E-4	1.012E-4	1.415E-4	3.132E-4	2.933E-4	-9.399E-6
Average-3σ (Bias1)	---	8.874E-5	-5.246E-5	-1.770E-5	-6.013E-6	5.301E-4	3.016E-5	8.036E-5	1.850E-4	1.428E-4	-5.472E-5
Average (Bias2)	---	1.019E-4	-3.568E-5	1.887E-5	2.472E-5	5.383E-4	7.224E-5	1.154E-4	2.380E-4	2.351E-4	1.262E-4
σ (Bias2)	---	3.618E-6	3.234E-6	9.282E-6	1.052E-5	5.844E-5	1.055E-5	1.376E-5	1.560E-5	1.409E-5	2.248E-4
Average+3σ (Bias2)	---	1.128E-4	-2.597E-5	4.671E-5	5.629E-5	7.136E-4	1.039E-4	1.566E-4	2.848E-4	2.774E-4	8.006E-4
Average-3σ (Bias2)	---	9.108E-5	-4.538E-5	-8.979E-6	-6.846E-6	3.630E-4	4.060E-5	7.407E-5	1.912E-4	1.928E-4	-5.482E-4

4. ICCL

Ta=25°C; If = 1.6 mA; Vcc = 18 V



ICCL . (mA) **Max = 2.0**

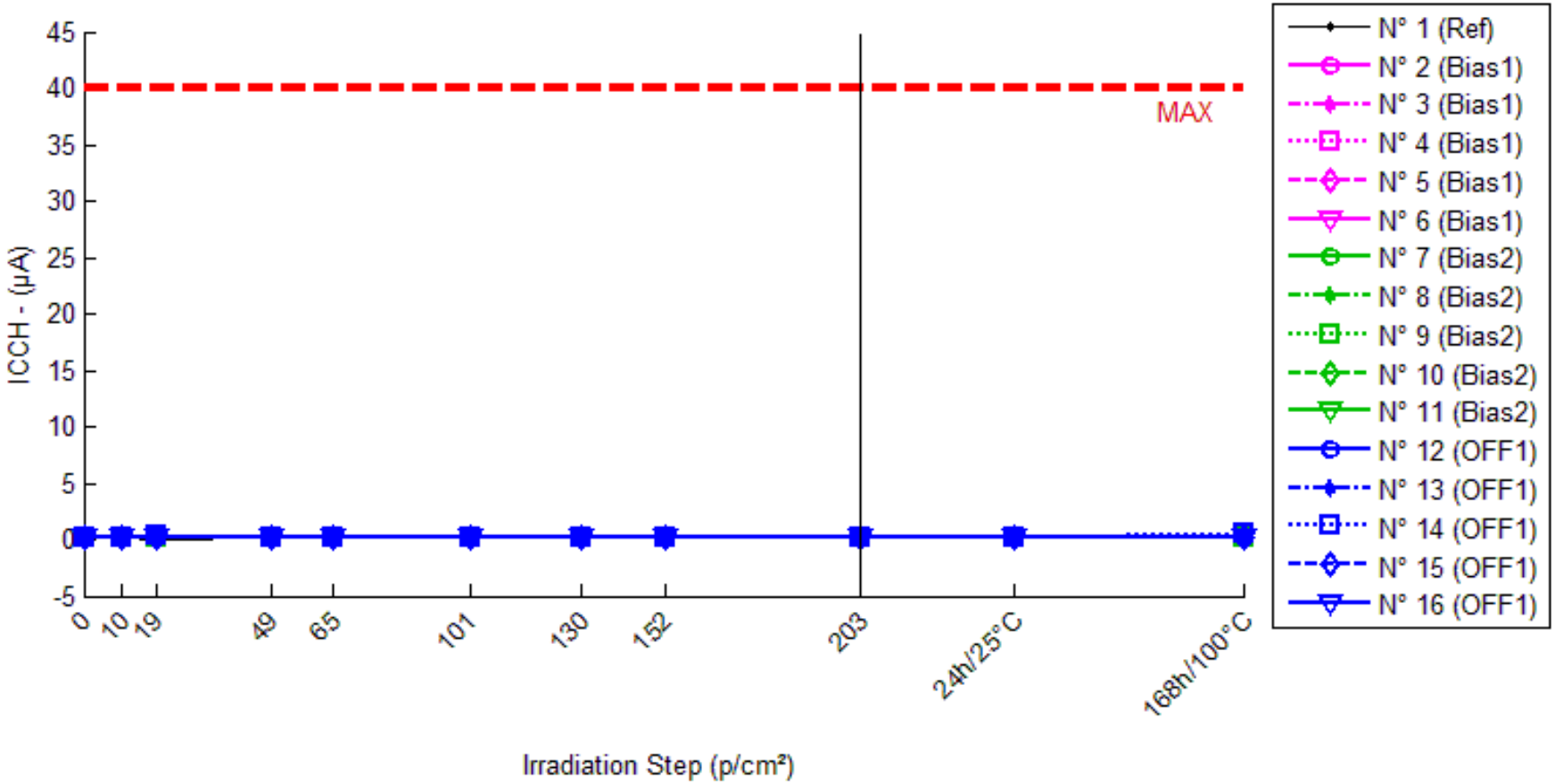
	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	0.866	0.858	0.860	0.895	0.846	0.880	0.837	0.855	0.868	0.876	0.850
N° 2 (Bias1)	0.996	0.852	0.703	0.605	0.548	0.418	0.535	0.528	0.508	0.525	0.831
N° 3 (Bias1)	1.372	1.195	1.095	0.725	0.618	0.592	0.784	0.786	0.759	0.784	1.235
N° 4 (Bias1)	1.239	1.086	0.819	0.540	0.580	0.620	0.684	0.679	0.657	0.679	1.079
N° 5 (Bias1)	1.074	0.938	0.785	0.520	0.666	0.627	0.551	0.577	0.556	0.574	0.930
N° 6 (Bias1)	1.086	0.945	0.715	0.515	0.444	0.462	0.582	0.582	0.565	0.582	0.919
N° 7 (Bias2)	1.009	0.823	0.545	0.380	0.284	0.256	0.352	0.359	0.322	0.343	0.591
N° 8 (Bias2)	1.710	1.341	1.196	0.598	0.608	0.542	0.566	0.692	0.634	0.666	1.064
N° 9 (Bias2)	1.474	1.206	0.827	0.613	0.376	0.503	0.622	0.622	0.570	0.600	0.926
N° 10 (Bias2)	0.928	0.707	0.489	0.305	0.340	0.247	0.340	0.318	0.293	0.310	0.527
N° 11 (Bias2)	1.268	1.032	0.905	0.557	0.400	0.333	0.519	0.481	0.450	0.483	0.765
N° 12 (OFF1)	1.037	0.807	0.663	0.376	0.343	0.233	0.369	0.350	0.304	0.329	0.580
N° 13 (OFF1)	0.892	0.542	0.531	0.354	0.282	0.278	0.320	0.304	0.264	0.282	0.500
N° 14 (OFF1)	1.149	0.708	0.841	0.432	0.345	0.311	0.446	0.424	0.370	0.400	0.683
N° 15 (OFF1)	1.362	0.881	0.702	0.537	0.545	0.364	0.552	0.530	0.462	0.491	0.809
N° 16 (OFF1)	1.391	1.107	0.784	0.495	0.685	0.408	0.547	0.521	0.456	0.488	0.825

Delta [ICCL]

	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	---	-8.245E-3	-5.856E-3	2.903E-2	-1.993E-2	1.404E-2	-2.951E-2	-1.133E-2	2.400E-3	1.044E-2	-1.578E-2
N° 2 (Bias1)	---	-1.443E-1	-2.932E-1	-3.910E-1	-4.481E-1	-5.780E-1	-4.610E-1	-4.680E-1	-4.880E-1	-4.710E-1	-1.650E-1
N° 3 (Bias1)	---	-1.775E-1	-2.772E-1	-6.473E-1	-7.542E-1	-7.807E-1	-5.881E-1	-5.863E-1	-6.133E-1	-5.882E-1	-1.379E-1
N° 4 (Bias1)	---	-1.532E-1	-4.200E-1	-6.984E-1	-6.591E-1	-6.183E-1	-5.545E-1	-5.600E-1	-5.819E-1	-5.597E-1	-1.595E-1
N° 5 (Bias1)	---	-1.355E-1	-2.884E-1	-5.544E-1	-4.083E-1	-4.470E-1	-5.229E-1	-4.966E-1	-5.176E-1	-4.997E-1	-1.440E-1
N° 6 (Bias1)	---	-1.409E-1	-3.706E-1	-5.703E-1	-6.417E-1	-6.239E-1	-5.036E-1	-5.033E-1	-5.207E-1	-5.034E-1	-1.664E-1
N° 7 (Bias2)	---	-1.855E-1	-4.642E-1	-6.284E-1	-7.253E-1	-7.528E-1	-6.569E-1	-6.496E-1	-6.866E-1	-6.664E-1	-4.177E-1
N° 8 (Bias2)	---	-3.686E-1	-5.142E-1	-1.112E+0	-1.102E+0	-1.168E+0	-1.144E+0	-1.018E+0	-1.076E+0	-1.044E+0	-6.459E-1
N° 9 (Bias2)	---	-2.677E-1	-6.472E-1	-8.606E-1	-1.098E+0	-9.710E-1	-8.517E-1	-8.514E-1	-9.034E-1	-8.741E-1	-5.479E-1
N° 10 (Bias2)	---	-2.207E-1	-4.392E-1	-6.227E-1	-5.883E-1	-6.809E-1	-5.881E-1	-6.102E-1	-6.350E-1	-6.179E-1	-4.011E-1
N° 11 (Bias2)	---	-2.360E-1	-3.631E-1	-7.105E-1	-8.675E-1	-9.353E-1	-7.487E-1	-7.870E-1	-8.175E-1	-7.844E-1	-5.028E-1
N° 12 (OFF1)	---	-2.299E-1	-3.744E-1	-6.612E-1	-6.946E-1	-8.043E-1	-6.684E-1	-6.872E-1	-7.335E-1	-7.080E-1	-4.577E-1
N° 13 (OFF1)	---	-3.505E-1	-3.609E-1	-5.379E-1	-6.108E-1	-6.147E-1	-5.718E-1	-5.881E-1	-6.286E-1	-6.102E-1	-3.924E-1
N° 14 (OFF1)	---	-4.406E-1	-3.078E-1	-7.168E-1	-8.041E-1	-8.378E-1	-7.028E-1	-7.244E-1	-7.787E-1	-7.484E-1	-4.661E-1
N° 15 (OFF1)	---	-4.804E-1	-6.593E-1	-8.244E-1	-8.168E-1	-9.977E-1	-8.100E-1	-8.316E-1	-8.997E-1	-8.707E-1	-5.531E-1
N° 16 (OFF1)	---	-2.843E-1	-6.074E-1	-8.954E-1	-7.054E-1	-9.827E-1	-8.442E-1	-8.698E-1	-9.347E-1	-9.034E-1	-5.656E-1
Average (OFF1)	---	-1.503E-1	-3.299E-1	-5.723E-1	-5.823E-1	-6.096E-1	-5.260E-1	-5.229E-1	-5.443E-1	-5.244E-1	-1.546E-1
σ (OFF1)	---	1.650E-2	6.248E-2	1.170E-1	1.477E-1	1.194E-1	4.851E-2	4.872E-2	5.155E-2	4.801E-2	1.287E-2
Average+3σ (OFF1)	---	-1.008E-1	-1.425E-1	-2.213E-1	-1.391E-1	-2.514E-1	-3.805E-1	-3.767E-1	-3.896E-1	-3.804E-1	-1.159E-1
Average-3σ (OFF1)	---	-1.998E-1	-5.173E-1	-9.233E-1	-1.025E+0	-9.677E-1	-6.716E-1	-6.690E-1	-6.989E-1	-6.684E-1	-1.932E-1
Average (Bias1)	---	-2.557E-1	-4.856E-1	-7.868E-1	-8.761E-1	-9.016E-1	-7.979E-1	-7.832E-1	-8.237E-1	-7.974E-1	-5.031E-1
σ (Bias1)	---	6.970E-2	1.055E-1	2.055E-1	2.267E-1	1.922E-1	2.173E-1	1.639E-1	1.763E-1	1.705E-1	1.001E-1
Average+3σ (Bias1)	---	-4.663E-2	-1.689E-1	-1.704E-1	-1.960E-1	-3.249E-1	-1.458E-1	-2.914E-1	-2.948E-1	-2.860E-1	-2.027E-1
Average-3σ (Bias1)	---	-4.648E-1	-8.022E-1	-1.403E+0	-1.556E+0	-1.478E+0	-1.450E+0	-1.275E+0	-1.352E+0	-1.309E+0	-8.034E-1
Average (Bias2)	---	-3.571E-1	-4.619E-1	-7.272E-1	-7.263E-1	-8.474E-1	-7.194E-1	-7.402E-1	-7.951E-1	-7.681E-1	-4.870E-1
σ (Bias2)	---	1.045E-1	1.595E-1	1.397E-1	8.519E-2	1.557E-1	1.100E-1	1.133E-1	1.247E-1	1.201E-1	7.208E-2
Average+3σ (Bias2)	---	-4.357E-2	1.645E-2	-3.080E-1	-4.707E-1	-3.802E-1	-3.893E-1	-4.003E-1	-4.209E-1	-4.077E-1	-2.707E-1
Average-3σ (Bias2)	---	-6.707E-1	-9.403E-1	-1.146E+0	-9.819E-1	-1.315E+0	-1.050E+0	-1.080E+0	-1.169E+0	-1.129E+0	-7.032E-1

5. ICCH

Ta=25°C; If = 0; Vcc = 18 V



ICCH . (µA) **Max = 40.0**

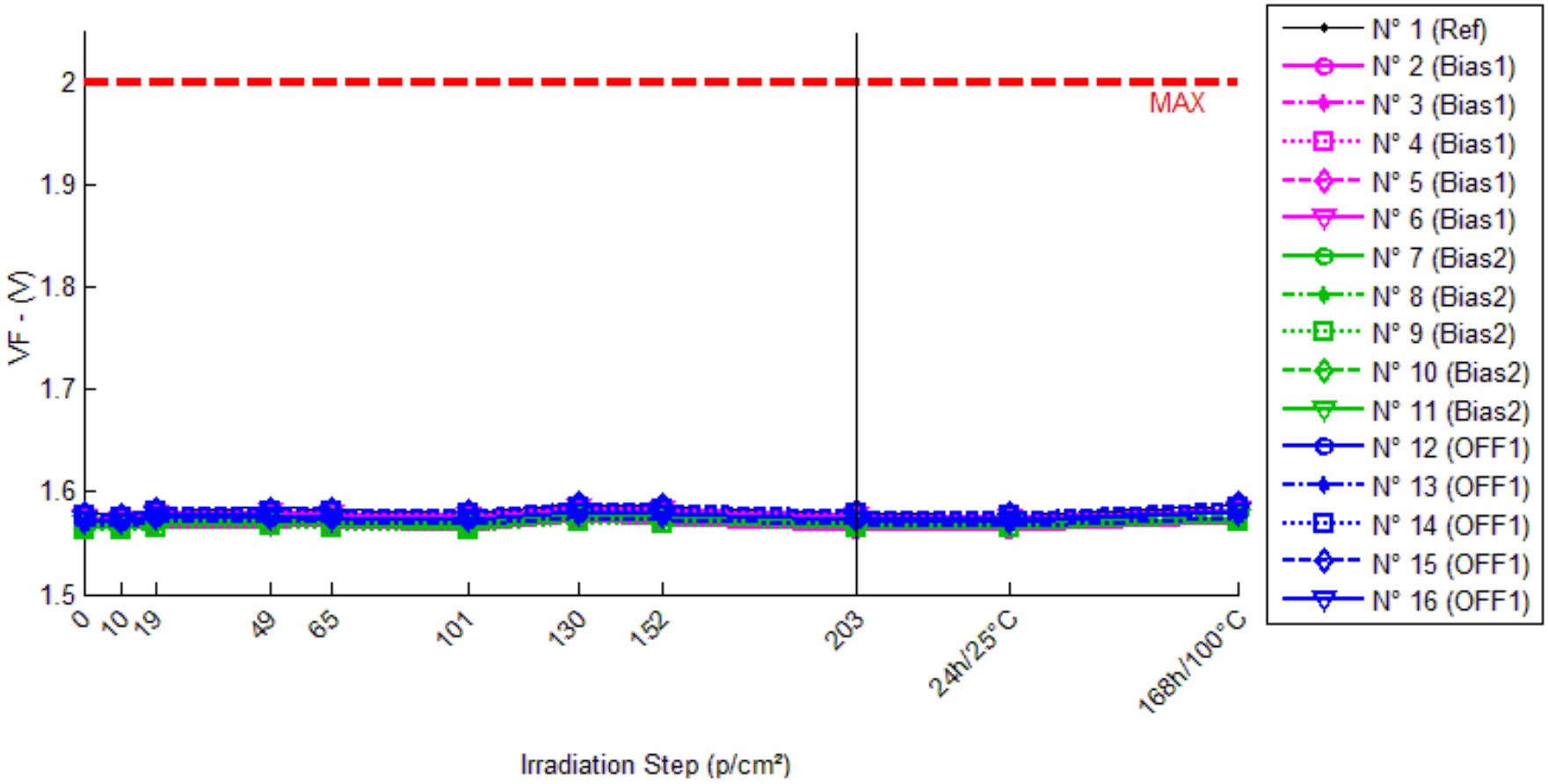
	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	0.278	0.194	0.068	0.195	0.237	0.193	0.191	0.164	0.253	0.238	0.187
N° 2 (Bias1)	0.190	0.183	0.098	0.224	0.189	0.200	0.159	0.209	0.239	0.206	0.159
N° 3 (Bias1)	0.162	0.206	0.103	0.223	0.230	0.193	0.179	0.198	0.221	0.218	0.176
N° 4 (Bias1)	0.139	0.188	0.134	0.219	0.229	0.194	0.174	0.190	0.218	0.202	0.191
N° 5 (Bias1)	0.119	0.202	0.138	0.212	0.208	0.202	0.158	0.195	0.205	0.181	0.182
N° 6 (Bias1)	0.110	0.207	0.157	0.213	0.201	0.180	0.170	0.191	0.182	0.220	0.173
N° 7 (Bias2)	0.105	0.196	0.157	0.224	0.202	0.193	0.190	0.186	0.196	0.204	0.169
N° 8 (Bias2)	0.113	0.206	0.171	0.206	0.167	0.197	0.185	0.166	0.198	0.196	0.184
N° 9 (Bias2)	0.107	0.203	0.181	0.212	0.198	0.191	0.175	0.186	0.198	0.169	0.178
N° 10 (Bias2)	0.110	0.198	0.189	0.217	0.208	0.192	0.190	0.184	0.202	0.188	0.181
N° 11 (Bias2)	0.123	0.203	0.186	0.215	0.205	0.208	0.182	0.194	0.181	0.181	0.183
N° 12 (OFF1)	0.114	0.203	0.173	0.223	0.205	0.171	0.176	0.200	0.177	0.194	0.189
N° 13 (OFF1)	0.121	0.193	0.188	0.216	0.189	0.201	0.196	0.213	0.192	0.169	0.183
N° 14 (OFF1)	0.161	0.270	0.276	0.269	0.256	0.223	0.207	0.229	0.228	0.190	0.578
N° 15 (OFF1)	0.116	0.209	0.193	0.213	0.182	0.205	0.182	0.192	0.206	0.189	0.151
N° 16 (OFF1)	0.120	0.198	0.189	0.216	0.234	0.179	0.188	0.195	0.198	0.182	0.161

Delta [ICCH]

