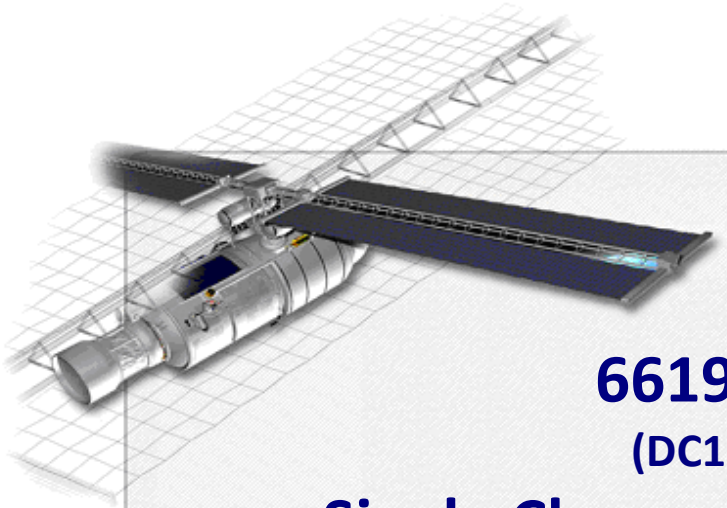
PROTONS DISPLACEMENT DAMAGE TEST REPORT



66193-002
(DC1120)
Single Channel Optocoupler
From
MICROPAC

TRAD/TP/66193/XXX1/ESA/YP/1104		Labège, April 16, 2012
TRAD Tests & radiations — afaq ISO 9001 Qualité AFNOR CERTIFICATION		TRAD, Bât Gallium 907, Voie l'Occitane - 31670 LABEGE France ☏ : 05 61 00 95 60 Fax : 05 61 00 95 61 Email : trad@trad.fr Web Site: www.trad.fr SIRET 397 862 038 00056 - TVA FR59397862038
Written by	Verified by / Quality control	Approved by
A. SAMARAS 10/04/2012	**M.SAUVAGNAC/Y.PADIE 16/04/2012**	**C.CHATRY 16/04/2012**
Issue : 0		
To: Marc POIZAT	Project/Program :	ESA Contract N°4000102571/10/NL/AF-Radiation Characterization of Laplace RH optocouplers, sensors and detectors

TABLE OF CONTENT

1 INTRODUCTION

This report includes the test results of 66193-002, a Single Channel Optocoupler from MICROPAC to evaluate displacement damage effects under proton irradiation. During January and February 2012, TRAD characterized this device for proton sensitivity at the KVI Facility, in GRONINGEN, The Netherlands using their AGOR cyclotron.
The objectives of the test are:

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

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-TP-66193-MIC-ESA-1119, Iss.3, 08/02/2012

2.2 Reference Documents

RD	1.	Datasheet 66193 by MICROPAC	SINGLE CHANNEL OPTOCOUPLERS REPLACEMENT FOR 3C91C
RD	2.	MICROPAC certificate of traceability and conformance dated 25/07/2011	

3 DEVICE INFORMATION

3.1 Device description

The 66193-002 device is a proton radiation tolerant single channel optocoupler (replacement for 3C91C optocoupler). It contains a proton tolerant 660nm GaAlAs LED optically coupled to a silicon planar phototransistor. It is hermetically sealed in a TO46 metallic package. The internal base connection has been eliminated for improved noise immunity.

Type	66193-002
Manufacturer	MICROPAC
Function	Optocoupler
Package	TO46
Date Code	1120
Sample size	46 parts (3x15 test parts + 1 control sample)

3.2 Procurement information

75 parts reference 66193-002 were procured by TRAD and delivered by MICROPAC through its French distributor ISOTOPE ELECTRONICS.
Their quality level defined by the 002 extension number corresponds to a commercial standard operating in the temperature range of -55° to +100°C and temperature tested (hot & cold temperature) by the manufacturer prior delivery.
One single lot of 75 parts, date-code 1120, was delivered with a Certificate of Conformance [RD2].

3.3 External view

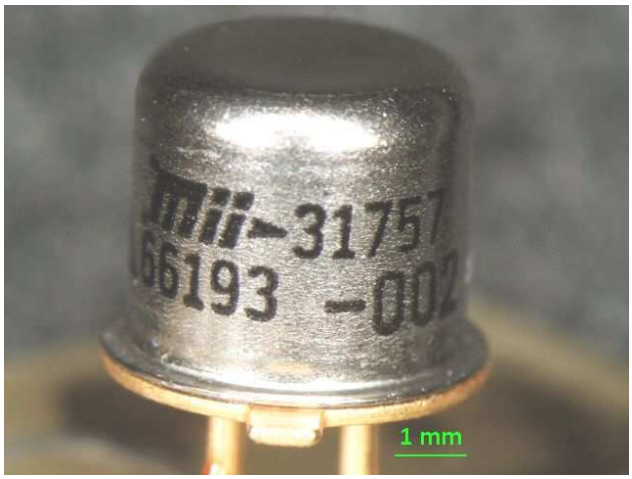


Figure 1: package marking

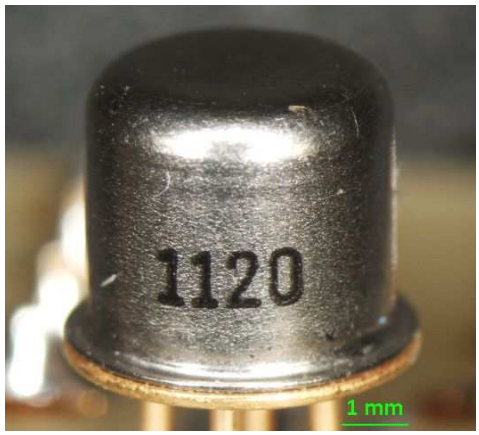


Figure 2: package marking – date code

3.4 Internal view

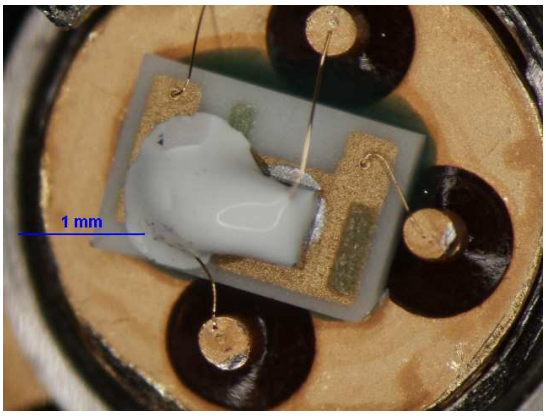


Figure 3: Internal view

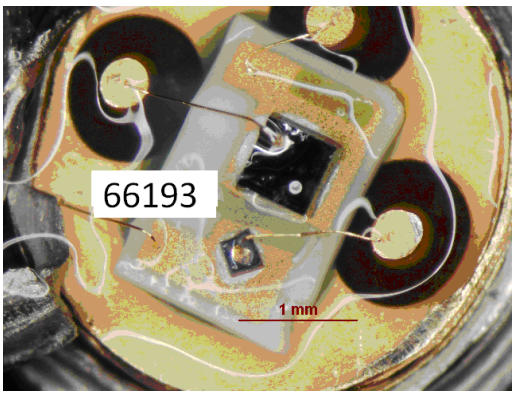


Figure 4: Internal view without potting

3.5 Serialization

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

Serial Number			
P1 (30MeV)	P2 (60MeV)	P3 (190MeV)	Mode
1 (Control sample)			
2	2	2	Bias 1
3	3	3	Bias 1
4	4	4	Bias 1
5	5	5	Bias 1
6	6	6	Bias 1
7	7	7	Bias 2
8	8	8	Bias 2
9	9	9	Bias 2
10	10	10	Bias 2
11	11	11	Bias 2
12	12	12	Off
13	13	13	Off
14	14	14	Off
15	15	15	Off
16	16	16	Off

4 IRRADIATION MEANS AND CONDITIONS

4.1 AGORFIRM/KVI irradiation facility (The Nederlands)

AGORFIRM is a facility that uses a dedicated beam line of the AGOR cyclotron for irradiations with protons in air. The facility is available for radiation damage studies. The standard proton beams used for irradiations produced by this cyclotron have primary energies of 90, 150 and 190 MeV.
The standard irradiation field has a diameter of 70 mm and homogeneity of better than ± 3%.

Figure 5: samples installed for irradiation

4.2 Energy and Flux measurement

The energy resolution of the beam when leaving the cyclotron is typically better than 0.25%. However, at the DUT position the resolution is in the order of a few MeV due to scattering in air, the scatter system and, when used, the energy degrader.
The proton flux at the centre of the irradiation field is measured with a 10 mm diameter scintillator detector. During the irradiation, the flux is monitored with a Beam Intensity Monitor (BIM). Before an irradiation the BIM signal (in Monitor Units) is related to the scintillator signal to obtain the flux calibration in protons cm^{-2} per MU. This calibration is conducted for every field size and every energy used during an irradiation.

4.3 Experimental conditions

An Equivalent total fluence of 1E12 #/cm² of 10 MeV protons is required [AD2] for this TNID (Total Non-Ionizing Dose) evaluation test. Considering NIEL (Non Ionizing Energy Loss) value for 10 MeV proton (7.86E-03 MeV cm^2 g^{-1}), total fluence to be reached at each energy is:

30	MeV	8,22E+11 cm^{-2}
60	MeV	1,14E+12 cm^{-2}
190	MeV	1,91E+12 cm^{-2}

Five steps were defined to determine the component degradation under 30MeV, 60MeV, 190MeV proton irradiation. The test devices have been exposed to the following proton fluence levels:

p/cm2	1,70E+10	8,50E+10	1,70E+11	1,70E+12
Energy (MeV)	30	30	30	30
p/cm2	2,30E+10	1,15E+11	2,30E+11	1,14E+12
Energy (MeV)	60	60	60	60
p/cm2	4,00E+10	2,00E+11	4,00E+11	1,91E+12
Energy (MeV)	190	190	190	190

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/N/OPTO/ZIP14/BR/1109
TEST PROGRAM	66193_TP30MeV_XXX1_B1_V10.llb 66193_TP60MeV_XXX1_B1_V10.llb 66193_TP200MeV_XXX1_B1_V10.llb

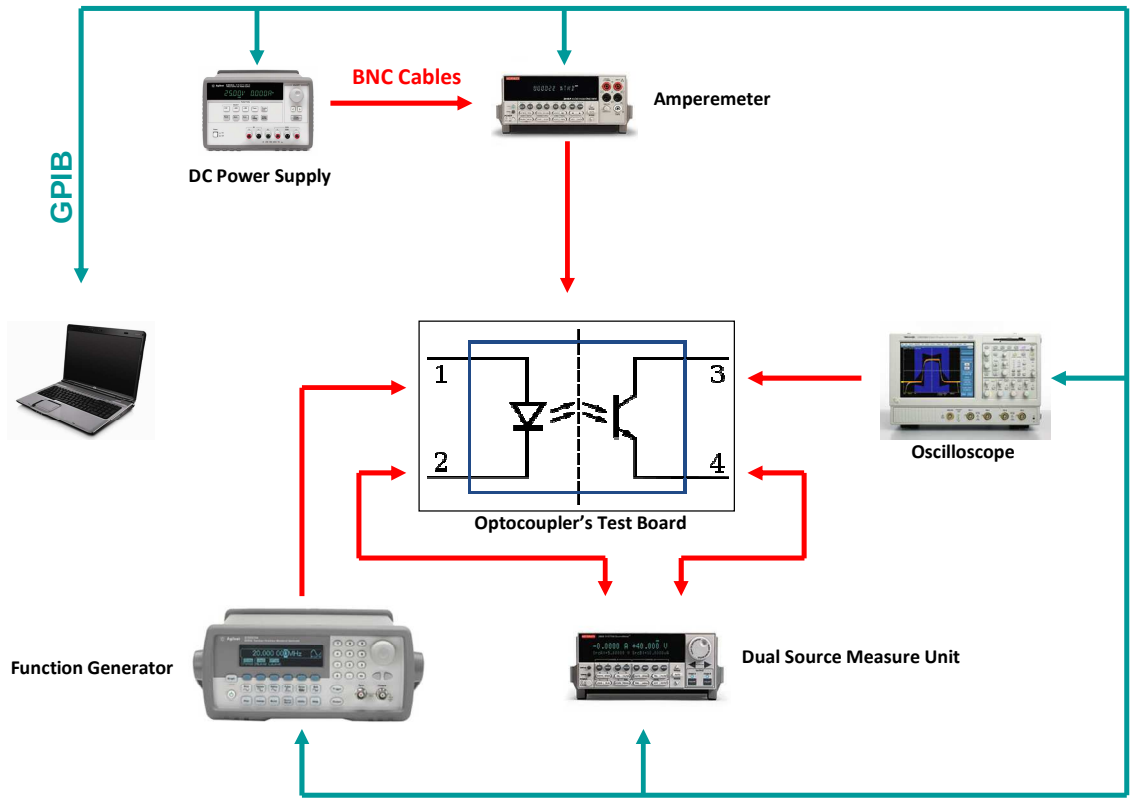


Figure 6: test principle

5.2 Test configuration

Samples were exposed to proton irradiation in three different modes - two on-modes (Figure 7and Figure 8) and one off-mode (all terminal leads short-circuited) –

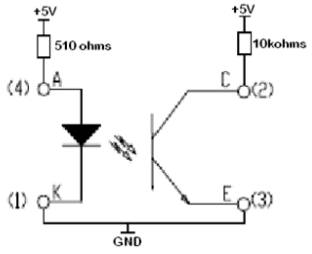


Figure 7: ON bias1

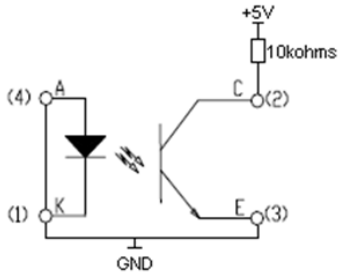


Figure 8: ON bias2

5.3 Electrical parameters

PARAMETER	SYMBOL	TEST CONDITION	MIN	MAX	UNIT
Input Diode Static Reverse Current	I_R	V_R = 3V		1	µA
Input Diode Static Forward Voltage	V_{F1}	I_F = 10mA		2	V
	V_{F2}	I_F = 20mA		2,2	V
Reverse Breakdown Voltage	B_{VR}	I_R = 100µA	7		V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = 1mA, I_b = 0, I_F = 0	50		
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	I_C = 10µA	7		
Collector-Emitter Dark Current	I_{CEO1}	V_{CE} = 50V, I_F = 0mA		100	nA
	I_{CEO2}	V_{CE} = 5V, I_F = 0mA		10	nA
On State Collector Current	$I_{C(ON)1}$	V_{CE} = 5V, I_F = 10mA	4		mA
	$I_{C(ON)2}$	V_{CE} = 0.4V, I_F = 10mA	3		mA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	I_F = 50mA, I_C = 10mA		0,4	V
Rise Time	tr	V_{CE} = 5V, I_F = 2mA, R_L = 100Ω		5	µs
Fall Time	tf	V_{CE} = 5V, I_F = 2mA, R_L = 100Ω		5	µs
Current Transfer Ratio	CTR1	V_{CE} = 5V, I_F = 1mA			%
	CTR2	V_{CE} = 5V, I_F = 2mA			%
	CTR3	V_{CE} = 5V, I_F = 10mA	40		%
	CTR4	V_{CE} = 5V, I_F = 20mA			%
	CTR5	V_{CE} = 30V, I_F = 10mA			%

Min/ Max values are those specified in the reference data-sheet [RD1].
Test measurements are performed at 25°C ± 10°C.

6 TEST HISTORY

Test sequence and all required conditions were executed as described in the test plan.
No incident during the test was noticed.

7 SUMMARY RESULTS

7.1 30 MeV proton irradiation summary results

Only the parameters with applicable test limits are shown hereunder.
Only the parameters with applicable test limits are shown hereunder.

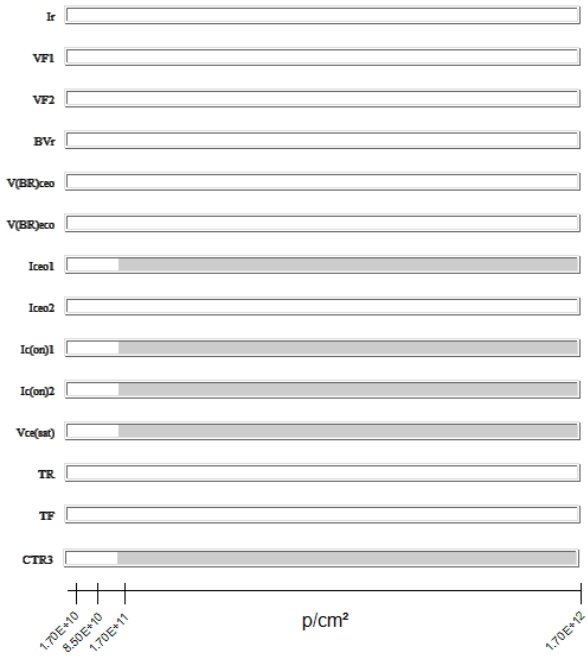


Figure 9: ON Bias 1 under 30 MeV protons

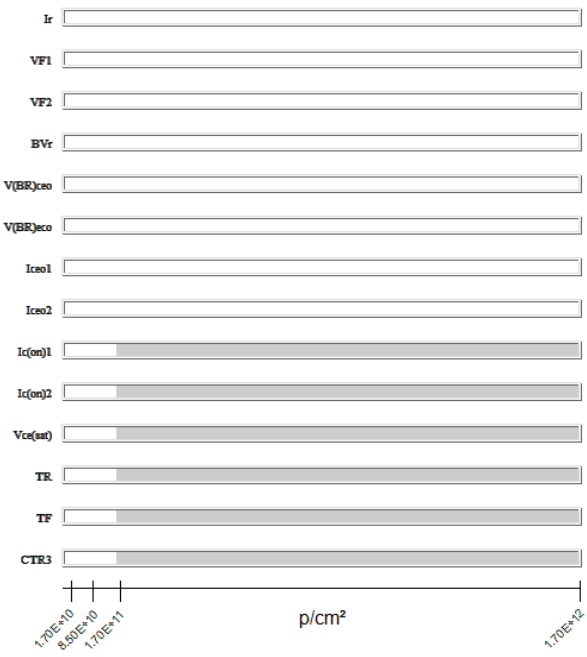


Figure 10: ON Bias 2 under 30 MeV protons

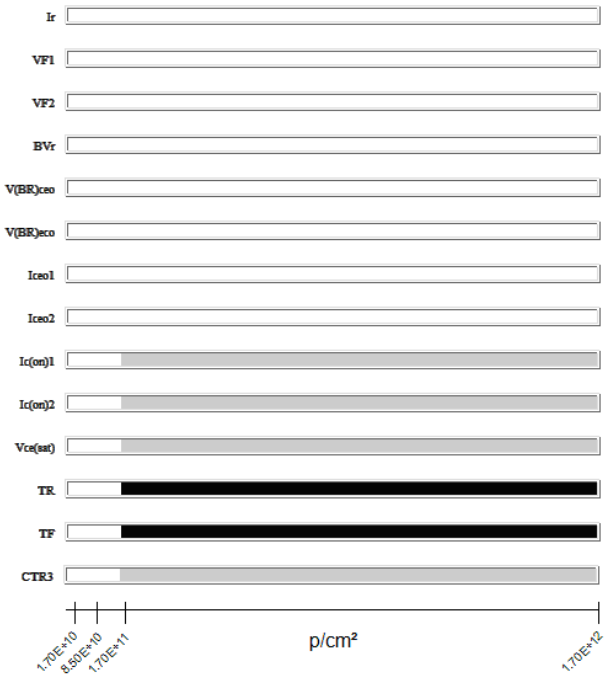


Figure 11: OFF Bias under 30 MeV protons

For all devices tested, whatever the bias condition, parameters **Ic(on)1**, **Ic(on)2, CTR3** and **Vce(sat)** are out of specification at step **1.7 E12.p/cm².**

With the ON Bias1 condition, the parameter **Iceo1** is out of specification at step **1.7 E12.p/cm².** However as shown in the Figure hereunder only the component N°5 is out of specification at the final step.

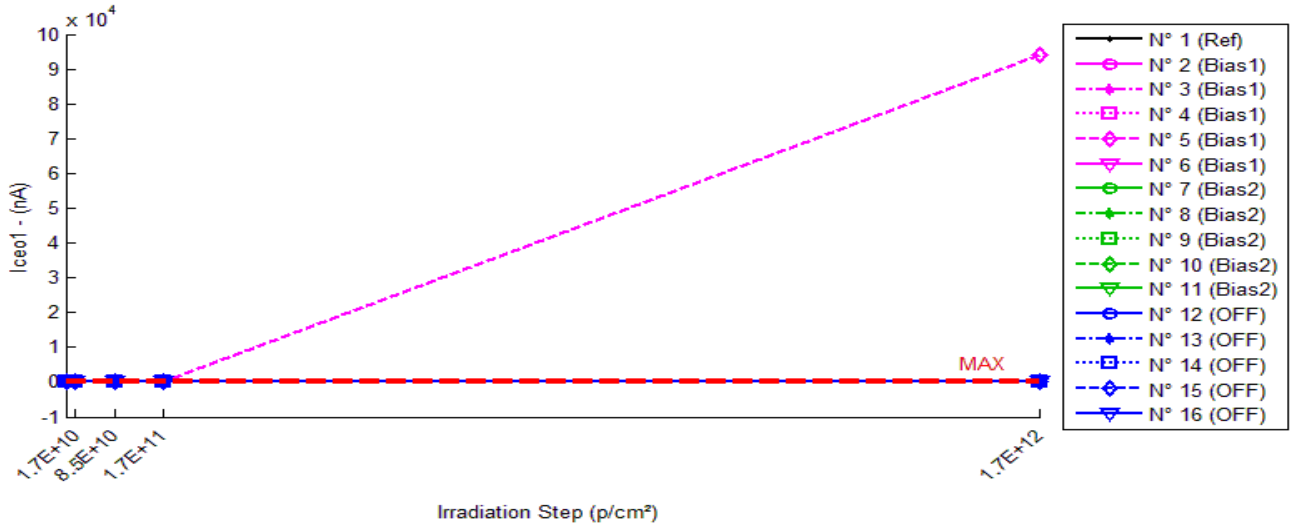


Figure 12: Iceo1 function 30 MeV proton irradiation step

With the ON Bias2 condition, parameter **TF** and **TR** are out of specification at step **1.7 E12.p/cm².** However as shown in the Figure hereunder only the component N°11 is out of specification at the final step.

Moreover, as shown in Figure 11, Figure 13 and Figure 14, TF and TR parameters are not measurable at step 1.7E12.p/cm² in OFF mode.

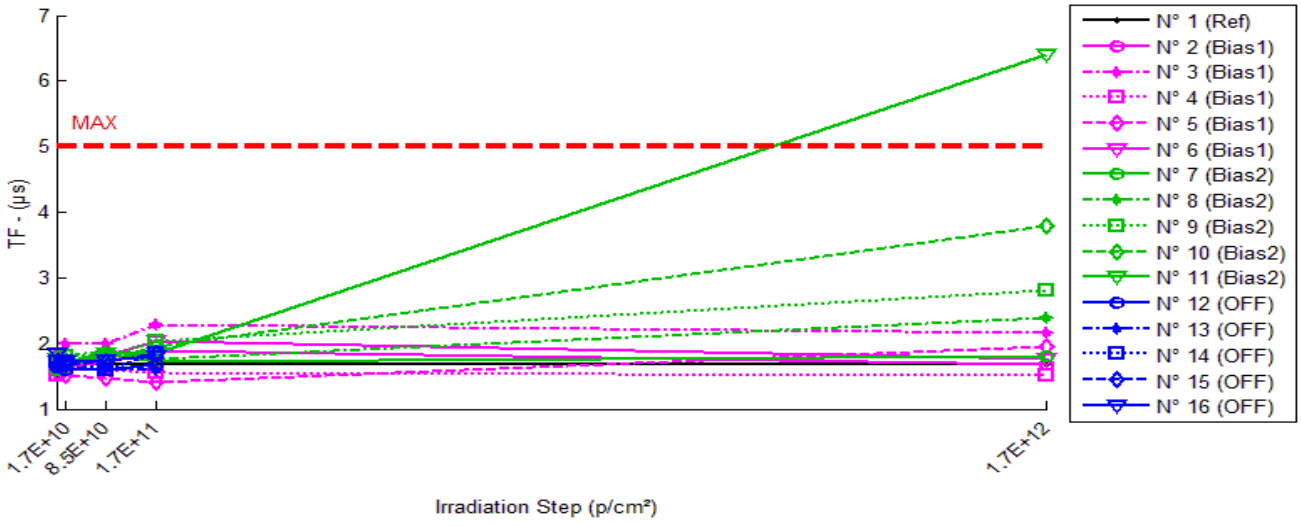


Figure 13: TF function 30 MeV proton irradiation step

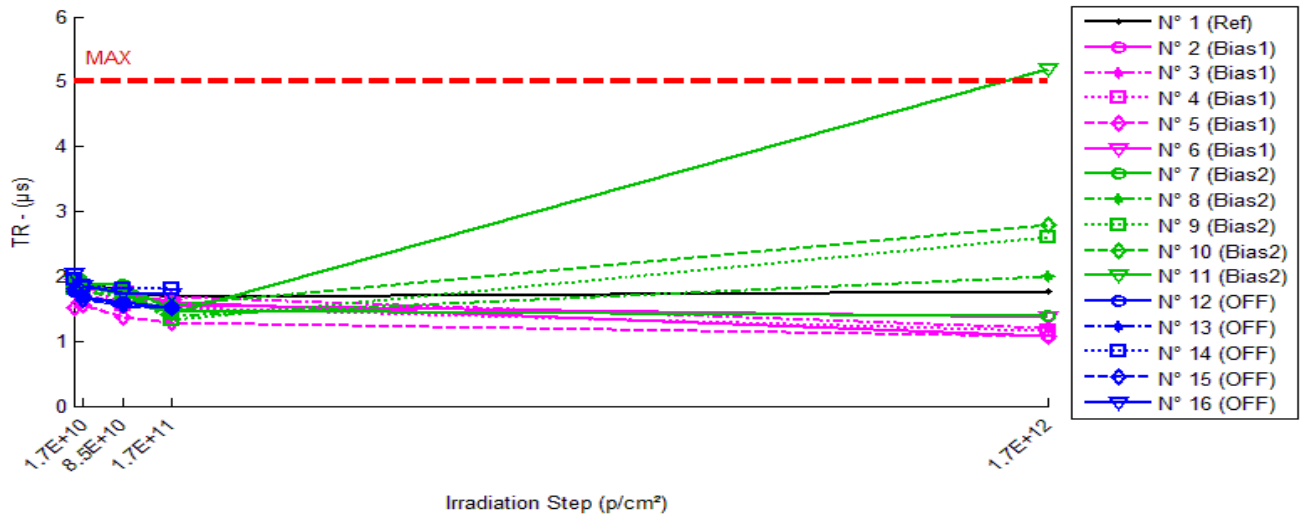


Figure 14: TR function 30 MeV proton irradiation step

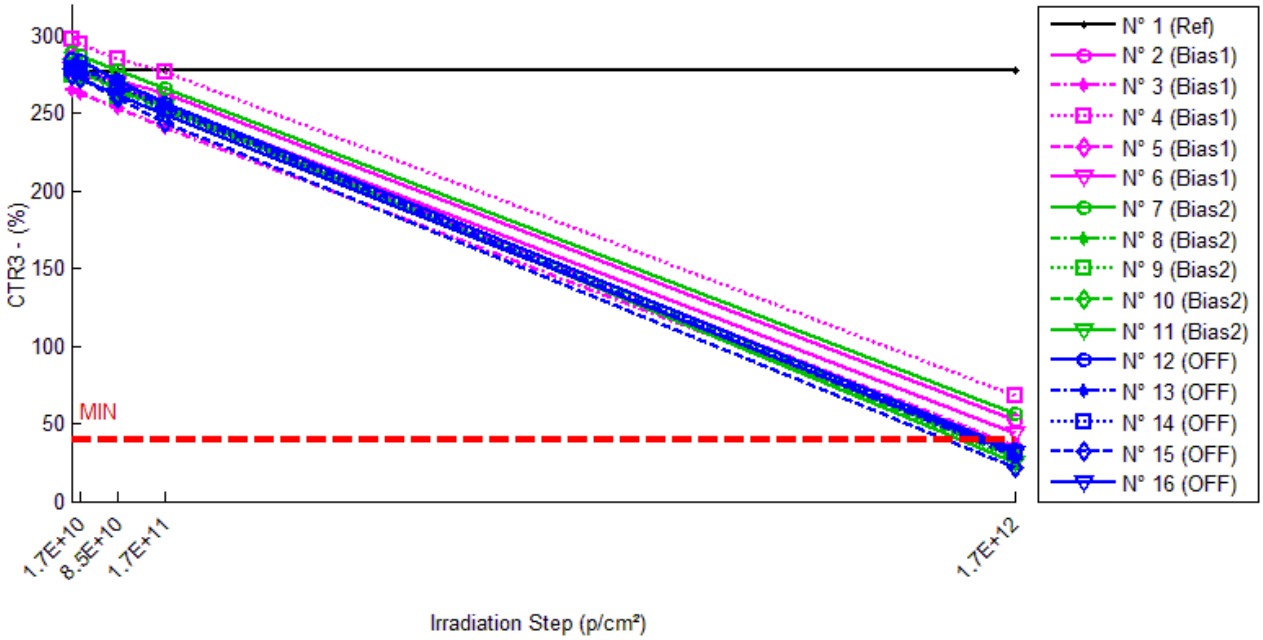


Figure 15: CTR3 function 30 MeV proton irradiation step

7.2 60 MeV proton irradiation summary results

Only the parameters with applicable test limits are shown hereunder.

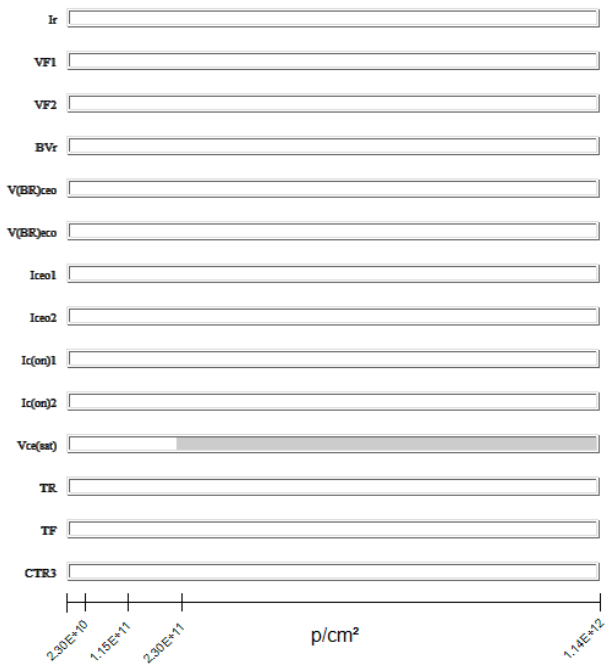


Figure 16: ON Bias 1 under 60 MeV protons

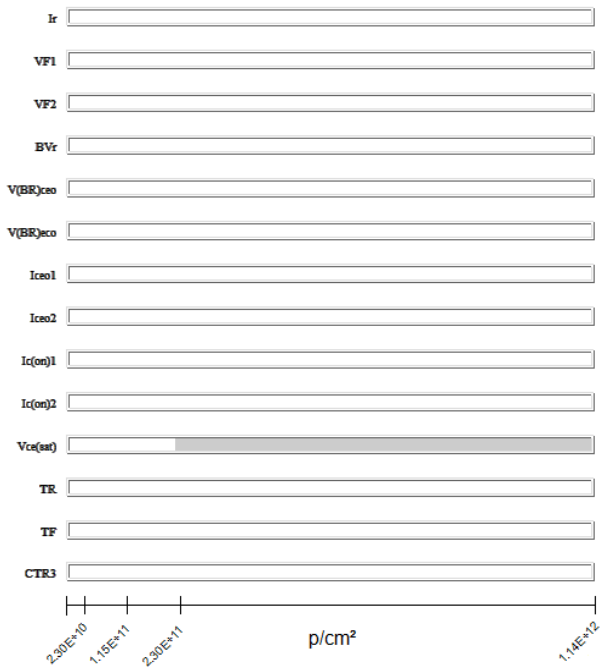


Figure 17: ON Bias 2 under 60 MeV protons

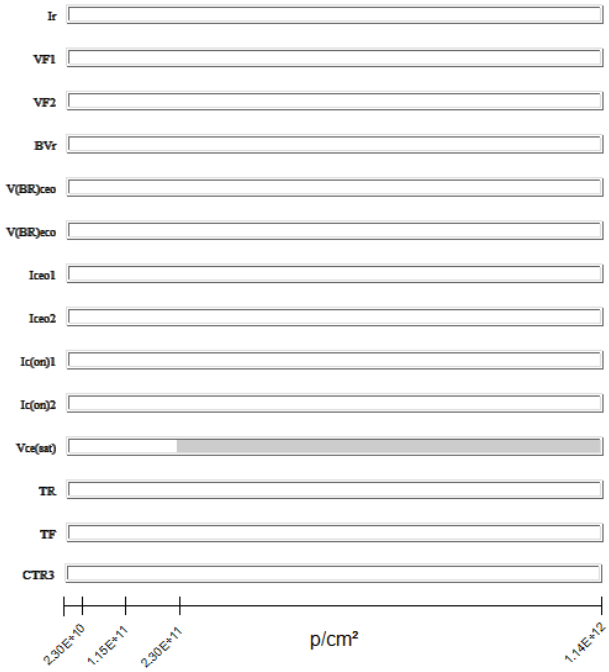
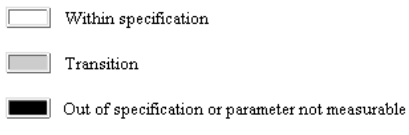


Figure 18: OFF Bias under 60 MeV protons



For all devices tested and whatever their bias condition, **Vce(sat)** is out of specification at step **1.14E12.p/cm².**

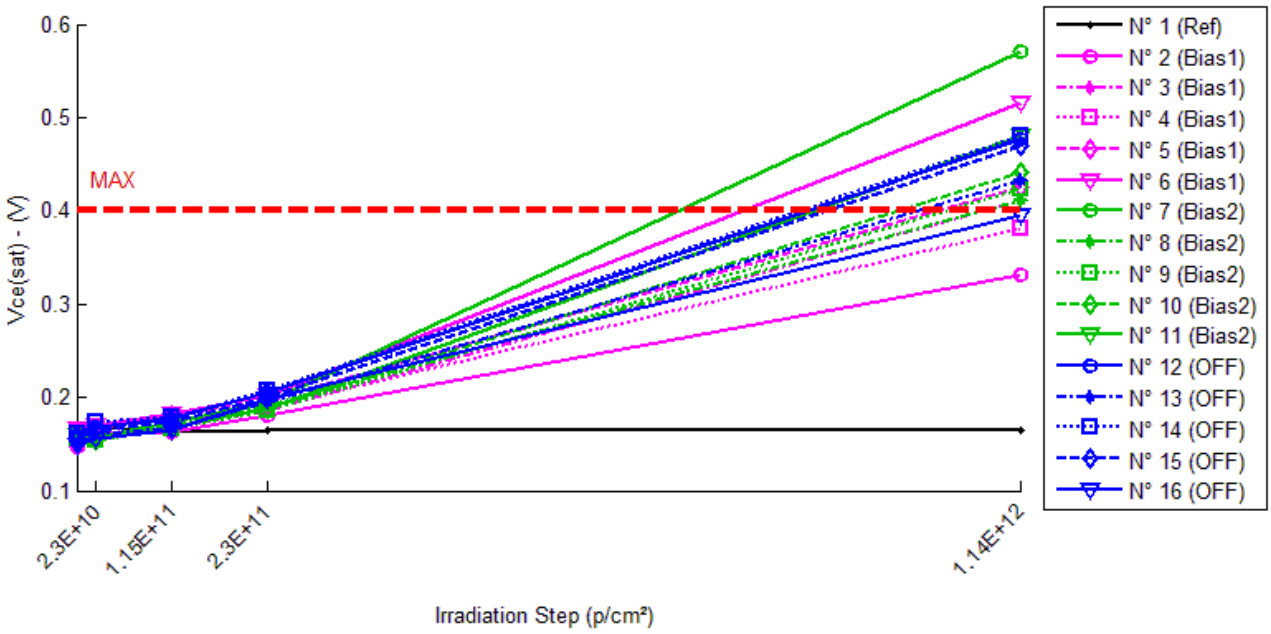


Figure 19: Vce(sat) function 60 MeV proton irradiation step

7.3 190 MeV proton irradiation summary results

Only the parameters with applicable test limits are shown hereunder.

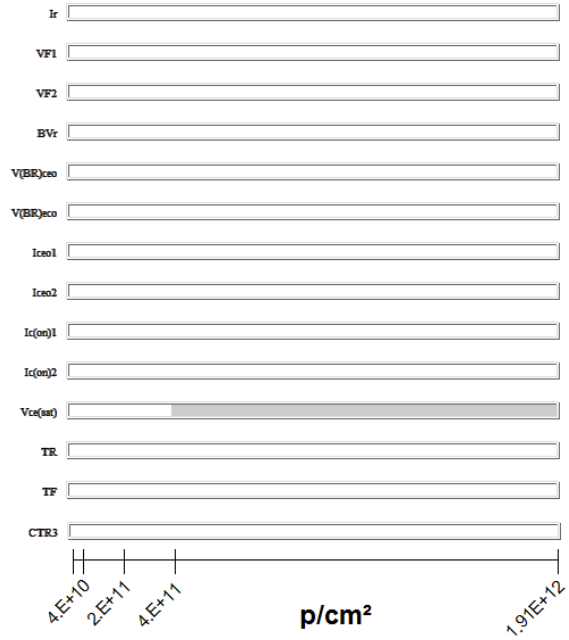


Figure 20: ON Bias 1 under 190 MeV protons

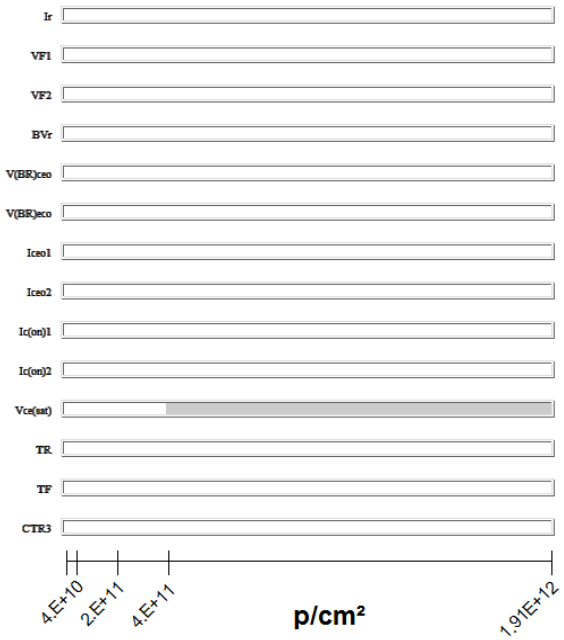


Figure 21: ON Bias 2 under 190 MeV protons

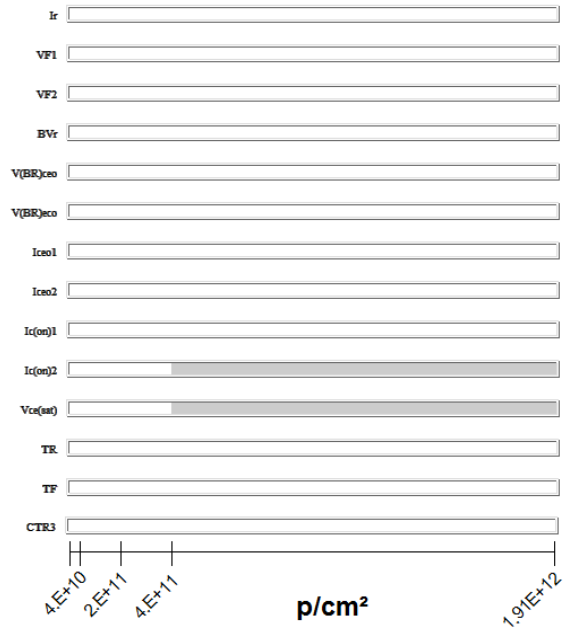
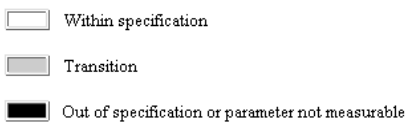


Figure 22: ON Bias 1 under 190 MeV protons



For all devices tested and whatever their bias condition, **Vce(sat)** is out of specification at step **1.91E12.p/cm²:**

- With ON Bias1, Vce(sat) is out of specification at 1.02 E12.p/cm² by interpolation
- With ON Bias2, Vce(sat) is out of specification at 1.02 E12.p/cm² by interpolation
- When unbiased, Vce(sat) is out of specification at 8.65 E11.p/cm² by interpolation

Moreover in OFF mode, the parameter Ic(on)2 is out of specification at 1.83 E12.p/cm² by interpolation.

8 CONCLUSION

Total fluence steady-state irradiation test using protons has been applied on **66193-002, Single Channel Optocoupler** from **MICROPAC:**

- up to 1.7E+12 protons/cm², with an energy of 30 MeV
- up to 1,14E+12 protons/cm², with an energy of 60 MeV
- up to 1,91E+12 protons/cm², with an energy of 190 MeV

The results indicate that:

- Under 30MeV proton Beam:

All devices are functional up to 1.7 E+11 protons/cm² total fluence level.

- Under 60MeV proton Beam:

All devices are functional up to 2.3 E+11 protons/cm² total fluence level.

- Under 190MeV proton Beam:

All devices are functional up to 4 E+11 protons/cm² total fluence level.

CTR4 configuration (Vce = 5V; If = 20 mA) exhibits the smallest average parameter drift whatever the Bias condition.

Conversely, CRT1 configuration (Vce = 5V; If = 1 mA) exhibits the greatest parameter degradation.

ON Bias1 configuration is the least sensitive configuration for all CTR configuration.

OFF configuration is the most sensitive configuration under 30 and 190 MeV proton while ON Bias 2 mode is the most sensitive configuration under 60 MeV protons.

After irradiation of 190 MeV protons and for all CTR configurations, average CTR drifts are almost the same for ON Bias 1 and ON Bias 2 configurations.

CTR3 (V_{CE} = 5V, I_F = 10mA), for which specification limit is specified in the data-sheet, is functional up to total fluence under 60 MeV and 190 MeV protons. However, CTR3 is out of specification at step 1.7E12P/cm² under 30MeV protons.

Average drift current transfer ratio are shown in the next Figures depending proton energy, CTR configuration and Bias condition at final irradiation step.

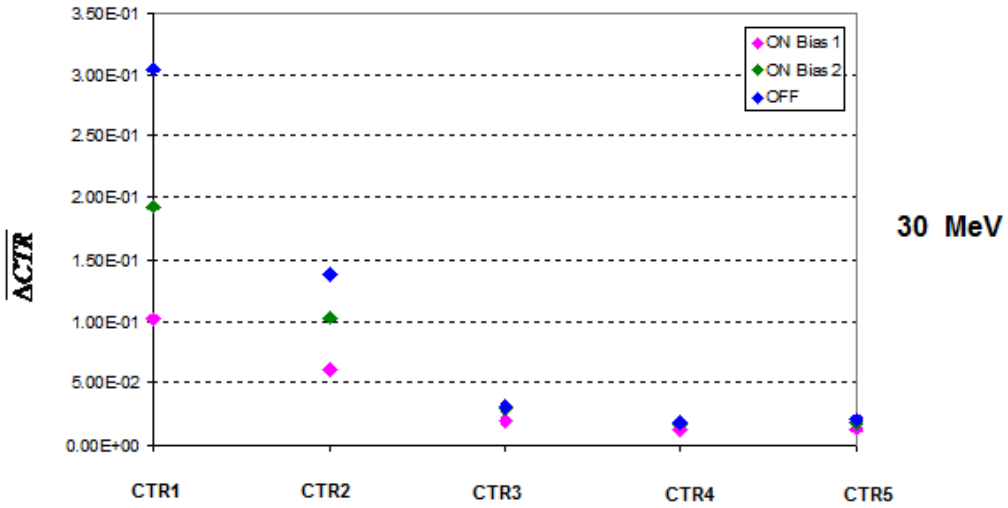


Figure 23: Average drift current transfer ratio under 30 MeV protons

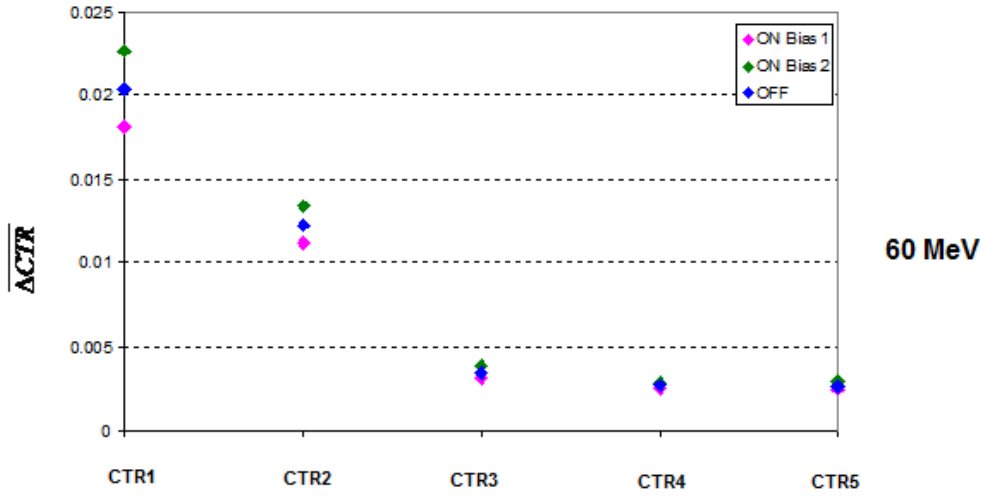


Figure 24: Average drift current transfer ratio under 60 MeV protons

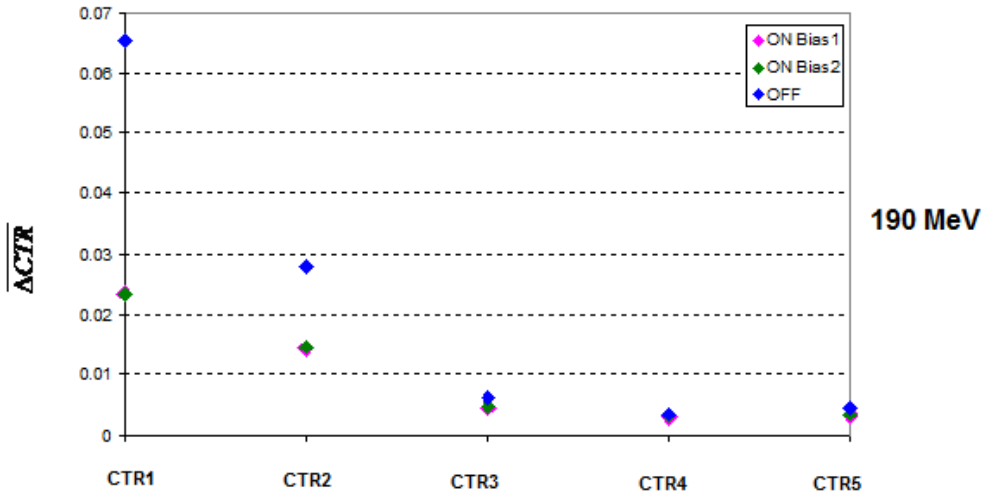


Figure 25: Average drift current transfer ratio under 190 MeV protons

.