	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	---	-8.384E-2	-2.099E-1	-8.285E-2	-4.049E-2	-8.435E-2	-8.633E-2	-1.142E-1	-2.506E-2	-3.951E-2	-9.081E-2
N° 2 (Bias1)	---	-7.336E-3	-9.201E-2	3.352E-2	-8.546E-4	9.599E-3	-3.174E-2	1.907E-2	4.846E-2	1.557E-2	-3.174E-2
N° 3 (Bias1)	---	4.447E-2	-5.864E-2	6.142E-2	6.789E-2	3.152E-2	1.708E-2	3.650E-2	5.892E-2	5.593E-2	1.409E-2
N° 4 (Bias1)	---	4.848E-2	-5.810E-3	7.987E-2	8.983E-2	5.495E-2	3.454E-2	5.047E-2	7.887E-2	6.242E-2	5.197E-2
N° 5 (Bias1)	---	8.308E-2	1.833E-2	9.255E-2	8.856E-2	8.308E-2	3.825E-2	7.611E-2	8.606E-2	6.215E-2	6.316E-2
N° 6 (Bias1)	---	9.768E-2	4.737E-2	1.032E-1	9.121E-2	7.027E-2	5.982E-2	8.124E-2	7.227E-2	1.101E-1	6.281E-2
N° 7 (Bias2)	---	9.126E-2	5.191E-2	1.192E-1	9.774E-2	8.826E-2	8.529E-2	8.179E-2	9.175E-2	9.972E-2	6.436E-2
N° 8 (Bias2)	---	9.302E-2	5.766E-2	9.252E-2	5.366E-2	8.405E-2	7.160E-2	5.266E-2	8.504E-2	8.304E-2	7.060E-2
N° 9 (Bias2)	---	9.548E-2	7.358E-2	1.045E-1	9.100E-2	8.402E-2	6.809E-2	7.904E-2	9.050E-2	6.110E-2	7.108E-2
N° 10 (Bias2)	---	8.821E-2	7.976E-2	1.071E-1	9.868E-2	8.273E-2	8.025E-2	7.476E-2	9.269E-2	7.824E-2	7.128E-2
N° 11 (Bias2)	---	7.945E-2	6.253E-2	9.191E-2	8.195E-2	8.493E-2	5.854E-2	7.049E-2	5.803E-2	5.802E-2	6.003E-2
N° 12 (OFF1)	---	8.957E-2	5.919E-2	1.095E-1	9.157E-2	5.718E-2	6.267E-2	8.609E-2	6.316E-2	8.010E-2	7.563E-2
N° 13 (OFF1)	---	7.178E-2	6.731E-2	9.470E-2	6.830E-2	7.975E-2	7.527E-2	9.221E-2	7.078E-2	4.786E-2	6.232E-2
N° 14 (OFF1)	---	1.087E-1	1.147E-1	1.077E-1	9.476E-2	6.187E-2	4.544E-2	6.735E-2	6.685E-2	2.898E-2	4.166E-1
N° 15 (OFF1)	---	9.322E-2	7.729E-2	9.771E-2	6.682E-2	8.923E-2	6.632E-2	7.628E-2	9.023E-2	7.378E-2	3.493E-2
N° 16 (OFF1)	---	7.863E-2	6.968E-2	9.607E-2	1.145E-1	5.970E-2	6.818E-2	7.515E-2	7.813E-2	6.219E-2	4.077E-2
Average (OFF1)	---	5.327E-2	-1.815E-2	7.410E-2	6.733E-2	4.988E-2	2.359E-2	5.268E-2	6.892E-2	6.124E-2	3.206E-2
σ (OFF1)	---	4.072E-2	5.673E-2	2.750E-2	3.930E-2	2.959E-2	3.446E-2	2.627E-2	1.519E-2	3.356E-2	4.093E-2
Average+3σ (OFF1)	---	1.754E-1	1.520E-1	1.566E-1	1.852E-1	1.387E-1	1.270E-1	1.315E-1	1.145E-1	1.619E-1	1.549E-1
Average-3σ (OFF1)	---	-6.890E-2	-1.883E-1	-8.405E-3	-5.056E-2	-3.890E-2	-7.980E-2	-2.613E-2	2.335E-2	-3.945E-2	-9.075E-2
Average (Bias1)	---	8.948E-2	6.509E-2	1.030E-1	8.461E-2	8.480E-2	7.275E-2	7.175E-2	8.360E-2	7.603E-2	6.747E-2
σ (Bias1)	---	6.202E-3	1.143E-2	1.133E-2	1.855E-2	2.090E-3	1.047E-2	1.150E-2	1.460E-2	1.705E-2	5.059E-3
Average+3σ (Bias1)	---	1.081E-1	9.938E-2	1.370E-1	1.402E-1	9.107E-2	1.042E-1	1.062E-1	1.274E-1	1.272E-1	8.265E-2
Average-3σ (Bias1)	---	7.088E-2	3.080E-2	6.906E-2	2.897E-2	7.853E-2	4.135E-2	3.725E-2	3.980E-2	2.488E-2	5.229E-2
Average (Bias2)	---	8.838E-2	7.763E-2	1.011E-1	8.719E-2	6.954E-2	6.358E-2	7.941E-2	7.383E-2	5.858E-2	1.261E-1
σ (Bias2)	---	1.422E-2	2.170E-2	6.928E-3	1.997E-2	1.415E-2	1.113E-2	9.769E-3	1.071E-2	2.060E-2	1.633E-1
Average+3σ (Bias2)	---	1.310E-1	1.427E-1	1.219E-1	1.471E-1	1.120E-1	9.696E-2	1.087E-1	1.060E-1	1.204E-1	6.158E-1
Average-3σ (Bias2)	---	4.573E-2	1.253E-2	8.036E-2	2.729E-2	2.711E-2	3.019E-2	5.011E-2	4.169E-2	-3.233E-3	-3.637E-1

6. VF

Ta=25°C; If = 1.6 mA



VF . (V) **Max = 2.0**

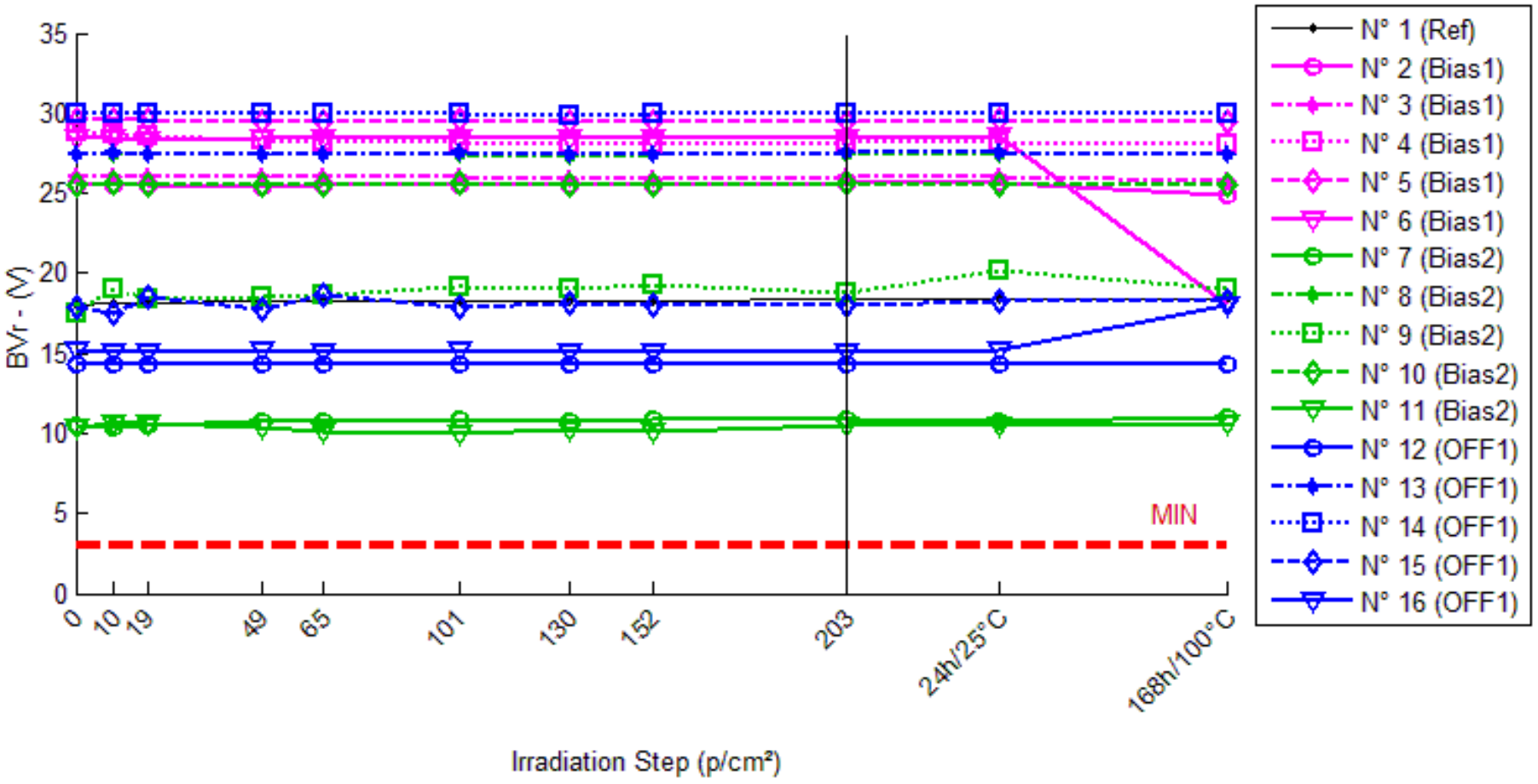
	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	1.578	1.578	1.580	1.584	1.583	1.579	1.588	1.585	1.579	1.576	1.587
N° 2 (Bias1)	1.564	1.564	1.565	1.567	1.566	1.563	1.572	1.569	1.563	1.562	1.571
N° 3 (Bias1)	1.567	1.565	1.569	1.564	1.569	1.563	1.575	1.573	1.568	1.566	1.574
N° 4 (Bias1)	1.570	1.569	1.573	1.574	1.573	1.570	1.579	1.575	1.572	1.570	1.577
N° 5 (Bias1)	1.573	1.571	1.576	1.577	1.575	1.573	1.581	1.578	1.575	1.572	1.579
N° 6 (Bias1)	1.575	1.573	1.579	1.580	1.579	1.576	1.585	1.582	1.577	1.575	1.583
N° 7 (Bias2)	1.564	1.565	1.569	1.571	1.569	1.565	1.575	1.572	1.567	1.565	1.573
N° 8 (Bias2)	1.567	1.567	1.570	1.573	1.571	1.567	1.577	1.574	1.569	1.567	1.574
N° 9 (Bias2)	1.562	1.562	1.565	1.567	1.565	1.562	1.571	1.569	1.564	1.565	1.570
N° 10 (Bias2)	1.568	1.566	1.571	1.573	1.572	1.569	1.577	1.575	1.570	1.571	1.576
N° 11 (Bias2)	1.569	1.567	1.572	1.573	1.572	1.569	1.577	1.575	1.569	1.569	1.575
N° 12 (OFF1)	1.572	1.570	1.575	1.575	1.575	1.573	1.580	1.578	1.573	1.572	1.580
N° 13 (OFF1)	1.567	1.566	1.570	1.570	1.570	1.568	1.574	1.572	1.568	1.567	1.574
N° 14 (OFF1)	1.576	1.575	1.580	1.581	1.580	1.578	1.585	1.582	1.578	1.577	1.585
N° 15 (OFF1)	1.579	1.577	1.583	1.583	1.582	1.580	1.588	1.586	1.581	1.579	1.589
N° 16 (OFF1)	1.572	1.570	1.576	1.577	1.573	1.573	1.581	1.578	1.573	1.571	1.580

Delta [VF]

	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	---	-2.050E-4	2.102E-3	5.570E-3	5.296E-3	1.074E-3	9.764E-3	7.259E-3	1.069E-3	-1.943E-3	8.734E-3
N° 2 (Bias1)	---	-2.080E-4	1.679E-3	3.355E-3	2.358E-3	-6.280E-4	8.287E-3	5.707E-3	-2.450E-4	-1.252E-3	6.820E-3
N° 3 (Bias1)	---	-2.089E-3	2.345E-3	-2.846E-3	2.315E-3	-3.991E-3	8.276E-3	5.700E-3	7.530E-4	-4.990E-4	6.615E-3
N° 4 (Bias1)	---	-1.527E-3	2.486E-3	4.047E-3	2.637E-3	1.200E-5	8.546E-3	5.306E-3	1.768E-3	-4.210E-4	6.655E-3
N° 5 (Bias1)	---	-1.969E-3	3.066E-3	4.280E-3	2.145E-3	8.110E-4	8.712E-3	5.777E-3	2.159E-3	-8.900E-5	6.679E-3
N° 6 (Bias1)	---	-2.498E-3	3.052E-3	4.949E-3	3.105E-3	7.000E-4	9.419E-3	6.433E-3	1.950E-3	-4.700E-5	7.452E-3
N° 7 (Bias2)	---	7.590E-4	4.926E-3	6.602E-3	5.317E-3	1.030E-3	1.075E-2	7.669E-3	3.264E-3	1.207E-3	9.175E-3
N° 8 (Bias2)	---	-4.940E-4	3.399E-3	5.711E-3	3.925E-3	-3.160E-4	9.996E-3	7.214E-3	2.075E-3	2.390E-4	7.339E-3
N° 9 (Bias2)	---	1.510E-4	2.958E-3	5.594E-3	3.249E-3	3.270E-4	9.220E-3	7.117E-3	1.896E-3	2.951E-3	7.835E-3
N° 10 (Bias2)	---	-1.800E-3	2.845E-3	5.228E-3	4.159E-3	1.208E-3	9.259E-3	6.491E-3	1.940E-3	2.706E-3	7.630E-3
N° 11 (Bias2)	---	-1.806E-3	3.173E-3	4.022E-3	3.771E-3	5.670E-4	8.218E-3	6.473E-3	2.800E-4	9.260E-4	6.668E-3
N° 12 (OFF1)	---	-2.018E-3	3.200E-3	3.221E-3	2.745E-3	3.580E-4	8.215E-3	5.599E-3	8.980E-4	1.120E-4	8.074E-3
N° 13 (OFF1)	---	-4.620E-4	3.408E-3	3.410E-3	3.812E-3	1.395E-3	7.901E-3	5.722E-3	1.184E-3	6.350E-4	7.731E-3
N° 14 (OFF1)	---	-9.300E-4	4.083E-3	4.412E-3	4.000E-3	1.398E-3	9.184E-3	5.975E-3	1.807E-3	4.420E-4	8.410E-3
N° 15 (OFF1)	---	-2.174E-3	3.236E-3	3.844E-3	2.891E-3	1.690E-4	8.748E-3	6.342E-3	1.189E-3	-3.970E-4	9.576E-3
N° 16 (OFF1)	---	-2.382E-3	3.933E-3	5.101E-3	4.860E-4	1.063E-3	8.492E-3	5.592E-3	7.290E-4	-1.313E-3	8.147E-3
Average (OFF1)	---	-1.658E-3	2.526E-3	2.757E-3	2.512E-3	-6.192E-4	8.648E-3	5.785E-3	1.277E-3	-4.616E-4	6.844E-3
σ (OFF1)	---	8.814E-4	5.745E-4	3.184E-3	3.757E-4	1.972E-3	4.684E-4	4.070E-4	1.008E-3	4.844E-4	3.484E-4
Average+3σ (OFF1)	---	9.861E-4	4.249E-3	1.231E-2	3.639E-3	5.296E-3	1.005E-2	7.006E-3	4.301E-3	9.915E-4	7.890E-3
Average-3σ (OFF1)	---	-4.303E-3	8.022E-4	-6.794E-3	1.385E-3	-6.535E-3	7.243E-3	4.563E-3	-1.747E-3	-1.915E-3	5.799E-3
Average (Bias1)	---	-6.380E-4	3.460E-3	5.431E-3	4.084E-3	5.632E-4	9.488E-3	6.993E-3	1.891E-3	1.606E-3	7.729E-3
σ (Bias1)	---	1.152E-3	8.464E-4	9.358E-4	7.659E-4	6.047E-4	9.454E-4	5.108E-4	1.063E-3	1.174E-3	9.206E-4
Average+3σ (Bias1)	---	2.818E-3	5.999E-3	8.239E-3	6.382E-3	2.377E-3	1.232E-2	8.525E-3	5.079E-3	5.127E-3	1.049E-2
Average-3σ (Bias1)	---	-4.094E-3	9.210E-4	2.624E-3	1.787E-3	-1.251E-3	6.651E-3	5.460E-3	-1.297E-3	-1.915E-3	4.968E-3
Average (Bias2)	---	-1.593E-3	3.572E-3	3.998E-3	2.787E-3	8.766E-4	8.508E-3	5.846E-3	1.161E-3	-1.042E-4	8.388E-3
σ (Bias2)	---	8.455E-4	4.092E-4	7.683E-4	1.399E-3	5.799E-4	4.922E-4	3.176E-4	4.106E-4	7.808E-4	7.071E-4
Average+3σ (Bias2)	---	9.433E-4	4.799E-3	6.303E-3	6.984E-3	2.616E-3	9.985E-3	6.799E-3	2.393E-3	2.238E-3	1.051E-2
Average-3σ (Bias2)	---	-4.130E-3	2.345E-3	1.693E-3	-1.410E-3	-8.630E-4	7.031E-3	4.893E-3	-7.045E-5	-2.447E-3	6.266E-3

7. BVr

Ta=25°C; Ir = 10 µA



BVr . (V) **Min = 3.0**

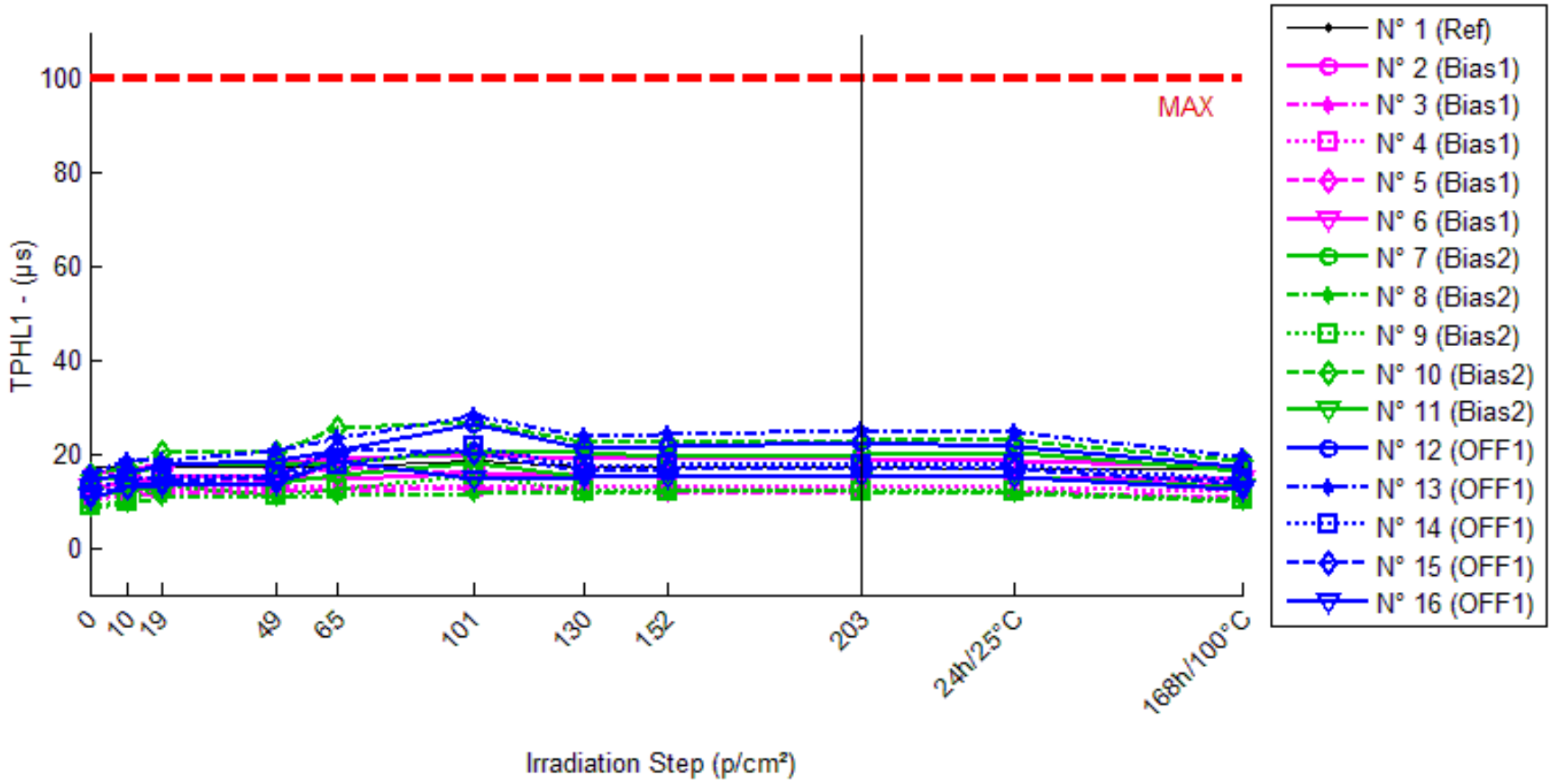
	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	18.03	18.10	18.15	18.23	18.24	18.32	18.31	18.32	18.35	18.36	18.33
N° 2 (Bias1)	25.55	25.50	25.46	25.45	25.53	25.58	25.51	25.58	25.61	25.67	24.85
N° 3 (Bias1)	26.08	26.03	25.98	26.01	25.97	26.02	25.92	25.95	25.99	26.02	25.77
N° 4 (Bias1)	28.85	28.65	28.51	28.28	28.23	28.17	28.05	28.09	28.13	28.13	28.05
N° 5 (Bias1)	29.57	29.60	29.53	29.50	29.52	29.54	29.45	29.48	29.52	29.55	29.51
N° 6 (Bias1)	28.47	28.42	28.38	28.41	28.45	28.50	28.41	28.44	28.50	28.51	17.97
N° 7 (Bias2)	10.48	10.40	10.56	10.81	10.78	10.83	10.76	10.92	10.84	10.80	10.98
N° 8 (Bias2)	27.44	27.48	27.43	27.40	27.43	27.49	27.36	27.40	27.46	27.46	27.38
N° 9 (Bias2)	17.50	18.98	18.44	18.49	18.70	19.16	19.04	19.34	18.80	20.17	19.07
N° 10 (Bias2)	25.56	25.61	25.58	25.55	25.57	25.59	25.51	25.54	25.59	25.58	25.53
N° 11 (Bias2)	10.36	10.68	10.65	10.31	10.07	10.00	10.21	10.16	10.48	10.47	10.66
N° 12 (OFF1)	14.37	14.38	14.36	14.36	14.37	14.37	14.34	14.36	14.37	14.37	14.35
N° 13 (OFF1)	27.46	27.52	27.47	27.47	27.49	27.50	27.42	27.45	27.51	27.50	27.43
N° 14 (OFF1)	29.96	30.03	29.96	29.96	29.98	29.99	29.89	29.94	29.98	30.01	29.92
N° 15 (OFF1)	17.89	17.46	18.48	17.75	18.64	17.83	18.10	17.96	17.99	18.30	18.31
N° 16 (OFF1)	15.19	15.07	15.08	15.20	15.12	15.19	15.14	15.10	15.09	15.21	18.03

Delta [BVr]

	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	---	7.038E-2	1.180E-1	2.039E-1	2.154E-1	2.949E-1	2.872E-1	2.895E-1	3.217E-1	3.297E-1	3.055E-1
N° 2 (Bias1)	---	-5.677E-2	-9.090E-2	-1.006E-1	-2.239E-2	2.638E-2	-4.088E-2	2.966E-2	5.080E-2	1.166E-1	-7.035E-1
N° 3 (Bias1)	---	-4.413E-2	-9.628E-2	-6.958E-2	-1.056E-1	-5.559E-2	-1.612E-1	-1.253E-1	-8.790E-2	-5.910E-2	-3.062E-1
N° 4 (Bias1)	---	-2.008E-1	-3.465E-1	-5.730E-1	-6.285E-1	-6.840E-1	-8.000E-1	-7.698E-1	-7.295E-1	-7.268E-1	-8.072E-1
N° 5 (Bias1)	---	3.461E-2	-3.972E-2	-7.080E-2	-4.640E-2	-2.702E-2	-1.207E-1	-8.934E-2	-4.820E-2	-1.316E-2	-5.178E-2
N° 6 (Bias1)	---	-5.869E-2	-8.907E-2	-6.129E-2	-2.712E-2	2.258E-2	-6.763E-2	-3.446E-2	2.250E-2	4.025E-2	-1.050E+1
N° 7 (Bias2)	---	-7.634E-2	8.682E-2	3.330E-1	3.000E-1	3.557E-1	2.783E-1	4.441E-1	3.611E-1	3.231E-1	5.041E-1
N° 8 (Bias2)	---	3.873E-2	-8.770E-3	-4.430E-2	-7.490E-3	4.857E-2	-7.785E-2	-3.838E-2	1.722E-2	2.160E-2	-6.297E-2
N° 9 (Bias2)	---	1.481E+0	9.378E-1	9.903E-1	1.204E+0	1.658E+0	1.541E+0	1.844E+0	1.299E+0	2.672E+0	1.573E+0
N° 10 (Bias2)	---	5.123E-2	1.532E-2	-1.423E-2	9.380E-3	2.714E-2	-5.188E-2	-1.794E-2	2.804E-2	2.228E-2	-3.154E-2
N° 11 (Bias2)	---	3.151E-1	2.889E-1	-5.821E-2	-2.901E-1	-3.640E-1	-1.506E-1	-2.074E-1	1.170E-1	1.013E-1	2.945E-1
N° 12 (OFF1)	---	1.031E-2	-1.126E-2	-1.214E-2	-8.790E-3	-6.040E-3	-3.316E-2	-1.858E-2	-8.510E-3	-6.110E-3	-2.192E-2
N° 13 (OFF1)	---	5.955E-2	8.130E-3	6.880E-3	2.947E-2	3.422E-2	-3.862E-2	-1.224E-2	4.524E-2	3.716E-2	-2.721E-2
N° 14 (OFF1)	---	6.297E-2	-3.990E-3	-3.920E-3	1.589E-2	2.168E-2	-6.941E-2	-2.284E-2	1.770E-2	4.714E-2	-4.903E-2
N° 15 (OFF1)	---	-4.345E-1	5.840E-1	-1.401E-1	7.459E-1	-6.016E-2	2.012E-1	6.876E-2	9.031E-2	4.069E-1	4.150E-1
N° 16 (OFF1)	---	-1.211E-1	-1.125E-1	7.820E-3	-7.655E-2	-6.030E-3	-5.591E-2	-9.356E-2	-1.059E-1	1.559E-2	2.841E+0
Average (OFF1)	---	-6.516E-2	-1.325E-1	-1.751E-1	-1.660E-1	-1.435E-1	-2.381E-1	-1.979E-1	-1.585E-1	-1.284E-1	-2.474E+0
σ (OFF1)	---	8.501E-2	1.218E-1	2.230E-1	2.607E-1	3.041E-1	3.176E-1	3.250E-1	3.239E-1	3.408E-1	4.497E+0
Average+3σ (OFF1)	---	1.899E-1	2.329E-1	4.938E-1	6.159E-1	7.687E-1	7.146E-1	7.773E-1	8.134E-1	8.940E-1	1.102E+1
Average-3σ (OFF1)	---	-3.202E-1	-4.979E-1	-8.439E-1	-9.480E-1	-1.056E+0	-1.191E+0	-1.173E+0	-1.130E+0	-1.151E+0	-1.597E+1
Average (Bias1)	---	3.619E-1	2.640E-1	2.413E-1	2.431E-1	3.451E-1	3.078E-1	4.050E-1	3.645E-1	6.281E-1	4.554E-1
σ (Bias1)	---	6.418E-1	3.944E-1	4.489E-1	5.761E-1	7.771E-1	7.089E-1	8.402E-1	5.404E-1	1.149E+0	6.677E-1
Average+3σ (Bias1)	---	2.287E+0	1.447E+0	1.588E+0	1.971E+0	2.676E+0	2.435E+0	2.926E+0	1.986E+0	4.076E+0	2.459E+0
Average-3σ (Bias1)	---	-1.563E+0	-9.192E-1	-1.105E+0	-1.485E+0	-1.986E+0	-1.819E+0	-2.116E+0	-1.257E+0	-2.820E+0	-1.548E+0
Average (Bias2)	---	-8.454E-2	9.288E-2	-2.829E-2	1.412E-1	-3.266E-3	8.120E-4	-1.569E-2	7.776E-3	1.001E-1	6.315E-1
σ (Bias2)	---	2.093E-1	2.787E-1	6.304E-2	3.405E-1	3.633E-2	1.129E-1	5.759E-2	7.330E-2	1.727E-1	1.250E+0
Average+3σ (Bias2)	---	5.435E-1	9.290E-1	1.608E-1	1.163E+0	1.057E-1	3.395E-1	1.571E-1	2.277E-1	6.183E-1	4.382E+0
Average-3σ (Bias2)	---	-7.126E-1	-7.433E-1	-2.174E-1	-8.803E-1	-1.123E-1	-3.379E-1	-1.885E-1	-2.121E-1	-4.180E-1	-3.119E+0

8. TPHL 1

Ta=25°C; If = 0.5 mA; RL = 4.7 kOhms; Vcc = 5 V



TPHL1 . (µs) **Max = 100.0**

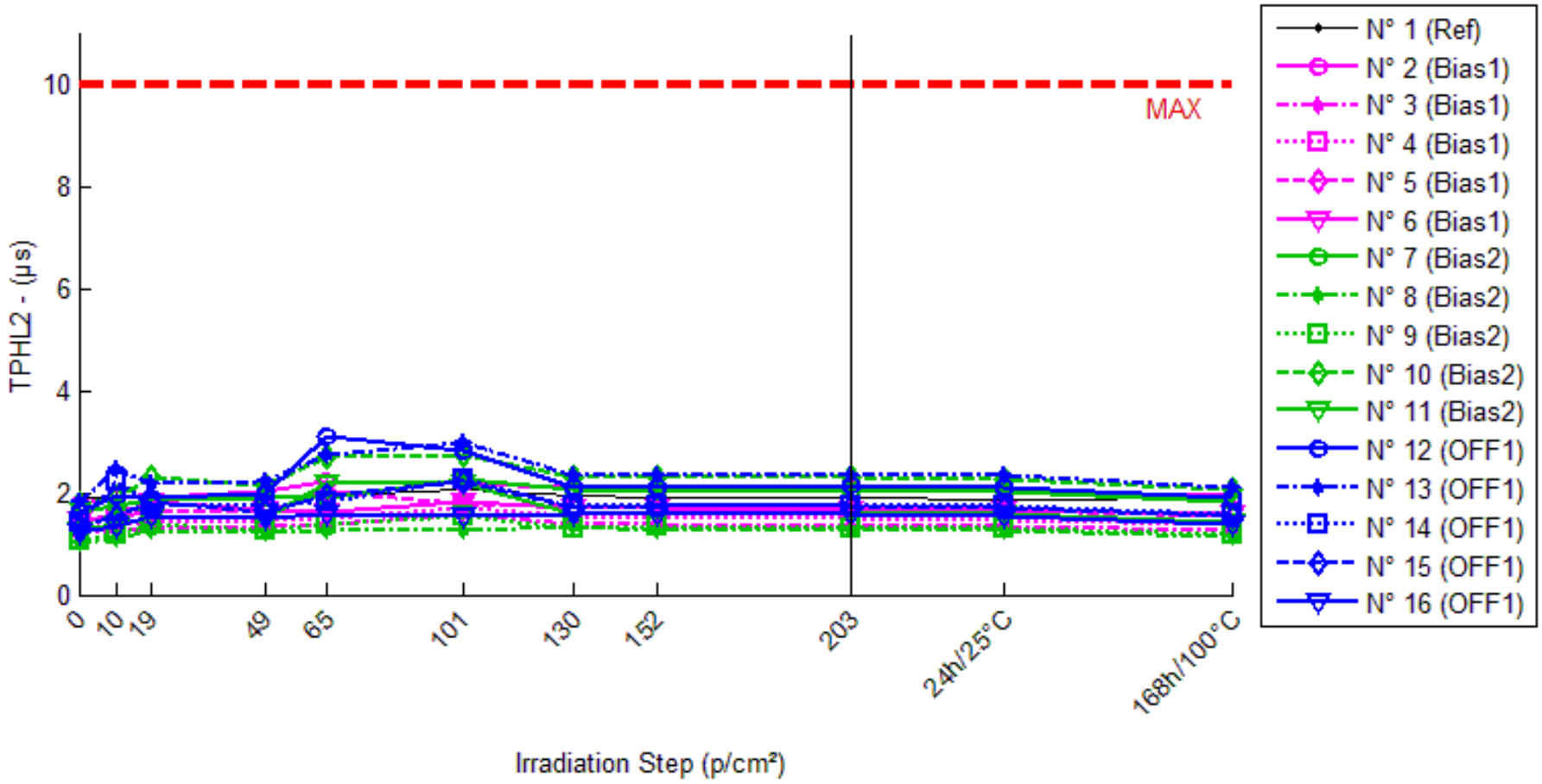
	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	17.2	17.4	17.4	17.3	17.3	18.5	17.2	17.1	17.2	17.0	16.9
N° 2 (Bias1)	15.7	16.8	17.5	18.3	19.1	19.7	18.9	18.9	19.1	18.8	17.2
N° 3 (Bias1)	10.5	11.1	11.4	12.1	12.2	12.7	12.1	11.8	11.8	11.9	10.8
N° 4 (Bias1)	11.2	11.9	12.4	12.8	12.9	12.9	13.3	13.1	13.1	13.1	12.0
N° 5 (Bias1)	12.7	13.7	14.3	14.5	17.1	16.0	15.2	15.1	15.1	14.9	13.5
N° 6 (Bias1)	13.0	13.9	15.5	14.9	14.8	16.0	15.6	15.2	15.2	15.2	14.5
N° 7 (Bias2)	14.2	15.5	17.6	17.6	18.1	20.7	20.2	19.6	20.1	20.3	16.3
N° 8 (Bias2)	8.6	9.6	10.6	10.7	11.1	11.6	11.6	12.0	11.9	11.7	9.9
N° 9 (Bias2)	9.2	10.0	13.2	11.3	12.5	15.6	12.1	12.0	12.1	12.1	10.3
N° 10 (Bias2)	15.7	17.4	20.5	20.4	25.4	26.8	22.5	22.3	23.1	23.0	18.8
N° 11 (Bias2)	11.0	12.1	13.5	13.7	15.6	18.0	15.1	14.9	15.2	15.2	12.8
N° 12 (OFF1)	14.2	16.1	17.9	18.7	20.9	26.3	21.1	21.6	22.5	21.8	17.4
N° 13 (OFF1)	15.9	18.8	18.7	20.9	23.6	28.0	23.7	24.1	25.2	24.7	19.3
N° 14 (OFF1)	12.4	14.5	15.1	15.7	17.6	21.7	17.4	17.7	17.6	17.8	14.5
N° 15 (OFF1)	11.8	13.1	14.2	15.1	21.0	20.4	16.5	16.8	17.4	17.0	14.0
N° 16 (OFF1)	10.6	12.7	13.2	13.9	18.7	14.7	14.9	15.2	15.7	15.3	12.3

Delta [TPHL1]

	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	---	2.000E-1	2.000E-1	1.000E-1	1.000E-1	1.300E+0	0.000E+0	-1.000E-1	0.000E+0	-2.000E-1	-3.000E-1
N° 2 (Bias1)	---	1.150E+0	1.850E+0	2.650E+0	3.450E+0	4.050E+0	3.300E+0	3.250E+0	3.450E+0	3.150E+0	1.550E+0
N° 3 (Bias1)	---	6.000E-1	9.000E-1	1.600E+0	1.700E+0	2.200E+0	1.600E+0	1.300E+0	1.300E+0	1.400E+0	3.500E-1
N° 4 (Bias1)	---	7.000E-1	1.200E+0	1.600E+0	1.700E+0	1.700E+0	2.100E+0	1.900E+0	1.900E+0	1.900E+0	8.000E-1
N° 5 (Bias1)	---	9.500E-1	1.600E+0	1.800E+0	4.400E+0	3.300E+0	2.500E+0	2.400E+0	2.350E+0	2.200E+0	8.000E-1
N° 6 (Bias1)	---	9.000E-1	2.500E+0	1.900E+0	1.800E+0	3.000E+0	2.600E+0	2.200E+0	2.200E+0	2.200E+0	1.500E+0
N° 7 (Bias2)	---	1.350E+0	3.450E+0	3.450E+0	4.000E+0	6.550E+0	6.050E+0	5.450E+0	5.950E+0	6.150E+0	2.150E+0
N° 8 (Bias2)	---	9.500E-1	2.000E+0	2.100E+0	2.500E+0	3.000E+0	3.000E+0	3.400E+0	3.300E+0	3.100E+0	1.300E+0
N° 9 (Bias2)	---	8.500E-1	4.050E+0	2.150E+0	3.350E+0	6.450E+0	2.950E+0	2.850E+0	2.950E+0	2.950E+0	1.150E+0
N° 10 (Bias2)	---	1.700E+0	4.800E+0	4.700E+0	9.700E+0	1.110E+1	6.800E+0	6.600E+0	7.400E+0	7.300E+0	3.100E+0
N° 11 (Bias2)	---	1.100E+0	2.500E+0	2.700E+0	4.600E+0	7.000E+0	4.100E+0	3.900E+0	4.200E+0	4.200E+0	1.850E+0
N° 12 (OFF1)	---	1.900E+0	3.650E+0	4.500E+0	6.700E+0	1.210E+1	6.900E+0	7.400E+0	8.300E+0	7.600E+0	3.200E+0
N° 13 (OFF1)	---	2.900E+0	2.800E+0	5.000E+0	7.700E+0	1.210E+1	7.800E+0	8.200E+0	9.350E+0	8.800E+0	3.400E+0
N° 14 (OFF1)	---	2.100E+0	2.700E+0	3.300E+0	5.200E+0	9.300E+0	5.000E+0	5.300E+0	5.200E+0	5.400E+0	2.100E+0
N° 15 (OFF1)	---	1.300E+0	2.350E+0	3.300E+0	9.200E+0	8.600E+0	4.700E+0	5.000E+0	5.600E+0	5.200E+0	2.200E+0
N° 16 (OFF1)	---	2.100E+0	2.600E+0	3.300E+0	8.100E+0	4.100E+0	4.350E+0	4.600E+0	5.100E+0	4.750E+0	1.700E+0
Average (OFF1)	---	8.600E-1	1.610E+0	1.910E+0	2.610E+0	2.850E+0	2.420E+0	2.210E+0	2.240E+0	2.170E+0	1.000E+0
σ (OFF1)	---	2.162E-1	6.168E-1	4.336E-1	1.247E+0	9.233E-1	6.301E-1	7.145E-1	7.869E-1	6.380E-1	5.136E-1
Average+3σ (OFF1)	---	1.509E+0	3.461E+0	3.211E+0	6.352E+0	5.620E+0	4.310E+0	4.353E+0	4.601E+0	4.084E+0	2.541E+0
Average-3σ (OFF1)	---	2.113E-1	-2.405E-1	6.092E-1	-1.132E+0	8.007E-2	5.298E-1	6.652E-2	-1.208E-1	2.561E-1	-5.407E-1
Average (Bias1)	---	1.190E+0	3.360E+0	3.020E+0	4.830E+0	6.820E+0	4.580E+0	4.440E+0	4.760E+0	4.740E+0	1.910E+0
σ (Bias1)	---	3.417E-1	1.134E+0	1.085E+0	2.832E+0	2.879E+0	1.766E+0	1.548E+0	1.878E+0	1.919E+0	7.789E-1
Average+3σ (Bias1)	---	2.215E+0	6.763E+0	6.276E+0	1.333E+1	1.546E+1	9.878E+0	9.084E+0	1.039E+1	1.050E+1	4.247E+0
Average-3σ (Bias1)	---	1.649E-1	-4.305E-2	-2.364E-1	-3.666E+0	-1.817E+0	-7.176E-1	-2.044E-1	-8.739E-1	-1.016E+0	-4.268E-1
Average (Bias2)	---	2.060E+0	2.820E+0	3.880E+0	7.380E+0	9.240E+0	5.750E+0	6.100E+0	6.710E+0	6.350E+0	2.520E+0
σ (Bias2)	---	5.727E-1	4.932E-1	8.136E-1	1.512E+0	3.286E+0	1.512E+0	1.597E+0	1.975E+0	1.757E+0	7.396E-1
Average+3σ (Bias2)	---	3.778E+0	4.300E+0	6.321E+0	1.192E+1	1.910E+1	1.029E+1	1.089E+1	1.263E+1	1.162E+1	4.739E+0
Average-3σ (Bias2)	---	3.419E-1	1.340E+0	1.439E+0	2.843E+0	-6.181E-1	1.213E+0	1.309E+0	7.851E-1	1.079E+0	3.012E-1