9 DETAILED TESTS RESULTS

The pre and post radiation test results are shown graphically in the following pages

- 30MeV: 9-2 to 9-37
- 60MeV: 10-2 to 10-37
- 190MeV: 11-2 to 11-37

The data is displayed in the following tables and graphs.

These graphs show parameter's shifts observed during the proton testing 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" protons/cm² step.

For CTR values, the formula used is:

$$\text{Drift} = \frac{1}{\text{measurement (X protons /cm}^2\text{)}} - \frac{1}{\text{measurement (0 proton /cm}^2\text{)}}$$

For the other measurements the formula used is:

Drift value= measurement (X protons/cm²) - measurement (0 proton/cm²)

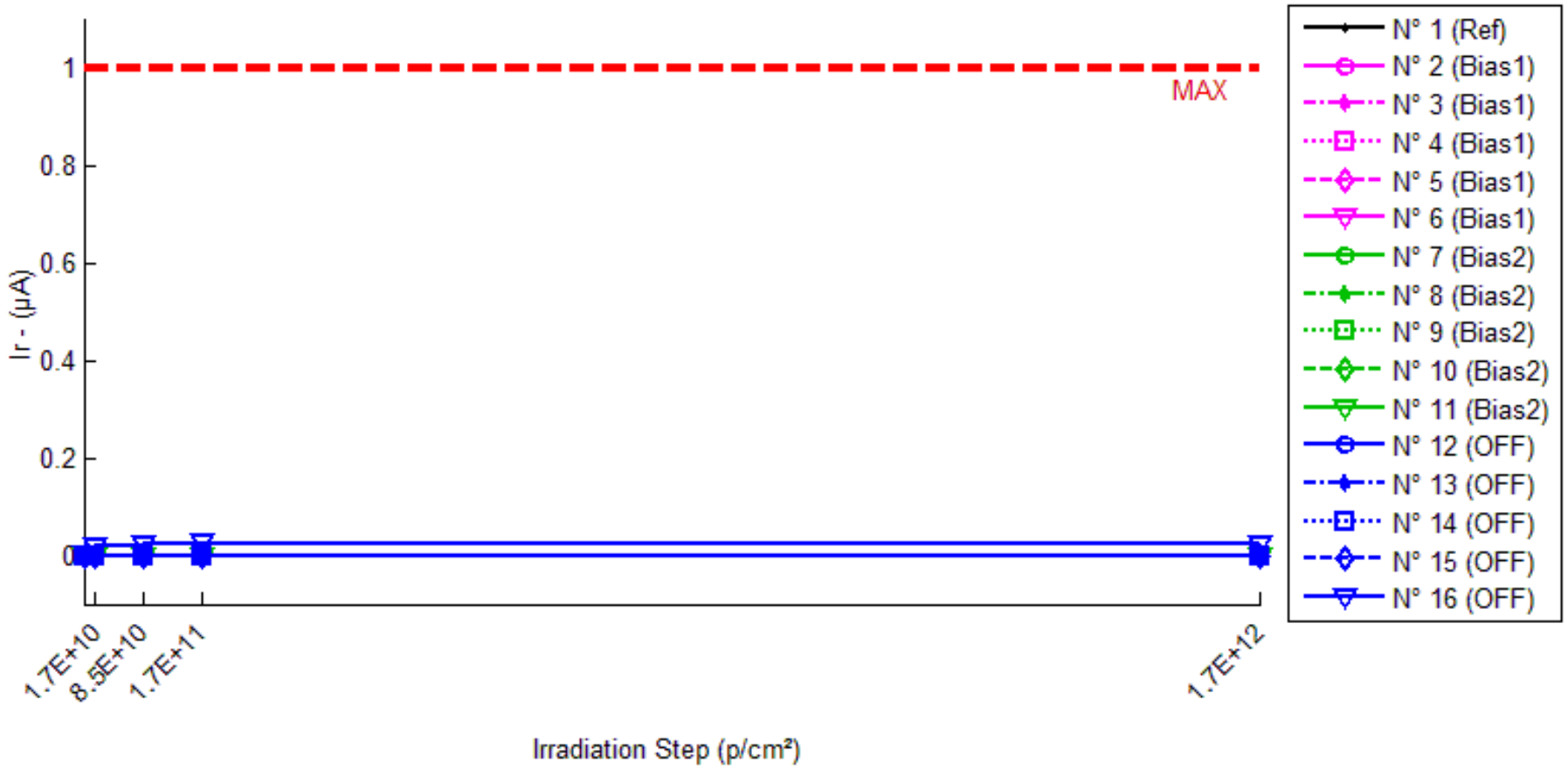
30 MeV proton / detailed results

CONTENTS

30 MeV proton / detailed results

1. Ir

Ta=25°C; Vr=3V



30 MeV proton / detailed results

Ir . (µA) **Max = 1.0**

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	3.568E-5	4.448E-5	5.438E-5	5.827E-5	5.739E-5
N° 2 (Bias1)	4.608E-5	5.366E-5	5.739E-5	4.088E-5	4.675E-5
N° 3 (Bias1)	4.566E-5	2.291E-5	5.836E-5	5.119E-5	5.450E-5
N° 4 (Bias1)	3.443E-5	5.878E-5	5.132E-5	5.999E-5	4.968E-5
N° 5 (Bias1)	4.381E-5	5.186E-5	5.559E-5	5.048E-5	2.734E-5
N° 6 (Bias1)	4.197E-5	3.765E-5	5.421E-5	4.972E-5	4.817E-5
N° 7 (Bias2)	3.690E-5	5.652E-5	1.006E-4	5.162E-5	5.279E-5
N° 8 (Bias2)	4.122E-5	5.791E-5	5.150E-5	4.525E-5	5.024E-5
N° 9 (Bias2)	3.946E-5	5.854E-5	5.007E-5	4.437E-5	6.076E-5
N° 10 (Bias2)	4.092E-5	5.560E-5	5.464E-5	4.290E-5	3.549E-5
N° 11 (Bias2)	4.524E-5	5.958E-5	6.554E-5	4.915E-5	4.885E-5
N° 12 (OFF)	3.480E-5	4.324E-5	4.747E-5	4.563E-5	7.078E-5
N° 13 (OFF)	3.988E-5	4.898E-5	4.885E-5	5.020E-5	4.932E-5
N° 14 (OFF)	3.476E-4	1.784E-4	1.732E-4	2.447E-4	2.165E-4
N° 15 (OFF)	2.729E-4	1.909E-4	1.869E-4	2.524E-4	2.189E-4
N° 16 (OFF)	3.273E-3	2.063E-2	2.301E-2	2.570E-2	2.524E-2

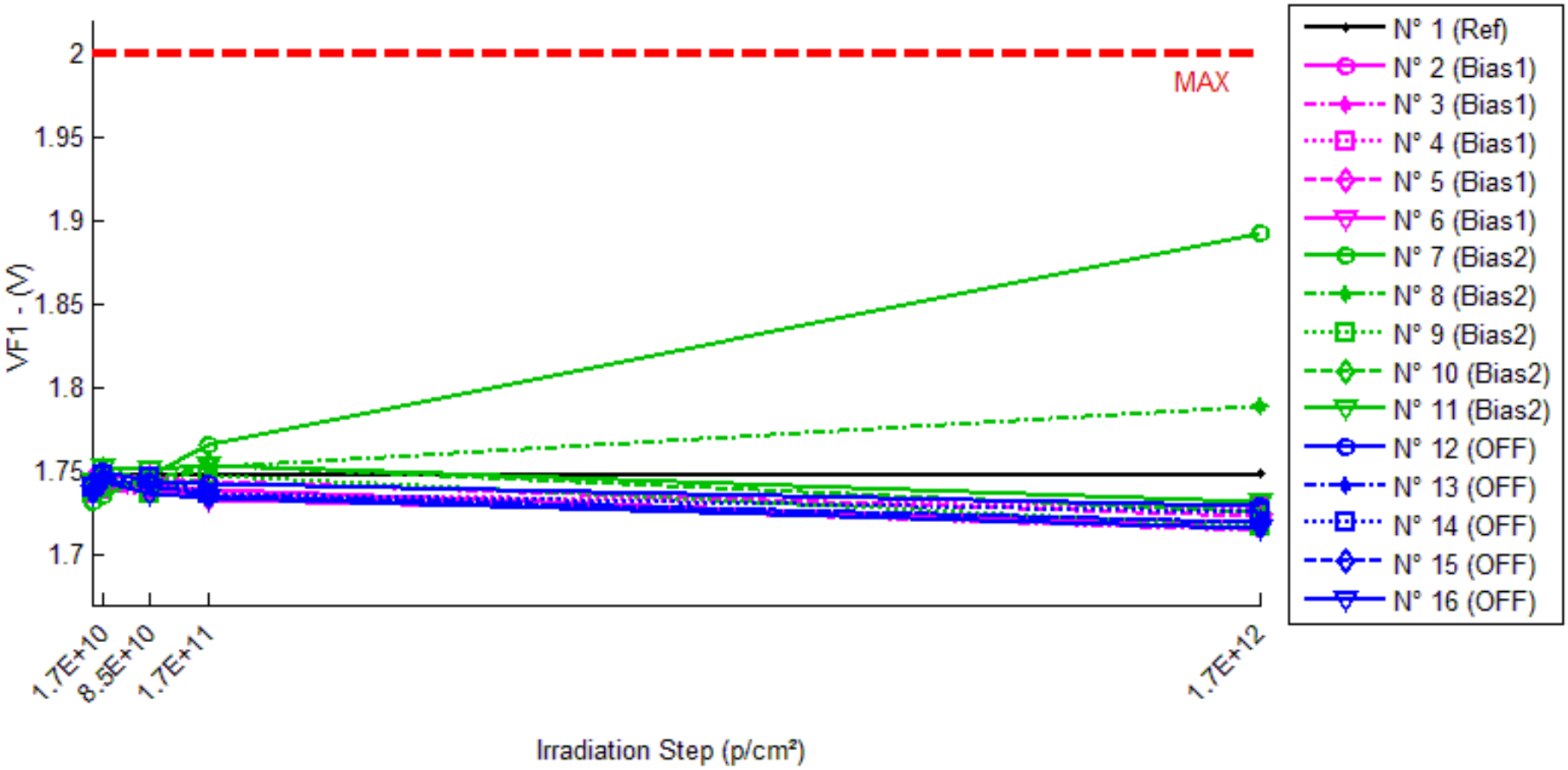
Delta [Ir]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	8.801E-6	1.869E-5	2.259E-5	2.171E-5
N° 2 (Bias1)	---	7.585E-6	1.131E-5	-5.197E-6	6.710E-7
N° 3 (Bias1)	---	-2.275E-5	1.270E-5	5.532E-6	8.843E-6
N° 4 (Bias1)	---	2.435E-5	1.689E-5	2.556E-5	1.526E-5
N° 5 (Bias1)	---	8.046E-6	1.178E-5	6.664E-6	-1.647E-5
N° 6 (Bias1)	---	-4.318E-6	1.224E-5	7.753E-6	6.203E-6
N° 7 (Bias2)	---	1.962E-5	6.368E-5	1.472E-5	1.589E-5
N° 8 (Bias2)	---	1.669E-5	1.028E-5	4.033E-6	9.021E-6
N° 9 (Bias2)	---	1.908E-5	1.061E-5	4.912E-6	2.130E-5
N° 10 (Bias2)	---	1.468E-5	1.371E-5	1.979E-6	-5.438E-6
N° 11 (Bias2)	---	1.434E-5	2.030E-5	3.907E-6	3.615E-6
N° 12 (OFF)	---	8.435E-6	1.267E-5	1.082E-5	3.597E-5
N° 13 (OFF)	---	9.105E-6	8.979E-6	1.032E-5	9.442E-6
N° 14 (OFF)	---	-1.692E-4	-1.744E-4	-1.029E-4	-1.311E-4
N° 15 (OFF)	---	-8.202E-5	-8.600E-5	-2.053E-5	-5.398E-5
N° 16 (OFF)	---	1.736E-2	1.974E-2	2.243E-2	2.196E-2
Average (OFF)	---	2.582E-6	1.298E-5	8.063E-6	2.900E-6
σ (OFF)	---	1.745E-5	2.244E-6	1.107E-5	1.203E-5
Average+3σ (OFF)	---	5.493E-5	1.971E-5	4.129E-5	3.900E-5
Average-3σ (OFF)	---	-4.977E-5	6.252E-6	-2.516E-5	-3.320E-5
Average (Bias1)	---	1.688E-5	2.372E-5	5.910E-6	8.879E-6
σ (Bias1)	---	2.433E-6	2.270E-5	5.040E-6	1.044E-5
Average+3σ (Bias1)	---	2.418E-5	9.181E-5	2.103E-5	4.021E-5
Average-3σ (Bias1)	---	9.585E-6	-4.438E-5	-9.209E-6	-2.245E-5
Average (Bias2)	---	3.425E-3	3.900E-3	4.465E-3	4.365E-3
σ (Bias2)	---	7.790E-3	8.855E-3	1.004E-2	9.838E-3
Average+3σ (Bias2)	---	2.680E-2	3.046E-2	3.459E-2	3.388E-2
Average-3σ (Bias2)	---	-1.995E-2	-2.266E-2	-2.566E-2	-2.515E-2

30 MeV proton / detailed results

2. VF1

Ta=25°C; If = 10 mA



30 MeV proton / detailed results

VF1 . (V) **Max = 2.0**

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	1.749	1.746	1.749	1.748	1.749
N° 2 (Bias1)	1.742	1.744	1.741	1.739	1.716
N° 3 (Bias1)	1.737	1.739	1.737	1.735	1.715
N° 4 (Bias1)	1.737	1.739	1.739	1.737	1.728
N° 5 (Bias1)	1.745	1.747	1.746	1.744	1.723
N° 6 (Bias1)	1.737	1.741	1.740	1.733	1.719
N° 7 (Bias2)	1.732	1.735	1.747	1.766	1.893
N° 8 (Bias2)	1.736	1.745	1.741	1.752	1.789
N° 9 (Bias2)	1.738	1.745	1.737	1.748	1.717
N° 10 (Bias2)	1.743	1.751	1.745	1.753	1.726
N° 11 (Bias2)	1.744	1.752	1.751	1.754	1.731
N° 12 (OFF)	1.742	1.750	1.744	1.743	1.729
N° 13 (OFF)	1.738	1.744	1.741	1.735	1.719
N° 14 (OFF)	1.740	1.748	1.746	1.737	1.725
N° 15 (OFF)	1.738	1.745	1.742	1.735	1.719
N° 16 (OFF)	1.737	1.744	1.736	1.734	1.716

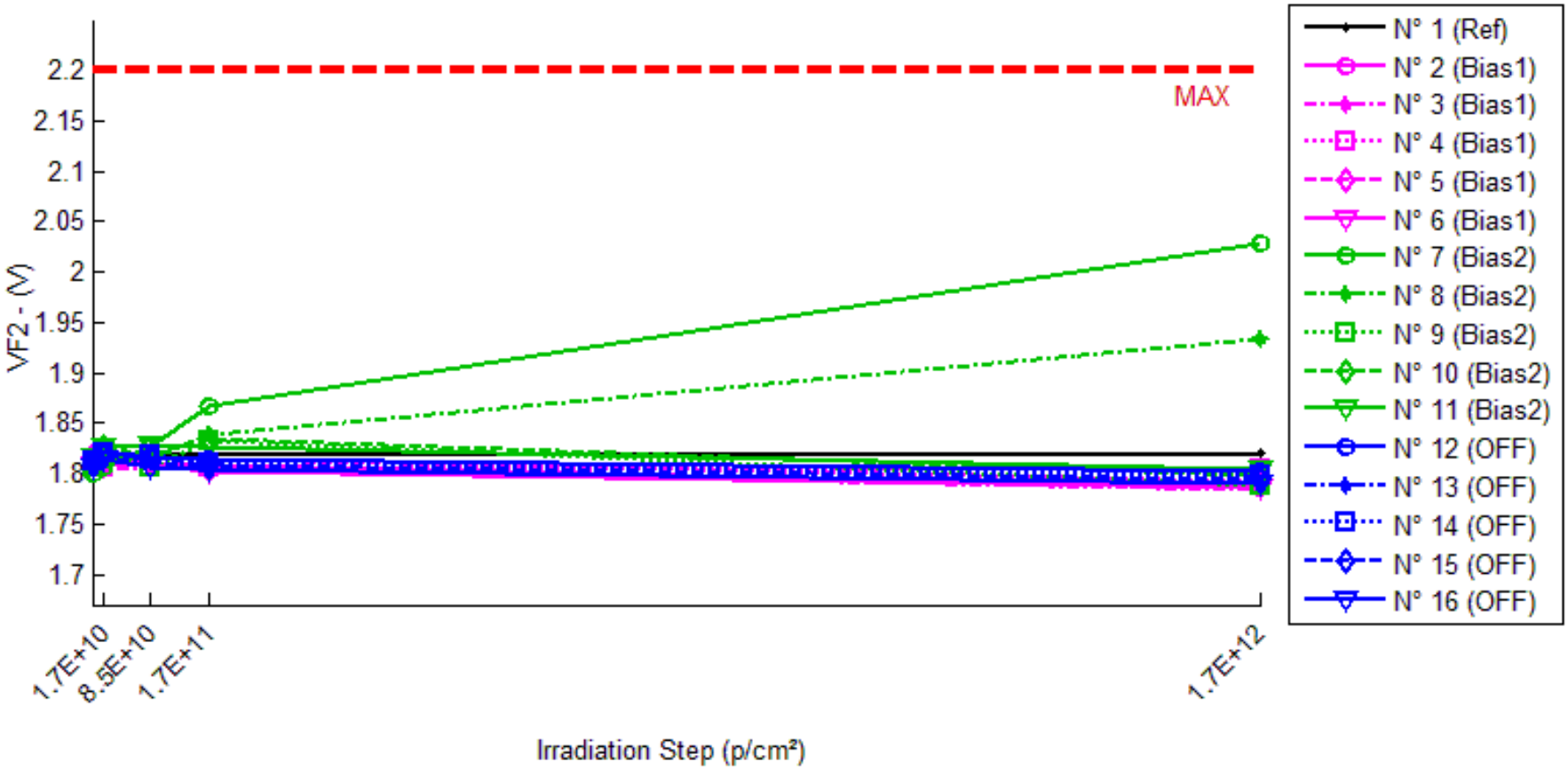
Delta [VF1]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	-3.072E-3	-6.950E-4	-1.131E-3	-1.890E-4
N° 2 (Bias1)	---	2.289E-3	-1.090E-3	-2.338E-3	-2.522E-2
N° 3 (Bias1)	---	1.517E-3	8.800E-5	-1.922E-3	-2.167E-2
N° 4 (Bias1)	---	2.013E-3	1.624E-3	1.620E-4	-9.474E-3
N° 5 (Bias1)	---	2.214E-3	1.840E-3	-2.480E-4	-2.175E-2
N° 6 (Bias1)	---	3.771E-3	2.949E-3	-3.700E-3	-1.779E-2
N° 7 (Bias2)	---	2.980E-3	1.488E-2	3.388E-2	1.612E-1
N° 8 (Bias2)	---	9.455E-3	5.237E-3	1.681E-2	5.316E-2
N° 9 (Bias2)	---	7.733E-3	-9.500E-4	1.016E-2	-2.025E-2
N° 10 (Bias2)	---	7.899E-3	1.208E-3	9.070E-3	-1.737E-2
N° 11 (Bias2)	---	7.967E-3	6.730E-3	9.603E-3	-1.312E-2
N° 12 (OFF)	---	7.550E-3	1.567E-3	8.700E-5	-1.369E-2
N° 13 (OFF)	---	5.954E-3	3.565E-3	-2.741E-3	-1.860E-2
N° 14 (OFF)	---	7.757E-3	6.019E-3	-3.188E-3	-1.544E-2
N° 15 (OFF)	---	6.933E-3	4.495E-3	-3.253E-3	-1.881E-2
N° 16 (OFF)	---	6.635E-3	-1.618E-3	-3.318E-3	-2.091E-2
Average (OFF)	---	2.361E-3	1.082E-3	-1.609E-3	-1.918E-2
σ (OFF)	---	8.439E-4	1.586E-3	1.580E-3	6.029E-3
Average+3σ (OFF)	---	4.892E-3	5.840E-3	3.132E-3	-1.095E-3
Average-3σ (OFF)	---	-1.708E-4	-3.675E-3	-6.350E-3	-3.727E-2
Average (Bias1)	---	7.207E-3	5.422E-3	1.590E-2	3.272E-2
σ (Bias1)	---	2.462E-3	6.116E-3	1.053E-2	7.800E-2
Average+3σ (Bias1)	---	1.459E-2	2.377E-2	4.749E-2	2.667E-1
Average-3σ (Bias1)	---	-1.805E-4	-1.293E-2	-1.568E-2	-2.013E-1
Average (Bias2)	---	6.966E-3	2.806E-3	-2.483E-3	-1.749E-2
σ (Bias2)	---	7.248E-4	2.952E-3	1.454E-3	2.887E-3
Average+3σ (Bias2)	---	9.140E-3	1.166E-2	1.880E-3	-8.827E-3
Average-3σ (Bias2)	---	4.791E-3	-6.051E-3	-6.845E-3	-2.615E-2

30 MeV proton / detailed results

3. VF2

Ta=25°C; If=20mA



30 MeV proton / detailed results

VF2 . (V) **Max = 2.2**

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	1.824	1.819	1.819	1.818	1.820
N° 2 (Bias1)	1.814	1.814	1.810	1.809	1.786
N° 3 (Bias1)	1.809	1.807	1.805	1.804	1.784
N° 4 (Bias1)	1.808	1.807	1.806	1.806	1.804
N° 5 (Bias1)	1.819	1.817	1.817	1.815	1.793
N° 6 (Bias1)	1.809	1.809	1.808	1.802	1.787
N° 7 (Bias2)	1.800	1.806	1.826	1.868	2.028
N° 8 (Bias2)	1.804	1.817	1.815	1.838	1.934
N° 9 (Bias2)	1.806	1.818	1.807	1.832	1.788
N° 10 (Bias2)	1.814	1.826	1.819	1.835	1.798
N° 11 (Bias2)	1.816	1.826	1.828	1.826	1.804
N° 12 (OFF)	1.813	1.822	1.817	1.815	1.803
N° 13 (OFF)	1.806	1.813	1.812	1.805	1.790
N° 14 (OFF)	1.812	1.821	1.819	1.810	1.799
N° 15 (OFF)	1.810	1.819	1.817	1.809	1.794
N° 16 (OFF)	1.806	1.815	1.807	1.805	1.790

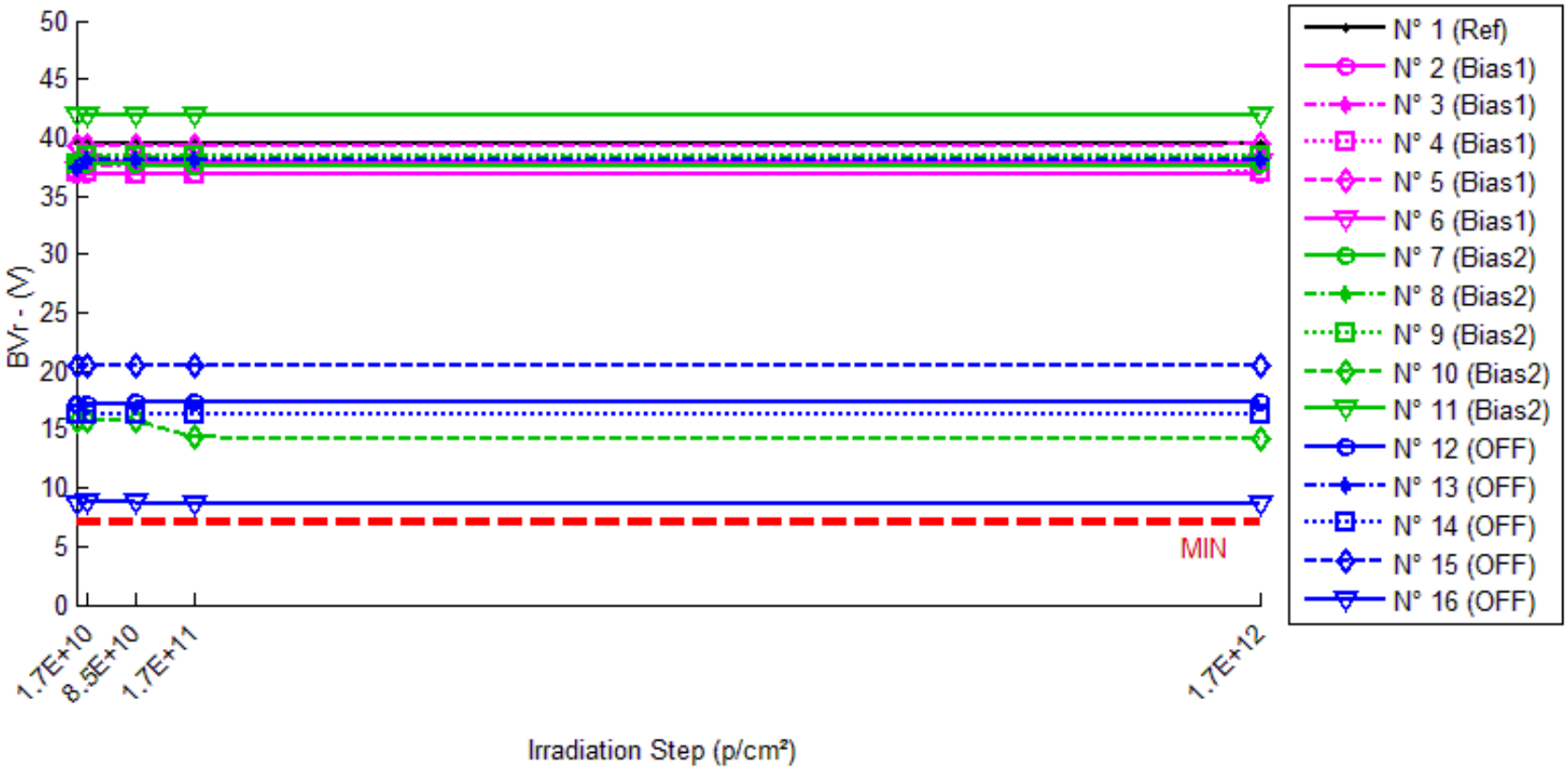
Delta [VF2]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	-4.750E-3	-4.105E-3	-5.244E-3	-3.627E-3
N° 2 (Bias1)	---	-4.850E-4	-4.860E-3	-5.716E-3	-2.875E-2
N° 3 (Bias1)	---	-2.047E-3	-3.707E-3	-5.273E-3	-2.507E-2
N° 4 (Bias1)	---	-1.274E-3	-1.731E-3	-1.884E-3	-4.214E-3
N° 5 (Bias1)	---	-1.264E-3	-1.828E-3	-3.250E-3	-2.533E-2
N° 6 (Bias1)	---	2.820E-4	-4.780E-4	-6.349E-3	-2.162E-2
N° 7 (Bias2)	---	5.754E-3	2.536E-2	6.759E-2	2.279E-1
N° 8 (Bias2)	---	1.365E-2	1.097E-2	3.470E-2	1.299E-1
N° 9 (Bias2)	---	1.251E-2	1.183E-3	2.614E-2	-1.766E-2
N° 10 (Bias2)	---	1.253E-2	4.801E-3	2.105E-2	-1.553E-2
N° 11 (Bias2)	---	1.070E-2	1.277E-2	1.001E-2	-1.130E-2
N° 12 (OFF)	---	9.133E-3	3.507E-3	2.148E-3	-1.064E-2
N° 13 (OFF)	---	7.716E-3	6.541E-3	-5.220E-4	-1.532E-2
N° 14 (OFF)	---	9.350E-3	7.887E-3	-1.233E-3	-1.222E-2
N° 15 (OFF)	---	9.227E-3	6.510E-3	-1.123E-3	-1.617E-2
N° 16 (OFF)	---	9.345E-3	8.310E-4	-1.066E-3	-1.639E-2
Average (OFF)	---	-9.576E-4	-2.521E-3	-4.494E-3	-2.100E-2
σ (OFF)	---	8.861E-4	1.743E-3	1.864E-3	9.715E-3
Average+3σ (OFF)	---	1.701E-3	2.709E-3	1.098E-3	8.150E-3
Average-3σ (OFF)	---	-3.616E-3	-7.751E-3	-1.009E-2	-5.014E-2
Average (Bias1)	---	1.103E-2	1.102E-2	3.190E-2	6.268E-2
σ (Bias1)	---	3.132E-3	9.275E-3	2.186E-2	1.117E-1
Average+3σ (Bias1)	---	2.043E-2	3.884E-2	9.748E-2	3.977E-1
Average-3σ (Bias1)	---	1.633E-3	-1.681E-2	-3.368E-2	-2.723E-1
Average (Bias2)	---	8.954E-3	5.055E-3	-3.592E-4	-1.415E-2
σ (Bias2)	---	6.980E-4	2.854E-3	1.428E-3	2.576E-3
Average+3σ (Bias2)	---	1.105E-2	1.362E-2	3.925E-3	-6.420E-3
Average-3σ (Bias2)	---	6.860E-3	-3.507E-3	-4.644E-3	-2.187E-2

30 MeV proton / detailed results

4. BVr

Ta=25°C; Ir=100µA



30 MeV proton / detailed results

BVr . (V) **Min = 7.0**

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	39.56	39.59	39.52	39.52	39.51
N° 2 (Bias1)	36.85	36.76	36.76	36.76	36.89
N° 3 (Bias1)	37.65	37.56	37.55	37.55	37.59
N° 4 (Bias1)	37.03	36.97	36.93	36.89	36.94
N° 5 (Bias1)	39.35	39.24	39.21	39.22	39.39
N° 6 (Bias1)	37.25	37.87	37.84	37.93	37.90
N° 7 (Bias2)	37.76	37.74	37.70	37.63	37.71
N° 8 (Bias2)	37.59	38.18	38.26	38.19	38.22
N° 9 (Bias2)	37.70	38.36	38.43	38.37	38.38
N° 10 (Bias2)	15.72	15.71	15.72	14.29	14.27
N° 11 (Bias2)	41.94	41.82	41.88	41.87	41.90
N° 12 (OFF)	17.17	17.23	17.25	17.28	17.33
N° 13 (OFF)	37.40	38.00	38.01	38.07	38.05
N° 14 (OFF)	16.34	16.28	16.28	16.32	16.30
N° 15 (OFF)	20.51	20.49	20.49	20.50	20.52
N° 16 (OFF)	8.57	8.79	8.73	8.63	8.70

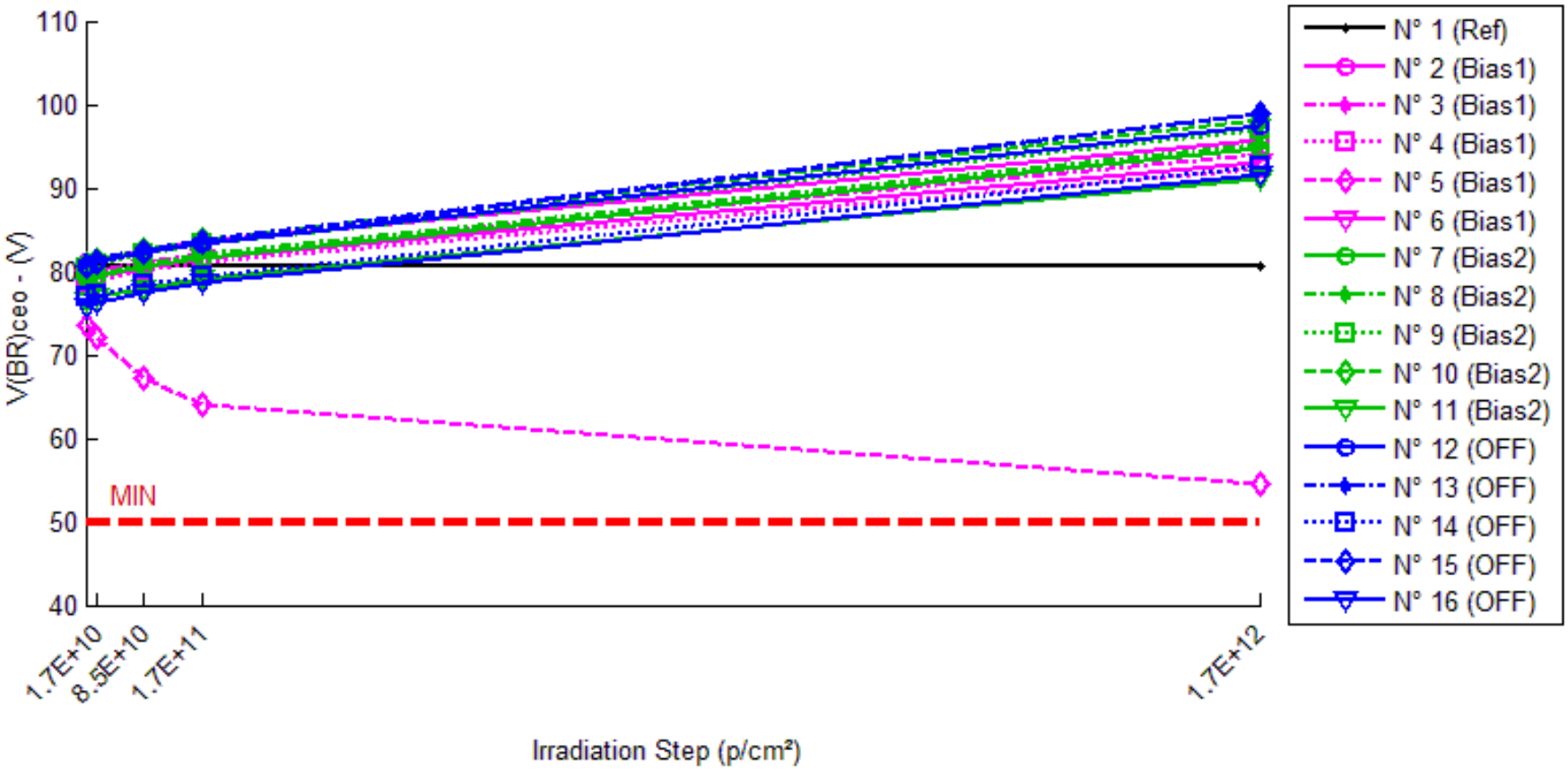
Delta [BVr]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	3.434E-2	-4.060E-2	-4.103E-2	-4.601E-2
N° 2 (Bias1)	---	-8.691E-2	-8.569E-2	-9.127E-2	4.193E-2
N° 3 (Bias1)	---	-8.945E-2	-1.019E-1	-1.023E-1	-6.383E-2
N° 4 (Bias1)	---	-6.003E-2	-9.518E-2	-1.344E-1	-8.831E-2
N° 5 (Bias1)	---	-1.074E-1	-1.384E-1	-1.209E-1	4.038E-2
N° 6 (Bias1)	---	6.214E-1	5.934E-1	6.854E-1	6.486E-1
N° 7 (Bias2)	---	-2.405E-2	-6.644E-2	-1.282E-1	-4.905E-2
N° 8 (Bias2)	---	5.940E-1	6.695E-1	5.996E-1	6.331E-1
N° 9 (Bias2)	---	6.605E-1	7.311E-1	6.687E-1	6.790E-1
N° 10 (Bias2)	---	-1.789E-2	-4.510E-3	-1.437E+0	-1.449E+0
N° 11 (Bias2)	---	-1.166E-1	-5.959E-2	-7.428E-2	-4.260E-2
N° 12 (OFF)	---	5.668E-2	7.695E-2	1.013E-1	1.597E-1
N° 13 (OFF)	---	6.084E-1	6.105E-1	6.788E-1	6.512E-1
N° 14 (OFF)	---	-5.056E-2	-5.424E-2	-1.780E-2	-3.523E-2
N° 15 (OFF)	---	-2.381E-2	-2.123E-2	-1.092E-2	7.270E-3
N° 16 (OFF)	---	2.211E-1	1.641E-1	6.431E-2	1.348E-1
Average (OFF)	---	5.552E-2	3.442E-2	4.729E-2	1.158E-1
σ (OFF)	---	3.168E-1	3.131E-1	3.571E-1	3.037E-1
Average+3σ (OFF)	---	1.006E+0	9.737E-1	1.119E+0	1.027E+0
Average-3σ (OFF)	---	-8.949E-1	-9.049E-1	-1.024E+0	-7.954E-1
Average (Bias1)	---	2.192E-1	2.540E-1	-7.415E-2	-4.576E-2
σ (Bias1)	---	3.753E-1	4.087E-1	8.463E-1	8.596E-1
Average+3σ (Bias1)	---	1.345E+0	1.480E+0	2.465E+0	2.533E+0
Average-3σ (Bias1)	---	-9.066E-1	-9.721E-1	-2.613E+0	-2.625E+0
Average (Bias2)	---	1.623E-1	1.552E-1	1.631E-1	1.836E-1
σ (Bias2)	---	2.709E-1	2.685E-1	2.926E-1	2.741E-1
Average+3σ (Bias2)	---	9.750E-1	9.608E-1	1.041E+0	1.006E+0
Average-3σ (Bias2)	---	-6.503E-1	-6.504E-1	-7.147E-1	-6.389E-1

30 MeV proton / detailed results

5. V(BR)ceo

Ta=25°C; Ic=1mA; Ib=0; If=0



30 MeV proton / detailed results

V(BR)ceo . (V) **Min = 50.0**

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	80.616	80.626	80.523	80.515	80.511
N° 2 (Bias1)	81.026	81.434	82.529	83.613	95.680
N° 3 (Bias1)	79.752	80.113	81.117	82.145	93.949
N° 4 (Bias1)	78.695	78.991	80.151	81.115	92.301
N° 5 (Bias1)	73.628	72.153	67.288	64.027	54.554
N° 6 (Bias1)	79.041	79.351	80.378	81.567	93.105
N° 7 (Bias2)	79.082	79.496	80.547	81.686	94.636
N° 8 (Bias2)	79.259	79.701	80.822	82.137	95.309
N° 9 (Bias2)	80.354	80.848	82.134	83.259	96.983
N° 10 (Bias2)	80.811	81.252	82.559	83.849	98.260
N° 11 (Bias2)	76.485	76.900	77.952	79.041	91.022
N° 12 (OFF)	80.629	81.069	82.327	83.378	97.527
N° 13 (OFF)	80.999	81.495	82.631	83.751	98.853
N° 14 (OFF)	76.856	77.286	78.430	79.492	92.641
N° 15 (OFF)	80.638	81.106	82.327	83.588	98.865
N° 16 (OFF)	75.711	76.164	77.532	78.659	91.467

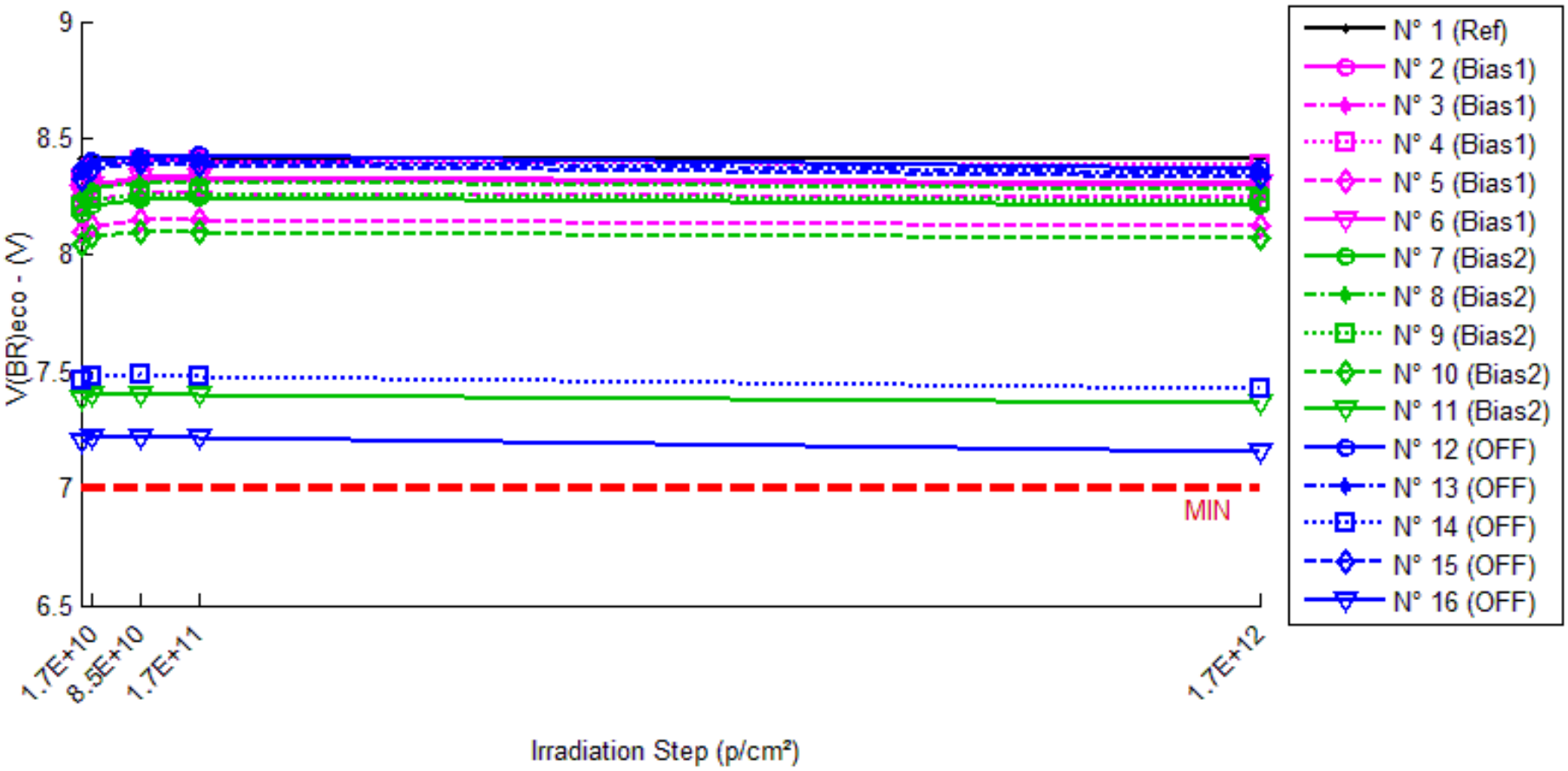
Delta [V(BR)ceo]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	1.044E-2	-9.315E-2	-1.012E-1	-1.047E-1
N° 2 (Bias1)	---	4.080E-1	1.503E+0	2.587E+0	1.465E+1
N° 3 (Bias1)	---	3.611E-1	1.365E+0	2.393E+0	1.420E+1
N° 4 (Bias1)	---	2.960E-1	1.456E+0	2.421E+0	1.361E+1
N° 5 (Bias1)	---	-1.475E+0	-6.339E+0	-9.600E+0	-1.907E+1
N° 6 (Bias1)	---	3.104E-1	1.337E+0	2.526E+0	1.406E+1
N° 7 (Bias2)	---	4.140E-1	1.465E+0	2.604E+0	1.555E+1
N° 8 (Bias2)	---	4.417E-1	1.563E+0	2.878E+0	1.605E+1
N° 9 (Bias2)	---	4.947E-1	1.781E+0	2.905E+0	1.663E+1
N° 10 (Bias2)	---	4.411E-1	1.748E+0	3.038E+0	1.745E+1
N° 11 (Bias2)	---	4.147E-1	1.467E+0	2.556E+0	1.454E+1
N° 12 (OFF)	---	4.400E-1	1.698E+0	2.748E+0	1.690E+1
N° 13 (OFF)	---	4.962E-1	1.633E+0	2.752E+0	1.785E+1
N° 14 (OFF)	---	4.304E-1	1.574E+0	2.636E+0	1.578E+1
N° 15 (OFF)	---	4.677E-1	1.688E+0	2.949E+0	1.823E+1
N° 16 (OFF)	---	4.528E-1	1.821E+0	2.947E+0	1.576E+1
Average (OFF)	---	-1.988E-2	-1.355E-1	6.507E-2	7.490E+0
σ (OFF)	---	8.146E-1	3.469E+0	5.404E+0	1.485E+1
Average+3σ (OFF)	---	2.424E+0	1.027E+1	1.628E+1	5.205E+1
Average-3σ (OFF)	---	-2.464E+0	-1.054E+1	-1.615E+1	-3.707E+1
Average (Bias1)	---	4.412E-1	1.605E+0	2.796E+0	1.604E+1
σ (Bias1)	---	3.280E-2	1.515E-1	2.070E-1	1.099E+0
Average+3σ (Bias1)	---	5.396E-1	2.059E+0	3.417E+0	1.934E+1
Average-3σ (Bias1)	---	3.428E-1	1.150E+0	2.175E+0	1.275E+1
Average (Bias2)	---	4.574E-1	1.683E+0	2.807E+0	1.690E+1
σ (Bias2)	---	2.580E-2	9.153E-2	1.375E-1	1.143E+0
Average+3σ (Bias2)	---	5.348E-1	1.957E+0	3.219E+0	2.033E+1
Average-3σ (Bias2)	---	3.800E-1	1.408E+0	2.394E+0	1.348E+1