9. TPHL2

Ta=25°C; If = 5 mA; RL = 680 Ohms; Vcc = 5 V



TPHL2 . (µs) **Max = 10.0**

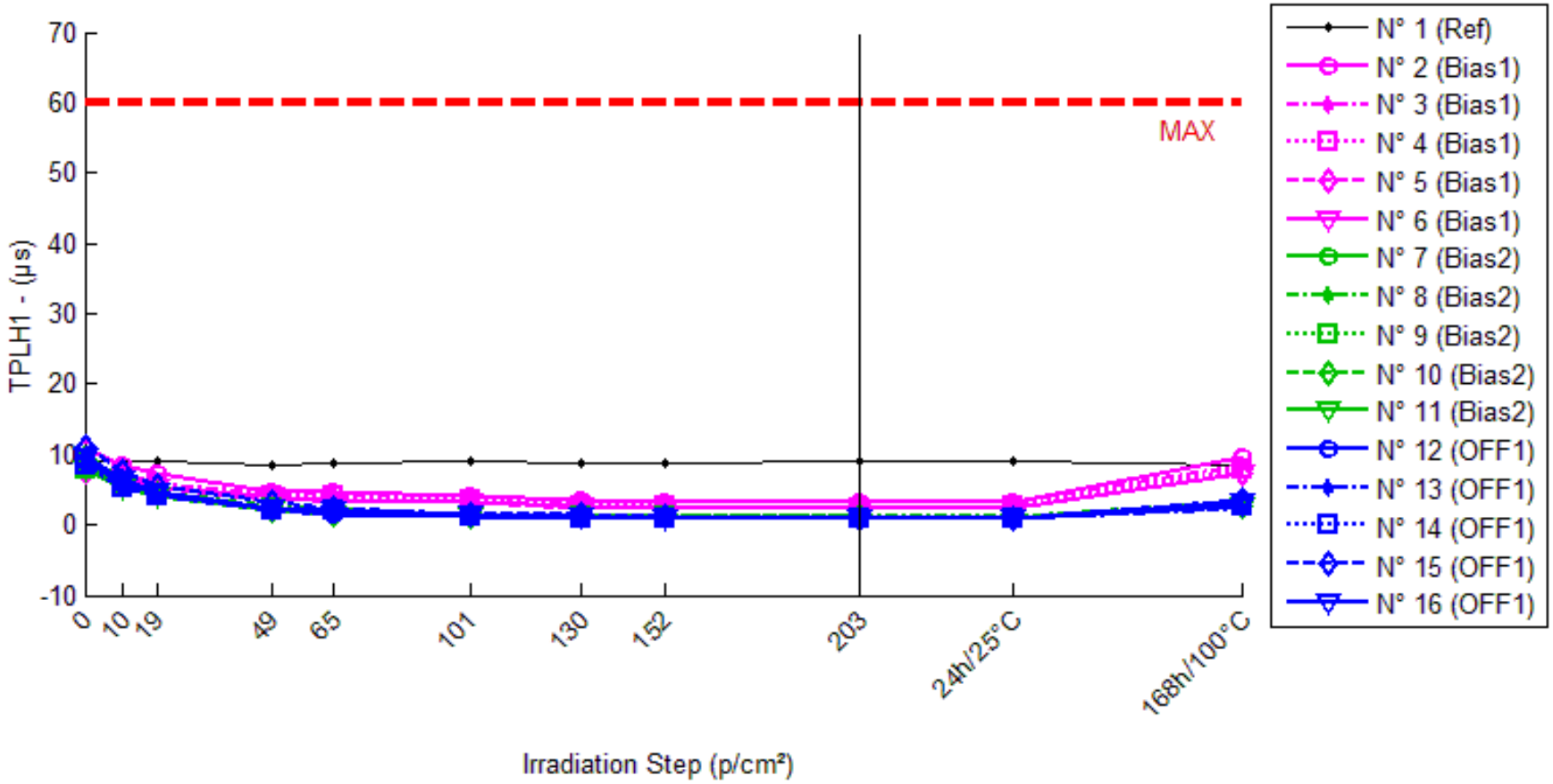
	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	1.90	1.91	1.91	1.92	1.95	2.07	1.93	1.89	1.89	1.86	1.90
N° 2 (Bias1)	1.77	1.89	1.92	2.01	2.21	2.19	2.09	2.07	2.05	2.02	1.93
N° 3 (Bias1)	1.21	1.27	1.32	1.36	1.38	1.57	1.39	1.38	1.36	1.35	1.27
N° 4 (Bias1)	1.29	1.38	1.44	1.47	1.49	1.69	1.53	1.51	1.49	1.47	1.40
N° 5 (Bias1)	1.46	1.55	1.64	1.63	2.02	1.77	1.73	1.70	1.69	1.66	1.56
N° 6 (Bias1)	1.46	1.55	1.84	1.65	1.63	1.84	1.72	1.69	1.68	1.65	1.58
N° 7 (Bias2)	1.61	1.75	1.86	1.91	1.91	2.25	2.07	2.03	2.04	2.01	1.82
N° 8 (Bias2)	1.02	1.11	1.28	1.21	1.27	1.27	1.33	1.28	1.26	1.25	1.14
N° 9 (Bias2)	1.07	1.17	1.40	1.26	1.39	1.56	1.32	1.33	1.31	1.30	1.19
N° 10 (Bias2)	1.77	1.92	2.29	2.16	2.70	2.76	2.29	2.30	2.30	2.26	2.06
N° 11 (Bias2)	1.28	1.40	1.51	1.52	2.17	2.17	1.60	1.59	1.59	1.57	1.44
N° 12 (OFF1)	1.61	1.94	1.92	2.00	3.10	2.82	2.12	2.11	2.13	2.09	1.90
N° 13 (OFF1)	1.82	2.47	2.18	2.22	2.76	2.98	2.34	2.33	2.36	2.33	2.11
N° 14 (OFF1)	1.41	2.23	1.74	1.73	1.81	2.28	1.75	1.76	1.76	1.74	1.58
N° 15 (OFF1)	1.36	1.54	1.83	1.63	1.96	2.24	1.72	1.73	1.73	1.71	1.55
N° 16 (OFF1)	1.23	1.34	1.53	1.50	1.57	1.56	1.57	1.57	1.59	1.56	1.40

Delta [TPHL2]

	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	---	1.000E-2	1.000E-2	2.000E-2	5.000E-2	1.700E-1	3.000E-2	-1.000E-2	-1.000E-2	-4.000E-2	0.000E+0
N° 2 (Bias1)	---	1.200E-1	1.500E-1	2.400E-1	4.400E-1	4.200E-1	3.200E-1	3.000E-1	2.800E-1	2.500E-1	1.600E-1
N° 3 (Bias1)	---	6.000E-2	1.100E-1	1.500E-1	1.700E-1	3.600E-1	1.800E-1	1.700E-1	1.500E-1	1.400E-1	6.000E-2
N° 4 (Bias1)	---	9.000E-2	1.500E-1	1.800E-1	2.000E-1	4.000E-1	2.400E-1	2.200E-1	2.000E-1	1.800E-1	1.100E-1
N° 5 (Bias1)	---	9.000E-2	1.800E-1	1.700E-1	5.600E-1	3.100E-1	2.700E-1	2.400E-1	2.300E-1	2.000E-1	1.000E-1
N° 6 (Bias1)	---	9.000E-2	3.800E-1	1.900E-1	1.700E-1	3.800E-1	2.600E-1	2.300E-1	2.200E-1	1.900E-1	1.200E-1
N° 7 (Bias2)	---	1.400E-1	2.500E-1	3.000E-1	3.000E-1	6.400E-1	4.600E-1	4.200E-1	4.300E-1	4.000E-1	2.100E-1
N° 8 (Bias2)	---	9.000E-2	2.600E-1	1.900E-1	2.500E-1	2.500E-1	3.100E-1	2.600E-1	2.400E-1	2.300E-1	1.200E-1
N° 9 (Bias2)	---	1.000E-1	3.300E-1	1.900E-1	3.200E-1	4.900E-1	2.500E-1	2.600E-1	2.400E-1	2.300E-1	1.200E-1
N° 10 (Bias2)	---	1.500E-1	5.200E-1	3.900E-1	9.300E-1	9.900E-1	5.200E-1	5.300E-1	5.300E-1	4.900E-1	2.900E-1
N° 11 (Bias2)	---	1.200E-1	2.300E-1	2.400E-1	8.900E-1	8.900E-1	3.200E-1	3.100E-1	3.100E-1	2.900E-1	1.600E-1
N° 12 (OFF1)	---	3.300E-1	3.100E-1	3.900E-1	1.490E+0	1.210E+0	5.100E-1	5.000E-1	5.200E-1	4.800E-1	2.900E-1
N° 13 (OFF1)	---	6.500E-1	3.600E-1	4.000E-1	9.400E-1	1.160E+0	5.200E-1	5.100E-1	5.400E-1	5.100E-1	2.900E-1
N° 14 (OFF1)	---	8.200E-1	3.300E-1	3.200E-1	4.000E-1	8.700E-1	3.400E-1	3.500E-1	3.500E-1	3.300E-1	1.700E-1
N° 15 (OFF1)	---	1.800E-1	4.700E-1	2.700E-1	6.000E-1	8.800E-1	3.600E-1	3.700E-1	3.700E-1	3.500E-1	1.900E-1
N° 16 (OFF1)	---	1.100E-1	3.000E-1	2.700E-1	3.400E-1	3.300E-1	3.400E-1	3.400E-1	3.600E-1	3.300E-1	1.700E-1
Average (OFF1)	---	9.000E-2	1.940E-1	1.860E-1	3.080E-1	3.740E-1	2.540E-1	2.320E-1	2.160E-1	1.920E-1	1.100E-1
σ (OFF1)	---	2.121E-2	1.069E-1	3.362E-2	1.807E-1	4.219E-2	5.079E-2	4.658E-2	4.722E-2	3.962E-2	3.606E-2
Average+3σ (OFF1)	---	1.536E-1	5.147E-1	2.868E-1	8.502E-1	5.006E-1	4.064E-1	3.717E-1	3.577E-1	3.109E-1	2.182E-1
Average-3σ (OFF1)	---	2.636E-2	-1.267E-1	8.515E-2	-2.342E-1	2.474E-1	1.016E-1	9.225E-2	7.433E-2	7.313E-2	1.833E-3
Average (Bias1)	---	1.200E-1	3.180E-1	2.620E-1	5.380E-1	6.520E-1	3.720E-1	3.560E-1	3.500E-1	3.280E-1	1.800E-1
σ (Bias1)	---	2.550E-2	1.190E-1	8.468E-2	3.408E-1	2.995E-1	1.130E-1	1.172E-1	1.271E-1	1.141E-1	7.176E-2
Average+3σ (Bias1)	---	1.965E-1	6.751E-1	5.160E-1	1.561E+0	1.551E+0	7.110E-1	7.075E-1	7.312E-1	6.703E-1	3.953E-1
Average-3σ (Bias1)	---	4.351E-2	-3.911E-2	7.972E-3	-4.845E-1	-2.466E-1	3.299E-2	4.475E-3	-3.125E-2	-1.432E-2	-3.529E-2
Average (Bias2)	---	4.180E-1	3.540E-1	3.300E-1	7.540E-1	8.900E-1	4.140E-1	4.140E-1	4.280E-1	4.000E-1	2.220E-1
σ (Bias2)	---	3.061E-1	6.877E-2	6.285E-2	4.735E-1	3.498E-1	9.263E-2	8.385E-2	9.365E-2	8.775E-2	6.261E-2
Average+3σ (Bias2)	---	1.336E+0	5.603E-1	5.185E-1	2.174E+0	1.939E+0	6.919E-1	6.655E-1	7.089E-1	6.632E-1	4.098E-1
Average-3σ (Bias2)	---	-5.002E-1	1.477E-1	1.415E-1	-6.664E-1	-1.594E-1	1.361E-1	1.625E-1	1.471E-1	1.368E-1	3.417E-2

10.TPLH1

Ta=25°C; If = 0.5 mA; RL = 4.7 kOhms; Vcc = 5 V



TPLH1 . (µs) **Max = 60.0**

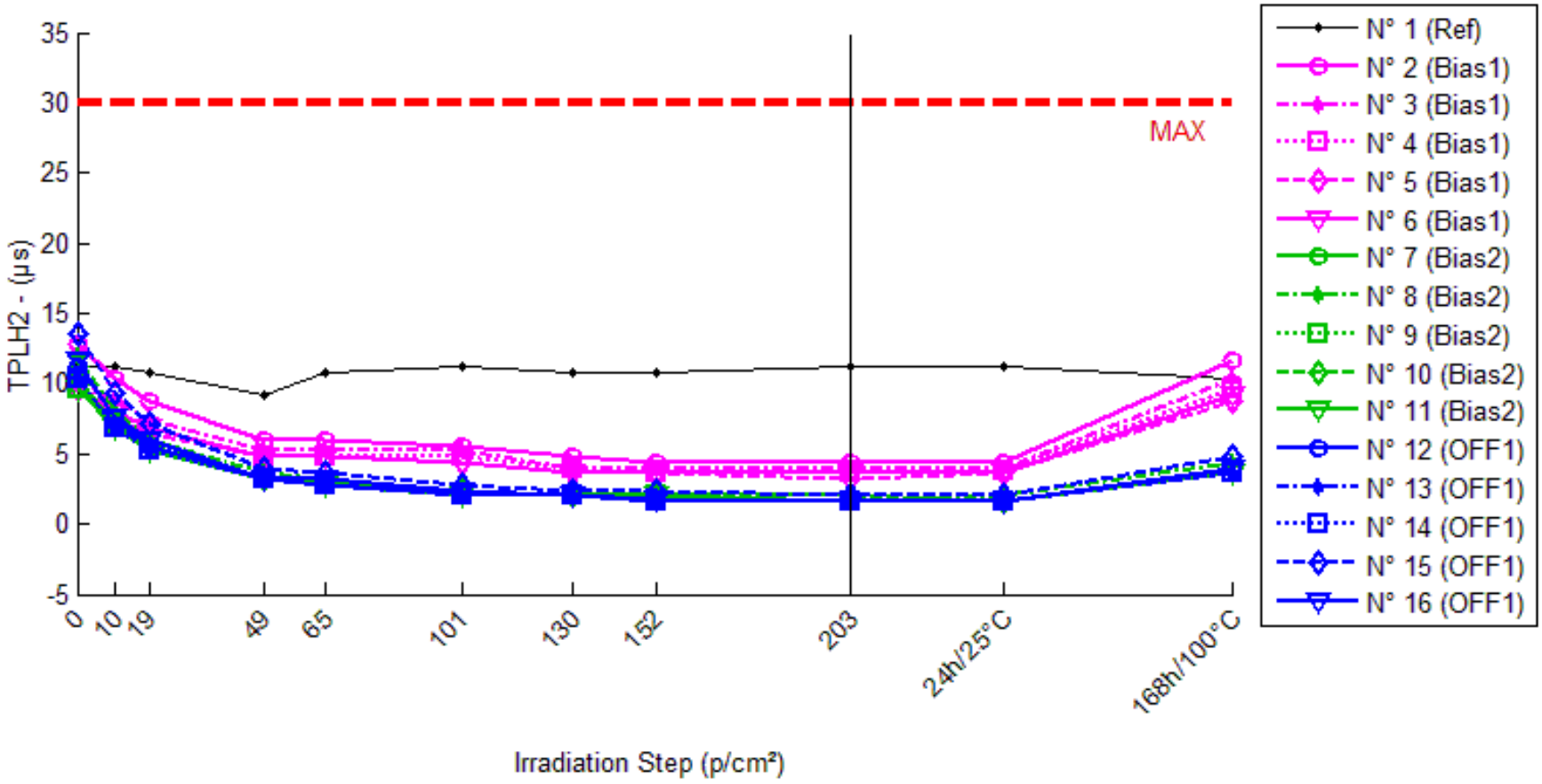
	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	9.2	9.2	9.0	8.4	8.8	9.2	8.8	8.8	9.2	9.2	8.4
N° 2 (Bias1)	10.8	8.4	7.2	4.8	4.8	4.0	3.4	3.2	3.2	3.2	9.6
N° 3 (Bias1)	8.8	7.2	6.0	4.4	4.4	4.0	3.2	3.2	3.2	3.2	8.4
N° 4 (Bias1)	8.4	6.8	5.6	4.0	4.0	3.6	2.8	2.8	2.4	2.8	8.0
N° 5 (Bias1)	7.6	6.0	5.2	3.6	3.6	3.2	2.4	2.4	2.4	2.4	7.2
N° 6 (Bias1)	8.0	6.4	5.2	4.0	3.2	3.2	2.8	2.4	2.4	2.4	7.4
N° 7 (Bias2)	8.4	5.6	4.0	2.0	1.6	1.2	1.0	0.8	0.8	0.8	2.8
N° 8 (Bias2)	10.0	6.4	4.8	2.8	2.4	1.6	1.2	1.2	1.2	1.2	3.2
N° 9 (Bias2)	8.0	5.2	4.0	2.4	2.0	1.2	1.2	1.2	0.8	0.8	2.8
N° 10 (Bias2)	9.2	6.0	4.4	2.2	1.6	1.2	1.2	1.2	1.2	0.8	2.8
N° 11 (Bias2)	8.0	5.2	4.0	2.2	1.6	1.2	1.2	0.8	0.8	0.8	2.8
N° 12 (OFF1)	9.2	6.0	4.4	2.4	1.6	1.2	1.0	0.8	0.8	0.8	2.8
N° 13 (OFF1)	8.4	5.2	4.0	2.0	1.6	1.2	1.0	0.8	0.8	0.8	2.4
N° 14 (OFF1)	8.4	5.2	4.0	2.0	2.0	1.2	0.8	0.8	0.8	0.8	2.8
N° 15 (OFF1)	11.2	7.6	5.6	3.2	2.4	1.6	1.6	1.2	0.8	0.8	3.6
N° 16 (OFF1)	9.6	6.4	4.8	2.4	2.0	1.6	1.2	0.8	0.8	0.8	3.2

Delta [TPLH1]

	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	---	0.000E+0	-2.000E-1	-8.000E-1	-4.000E-1	0.000E+0	-4.000E-1	-4.000E-1	0.000E+0	0.000E+0	-8.000E-1
N° 2 (Bias1)	---	-2.400E+0	-3.600E+0	-6.000E+0	-6.000E+0	-6.800E+0	-7.400E+0	-7.600E+0	-7.600E+0	-7.600E+0	-1.200E+0
N° 3 (Bias1)	---	-1.600E+0	-2.800E+0	-4.400E+0	-4.400E+0	-4.800E+0	-5.600E+0	-5.600E+0	-5.600E+0	-5.600E+0	-4.000E-1
N° 4 (Bias1)	---	-1.600E+0	-2.800E+0	-4.400E+0	-4.400E+0	-4.800E+0	-5.600E+0	-5.600E+0	-6.000E+0	-5.600E+0	-4.000E-1
N° 5 (Bias1)	---	-1.600E+0	-2.400E+0	-4.000E+0	-4.000E+0	-4.400E+0	-5.200E+0	-5.200E+0	-5.200E+0	-5.200E+0	-4.000E-1
N° 6 (Bias1)	---	-1.600E+0	-2.800E+0	-4.000E+0	-4.800E+0	-4.800E+0	-5.200E+0	-5.600E+0	-5.600E+0	-5.600E+0	-6.000E-1
N° 7 (Bias2)	---	-2.800E+0	-4.400E+0	-6.400E+0	-6.800E+0	-7.200E+0	-7.400E+0	-7.600E+0	-7.600E+0	-7.600E+0	-5.600E+0
N° 8 (Bias2)	---	-3.600E+0	-5.200E+0	-7.200E+0	-7.600E+0	-8.400E+0	-8.800E+0	-8.800E+0	-8.800E+0	-8.800E+0	-6.800E+0
N° 9 (Bias2)	---	-2.800E+0	-4.000E+0	-5.600E+0	-6.000E+0	-6.800E+0	-6.800E+0	-6.800E+0	-7.200E+0	-7.200E+0	-5.200E+0
N° 10 (Bias2)	---	-3.200E+0	-4.800E+0	-7.000E+0	-7.600E+0	-8.000E+0	-8.000E+0	-8.000E+0	-8.000E+0	-8.400E+0	-6.400E+0
N° 11 (Bias2)	---	-2.800E+0	-4.000E+0	-5.800E+0	-6.400E+0	-6.800E+0	-6.800E+0	-7.200E+0	-7.200E+0	-7.200E+0	-5.200E+0
N° 12 (OFF1)	---	-3.200E+0	-4.800E+0	-6.800E+0	-7.600E+0	-8.000E+0	-8.200E+0	-8.400E+0	-8.400E+0	-8.400E+0	-6.400E+0
N° 13 (OFF1)	---	-3.200E+0	-4.400E+0	-6.400E+0	-6.800E+0	-7.200E+0	-7.400E+0	-7.600E+0	-7.600E+0	-7.600E+0	-6.000E+0
N° 14 (OFF1)	---	-3.200E+0	-4.400E+0	-6.400E+0	-6.400E+0	-7.200E+0	-7.600E+0	-7.600E+0	-7.600E+0	-7.600E+0	-5.600E+0
N° 15 (OFF1)	---	-3.600E+0	-5.600E+0	-8.000E+0	-8.800E+0	-9.600E+0	-9.600E+0	-1.000E+1	-1.040E+1	-1.040E+1	-7.600E+0
N° 16 (OFF1)	---	-3.200E+0	-4.800E+0	-7.200E+0	-7.600E+0	-8.000E+0	-8.400E+0	-8.800E+0	-8.800E+0	-8.800E+0	-6.400E+0
Average (OFF1)	---	-1.760E+0	-2.880E+0	-4.560E+0	-4.720E+0	-5.120E+0	-5.800E+0	-5.920E+0	-6.000E+0	-5.920E+0	-6.000E-1
σ (OFF1)	---	3.578E-1	4.382E-1	8.295E-1	7.694E-1	9.550E-1	9.165E-1	9.550E-1	9.381E-1	9.550E-1	3.464E-1
Average+3σ (OFF1)	---	-6.867E-1	-1.565E+0	-2.072E+0	-2.412E+0	-2.255E+0	-3.050E+0	-3.055E+0	-3.186E+0	-3.055E+0	4.392E-1
Average-3σ (OFF1)	---	-2.833E+0	-4.195E+0	-7.048E+0	-7.028E+0	-7.985E+0	-8.550E+0	-8.785E+0	-8.814E+0	-8.785E+0	-1.639E+0
Average (Bias1)	---	-3.040E+0	-4.480E+0	-6.400E+0	-6.880E+0	-7.440E+0	-7.560E+0	-7.680E+0	-7.760E+0	-7.840E+0	-5.840E+0
σ (Bias1)	---	3.578E-1	5.215E-1	7.071E-1	7.155E-1	7.266E-1	8.532E-1	7.694E-1	6.693E-1	7.266E-1	7.266E-1
Average+3σ (Bias1)	---	-1.967E+0	-2.915E+0	-4.279E+0	-4.733E+0	-5.260E+0	-5.000E+0	-5.372E+0	-5.752E+0	-5.660E+0	-3.660E+0
Average-3σ (Bias1)	---	-4.113E+0	-6.045E+0	-8.521E+0	-9.027E+0	-9.620E+0	-1.012E+1	-9.988E+0	-9.768E+0	-1.002E+1	-8.020E+0
Average (Bias2)	---	-3.280E+0	-4.800E+0	-6.960E+0	-7.440E+0	-8.000E+0	-8.240E+0	-8.480E+0	-8.560E+0	-8.560E+0	-6.400E+0
σ (Bias2)	---	1.789E-1	4.899E-1	6.693E-1	9.209E-1	9.798E-1	8.649E-1	9.960E-1	1.152E+0	1.152E+0	7.483E-1
Average+3σ (Bias2)	---	-2.743E+0	-3.330E+0	-4.952E+0	-4.677E+0	-5.061E+0	-5.645E+0	-5.492E+0	-5.103E+0	-5.103E+0	-4.155E+0
Average-3σ (Bias2)	---	-3.817E+0	-6.270E+0	-8.968E+0	-1.020E+1	-1.094E+1	-1.083E+1	-1.147E+1	-1.202E+1	-1.202E+1	-8.645E+0

11.TPLH2

Ta=25°C; If = 5 mA; RL = 680 Ohms; Vcc = 5 V



TPLH2 . (µs) **Max = 30.0**

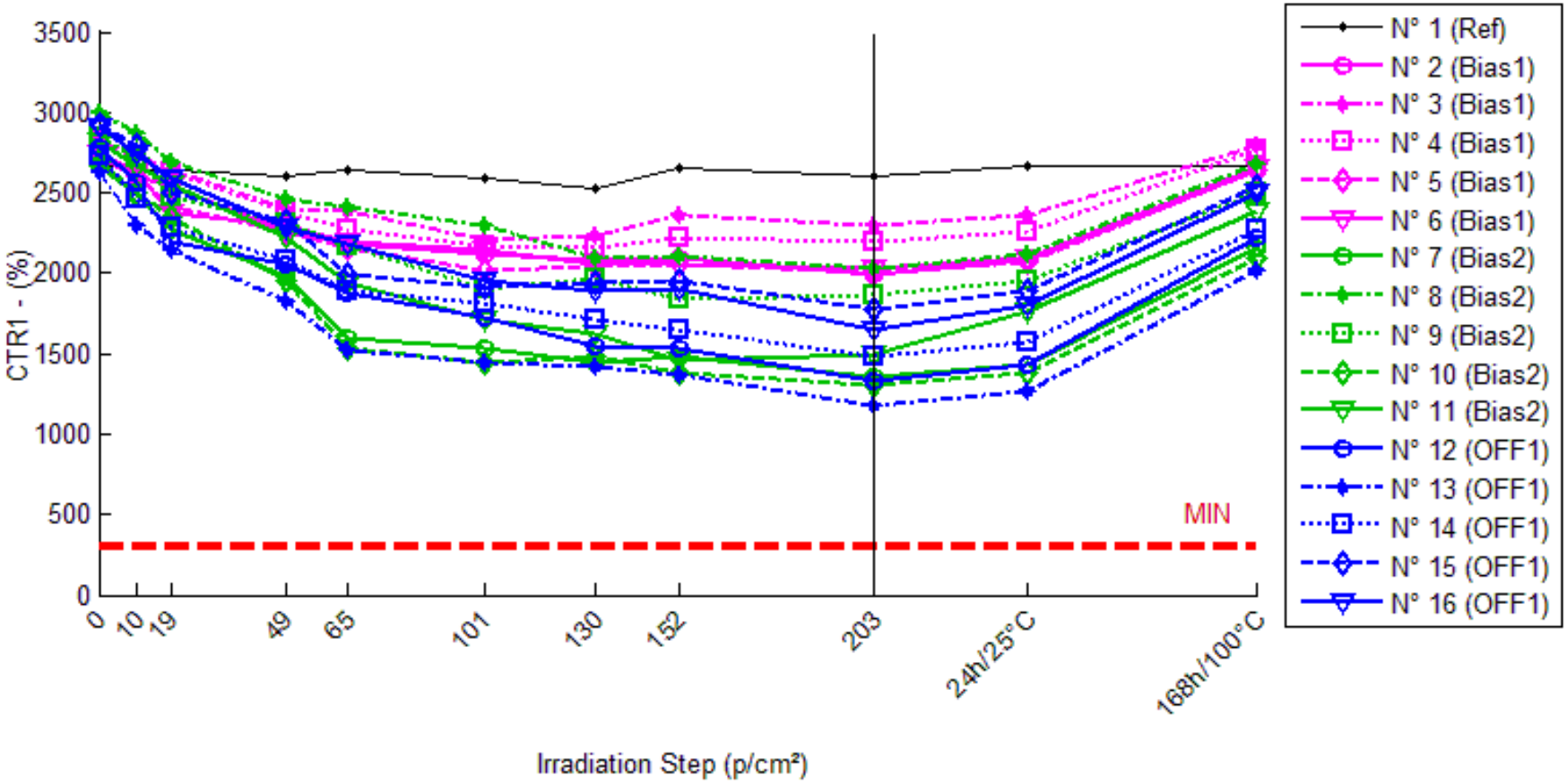
	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	11.2	11.2	10.8	9.2	10.8	11.2	10.8	10.8	11.2	11.2	10.4
N° 2 (Bias1)	12.8	10.4	8.8	6.0	6.0	5.6	4.8	4.4	4.4	4.4	11.6
N° 3 (Bias1)	10.4	8.8	7.4	5.2	5.2	5.2	4.0	4.0	4.0	4.0	10.4
N° 4 (Bias1)	10.0	8.0	6.8	4.8	4.8	4.8	4.0	3.6	3.6	3.8	9.6
N° 5 (Bias1)	9.6	7.6	6.4	4.8	4.8	4.4	3.6	3.6	3.2	3.6	8.8
N° 6 (Bias1)	9.6	8.0	6.8	4.8	4.8	4.4	3.6	3.6	3.6	3.6	9.2
N° 7 (Bias2)	10.4	7.0	5.6	3.2	3.0	2.4	2.0	2.0	1.6	1.6	4.0
N° 8 (Bias2)	12.0	8.0	6.0	3.6	3.2	2.4	2.0	2.0	1.6	2.0	4.4
N° 9 (Bias2)	9.6	6.8	5.2	3.2	2.8	2.0	2.0	2.0	1.6	1.6	3.6
N° 10 (Bias2)	11.2	7.6	5.6	3.2	3.0	2.4	2.0	2.0	2.0	1.6	4.0
N° 11 (Bias2)	9.6	6.8	5.2	3.2	2.8	2.0	2.0	2.0	1.6	1.6	3.6
N° 12 (OFF1)	11.2	7.6	5.6	3.2	2.8	2.2	2.0	1.6	1.6	1.6	4.0
N° 13 (OFF1)	10.4	6.8	5.6	3.2	2.8	2.0	2.0	1.6	1.6	1.6	3.6
N° 14 (OFF1)	10.4	6.8	5.2	3.2	2.8	2.0	2.0	1.6	1.6	1.6	3.6
N° 15 (OFF1)	13.6	9.4	7.2	4.0	3.6	2.8	2.4	2.4	2.0	2.0	4.8
N° 16 (OFF1)	11.6	7.6	6.0	3.2	3.2	2.4	2.0	1.8	1.6	1.6	4.0

Delta [TPLH2]

	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	---	0.000E+0	-4.000E-1	-2.000E+0	-4.000E-1	0.000E+0	-4.000E-1	-4.000E-1	0.000E+0	0.000E+0	-8.000E-1
N° 2 (Bias1)	---	-2.400E+0	-4.000E+0	-6.800E+0	-6.800E+0	-7.200E+0	-8.000E+0	-8.400E+0	-8.400E+0	-8.400E+0	-1.200E+0
N° 3 (Bias1)	---	-1.600E+0	-3.000E+0	-5.200E+0	-5.200E+0	-5.200E+0	-6.400E+0	-6.400E+0	-6.400E+0	-6.400E+0	0.000E+0
N° 4 (Bias1)	---	-2.000E+0	-3.200E+0	-5.200E+0	-5.200E+0	-5.200E+0	-6.000E+0	-6.400E+0	-6.400E+0	-6.200E+0	-4.000E-1
N° 5 (Bias1)	---	-2.000E+0	-3.200E+0	-4.800E+0	-4.800E+0	-5.200E+0	-6.000E+0	-6.000E+0	-6.400E+0	-6.000E+0	-8.000E-1
N° 6 (Bias1)	---	-1.600E+0	-2.800E+0	-4.800E+0	-4.800E+0	-5.200E+0	-6.000E+0	-6.000E+0	-6.000E+0	-6.000E+0	-4.000E-1
N° 7 (Bias2)	---	-3.400E+0	-4.800E+0	-7.200E+0	-7.400E+0	-8.000E+0	-8.400E+0	-8.400E+0	-8.800E+0	-8.800E+0	-6.400E+0
N° 8 (Bias2)	---	-4.000E+0	-6.000E+0	-8.400E+0	-8.800E+0	-9.600E+0	-1.000E+1	-1.000E+1	-1.040E+1	-1.000E+1	-7.600E+0
N° 9 (Bias2)	---	-2.800E+0	-4.400E+0	-6.400E+0	-6.800E+0	-7.600E+0	-7.600E+0	-7.600E+0	-8.000E+0	-8.000E+0	-6.000E+0
N° 10 (Bias2)	---	-3.600E+0	-5.600E+0	-8.000E+0	-8.200E+0	-8.800E+0	-9.200E+0	-9.200E+0	-9.200E+0	-9.600E+0	-7.200E+0
N° 11 (Bias2)	---	-2.800E+0	-4.400E+0	-6.400E+0	-6.800E+0	-7.600E+0	-7.600E+0	-7.600E+0	-8.000E+0	-8.000E+0	-6.000E+0
N° 12 (OFF1)	---	-3.600E+0	-5.600E+0	-8.000E+0	-8.400E+0	-9.000E+0	-9.200E+0	-9.600E+0	-9.600E+0	-9.600E+0	-7.200E+0
N° 13 (OFF1)	---	-3.600E+0	-4.800E+0	-7.200E+0	-7.600E+0	-8.400E+0	-8.400E+0	-8.800E+0	-8.800E+0	-8.800E+0	-6.800E+0
N° 14 (OFF1)	---	-3.600E+0	-5.200E+0	-7.200E+0	-7.600E+0	-8.400E+0	-8.400E+0	-8.800E+0	-8.800E+0	-8.800E+0	-6.800E+0
N° 15 (OFF1)	---	-4.200E+0	-6.400E+0	-9.600E+0	-1.000E+1	-1.080E+1	-1.120E+1	-1.120E+1	-1.160E+1	-1.160E+1	-8.800E+0
N° 16 (OFF1)	---	-4.000E+0	-5.600E+0	-8.400E+0	-8.400E+0	-9.200E+0	-9.600E+0	-9.800E+0	-1.000E+1	-1.000E+1	-7.600E+0
Average (OFF1)	---	-1.920E+0	-3.240E+0	-5.360E+0	-5.360E+0	-5.600E+0	-6.480E+0	-6.640E+0	-6.720E+0	-6.600E+0	-5.600E-1
σ (OFF1)	---	3.347E-1	4.561E-1	8.295E-1	8.295E-1	8.944E-1	8.672E-1	1.004E+0	9.550E-1	1.020E+0	4.561E-1
Average+3σ (OFF1)	---	-9.160E-1	-1.872E+0	-2.872E+0	-2.872E+0	-2.917E+0	-3.878E+0	-3.628E+0	-3.855E+0	-3.541E+0	8.082E-1
Average-3σ (OFF1)	---	-2.924E+0	-4.608E+0	-7.848E+0	-7.848E+0	-8.283E+0	-9.082E+0	-9.652E+0	-9.585E+0	-9.659E+0	-1.928E+0
Average (Bias1)	---	-3.320E+0	-5.040E+0	-7.280E+0	-7.600E+0	-8.320E+0	-8.560E+0	-8.560E+0	-8.880E+0	-8.880E+0	-6.640E+0
σ (Bias1)	---	5.215E-1	7.266E-1	9.121E-1	8.832E-1	8.672E-1	1.043E+0	1.043E+0	9.960E-1	9.121E-1	7.266E-1
Average+3σ (Bias1)	---	-1.755E+0	-2.860E+0	-4.544E+0	-4.950E+0	-5.718E+0	-5.431E+0	-5.431E+0	-5.892E+0	-6.144E+0	-4.460E+0
Average-3σ (Bias1)	---	-4.885E+0	-7.220E+0	-1.002E+1	-1.025E+1	-1.092E+1	-1.169E+1	-1.169E+1	-1.187E+1	-1.162E+1	-8.820E+0
Average (Bias2)	---	-3.800E+0	-5.520E+0	-8.080E+0	-8.400E+0	-9.160E+0	-9.360E+0	-9.640E+0	-9.760E+0	-9.760E+0	-7.440E+0
σ (Bias2)	---	2.828E-1	5.933E-1	9.960E-1	9.798E-1	9.839E-1	1.152E+0	9.839E-1	1.152E+0	1.152E+0	8.295E-1
Average+3σ (Bias2)	---	-2.951E+0	-3.740E+0	-5.092E+0	-5.461E+0	-6.208E+0	-5.903E+0	-6.688E+0	-6.303E+0	-6.303E+0	-4.952E+0
Average-3σ (Bias2)	---	-4.649E+0	-7.300E+0	-1.107E+1	-1.134E+1	-1.211E+1	-1.282E+1	-1.259E+1	-1.322E+1	-1.322E+1	-9.928E+0

12.CTR1

Ta=25°C; If = 1.6 mA; Vo = 0.4 V; Vcc = 4.5 V



s

CTR1 . (%) **Min = 300.0**

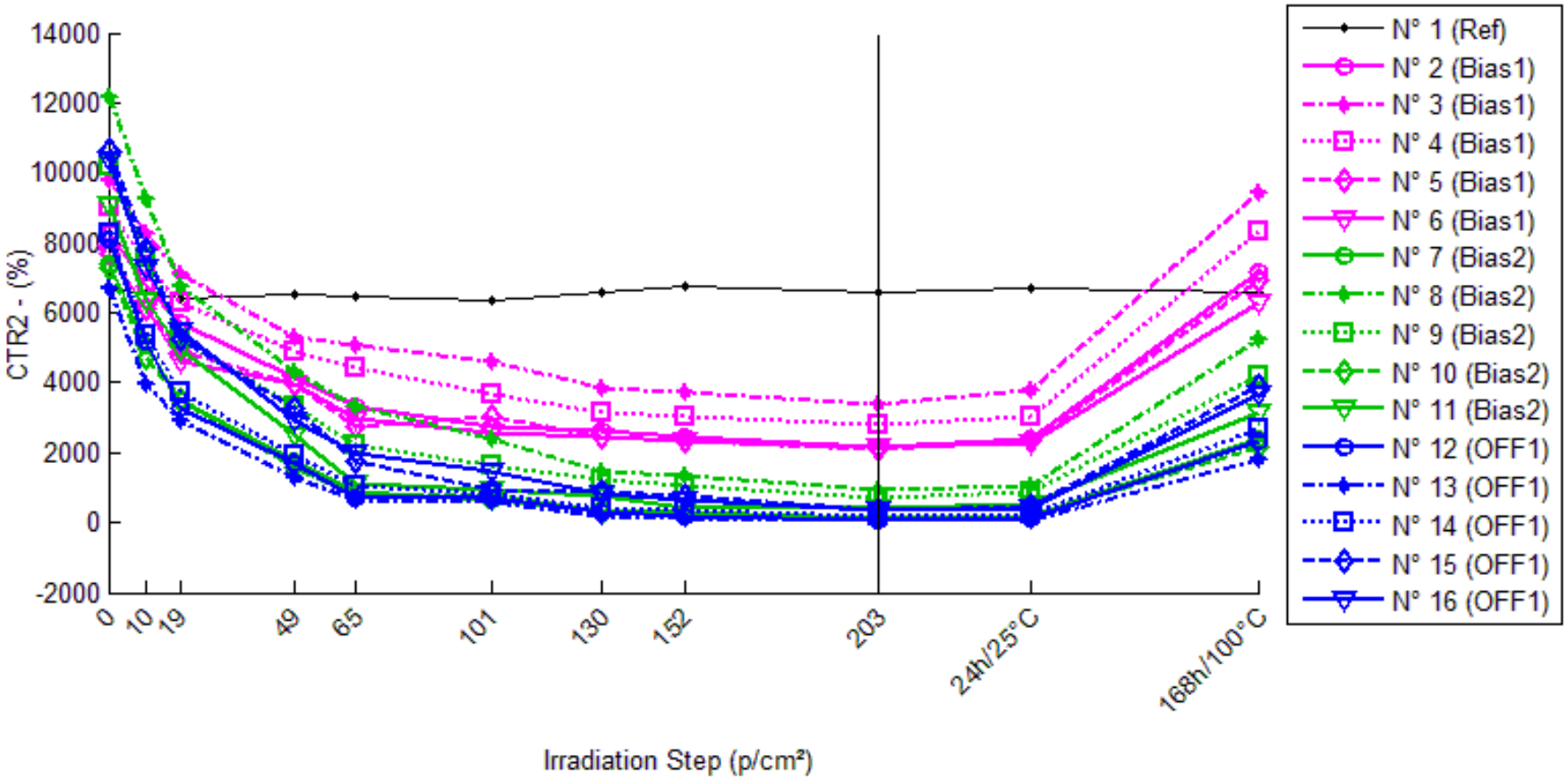
	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	2673.03	2644.66	2640.84	2608.97	2638.15	2584.48	2529.89	2647.65	2596.81	2668.18	2661.36
N° 2 (Bias1)	2727.83	2608.96	2535.43	2256.86	2178.93	2116.70	2085.33	2088.89	1993.56	2078.31	2639.91
N° 3 (Bias1)	2826.83	2736.22	2643.12	2405.01	2384.84	2209.60	2237.62	2359.52	2291.82	2364.78	2792.69
N° 4 (Bias1)	2827.03	2715.47	2633.22	2382.89	2274.27	2171.25	2159.99	2226.35	2197.52	2261.98	2769.52
N° 5 (Bias1)	2719.28	2601.79	2413.08	2265.30	2154.21	2013.54	2045.87	2049.48	2006.11	2066.72	2644.46
N° 6 (Bias1)	2744.94	2624.29	2368.80	2296.59	2195.00	2138.87	2061.23	2057.84	2030.19	2097.52	2658.27
N° 7 (Bias2)	2661.09	2491.08	2267.69	1980.21	1597.48	1528.09	1447.75	1480.38	1357.14	1427.67	2152.02
N° 8 (Bias2)	2994.49	2867.25	2687.16	2461.06	2405.65	2294.82	2094.22	2112.64	2032.25	2117.62	2681.25
N° 9 (Bias2)	2840.10	2712.74	2478.02	2311.26	2170.80	1908.29	1967.15	1837.71	1866.35	1949.57	2499.65
N° 10 (Bias2)	2697.75	2497.21	2346.27	1957.41	1535.84	1448.01	1479.85	1381.34	1305.62	1375.21	2099.85
N° 11 (Bias2)	2817.86	2670.34	2551.68	2220.15	1941.66	1714.88	1626.81	1462.90	1490.24	1759.52	2382.82
N° 12 (OFF1)	2785.01	2564.88	2195.46	2060.50	1883.50	1725.86	1541.24	1532.60	1324.12	1430.60	2214.85
N° 13 (OFF1)	2632.01	2293.94	2146.98	1826.33	1521.15	1448.05	1419.56	1365.21	1181.92	1262.16	2013.50
N° 14 (OFF1)	2729.30	2460.32	2279.79	2077.09	1888.78	1810.30	1705.98	1650.94	1482.49	1570.18	2277.40
N° 15 (OFF1)	2918.62	2787.71	2506.43	2328.56	1996.37	1917.55	1940.72	1947.57	1769.67	1886.77	2532.81
N° 16 (OFF1)	2905.47	2747.72	2586.05	2285.41	2179.03	1959.54	1893.76	1903.54	1652.42	1804.45	2499.13

1/Delta [CTR1]