30 MeV proton / detailed results

6. V(BR)eco

Ta=25°C; Ic=10µA



30 MeV proton / detailed results

V(BR)eco . (V) **Min = 7.0**

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	8.410	8.409	8.412	8.412	8.412
N° 2 (Bias1)	8.256	8.293	8.318	8.323	8.299
N° 3 (Bias1)	8.200	8.239	8.263	8.266	8.243
N° 4 (Bias1)	8.329	8.370	8.399	8.403	8.385
N° 5 (Bias1)	8.100	8.127	8.147	8.150	8.125
N° 6 (Bias1)	8.262	8.303	8.330	8.330	8.311
N° 7 (Bias2)	8.180	8.214	8.239	8.243	8.208
N° 8 (Bias2)	8.249	8.290	8.310	8.315	8.280
N° 9 (Bias2)	8.203	8.241	8.259	8.264	8.230
N° 10 (Bias2)	8.045	8.079	8.096	8.100	8.069
N° 11 (Bias2)	7.381	7.399	7.402	7.402	7.366
N° 12 (OFF)	8.360	8.403	8.423	8.426	8.368
N° 13 (OFF)	8.365	8.387	8.405	8.403	8.350
N° 14 (OFF)	7.459	7.478	7.486	7.478	7.424
N° 15 (OFF)	8.327	8.369	8.393	8.389	8.334
N° 16 (OFF)	7.204	7.217	7.217	7.215	7.160

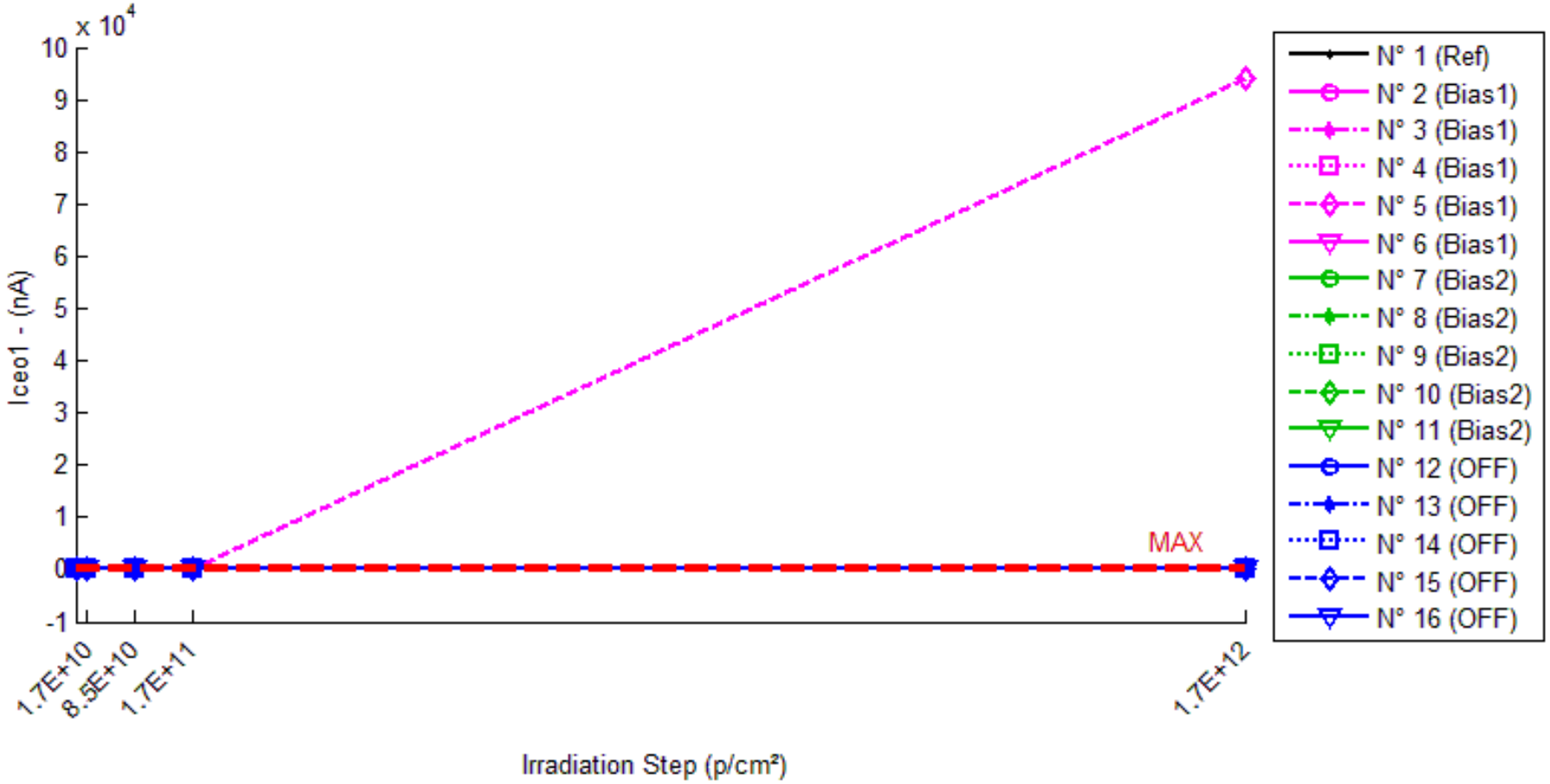
Delta [V(BR)eco]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	-1.074E-3	1.913E-3	2.110E-3	2.316E-3
N° 2 (Bias1)	---	3.737E-2	6.222E-2	6.694E-2	4.277E-2
N° 3 (Bias1)	---	3.828E-2	6.247E-2	6.583E-2	4.235E-2
N° 4 (Bias1)	---	4.035E-2	6.994E-2	7.405E-2	5.525E-2
N° 5 (Bias1)	---	2.679E-2	4.638E-2	4.963E-2	2.496E-2
N° 6 (Bias1)	---	4.133E-2	6.827E-2	6.798E-2	4.836E-2
N° 7 (Bias2)	---	3.398E-2	5.937E-2	6.378E-2	2.795E-2
N° 8 (Bias2)	---	4.192E-2	6.155E-2	6.634E-2	3.112E-2
N° 9 (Bias2)	---	3.791E-2	5.591E-2	6.013E-2	2.659E-2
N° 10 (Bias2)	---	3.393E-2	5.117E-2	5.537E-2	2.416E-2
N° 11 (Bias2)	---	1.762E-2	2.107E-2	2.115E-2	-1.508E-2
N° 12 (OFF)	---	4.303E-2	6.365E-2	6.605E-2	8.094E-3
N° 13 (OFF)	---	2.227E-2	4.034E-2	3.837E-2	-1.483E-2
N° 14 (OFF)	---	1.834E-2	2.697E-2	1.848E-2	-3.540E-2
N° 15 (OFF)	---	4.244E-2	6.618E-2	6.204E-2	6.986E-3
N° 16 (OFF)	---	1.333E-2	1.286E-2	1.095E-2	-4.415E-2
Average (OFF)	---	3.683E-2	6.186E-2	6.489E-2	4.274E-2
σ (OFF)	---	5.827E-3	9.306E-3	9.104E-3	1.123E-2
Average+3σ (OFF)	---	5.431E-2	8.977E-2	9.220E-2	7.642E-2
Average-3σ (OFF)	---	1.935E-2	3.394E-2	3.757E-2	9.056E-3
Average (Bias1)	---	3.307E-2	4.981E-2	5.336E-2	1.895E-2
σ (Bias1)	---	9.248E-3	1.654E-2	1.847E-2	1.919E-2
Average+3σ (Bias1)	---	6.081E-2	9.944E-2	1.088E-1	7.651E-2
Average-3σ (Bias1)	---	5.329E-3	1.870E-4	-2.058E-3	-3.862E-2
Average (Bias2)	---	2.788E-2	4.200E-2	3.918E-2	-1.586E-2
σ (Bias2)	---	1.393E-2	2.308E-2	2.485E-2	2.387E-2
Average+3σ (Bias2)	---	6.966E-2	1.112E-1	1.137E-1	5.575E-2
Average-3σ (Bias2)	---	-1.389E-2	-2.725E-2	-3.539E-2	-8.747E-2

30 MeV proton / detailed results

7. Iceo1

Ta=25°C; Vce=50V; If=0



30 MeV proton / detailed results

Iceo1 . (nA) **Max = 100.0**

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	1.743	1.602	1.359	1.403	1.373
N° 2 (Bias1)	1.788	2.375	5.281	7.907	25.064
N° 3 (Bias1)	1.919	2.174	4.745	7.371	19.413
N° 4 (Bias1)	1.702	2.091	3.699	6.111	15.860
N° 5 (Bias1)	1.381	1.277	1.972	4.514	94085.700
N° 6 (Bias1)	2.126	2.630	5.146	10.737	19.568
N° 7 (Bias2)	1.925	3.037	11.101	13.245	27.400
N° 8 (Bias2)	1.767	2.019	8.443	10.083	18.744
N° 9 (Bias2)	1.865	2.209	9.935	11.386	14.965
N° 10 (Bias2)	1.743	2.247	8.071	11.128	16.230
N° 11 (Bias2)	1.909	2.349	8.739	14.082	25.924
N° 12 (OFF)	2.018	2.225	7.100	10.289	11.416
N° 13 (OFF)	1.922	2.050	6.392	11.874	10.756
N° 14 (OFF)	1.937	2.505	7.557	19.726	19.971
N° 15 (OFF)	2.071	2.388	6.350	14.140	11.853
N° 16 (OFF)	47.046	34.530	32.986	32.556	24.379

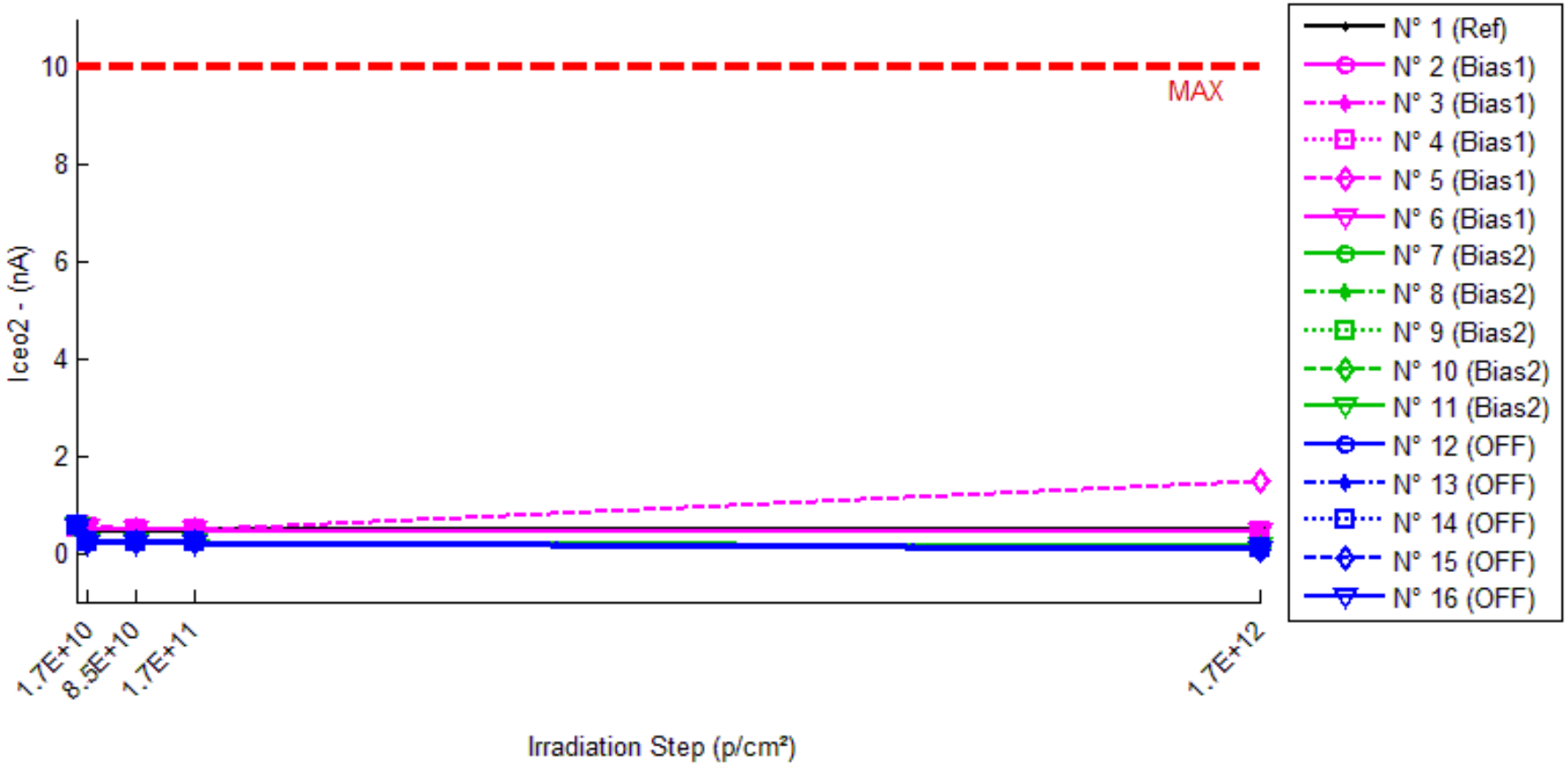
Delta [Iceo1]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	-1.416E-1	-3.840E-1	-3.398E-1	-3.699E-1
N° 2 (Bias1)	---	5.861E-1	3.492E+0	6.119E+0	2.328E+1
N° 3 (Bias1)	---	2.554E-1	2.827E+0	5.453E+0	1.749E+1
N° 4 (Bias1)	---	3.885E-1	1.996E+0	4.409E+0	1.416E+1
N° 5 (Bias1)	---	-1.046E-1	5.908E-1	3.132E+0	9.408E+4
N° 6 (Bias1)	---	5.045E-1	3.021E+0	8.611E+0	1.744E+1
N° 7 (Bias2)	---	1.112E+0	9.176E+0	1.132E+1	2.547E+1
N° 8 (Bias2)	---	2.526E-1	6.676E+0	8.317E+0	1.698E+1
N° 9 (Bias2)	---	3.439E-1	8.069E+0	9.521E+0	1.310E+1
N° 10 (Bias2)	---	5.038E-1	6.327E+0	9.385E+0	1.449E+1
N° 11 (Bias2)	---	4.398E-1	6.830E+0	1.217E+1	2.401E+1
N° 12 (OFF)	---	2.066E-1	5.082E+0	8.271E+0	9.398E+0
N° 13 (OFF)	---	1.283E-1	4.470E+0	9.952E+0	8.834E+0
N° 14 (OFF)	---	5.681E-1	5.620E+0	1.779E+1	1.803E+1
N° 15 (OFF)	---	3.166E-1	4.279E+0	1.207E+1	9.782E+0
N° 16 (OFF)	---	-1.252E+1	-1.406E+1	-1.449E+1	-2.267E+1
Average (OFF)	---	3.260E-1	2.385E+0	5.545E+0	1.883E+4
σ (OFF)	---	2.710E-1	1.140E+0	2.052E+0	4.207E+4
Average+3σ (OFF)	---	1.139E+0	5.804E+0	1.170E+1	1.450E+5
Average-3σ (OFF)	---	-4.870E-1	-1.034E+0	-6.123E-1	-1.074E+5
Average (Bias1)	---	5.303E-1	7.416E+0	1.014E+1	1.881E+1
σ (Bias1)	---	3.386E-1	1.183E+0	1.566E+0	5.616E+0
Average+3σ (Bias1)	---	1.546E+0	1.097E+1	1.484E+1	3.566E+1
Average-3σ (Bias1)	---	-4.855E-1	3.866E+0	5.446E+0	1.962E+0
Average (Bias2)	---	-2.259E+0	1.078E+0	6.718E+0	4.677E+0
σ (Bias2)	---	5.736E+0	8.479E+0	1.239E+1	1.575E+1
Average+3σ (Bias2)	---	1.495E+1	2.652E+1	4.388E+1	5.191E+1
Average-3σ (Bias2)	---	-1.947E+1	-2.436E+1	-3.045E+1	-4.256E+1

30 MeV proton / detailed results

8. Iceo2

Ta=25°C; Vce=5V; If=0



30 MeV proton / detailed results

Iceo2 . (nA) **Max = 10.0**

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	0.531	0.495	0.462	0.481	0.521
N° 2 (Bias1)	0.528	0.521	0.469	0.467	0.432
N° 3 (Bias1)	0.531	0.551	0.473	0.483	0.455
N° 4 (Bias1)	0.535	0.512	0.477	0.490	0.436
N° 5 (Bias1)	0.562	0.528	0.482	0.502	1.507
N° 6 (Bias1)	0.536	0.518	0.492	0.490	0.450
N° 7 (Bias2)	0.543	0.228	0.242	0.233	0.125
N° 8 (Bias2)	0.549	0.234	0.248	0.227	0.136
N° 9 (Bias2)	0.550	0.229	0.243	0.237	0.115
N° 10 (Bias2)	0.561	0.236	0.246	0.234	0.123
N° 11 (Bias2)	0.553	0.237	0.251	0.232	0.138
N° 12 (OFF)	0.558	0.227	0.220	0.220	0.094
N° 13 (OFF)	0.555	0.219	0.220	0.220	0.091
N° 14 (OFF)	0.551	0.229	0.215	0.218	0.090
N° 15 (OFF)	0.558	0.223	0.224	0.222	0.084
N° 16 (OFF)	0.521	0.197	0.197	0.198	0.083

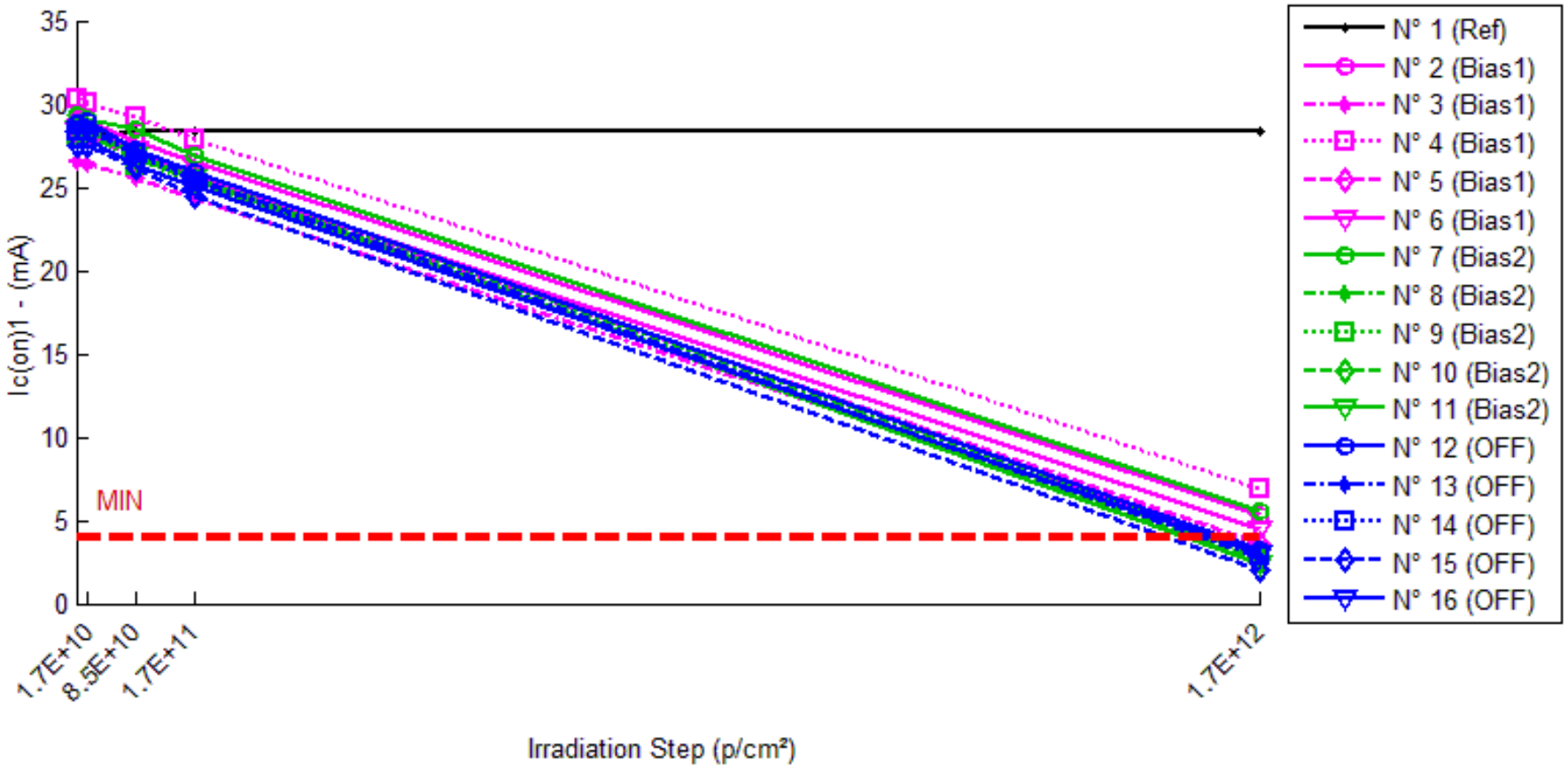
Delta [Iceo2]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	-3.617E-2	-6.912E-2	-5.017E-2	-1.073E-2
N° 2 (Bias1)	---	-7.672E-3	-5.918E-2	-6.090E-2	-9.582E-2
N° 3 (Bias1)	---	1.999E-2	-5.776E-2	-4.812E-2	-7.528E-2
N° 4 (Bias1)	---	-2.335E-2	-5.784E-2	-4.560E-2	-9.971E-2
N° 5 (Bias1)	---	-3.370E-2	-8.006E-2	-6.010E-2	9.448E-1
N° 6 (Bias1)	---	-1.815E-2	-4.372E-2	-4.619E-2	-8.588E-2
N° 7 (Bias2)	---	-3.144E-1	-3.011E-1	-3.101E-1	-4.172E-1
N° 8 (Bias2)	---	-3.153E-1	-3.016E-1	-3.223E-1	-4.134E-1
N° 9 (Bias2)	---	-3.206E-1	-3.065E-1	-3.131E-1	-4.350E-1
N° 10 (Bias2)	---	-3.260E-1	-3.159E-1	-3.279E-1	-4.382E-1
N° 11 (Bias2)	---	-3.153E-1	-3.013E-1	-3.207E-1	-4.149E-1
N° 12 (OFF)	---	-3.306E-1	-3.380E-1	-3.377E-1	-4.639E-1
N° 13 (OFF)	---	-3.359E-1	-3.345E-1	-3.343E-1	-4.633E-1
N° 14 (OFF)	---	-3.221E-1	-3.358E-1	-3.332E-1	-4.614E-1
N° 15 (OFF)	---	-3.351E-1	-3.340E-1	-3.363E-1	-4.740E-1
N° 16 (OFF)	---	-3.244E-1	-3.240E-1	-3.234E-1	-4.387E-1
Average (OFF)	---	-1.258E-2	-5.971E-2	-5.218E-2	1.176E-1
σ (OFF)	---	2.048E-2	1.301E-2	7.657E-3	4.625E-1
Average+3σ (OFF)	---	4.887E-2	-2.067E-2	-2.921E-2	1.505E+0
Average-3σ (OFF)	---	-7.402E-2	-9.875E-2	-7.515E-2	-1.270E+0
Average (Bias1)	---	-3.183E-1	-3.053E-1	-3.188E-1	-4.238E-1
σ (Bias1)	---	4.917E-3	6.325E-3	7.205E-3	1.187E-2
Average+3σ (Bias1)	---	-3.036E-1	-2.863E-1	-2.972E-1	-3.881E-1
Average-3σ (Bias1)	---	-3.331E-1	-3.242E-1	-3.404E-1	-4.594E-1
Average (Bias2)	---	-3.296E-1	-3.333E-1	-3.330E-1	-4.602E-1
σ (Bias2)	---	6.214E-3	5.412E-3	5.652E-3	1.300E-2
Average+3σ (Bias2)	---	-3.110E-1	-3.170E-1	-3.160E-1	-4.213E-1
Average-3σ (Bias2)	---	-3.483E-1	-3.495E-1	-3.499E-1	-4.992E-1

30 MeV proton / detailed results

9. Ic(on)1

Ta=25°C; Vce=5V; If=10mA



30 MeV proton / detailed results

Ic(on)1 . (mA) **Min = 4.0**

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	28.158	28.000	28.312	28.348	28.368
N° 2 (Bias1)	29.069	28.938	27.697	26.542	5.295
N° 3 (Bias1)	26.543	26.454	25.492	24.285	3.225
N° 4 (Bias1)	30.305	30.071	29.170	27.877	6.845
N° 5 (Bias1)	28.164	28.074	26.886	25.537	3.550
N° 6 (Bias1)	28.310	28.312	27.305	25.651	4.411
N° 7 (Bias2)	29.322	29.132	28.418	26.836	5.581
N° 8 (Bias2)	28.240	28.291	26.667	25.505	3.105
N° 9 (Bias2)	27.969	27.902	26.274	25.253	2.819
N° 10 (Bias2)	28.580	28.473	26.802	25.481	2.626
N° 11 (Bias2)	28.477	28.427	26.848	25.580	2.326
N° 12 (OFF)	28.893	28.914	27.261	25.864	3.268
N° 13 (OFF)	28.488	28.469	27.153	25.583	2.800
N° 14 (OFF)	28.322	28.360	27.063	25.295	2.916
N° 15 (OFF)	27.559	27.465	26.153	24.441	2.040
N° 16 (OFF)	27.888	27.831	26.266	25.023	2.998

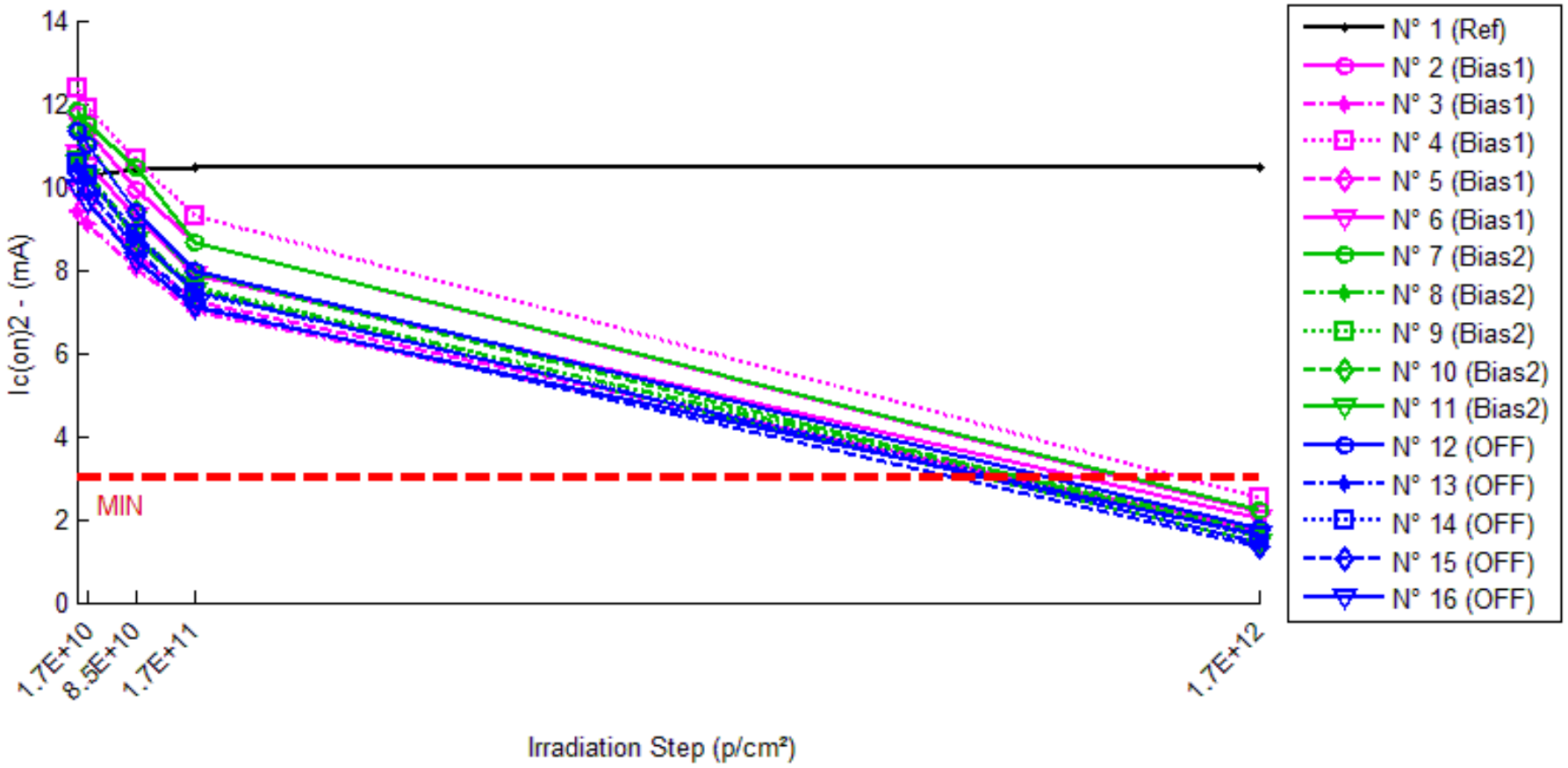
Delta [Ic(on)1]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	-1.582E-1	1.541E-1	1.899E-1	2.099E-1
N° 2 (Bias1)	---	-1.317E-1	-1.372E+0	-2.527E+0	-2.377E+1
N° 3 (Bias1)	---	-8.845E-2	-1.051E+0	-2.258E+0	-2.332E+1
N° 4 (Bias1)	---	-2.332E-1	-1.134E+0	-2.428E+0	-2.346E+1
N° 5 (Bias1)	---	-8.995E-2	-1.278E+0	-2.626E+0	-2.461E+1
N° 6 (Bias1)	---	2.450E-3	-1.005E+0	-2.659E+0	-2.390E+1
N° 7 (Bias2)	---	-1.901E-1	-9.039E-1	-2.486E+0	-2.374E+1
N° 8 (Bias2)	---	5.132E-2	-1.573E+0	-2.735E+0	-2.513E+1
N° 9 (Bias2)	---	-6.699E-2	-1.695E+0	-2.716E+0	-2.515E+1
N° 10 (Bias2)	---	-1.071E-1	-1.778E+0	-3.099E+0	-2.595E+1
N° 11 (Bias2)	---	-5.027E-2	-1.629E+0	-2.897E+0	-2.615E+1
N° 12 (OFF)	---	2.079E-2	-1.633E+0	-3.029E+0	-2.563E+1
N° 13 (OFF)	---	-1.954E-2	-1.335E+0	-2.905E+0	-2.569E+1
N° 14 (OFF)	---	3.753E-2	-1.259E+0	-3.027E+0	-2.541E+1
N° 15 (OFF)	---	-9.409E-2	-1.406E+0	-3.119E+0	-2.552E+1
N° 16 (OFF)	---	-5.608E-2	-1.622E+0	-2.864E+0	-2.489E+1
Average (OFF)	---	-1.082E-1	-1.168E+0	-2.499E+0	-2.381E+1
σ (OFF)	---	8.538E-2	1.543E-1	1.626E-1	5.050E-1
Average+3σ (OFF)	---	1.479E-1	-7.052E-1	-2.012E+0	-2.230E+1
Average-3σ (OFF)	---	-3.643E-1	-1.631E+0	-2.987E+0	-2.533E+1
Average (Bias1)	---	-7.263E-2	-1.516E+0	-2.787E+0	-2.523E+1
σ (Bias1)	---	8.787E-2	3.504E-1	2.276E-1	9.491E-1
Average+3σ (Bias1)	---	1.910E-1	-4.645E-1	-2.104E+0	-2.238E+1
Average-3σ (Bias1)	---	-3.362E-1	-2.567E+0	-3.469E+0	-2.807E+1
Average (Bias2)	---	-2.228E-2	-1.451E+0	-2.989E+0	-2.543E+1
σ (Bias2)	---	5.417E-2	1.691E-1	1.031E-1	3.184E-1
Average+3σ (Bias2)	---	1.402E-1	-9.438E-1	-2.679E+0	-2.447E+1
Average-3σ (Bias2)	---	-1.848E-1	-1.958E+0	-3.298E+0	-2.638E+1

30 MeV proton / detailed results

10.Ic(on)2

Ta=25°C; Vce=0.4V; If=10mA



30 MeV proton / detailed results

Ic(on)2 . (mA) **Min = 3.0**

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	10.391	10.267	10.435	10.467	10.467
N° 2 (Bias1)	11.732	11.362	9.919	8.676	2.164
N° 3 (Bias1)	9.375	9.084	8.023	6.981	1.775
N° 4 (Bias1)	12.343	11.855	10.663	9.310	2.510
N° 5 (Bias1)	9.961	9.640	8.383	7.234	1.724
N° 6 (Bias1)	10.804	10.496	9.272	7.857	2.039
N° 7 (Bias2)	11.825	11.476	10.474	8.637	2.216
N° 8 (Bias2)	10.611	10.307	8.840	7.548	1.741
N° 9 (Bias2)	10.609	10.273	8.787	7.597	1.643
N° 10 (Bias2)	11.415	11.028	9.404	7.949	1.568
N° 11 (Bias2)	10.560	10.197	8.723	7.464	1.451
N° 12 (OFF)	11.337	10.989	9.385	7.983	1.780
N° 13 (OFF)	10.442	10.154	8.812	7.503	1.428
N° 14 (OFF)	10.583	10.271	8.865	7.451	1.594
N° 15 (OFF)	10.302	9.910	8.494	7.126	1.326
N° 16 (OFF)	9.954	9.636	8.232	7.078	1.615

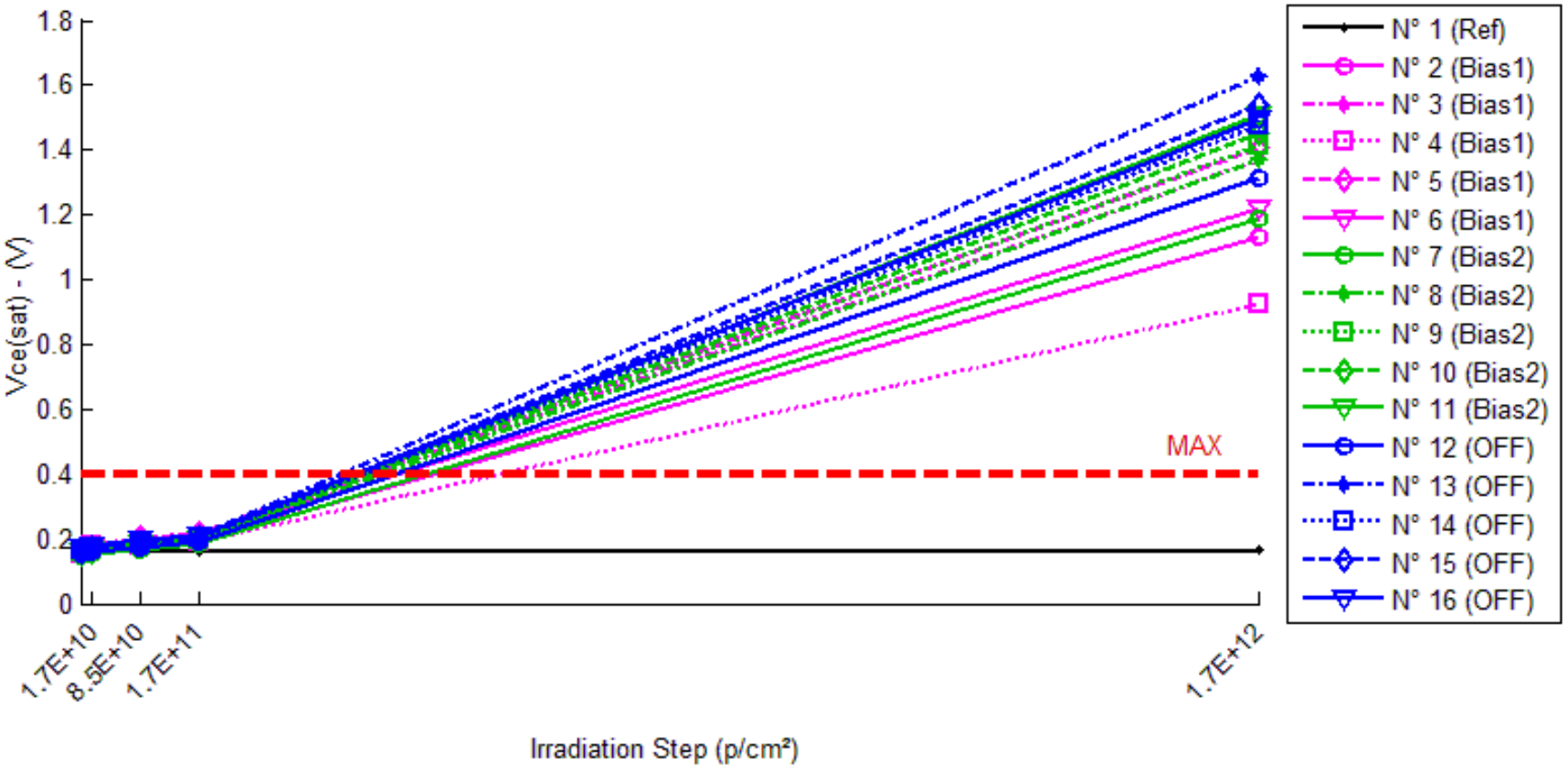
Delta [Ic(on)2]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	-1.233E-1	4.431E-2	7.598E-2	7.595E-2
N° 2 (Bias1)	---	-3.703E-1	-1.812E+0	-3.056E+0	-9.568E+0
N° 3 (Bias1)	---	-2.909E-1	-1.351E+0	-2.394E+0	-7.600E+0
N° 4 (Bias1)	---	-4.882E-1	-1.681E+0	-3.034E+0	-9.833E+0
N° 5 (Bias1)	---	-3.216E-1	-1.578E+0	-2.727E+0	-8.237E+0
N° 6 (Bias1)	---	-3.074E-1	-1.531E+0	-2.947E+0	-8.764E+0
N° 7 (Bias2)	---	-3.492E-1	-1.350E+0	-3.188E+0	-9.609E+0
N° 8 (Bias2)	---	-3.042E-1	-1.771E+0	-3.063E+0	-8.870E+0
N° 9 (Bias2)	---	-3.364E-1	-1.823E+0	-3.013E+0	-8.966E+0
N° 10 (Bias2)	---	-3.867E-1	-2.010E+0	-3.465E+0	-9.847E+0
N° 11 (Bias2)	---	-3.631E-1	-1.836E+0	-3.096E+0	-9.109E+0
N° 12 (OFF)	---	-3.478E-1	-1.952E+0	-3.354E+0	-9.557E+0
N° 13 (OFF)	---	-2.876E-1	-1.629E+0	-2.938E+0	-9.013E+0
N° 14 (OFF)	---	-3.119E-1	-1.718E+0	-3.133E+0	-8.989E+0
N° 15 (OFF)	---	-3.919E-1	-1.808E+0	-3.176E+0	-8.975E+0
N° 16 (OFF)	---	-3.176E-1	-1.722E+0	-2.876E+0	-8.340E+0
Average (OFF)	---	-3.557E-1	-1.591E+0	-2.831E+0	-8.800E+0
σ (OFF)	---	7.980E-2	1.719E-1	2.770E-1	9.241E-1
Average+3σ (OFF)	---	-1.163E-1	-1.075E+0	-2.000E+0	-6.028E+0
Average-3σ (OFF)	---	-5.951E-1	-2.107E+0	-3.662E+0	-1.157E+1
Average (Bias1)	---	-3.479E-1	-1.758E+0	-3.165E+0	-9.280E+0
σ (Bias1)	---	3.074E-2	2.451E-1	1.797E-1	4.259E-1
Average+3σ (Bias1)	---	-2.557E-1	-1.023E+0	-2.626E+0	-8.002E+0
Average-3σ (Bias1)	---	-4.401E-1	-2.494E+0	-3.704E+0	-1.056E+1
Average (Bias2)	---	-3.314E-1	-1.766E+0	-3.095E+0	-8.975E+0
σ (Bias2)	---	4.006E-2	1.219E-1	1.920E-1	4.314E-1
Average+3σ (Bias2)	---	-2.112E-1	-1.400E+0	-2.519E+0	-7.681E+0
Average-3σ (Bias2)	---	-4.516E-1	-2.132E+0	-3.671E+0	-1.027E+1

30 MeV proton / detailed results

11.Vce(sat)

Ta=25°C; If=50mA; Ic=10mA



30 MeV proton / detailed results

Vce(sat) . (V) **Max = 0.4**

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	0.166	0.164	0.167	0.163	0.164
N° 2 (Bias1)	0.156	0.163	0.183	0.190	1.132
N° 3 (Bias1)	0.173	0.183	0.195	0.210	1.369
N° 4 (Bias1)	0.153	0.177	0.178	0.193	0.925
N° 5 (Bias1)	0.167	0.175	0.201	0.217	1.407
N° 6 (Bias1)	0.162	0.170	0.182	0.210	1.220
N° 7 (Bias2)	0.149	0.153	0.169	0.186	1.186
N° 8 (Bias2)	0.160	0.162	0.182	0.200	1.370
N° 9 (Bias2)	0.162	0.166	0.184	0.200	1.413
N° 10 (Bias2)	0.155	0.159	0.177	0.195	1.453
N° 11 (Bias2)	0.161	0.165	0.182	0.200	1.509
N° 12 (OFF)	0.154	0.160	0.174	0.193	1.315
N° 13 (OFF)	0.176	0.179	0.192	0.210	1.627
N° 14 (OFF)	0.165	0.172	0.184	0.204	1.474
N° 15 (OFF)	0.159	0.170	0.183	0.202	1.537
N° 16 (OFF)	0.172	0.178	0.195	0.212	1.497