	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	---	4.013E-6	4.559E-6	9.185E-6	4.945E-6	1.282E-5	2.117E-5	3.585E-6	1.098E-5	6.802E-7	1.639E-6
N° 2 (Bias1)	---	1.670E-5	2.782E-5	7.650E-5	9.235E-5	1.058E-4	1.129E-4	1.121E-4	1.350E-4	1.146E-4	1.221E-5
N° 3 (Bias1)	---	1.171E-5	2.459E-5	6.205E-5	6.556E-5	9.882E-5	9.315E-5	7.006E-5	8.258E-5	6.912E-5	4.325E-6
N° 4 (Bias1)	---	1.453E-5	2.604E-5	6.593E-5	8.597E-5	1.068E-4	1.092E-4	9.544E-5	1.013E-4	8.836E-5	7.346E-6
N° 5 (Bias1)	---	1.661E-5	4.666E-5	7.370E-5	9.646E-5	1.289E-4	1.210E-4	1.202E-4	1.307E-4	1.161E-4	1.040E-5
N° 6 (Bias1)	---	1.675E-5	5.785E-5	7.112E-5	9.127E-5	1.032E-4	1.208E-4	1.216E-4	1.283E-4	1.124E-4	1.188E-5
N° 7 (Bias2)	---	2.565E-5	6.519E-5	1.292E-4	2.502E-4	2.786E-4	3.149E-4	2.997E-4	3.611E-4	3.247E-4	8.889E-5
N° 8 (Bias2)	---	1.482E-5	3.819E-5	7.238E-5	8.174E-5	1.018E-4	1.436E-4	1.394E-4	1.581E-4	1.383E-4	3.901E-5
N° 9 (Bias2)	---	1.653E-5	5.145E-5	8.056E-5	1.086E-4	1.719E-4	1.563E-4	1.921E-4	1.837E-4	1.608E-4	4.796E-5
N° 10 (Bias2)	---	2.977E-5	5.553E-5	1.402E-4	2.804E-4	3.199E-4	3.051E-4	3.533E-4	3.952E-4	3.565E-4	1.055E-4
N° 11 (Bias2)	---	1.960E-5	3.702E-5	9.554E-5	1.601E-4	2.283E-4	2.598E-4	3.287E-4	3.162E-4	2.135E-4	6.479E-5
N° 12 (OFF1)	---	3.082E-5	9.642E-5	1.263E-4	1.719E-4	2.204E-4	2.898E-4	2.934E-4	3.962E-4	3.399E-4	9.243E-5
N° 13 (OFF1)	---	5.599E-5	8.583E-5	1.676E-4	2.775E-4	3.106E-4	3.245E-4	3.525E-4	4.661E-4	4.124E-4	1.167E-4
N° 14 (OFF1)	---	4.006E-5	7.224E-5	1.150E-4	1.630E-4	1.860E-4	2.198E-4	2.393E-4	3.081E-4	2.705E-4	7.270E-5
N° 15 (OFF1)	---	1.609E-5	5.635E-5	8.682E-5	1.583E-4	1.789E-4	1.726E-4	1.708E-4	2.225E-4	1.874E-4	5.219E-5
N° 16 (OFF1)	---	1.976E-5	4.251E-5	9.338E-5	1.147E-4	1.661E-4	1.839E-4	1.812E-4	2.610E-4	2.100E-4	5.596E-5
Average (OFF1)	---	1.526E-5	3.659E-5	6.986E-5	8.632E-5	1.087E-4	1.114E-4	1.039E-4	1.156E-4	1.001E-4	9.232E-6
σ (OFF1)	---	2.191E-6	1.488E-5	5.851E-6	1.219E-5	1.169E-5	1.143E-5	2.159E-5	2.270E-5	2.071E-5	3.349E-6
Average+3σ (OFF1)	---	2.183E-5	8.123E-5	8.741E-5	1.229E-4	1.438E-4	1.457E-4	1.687E-4	1.837E-4	1.623E-4	1.928E-5
Average-3σ (OFF1)	---	8.687E-6	-8.051E-6	5.231E-5	4.974E-5	7.364E-5	7.716E-5	3.913E-5	4.750E-5	3.799E-5	-8.157E-7
Average (Bias1)	---	2.127E-5	4.948E-5	1.036E-4	1.762E-4	2.201E-4	2.359E-4	2.626E-4	2.829E-4	2.387E-4	6.924E-5
σ (Bias1)	---	6.289E-6	1.194E-5	2.986E-5	8.674E-5	8.627E-5	8.135E-5	9.236E-5	1.064E-4	9.752E-5	2.780E-5
Average+3σ (Bias1)	---	4.014E-5	8.529E-5	1.931E-4	4.364E-4	4.789E-4	4.800E-4	5.397E-4	6.019E-4	5.313E-4	1.526E-4
Average-3σ (Bias1)	---	2.407E-6	1.367E-5	1.401E-5	-8.401E-5	-3.869E-5	-8.139E-6	-1.445E-5	-3.621E-5	-5.383E-5	-1.415E-5
Average (Bias2)	---	3.254E-5	7.067E-5	1.178E-4	1.771E-4	2.124E-4	2.381E-4	2.475E-4	3.308E-4	2.840E-4	7.800E-5
σ (Bias2)	---	1.615E-5	2.176E-5	3.208E-5	6.029E-5	5.847E-5	6.651E-5	7.663E-5	9.964E-5	9.300E-5	2.686E-5
Average+3σ (Bias2)	---	8.100E-5	1.359E-4	2.141E-4	3.579E-4	3.878E-4	4.377E-4	4.774E-4	6.297E-4	5.630E-4	1.586E-4
Average-3σ (Bias2)	---	-1.591E-5	5.399E-6	2.159E-5	-3.793E-6	3.699E-5	3.858E-5	1.756E-5	3.185E-5	5.024E-6	-2.593E-6

13.CTR2

Ta=25°C; If = 0.16 mA; Vo = 0.4 V; Vcc = 5 V



CTR2 . (%)

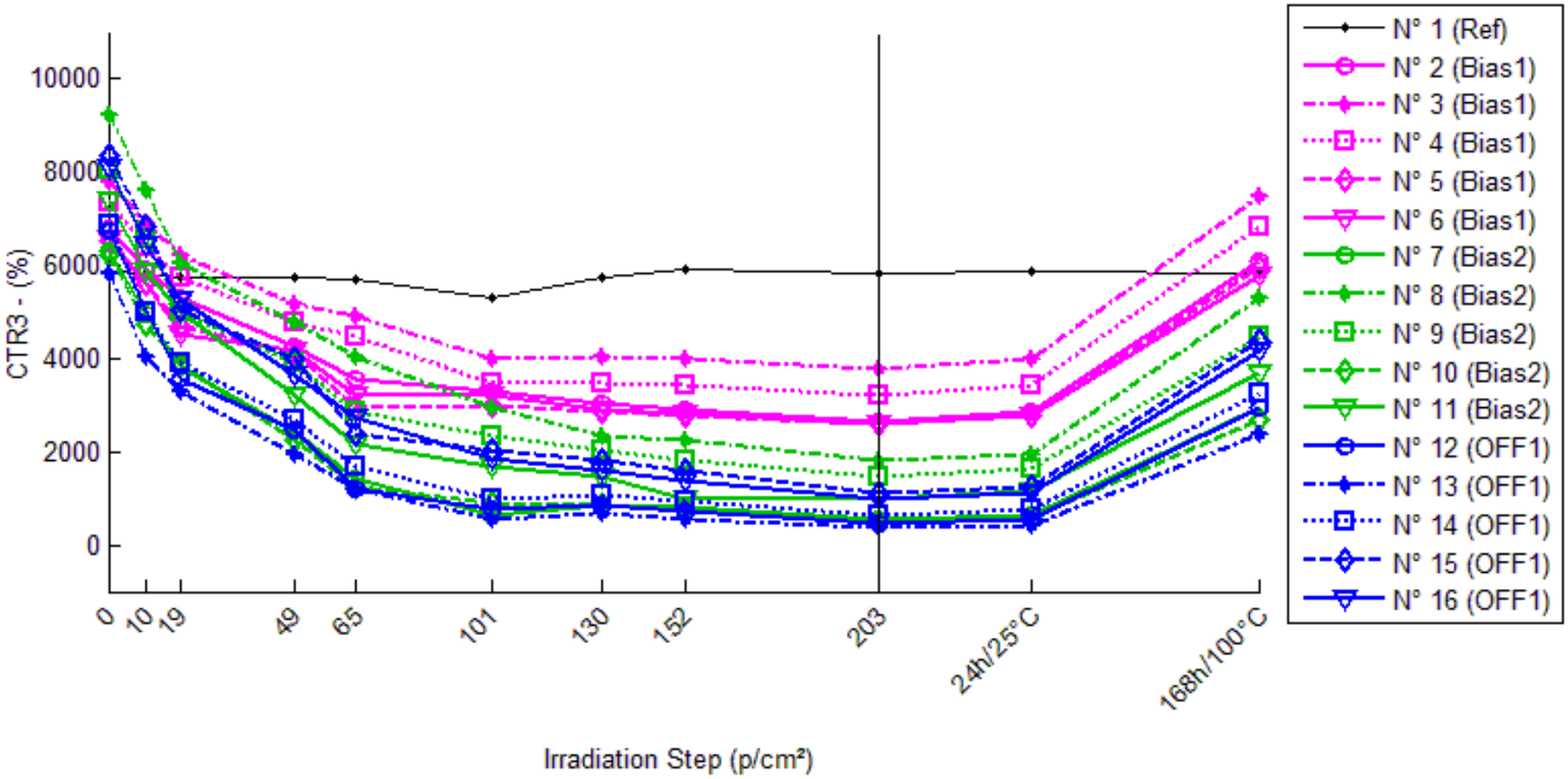
	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	6650.05	6584.46	6430.46	6537.80	6462.17	6366.83	6564.04	6752.37	6576.15	6677.71	6591.80
N° 2 (Bias1)	8273.42	6752.68	5694.40	4158.80	3337.51	2743.66	2621.15	2457.82	2142.75	2401.62	7141.71
N° 3 (Bias1)	9803.91	8246.55	7122.25	5291.96	5050.58	4611.10	3833.88	3734.20	3396.13	3760.87	9425.07
N° 4 (Bias1)	9051.01	7339.19	6311.46	4876.24	4414.95	3683.08	3137.82	3013.60	2800.70	3057.09	8329.43
N° 5 (Bias1)	7673.20	6121.11	4870.12	3947.44	2736.83	3053.45	2446.60	2322.53	2124.88	2320.70	6925.28
N° 6 (Bias1)	7713.51	6089.98	4632.46	3989.96	2958.31	2548.86	2458.91	2336.58	2142.25	2304.78	6289.49
N° 7 (Bias2)	7419.22	5095.27	3526.51	1752.15	903.51	676.07	344.37	282.74	142.78	195.21	2421.55
N° 8 (Bias2)	12188.82	9229.34	6768.53	4336.08	3328.62	2381.27	1483.34	1349.46	934.80	1076.68	5239.45
N° 9 (Bias2)	10211.36	7560.14	5215.74	3323.49	2222.99	1634.86	1222.74	1046.94	730.18	894.28	4218.32
N° 10 (Bias2)	7307.51	4731.10	3493.56	1564.38	755.24	798.96	318.06	220.13	119.87	171.85	2157.02
N° 11 (Bias2)	9067.23	6367.02	4936.02	2489.78	1096.66	943.08	736.87	435.62	402.29	524.57	3157.98
N° 12 (OFF1)	8083.69	5194.74	3254.03	1711.42	713.25	696.96	288.93	205.95	83.53	123.06	2355.60
N° 13 (OFF1)	6695.87	3949.02	2917.80	1264.40	663.43	585.46	183.19	126.19	42.16	63.64	1785.84
N° 14 (OFF1)	8274.85	5345.30	3710.90	1927.81	1052.59	834.73	438.85	327.40	156.75	221.88	2682.59
N° 15 (OFF1)	10673.23	7787.93	5248.27	3274.50	1774.67	928.48	902.77	743.77	380.45	465.34	3918.05
N° 16 (OFF1)	10351.84	7279.74	5456.13	2935.24	1958.99	1483.60	802.35	618.92	349.25	421.28	3670.47

1/Delta [CTR2]

	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	---	1.498E-6	5.135E-6	2.582E-6	4.372E-6	6.689E-6	1.970E-6	-2.279E-6	1.690E-6	-6.228E-7	1.329E-6
N° 2 (Bias1)	---	2.722E-5	5.474E-5	1.196E-4	1.788E-4	2.436E-4	2.606E-4	2.860E-4	3.458E-4	2.955E-4	1.915E-5
N° 3 (Bias1)	---	1.926E-5	3.840E-5	8.697E-5	9.600E-5	1.149E-4	1.588E-4	1.658E-4	1.925E-4	1.639E-4	4.100E-6
N° 4 (Bias1)	---	2.577E-5	4.796E-5	9.459E-5	1.160E-4	1.610E-4	2.082E-4	2.213E-4	2.466E-4	2.166E-4	9.571E-6
N° 5 (Bias1)	---	3.305E-5	7.501E-5	1.230E-4	2.351E-4	1.972E-4	2.784E-4	3.002E-4	3.403E-4	3.006E-4	1.407E-5
N° 6 (Bias1)	---	3.456E-5	8.623E-5	1.210E-4	2.084E-4	2.627E-4	2.770E-4	2.983E-4	3.372E-4	3.042E-4	2.935E-5
N° 7 (Bias2)	---	6.148E-5	1.488E-4	4.359E-4	9.720E-4	1.344E-3	2.769E-3	3.402E-3	6.869E-3	4.988E-3	2.782E-4
N° 8 (Bias2)	---	2.631E-5	6.570E-5	1.486E-4	2.184E-4	3.379E-4	5.921E-4	6.590E-4	9.877E-4	8.467E-4	1.088E-4
N° 9 (Bias2)	---	3.434E-5	9.380E-5	2.030E-4	3.519E-4	5.137E-4	7.199E-4	8.572E-4	1.272E-3	1.020E-3	1.391E-4
N° 10 (Bias2)	---	7.452E-5	1.494E-4	5.024E-4	1.187E-3	1.115E-3	3.007E-3	4.406E-3	8.205E-3	5.682E-3	3.268E-4
N° 11 (Bias2)	---	4.677E-5	9.231E-5	2.914E-4	8.016E-4	9.501E-4	1.247E-3	2.185E-3	2.375E-3	1.796E-3	2.064E-4
N° 12 (OFF1)	---	6.880E-5	1.836E-4	4.606E-4	1.278E-3	1.311E-3	3.337E-3	4.732E-3	1.185E-2	8.003E-3	3.008E-4
N° 13 (OFF1)	---	1.039E-4	1.934E-4	6.415E-4	1.358E-3	1.559E-3	5.309E-3	7.775E-3	2.357E-2	1.556E-2	4.106E-4
N° 14 (OFF1)	---	6.623E-5	1.486E-4	3.979E-4	8.292E-4	1.077E-3	2.158E-3	2.934E-3	6.259E-3	4.386E-3	2.519E-4
N° 15 (OFF1)	---	3.471E-5	9.685E-5	2.117E-4	4.698E-4	9.833E-4	1.014E-3	1.251E-3	2.535E-3	2.055E-3	1.615E-4
N° 16 (OFF1)	---	4.077E-5	8.668E-5	2.441E-4	4.139E-4	5.774E-4	1.150E-3	1.519E-3	2.767E-3	2.277E-3	1.758E-4
Average (OFF1)	---	2.797E-5	6.047E-5	1.090E-4	1.668E-4	1.959E-4	2.366E-4	2.543E-4	2.925E-4	2.562E-4	1.525E-5
σ (OFF1)	---	6.132E-6	1.969E-5	1.692E-5	5.942E-5	6.025E-5	5.200E-5	5.910E-5	6.936E-5	6.307E-5	9.645E-6
Average+3σ (OFF1)	---	4.637E-5	1.195E-4	1.598E-4	3.451E-4	3.766E-4	3.926E-4	4.317E-4	5.005E-4	4.454E-4	4.418E-5
Average-3σ (OFF1)	---	9.575E-6	1.394E-6	5.827E-5	-1.142E-5	1.512E-5	8.063E-5	7.703E-5	8.439E-5	6.697E-5	-1.368E-5
Average (Bias1)	---	4.868E-5	1.100E-4	3.162E-4	7.062E-4	8.522E-4	1.667E-3	2.302E-3	3.942E-3	2.867E-3	2.118E-4
σ (Bias1)	---	1.963E-5	3.740E-5	1.504E-4	4.107E-4	4.183E-4	1.145E-3	1.615E-3	3.356E-3	2.295E-3	9.156E-5
Average+3σ (Bias1)	---	1.076E-4	2.222E-4	7.676E-4	1.938E-3	2.107E-3	5.101E-3	7.148E-3	1.401E-2	9.751E-3	4.865E-4
Average-3σ (Bias1)	---	-1.020E-5	-2.195E-6	-1.351E-4	-5.258E-4	-4.026E-4	-1.767E-3	-2.544E-3	-6.127E-3	-4.017E-3	-6.284E-5
Average (Bias2)	---	6.288E-5	1.418E-4	3.912E-4	8.698E-4	1.102E-3	2.594E-3	3.642E-3	9.395E-3	6.457E-3	2.601E-4
σ (Bias2)	---	2.743E-5	4.877E-5	1.742E-4	4.401E-4	3.682E-4	1.782E-3	2.693E-3	8.771E-3	5.623E-3	1.015E-4
Average+3σ (Bias2)	---	1.452E-4	2.881E-4	9.138E-4	2.190E-3	2.206E-3	7.939E-3	1.172E-2	3.571E-2	2.332E-2	5.646E-4
Average-3σ (Bias2)	---	-1.942E-5	-4.480E-6	-1.315E-4	-4.505E-4	-2.946E-6	-2.752E-3	-4.435E-3	-1.692E-2	-1.041E-2	-4.429E-5

14. CTR3

Ta=25°C; If = 0.32 mA; Vo = 0.4 V; Vcc = 5 V



CTR3 . (%)

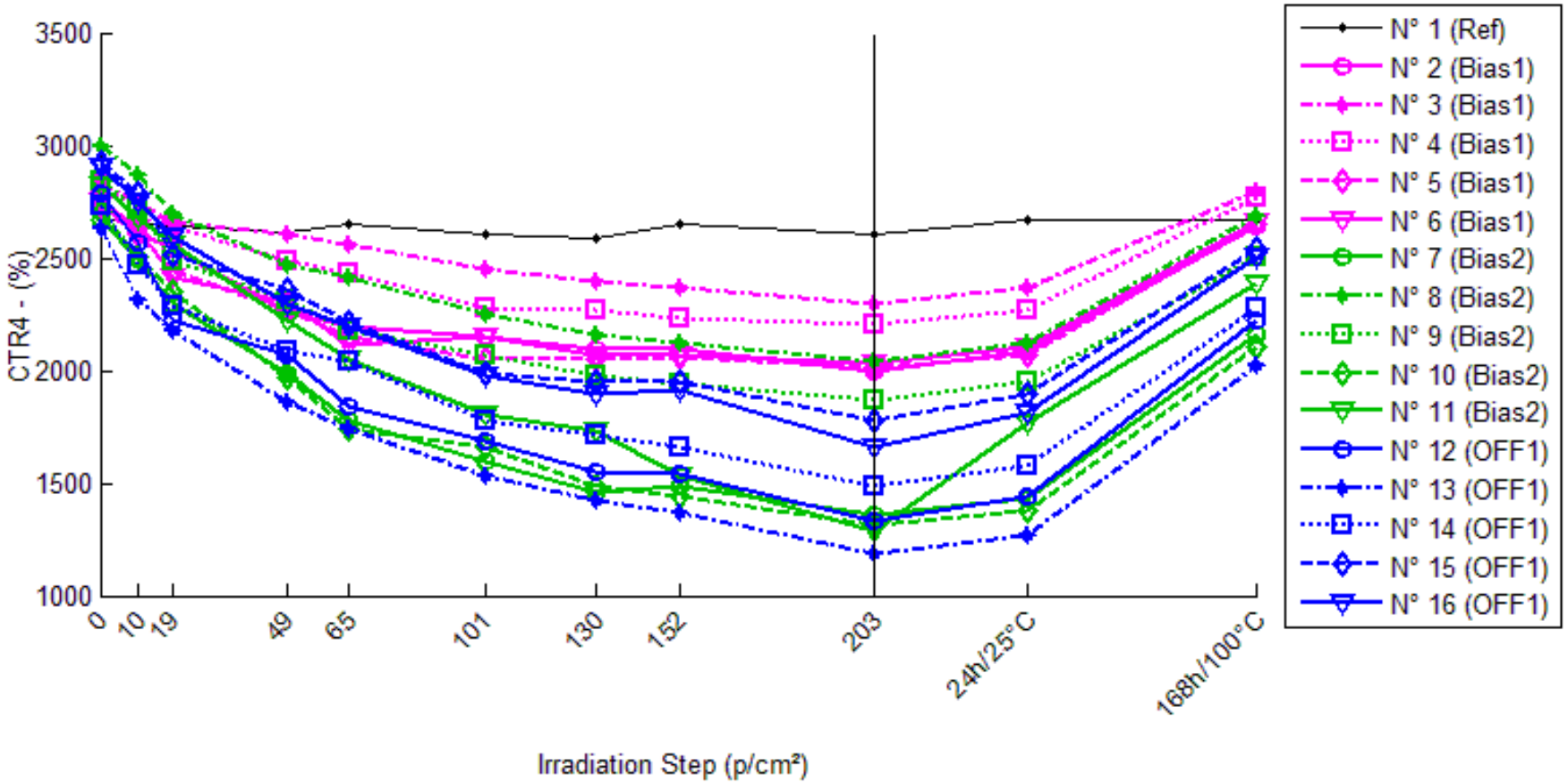
	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	5866.89	5811.91	5749.67	5730.25	5706.34	5314.51	5748.51	5894.76	5812.10	5894.17	5808.62
N° 2 (Bias1)	6796.64	5926.64	5312.52	4267.10	3556.18	3294.25	3029.77	2913.07	2637.87	2857.75	6083.79
N° 3 (Bias1)	7782.47	6914.73	6207.00	5153.62	4891.17	3993.33	4035.72	3997.03	3757.09	4012.17	7467.12
N° 4 (Bias1)	7363.24	6384.95	5752.05	4795.26	4496.66	3483.91	3479.08	3408.01	3220.39	3435.34	6848.88
N° 5 (Bias1)	6511.23	5604.29	4698.69	4117.52	2930.81	2971.42	2853.83	2766.57	2582.11	2755.21	5978.68
N° 6 (Bias1)	6566.01	5623.82	4531.43	4180.49	3189.14	3208.95	2898.21	2798.23	2616.24	2781.30	5764.63
N° 7 (Bias2)	6297.75	4959.25	3833.73	2436.10	1425.27	636.08	850.71	792.49	557.19	653.09	2946.10
N° 8 (Bias2)	9218.68	7632.43	6065.42	4768.52	4034.47	2930.60	2338.49	2246.46	1794.58	1959.38	5286.32
N° 9 (Bias2)	8037.68	6585.89	4989.33	3920.12	2872.04	2317.54	2026.09	1828.46	1462.40	1643.35	4473.01
N° 10 (Bias2)	6240.58	4734.67	3870.98	2234.53	1252.72	899.74	841.87	721.21	505.53	600.77	2687.42
N° 11 (Bias2)	7383.54	5873.98	4979.56	3220.37	2161.81	1688.81	1448.57	970.21	1006.80	1162.07	3670.42
N° 12 (OFF1)	6749.44	5058.79	3539.05	2450.64	1192.78	747.72	858.84	725.76	472.78	563.89	2954.82
N° 13 (OFF1)	5845.96	4051.77	3310.06	1923.72	1190.87	565.48	662.89	557.09	352.83	414.08	2376.48
N° 14 (OFF1)	6859.62	5017.13	3923.65	2683.39	1678.11	978.93	1092.20	933.59	635.37	758.56	3275.23
N° 15 (OFF1)	8339.03	6816.22	5040.89	3980.97	2395.19	2012.77	1795.56	1596.92	1097.19	1228.60	4392.85
N° 16 (OFF1)	8116.26	6441.49	5282.42	3629.68	2722.62	1871.61	1606.37	1384.74	992.40	1104.16	4157.86