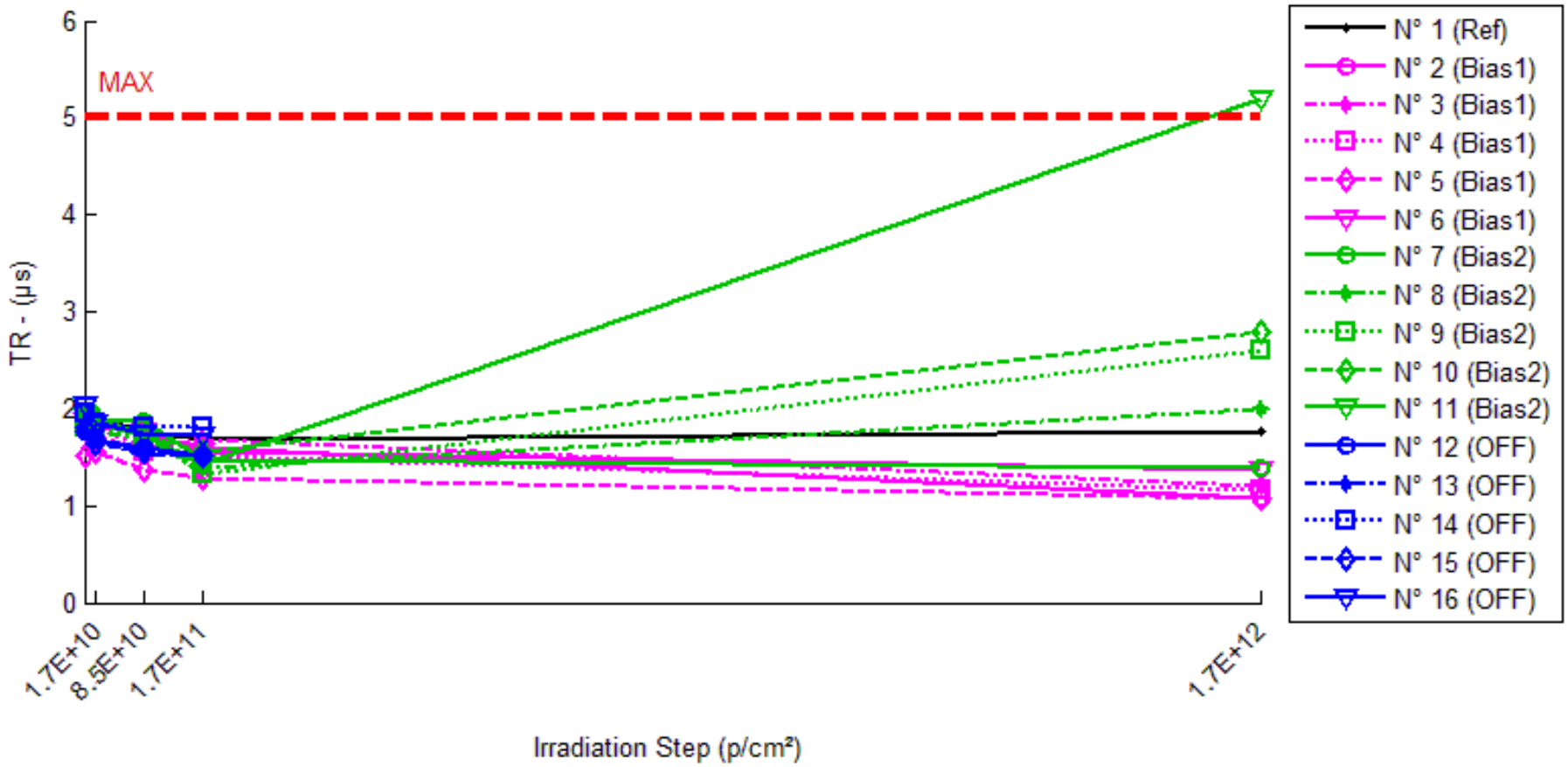
Delta [Vce(sat)]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	-1.563E-3	1.206E-3	-2.808E-3	-1.838E-3
N° 2 (Bias1)	---	6.988E-3	2.630E-2	3.410E-2	9.757E-1
N° 3 (Bias1)	---	1.004E-2	2.217E-2	3.718E-2	1.196E+0
N° 4 (Bias1)	---	2.445E-2	2.543E-2	4.003E-2	7.721E-1
N° 5 (Bias1)	---	8.048E-3	3.414E-2	4.981E-2	1.240E+0
N° 6 (Bias1)	---	8.824E-3	2.012E-2	4.827E-2	1.059E+0
N° 7 (Bias2)	---	3.371E-3	1.979E-2	3.640E-2	1.037E+0
N° 8 (Bias2)	---	2.688E-3	2.208E-2	4.013E-2	1.210E+0
N° 9 (Bias2)	---	4.632E-3	2.175E-2	3.813E-2	1.251E+0
N° 10 (Bias2)	---	3.828E-3	2.182E-2	3.994E-2	1.298E+0
N° 11 (Bias2)	---	4.292E-3	2.119E-2	3.902E-2	1.348E+0
N° 12 (OFF)	---	5.920E-3	2.048E-2	3.916E-2	1.162E+0
N° 13 (OFF)	---	3.024E-3	1.613E-2	3.471E-2	1.451E+0
N° 14 (OFF)	---	7.295E-3	1.931E-2	3.879E-2	1.309E+0
N° 15 (OFF)	---	1.152E-2	2.432E-2	4.373E-2	1.378E+0
N° 16 (OFF)	---	6.824E-3	2.347E-2	4.036E-2	1.325E+0
Average (OFF)	---	1.167E-2	2.563E-2	4.188E-2	1.049E+0
σ (OFF)	---	7.233E-3	5.369E-3	6.888E-3	1.874E-1
Average+3σ (OFF)	---	3.337E-2	4.174E-2	6.254E-2	1.611E+0
Average-3σ (OFF)	---	-1.003E-2	9.525E-3	2.121E-2	4.865E-1
Average (Bias1)	---	3.762E-3	2.133E-2	3.872E-2	1.229E+0
σ (Bias1)	---	7.662E-4	9.188E-4	1.524E-3	1.189E-1
Average+3σ (Bias1)	---	6.061E-3	2.408E-2	4.330E-2	1.586E+0
Average-3σ (Bias1)	---	1.464E-3	1.857E-2	3.415E-2	8.721E-1
Average (Bias2)	---	6.917E-3	2.074E-2	3.935E-2	1.325E+0
σ (Bias2)	---	3.061E-3	3.300E-3	3.242E-3	1.068E-1
Average+3σ (Bias2)	---	1.610E-2	3.064E-2	4.908E-2	1.646E+0
Average-3σ (Bias2)	---	-2.268E-3	1.084E-2	2.963E-2	1.005E+0

30 MeV proton / detailed results

12.TR

Ta=25°C; Vce=5V; If=2mA; RL=100 Ohms



30 MeV proton / detailed results

TR . (µs) **Max = 5.0**

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	1.84	1.92	1.76	1.68	1.76
N° 2 (Bias1)	1.80	1.84	1.72	1.60	1.08
N° 3 (Bias1)	1.84	1.80	1.60	1.68	1.20
N° 4 (Bias1)	1.88	1.72	1.56	1.52	1.16
N° 5 (Bias1)	1.52	1.56	1.36	1.28	1.08
N° 6 (Bias1)	1.88	1.80	1.76	1.56	1.36
N° 7 (Bias2)	1.84	1.88	1.88	1.48	1.40
N° 8 (Bias2)	1.80	1.76	1.68	1.40	2.00
N° 9 (Bias2)	1.80	1.76	1.72	1.32	2.60
N° 10 (Bias2)	1.92	1.92	1.72	1.56	2.80
N° 11 (Bias2)	1.92	1.84	1.72	1.44	5.20
N° 12 (OFF)	1.76	1.68	1.60	1.52	Not Measurable
N° 13 (OFF)	1.76	1.68	1.52	1.52	Not Measurable
N° 14 (OFF)	1.96	1.84	1.81	1.80	Not Measurable
N° 15 (OFF)	1.80	1.64	1.55	1.52	Not Measurable
N° 16 (OFF)	2.04	1.84	1.75	1.72	Not Measurable

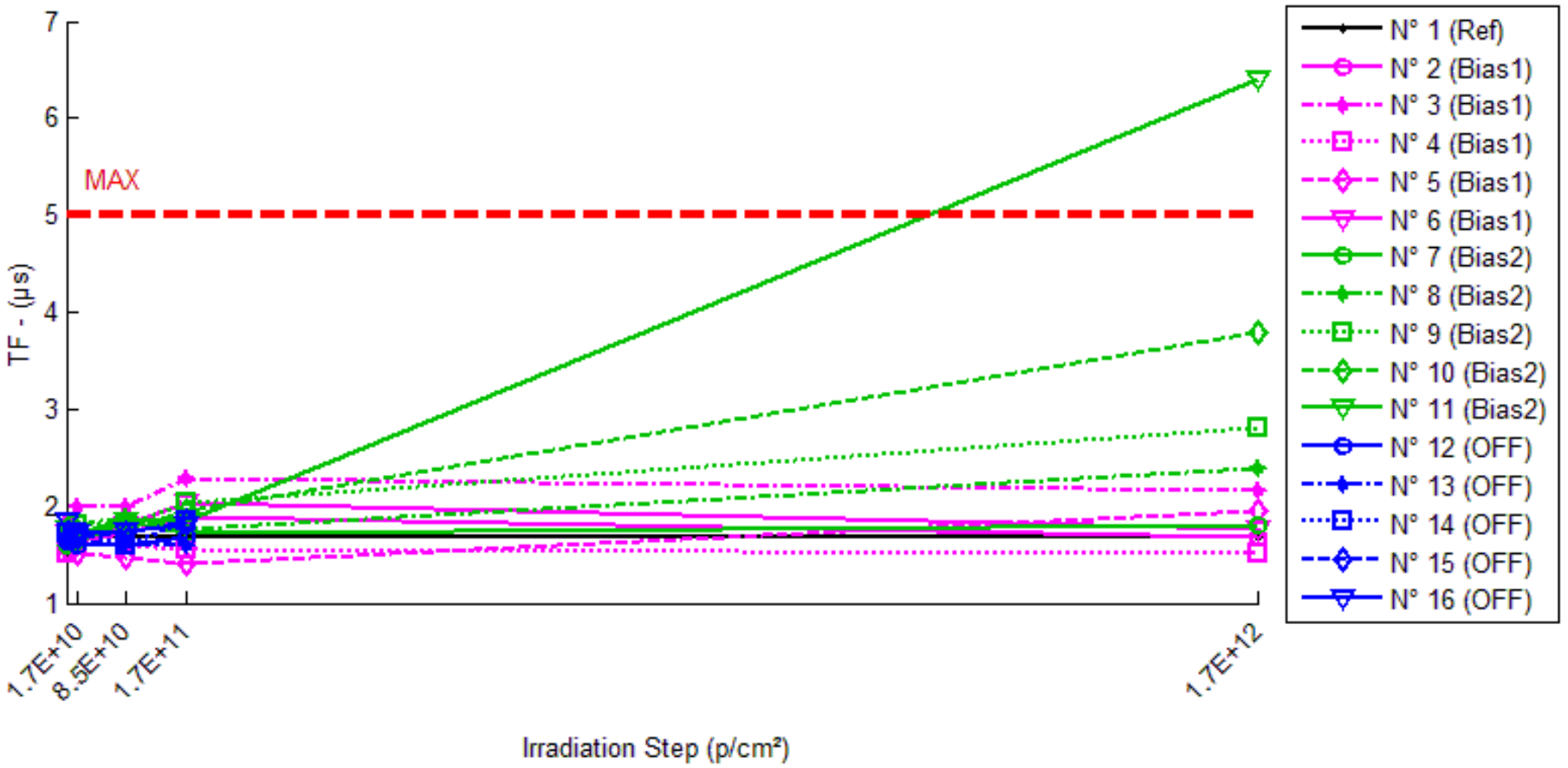
Delta [TR]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	8.000E-2	-8.000E-2	-1.600E-1	-8.000E-2
N° 2 (Bias1)	---	4.000E-2	-8.000E-2	-2.000E-1	-7.200E-1
N° 3 (Bias1)	---	-4.000E-2	-2.400E-1	-1.600E-1	-6.400E-1
N° 4 (Bias1)	---	-1.600E-1	-3.200E-1	-3.600E-1	-7.200E-1
N° 5 (Bias1)	---	4.000E-2	-1.600E-1	-2.400E-1	-4.400E-1
N° 6 (Bias1)	---	-8.000E-2	-1.200E-1	-3.200E-1	-5.200E-1
N° 7 (Bias2)	---	4.000E-2	4.000E-2	-3.600E-1	-4.400E-1
N° 8 (Bias2)	---	-4.000E-2	-1.200E-1	-4.000E-1	2.000E-1
N° 9 (Bias2)	---	-4.000E-2	-8.000E-2	-4.800E-1	8.000E-1
N° 10 (Bias2)	---	0.000E+0	-2.000E-1	-3.600E-1	8.800E-1
N° 11 (Bias2)	---	-8.000E-2	-2.000E-1	-4.800E-1	3.280E+0
N° 12 (OFF)	---	-8.000E-2	-1.600E-1	-2.400E-1	NaN
N° 13 (OFF)	---	-8.000E-2	-2.400E-1	-2.400E-1	NaN
N° 14 (OFF)	---	-1.200E-1	-1.500E-1	-1.600E-1	NaN
N° 15 (OFF)	---	-1.600E-1	-2.500E-1	-2.800E-1	NaN
N° 16 (OFF)	---	-2.000E-1	-2.900E-1	-3.200E-1	NaN
Average (OFF)	---	-4.000E-2	-1.840E-1	-2.560E-1	-6.080E-1
σ (OFF)	---	8.485E-2	9.633E-2	8.295E-2	1.246E-1
Average+3σ (OFF)	---	2.146E-1	1.050E-1	-7.163E-3	-2.343E-1
Average-3σ (OFF)	---	-2.946E-1	-4.730E-1	-5.048E-1	-9.817E-1
Average (Bias1)	---	-2.400E-2	-1.120E-1	-4.160E-1	9.440E-1
σ (Bias1)	---	4.561E-2	9.960E-2	6.066E-2	1.410E+0
Average+3σ (Bias1)	---	1.128E-1	1.868E-1	-2.340E-1	5.174E+0
Average-3σ (Bias1)	---	-1.608E-1	-4.108E-1	-5.980E-1	-3.286E+0
Average (Bias2)	---	-1.280E-1	-2.180E-1	-2.480E-1	NaN
σ (Bias2)	---	5.215E-2	6.058E-2	5.933E-2	0.000E+0
Average+3σ (Bias2)	---	2.846E-2	-3.626E-2	-7.001E-2	NaN
Average-3σ (Bias2)	---	-2.845E-1	-3.997E-1	-4.260E-1	NaN

30 MeV proton / detailed results

13.TF

Ta=25°C; Vce=5V; If=2mA; RL=100 Ohms



30 MeV proton / detailed results

TF . (µs) **Max = 5.0**

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	1.68	1.76	1.68	1.68	1.68
N° 2 (Bias1)	1.60	1.64	1.72	1.88	1.68
N° 3 (Bias1)	1.84	2.00	2.00	2.28	2.16
N° 4 (Bias1)	1.52	1.60	1.60	1.56	1.52
N° 5 (Bias1)	1.56	1.52	1.48	1.40	1.96
N° 6 (Bias1)	1.72	1.68	1.80	2.04	1.76
N° 7 (Bias2)	1.60	1.64	1.84	1.72	1.80
N° 8 (Bias2)	1.64	1.80	1.88	1.76	2.40
N° 9 (Bias2)	1.72	1.80	1.80	2.04	2.80
N° 10 (Bias2)	1.76	1.72	1.76	1.96	3.80
N° 11 (Bias2)	1.76	1.72	1.84	1.84	6.40
N° 12 (OFF)	1.64	1.60	1.60	1.68	Not Measurable
N° 13 (OFF)	1.68	1.64	1.61	1.60	Not Measurable
N° 14 (OFF)	1.72	1.72	1.60	1.84	Not Measurable
N° 15 (OFF)	1.68	1.68	1.73	1.84	Not Measurable
N° 16 (OFF)	1.84	1.72	1.74	1.80	Not Measurable

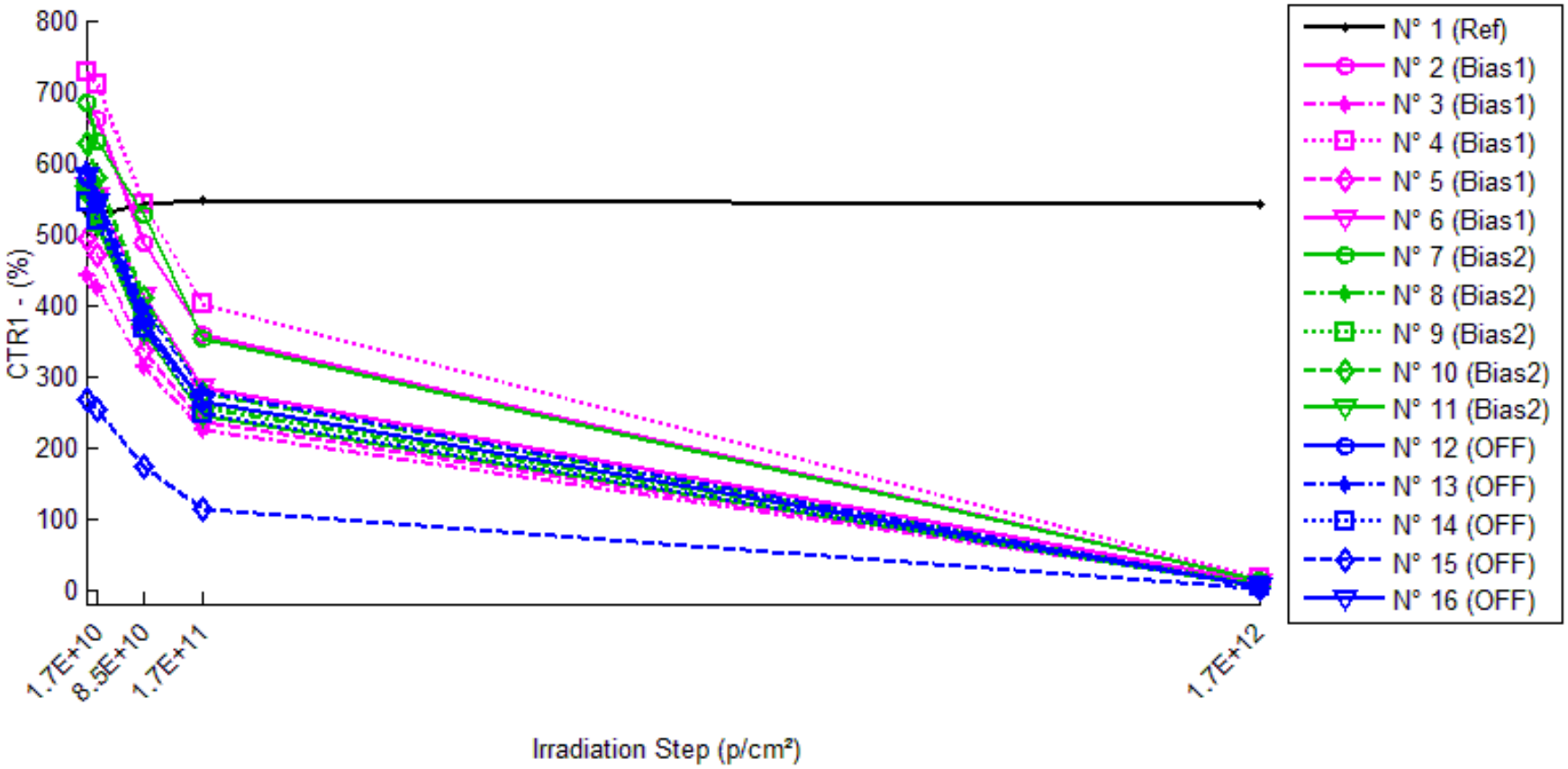
Delta [TF]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	8.000E-2	0.000E+0	0.000E+0	0.000E+0
N° 2 (Bias1)	---	4.000E-2	1.200E-1	2.800E-1	8.000E-2
N° 3 (Bias1)	---	1.600E-1	1.600E-1	4.400E-1	3.200E-1
N° 4 (Bias1)	---	8.000E-2	8.000E-2	4.000E-2	0.000E+0
N° 5 (Bias1)	---	-4.000E-2	-8.000E-2	-1.600E-1	4.000E-1
N° 6 (Bias1)	---	-4.000E-2	8.000E-2	3.200E-1	4.000E-2
N° 7 (Bias2)	---	4.000E-2	2.400E-1	1.200E-1	2.000E-1
N° 8 (Bias2)	---	1.600E-1	2.400E-1	1.200E-1	7.600E-1
N° 9 (Bias2)	---	8.000E-2	8.000E-2	3.200E-1	1.080E+0
N° 10 (Bias2)	---	-4.000E-2	0.000E+0	2.000E-1	2.040E+0
N° 11 (Bias2)	---	-4.000E-2	8.000E-2	8.000E-2	4.640E+0
N° 12 (OFF)	---	-4.000E-2	-4.000E-2	4.000E-2	NaN
N° 13 (OFF)	---	-4.000E-2	-7.000E-2	-8.000E-2	NaN
N° 14 (OFF)	---	0.000E+0	-1.200E-1	1.200E-1	NaN
N° 15 (OFF)	---	0.000E+0	5.000E-2	1.600E-1	NaN
N° 16 (OFF)	---	-1.200E-1	-1.000E-1	-4.000E-2	NaN
Average (OFF)	---	4.000E-2	7.200E-2	1.840E-1	1.680E-1
σ (OFF)	---	8.485E-2	9.121E-2	2.410E-1	1.798E-1
Average+3σ (OFF)	---	2.946E-1	3.456E-1	9.070E-1	7.073E-1
Average-3σ (OFF)	---	-2.146E-1	-2.016E-1	-5.390E-1	-3.713E-1
Average (Bias1)	---	4.000E-2	1.280E-1	1.680E-1	1.744E+0
σ (Bias1)	---	8.485E-2	1.073E-1	9.550E-2	1.751E+0
Average+3σ (Bias1)	---	2.946E-1	4.500E-1	4.545E-1	6.998E+0
Average-3σ (Bias1)	---	-2.146E-1	-1.940E-1	-1.185E-1	-3.510E+0
Average (Bias2)	---	-4.000E-2	-5.600E-2	4.000E-2	NaN
σ (Bias2)	---	4.899E-2	6.656E-2	1.020E-1	0.000E+0
Average+3σ (Bias2)	---	1.070E-1	1.437E-1	3.459E-1	NaN
Average-3σ (Bias2)	---	-1.870E-1	-2.557E-1	-2.659E-1	NaN

30 MeV proton / detailed results

14.CTR1

Ta=25°C; Vce=5V; If=1mA



30 MeV proton / detailed results

CTR1 . (%)

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	531.42	526.19	540.42	546.22	542.11
N° 2 (Bias1)	685.53	660.65	485.80	357.27	12.04
N° 3 (Bias1)	441.26	424.99	313.18	224.69	7.66
N° 4 (Bias1)	726.41	709.81	540.15	401.56	16.30
N° 5 (Bias1)	493.70	471.18	336.54	234.30	6.87
N° 6 (Bias1)	567.41	554.10	411.48	283.23	10.27
N° 7 (Bias2)	683.16	630.80	526.54	352.05	12.05
N° 8 (Bias2)	558.51	519.68	380.82	256.39	6.12
N° 9 (Bias2)	561.29	516.54	377.27	262.09	5.33
N° 10 (Bias2)	626.14	579.32	410.78	276.13	4.20
N° 11 (Bias2)	557.02	513.48	362.14	245.40	3.31
N° 12 (OFF)	578.03	544.72	378.11	264.97	4.67
N° 13 (OFF)	590.83	552.75	396.11	277.88	4.48
N° 14 (OFF)	543.94	518.08	366.29	246.27	3.94
N° 15 (OFF)	268.51	253.22	174.04	114.02	1.54
N° 16 (OFF)	582.05	544.45	367.69	263.27	5.25

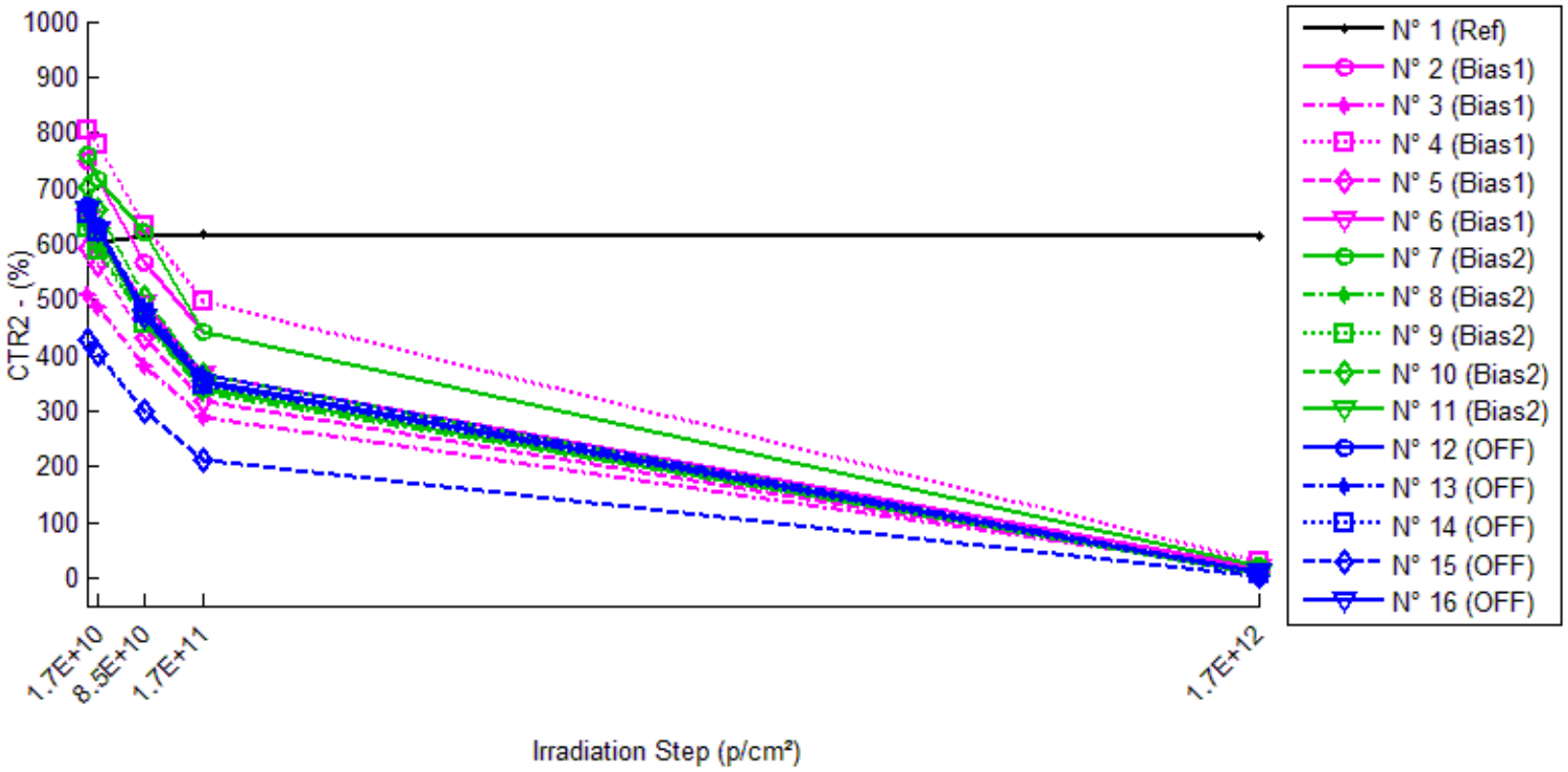
1/Delta [CTR1]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	1.869E-5	-3.135E-5	-5.101E-5	-3.714E-5
N° 2 (Bias1)	---	5.495E-5	5.997E-4	1.340E-3	8.161E-2
N° 3 (Bias1)	---	8.674E-5	9.268E-4	2.184E-3	1.283E-1
N° 4 (Bias1)	---	3.219E-5	4.747E-4	1.114E-3	5.997E-2
N° 5 (Bias1)	---	9.682E-5	9.459E-4	2.243E-3	1.435E-1
N° 6 (Bias1)	---	4.234E-5	6.679E-4	1.768E-3	9.559E-2
N° 7 (Bias2)	---	1.215E-4	4.354E-4	1.377E-3	8.149E-2
N° 8 (Bias2)	---	1.338E-4	8.354E-4	2.110E-3	1.615E-1
N° 9 (Bias2)	---	1.544E-4	8.690E-4	2.034E-3	1.857E-1
N° 10 (Bias2)	---	1.291E-4	8.373E-4	2.024E-3	2.367E-1
N° 11 (Bias2)	---	1.522E-4	9.661E-4	2.280E-3	3.001E-1
N° 12 (OFF)	---	1.058E-4	9.147E-4	2.044E-3	2.125E-1
N° 13 (OFF)	---	1.166E-4	8.320E-4	1.906E-3	2.217E-1
N° 14 (OFF)	---	9.174E-5	8.916E-4	2.222E-3	2.520E-1
N° 15 (OFF)	---	2.248E-4	2.021E-3	5.046E-3	6.442E-1
N° 16 (OFF)	---	1.187E-4	1.002E-3	2.080E-3	1.886E-1
Average (OFF)	---	6.261E-5	7.230E-4	1.730E-3	1.018E-1
σ (OFF)	---	2.805E-5	2.068E-4	5.006E-4	3.407E-2
Average+3σ (OFF)	---	1.468E-4	1.343E-3	3.232E-3	2.040E-1
Average-3σ (OFF)	---	-2.155E-5	1.026E-4	2.280E-4	-3.990E-4
Average (Bias1)	---	1.382E-4	7.887E-4	1.965E-3	1.931E-1
σ (Bias1)	---	1.449E-5	2.045E-4	3.443E-4	8.195E-2
Average+3σ (Bias1)	---	1.817E-4	1.402E-3	2.998E-3	4.389E-1
Average-3σ (Bias1)	---	9.470E-5	1.751E-4	9.319E-4	-5.274E-2
Average (Bias2)	---	1.315E-4	1.132E-3	2.660E-3	3.038E-1
σ (Bias2)	---	5.324E-5	5.007E-4	1.339E-3	1.916E-1
Average+3σ (Bias2)	---	2.913E-4	2.634E-3	6.676E-3	8.787E-1
Average-3σ (Bias2)	---	-2.820E-5	-3.699E-4	-1.356E-3	-2.711E-1

30 MeV proton / detailed results

15.CTR2

Ta=25°C; Vce=5V; If=2mA



30 MeV proton / detailed results

CTR2 . (%)

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	607.27	603.37	613.03	615.97	614.21
N° 2 (Bias1)	747.78	716.00	565.26	440.43	20.03
N° 3 (Bias1)	507.48	484.52	378.93	286.73	12.28
N° 4 (Bias1)	805.26	778.07	631.79	498.48	26.89
N° 5 (Bias1)	592.45	562.78	429.80	317.31	12.06
N° 6 (Bias1)	646.09	621.97	491.91	366.09	16.74
N° 7 (Bias2)	758.85	716.08	620.15	443.55	21.07
N° 8 (Bias2)	631.01	592.86	459.01	333.88	10.65
N° 9 (Bias2)	629.97	589.94	457.22	341.49	9.50
N° 10 (Bias2)	703.39	659.78	502.77	365.49	8.03
N° 11 (Bias2)	659.01	614.24	463.75	339.91	6.61
N° 12 (OFF)	668.36	631.91	477.11	354.59	9.18
N° 13 (OFF)	667.84	631.09	487.16	363.63	8.54
N° 14 (OFF)	655.44	622.22	475.29	346.70	8.19
N° 15 (OFF)	428.50	402.14	298.03	211.90	4.04
N° 16 (OFF)	663.11	625.81	467.49	351.55	9.89

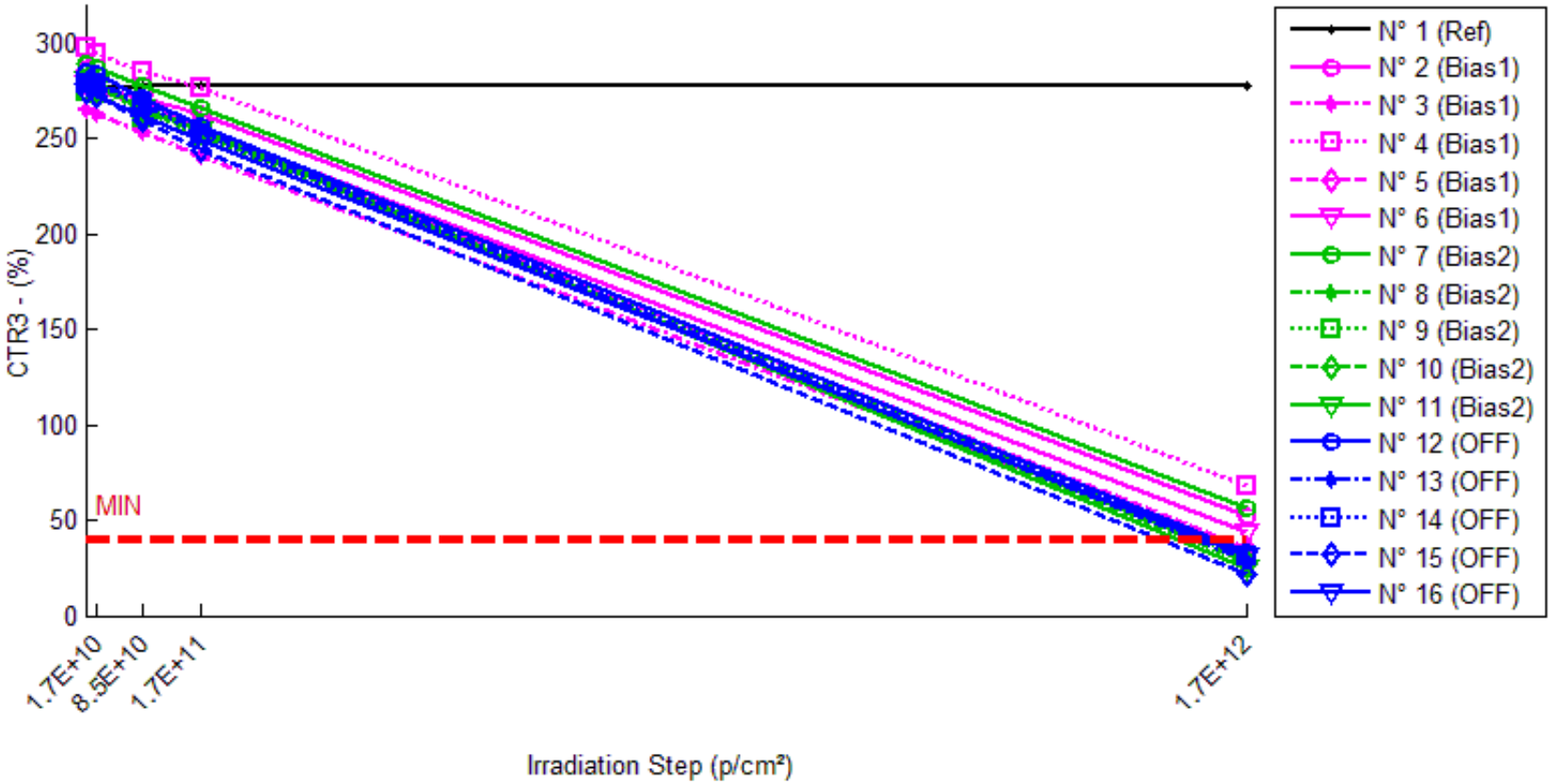
1/Delta [CTR2]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	1.065E-5	-1.546E-5	-2.326E-5	-1.861E-5
N° 2 (Bias1)	---	5.935E-5	4.318E-4	9.332E-4	4.860E-2
N° 3 (Bias1)	---	9.338E-5	6.685E-4	1.517E-3	7.949E-2
N° 4 (Bias1)	---	4.338E-5	3.410E-4	7.643E-4	3.595E-2
N° 5 (Bias1)	---	8.899E-5	6.388E-4	1.464E-3	8.126E-2
N° 6 (Bias1)	---	6.002E-5	4.851E-4	1.184E-3	5.819E-2
N° 7 (Bias2)	---	7.870E-5	2.947E-4	9.368E-4	4.615E-2
N° 8 (Bias2)	---	1.020E-4	5.938E-4	1.410E-3	9.232E-2
N° 9 (Bias2)	---	1.077E-4	5.998E-4	1.341E-3	1.037E-1
N° 10 (Bias2)	---	9.395E-5	5.673E-4	1.314E-3	1.232E-1
N° 11 (Bias2)	---	1.106E-4	6.389E-4	1.425E-3	1.497E-1
N° 12 (OFF)	---	8.629E-5	5.998E-4	1.324E-3	1.075E-1
N° 13 (OFF)	---	8.720E-5	5.553E-4	1.253E-3	1.156E-1
N° 14 (OFF)	---	8.145E-5	5.783E-4	1.359E-3	1.206E-1
N° 15 (OFF)	---	1.530E-4	1.022E-3	2.385E-3	2.454E-1
N° 16 (OFF)	---	8.989E-5	6.311E-4	1.336E-3	9.958E-2
Average (OFF)	---	6.902E-5	5.130E-4	1.172E-3	6.070E-2
σ (OFF)	---	2.135E-5	1.387E-4	3.269E-4	1.963E-2
Average+3σ (OFF)	---	1.331E-4	9.292E-4	2.153E-3	1.196E-1
Average-3σ (OFF)	---	4.967E-6	9.689E-5	1.916E-4	1.808E-3
Average (Bias1)	---	9.859E-5	5.389E-4	1.285E-3	1.030E-1
σ (Bias1)	---	1.280E-5	1.389E-4	2.003E-4	3.851E-2
Average+3σ (Bias1)	---	1.370E-4	9.555E-4	1.886E-3	2.185E-1
Average-3σ (Bias1)	---	6.018E-5	1.223E-4	6.846E-4	-1.252E-2
Average (Bias2)	---	9.956E-5	6.772E-4	1.531E-3	1.377E-1
σ (Bias2)	---	3.002E-5	1.945E-4	4.790E-4	6.071E-2
Average+3σ (Bias2)	---	1.896E-4	1.261E-3	2.969E-3	3.199E-1
Average-3σ (Bias2)	---	9.515E-6	9.358E-5	9.434E-5	-4.439E-2

30 MeV proton / detailed results

16.CTR3

Ta=25°C; Vce=5V; If=10mA



30 MeV proton / detailed results

CTR3 . (%) **Min : 40**

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	276.01	276.41	277.39	277.03	277.77
N° 2 (Bias1)	286.03	283.35	271.43	262.91	52.63
N° 3 (Bias1)	264.38	262.17	252.88	240.90	32.04
N° 4 (Bias1)	297.77	294.29	285.19	276.11	67.90
N° 5 (Bias1)	277.94	275.63	266.58	253.47	35.42
N° 6 (Bias1)	278.72	277.17	270.16	255.19	43.79
N° 7 (Bias2)	288.73	286.73	277.56	266.09	56.30
N° 8 (Bias2)	277.83	277.36	263.76	253.14	31.55
N° 9 (Bias2)	274.43	273.22	260.00	250.72	29.49
N° 10 (Bias2)	280.90	279.11	265.19	253.13	27.59
N° 11 (Bias2)	280.21	278.82	265.76	254.22	24.36
N° 12 (OFF)	284.46	283.62	270.99	256.78	32.68
N° 13 (OFF)	279.79	278.83	269.55	254.23	29.31
N° 14 (OFF)	278.72	277.62	268.38	251.90	30.60
N° 15 (OFF)	274.25	272.14	259.56	243.51	21.51
N° 16 (OFF)	274.17	272.62	261.74	248.76	31.35

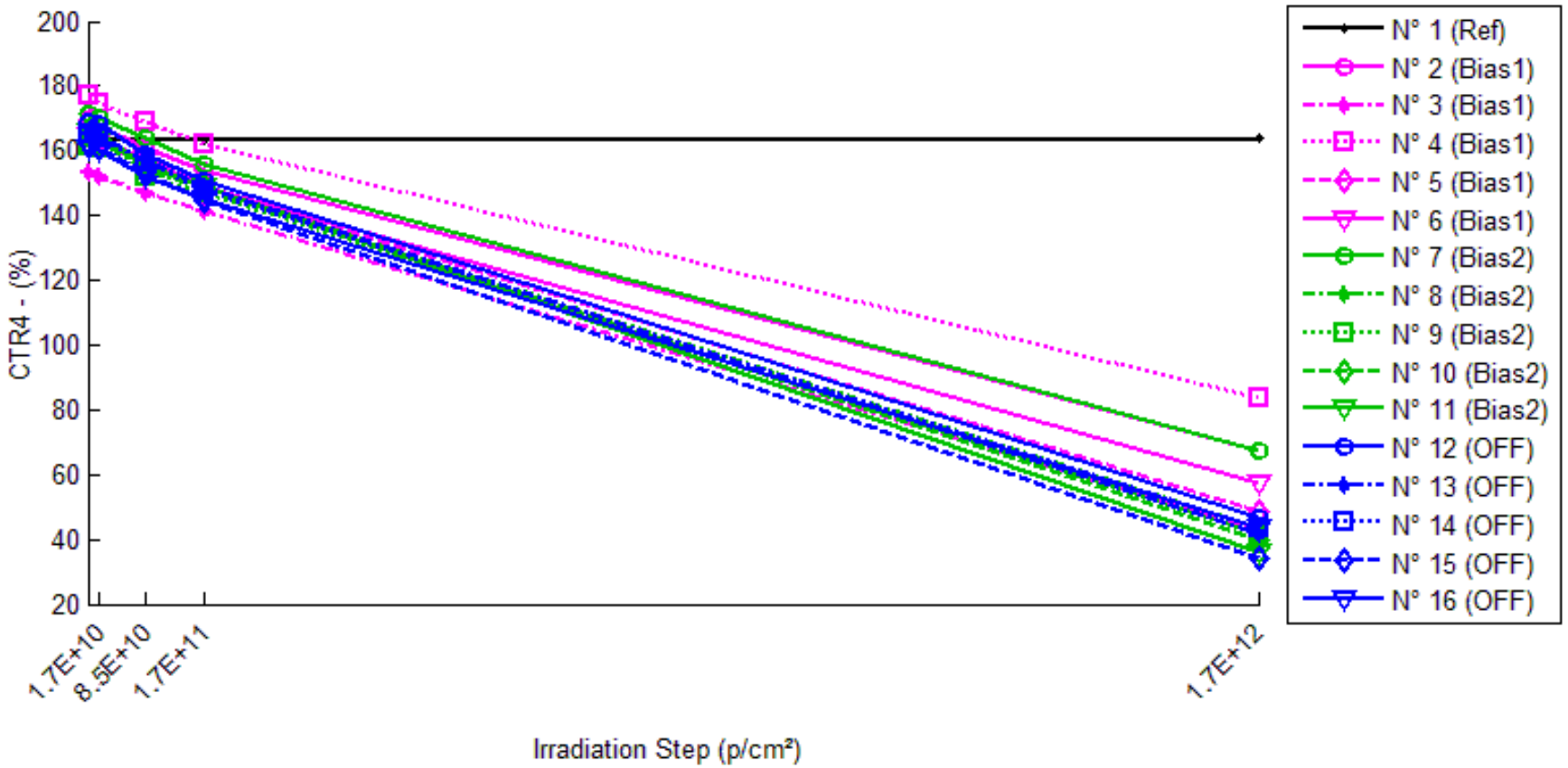
1/Delta [CTR3]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	-5.209E-6	-1.797E-5	-1.333E-5	-2.297E-5
N° 2 (Bias1)	---	3.313E-5	1.881E-4	3.075E-4	1.550E-2
N° 3 (Bias1)	---	3.192E-5	1.719E-4	3.686E-4	2.743E-2
N° 4 (Bias1)	---	3.968E-5	1.481E-4	2.634E-4	1.137E-2
N° 5 (Bias1)	---	3.009E-5	1.532E-4	3.474E-4	2.464E-2
N° 6 (Bias1)	---	2.016E-5	1.137E-4	3.309E-4	1.925E-2
N° 7 (Bias2)	---	2.410E-5	1.394E-4	2.946E-4	1.430E-2
N° 8 (Bias2)	---	6.034E-6	1.919E-4	3.510E-4	2.809E-2
N° 9 (Bias2)	---	1.601E-5	2.022E-4	3.445E-4	3.026E-2
N° 10 (Bias2)	---	2.278E-5	2.109E-4	3.905E-4	3.269E-2
N° 11 (Bias2)	---	1.781E-5	1.941E-4	3.648E-4	3.748E-2
N° 12 (OFF)	---	1.044E-5	1.747E-4	3.789E-4	2.708E-2
N° 13 (OFF)	---	1.225E-5	1.357E-4	3.593E-4	3.054E-2
N° 14 (OFF)	---	1.423E-5	1.382E-4	3.820E-4	2.909E-2
N° 15 (OFF)	---	2.824E-5	2.064E-4	4.602E-4	4.285E-2
N° 16 (OFF)	---	2.081E-5	1.733E-4	3.726E-4	2.825E-2
Average (OFF)	---	3.100E-5	1.550E-4	3.235E-4	1.964E-2
σ (OFF)	---	7.054E-6	2.801E-5	4.039E-5	6.544E-3
Average+3σ (OFF)	---	5.216E-5	2.390E-4	4.447E-4	3.927E-2
Average-3σ (OFF)	---	9.835E-6	7.098E-5	2.024E-4	6.388E-6
Average (Bias1)	---	1.735E-5	1.877E-4	3.491E-4	2.857E-2
σ (Bias1)	---	7.162E-6	2.801E-5	3.520E-5	8.706E-3
Average+3σ (Bias1)	---	3.883E-5	2.717E-4	4.547E-4	5.468E-2
Average-3σ (Bias1)	---	-4.137E-6	1.037E-4	2.435E-4	2.449E-3
Average (Bias2)	---	1.719E-5	1.657E-4	3.906E-4	3.156E-2
σ (Bias2)	---	7.312E-6	2.938E-5	3.989E-5	6.434E-3
Average+3σ (Bias2)	---	3.913E-5	2.538E-4	5.103E-4	5.086E-2
Average-3σ (Bias2)	---	-4.742E-6	7.753E-5	2.709E-4	1.226E-2

30 MeV proton / detailed results

17.CTR4

Ta=25°C; Vce=5V; If=20mA



30 MeV proton / detailed results

CTR4 . (%)

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	162.72	163.59	163.43	163.25	163.67
N° 2 (Bias1)	169.54	167.81	160.62	154.03	67.32
N° 3 (Bias1)	153.39	152.09	147.16	141.14	43.18
N° 4 (Bias1)	176.95	174.72	169.08	161.80	83.37
N° 5 (Bias1)	164.30	162.85	156.15	148.83	48.58
N° 6 (Bias1)	164.34	163.24	157.47	149.11	57.20
N° 7 (Bias2)	171.18	169.93	164.17	155.79	67.33
N° 8 (Bias2)	163.61	163.19	153.99	148.19	43.58
N° 9 (Bias2)	161.65	160.85	151.75	146.70	41.39
N° 10 (Bias2)	166.54	165.33	155.60	148.63	39.73
N° 11 (Bias2)	165.55	164.52	155.40	148.88	35.74
N° 12 (OFF)	168.71	168.03	159.12	150.96	46.68
N° 13 (OFF)	165.03	164.32	157.24	148.63	41.89
N° 14 (OFF)	164.96	164.09	156.93	147.57	43.82
N° 15 (OFF)	162.20	160.83	153.50	144.73	34.05
N° 16 (OFF)	160.92	159.89	152.18	144.85	43.32

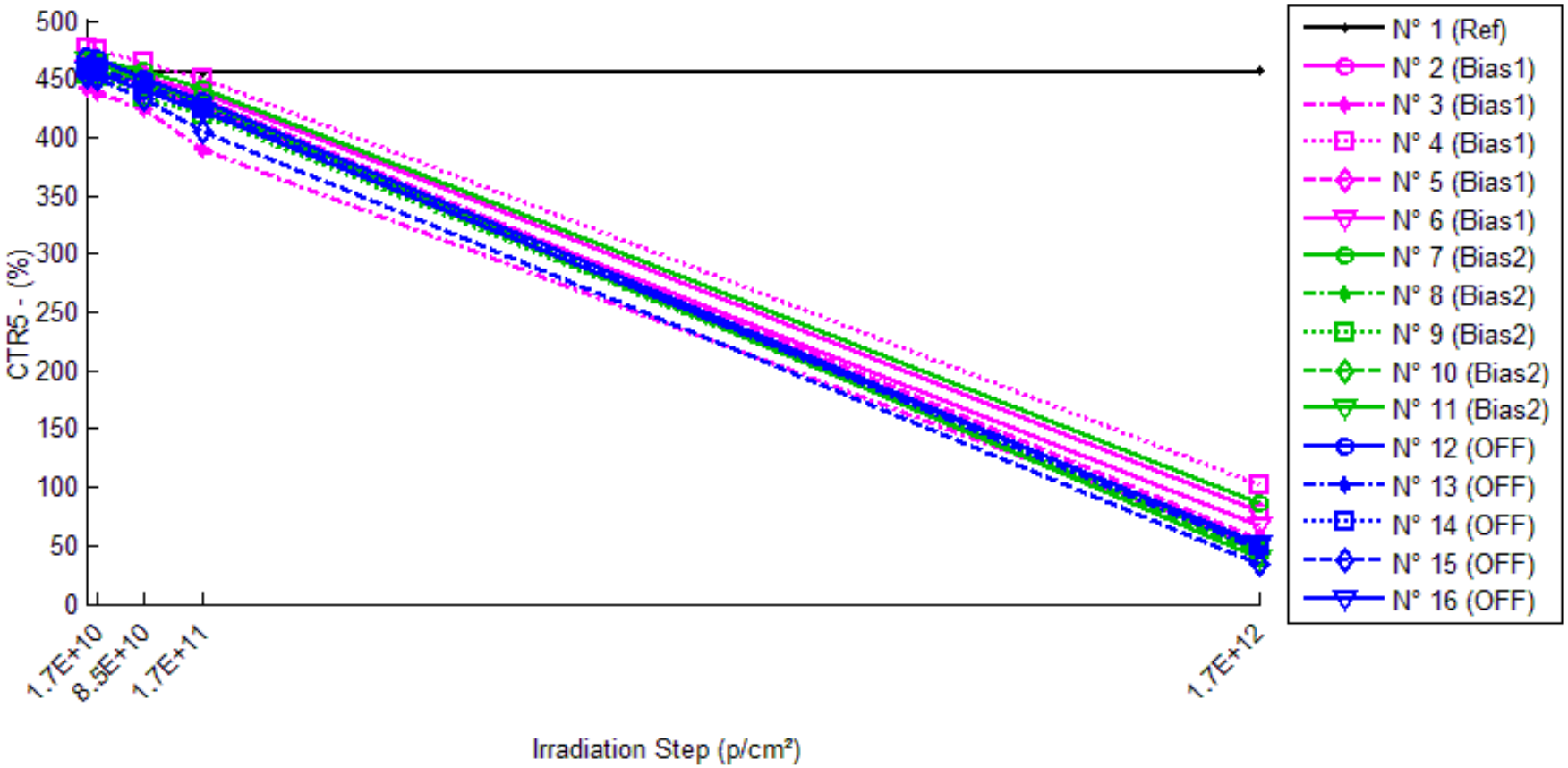
1/Delta [CTR4]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	-3.265E-5	-2.658E-5	-1.993E-5	-3.570E-5
N° 2 (Bias1)	---	6.088E-5	3.277E-4	5.938E-4	8.955E-3
N° 3 (Bias1)	---	5.592E-5	2.763E-4	5.662E-4	1.664E-2
N° 4 (Bias1)	---	7.196E-5	2.629E-4	5.292E-4	6.344E-3
N° 5 (Bias1)	---	5.436E-5	3.179E-4	6.328E-4	1.450E-2
N° 6 (Bias1)	---	4.097E-5	2.657E-4	6.215E-4	1.140E-2
N° 7 (Bias2)	---	4.296E-5	2.493E-4	5.771E-4	9.010E-3
N° 8 (Bias2)	---	1.593E-5	3.820E-4	6.361E-4	1.683E-2
N° 9 (Bias2)	---	3.054E-5	4.037E-4	6.304E-4	1.798E-2
N° 10 (Bias2)	---	4.380E-5	4.220E-4	7.233E-4	1.917E-2
N° 11 (Bias2)	---	3.774E-5	3.945E-4	6.763E-4	2.194E-2
N° 12 (OFF)	---	2.411E-5	3.574E-4	6.968E-4	1.549E-2
N° 13 (OFF)	---	2.635E-5	3.002E-4	6.689E-4	1.781E-2
N° 14 (OFF)	---	3.221E-5	3.104E-4	7.144E-4	1.676E-2
N° 15 (OFF)	---	5.271E-5	3.493E-4	7.444E-4	2.321E-2
N° 16 (OFF)	---	3.990E-5	3.568E-4	6.893E-4	1.687E-2
Average (OFF)	---	5.682E-5	2.901E-4	5.887E-4	1.157E-2
σ (OFF)	---	1.122E-5	3.046E-5	4.211E-5	4.137E-3
Average+3σ (OFF)	---	9.049E-5	3.815E-4	7.150E-4	2.398E-2
Average-3σ (OFF)	---	2.314E-5	1.987E-4	4.623E-4	-8.449E-4
Average (Bias1)	---	3.419E-5	3.703E-4	6.486E-4	1.699E-2
σ (Bias1)	---	1.150E-5	6.917E-5	5.466E-5	4.846E-3
Average+3σ (Bias1)	---	6.869E-5	5.778E-4	8.126E-4	3.152E-2
Average-3σ (Bias1)	---	-3.018E-7	1.628E-4	4.847E-4	2.449E-3
Average (Bias2)	---	3.506E-5	3.348E-4	7.028E-4	1.803E-2
σ (Bias2)	---	1.161E-5	2.738E-5	2.846E-5	3.010E-3
Average+3σ (Bias2)	---	6.987E-5	4.170E-4	7.881E-4	2.706E-2
Average-3σ (Bias2)	---	2.392E-7	2.527E-4	6.174E-4	8.998E-3

30 MeV proton / detailed results

18.CTR5

Ta=25°C; Vce=30V; If=10mA



30 MeV proton / detailed results

CTR5 . (%)

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	455.35	453.78	456.66	455.91	456.99
N° 2 (Bias1)	467.52	464.86	451.87	437.64	79.34
N° 3 (Bias1)	441.38	438.90	424.32	389.13	49.21
N° 4 (Bias1)	476.20	474.22	464.13	450.72	102.44
N° 5 (Bias1)	467.65	465.17	452.34	433.18	55.27
N° 6 (Bias1)	458.35	456.50	445.16	425.80	66.87
N° 7 (Bias2)	468.52	466.63	456.86	440.81	85.89
N° 8 (Bias2)	460.47	459.79	440.81	423.22	49.04
N° 9 (Bias2)	453.91	452.11	433.93	418.60	45.94
N° 10 (Bias2)	460.50	459.01	440.77	424.70	42.87
N° 11 (Bias2)	465.50	464.03	446.12	430.08	39.62
N° 12 (OFF)	468.66	467.65	450.77	431.48	50.34
N° 13 (OFF)	460.41	459.66	445.74	425.46	45.80
N° 14 (OFF)	459.32	458.57	444.42	423.51	49.04
N° 15 (OFF)	452.07	449.93	433.43	404.93	33.50
N° 16 (OFF)	456.87	454.99	439.86	421.61	51.10

1/Delta [CTR5]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	7.597E-6	-6.282E-6	-2.687E-6	-7.861E-6
N° 2 (Bias1)	---	1.226E-5	7.407E-5	1.460E-4	1.047E-2
N° 3 (Bias1)	---	1.283E-5	9.111E-5	3.043E-4	1.805E-2
N° 4 (Bias1)	---	8.766E-6	5.460E-5	1.187E-4	7.662E-3
N° 5 (Bias1)	---	1.140E-5	7.237E-5	1.701E-4	1.596E-2
N° 6 (Bias1)	---	8.833E-6	6.464E-5	1.668E-4	1.277E-2
N° 7 (Bias2)	---	8.612E-6	5.446E-5	1.342E-4	9.508E-3
N° 8 (Bias2)	---	3.235E-6	9.684E-5	1.912E-4	1.822E-2
N° 9 (Bias2)	---	8.755E-6	1.014E-4	1.858E-4	1.956E-2
N° 10 (Bias2)	---	7.067E-6	9.720E-5	1.831E-4	2.115E-2
N° 11 (Bias2)	---	6.804E-6	9.332E-5	1.770E-4	2.309E-2
N° 12 (OFF)	---	4.617E-6	8.470E-5	1.838E-4	1.773E-2
N° 13 (OFF)	---	3.573E-6	7.149E-5	1.784E-4	1.966E-2
N° 14 (OFF)	---	3.593E-6	7.298E-5	1.841E-4	1.821E-2
N° 15 (OFF)	---	1.051E-5	9.515E-5	2.575E-4	2.764E-2
N° 16 (OFF)	---	9.032E-6	8.466E-5	1.831E-4	1.738E-2
Average (OFF)	---	1.082E-5	7.136E-5	1.812E-4	1.298E-2
σ (OFF)	---	1.910E-6	1.346E-5	7.180E-5	4.161E-3
Average+3σ (OFF)	---	1.655E-5	1.117E-4	3.966E-4	2.546E-2
Average-3σ (OFF)	---	5.086E-6	3.099E-5	-3.421E-5	4.993E-4
Average (Bias1)	---	6.895E-6	8.865E-5	1.742E-4	1.831E-2
σ (Bias1)	---	2.227E-6	1.933E-5	2.298E-5	5.244E-3
Average+3σ (Bias1)	---	1.358E-5	1.466E-4	2.432E-4	3.404E-2
Average-3σ (Bias1)	---	2.130E-7	3.067E-5	1.053E-4	2.576E-3
Average (Bias2)	---	6.266E-6	8.179E-5	1.974E-4	2.012E-2
σ (Bias2)	---	3.272E-6	9.732E-6	3.368E-5	4.289E-3
Average+3σ (Bias2)	---	1.608E-5	1.110E-4	2.984E-4	3.299E-2
Average-3σ (Bias2)	---	-3.549E-6	5.260E-5	9.635E-5	7.258E-3

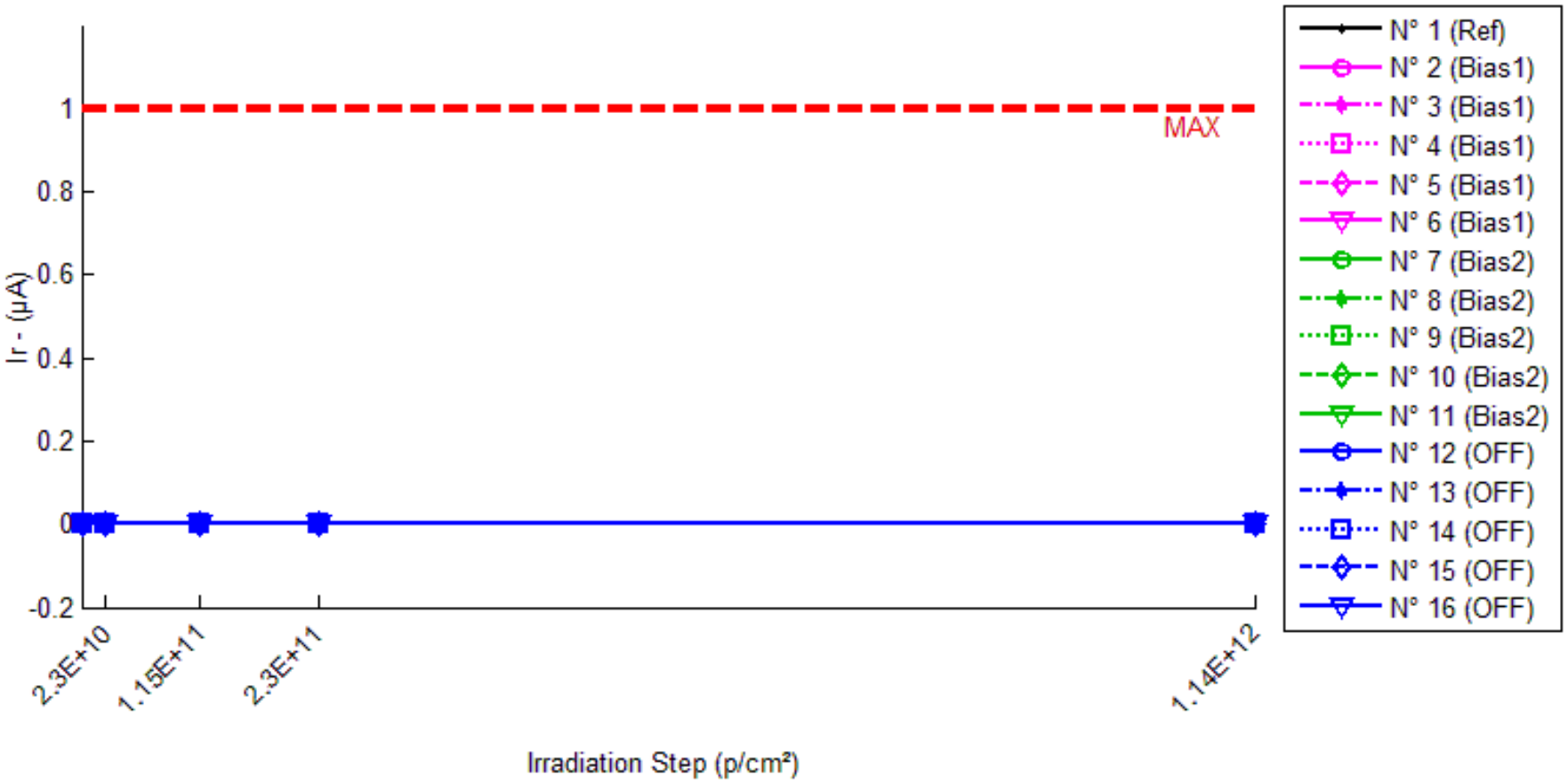
60 MeV proton / detailed results

CONTENTS

60 MeV proton / detailed results

1. Ir

Ta=25°C; Vr=3V



60 MeV proton / detailed results

Ir . (µA) **Max = 1.0**

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	4.881E-5	5.389E-5	4.986E-5	5.179E-5	4.764E-5
N° 2 (Bias1)	5.330E-5	4.898E-5	5.108E-5	5.112E-5	4.793E-5
N° 3 (Bias1)	4.927E-5	5.246E-5	4.823E-5	5.200E-5	4.638E-5
N° 4 (Bias1)	5.326E-5	4.915E-5	5.250E-5	4.865E-5	4.269E-5
N° 5 (Bias1)	4.860E-5	5.296E-5	4.915E-5	5.418E-5	4.337E-5
N° 6 (Bias1)	5.267E-5	4.487E-5	5.682E-5	5.217E-5	4.559E-5
N° 7 (Bias2)	4.927E-5	3.679E-5	5.590E-5	3.167E-5	4.936E-5
N° 8 (Bias2)	4.244E-5	4.873E-5	4.798E-5	4.743E-5	3.859E-5
N° 9 (Bias2)	4.475E-5	6.080E-5	3.544E-5	4.760E-5	4.592E-5
N° 10 (Bias2)	5.032E-5	4.596E-5	4.668E-5	4.953E-5	4.592E-5
N° 11 (Bias2)	2.413E-5	5.749E-5	4.684E-5	5.435E-5	4.638E-5
N° 12 (OFF)	4.936E-5	4.806E-5	4.793E-5	5.217E-5	4.223E-5
N° 13 (OFF)	5.531E-5	5.196E-5	4.802E-5	5.514E-5	4.697E-5
N° 14 (OFF)	5.015E-5	4.777E-5	4.412E-5	3.741E-5	5.846E-5
N° 15 (OFF)	3.444E-5	6.558E-5	3.540E-5	3.787E-5	4.768E-5
N° 16 (OFF)	5.074E-5	4.190E-5	4.584E-5	4.408E-5	5.171E-5

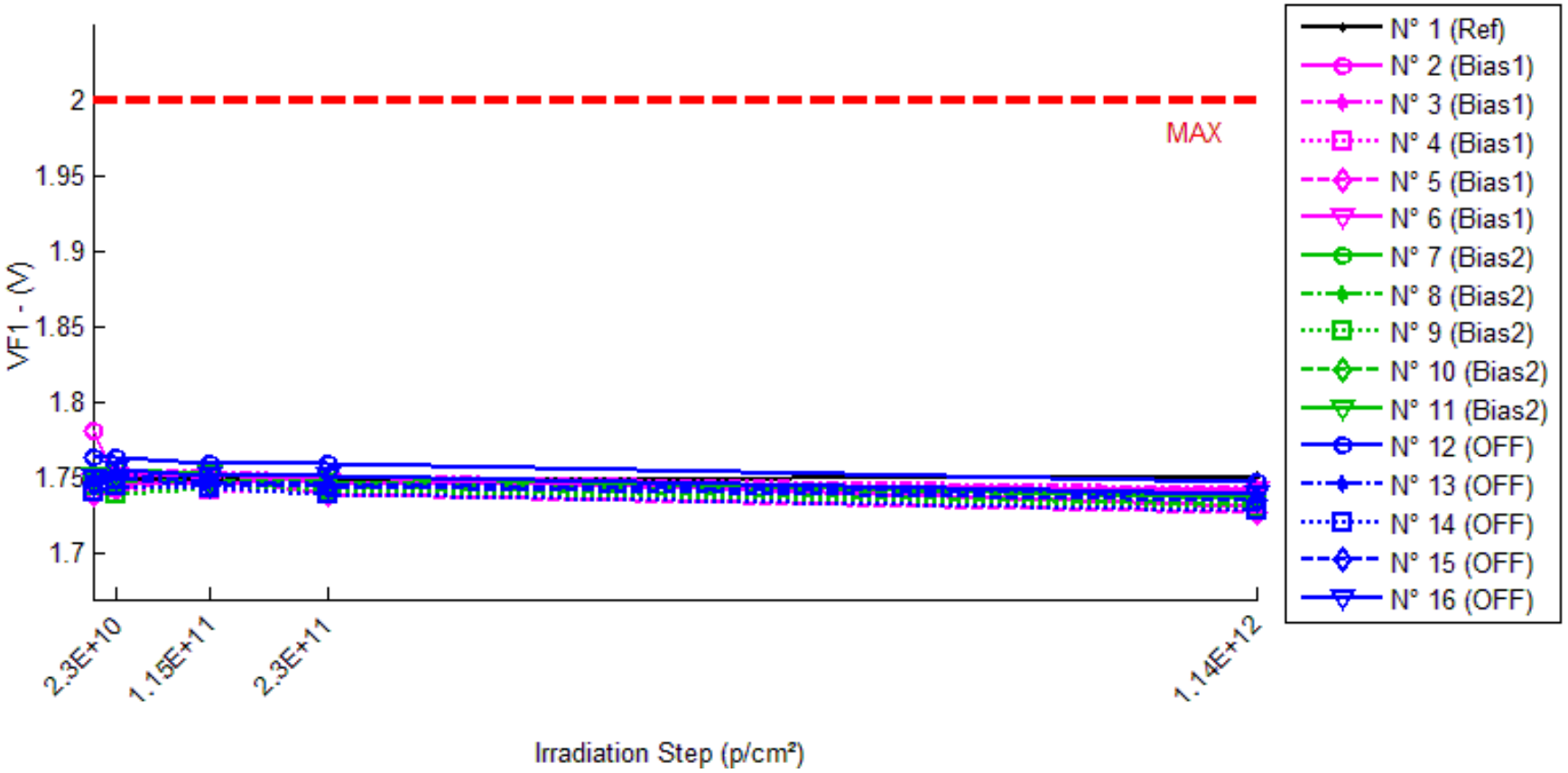
Delta [Ir]

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	---	5.071E-6	1.048E-6	2.976E-6	-1.173E-6
N° 2 (Bias1)	---	-4.318E-6	-2.221E-6	-2.180E-6	-5.365E-6
N° 3 (Bias1)	---	3.185E-6	-1.047E-6	2.724E-6	-2.892E-6
N° 4 (Bias1)	---	-4.108E-6	-7.540E-7	-4.611E-6	-1.056E-5
N° 5 (Bias1)	---	4.359E-6	5.460E-7	5.575E-6	-5.238E-6
N° 6 (Bias1)	---	-7.796E-6	4.150E-6	-5.030E-7	-7.083E-6
N° 7 (Bias2)	---	-1.249E-5	6.623E-6	-1.760E-5	8.500E-8
N° 8 (Bias2)	---	6.287E-6	5.533E-6	4.988E-6	-3.855E-6
N° 9 (Bias2)	---	1.605E-5	-9.304E-6	2.851E-6	1.175E-6
N° 10 (Bias2)	---	-4.359E-6	-3.646E-6	-7.960E-7	-4.400E-6
N° 11 (Bias2)	---	3.336E-5	2.272E-5	3.022E-5	2.226E-5
N° 12 (OFF)	---	-1.299E-6	-1.425E-6	2.809E-6	-7.125E-6
N° 13 (OFF)	---	-3.352E-6	-7.292E-6	-1.670E-7	-8.340E-6
N° 14 (OFF)	---	-2.389E-6	-6.035E-6	-1.274E-5	8.300E-6
N° 15 (OFF)	---	3.114E-5	9.650E-7	3.438E-6	1.325E-5
N° 16 (OFF)	---	-8.844E-6	-4.903E-6	-6.664E-6	9.650E-7
Average (OFF)	---	-1.736E-6	1.348E-7	2.010E-7	-6.228E-6
σ (OFF)	---	5.253E-6	2.451E-6	4.018E-6	2.845E-6
Average+3σ (OFF)	---	1.402E-5	7.487E-6	1.225E-5	2.306E-6
Average-3σ (OFF)	---	-1.750E-5	-7.218E-6	-1.185E-5	-1.476E-5
Average (Bias1)	---	7.771E-6	4.385E-6	3.932E-6	3.052E-6
σ (Bias1)	---	1.791E-5	1.219E-5	1.717E-5	1.100E-5
Average+3σ (Bias1)	---	6.151E-5	4.095E-5	5.545E-5	3.607E-5
Average-3σ (Bias1)	---	-4.597E-5	-3.218E-5	-4.758E-5	-2.996E-5
Average (Bias2)	---	3.052E-6	-3.738E-6	-2.665E-6	1.409E-6
σ (Bias2)	---	1.597E-5	3.418E-6	6.910E-6	9.430E-6
Average+3σ (Bias2)	---	5.096E-5	6.516E-6	1.806E-5	2.970E-5
Average-3σ (Bias2)	---	-4.486E-5	-1.399E-5	-2.339E-5	-2.688E-5

60 MeV proton / detailed results

2. VF1

Ta=25°C; If = 10 mA



60 MeV proton / detailed results

VF1 . (V) **Max = 2.0**

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	1.749	1.749	1.749	1.749	1.752
N° 2 (Bias1)	1.781	1.748	1.746	1.751	1.731
N° 3 (Bias1)	1.751	1.754	1.754	1.752	1.744
N° 4 (Bias1)	1.741	1.744	1.742	1.741	1.732
N° 5 (Bias1)	1.740	1.743	1.750	1.739	1.727
N° 6 (Bias1)	1.748	1.751	1.753	1.747	1.742
N° 7 (Bias2)	1.753	1.755	1.752	1.751	1.737
N° 8 (Bias2)	1.749	1.749	1.747	1.745	1.733
N° 9 (Bias2)	1.745	1.740	1.743	1.742	1.730
N° 10 (Bias2)	1.750	1.747	1.748	1.747	1.735
N° 11 (Bias2)	1.752	1.755	1.753	1.751	1.740
N° 12 (OFF)	1.764	1.763	1.759	1.760	1.747
N° 13 (OFF)	1.749	1.753	1.748	1.746	1.740
N° 14 (OFF)	1.741	1.745	1.744	1.739	1.729
N° 15 (OFF)	1.746	1.750	1.745	1.745	1.735
N° 16 (OFF)	1.750	1.755	1.752	1.751	1.740

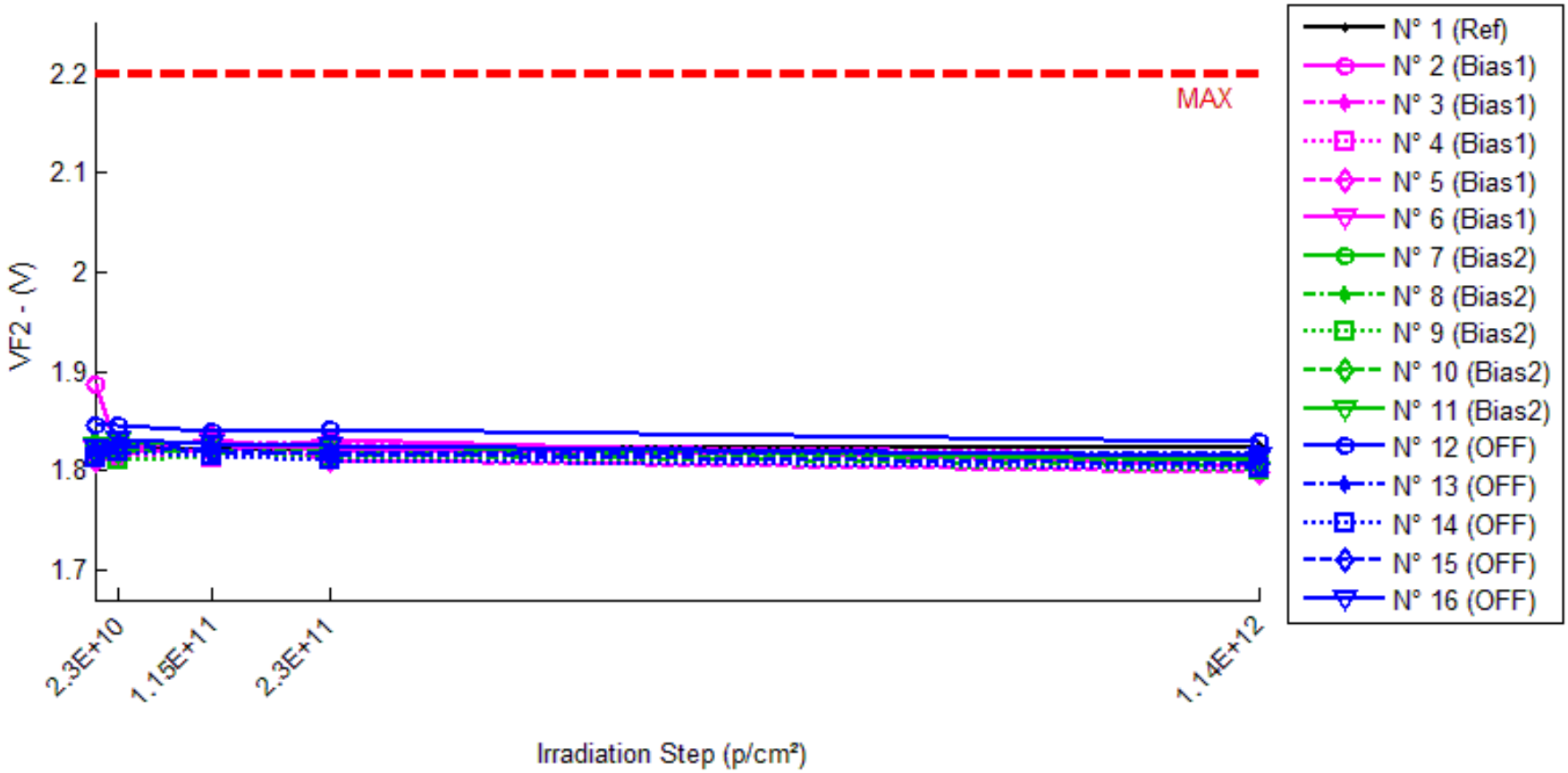
Delta [VF1]

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	---	-6.400E-5	2.060E-4	-6.800E-5	2.981E-3
N° 2 (Bias1)	---	-3.317E-2	-3.474E-2	-3.022E-2	-4.949E-2
N° 3 (Bias1)	---	2.980E-3	2.171E-3	4.060E-4	-7.423E-3
N° 4 (Bias1)	---	2.817E-3	7.130E-4	-1.500E-4	-9.480E-3
N° 5 (Bias1)	---	2.971E-3	1.055E-2	-4.680E-4	-1.319E-2
N° 6 (Bias1)	---	2.534E-3	4.589E-3	-9.750E-4	-6.862E-3
N° 7 (Bias2)	---	1.089E-3	-1.183E-3	-2.615E-3	-1.625E-2
N° 8 (Bias2)	---	5.130E-4	-2.072E-3	-3.440E-3	-1.550E-2
N° 9 (Bias2)	---	-4.541E-3	-1.524E-3	-3.144E-3	-1.510E-2
N° 10 (Bias2)	---	-2.934E-3	-1.713E-3	-3.099E-3	-1.477E-2
N° 11 (Bias2)	---	2.407E-3	1.020E-3	-1.026E-3	-1.176E-2
N° 12 (OFF)	---	-9.190E-4	-4.615E-3	-3.656E-3	-1.677E-2
N° 13 (OFF)	---	3.692E-3	-1.027E-3	-3.164E-3	-8.962E-3
N° 14 (OFF)	---	3.057E-3	2.170E-3	-2.691E-3	-1.248E-2
N° 15 (OFF)	---	4.179E-3	-7.820E-4	-9.610E-4	-1.146E-2
N° 16 (OFF)	---	4.408E-3	1.668E-3	6.590E-4	-1.076E-2
Average (OFF)	---	-4.374E-3	-3.344E-3	-6.281E-3	-1.729E-2
σ (OFF)	---	1.610E-2	1.795E-2	1.339E-2	1.817E-2
Average+3σ (OFF)	---	4.393E-2	5.050E-2	3.389E-2	3.722E-2
Average-3σ (OFF)	---	-5.267E-2	-5.719E-2	-4.646E-2	-7.179E-2
Average (Bias1)	---	-6.932E-4	-1.094E-3	-2.665E-3	-1.467E-2
σ (Bias1)	---	2.918E-3	1.225E-3	9.627E-4	1.720E-3
Average+3σ (Bias1)	---	8.062E-3	2.580E-3	2.233E-4	-9.516E-3
Average-3σ (Bias1)	---	-9.449E-3	-4.769E-3	-5.553E-3	-1.983E-2
Average (Bias2)	---	2.883E-3	-5.172E-4	-1.963E-3	-1.209E-2
σ (Bias2)	---	2.188E-3	2.698E-3	1.783E-3	2.916E-3
Average+3σ (Bias2)	---	9.447E-3	7.577E-3	3.387E-3	-3.337E-3
Average-3σ (Bias2)	---	-3.680E-3	-8.611E-3	-7.312E-3	-2.084E-2

60 MeV proton / detailed results

3. VF2

Ta=25°C; If=20mA



60 MeV proton / detailed results

VF2 . (V) **Max = 2.2**

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	1.822	1.826	1.821	1.824	1.825
N° 2 (Bias1)	1.888	1.820	1.819	1.831	1.804
N° 3 (Bias1)	1.826	1.829	1.828	1.827	1.818
N° 4 (Bias1)	1.812	1.815	1.812	1.812	1.802
N° 5 (Bias1)	1.810	1.814	1.833	1.810	1.798
N° 6 (Bias1)	1.821	1.824	1.829	1.821	1.814
N° 7 (Bias2)	1.828	1.829	1.827	1.825	1.811
N° 8 (Bias2)	1.821	1.821	1.819	1.818	1.805
N° 9 (Bias2)	1.815	1.811	1.814	1.812	1.800
N° 10 (Bias2)	1.822	1.819	1.821	1.820	1.808
N° 11 (Bias2)	1.826	1.829	1.827	1.826	1.814
N° 12 (OFF)	1.846	1.846	1.840	1.841	1.829
N° 13 (OFF)	1.823	1.828	1.821	1.818	1.817
N° 14 (OFF)	1.813	1.819	1.816	1.811	1.803
N° 15 (OFF)	1.818	1.825	1.819	1.817	1.807
N° 16 (OFF)	1.824	1.831	1.827	1.826	1.814

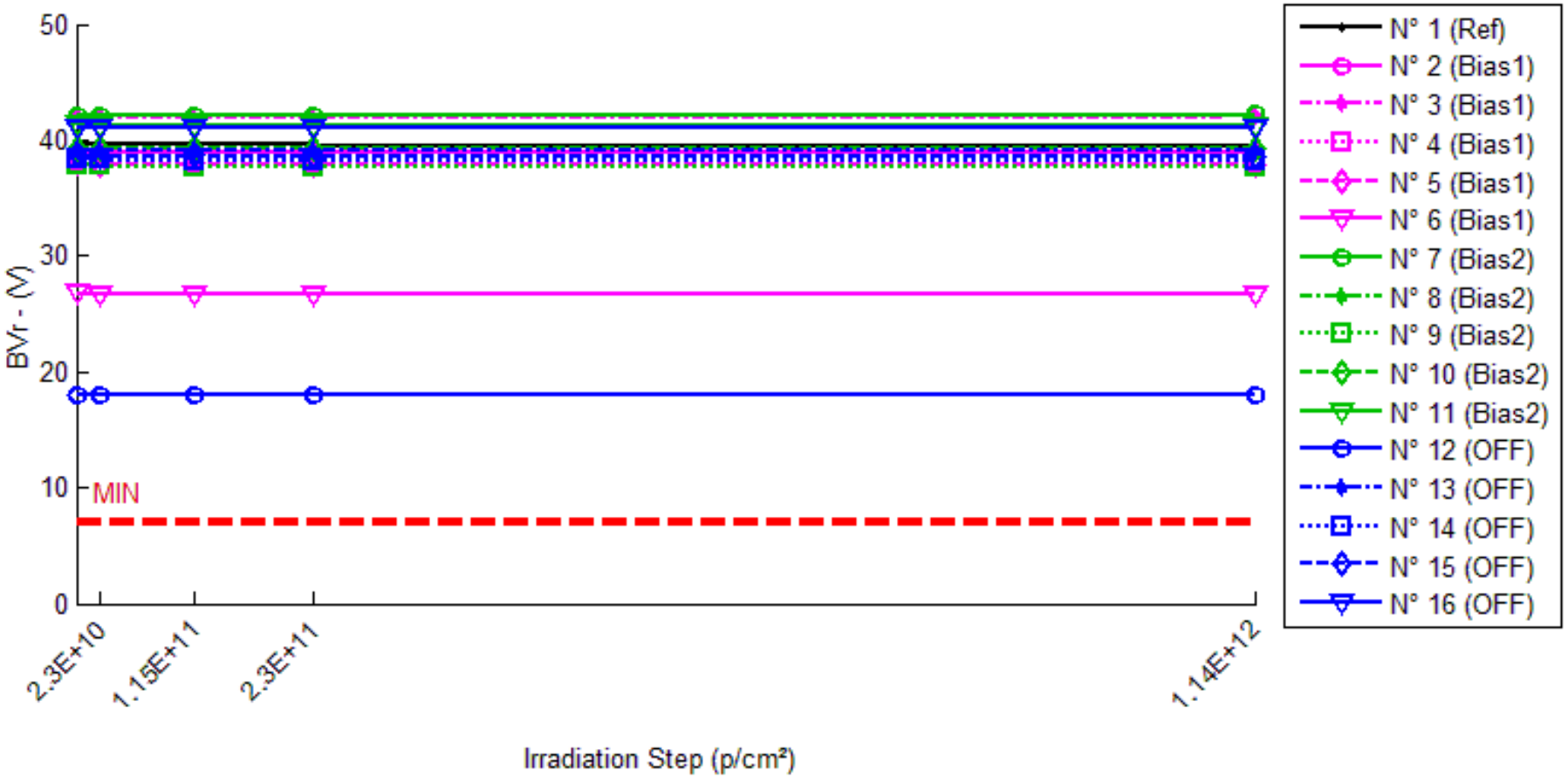
Delta [VF2]

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	---	4.241E-3	-5.840E-4	1.971E-3	3.064E-3
N° 2 (Bias1)	---	-6.801E-2	-6.975E-2	-5.738E-2	-8.443E-2
N° 3 (Bias1)	---	2.802E-3	1.801E-3	8.200E-5	-8.022E-3
N° 4 (Bias1)	---	3.415E-3	7.830E-4	7.600E-5	-9.337E-3
N° 5 (Bias1)	---	3.832E-3	2.254E-2	-7.200E-5	-1.270E-2
N° 6 (Bias1)	---	2.818E-3	7.418E-3	-8.790E-4	-7.068E-3
N° 7 (Bias2)	---	8.050E-4	-1.329E-3	-2.467E-3	-1.652E-2
N° 8 (Bias2)	---	2.930E-4	-2.087E-3	-3.212E-3	-1.544E-2
N° 9 (Bias2)	---	-4.551E-3	-1.495E-3	-2.858E-3	-1.503E-2
N° 10 (Bias2)	---	-3.020E-3	-1.775E-3	-2.867E-3	-1.476E-2
N° 11 (Bias2)	---	2.290E-3	9.810E-4	-6.670E-4	-1.178E-2
N° 12 (OFF)	---	-2.000E-4	-5.897E-3	-4.472E-3	-1.714E-2
N° 13 (OFF)	---	5.487E-3	-1.947E-3	-4.501E-3	-6.349E-3
N° 14 (OFF)	---	5.679E-3	3.230E-3	-2.209E-3	-9.490E-3
N° 15 (OFF)	---	6.806E-3	8.290E-4	-6.670E-4	-1.114E-2
N° 16 (OFF)	---	6.776E-3	2.356E-3	1.532E-3	-1.029E-2
Average (OFF)	---	-1.103E-2	-7.440E-3	-1.163E-2	-2.431E-2
σ (OFF)	---	3.186E-2	3.590E-2	2.557E-2	3.367E-2
Average+3σ (OFF)	---	8.454E-2	1.003E-1	6.509E-2	7.671E-2
Average-3σ (OFF)	---	-1.066E-1	-1.151E-1	-8.836E-2	-1.253E-1
Average (Bias1)	---	-8.366E-4	-1.141E-3	-2.414E-3	-1.471E-2
σ (Bias1)	---	2.842E-3	1.221E-3	1.012E-3	1.770E-3
Average+3σ (Bias1)	---	7.690E-3	2.521E-3	6.208E-4	-9.399E-3
Average-3σ (Bias1)	---	-9.363E-3	-4.803E-3	-5.449E-3	-2.002E-2
Average (Bias2)	---	4.910E-3	-2.858E-4	-2.063E-3	-1.088E-2
σ (Bias2)	---	2.920E-3	3.702E-3	2.581E-3	3.940E-3
Average+3σ (Bias2)	---	1.367E-2	1.082E-2	5.679E-3	9.393E-4
Average-3σ (Bias2)	---	-3.851E-3	-1.139E-2	-9.806E-3	-2.270E-2

60 MeV proton / detailed results

4. BVr

Ta=25°C; Ir=100µA



60 MeV proton / detailed results

BVr . (V) **Min = 7.0**

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	39.55	39.60	39.54	39.54	39.50
N° 2 (Bias1)	38.99	38.96	38.96	38.98	39.03
N° 3 (Bias1)	42.13	42.07	42.01	42.02	42.04
N° 4 (Bias1)	37.96	37.91	37.91	37.89	37.88
N° 5 (Bias1)	37.97	37.93	37.96	37.90	37.94
N° 6 (Bias1)	26.82	26.77	26.74	26.71	26.69
N° 7 (Bias2)	42.17	42.13	42.13	42.12	42.21
N° 8 (Bias2)	39.14	39.11	39.12	39.10	39.13
N° 9 (Bias2)	37.77	37.84	37.75	37.73	37.75
N° 10 (Bias2)	39.22	39.24	39.20	39.19	39.22
N° 11 (Bias2)	41.35	41.28	41.27	41.27	41.28
N° 12 (OFF)	17.97	17.95	17.94	17.92	17.93
N° 13 (OFF)	39.18	39.14	39.14	39.14	39.15
N° 14 (OFF)	38.34	38.32	38.26	38.29	38.28
N° 15 (OFF)	38.67	38.63	38.66	38.61	38.61
N° 16 (OFF)	41.09	41.06	41.03	41.04	41.09

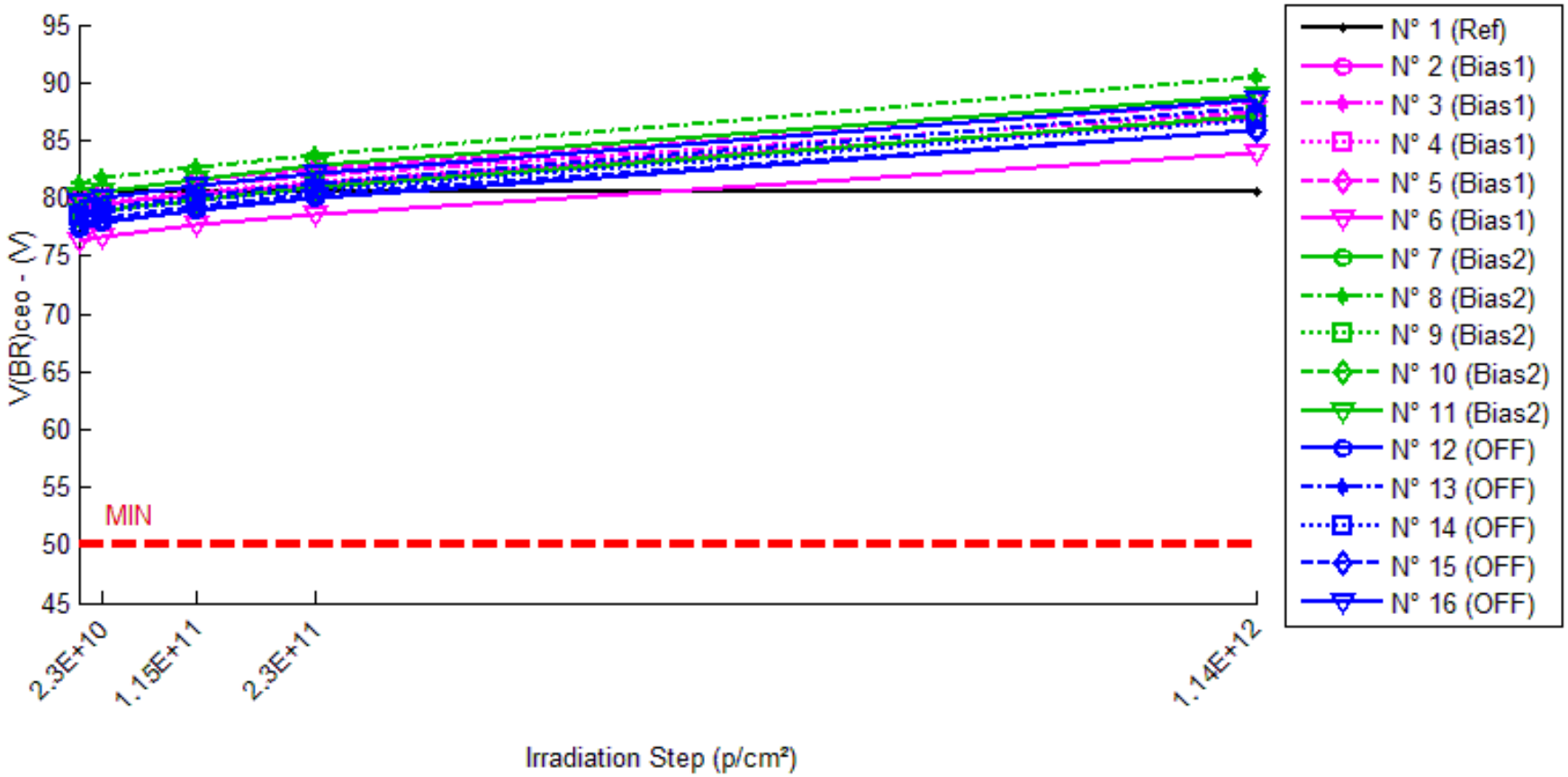
Delta [BVr]

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	---	5.170E-2	-1.095E-2	-7.440E-3	-4.387E-2
N° 2 (Bias1)	---	-3.149E-2	-3.196E-2	-3.460E-3	3.750E-2
N° 3 (Bias1)	---	-5.433E-2	-1.116E-1	-1.084E-1	-8.561E-2
N° 4 (Bias1)	---	-4.605E-2	-5.368E-2	-6.833E-2	-7.739E-2
N° 5 (Bias1)	---	-4.349E-2	-1.716E-2	-6.791E-2	-3.012E-2
N° 6 (Bias1)	---	-4.594E-2	-8.058E-2	-1.039E-1	-1.249E-1
N° 7 (Bias2)	---	-4.470E-2	-3.745E-2	-5.251E-2	3.762E-2
N° 8 (Bias2)	---	-3.282E-2	-1.800E-2	-3.960E-2	-6.150E-3
N° 9 (Bias2)	---	6.546E-2	-2.353E-2	-4.158E-2	-2.566E-2
N° 10 (Bias2)	---	2.872E-2	-1.240E-2	-2.097E-2	2.770E-3
N° 11 (Bias2)	---	-6.542E-2	-7.411E-2	-7.845E-2	-6.847E-2
N° 12 (OFF)	---	-2.219E-2	-3.127E-2	-5.049E-2	-3.902E-2
N° 13 (OFF)	---	-4.031E-2	-4.571E-2	-4.753E-2	-3.423E-2
N° 14 (OFF)	---	-2.419E-2	-8.436E-2	-4.972E-2	-5.883E-2
N° 15 (OFF)	---	-4.184E-2	-1.120E-2	-5.977E-2	-6.764E-2
N° 16 (OFF)	---	-3.709E-2	-6.296E-2	-5.677E-2	-1.250E-3
Average (OFF)	---	-4.426E-2	-5.900E-2	-7.040E-2	-5.610E-2
σ (OFF)	---	8.233E-3	3.789E-2	4.201E-2	6.224E-2
Average+3σ (OFF)	---	-1.956E-2	5.468E-2	5.562E-2	1.306E-1
Average-3σ (OFF)	---	-6.896E-2	-1.727E-1	-1.964E-1	-2.428E-1
Average (Bias1)	---	-9.752E-3	-3.310E-2	-4.662E-2	-1.198E-2
σ (Bias1)	---	5.475E-2	2.474E-2	2.110E-2	3.902E-2
Average+3σ (Bias1)	---	1.545E-1	4.113E-2	1.667E-2	1.051E-1
Average-3σ (Bias1)	---	-1.740E-1	-1.073E-1	-1.099E-1	-1.290E-1
Average (Bias2)	---	-3.312E-2	-4.710E-2	-5.286E-2	-4.019E-2
σ (Bias2)	---	9.256E-3	2.820E-2	5.170E-3	2.576E-2
Average+3σ (Bias2)	---	-5.356E-3	3.750E-2	-3.735E-2	3.708E-2
Average-3σ (Bias2)	---	-6.089E-2	-1.317E-1	-6.837E-2	-1.175E-1