1/Delta [CTR3]

	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	---	1.613E-6	3.475E-6	4.064E-6	4.796E-6	1.772E-5	3.510E-6	-8.058E-7	1.607E-6	-7.888E-7	1.710E-6
N° 2 (Bias1)	---	2.160E-5	4.110E-5	8.722E-5	1.341E-4	1.564E-4	1.829E-4	1.961E-4	2.320E-4	2.028E-4	1.724E-5
N° 3 (Bias1)	---	1.612E-5	3.261E-5	6.554E-5	7.596E-5	1.219E-4	1.193E-4	1.217E-4	1.377E-4	1.207E-4	5.427E-6
N° 4 (Bias1)	---	2.081E-5	3.804E-5	7.273E-5	8.658E-5	1.512E-4	1.516E-4	1.576E-4	1.747E-4	1.553E-4	1.020E-5
N° 5 (Bias1)	---	2.485E-5	5.924E-5	8.928E-5	1.876E-4	1.830E-4	1.968E-4	2.079E-4	2.337E-4	2.094E-4	1.368E-5
N° 6 (Bias1)	---	2.552E-5	6.838E-5	8.691E-5	1.613E-4	1.593E-4	1.927E-4	2.051E-4	2.299E-4	2.072E-4	2.117E-5
N° 7 (Bias2)	---	4.286E-5	1.021E-4	2.517E-4	5.428E-4	1.413E-3	1.017E-3	1.103E-3	1.636E-3	1.372E-3	1.806E-4
N° 8 (Bias2)	---	2.254E-5	5.639E-5	1.012E-4	1.394E-4	2.328E-4	3.192E-4	3.367E-4	4.488E-4	4.019E-4	8.069E-5
N° 9 (Bias2)	---	2.743E-5	7.601E-5	1.307E-4	2.238E-4	3.071E-4	3.691E-4	4.225E-4	5.594E-4	4.841E-4	9.915E-5
N° 10 (Bias2)	---	5.097E-5	9.809E-5	2.873E-4	6.380E-4	9.512E-4	1.028E-3	1.226E-3	1.818E-3	1.504E-3	2.119E-4
N° 11 (Bias2)	---	3.481E-5	6.538E-5	1.751E-4	3.271E-4	4.567E-4	5.549E-4	8.953E-4	8.578E-4	7.251E-4	1.370E-4
N° 12 (OFF1)	---	4.952E-5	1.344E-4	2.599E-4	6.902E-4	1.189E-3	1.016E-3	1.230E-3	1.967E-3	1.625E-3	1.903E-4
N° 13 (OFF1)	---	7.575E-5	1.311E-4	3.488E-4	6.687E-4	1.597E-3	1.337E-3	1.624E-3	2.663E-3	2.244E-3	2.497E-4
N° 14 (OFF1)	---	5.354E-5	1.091E-4	2.269E-4	4.501E-4	8.757E-4	7.698E-4	9.253E-4	1.428E-3	1.173E-3	1.595E-4
N° 15 (OFF1)	---	2.679E-5	7.846E-5	1.313E-4	2.976E-4	3.769E-4	4.370E-4	5.063E-4	7.915E-4	6.940E-4	1.077E-4
N° 16 (OFF1)	---	3.203E-5	6.610E-5	1.523E-4	2.441E-4	4.111E-4	4.993E-4	5.989E-4	8.844E-4	7.825E-4	1.173E-4
Average (OFF1)	---	2.178E-5	4.788E-5	8.034E-5	1.291E-4	1.544E-4	1.687E-4	1.777E-4	2.016E-4	1.791E-4	1.354E-5
σ (OFF1)	---	3.754E-6	1.521E-5	1.057E-5	4.774E-5	2.184E-5	3.280E-5	3.722E-5	4.349E-5	3.950E-5	6.102E-6
Average+3σ (OFF1)	---	3.304E-5	9.350E-5	1.121E-4	2.723E-4	2.199E-4	2.671E-4	2.893E-4	3.321E-4	2.976E-4	3.185E-5
Average-3σ (OFF1)	---	1.052E-5	2.250E-6	4.861E-5	-1.412E-5	8.884E-5	7.027E-5	6.603E-5	7.113E-5	6.058E-5	-4.763E-6
Average (Bias1)	---	3.572E-5	7.959E-5	1.892E-4	3.742E-4	6.722E-4	6.575E-4	7.968E-4	1.064E-3	8.976E-4	1.419E-4
σ (Bias1)	---	1.147E-5	2.000E-5	7.888E-5	2.110E-4	5.000E-4	3.443E-4	3.999E-4	6.267E-4	5.099E-4	5.476E-5
Average+3σ (Bias1)	---	7.014E-5	1.396E-4	4.258E-4	1.007E-3	2.172E-3	1.690E-3	1.997E-3	2.944E-3	2.427E-3	3.061E-4
Average-3σ (Bias1)	---	1.298E-6	1.959E-5	-4.744E-5	-2.587E-4	-8.278E-4	-3.754E-4	-4.031E-4	-8.162E-4	-6.321E-4	-2.240E-5
Average (Bias2)	---	4.752E-5	1.038E-4	2.238E-4	4.701E-4	8.901E-4	8.120E-4	9.769E-4	1.547E-3	1.304E-3	1.649E-4
σ (Bias2)	---	1.941E-5	3.070E-5	8.747E-5	2.056E-4	5.203E-4	3.735E-4	4.609E-4	7.820E-4	6.419E-4	5.789E-5
Average+3σ (Bias2)	---	1.057E-4	1.959E-4	4.862E-4	1.087E-3	2.451E-3	1.932E-3	2.359E-3	3.893E-3	3.229E-3	3.386E-4
Average-3σ (Bias2)	---	-1.070E-5	1.171E-5	-3.858E-5	-1.467E-4	-6.707E-4	-3.085E-4	-4.057E-4	-7.991E-4	-6.220E-4	-8.748E-6

15. CTR4

Ta=25°C; If = 1.6 mA; Vo = 0.4 V; Vcc = 5 V



CTR4 . (%)

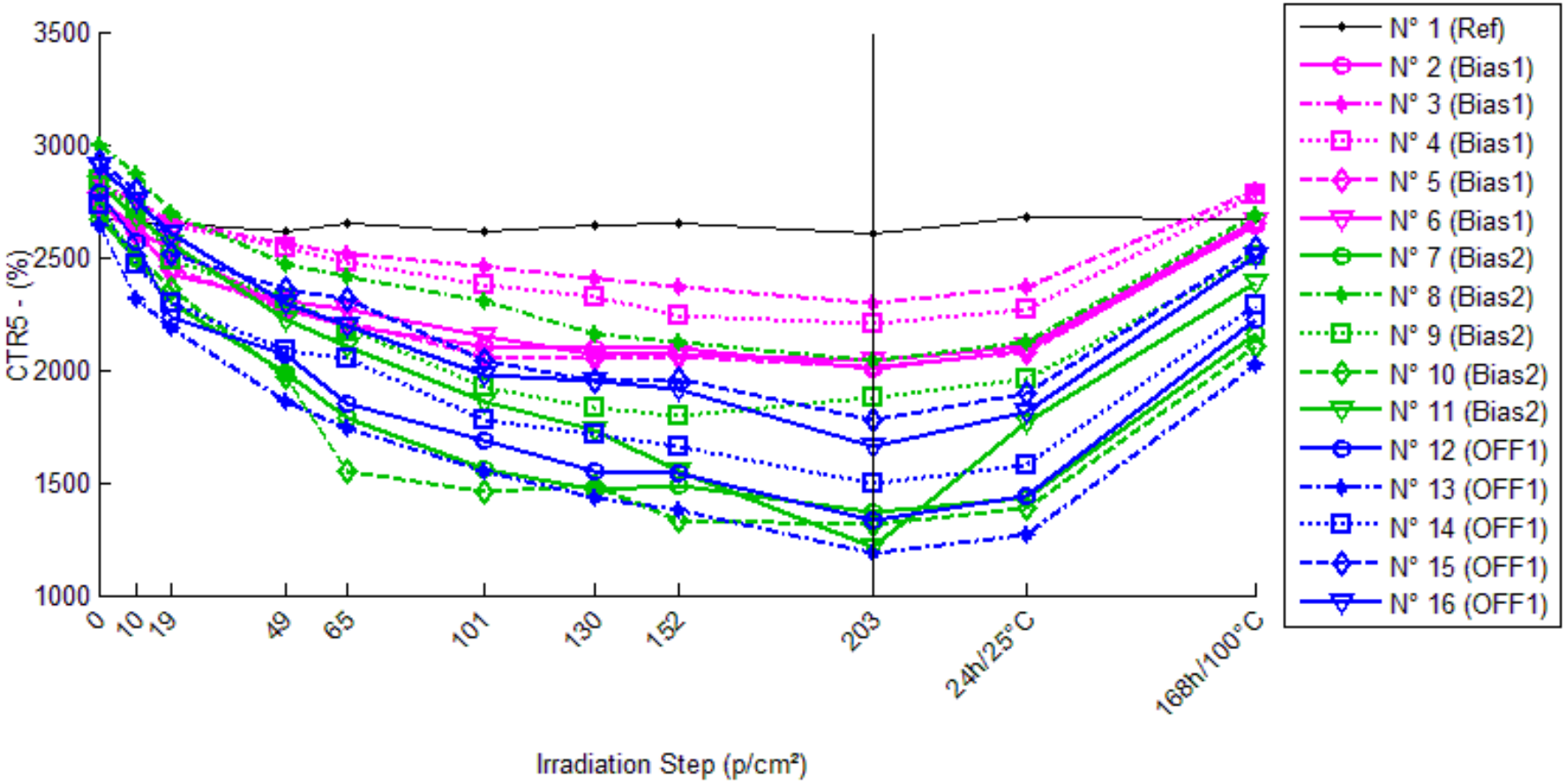
	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	2676.92	2649.16	2644.66	2611.91	2645.70	2608.24	2586.56	2652.15	2600.40	2672.33	2666.01
N° 2 (Bias1)	2730.94	2612.77	2539.88	2262.24	2195.55	2151.55	2091.19	2095.09	1998.65	2083.61	2643.57
N° 3 (Bias1)	2829.08	2738.48	2655.24	2607.65	2556.87	2453.22	2397.86	2364.67	2296.32	2369.37	2795.11
N° 4 (Bias1)	2829.56	2718.38	2637.60	2486.35	2429.27	2279.03	2271.98	2235.51	2202.46	2267.38	2772.41
N° 5 (Bias1)	2722.29	2605.16	2440.48	2268.75	2149.41	2054.13	2051.47	2055.01	2011.41	2071.78	2647.63
N° 6 (Bias1)	2748.01	2627.95	2414.36	2301.48	2110.46	2151.37	2066.67	2064.46	2035.56	2102.67	2661.68
N° 7 (Bias2)	2664.22	2495.49	2291.13	1986.49	1775.86	1596.42	1460.58	1486.82	1363.54	1432.52	2156.33
N° 8 (Bias2)	2996.35	2870.09	2693.55	2464.91	2410.80	2249.49	2158.49	2121.03	2038.59	2122.31	2685.05
N° 9 (Bias2)	2841.99	2715.54	2486.24	2315.52	2180.99	2066.98	1976.08	1939.26	1871.32	1954.48	2503.42
N° 10 (Bias2)	2701.26	2501.73	2353.26	1964.20	1743.97	1655.95	1486.08	1444.21	1312.67	1380.55	2104.35
N° 11 (Bias2)	2820.33	2674.27	2558.46	2224.80	2049.39	1807.86	1732.27	1535.63	1282.77	1763.86	2387.21
N° 12 (OFF1)	2788.33	2569.91	2224.02	2068.48	1841.73	1687.57	1548.20	1540.54	1331.30	1436.41	2219.36
N° 13 (OFF1)	2635.94	2311.18	2178.42	1858.58	1737.83	1531.41	1426.17	1372.21	1188.66	1267.43	2018.24
N° 14 (OFF1)	2731.74	2469.26	2288.85	2088.43	2044.00	1773.43	1712.68	1657.48	1489.75	1575.19	2281.39
N° 15 (OFF1)	2921.10	2790.64	2513.24	2356.27	2211.82	1987.27	1946.38	1953.51	1777.20	1893.17	2537.68
N° 16 (OFF1)	2907.76	2751.62	2598.85	2292.80	2192.55	1976.48	1899.47	1910.64	1658.00	1809.91	2503.81

1/Delta [CTR4]

	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	---	3.913E-6	4.557E-6	9.298E-6	4.407E-6	9.836E-6	1.305E-5	3.489E-6	1.099E-5	6.407E-7	1.529E-6
N° 2 (Bias1)	---	1.656E-5	2.754E-5	7.587E-5	8.929E-5	9.861E-5	1.120E-4	1.111E-4	1.342E-4	1.138E-4	1.210E-5
N° 3 (Bias1)	---	1.169E-5	2.314E-5	3.002E-5	3.763E-5	5.416E-5	6.357E-5	6.942E-5	8.201E-5	6.858E-5	4.297E-6
N° 4 (Bias1)	---	1.446E-5	2.572E-5	4.878E-5	5.823E-5	8.537E-5	8.673E-5	9.391E-5	1.006E-4	8.763E-5	7.285E-6
N° 5 (Bias1)	---	1.652E-5	4.242E-5	7.343E-5	9.791E-5	1.195E-4	1.201E-4	1.193E-4	1.298E-4	1.153E-4	1.036E-5
N° 6 (Bias1)	---	1.662E-5	5.029E-5	7.060E-5	1.099E-4	1.009E-4	1.200E-4	1.205E-4	1.274E-4	1.117E-4	1.180E-5
N° 7 (Bias2)	---	2.538E-5	6.112E-5	1.281E-4	1.878E-4	2.511E-4	3.093E-4	2.972E-4	3.580E-4	3.227E-4	8.841E-5
N° 8 (Bias2)	---	1.468E-5	3.752E-5	7.196E-5	8.106E-5	1.108E-4	1.295E-4	1.377E-4	1.568E-4	1.374E-4	3.869E-5
N° 9 (Bias2)	---	1.639E-5	5.035E-5	8.000E-5	1.066E-4	1.319E-4	1.542E-4	1.638E-4	1.825E-4	1.598E-4	4.759E-5
N° 10 (Bias2)	---	2.953E-5	5.475E-5	1.389E-4	2.032E-4	2.337E-4	3.027E-4	3.222E-4	3.916E-4	3.542E-4	1.050E-4
N° 11 (Bias2)	---	1.937E-5	3.629E-5	9.491E-5	1.334E-4	1.986E-4	2.227E-4	2.966E-4	4.250E-4	2.124E-4	6.433E-5
N° 12 (OFF1)	---	3.048E-5	9.100E-5	1.248E-4	1.843E-4	2.339E-4	2.873E-4	2.905E-4	3.925E-4	3.375E-4	9.194E-5
N° 13 (OFF1)	---	5.331E-5	7.968E-5	1.587E-4	1.961E-4	2.736E-4	3.218E-4	3.494E-4	4.619E-4	4.096E-4	1.161E-4
N° 14 (OFF1)	---	3.891E-5	7.083E-5	1.128E-4	1.232E-4	1.978E-4	2.178E-4	2.373E-4	3.052E-4	2.688E-4	7.226E-5
N° 15 (OFF1)	---	1.600E-5	5.556E-5	8.206E-5	1.098E-4	1.609E-4	1.714E-4	1.696E-4	2.203E-4	1.859E-4	5.172E-5
N° 16 (OFF1)	---	1.951E-5	4.088E-5	9.224E-5	1.122E-4	1.620E-4	1.826E-4	1.795E-4	2.592E-4	2.086E-4	5.548E-5
Average (OFF1)	---	1.517E-5	3.382E-5	5.974E-5	7.860E-5	9.171E-5	1.005E-4	1.028E-4	1.148E-4	9.940E-5	9.169E-6
σ (OFF1)	---	2.148E-6	1.188E-5	1.981E-5	2.984E-5	2.426E-5	2.475E-5	2.149E-5	2.255E-5	2.061E-5	3.326E-6
Average+3σ (OFF1)	---	2.161E-5	6.945E-5	1.192E-4	1.681E-4	1.645E-4	1.747E-4	1.673E-4	1.825E-4	1.612E-4	1.915E-5
Average-3σ (OFF1)	---	8.726E-6	-1.803E-6	3.220E-7	-1.092E-5	1.893E-5	2.623E-5	3.838E-5	4.713E-5	3.756E-5	-8.085E-7
Average (Bias1)	---	2.107E-5	4.800E-5	1.028E-4	1.424E-4	1.852E-4	2.237E-4	2.435E-4	3.028E-4	2.373E-4	6.881E-5
σ (Bias1)	---	6.239E-6	1.084E-5	2.948E-5	5.215E-5	6.172E-5	8.257E-5	8.580E-5	1.242E-4	9.690E-5	2.771E-5
Average+3σ (Bias1)	---	3.979E-5	8.053E-5	1.912E-4	2.989E-4	3.704E-4	4.714E-4	5.009E-4	6.752E-4	5.280E-4	1.519E-4
Average-3σ (Bias1)	---	2.349E-6	1.548E-5	1.434E-5	-1.403E-5	4.185E-8	-2.401E-5	-1.388E-5	-6.967E-5	-5.339E-5	-1.433E-5
Average (Bias2)	---	3.164E-5	6.759E-5	1.141E-4	1.451E-4	2.057E-4	2.362E-4	2.452E-4	3.278E-4	2.821E-4	7.750E-5
σ (Bias2)	---	1.513E-5	1.977E-5	3.003E-5	4.168E-5	4.845E-5	6.585E-5	7.584E-5	9.866E-5	9.243E-5	2.681E-5
Average+3σ (Bias2)	---	7.702E-5	1.269E-4	2.042E-4	2.701E-4	3.510E-4	4.337E-4	4.728E-4	6.238E-4	5.594E-4	1.579E-4
Average-3σ (Bias2)	---	-1.374E-5	8.287E-6	2.402E-5	2.007E-5	6.031E-5	3.862E-5	1.771E-5	3.186E-5	4.787E-6	-2.934E-6