60 MeV proton / detailed results

5. V(BR)ceo

Ta=25°C; Ic=1mA; Ib=0; If=0



60 MeV proton / detailed results

V(BR)ceo . (V) **Min = 50.0**

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	80.58	80.57	80.54	80.53	80.49
N° 2 (Bias1)	79.10	79.53	80.42	81.34	86.91
N° 3 (Bias1)	79.69	80.04	81.03	81.92	87.53
N° 4 (Bias1)	79.33	79.62	80.61	81.45	86.92
N° 5 (Bias1)	80.23	80.58	81.56	82.43	88.34
N° 6 (Bias1)	76.31	76.65	77.64	78.53	83.91
N° 7 (Bias2)	78.50	78.89	79.88	80.97	87.11
N° 8 (Bias2)	81.34	81.75	82.71	83.76	90.43
N° 9 (Bias2)	78.65	79.08	79.95	81.15	87.10
N° 10 (Bias2)	78.42	78.97	79.92	80.94	87.14
N° 11 (Bias2)	80.18	80.58	81.59	82.77	88.89
N° 12 (OFF)	77.32	77.81	78.98	80.03	85.95
N° 13 (OFF)	78.80	79.16	80.27	81.30	87.87
N° 14 (OFF)	78.43	78.81	79.81	80.77	86.78
N° 15 (OFF)	77.76	78.20	79.32	80.33	85.92
N° 16 (OFF)	79.59	80.02	81.15	82.11	88.61

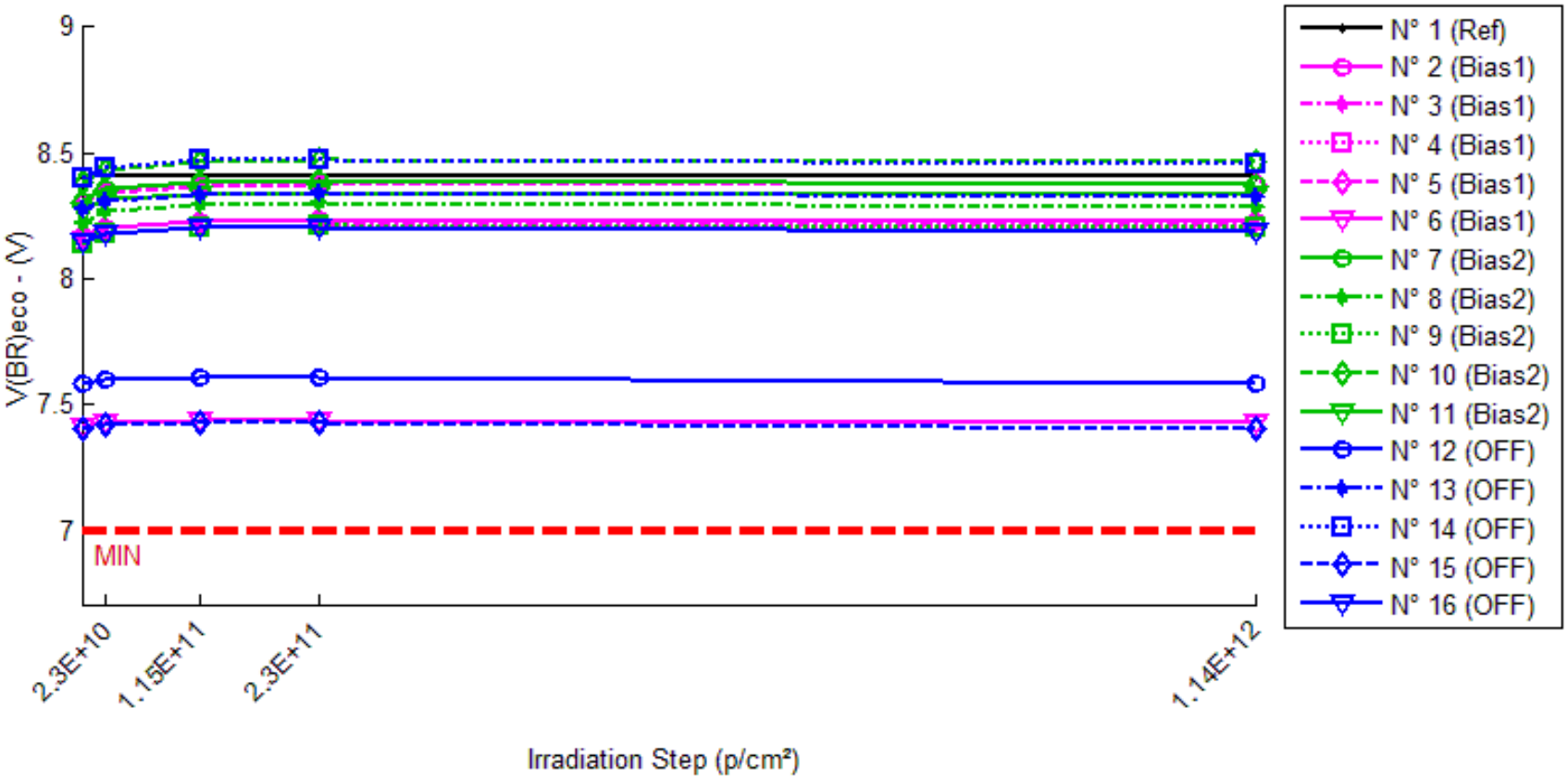
Delta [V(BR)ceo]

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	---	-1.484E-2	-4.504E-2	-5.044E-2	-8.839E-2
N° 2 (Bias1)	---	4.243E-1	1.320E+0	2.233E+0	7.808E+0
N° 3 (Bias1)	---	3.448E-1	1.334E+0	2.224E+0	7.837E+0
N° 4 (Bias1)	---	2.941E-1	1.275E+0	2.116E+0	7.586E+0
N° 5 (Bias1)	---	3.514E-1	1.329E+0	2.201E+0	8.106E+0
N° 6 (Bias1)	---	3.378E-1	1.327E+0	2.215E+0	7.598E+0
N° 7 (Bias2)	---	3.837E-1	1.377E+0	2.468E+0	8.605E+0
N° 8 (Bias2)	---	4.122E-1	1.368E+0	2.414E+0	9.089E+0
N° 9 (Bias2)	---	4.257E-1	1.293E+0	2.493E+0	8.446E+0
N° 10 (Bias2)	---	5.469E-1	1.495E+0	2.513E+0	8.721E+0
N° 11 (Bias2)	---	4.018E-1	1.404E+0	2.584E+0	8.707E+0
N° 12 (OFF)	---	4.925E-1	1.662E+0	2.704E+0	8.624E+0
N° 13 (OFF)	---	3.561E-1	1.472E+0	2.500E+0	9.069E+0
N° 14 (OFF)	---	3.748E-1	1.379E+0	2.341E+0	8.350E+0
N° 15 (OFF)	---	4.412E-1	1.555E+0	2.565E+0	8.158E+0
N° 16 (OFF)	---	4.237E-1	1.560E+0	2.520E+0	9.016E+0
Average (OFF)	---	3.505E-1	1.317E+0	2.198E+0	7.787E+0
σ (OFF)	---	4.696E-2	2.429E-2	4.717E-2	2.127E-1
Average+3σ (OFF)	---	4.913E-1	1.390E+0	2.340E+0	8.425E+0
Average-3σ (OFF)	---	2.096E-1	1.244E+0	2.057E+0	7.149E+0
Average (Bias1)	---	4.341E-1	1.388E+0	2.494E+0	8.714E+0
σ (Bias1)	---	6.492E-2	7.307E-2	6.210E-2	2.369E-1
Average+3σ (Bias1)	---	6.288E-1	1.607E+0	2.681E+0	9.424E+0
Average-3σ (Bias1)	---	2.393E-1	1.168E+0	2.308E+0	8.003E+0
Average (Bias2)	---	4.177E-1	1.526E+0	2.526E+0	8.644E+0
σ (Bias2)	---	5.438E-2	1.059E-1	1.303E-1	4.006E-1
Average+3σ (Bias2)	---	5.808E-1	1.844E+0	2.917E+0	9.846E+0
Average-3σ (Bias2)	---	2.545E-1	1.208E+0	2.135E+0	7.442E+0

60 MeV proton / detailed results

6. V(BR)eco

Ta=25°C; Ic=10µA



60 MeV proton / detailed results

V(BR)eco . (V) **Min = 7.0**

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	8.407	8.405	8.405	8.409	8.408
N° 2 (Bias1)	8.169	8.204	8.229	8.235	8.229
N° 3 (Bias1)	8.150	8.184	8.207	8.214	8.209
N° 4 (Bias1)	8.144	8.178	8.202	8.210	8.207
N° 5 (Bias1)	8.306	8.342	8.367	8.377	8.372
N° 6 (Bias1)	7.413	7.427	7.435	7.437	7.432
N° 7 (Bias2)	8.309	8.361	8.387	8.393	8.380
N° 8 (Bias2)	8.225	8.269	8.292	8.299	8.290
N° 9 (Bias2)	8.138	8.179	8.205	8.210	8.202
N° 10 (Bias2)	8.388	8.437	8.466	8.472	8.466
N° 11 (Bias2)	8.269	8.315	8.339	8.344	8.336
N° 12 (OFF)	7.582	7.598	7.607	7.609	7.586
N° 13 (OFF)	8.275	8.313	8.337	8.341	8.327
N° 14 (OFF)	8.402	8.443	8.471	8.472	8.460
N° 15 (OFF)	7.406	7.421	7.426	7.428	7.407
N° 16 (OFF)	8.146	8.181	8.205	8.208	8.190

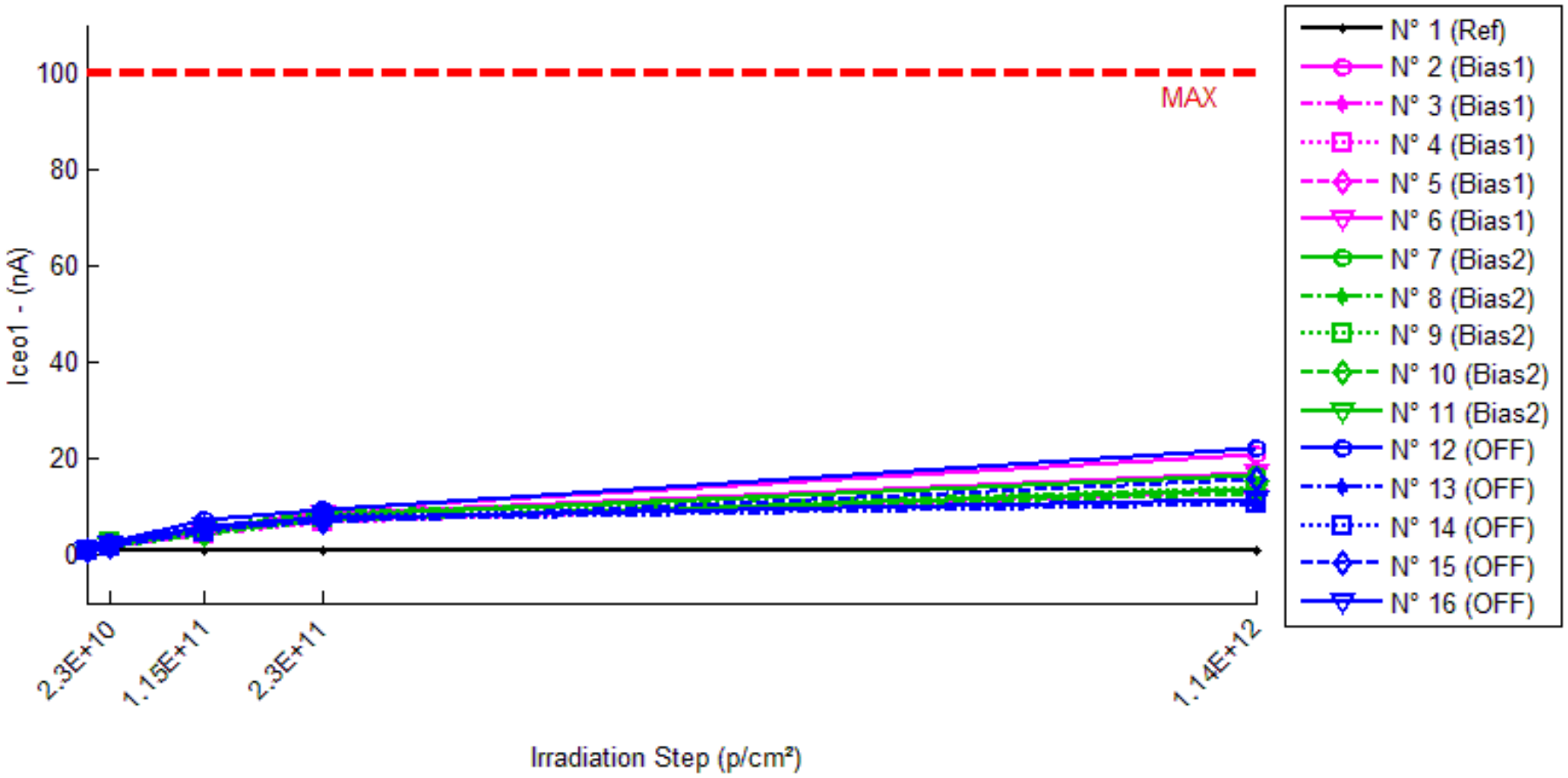
Delta [V(BR)eco]

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	---	-1.687E-3	-2.278E-3	1.857E-3	1.152E-3
N° 2 (Bias1)	---	3.474E-2	5.963E-2	6.549E-2	5.926E-2
N° 3 (Bias1)	---	3.398E-2	5.710E-2	6.355E-2	5.916E-2
N° 4 (Bias1)	---	3.319E-2	5.719E-2	6.511E-2	6.213E-2
N° 5 (Bias1)	---	3.526E-2	6.034E-2	7.063E-2	6.589E-2
N° 6 (Bias1)	---	1.477E-2	2.232E-2	2.479E-2	1.888E-2
N° 7 (Bias2)	---	5.227E-2	7.754E-2	8.386E-2	7.139E-2
N° 8 (Bias2)	---	4.397E-2	6.672E-2	7.332E-2	6.486E-2
N° 9 (Bias2)	---	4.113E-2	6.698E-2	7.196E-2	6.333E-2
N° 10 (Bias2)	---	4.890E-2	7.831E-2	8.470E-2	7.817E-2
N° 11 (Bias2)	---	4.670E-2	7.085E-2	7.534E-2	6.695E-2
N° 12 (OFF)	---	1.579E-2	2.541E-2	2.759E-2	3.717E-3
N° 13 (OFF)	---	3.825E-2	6.219E-2	6.615E-2	5.198E-2
N° 14 (OFF)	---	4.030E-2	6.872E-2	6.966E-2	5.729E-2
N° 15 (OFF)	---	1.558E-2	2.019E-2	2.203E-2	1.519E-3
N° 16 (OFF)	---	3.449E-2	5.831E-2	6.171E-2	4.348E-2
Average (OFF)	---	3.039E-2	5.131E-2	5.791E-2	5.307E-2
σ (OFF)	---	8.766E-3	1.627E-2	1.871E-2	1.930E-2
Average+3σ (OFF)	---	5.668E-2	1.001E-1	1.140E-1	1.110E-1
Average-3σ (OFF)	---	4.091E-3	2.494E-3	1.792E-3	-4.847E-3
Average (Bias1)	---	4.659E-2	7.208E-2	7.784E-2	6.894E-2
σ (Bias1)	---	4.308E-3	5.587E-3	6.013E-3	5.988E-3
Average+3σ (Bias1)	---	5.952E-2	8.884E-2	9.587E-2	8.690E-2
Average-3σ (Bias1)	---	3.367E-2	5.532E-2	5.980E-2	5.097E-2
Average (Bias2)	---	2.888E-2	4.697E-2	4.943E-2	3.160E-2
σ (Bias2)	---	1.223E-2	2.245E-2	2.274E-2	2.692E-2
Average+3σ (Bias2)	---	6.556E-2	1.143E-1	1.176E-1	1.124E-1
Average-3σ (Bias2)	---	-7.795E-3	-2.038E-2	-1.878E-2	-4.916E-2

60 MeV proton / detailed results

7. Iceo1

Ta=25°C; Vce=50V; If=0



60 MeV proton / detailed results

Iceo1 . (nA) **Max = 100.0**

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	0.886	0.958	0.832	0.866	0.775
N° 2 (Bias1)	0.963	1.715	4.681	9.287	20.650
N° 3 (Bias1)	1.087	1.703	4.045	6.860	13.047
N° 4 (Bias1)	1.030	1.724	4.346	7.018	13.857
N° 5 (Bias1)	0.861	1.528	4.829	7.189	13.584
N° 6 (Bias1)	0.965	1.826	4.236	8.472	17.058
N° 7 (Bias2)	0.786	1.760	4.962	7.963	16.714
N° 8 (Bias2)	0.806	1.781	5.491	9.023	13.601
N° 9 (Bias2)	0.838	2.348	4.870	7.594	14.234
N° 10 (Bias2)	0.695	1.660	4.055	7.217	12.620
N° 11 (Bias2)	0.980	1.869	4.968	7.176	13.559
N° 12 (OFF)	0.953	2.651	7.397	9.382	21.957
N° 13 (OFF)	0.767	1.752	5.272	7.428	10.745
N° 14 (OFF)	0.833	1.798	4.714	7.932	10.771
N° 15 (OFF)	0.748	1.560	5.497	7.013	15.724
N° 16 (OFF)	0.936	2.020	5.802	7.659	11.491

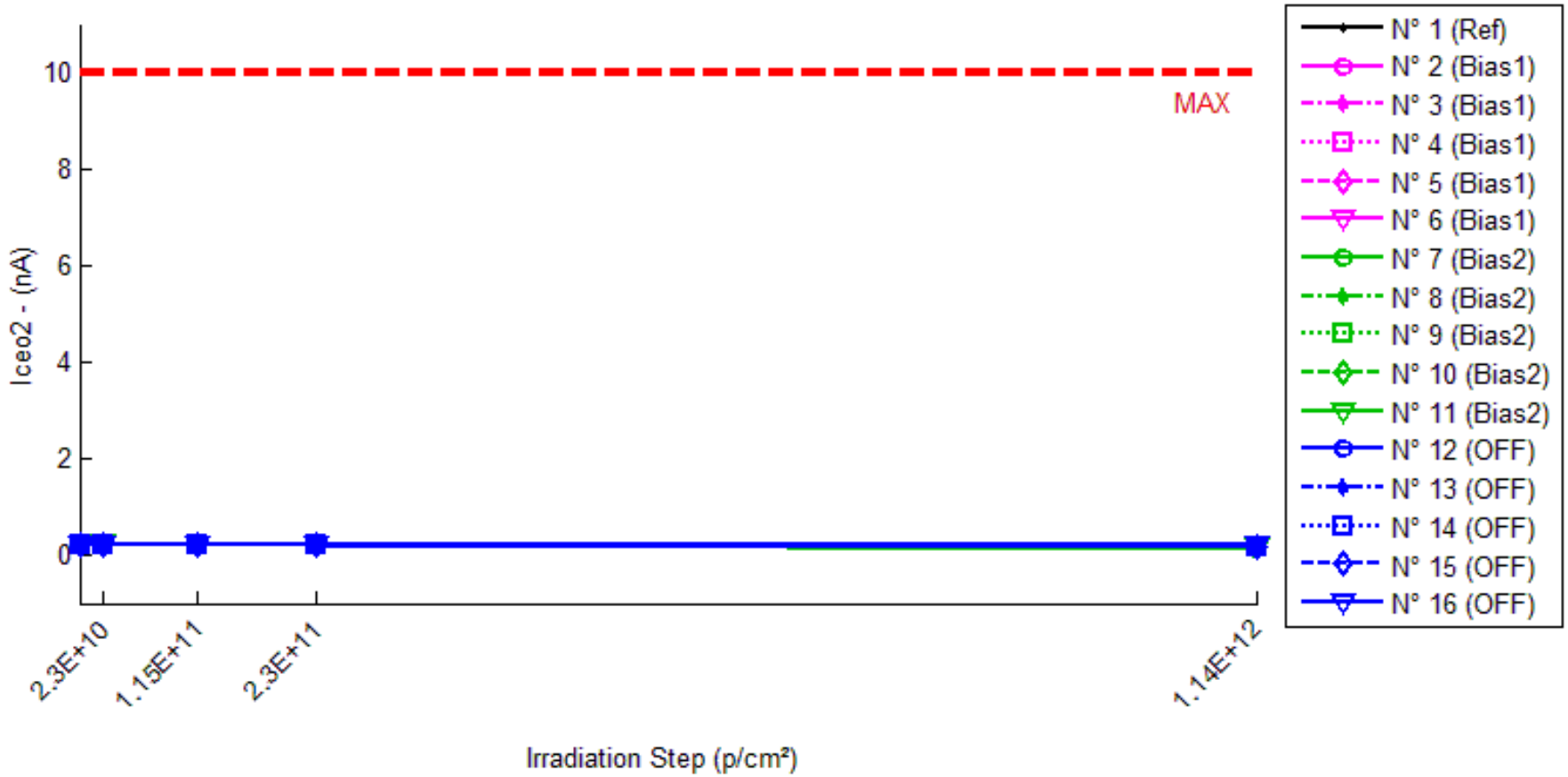
Delta [Iceo1]

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	---	7.193E-2	-5.398E-2	-2.041E-2	-1.109E-1
N° 2 (Bias1)	---	7.520E-1	3.719E+0	8.324E+0	1.969E+1
N° 3 (Bias1)	---	6.158E-1	2.957E+0	5.772E+0	1.196E+1
N° 4 (Bias1)	---	6.937E-1	3.316E+0	5.988E+0	1.283E+1
N° 5 (Bias1)	---	6.673E-1	3.968E+0	6.329E+0	1.272E+1
N° 6 (Bias1)	---	8.602E-1	3.271E+0	7.507E+0	1.609E+1
N° 7 (Bias2)	---	9.745E-1	4.176E+0	7.178E+0	1.593E+1
N° 8 (Bias2)	---	9.748E-1	4.685E+0	8.217E+0	1.280E+1
N° 9 (Bias2)	---	1.509E+0	4.032E+0	6.755E+0	1.340E+1
N° 10 (Bias2)	---	9.643E-1	3.359E+0	6.521E+0	1.192E+1
N° 11 (Bias2)	---	8.891E-1	3.988E+0	6.196E+0	1.258E+1
N° 12 (OFF)	---	1.698E+0	6.444E+0	8.429E+0	2.100E+1
N° 13 (OFF)	---	9.853E-1	4.505E+0	6.661E+0	9.978E+0
N° 14 (OFF)	---	9.647E-1	3.881E+0	7.099E+0	9.938E+0
N° 15 (OFF)	---	8.117E-1	4.748E+0	6.265E+0	1.498E+1
N° 16 (OFF)	---	1.083E+0	4.865E+0	6.723E+0	1.055E+1
Average (OFF)	---	7.178E-1	3.446E+0	6.784E+0	1.466E+1
σ (OFF)	---	9.351E-2	3.981E-1	1.091E+0	3.230E+0
Average+3σ (OFF)	---	9.983E-1	4.640E+0	1.006E+1	2.435E+1
Average-3σ (OFF)	---	4.373E-1	2.252E+0	3.511E+0	4.968E+0
Average (Bias1)	---	1.062E+0	4.048E+0	6.973E+0	1.332E+1
σ (Bias1)	---	2.524E-1	4.746E-1	7.817E-1	1.548E+0
Average+3σ (Bias1)	---	1.820E+0	5.472E+0	9.319E+0	1.797E+1
Average-3σ (Bias1)	---	3.053E-1	2.625E+0	4.628E+0	8.681E+0
Average (Bias2)	---	1.109E+0	4.889E+0	7.035E+0	1.329E+1
σ (Bias2)	---	3.434E-1	9.489E-1	8.333E-1	4.797E+0
Average+3σ (Bias2)	---	2.139E+0	7.735E+0	9.535E+0	2.768E+1
Average-3σ (Bias2)	---	7.825E-2	2.042E+0	4.536E+0	-1.101E+0

60 MeV proton / detailed results

8. Iceo2

Ta=25°C; Vce=5V; If=0



60 MeV proton / detailed results

Iceo2 . (nA) **Max = 10.0**

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	0.206	0.228	0.198	0.209	0.208
N° 2 (Bias1)	0.223	0.221	0.207	0.208	0.172
N° 3 (Bias1)	0.218	0.219	0.200	0.203	0.179
N° 4 (Bias1)	0.214	0.214	0.198	0.204	0.182
N° 5 (Bias1)	0.217	0.210	0.205	0.209	0.182
N° 6 (Bias1)	0.228	0.223	0.217	0.211	0.196
N° 7 (Bias2)	0.223	0.212	0.214	0.208	0.146
N° 8 (Bias2)	0.222	0.211	0.213	0.199	0.155
N° 9 (Bias2)	0.223	0.216	0.214	0.205	0.162
N° 10 (Bias2)	0.226	0.226	0.211	0.207	0.158
N° 11 (Bias2)	0.219	0.241	0.221	0.204	0.165
N° 12 (OFF)	0.216	0.215	0.206	0.205	0.167
N° 13 (OFF)	0.225	0.227	0.221	0.209	0.179
N° 14 (OFF)	0.213	0.217	0.208	0.215	0.177
N° 15 (OFF)	0.221	0.228	0.218	0.213	0.177
N° 16 (OFF)	0.220	0.217	0.206	0.209	0.199

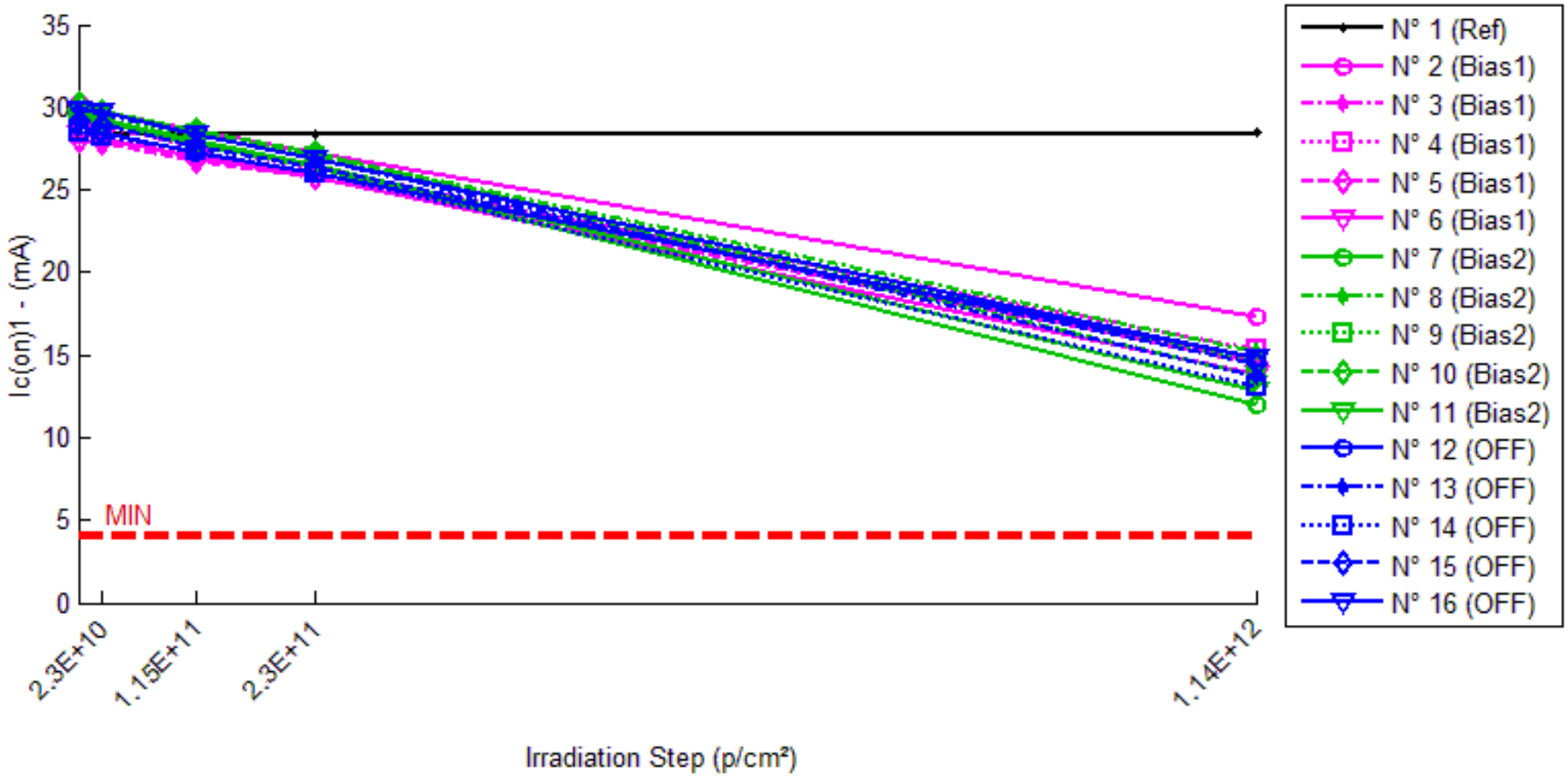
Delta [Iceo2]

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	---	2.234E-2	-7.838E-3	3.479E-3	2.222E-3
N° 2 (Bias1)	---	-1.467E-3	-1.551E-2	-1.496E-2	-5.055E-2
N° 3 (Bias1)	---	9.640E-4	-1.815E-2	-1.492E-2	-3.969E-2
N° 4 (Bias1)	---	-5.030E-4	-1.689E-2	-1.010E-2	-3.215E-2
N° 5 (Bias1)	---	-7.503E-3	-1.236E-2	-8.216E-3	-3.571E-2
N° 6 (Bias1)	---	-5.072E-3	-1.123E-2	-1.723E-2	-3.223E-2
N° 7 (Bias2)	---	-1.077E-2	-9.054E-3	-1.484E-2	-7.675E-2
N° 8 (Bias2)	---	-1.178E-2	-9.054E-3	-2.351E-2	-6.736E-2
N° 9 (Bias2)	---	-7.503E-3	-8.718E-3	-1.823E-2	-6.145E-2
N° 10 (Bias2)	---	8.420E-5	-1.559E-2	-1.899E-2	-6.837E-2
N° 11 (Bias2)	---	2.280E-2	2.264E-3	-1.484E-2	-5.340E-2
N° 12 (OFF)	---	-1.592E-3	-1.027E-2	-1.077E-2	-4.967E-2
N° 13 (OFF)	---	1.761E-3	-4.275E-3	-1.568E-2	-4.602E-2
N° 14 (OFF)	---	3.940E-3	-5.239E-3	1.425E-3	-3.655E-2
N° 15 (OFF)	---	7.042E-3	-3.521E-3	-8.634E-3	-4.414E-2
N° 16 (OFF)	---	-3.688E-3	-1.387E-2	-1.174E-2	-2.138E-2
Average (OFF)	---	-2.716E-3	-1.483E-2	-1.309E-2	-3.807E-2
σ (OFF)	---	3.481E-3	2.947E-3	3.764E-3	7.634E-3
Average+3σ (OFF)	---	7.726E-3	-5.988E-3	-1.794E-3	-1.517E-2
Average-3σ (OFF)	---	-1.316E-2	-2.367E-2	-2.438E-2	-6.097E-2
Average (Bias1)	---	-1.433E-3	-8.031E-3	-1.808E-2	-6.546E-2
σ (Bias1)	---	1.432E-2	6.437E-3	3.585E-3	8.674E-3
Average+3σ (Bias1)	---	4.154E-2	1.128E-2	-7.328E-3	-3.944E-2
Average-3σ (Bias1)	---	-4.441E-2	-2.734E-2	-2.884E-2	-9.149E-2
Average (Bias2)	---	1.493E-3	-7.436E-3	-9.079E-3	-3.955E-2
σ (Bias2)	---	4.279E-3	4.462E-3	6.403E-3	1.123E-2
Average+3σ (Bias2)	---	1.433E-2	5.949E-3	1.013E-2	-5.856E-3
Average-3σ (Bias2)	---	-1.134E-2	-2.082E-2	-2.829E-2	-7.325E-2

60 MeV proton / detailed results

9. Ic(on)1

Ta=25°C; Vce=5V; If=10mA



60 MeV proton / detailed results

Ic(on)1 . (mA) **Min = 4.0**

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	28.256	28.394	28.356	28.402	28.465
N° 2 (Bias1)	30.192	29.731	28.667	27.286	17.349
N° 3 (Bias1)	28.994	28.811	27.662	26.367	14.425
N° 4 (Bias1)	28.469	28.311	27.294	26.147	15.300
N° 5 (Bias1)	28.029	27.862	26.797	25.771	14.526
N° 6 (Bias1)	28.366	28.143	27.040	25.708	13.812
N° 7 (Bias2)	29.292	29.082	27.745	26.319	11.931
N° 8 (Bias2)	30.074	29.804	28.486	27.120	15.144
N° 9 (Bias2)	29.701	29.206	28.304	26.968	14.618
N° 10 (Bias2)	30.200	29.708	28.622	27.218	13.727
N° 11 (Bias2)	29.354	29.242	28.025	26.542	12.841
N° 12 (OFF)	28.825	28.438	27.265	25.998	14.838
N° 13 (OFF)	29.880	29.612	28.341	26.881	13.771
N° 14 (OFF)	28.525	28.242	27.378	25.959	13.122
N° 15 (OFF)	29.230	28.990	27.676	26.427	14.484
N° 16 (OFF)	29.893	29.686	28.398	26.922	14.798

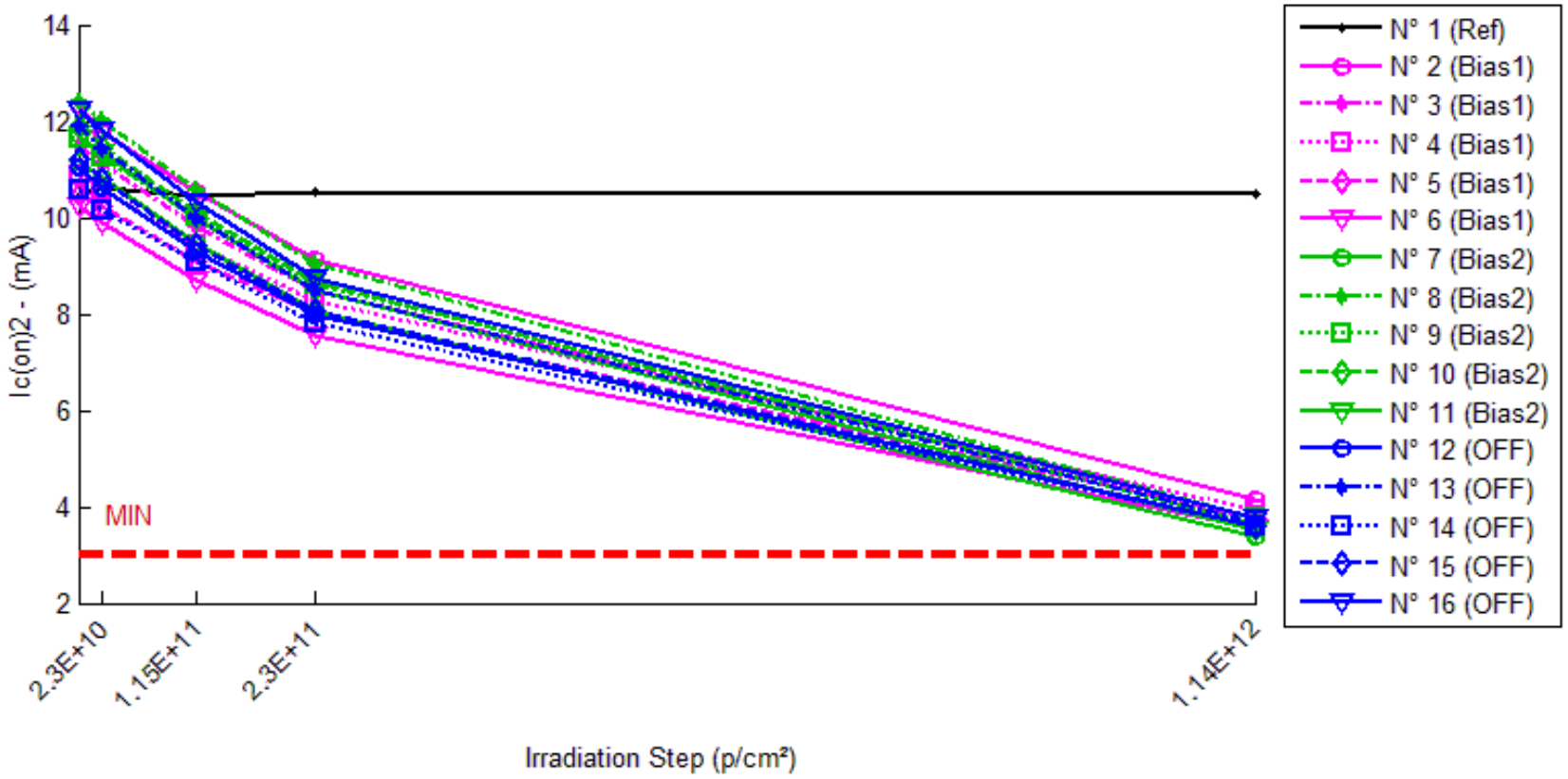
Delta [Ic(on)1]

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	---	1.378E-1	9.954E-2	1.457E-1	2.085E-1
N° 2 (Bias1)	---	-4.613E-1	-1.525E+0	-2.906E+0	-1.284E+1
N° 3 (Bias1)	---	-1.830E-1	-1.332E+0	-2.626E+0	-1.457E+1
N° 4 (Bias1)	---	-1.582E-1	-1.175E+0	-2.322E+0	-1.317E+1
N° 5 (Bias1)	---	-1.665E-1	-1.231E+0	-2.257E+0	-1.350E+1
N° 6 (Bias1)	---	-2.233E-1	-1.326E+0	-2.658E+0	-1.455E+1
N° 7 (Bias2)	---	-2.103E-1	-1.547E+0	-2.973E+0	-1.736E+1
N° 8 (Bias2)	---	-2.698E-1	-1.588E+0	-2.954E+0	-1.493E+1
N° 9 (Bias2)	---	-4.954E-1	-1.397E+0	-2.733E+0	-1.508E+1
N° 10 (Bias2)	---	-4.924E-1	-1.579E+0	-2.982E+0	-1.647E+1
N° 11 (Bias2)	---	-1.123E-1	-1.329E+0	-2.813E+0	-1.651E+1
N° 12 (OFF)	---	-3.866E-1	-1.560E+0	-2.827E+0	-1.399E+1
N° 13 (OFF)	---	-2.677E-1	-1.539E+0	-2.999E+0	-1.611E+1
N° 14 (OFF)	---	-2.826E-1	-1.147E+0	-2.566E+0	-1.540E+1
N° 15 (OFF)	---	-2.397E-1	-1.554E+0	-2.803E+0	-1.475E+1
N° 16 (OFF)	---	-2.077E-1	-1.495E+0	-2.972E+0	-1.510E+1
Average (OFF)	---	-2.385E-1	-1.318E+0	-2.554E+0	-1.373E+1
σ (OFF)	---	1.271E-1	1.332E-1	2.653E-1	7.961E-1
Average+3σ (OFF)	---	1.428E-1	-9.182E-1	-1.758E+0	-1.134E+1
Average-3σ (OFF)	---	-6.197E-1	-1.717E+0	-3.350E+0	-1.612E+1
Average (Bias1)	---	-3.160E-1	-1.488E+0	-2.891E+0	-1.607E+1
σ (Bias1)	---	1.718E-1	1.175E-1	1.121E-1	1.037E+0
Average+3σ (Bias1)	---	1.994E-1	-1.135E+0	-2.555E+0	-1.296E+1
Average-3σ (Bias1)	---	-8.315E-1	-1.840E+0	-3.227E+0	-1.918E+1
Average (Bias2)	---	-2.768E-1	-1.459E+0	-2.833E+0	-1.507E+1
σ (Bias2)	---	6.770E-2	1.762E-1	1.725E-1	7.856E-1
Average+3σ (Bias2)	---	-7.374E-2	-9.303E-1	-2.316E+0	-1.271E+1
Average-3σ (Bias2)	---	-4.800E-1	-1.988E+0	-3.351E+0	-1.742E+1

60 MeV proton / detailed results

10.Ic(on)2

Ta=25°C; Vce=0.4V; If=10mA



60 MeV proton / detailed results

Ic(on)2 . (mA) **Min = 3.0**

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	10.427	10.617	10.468	10.543	10.496
N° 2 (Bias1)	12.338	11.776	10.535	9.142	4.138
N° 3 (Bias1)	11.451	11.120	9.802	8.497	3.775
N° 4 (Bias1)	10.876	10.594	9.440	8.279	3.922
N° 5 (Bias1)	10.506	10.222	9.101	8.003	3.785
N° 6 (Bias1)	10.213	9.883	8.723	7.564	3.541
N° 7 (Bias2)	11.190	10.838	9.451	8.065	3.374
N° 8 (Bias2)	12.411	12.022	10.554	9.048	3.763
N° 9 (Bias2)	11.649	11.243	10.031	8.636	3.755
N° 10 (Bias2)	11.912	11.469	10.123	8.646	3.653
N° 11 (Bias2)	11.649	11.347	9.986	8.474	3.515
N° 12 (OFF)	11.059	10.624	9.305	7.969	3.612
N° 13 (OFF)	11.897	11.441	9.992	8.500	3.662
N° 14 (OFF)	10.555	10.169	9.084	7.801	3.601
N° 15 (OFF)	11.194	10.784	9.419	8.068	3.608
N° 16 (OFF)	12.231	11.819	10.304	8.732	3.749

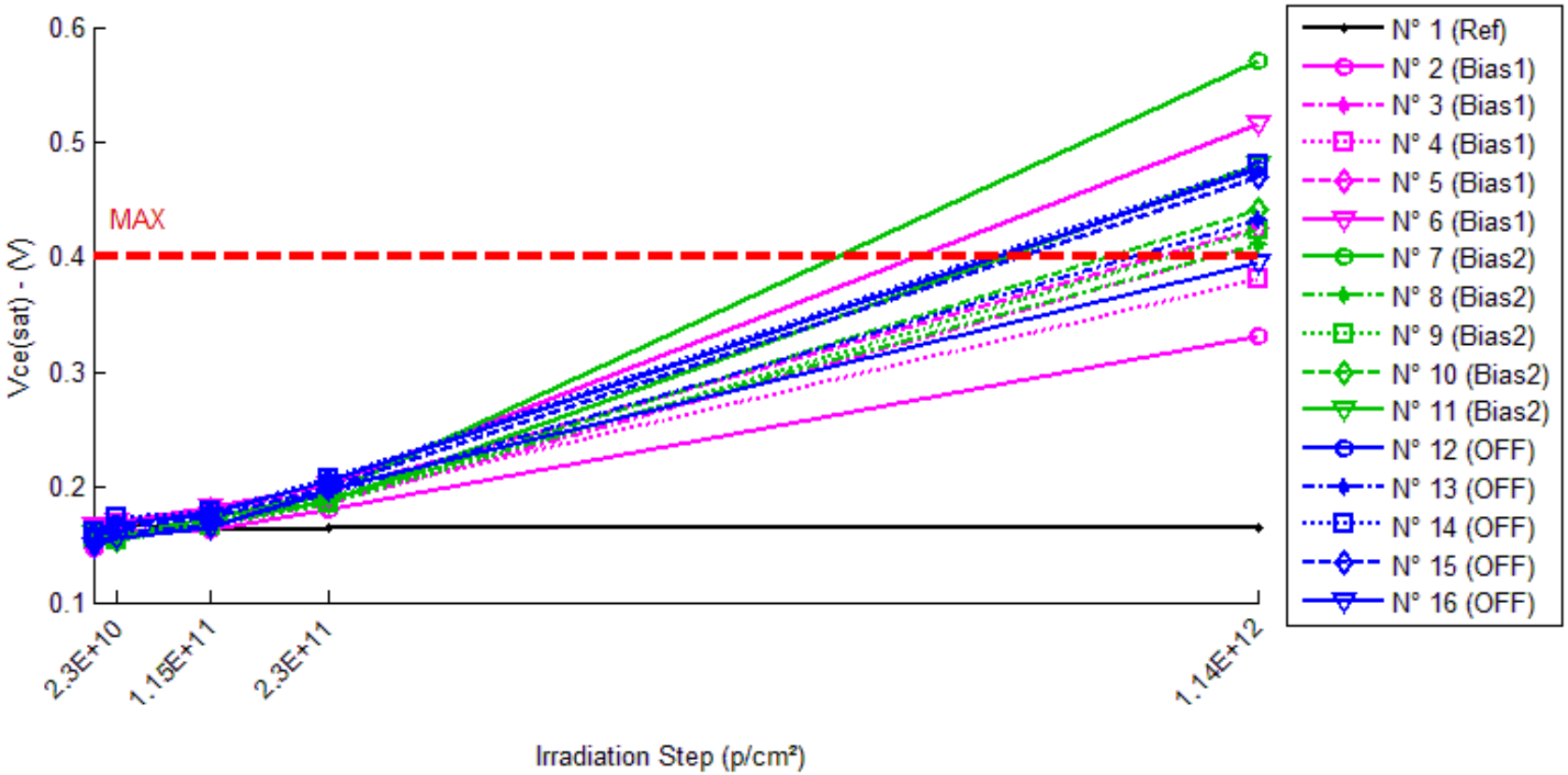
Delta [Ic(on)2]

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	---	1.893E-1	4.034E-2	1.153E-1	6.816E-2
N° 2 (Bias1)	---	-5.619E-1	-1.802E+0	-3.195E+0	-8.199E+0
N° 3 (Bias1)	---	-3.310E-1	-1.649E+0	-2.953E+0	-7.676E+0
N° 4 (Bias1)	---	-2.816E-1	-1.436E+0	-2.596E+0	-6.954E+0
N° 5 (Bias1)	---	-2.838E-1	-1.405E+0	-2.503E+0	-6.721E+0
N° 6 (Bias1)	---	-3.304E-1	-1.491E+0	-2.649E+0	-6.672E+0
N° 7 (Bias2)	---	-3.525E-1	-1.740E+0	-3.126E+0	-7.816E+0
N° 8 (Bias2)	---	-3.887E-1	-1.856E+0	-3.363E+0	-8.647E+0
N° 9 (Bias2)	---	-4.060E-1	-1.618E+0	-3.013E+0	-7.894E+0
N° 10 (Bias2)	---	-4.438E-1	-1.790E+0	-3.266E+0	-8.259E+0
N° 11 (Bias2)	---	-3.021E-1	-1.663E+0	-3.175E+0	-8.134E+0
N° 12 (OFF)	---	-4.354E-1	-1.754E+0	-3.090E+0	-7.447E+0
N° 13 (OFF)	---	-4.560E-1	-1.906E+0	-3.398E+0	-8.235E+0
N° 14 (OFF)	---	-3.867E-1	-1.471E+0	-2.754E+0	-6.954E+0
N° 15 (OFF)	---	-4.103E-1	-1.775E+0	-3.127E+0	-7.586E+0
N° 16 (OFF)	---	-4.123E-1	-1.927E+0	-3.499E+0	-8.482E+0
Average (OFF)	---	-3.577E-1	-1.556E+0	-2.779E+0	-7.244E+0
σ (OFF)	---	1.166E-1	1.665E-1	2.873E-1	6.678E-1
Average+3σ (OFF)	---	-7.916E-3	-1.057E+0	-1.917E+0	-5.241E+0
Average-3σ (OFF)	---	-7.076E-1	-2.056E+0	-3.641E+0	-9.248E+0
Average (Bias1)	---	-3.786E-1	-1.733E+0	-3.189E+0	-8.150E+0
σ (Bias1)	---	5.395E-2	9.563E-2	1.334E-1	3.304E-1
Average+3σ (Bias1)	---	-2.168E-1	-1.446E+0	-2.788E+0	-7.159E+0
Average-3σ (Bias1)	---	-5.405E-1	-2.020E+0	-3.589E+0	-9.141E+0
Average (Bias2)	---	-4.201E-1	-1.767E+0	-3.174E+0	-7.741E+0
σ (Bias2)	---	2.645E-2	1.820E-1	2.921E-1	6.168E-1
Average+3σ (Bias2)	---	-3.408E-1	-1.221E+0	-2.297E+0	-5.891E+0
Average-3σ (Bias2)	---	-4.995E-1	-2.313E+0	-4.050E+0	-9.592E+0

60 MeV proton / detailed results

11.Vce(sat)

Ta=25°C; If=50mA; Ic=10mA



60 MeV proton / detailed results

Vce(sat) . (V) **Max = 0.4**

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	0.166	0.164	0.167	0.163	0.164
N° 2 (Bias1)	0.156	0.163	0.183	0.190	1.132
N° 3 (Bias1)	0.173	0.183	0.195	0.210	1.369
N° 4 (Bias1)	0.153	0.177	0.178	0.193	0.925
N° 5 (Bias1)	0.167	0.175	0.201	0.217	1.407
N° 6 (Bias1)	0.162	0.170	0.182	0.210	1.220
N° 7 (Bias2)	0.149	0.153	0.169	0.186	1.186
N° 8 (Bias2)	0.160	0.162	0.182	0.200	1.370
N° 9 (Bias2)	0.162	0.166	0.184	0.200	1.413
N° 10 (Bias2)	0.155	0.159	0.177	0.195	1.453
N° 11 (Bias2)	0.161	0.165	0.182	0.200	1.509
N° 12 (OFF)	0.154	0.160	0.174	0.193	1.315
N° 13 (OFF)	0.176	0.179	0.192	0.210	1.627
N° 14 (OFF)	0.165	0.172	0.184	0.204	1.474
N° 15 (OFF)	0.159	0.170	0.183	0.202	1.537
N° 16 (OFF)	0.172	0.178	0.195	0.212	1.497

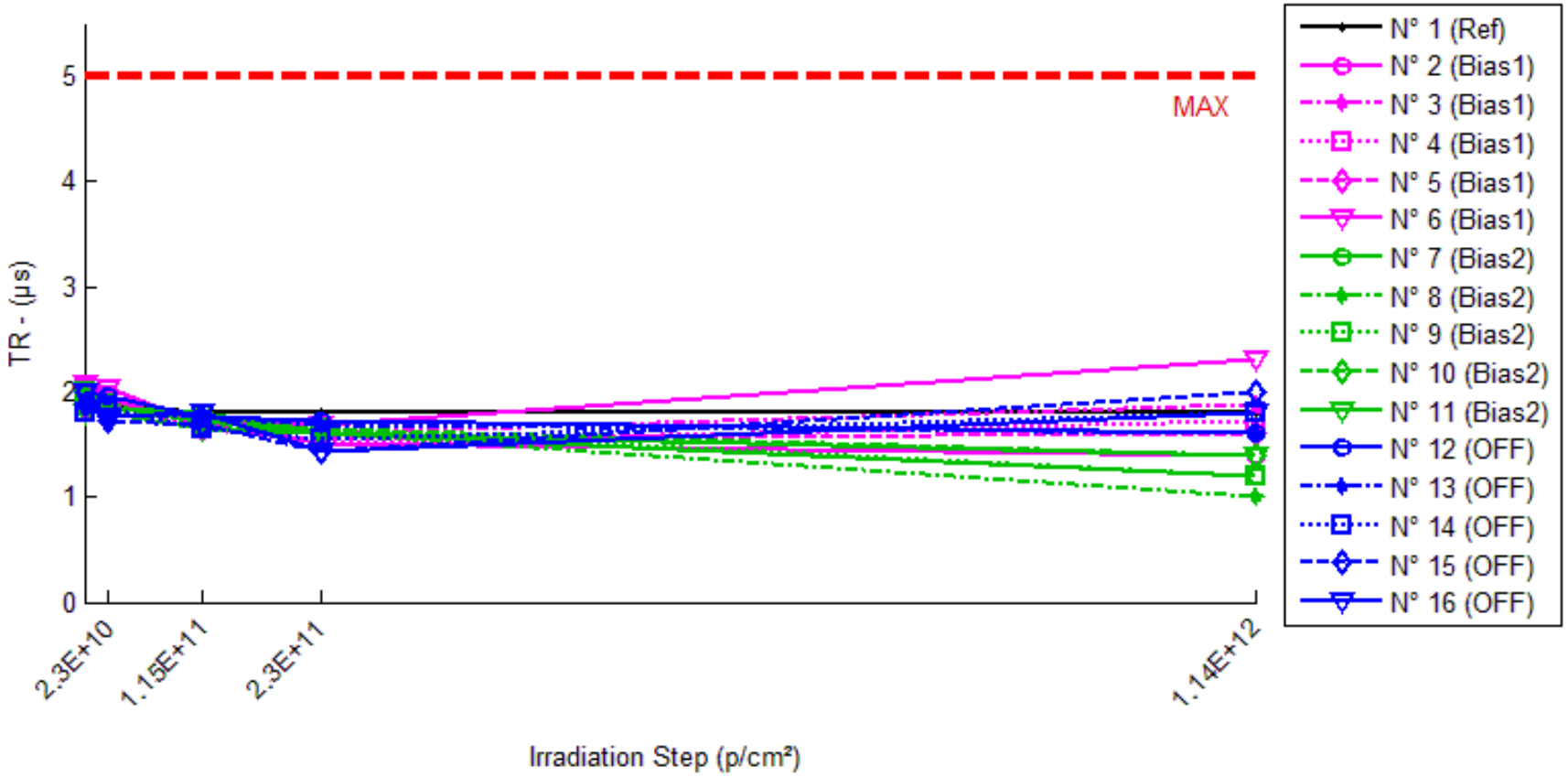
Delta [Vce(sat)]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	-1.563E-3	1.206E-3	-2.808E-3	-1.838E-3
N° 2 (Bias1)	---	6.988E-3	2.630E-2	3.410E-2	9.757E-1
N° 3 (Bias1)	---	1.004E-2	2.217E-2	3.718E-2	1.196E+0
N° 4 (Bias1)	---	2.445E-2	2.543E-2	4.003E-2	7.721E-1
N° 5 (Bias1)	---	8.048E-3	3.414E-2	4.981E-2	1.240E+0
N° 6 (Bias1)	---	8.824E-3	2.012E-2	4.827E-2	1.059E+0
N° 7 (Bias2)	---	3.371E-3	1.979E-2	3.640E-2	1.037E+0
N° 8 (Bias2)	---	2.688E-3	2.208E-2	4.013E-2	1.210E+0
N° 9 (Bias2)	---	4.632E-3	2.175E-2	3.813E-2	1.251E+0
N° 10 (Bias2)	---	3.828E-3	2.182E-2	3.994E-2	1.298E+0
N° 11 (Bias2)	---	4.292E-3	2.119E-2	3.902E-2	1.348E+0
N° 12 (OFF)	---	5.920E-3	2.048E-2	3.916E-2	1.162E+0
N° 13 (OFF)	---	3.024E-3	1.613E-2	3.471E-2	1.451E+0
N° 14 (OFF)	---	7.295E-3	1.931E-2	3.879E-2	1.309E+0
N° 15 (OFF)	---	1.152E-2	2.432E-2	4.373E-2	1.378E+0
N° 16 (OFF)	---	6.824E-3	2.347E-2	4.036E-2	1.325E+0
Average (OFF)	---	1.167E-2	2.563E-2	4.188E-2	1.049E+0
σ (OFF)	---	7.233E-3	5.369E-3	6.888E-3	1.874E-1
Average+3σ (OFF)	---	3.337E-2	4.174E-2	6.254E-2	1.611E+0
Average-3σ (OFF)	---	-1.003E-2	9.525E-3	2.121E-2	4.865E-1
Average (Bias1)	---	3.762E-3	2.133E-2	3.872E-2	1.229E+0
σ (Bias1)	---	7.662E-4	9.188E-4	1.524E-3	1.189E-1
Average+3σ (Bias1)	---	6.061E-3	2.408E-2	4.330E-2	1.586E+0
Average-3σ (Bias1)	---	1.464E-3	1.857E-2	3.415E-2	8.721E-1
Average (Bias2)	---	6.917E-3	2.074E-2	3.935E-2	1.325E+0
σ (Bias2)	---	3.061E-3	3.300E-3	3.242E-3	1.068E-1
Average+3σ (Bias2)	---	1.610E-2	3.064E-2	4.908E-2	1.646E+0
Average-3σ (Bias2)	---	-2.268E-3	1.084E-2	2.963E-2	1.005E+0

60 MeV proton / detailed results

12.TR

Ta=25°C; Vce=5V; If=2mA; RL=100 Ohms



60 MeV proton / detailed results

TR . (µs) **Max = 5.0**

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	1.88	1.88	1.80	1.80	1.80
N° 2 (Bias1)	1.96	1.92	1.68	1.52	1.40
N° 3 (Bias1)	1.88	1.88	1.64	1.60	1.88
N° 4 (Bias1)	2.04	1.96	1.68	1.52	1.72
N° 5 (Bias1)	1.84	1.80	1.64	1.56	1.60
N° 6 (Bias1)	2.08	2.04	1.68	1.68	2.32
N° 7 (Bias2)	1.96	1.84	1.80	1.60	1.20
N° 8 (Bias2)	1.84	1.84	1.72	1.60	1.00
N° 9 (Bias2)	2.00	1.88	1.68	1.64	1.20
N° 10 (Bias2)	1.92	1.84	1.72	1.64	1.40
N° 11 (Bias2)	1.80	1.80	1.64	1.60	1.40
N° 12 (OFF)	2.00	1.96	1.76	1.72	1.60
N° 13 (OFF)	1.88	1.76	1.76	1.68	1.60
N° 14 (OFF)	1.80	1.84	1.64	1.56	1.80
N° 15 (OFF)	1.88	1.72	1.68	1.44	2.00
N° 16 (OFF)	2.00	1.76	1.80	1.44	1.80

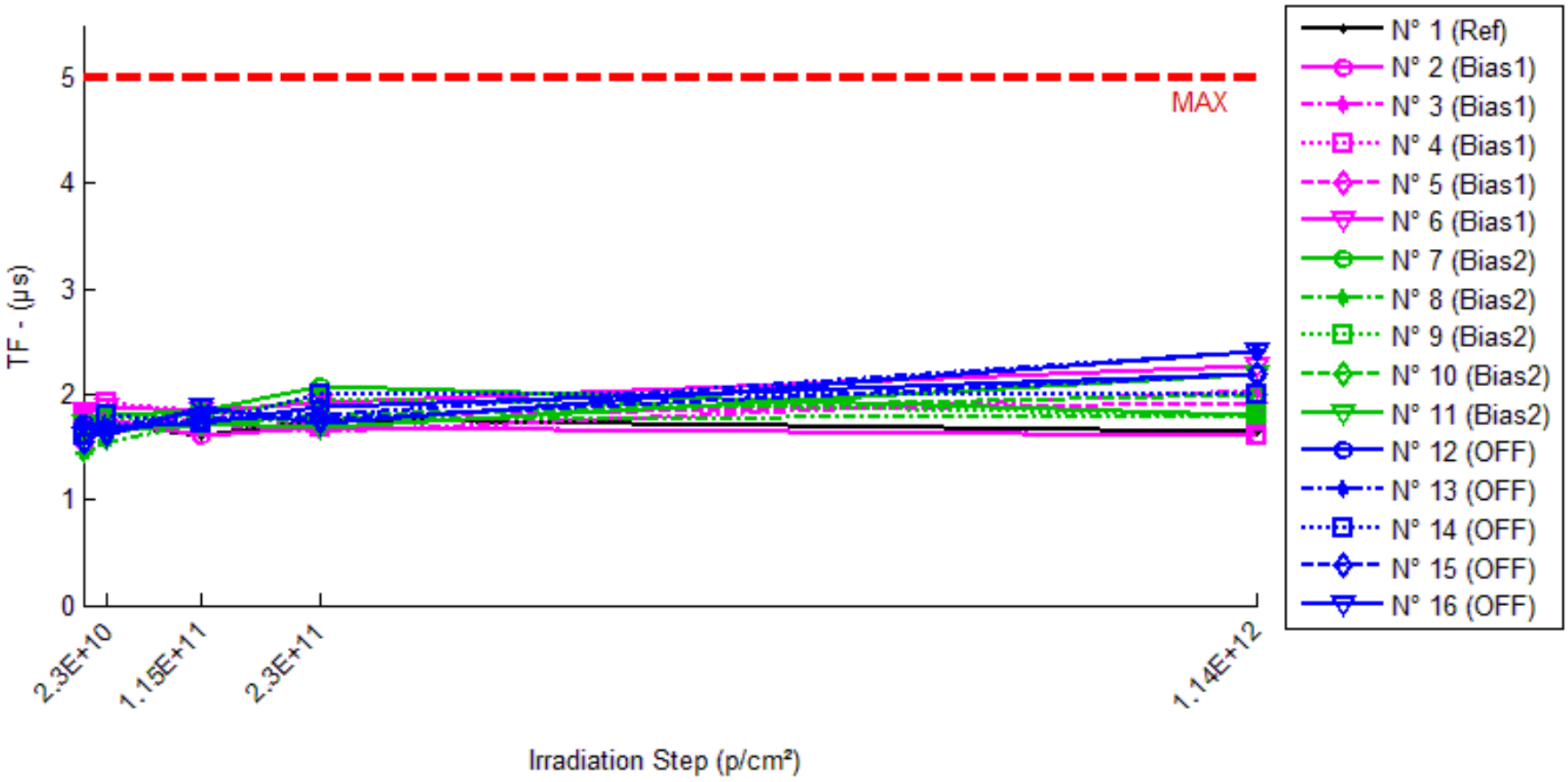
Delta [TR]

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	---	0.000E+0	-8.000E-2	-8.000E-2	-8.000E-2
N° 2 (Bias1)	---	-4.000E-2	-2.800E-1	-4.400E-1	-5.600E-1
N° 3 (Bias1)	---	0.000E+0	-2.400E-1	-2.800E-1	0.000E+0
N° 4 (Bias1)	---	-8.000E-2	-3.600E-1	-5.200E-1	-3.200E-1
N° 5 (Bias1)	---	-4.000E-2	-2.000E-1	-2.800E-1	-2.400E-1
N° 6 (Bias1)	---	-4.000E-2	-4.000E-1	-4.000E-1	2.400E-1
N° 7 (Bias2)	---	-1.200E-1	-1.600E-1	-3.600E-1	-7.600E-1
N° 8 (Bias2)	---	0.000E+0	-1.200E-1	-2.400E-1	-8.400E-1
N° 9 (Bias2)	---	-1.200E-1	-3.200E-1	-3.600E-1	-8.000E-1
N° 10 (Bias2)	---	-8.000E-2	-2.000E-1	-2.800E-1	-5.200E-1
N° 11 (Bias2)	---	0.000E+0	-1.600E-1	-2.000E-1	-4.000E-1
N° 12 (OFF)	---	-4.000E-2	-2.400E-1	-2.800E-1	-4.000E-1
N° 13 (OFF)	---	-1.200E-1	-1.200E-1	-2.000E-1	-2.800E-1
N° 14 (OFF)	---	4.000E-2	-1.600E-1	-2.400E-1	0.000E+0
N° 15 (OFF)	---	-1.600E-1	-2.000E-1	-4.400E-1	1.200E-1
N° 16 (OFF)	---	-2.400E-1	-2.000E-1	-5.600E-1	-2.000E-1
Average (OFF)	---	-4.000E-2	-2.960E-1	-3.840E-1	-1.760E-1
σ (OFF)	---	2.828E-2	8.295E-2	1.043E-1	3.067E-1
Average+3σ (OFF)	---	4.485E-2	-4.716E-2	-7.108E-2	7.442E-1
Average-3σ (OFF)	---	-1.249E-1	-5.448E-1	-6.969E-1	-1.096E+0
Average (Bias1)	---	-6.400E-2	-1.920E-1	-2.880E-1	-6.640E-1
σ (Bias1)	---	6.066E-2	7.694E-2	7.155E-2	1.931E-1
Average+3σ (Bias1)	---	1.180E-1	3.882E-2	-7.334E-2	-8.476E-2
Average-3σ (Bias1)	---	-2.460E-1	-4.228E-1	-5.027E-1	-1.243E+0
Average (Bias2)	---	-1.040E-1	-1.840E-1	-3.440E-1	-1.520E-1
σ (Bias2)	---	1.081E-1	4.561E-2	1.513E-1	2.105E-1
Average+3σ (Bias2)	---	2.202E-1	-4.718E-2	1.098E-1	4.796E-1
Average-3σ (Bias2)	---	-4.282E-1	-3.208E-1	-7.978E-1	-7.836E-1

60 MeV proton / detailed results

13.TF

Ta=25°C; Vce=5V; If=2mA; RL=100 Ohms



60 MeV proton / detailed results

TF . (µs) **Max = 5.0**

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	1.84	1.72	1.60	1.76	1.64
N° 2 (Bias1)	1.56	1.76	1.60	1.68	1.60
N° 3 (Bias1)	1.76	1.72	1.72	1.64	2.04
N° 4 (Bias1)	1.80	1.92	1.84	1.68	1.60
N° 5 (Bias1)	1.80	1.72	1.76	1.80	1.92
N° 6 (Bias1)	1.84	1.88	1.84	1.92	2.28
N° 7 (Bias2)	1.68	1.80	1.84	2.08	1.80
N° 8 (Bias2)	1.44	1.56	1.72	1.76	1.80
N° 9 (Bias2)	1.60	1.76	1.80	1.96	1.80
N° 10 (Bias2)	1.64	1.68	1.72	1.80	2.00
N° 11 (Bias2)	1.72	1.64	1.72	1.68	2.20
N° 12 (OFF)	1.72	1.68	1.72	1.88	2.20
N° 13 (OFF)	1.72	1.68	1.84	1.80	2.40
N° 14 (OFF)	1.60	1.80	1.72	2.00	2.00
N° 15 (OFF)	1.56	1.64	1.76	1.76	2.20
N° 16 (OFF)	1.60	1.60	1.88	1.72	2.40

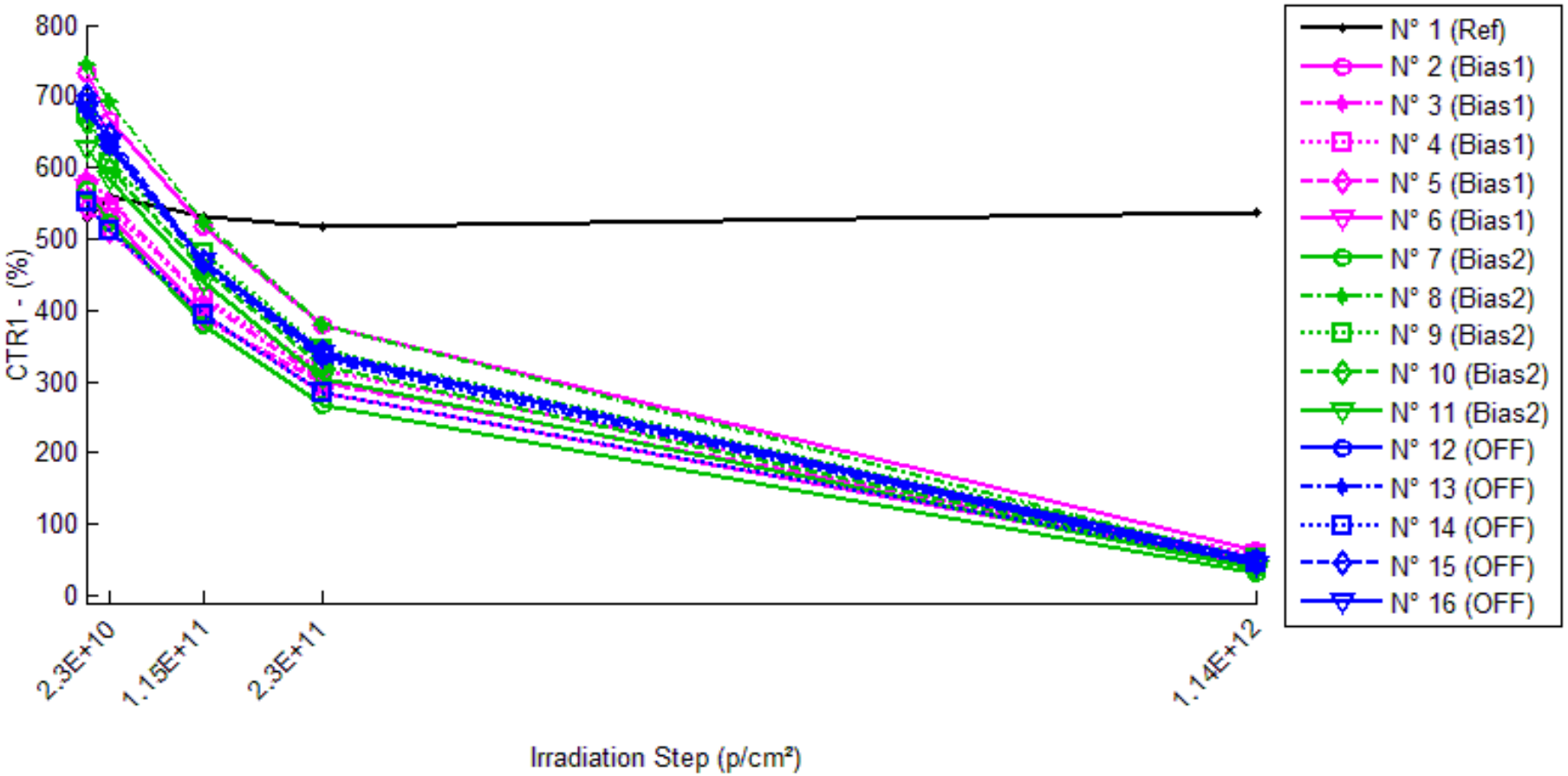
Delta [TF]

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	---	-1.200E-1	-2.400E-1	-8.000E-2	-2.000E-1
N° 2 (Bias1)	---	2.000E-1	4.000E-2	1.200E-1	4.000E-2
N° 3 (Bias1)	---	-4.000E-2	-4.000E-2	-1.200E-1	2.800E-1
N° 4 (Bias1)	---	1.200E-1	4.000E-2	-1.200E-1	-2.000E-1
N° 5 (Bias1)	---	-8.000E-2	-4.000E-2	0.000E+0	1.200E-1
N° 6 (Bias1)	---	4.000E-2	0.000E+0	8.000E-2	4.400E-1
N° 7 (Bias2)	---	1.200E-1	1.600E-1	4.000E-1	1.200E-1
N° 8 (Bias2)	---	1.200E-1	2.800E-1	3.200E-1	3.600E-1
N° 9 (Bias2)	---	1.600E-1	2.000E-1	3.600E-1	2.000E-1
N° 10 (Bias2)	---	4.000E-2	8.000E-2	1.600E-1	3.600E-1
N° 11 (Bias2)	---	-8.000E-2	0.000E+0	-4.000E-2	4.800E-1
N° 12 (OFF)	---	-4.000E-2	0.000E+0	1.600E-1	4.800E-1
N° 13 (OFF)	---	-4.000E-2	1.200E-1	8.000E-2	6.800E-1
N° 14 (OFF)	---	2.000E-1	1.200E-1	4.000E-1	4.000E-1
N° 15 (OFF)	---	8.000E-2	2.000E-1	2.000E-1	6.400E-1
N° 16 (OFF)	---	0.000E+0	2.800E-1	1.200E-1	8.000E-1
Average (OFF)	---	4.800E-2	0.000E+0	-8.000E-3	1.360E-1
σ (OFF)	---	1.145E-1	4.000E-2	1.110E-1	2.427E-1
Average+3σ (OFF)	---	3.916E-1	1.200E-1	3.250E-1	8.640E-1
Average-3σ (OFF)	---	-2.956E-1	-1.200E-1	-3.410E-1	-5.920E-1
Average (Bias1)	---	7.200E-2	1.440E-1	2.400E-1	3.040E-1
σ (Bias1)	---	9.550E-2	1.081E-1	1.811E-1	1.431E-1
Average+3σ (Bias1)	---	3.585E-1	4.682E-1	7.833E-1	7.333E-1
Average-3σ (Bias1)	---	-2.145E-1	-1.802E-1	-3.033E-1	-1.253E-1
Average (Bias2)	---	4.000E-2	1.440E-1	1.920E-1	6.000E-1
σ (Bias2)	---	1.020E-1	1.043E-1	1.246E-1	1.600E-1
Average+3σ (Bias2)	---	3.459E-1	4.569E-1	5.657E-1	1.080E+0
Average-3σ (Bias2)	---	-2.659E-1	-1.689E-1	-1.817E-1	1.200E-1

60 MeV proton / detailed results

14.CTR1

Ta=25°C; Vce=5V; If=1mA



60 MeV proton / detailed results

CTR1 . (%)

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	529.26	560.61	530.78	516.70	538.56
N° 2 (Bias1)	733.70	667.54	515.88	380.01	62.52
N° 3 (Bias1)	586.03	554.25	412.26	300.39	43.44
N° 4 (Bias1)	569.86	543.36	416.40	316.14	57.06
N° 5 (Bias1)	541.75	511.24	388.72	297.58	52.79
N° 6 (Bias1)	572.93	531.07	392.84	283.21	42.25
N° 7 (Bias2)	568.16	523.72	380.23	266.36	32.75
N° 8 (Bias2)	744.57	692.29	521.82	377.79	50.29
N° 9 (Bias2)	675.25	607.50	480.01	345.96	51.40
N° 10 (Bias2)	664.50	597.31	455.46	323.18	41.59
N° 11 (Bias2)	625.60	584.11	438.23	303.09	37.02
N° 12 (OFF)	693.63	630.75	467.60	336.65	50.46
N° 13 (OFF)	676.69	629.56	461.36	328.96	42.45
N° 14 (OFF)	552.52	510.20	393.64	284.16	45.24
N° 15 (OFF)	700.91	646.77	467.22	340.56	48.33
N° 16 (OFF)	679.63	635.84	467.41	337.75	42.93

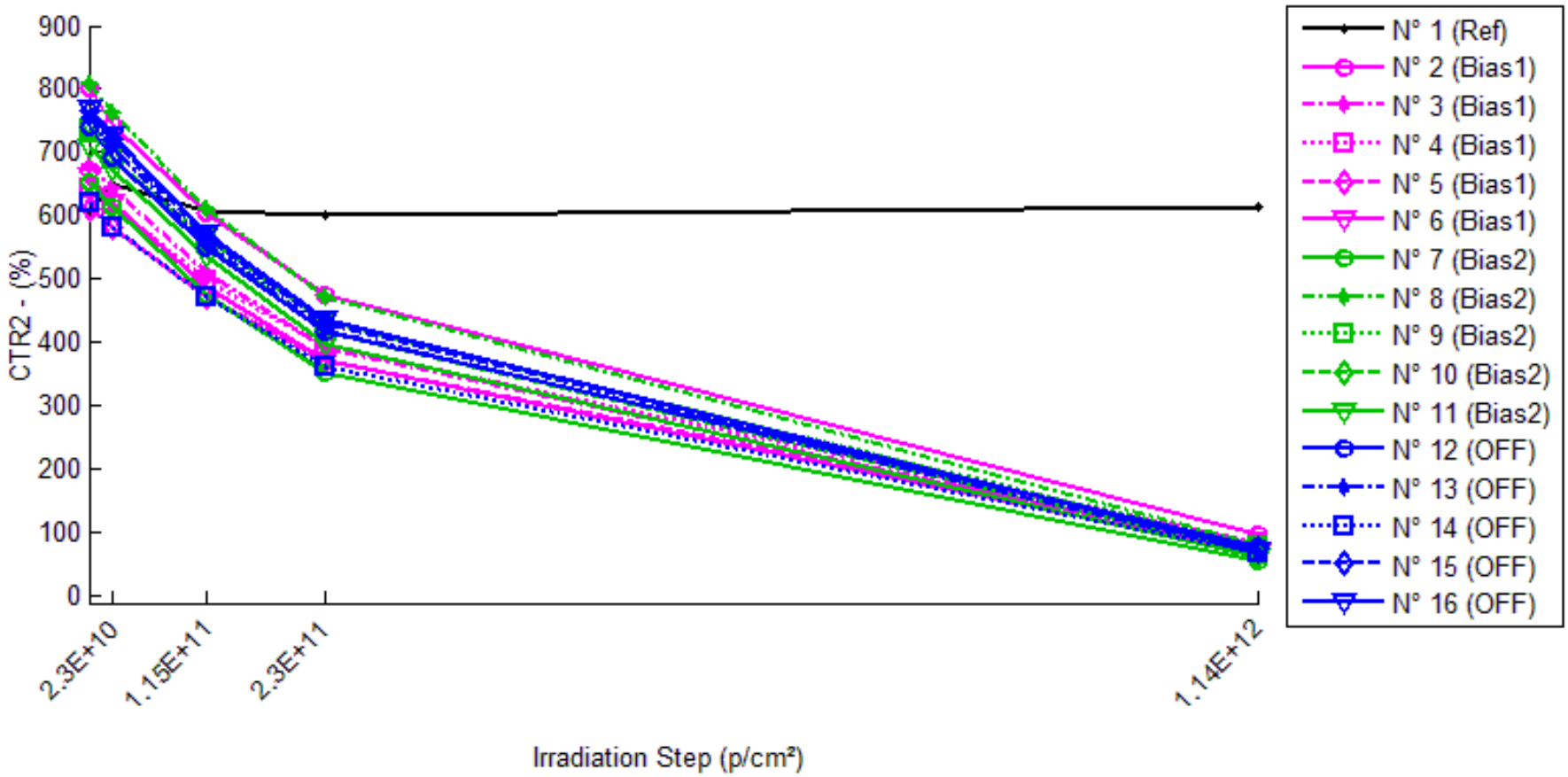
1/Delta [CTR1]

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	---	-1.057E-4	-5.424E-6	4.593E-5	-3.263E-5
N° 2 (Bias1)	---	1.351E-4	5.755E-4	1.269E-3	1.463E-2
N° 3 (Bias1)	---	9.786E-5	7.192E-4	1.623E-3	2.131E-2
N° 4 (Bias1)	---	8.559E-5	6.467E-4	1.408E-3	1.577E-2
N° 5 (Bias1)	---	1.102E-4	7.267E-4	1.515E-3	1.710E-2
N° 6 (Bias1)	---	1.376E-4	8.002E-4	1.786E-3	2.192E-2
N° 7 (Bias2)	---	1.493E-4	8.700E-4	1.994E-3	2.877E-2
N° 8 (Bias2)	---	1.014E-4	5.733E-4	1.304E-3	1.854E-2
N° 9 (Bias2)	---	1.652E-4	6.024E-4	1.410E-3	1.797E-2
N° 10 (Bias2)	---	1.693E-4	6.907E-4	1.589E-3	2.254E-2
N° 11 (Bias2)	---	1.136E-4	6.835E-4	1.701E-3	2.542E-2
N° 12 (OFF)	---	1.437E-4	6.969E-4	1.529E-3	1.838E-2
N° 13 (OFF)	---	1.106E-4	6.898E-4	1.562E-3	2.208E-2
N° 14 (OFF)	---	1.501E-4	7.305E-4	1.709E-3	2.029E-2
N° 15 (OFF)	---	1.194E-4	7.136E-4	1.510E-3	1.927E-2
N° 16 (OFF)	---	1.013E-4	6.680E-4	1.489E-3	2.182E-2
Average (OFF)	---	1.133E-4	6.937E-4	1.520E-3	1.815E-2
σ (OFF)	---	2.280E-5	8.552E-5	1.980E-4	3.292E-3
Average+3σ (OFF)	---	1.817E-4	9.502E-4	2.114E-3	2.802E-2
Average-3σ (OFF)	---	4.484E-5	4.371E-4	9.261E-4	8.270E-3
Average (Bias1)	---	1.398E-4	6.840E-4	1.600E-3	2.265E-2
σ (Bias1)	---	3.068E-5	1.157E-4	2.691E-4	4.579E-3
Average+3σ (Bias1)	---	2.318E-4	1.031E-3	2.407E-3	3.638E-2
Average-3σ (Bias1)	---	4.772E-5	3.369E-4	7.923E-4	8.911E-3
Average (Bias2)	---	1.250E-4	6.998E-4	1.560E-3	2.037E-2
σ (Bias2)	---	2.110E-5	2.372E-5	8.770E-5	1.598E-3
Average+3σ (Bias2)	---	1.883E-4	7.709E-4	1.823E-3	2.516E-2
Average-3σ (Bias2)	---	6.176E-5	6.286E-4	1.297E-3	1.557E-2

60 MeV proton / detailed results

15.CTR2

Ta=25°C; Vce=5V; If=2mA



60 MeV proton / detailed results

CTR2 . (%)

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	607.40	649.67	609.20	602.06	613.35
N° 2 (Bias1)	802.02	744.59	606.13	476.18	96.89
N° 3 (Bias1)	677.89	644.09	509.71	393.25	70.69
N° 4 (Bias1)	645.03	616.95	499.51	395.18	85.63
N° 5 (Bias1)	611.54	581.66	471.18	373.48	79.64
N° 6 (Bias1)	662.43	622.07	489.75	373.41	68.25
N° 7 (Bias2)	654.35	612.95	476.85	353.44	55.06
N° 8 (Bias2)	807.82	762.44	611.95	471.71	80.37
N° 9 (Bias2)	738.61	688.54	565.38	433.17	79.80
N° 10 (Bias2)	743.58	690.69	552.31	418.48	68.48
N° 11 (Bias2)	709.44	671.05	535.60	397.10	61.67
N° 12 (OFF)	739.53	691.40	548.75	418.06	79.38
N° 13 (OFF)	752.04	708.23	555.78	420.71	69.51
N° 14 (OFF)	620.38	582.82	472.57	361.49	70.40
N° 15 (OFF)	766.53	721.53	564.41	431.64	76.72
N° 16 (OFF)	768.16	727.48	571.66	437.84	72.87

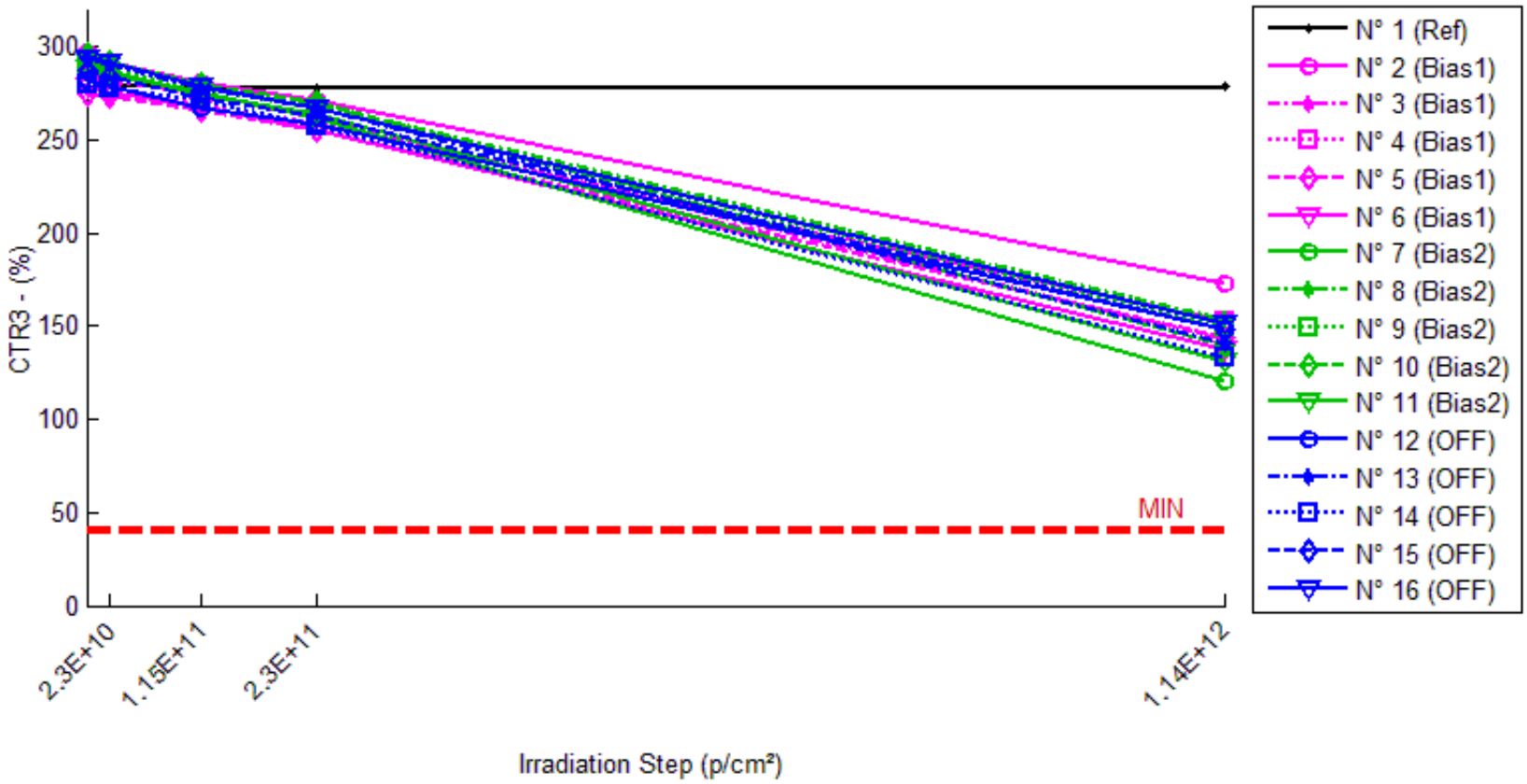
1/Delta [CTR2]

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	---	-1.071E-4	-4.874E-6	1.460E-5	-1.597E-5
N° 2 (Bias1)	---	9.616E-5	4.029E-4	8.532E-4	9.074E-3
N° 3 (Bias1)	---	7.741E-5	4.867E-4	1.068E-3	1.267E-2
N° 4 (Bias1)	---	7.057E-5	4.517E-4	9.802E-4	1.013E-2
N° 5 (Bias1)	---	8.399E-5	4.871E-4	1.042E-3	1.092E-2
N° 6 (Bias1)	---	9.793E-5	5.323E-4	1.168E-3	1.314E-2
N° 7 (Bias2)	---	1.032E-4	5.689E-4	1.301E-3	1.663E-2
N° 8 (Bias2)	---	7.368E-5	3.962E-4	8.820E-4	1.120E-2
N° 9 (Bias2)	---	9.844E-5	4.148E-4	9.547E-4	1.118E-2
N° 10 (Bias2)	---	1.030E-4	4.657E-4	1.045E-3	1.326E-2
N° 11 (Bias2)	---	8.063E-5	4.575E-4	1.109E-3	1.481E-2
N° 12 (OFF)	---	9.414E-5	4.701E-4	1.040E-3	1.124E-2
N° 13 (OFF)	---	8.225E-5	4.696E-4	1.047E-3	1.306E-2
N° 14 (OFF)	---	1.039E-4	5.042E-4	1.154E-3	1.259E-2
N° 15 (OFF)	---	8.137E-5	4.672E-4	1.012E-3	1.173E-2
N° 16 (OFF)	---	7.280E-5	4.475E-4	9.821E-4	1.242E-2
Average (OFF)	---	8.521E-5	4.721E-4	1.022E-3	1.119E-2
σ (OFF)	---	1.182E-5	4.811E-5	1.164E-4	1.709E-3
Average+3σ (OFF)	---	1.207E-4	6.165E-4	1.372E-3	1.632E-2
Average-3σ (OFF)	---	4.976E-5	3.278E-4	6.732E-4	6.059E-3
Average (Bias1)	---	9.179E-5	4.606E-4	1.058E-3	1.342E-2
σ (Bias1)	---	1.371E-5	6.708E-5	1.608E-4	2.357E-3
Average+3σ (Bias1)	---	1.329E-4	6.619E-4	1.541E-3	2.049E-2
Average-3σ (Bias1)	---	5.065E-5	2.594E-4	5.757E-4	6.346E-3
Average (Bias2)	---	8.689E-5	4.717E-4	1.047E-3	1.221E-2
σ (Bias2)	---	1.217E-5	2.043E-5	6.521E-5	7.190E-4
Average+3σ (Bias2)	---	1.234E-4	5.330E-4	1.243E-3	1.437E-2
Average-3σ (Bias2)	---	5.039E-5	4.104E-4	8.515E-4	1.005E-2

60 MeV proton / detailed results

16.CTR3

Ta=25°C; Vce=5V; If=10mA



60 MeV proton / detailed results

CTR3 . (%)

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	276.56	280.14	277.99	277.67	278.37
N° 2 (Bias1)	296.46	291.38	280.45	270.91	172.93
N° 3 (Bias1)	285.06	282.39	274.21	261.35	143.35
N° 4 (Bias1)	279.94	277.70	270.69	258.89	152.24
N° 5 (Bias1)	274.95	272.96	266.16	255.19	144.42
N° 6 (Bias1)	278.39	275.59	267.85	254.84	137.30
N° 7 (Bias2)	287.16	284.80	275.06	261.26	120.14
N° 8 (Bias2)	294.57	291.72	278.96	269.00	154.11
N° 9 (Bias2)	290.96	287.00	277.30	267.53	148.80
N° 10 (Bias2)	295.88	291.46	280.31	270.07	140.03
N° 11 (Bias2)	288.01	286.61	274.56	263.51	131.20
N° 12 (OFF)	282.04	278.77	267.21	258.00	148.58
N° 13 (OFF)	293.41	290.68	278.26	266.90	140.82
N° 14 (OFF)	280.09	277.41	271.52	257.83	133.65
N° 15 (OFF)	286.88	284.48	272.31	262.41	147.83
N° 16 (OFF)	293.69	291.34	278.79	266.97	151.03