16. CTR5

Ta=25°C; If = 16 mA; Vo = 0.4 V; Vcc = 5 V



CTR5 . (%)

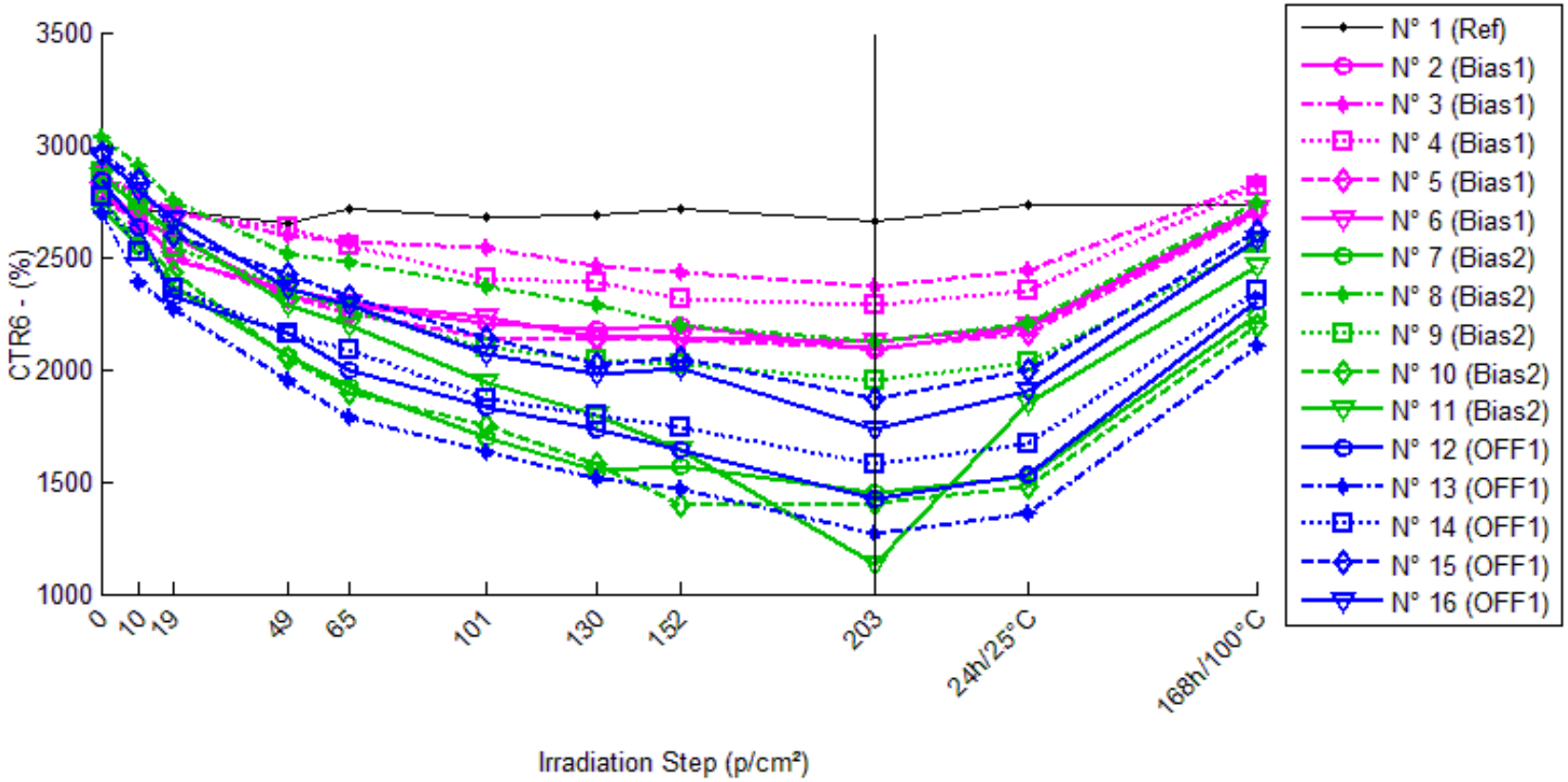
	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	2678.02	2650.31	2645.69	2612.23	2647.26	2614.56	2637.97	2653.39	2601.38	2673.45	2667.23
N° 2 (Bias1)	2731.80	2613.89	2540.98	2263.77	2198.87	2106.73	2093.51	2097.37	2000.59	2085.80	2644.55
N° 3 (Bias1)	2829.66	2739.11	2657.36	2558.25	2510.11	2458.25	2403.16	2366.20	2297.56	2370.50	2795.73
N° 4 (Bias1)	2830.32	2719.11	2638.65	2537.40	2480.70	2380.34	2324.30	2237.40	2204.47	2268.83	2773.20
N° 5 (Bias1)	2723.16	2606.01	2445.78	2269.65	2217.66	2062.35	2053.53	2057.23	2013.44	2074.13	2648.59
N° 6 (Bias1)	2748.91	2628.86	2420.87	2302.63	2265.09	2154.49	2068.86	2066.83	2037.61	2104.91	2662.67
N° 7 (Bias2)	2664.93	2496.78	2294.22	1988.34	1781.85	1560.34	1463.92	1488.78	1366.10	1433.85	2158.41
N° 8 (Bias2)	2996.65	2870.73	2695.26	2466.00	2412.00	2300.73	2160.96	2123.04	2040.73	2124.16	2685.91
N° 9 (Bias2)	2842.40	2716.25	2489.17	2316.41	2183.43	1919.34	1827.65	1792.49	1873.42	1955.39	2504.76
N° 10 (Bias2)	2702.29	2503.39	2355.35	1966.90	1547.15	1458.09	1488.32	1334.48	1314.91	1382.31	2106.84
N° 11 (Bias2)	2821.06	2675.30	2560.35	2226.38	2103.77	1857.20	1735.39	1550.82	1213.13	1765.48	2388.67
N° 12 (OFF1)	2789.26	2571.14	2232.33	2071.17	1845.99	1689.73	1550.10	1542.69	1333.88	1437.88	2222.26
N° 13 (OFF1)	2637.04	2314.74	2183.81	1862.85	1741.11	1546.76	1427.83	1374.42	1190.69	1269.35	2020.44
N° 14 (OFF1)	2732.53	2471.66	2291.14	2090.64	2046.02	1778.91	1714.62	1659.63	1492.33	1576.83	2283.10
N° 15 (OFF1)	2921.66	2791.43	2517.25	2357.74	2316.40	2037.25	1948.05	1956.05	1779.49	1894.87	2539.06
N° 16 (OFF1)	2908.34	2752.75	2602.47	2294.34	2195.55	1980.03	1951.76	1912.17	1658.62	1811.85	2505.15

1/Delta [CTR5]

	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	---	3.903E-6	4.562E-6	9.405E-6	4.338E-6	9.063E-6	5.669E-6	3.466E-6	1.100E-5	6.376E-7	1.510E-6
N° 2 (Bias1)	---	1.651E-5	2.749E-5	7.568E-5	8.872E-5	1.086E-4	1.116E-4	1.107E-4	1.338E-4	1.134E-4	1.208E-5
N° 3 (Bias1)	---	1.168E-5	2.291E-5	3.749E-5	4.499E-5	5.339E-5	6.272E-5	6.922E-5	8.185E-5	6.845E-5	4.290E-6
N° 4 (Bias1)	---	1.445E-5	2.566E-5	4.079E-5	4.980E-5	6.679E-5	7.692E-5	9.363E-5	1.003E-4	8.744E-5	7.277E-6
N° 5 (Bias1)	---	1.651E-5	4.165E-5	7.338E-5	8.371E-5	1.177E-4	1.197E-4	1.189E-4	1.294E-4	1.149E-4	1.034E-5
N° 6 (Bias1)	---	1.661E-5	4.929E-5	7.050E-5	7.770E-5	1.004E-4	1.196E-4	1.201E-4	1.270E-4	1.113E-4	1.178E-5
N° 7 (Bias2)	---	2.527E-5	6.063E-5	1.277E-4	1.860E-4	2.656E-4	3.079E-4	2.964E-4	3.568E-4	3.222E-4	8.806E-5
N° 8 (Bias2)	---	1.464E-5	3.732E-5	7.181E-5	8.089E-5	1.009E-4	1.291E-4	1.373E-4	1.563E-4	1.371E-4	3.861E-5
N° 9 (Bias2)	---	1.634E-5	4.993E-5	7.989E-5	1.062E-4	1.692E-4	1.953E-4	2.061E-4	1.820E-4	1.596E-4	4.742E-5
N° 10 (Bias2)	---	2.940E-5	5.451E-5	1.384E-4	2.763E-4	3.158E-4	3.018E-4	3.793E-4	3.905E-4	3.534E-4	1.046E-4
N° 11 (Bias2)	---	1.931E-5	3.609E-5	9.468E-5	1.209E-4	1.840E-4	2.218E-4	2.903E-4	4.698E-4	2.119E-4	6.417E-5
N° 12 (OFF1)	---	3.041E-5	8.944E-5	1.243E-4	1.832E-4	2.333E-4	2.866E-4	2.897E-4	3.912E-4	3.369E-4	9.147E-5
N° 13 (OFF1)	---	5.280E-5	7.870E-5	1.576E-4	1.951E-4	2.673E-4	3.212E-4	3.484E-4	4.606E-4	4.086E-4	1.157E-4
N° 14 (OFF1)	---	3.863E-5	7.050E-5	1.124E-4	1.228E-4	1.962E-4	2.173E-4	2.366E-4	3.041E-4	2.682E-4	7.204E-5
N° 15 (OFF1)	---	1.597E-5	5.499E-5	8.186E-5	8.943E-5	1.486E-4	1.711E-4	1.690E-4	2.197E-4	1.855E-4	5.158E-5
N° 16 (OFF1)	---	1.943E-5	4.041E-5	9.202E-5	1.116E-4	1.612E-4	1.685E-4	1.791E-4	2.591E-4	2.081E-4	5.534E-5
Average (OFF1)	---	1.515E-5	3.340E-5	5.957E-5	6.898E-5	8.936E-5	9.811E-5	1.025E-4	1.145E-4	9.909E-5	9.153E-6
σ (OFF1)	---	2.142E-6	1.146E-5	1.877E-5	2.016E-5	2.782E-5	2.652E-5	2.139E-5	2.247E-5	2.048E-5	3.318E-6
Average+3σ (OFF1)	---	2.158E-5	6.778E-5	1.159E-4	1.295E-4	1.728E-4	1.777E-4	1.667E-4	1.819E-4	1.605E-4	1.911E-5
Average-3σ (OFF1)	---	8.728E-6	-9.788E-7	3.246E-6	8.495E-6	5.906E-6	1.856E-5	3.833E-5	4.707E-5	3.766E-5	-8.009E-7
Average (Bias1)	---	2.099E-5	4.770E-5	1.025E-4	1.540E-4	2.071E-4	2.312E-4	2.619E-4	3.111E-4	2.368E-4	6.857E-5
σ (Bias1)	---	6.203E-6	1.074E-5	2.930E-5	7.859E-5	8.438E-5	7.529E-5	9.277E-5	1.362E-4	9.670E-5	2.757E-5
Average+3σ (Bias1)	---	3.960E-5	7.991E-5	1.904E-4	3.898E-4	4.602E-4	4.570E-4	5.402E-4	7.197E-4	5.269E-4	1.513E-4
Average-3σ (Bias1)	---	2.385E-6	1.549E-5	1.458E-5	-8.174E-5	-4.603E-5	5.293E-6	-1.641E-5	-9.756E-5	-5.327E-5	-1.415E-5
Average (Bias2)	---	3.145E-5	6.681E-5	1.136E-4	1.404E-4	2.013E-4	2.329E-4	2.445E-4	3.269E-4	2.815E-4	7.723E-5
σ (Bias2)	---	1.494E-5	1.939E-5	2.969E-5	4.627E-5	4.948E-5	6.871E-5	7.562E-5	9.827E-5	9.222E-5	2.669E-5
Average+3σ (Bias2)	---	7.626E-5	1.250E-4	2.027E-4	2.792E-4	3.497E-4	4.391E-4	4.714E-4	6.218E-4	5.581E-4	1.573E-4
Average-3σ (Bias2)	---	-1.336E-5	8.639E-6	2.457E-5	1.635E-6	5.288E-5	2.678E-5	1.769E-5	3.213E-5	4.817E-6	-2.837E-6

17. CTR6

Ta=25°C; If = 1.6 mA; Vo = 0.4 V; Vcc = 20 V



CTR6 . (%)

	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	2737.47	2708.91	2704.19	2651.94	2711.56	2680.55	2689.18	2712.29	2654.57	2732.03	2728.86
N° 2 (Bias1)	2781.95	2662.05	2596.27	2322.68	2289.59	2207.68	2181.58	2192.42	2089.55	2181.99	2700.41
N° 3 (Bias1)	2865.43	2774.76	2700.50	2597.69	2571.03	2539.41	2459.95	2434.59	2364.84	2440.09	2833.51
N° 4 (Bias1)	2870.29	2758.32	2684.28	2634.29	2545.97	2407.37	2389.10	2312.67	2283.29	2348.95	2816.96
N° 5 (Bias1)	2767.25	2649.79	2502.40	2320.46	2252.85	2143.64	2127.84	2135.86	2095.15	2157.99	2696.96
N° 6 (Bias1)	2794.14	2673.48	2483.97	2355.55	2298.67	2232.04	2142.50	2144.25	2120.20	2191.01	2712.95
N° 7 (Bias2)	2711.96	2548.25	2364.29	2058.34	1923.04	1697.45	1546.96	1570.51	1450.31	1519.66	2238.66
N° 8 (Bias2)	3028.60	2907.39	2747.14	2513.97	2479.03	2371.01	2285.03	2195.72	2120.65	2208.11	2742.76
N° 9 (Bias2)	2874.28	2751.84	2543.21	2365.94	2255.93	2094.44	2040.26	2026.84	1948.34	2034.48	2560.41
N° 10 (Bias2)	2756.44	2563.10	2431.51	2049.24	1891.51	1750.04	1575.82	1399.97	1404.83	1474.79	2199.18
N° 11 (Bias2)	2860.41	2718.47	2615.57	2288.70	2193.19	1939.40	1797.65	1641.66	1134.56	1854.24	2460.68
N° 12 (OFF1)	2839.95	2632.60	2325.32	2156.16	1998.24	1836.25	1736.05	1641.26	1420.02	1533.15	2308.53
N° 13 (OFF1)	2692.44	2383.32	2267.83	1949.90	1785.54	1632.34	1516.25	1463.92	1270.99	1355.99	2102.85
N° 14 (OFF1)	2772.66	2526.46	2362.08	2158.91	2082.97	1867.73	1797.69	1744.05	1575.50	1663.75	2353.19
N° 15 (OFF1)	2962.38	2837.92	2594.94	2424.89	2324.66	2139.71	2026.59	2047.10	1871.68	1999.60	2613.00
N° 16 (OFF1)	2946.56	2798.62	2666.52	2358.08	2282.62	2067.69	1978.81	2005.14	1728.47	1906.51	2574.43

1/Delta [CTR6]

	0krad(Si)	10krad(Si)	19krad(Si)	49krad(Si)	65krad(Si)	101krad(Si)	130krad(Si)	152krad(Si)	203krad(Si)	24h/25°C	168h/100°C
N° 1 (Ref)	---	3.851E-6	4.495E-6	1.178E-5	3.490E-6	7.757E-6	6.559E-6	3.391E-6	1.141E-5	7.274E-7	1.153E-6
N° 2 (Bias1)	---	1.619E-5	2.571E-5	7.108E-5	7.730E-5	9.350E-5	9.892E-5	9.666E-5	1.191E-4	9.884E-5	1.085E-5
N° 3 (Bias1)	---	1.140E-5	2.131E-5	3.597E-5	3.996E-5	4.480E-5	5.753E-5	6.176E-5	7.388E-5	6.083E-5	3.932E-6
N° 4 (Bias1)	---	1.414E-5	2.414E-5	3.121E-5	4.438E-5	6.699E-5	7.017E-5	8.400E-5	8.957E-5	7.733E-5	6.596E-6
N° 5 (Bias1)	---	1.602E-5	3.825E-5	6.958E-5	8.251E-5	1.051E-4	1.086E-4	1.068E-4	1.159E-4	1.020E-4	9.418E-6
N° 6 (Bias1)	---	1.615E-5	4.469E-5	6.664E-5	7.714E-5	9.013E-5	1.089E-4	1.085E-4	1.138E-4	9.852E-5	1.071E-5
N° 7 (Bias2)	---	2.369E-5	5.422E-5	1.171E-4	1.513E-4	2.204E-4	2.777E-4	2.680E-4	3.208E-4	2.893E-4	7.796E-5
N° 8 (Bias2)	---	1.377E-5	3.383E-5	6.759E-5	7.320E-5	9.157E-5	1.074E-4	1.252E-4	1.414E-4	1.227E-4	3.441E-5
N° 9 (Bias2)	---	1.548E-5	4.529E-5	7.475E-5	9.536E-5	1.295E-4	1.422E-4	1.455E-4	1.653E-4	1.436E-4	4.265E-5
N° 10 (Bias2)	---	2.737E-5	4.848E-5	1.252E-4	1.659E-4	2.086E-4	2.718E-4	3.515E-4	3.490E-4	3.153E-4	9.193E-5
N° 11 (Bias2)	---	1.825E-5	3.273E-5	8.733E-5	1.064E-4	1.660E-4	2.067E-4	2.595E-4	5.318E-4	1.897E-4	5.679E-5
N° 12 (OFF1)	---	2.773E-5	7.793E-5	1.117E-4	1.483E-4	1.925E-4	2.239E-4	2.572E-4	3.521E-4	3.001E-4	8.106E-5
N° 13 (OFF1)	---	4.817E-5	6.954E-5	1.414E-4	1.886E-4	2.412E-4	2.881E-4	3.117E-4	4.154E-4	3.661E-4	1.041E-4
N° 14 (OFF1)	---	3.515E-5	6.269E-5	1.025E-4	1.194E-4	1.747E-4	1.956E-4	2.127E-4	2.741E-4	2.404E-4	6.429E-5
N° 15 (OFF1)	---	1.481E-5	4.780E-5	7.482E-5	9.260E-5	1.298E-4	1.559E-4	1.509E-4	1.967E-4	1.625E-4	4.514E-5
N° 16 (OFF1)	---	1.794E-5	3.564E-5	8.470E-5	9.871E-5	1.443E-4	1.660E-4	1.593E-4	2.392E-4	1.851E-4	4.906E-5
Average (OFF1)	---	1.478E-5	3.082E-5	5.490E-5	6.426E-5	8.011E-5	8.881E-5	9.154E-5	1.024E-4	8.751E-5	8.302E-6
σ (OFF1)	---	2.074E-6	1.011E-5	1.959E-5	2.034E-5	2.410E-5	2.357E-5	1.930E-5	1.981E-5	1.786E-5	2.982E-6
Average+3σ (OFF1)	---	2.100E-5	6.114E-5	1.137E-4	1.253E-4	1.524E-4	1.595E-4	1.494E-4	1.619E-4	1.411E-4	1.725E-5
Average-3σ (OFF1)	---	8.559E-6	4.993E-7	-3.862E-6	3.242E-6	7.798E-6	1.812E-5	3.364E-5	4.302E-5	3.394E-5	-6.439E-7
Average (Bias1)	---	1.971E-5	4.291E-5	9.439E-5	1.184E-4	1.632E-4	2.012E-4	2.300E-4	3.017E-4	2.121E-4	6.075E-5
σ (Bias1)	---	5.697E-6	9.366E-6	2.558E-5	3.891E-5	5.386E-5	7.605E-5	9.381E-5	1.580E-4	8.630E-5	2.401E-5
Average+3σ (Bias1)	---	3.680E-5	7.101E-5	1.711E-4	2.351E-4	3.248E-4	4.293E-4	5.114E-4	7.756E-4	4.710E-4	1.328E-4
Average-3σ (Bias1)	---	2.621E-6	1.481E-5	1.764E-5	1.693E-6	1.642E-6	-2.698E-5	-5.148E-5	-1.723E-4	-4.679E-5	-1.127E-5
Average (Bias2)	---	2.876E-5	5.872E-5	1.030E-4	1.295E-4	1.765E-4	2.059E-4	2.184E-4	2.955E-4	2.509E-4	6.874E-5
σ (Bias2)	---	1.351E-5	1.698E-5	2.589E-5	3.957E-5	4.378E-5	5.312E-5	6.760E-5	8.798E-5	8.356E-5	2.434E-5
Average+3σ (Bias2)	---	6.930E-5	1.097E-4	1.807E-4	2.482E-4	3.078E-4	3.652E-4	4.212E-4	5.594E-4	5.015E-4	1.417E-4
Average-3σ (Bias2)	---	-1.178E-5	7.771E-6	2.535E-5	1.083E-5	4.515E-5	4.654E-5	1.557E-5	3.153E-5	1.711E-7	-4.272E-6