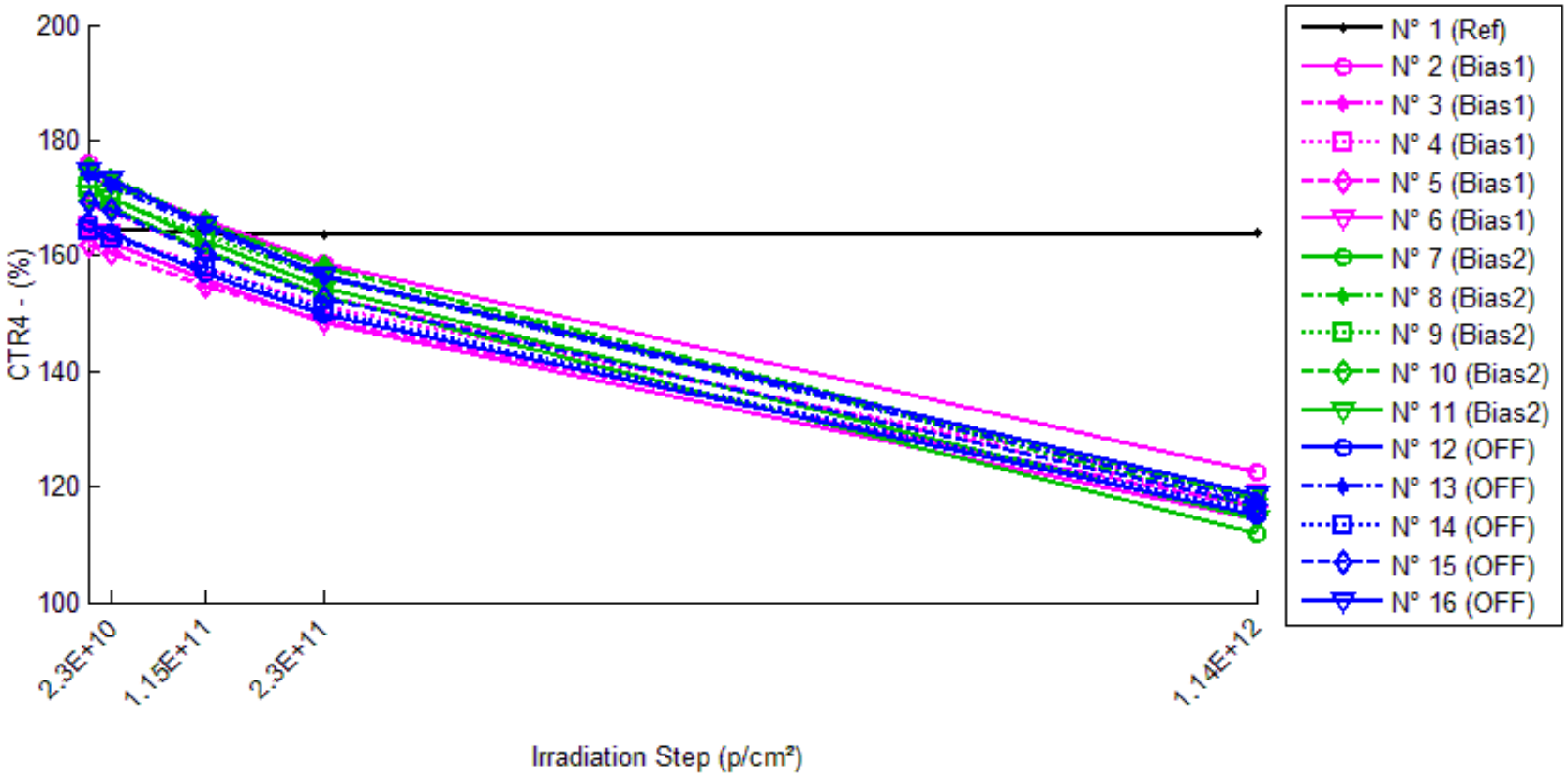
1/Delta [CTR3]

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	---	-4.621E-5	-1.856E-5	-1.439E-5	-2.348E-5
N° 2 (Bias1)	---	5.880E-5	1.925E-4	3.181E-4	2.410E-3
N° 3 (Bias1)	---	3.319E-5	1.388E-4	3.183E-4	3.468E-3
N° 4 (Bias1)	---	2.881E-5	1.219E-4	2.905E-4	2.996E-3
N° 5 (Bias1)	---	2.649E-5	1.201E-4	2.816E-4	3.287E-3
N° 6 (Bias1)	---	3.643E-5	1.413E-4	3.319E-4	3.691E-3
N° 7 (Bias2)	---	2.888E-5	1.533E-4	3.453E-4	4.841E-3
N° 8 (Bias2)	---	3.308E-5	1.900E-4	3.226E-4	3.094E-3
N° 9 (Bias2)	---	4.743E-5	1.692E-4	3.010E-4	3.284E-3
N° 10 (Bias2)	---	5.118E-5	1.878E-4	3.229E-4	3.762E-3
N° 11 (Bias2)	---	1.699E-5	1.701E-4	3.229E-4	4.150E-3
N° 12 (OFF)	---	4.164E-5	1.968E-4	3.304E-4	3.185E-3
N° 13 (OFF)	---	3.190E-5	1.855E-4	3.384E-4	3.693E-3
N° 14 (OFF)	---	3.443E-5	1.127E-4	3.082E-4	3.912E-3
N° 15 (OFF)	---	2.942E-5	1.866E-4	3.250E-4	3.279E-3
N° 16 (OFF)	---	2.754E-5	1.821E-4	3.409E-4	3.216E-3
Average (OFF)	---	3.674E-5	1.429E-4	3.081E-4	3.170E-3
σ (OFF)	---	1.291E-5	2.932E-5	2.111E-5	4.955E-4
Average+3σ (OFF)	---	7.549E-5	2.309E-4	3.714E-4	4.657E-3
Average-3σ (OFF)	---	-2.001E-6	5.496E-5	2.447E-4	1.684E-3
Average (Bias1)	---	3.551E-5	1.741E-4	3.229E-4	3.826E-3
σ (Bias1)	---	1.397E-5	1.510E-5	1.566E-5	7.017E-4
Average+3σ (Bias1)	---	7.742E-5	2.194E-4	3.699E-4	5.931E-3
Average-3σ (Bias1)	---	-6.397E-6	1.288E-4	2.760E-4	1.721E-3
Average (Bias2)	---	3.299E-5	1.727E-4	3.286E-4	3.457E-3
σ (Bias2)	---	5.491E-6	3.399E-5	1.305E-5	3.265E-4
Average+3σ (Bias2)	---	4.946E-5	2.747E-4	3.677E-4	4.436E-3
Average-3σ (Bias2)	---	1.652E-5	7.075E-5	2.894E-4	2.477E-3

60 MeV proton / detailed results

17.CTR4

Ta=25°C; Vce=5V; If=20mA



60 MeV proton / detailed results

CTR4 . (%)

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	163.24	164.55	163.85	163.69	164.03
N° 2 (Bias1)	175.94	172.77	166.03	158.55	122.38
N° 3 (Bias1)	169.14	167.48	160.73	153.19	117.01
N° 4 (Bias1)	165.01	163.63	157.95	151.16	118.72
N° 5 (Bias1)	161.79	160.57	154.93	148.72	116.55
N° 6 (Bias1)	163.90	162.19	155.69	148.23	114.39
N° 7 (Bias2)	169.64	168.15	160.74	152.96	111.93
N° 8 (Bias2)	175.29	173.48	165.63	157.86	116.52
N° 9 (Bias2)	171.83	169.59	163.58	156.28	118.32
N° 10 (Bias2)	175.14	172.58	165.70	158.02	118.01
N° 11 (Bias2)	170.83	169.86	162.60	154.53	114.44
N° 12 (OFF)	165.91	163.98	157.04	149.87	115.20
N° 13 (OFF)	173.88	172.10	164.57	156.27	117.63
N° 14 (OFF)	164.53	162.92	157.95	150.37	115.81
N° 15 (OFF)	169.32	167.77	160.44	152.76	116.82
N° 16 (OFF)	174.70	173.15	165.36	156.67	118.50

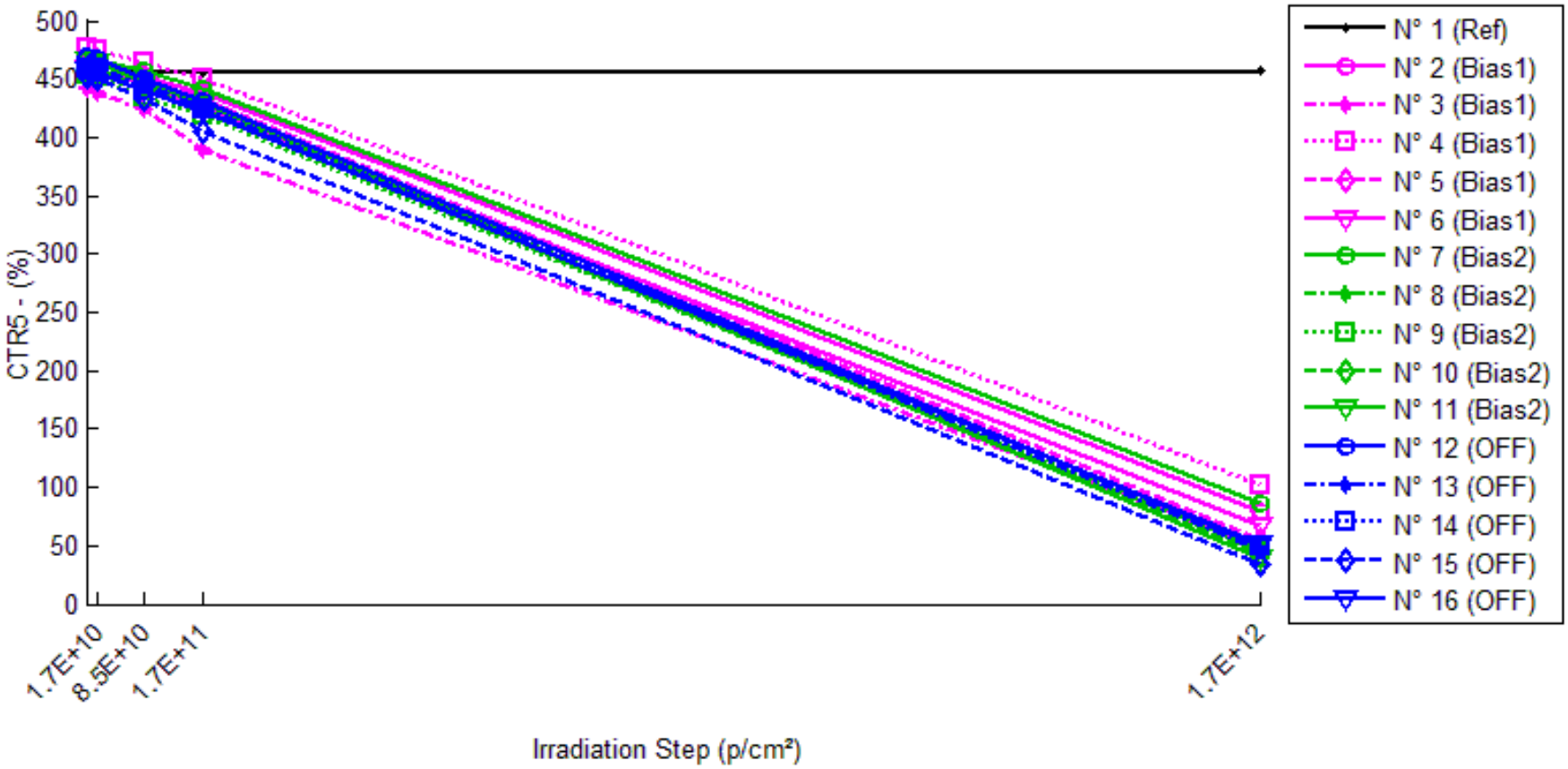
1/Delta [CTR4]

	0.p/cm²	2.3E10.p/cm²	1.15E11.p/cm²	2.3E11.p/cm²	1.14E12.p/cm²
N° 1 (Ref)	---	-4.881E-5	-2.272E-5	-1.692E-5	-2.961E-5
N° 2 (Bias1)	---	1.041E-4	3.391E-4	6.235E-4	2.487E-3
N° 3 (Bias1)	---	5.869E-5	3.091E-4	6.156E-4	2.634E-3
N° 4 (Bias1)	---	5.109E-5	2.708E-4	5.550E-4	2.363E-3
N° 5 (Bias1)	---	4.689E-5	2.735E-4	5.430E-4	2.399E-3
N° 6 (Bias1)	---	6.432E-5	3.218E-4	6.451E-4	2.641E-3
N° 7 (Bias2)	---	5.220E-5	3.264E-4	6.427E-4	3.039E-3
N° 8 (Bias2)	---	5.935E-5	3.326E-4	6.297E-4	2.877E-3
N° 9 (Bias2)	---	7.695E-5	2.936E-4	5.790E-4	2.632E-3
N° 10 (Bias2)	---	8.487E-5	3.253E-4	6.186E-4	2.764E-3
N° 11 (Bias2)	---	3.339E-5	2.963E-4	6.174E-4	2.885E-3
N° 12 (OFF)	---	7.106E-5	3.403E-4	6.450E-4	2.653E-3
N° 13 (OFF)	---	5.956E-5	3.256E-4	6.482E-4	2.750E-3
N° 14 (OFF)	---	6.011E-5	2.533E-4	5.727E-4	2.557E-3
N° 15 (OFF)	---	5.441E-5	3.269E-4	6.402E-4	2.654E-3
N° 16 (OFF)	---	5.151E-5	3.233E-4	6.589E-4	2.715E-3
Average (OFF)	---	6.502E-5	3.029E-4	5.964E-4	2.505E-3
σ (OFF)	---	2.286E-5	3.002E-5	4.481E-5	1.293E-4
Average+3σ (OFF)	---	1.336E-4	3.929E-4	7.309E-4	2.893E-3
Average-3σ (OFF)	---	-3.553E-6	2.128E-4	4.620E-4	2.117E-3
Average (Bias1)	---	6.135E-5	3.148E-4	6.175E-4	2.839E-3
σ (Bias1)	---	2.041E-5	1.839E-5	2.384E-5	1.519E-4
Average+3σ (Bias1)	---	1.226E-4	3.700E-4	6.890E-4	3.295E-3
Average-3σ (Bias1)	---	1.230E-7	2.597E-4	5.460E-4	2.384E-3
Average (Bias2)	---	5.933E-5	3.139E-4	6.330E-4	2.666E-3
σ (Bias2)	---	7.477E-6	3.453E-5	3.441E-5	7.359E-5
Average+3σ (Bias2)	---	8.176E-5	4.175E-4	7.362E-4	2.887E-3
Average-3σ (Bias2)	---	3.690E-5	2.103E-4	5.297E-4	2.445E-3

60 MeV proton / detailed results

18.CTR5

Ta=25°C; Vce=30V; If=10mA



60 MeV proton / detailed results

CTR5 . (%)

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	455.35	453.78	456.66	455.91	456.99
N° 2 (Bias1)	467.52	464.86	451.87	437.64	79.34
N° 3 (Bias1)	441.38	438.90	424.32	389.13	49.21
N° 4 (Bias1)	476.20	474.22	464.13	450.72	102.44
N° 5 (Bias1)	467.65	465.17	452.34	433.18	55.27
N° 6 (Bias1)	458.35	456.50	445.16	425.80	66.87
N° 7 (Bias2)	468.52	466.63	456.86	440.81	85.89
N° 8 (Bias2)	460.47	459.79	440.81	423.22	49.04
N° 9 (Bias2)	453.91	452.11	433.93	418.60	45.94
N° 10 (Bias2)	460.50	459.01	440.77	424.70	42.87
N° 11 (Bias2)	465.50	464.03	446.12	430.08	39.62
N° 12 (OFF)	468.66	467.65	450.77	431.48	50.34
N° 13 (OFF)	460.41	459.66	445.74	425.46	45.80
N° 14 (OFF)	459.32	458.57	444.42	423.51	49.04
N° 15 (OFF)	452.07	449.93	433.43	404.93	33.50
N° 16 (OFF)	456.87	454.99	439.86	421.61	51.10

1/Delta [CTR5]

	0.p/cm²	1.7E10.p/cm²	8.5E10.p/cm²	1.7E11.p/cm²	1.7E12.p/cm²
N° 1 (Ref)	---	7.597E-6	-6.282E-6	-2.687E-6	-7.861E-6
N° 2 (Bias1)	---	1.226E-5	7.407E-5	1.460E-4	1.047E-2
N° 3 (Bias1)	---	1.283E-5	9.111E-5	3.043E-4	1.805E-2
N° 4 (Bias1)	---	8.766E-6	5.460E-5	1.187E-4	7.662E-3
N° 5 (Bias1)	---	1.140E-5	7.237E-5	1.701E-4	1.596E-2
N° 6 (Bias1)	---	8.833E-6	6.464E-5	1.668E-4	1.277E-2
N° 7 (Bias2)	---	8.612E-6	5.446E-5	1.342E-4	9.508E-3
N° 8 (Bias2)	---	3.235E-6	9.684E-5	1.912E-4	1.822E-2
N° 9 (Bias2)	---	8.755E-6	1.014E-4	1.858E-4	1.956E-2
N° 10 (Bias2)	---	7.067E-6	9.720E-5	1.831E-4	2.115E-2
N° 11 (Bias2)	---	6.804E-6	9.332E-5	1.770E-4	2.309E-2
N° 12 (OFF)	---	4.617E-6	8.470E-5	1.838E-4	1.773E-2
N° 13 (OFF)	---	3.573E-6	7.149E-5	1.784E-4	1.966E-2
N° 14 (OFF)	---	3.593E-6	7.298E-5	1.841E-4	1.821E-2
N° 15 (OFF)	---	1.051E-5	9.515E-5	2.575E-4	2.764E-2
N° 16 (OFF)	---	9.032E-6	8.466E-5	1.831E-4	1.738E-2
Average (OFF)	---	1.082E-5	7.136E-5	1.812E-4	1.298E-2
σ (OFF)	---	1.910E-6	1.346E-5	7.180E-5	4.161E-3
Average+3σ (OFF)	---	1.655E-5	1.117E-4	3.966E-4	2.546E-2
Average-3σ (OFF)	---	5.086E-6	3.099E-5	-3.421E-5	4.993E-4
Average (Bias1)	---	6.895E-6	8.865E-5	1.742E-4	1.831E-2
σ (Bias1)	---	2.227E-6	1.933E-5	2.298E-5	5.244E-3
Average+3σ (Bias1)	---	1.358E-5	1.466E-4	2.432E-4	3.404E-2
Average-3σ (Bias1)	---	2.130E-7	3.067E-5	1.053E-4	2.576E-3
Average (Bias2)	---	6.266E-6	8.179E-5	1.974E-4	2.012E-2
σ (Bias2)	---	3.272E-6	9.732E-6	3.368E-5	4.289E-3
Average+3σ (Bias2)	---	1.608E-5	1.110E-4	2.984E-4	3.299E-2
Average-3σ (Bias2)	---	-3.549E-6	5.260E-5	9.635E-5	7.258E-3

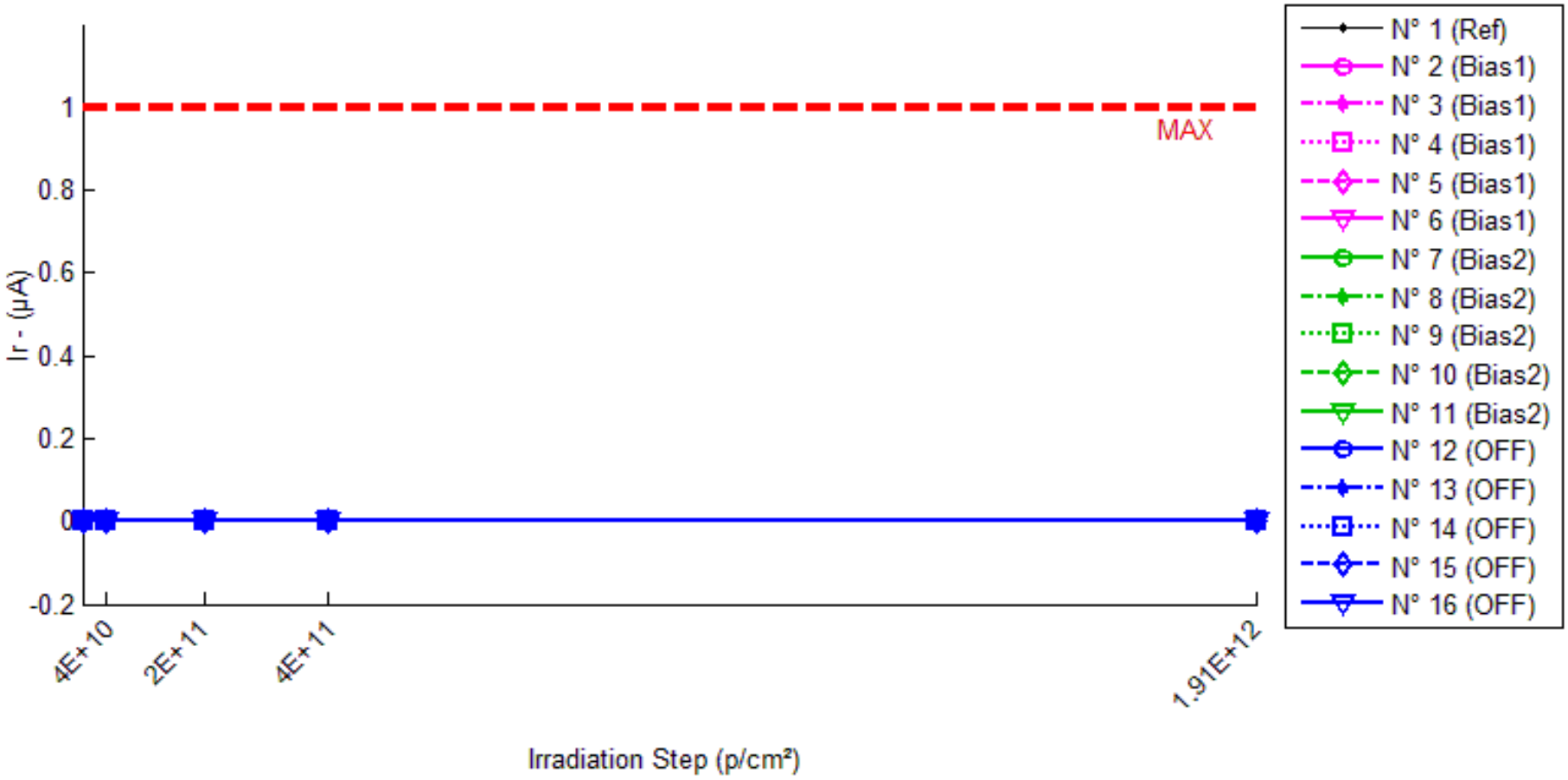
190 MeV proton / detailed results

CONTENTS

190 MeV proton / detailed results

1. Ir

Ta=25°C; Vr=3V



190 MeV proton / detailed results

Ir . (µA) **Max = 1.0**

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	6.293E-5	1.722E-4	3.669E-4	2.810E-4	2.313E-4
N° 2 (Bias1)	2.521E-5	1.902E-4	2.947E-4	2.956E-4	2.333E-4
N° 3 (Bias1)	6.955E-5	1.848E-4	3.098E-4	2.895E-4	2.442E-4
N° 4 (Bias1)	5.870E-5	2.050E-4	3.498E-4	2.937E-4	2.605E-4
N° 5 (Bias1)	4.935E-5	2.439E-4	3.328E-4	2.978E-4	2.616E-4
N° 6 (Bias1)	6.243E-5	4.355E-4	3.513E-4	2.986E-4	2.752E-4
N° 7 (Bias2)	5.513E-5	2.230E-4	2.354E-4	1.577E-4	2.170E-4
N° 8 (Bias2)	6.297E-5	2.271E-4	2.176E-4	1.886E-4	2.556E-4
N° 9 (Bias2)	6.058E-5	2.061E-4	2.282E-4	1.986E-4	2.800E-4
N° 10 (Bias2)	5.363E-5	2.700E-4	2.120E-4	1.986E-4	2.810E-4
N° 11 (Bias2)	6.012E-5	2.304E-4	2.232E-4	2.049E-4	2.893E-4
N° 12 (OFF)	7.364E-5	2.521E-4	2.445E-4	2.182E-4	1.907E-4
N° 13 (OFF)	3.626E-5	2.450E-4	2.488E-4	2.295E-4	1.875E-4
N° 14 (OFF)	3.546E-5	2.456E-4	2.517E-4	2.338E-4	1.979E-4
N° 15 (OFF)	6.979E-5	2.319E-4	2.460E-4	2.256E-4	2.010E-4
N° 16 (OFF)	3.043E-5	2.428E-4	2.457E-4	2.266E-4	1.888E-4

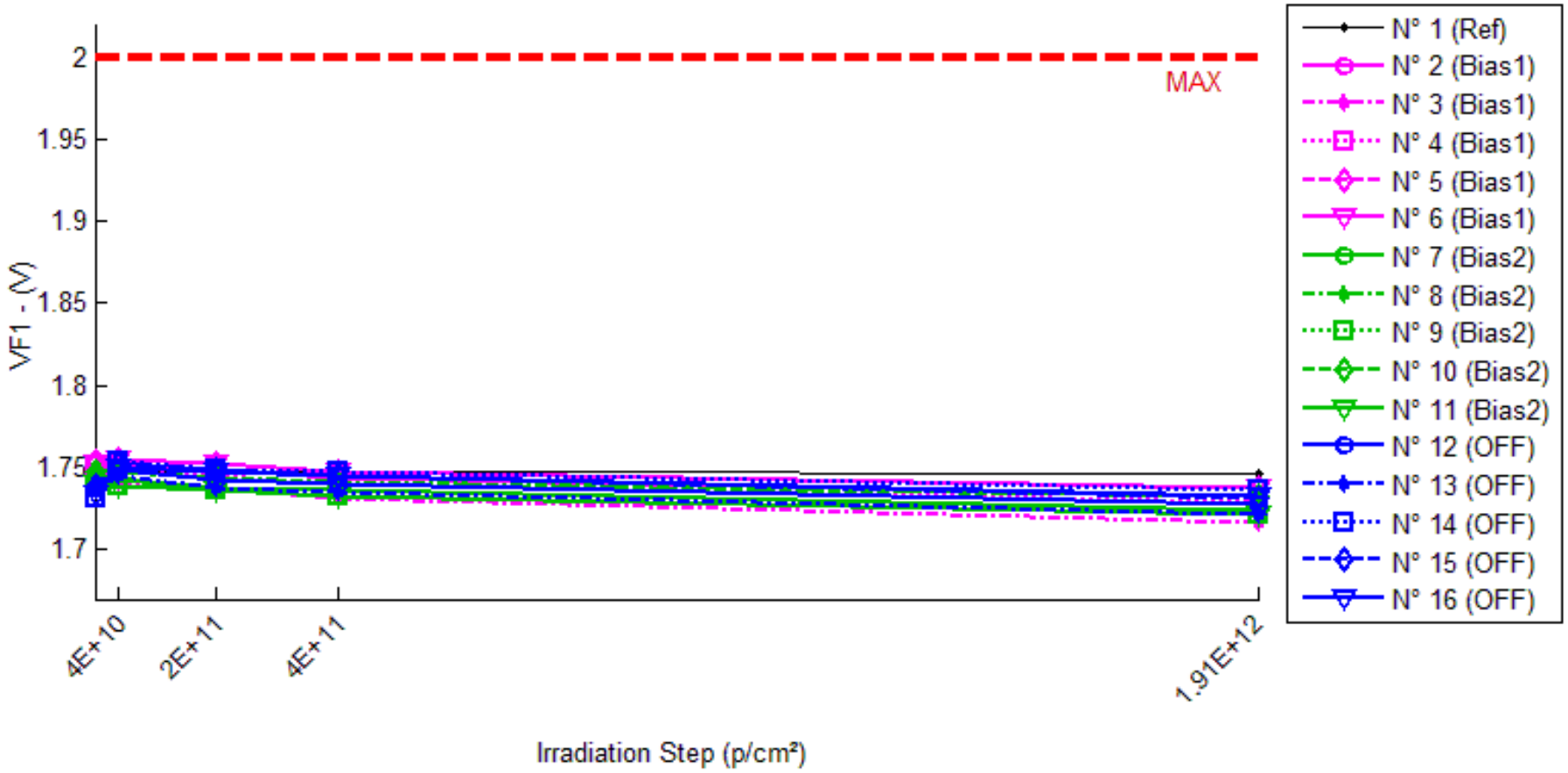
Delta [Ir]

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	---	1.093E-4	3.040E-4	2.181E-4	1.684E-4
N° 2 (Bias1)	---	1.650E-4	2.695E-4	2.703E-4	2.081E-4
N° 3 (Bias1)	---	1.153E-4	2.402E-4	2.199E-4	1.746E-4
N° 4 (Bias1)	---	1.463E-4	2.911E-4	2.350E-4	2.018E-4
N° 5 (Bias1)	---	1.945E-4	2.834E-4	2.484E-4	2.122E-4
N° 6 (Bias1)	---	3.730E-4	2.889E-4	2.361E-4	2.128E-4
N° 7 (Bias2)	---	1.679E-4	1.803E-4	1.026E-4	1.619E-4
N° 8 (Bias2)	---	1.641E-4	1.546E-4	1.257E-4	1.927E-4
N° 9 (Bias2)	---	1.455E-4	1.677E-4	1.381E-4	2.194E-4
N° 10 (Bias2)	---	2.164E-4	1.584E-4	1.450E-4	2.274E-4
N° 11 (Bias2)	---	1.703E-4	1.631E-4	1.448E-4	2.292E-4
N° 12 (OFF)	---	1.785E-4	1.708E-4	1.445E-4	1.171E-4
N° 13 (OFF)	---	2.087E-4	2.125E-4	1.932E-4	1.512E-4
N° 14 (OFF)	---	2.102E-4	2.162E-4	1.983E-4	1.624E-4
N° 15 (OFF)	---	1.621E-4	1.762E-4	1.558E-4	1.312E-4
N° 16 (OFF)	---	2.123E-4	2.153E-4	1.961E-4	1.584E-4
Average (Bias1)	---	1.988E-4	2.746E-4	2.420E-4	2.019E-4
σ (Bias1)	---	1.016E-4	2.099E-5	1.881E-5	1.588E-5
Average+3σ (Bias1)	---	5.035E-4	3.376E-4	2.984E-4	2.495E-4
Average-3σ (Bias1)	---	-1.058E-4	2.117E-4	1.855E-4	1.543E-4
Average (Bias2)	---	1.728E-4	1.648E-4	1.312E-4	2.061E-4
σ (Bias2)	---	2.622E-5	9.939E-6	1.782E-5	2.872E-5
Average+3σ (Bias2)	---	2.515E-4	1.946E-4	1.847E-4	2.923E-4
Average-3σ (Bias2)	---	9.416E-5	1.350E-4	7.775E-5	1.199E-4
Average (OFF)	---	1.944E-4	1.982E-4	1.776E-4	1.441E-4
σ (OFF)	---	2.274E-5	2.267E-5	2.542E-5	1.929E-5
Average+3σ (OFF)	---	2.626E-4	2.662E-4	2.539E-4	2.019E-4
Average-3σ (OFF)	---	1.261E-4	1.302E-4	1.013E-4	8.619E-5

190 MeV proton / detailed results

2. VF1

Ta=25°C; If = 10 mA



190 MeV proton / detailed results

VF1 . (V) **Max = 2.0**

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	1.746	1.748	1.747	1.747	1.746
N° 2 (Bias1)	1.747	1.752	1.749	1.744	1.733
N° 3 (Bias1)	1.739	1.741	1.738	1.732	1.717
N° 4 (Bias1)	1.746	1.748	1.745	1.740	1.729
N° 5 (Bias1)	1.754	1.755	1.752	1.748	1.738
N° 6 (Bias1)	1.753	1.755	1.752	1.747	1.738
N° 7 (Bias2)	1.741	1.742	1.738	1.736	1.724
N° 8 (Bias2)	1.747	1.747	1.744	1.741	1.733
N° 9 (Bias2)	1.739	1.739	1.736	1.733	1.722
N° 10 (Bias2)	1.747	1.747	1.744	1.740	1.733
N° 11 (Bias2)	1.740	1.739	1.736	1.733	1.722
N° 12 (OFF)	1.738	1.749	1.743	1.740	1.728
N° 13 (OFF)	1.736	1.745	1.738	1.735	1.722
N° 14 (OFF)	1.732	1.754	1.749	1.747	1.737
N° 15 (OFF)	1.739	1.753	1.749	1.745	1.731
N° 16 (OFF)	1.734	1.750	1.748	1.745	1.733

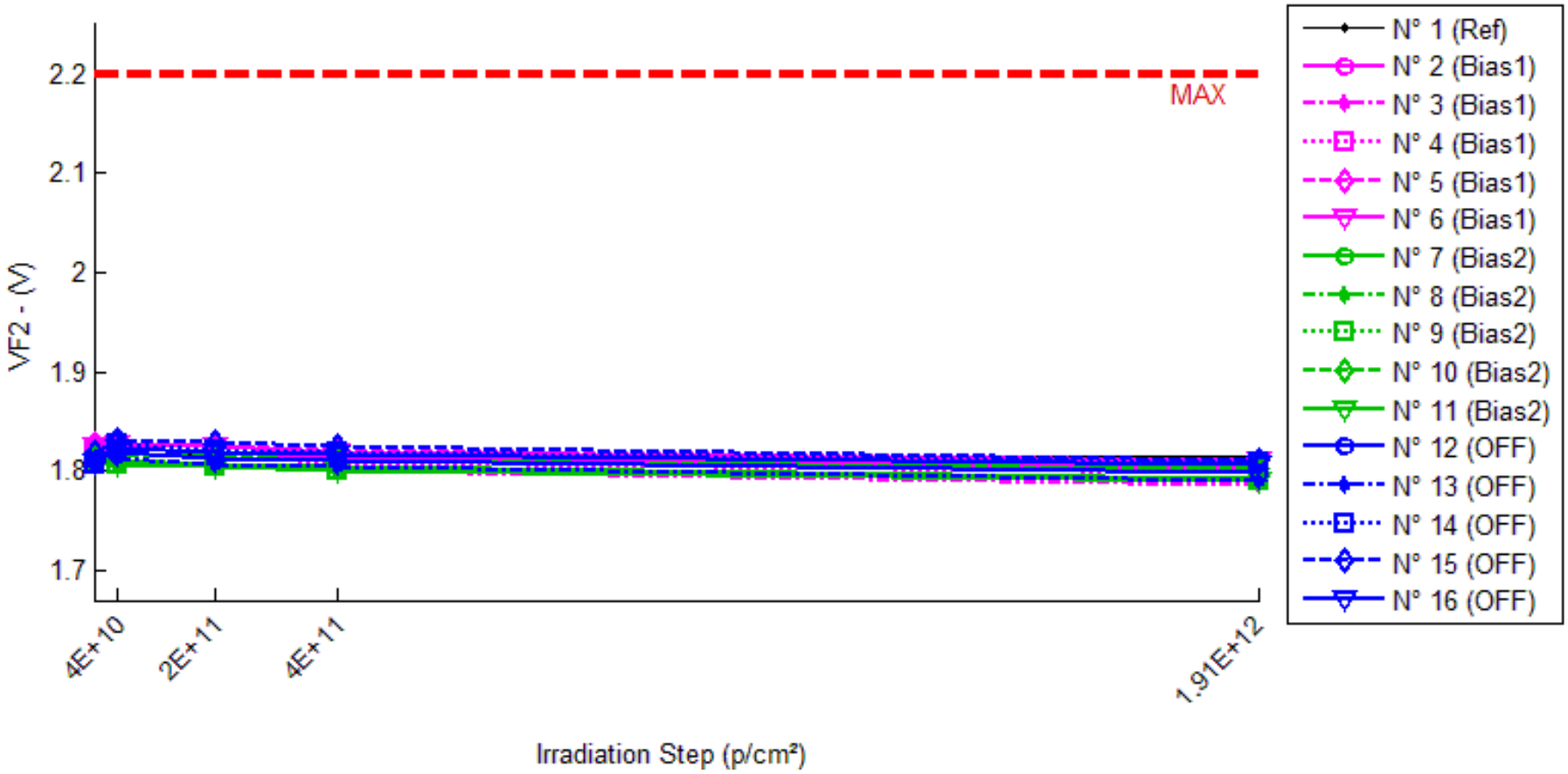
Delta [VF1]

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	---	1.373E-3	8.360E-4	8.470E-4	-6.800E-4
N° 2 (Bias1)	---	4.981E-3	2.081E-3	-2.891E-3	-1.438E-2
N° 3 (Bias1)	---	1.736E-3	-1.263E-3	-7.198E-3	-2.134E-2
N° 4 (Bias1)	---	1.532E-3	-1.368E-3	-6.071E-3	-1.738E-2
N° 5 (Bias1)	---	1.380E-3	-1.740E-3	-5.892E-3	-1.637E-2
N° 6 (Bias1)	---	1.667E-3	-1.033E-3	-5.758E-3	-1.567E-2
N° 7 (Bias2)	---	9.310E-4	-2.531E-3	-5.026E-3	-1.699E-2
N° 8 (Bias2)	---	1.200E-4	-3.665E-3	-6.595E-3	-1.447E-2
N° 9 (Bias2)	---	1.320E-4	-3.468E-3	-5.998E-3	-1.747E-2
N° 10 (Bias2)	---	-9.700E-5	-3.155E-3	-6.596E-3	-1.423E-2
N° 11 (Bias2)	---	-1.452E-3	-4.247E-3	-7.374E-3	-1.866E-2
N° 12 (OFF)	---	1.107E-2	5.211E-3	2.402E-3	-1.004E-2
N° 13 (OFF)	---	8.796E-3	2.444E-3	-4.440E-4	-1.379E-2
N° 14 (OFF)	---	2.206E-2	1.679E-2	1.462E-2	4.111E-3
N° 15 (OFF)	---	1.367E-2	9.744E-3	6.408E-3	-7.982E-3
N° 16 (OFF)	---	1.677E-2	1.388E-2	1.086E-2	-4.290E-4
Average (Bias1)	---	2.259E-3	-6.646E-4	-5.562E-3	-1.703E-2
σ (Bias1)	---	1.528E-3	1.556E-3	1.598E-3	2.646E-3
Average+3σ (Bias1)	---	6.842E-3	4.003E-3	-7.674E-4	-9.088E-3
Average-3σ (Bias1)	---	-2.324E-3	-5.332E-3	-1.036E-2	-2.497E-2
Average (Bias2)	---	-7.320E-5	-3.413E-3	-6.318E-3	-1.637E-2
σ (Bias2)	---	8.645E-4	6.338E-4	8.719E-4	1.939E-3
Average+3σ (Bias2)	---	2.520E-3	-1.512E-3	-3.702E-3	-1.055E-2
Average-3σ (Bias2)	---	-2.667E-3	-5.314E-3	-8.933E-3	-2.218E-2
Average (OFF)	---	1.447E-2	9.614E-3	6.768E-3	-5.625E-3
σ (OFF)	---	5.180E-3	5.926E-3	6.114E-3	7.305E-3
Average+3σ (OFF)	---	3.001E-2	2.739E-2	2.511E-2	1.629E-2
Average-3σ (OFF)	---	-1.066E-3	-8.166E-3	-1.157E-2	-2.754E-2

190 MeV proton / detailed results

3. VF2

Ta=25°C; If=20mA



190 MeV proton / detailed results

VF2 . (V) **Max = 2.2**

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	1.816	1.818	1.817	1.817	1.816
N° 2 (Bias1)	1.818	1.823	1.820	1.815	1.803
N° 3 (Bias1)	1.807	1.808	1.806	1.800	1.786
N° 4 (Bias1)	1.815	1.817	1.814	1.809	1.798
N° 5 (Bias1)	1.827	1.828	1.825	1.821	1.810
N° 6 (Bias1)	1.826	1.827	1.825	1.820	1.810
N° 7 (Bias2)	1.809	1.810	1.807	1.804	1.792
N° 8 (Bias2)	1.817	1.818	1.814	1.811	1.803
N° 9 (Bias2)	1.807	1.807	1.804	1.801	1.790
N° 10 (Bias2)	1.816	1.816	1.814	1.810	1.802
N° 11 (Bias2)	1.808	1.807	1.804	1.801	1.790
N° 12 (OFF)	1.810	1.819	1.813	1.810	1.798
N° 13 (OFF)	1.806	1.813	1.807	1.805	1.791
N° 14 (OFF)	1.807	1.827	1.822	1.820	1.809
N° 15 (OFF)	1.820	1.832	1.829	1.825	1.811
N° 16 (OFF)	1.808	1.823	1.820	1.817	1.806

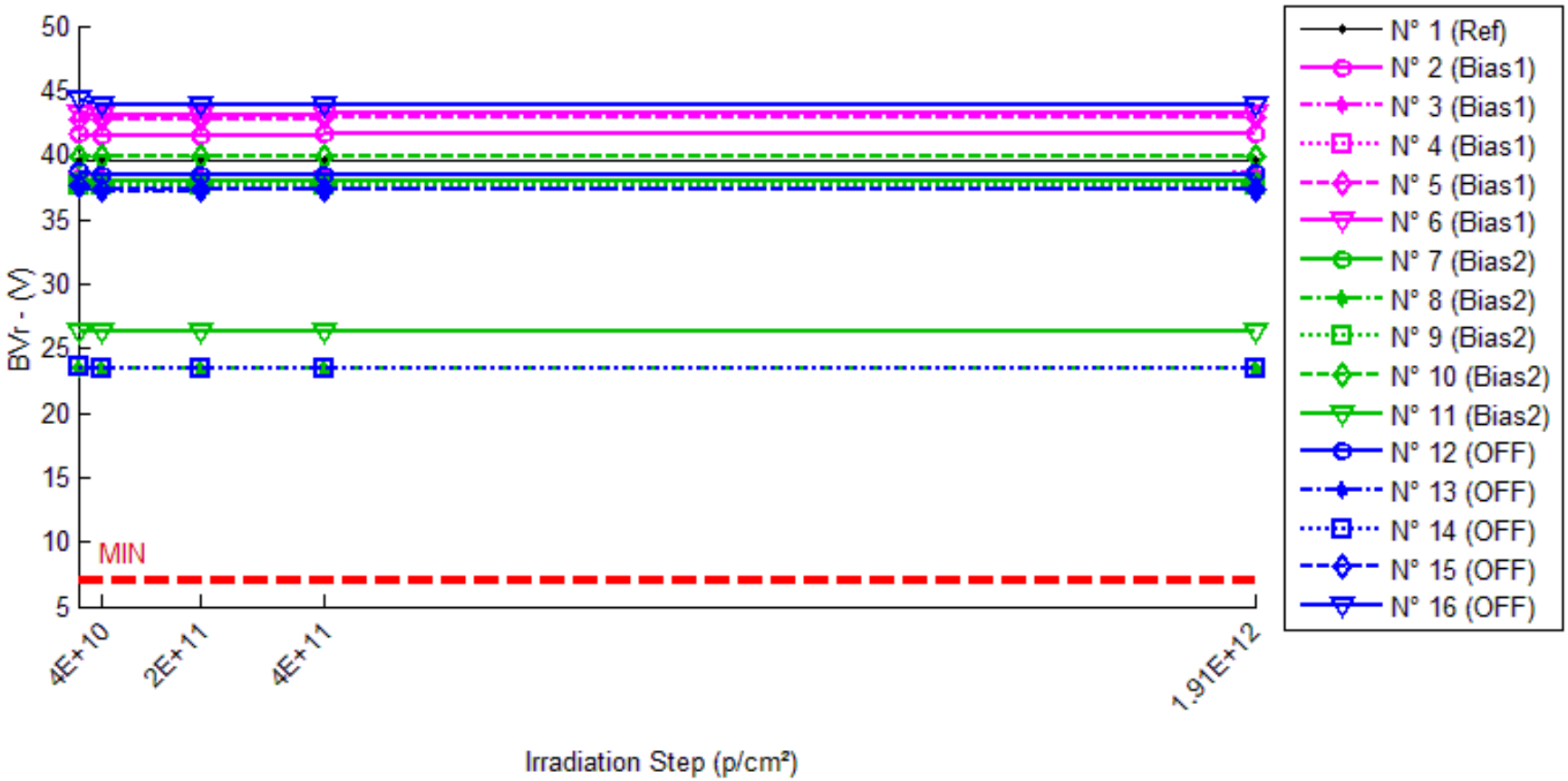
Delta [VF2]

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	---	1.453E-3	9.500E-4	8.970E-4	-6.600E-4
N° 2 (Bias1)	---	4.971E-3	2.051E-3	-2.799E-3	-1.464E-2
N° 3 (Bias1)	---	1.832E-3	-9.750E-4	-6.714E-3	-2.089E-2
N° 4 (Bias1)	---	1.604E-3	-1.160E-3	-5.787E-3	-1.748E-2
N° 5 (Bias1)	---	1.472E-3	-1.541E-3	-5.687E-3	-1.645E-2
N° 6 (Bias1)	---	1.743E-3	-9.270E-4	-5.723E-3	-1.596E-2
N° 7 (Bias2)	---	1.210E-3	-2.103E-3	-4.675E-3	-1.696E-2
N° 8 (Bias2)	---	3.290E-4	-3.294E-3	-6.333E-3	-1.449E-2
N° 9 (Bias2)	---	2.680E-4	-3.111E-3	-5.637E-3	-1.706E-2
N° 10 (Bias2)	---	-1.900E-5	-2.928E-3	-6.381E-3	-1.427E-2
N° 11 (Bias2)	---	-1.344E-3	-3.874E-3	-6.912E-3	-1.816E-2
N° 12 (OFF)	---	9.204E-3	3.518E-3	8.180E-4	-1.181E-2
N° 13 (OFF)	---	6.999E-3	9.230E-4	-1.835E-3	-1.527E-2
N° 14 (OFF)	---	1.967E-2	1.450E-2	1.239E-2	1.791E-3
N° 15 (OFF)	---	1.221E-2	8.422E-3	5.252E-3	-9.069E-3
N° 16 (OFF)	---	1.472E-2	1.192E-2	9.013E-3	-2.211E-3
Average (Bias1)	---	2.324E-3	-5.104E-4	-5.342E-3	-1.708E-2
σ (Bias1)	---	1.486E-3	1.452E-3	1.484E-3	2.362E-3
Average+3σ (Bias1)	---	6.782E-3	3.846E-3	-8.894E-4	-9.997E-3
Average-3σ (Bias1)	---	-2.133E-3	-4.867E-3	-9.795E-3	-2.417E-2
Average (Bias2)	---	8.880E-5	-3.062E-3	-5.988E-3	-1.619E-2
σ (Bias2)	---	9.235E-4	6.429E-4	8.623E-4	1.717E-3
Average+3σ (Bias2)	---	2.859E-3	-1.133E-3	-3.401E-3	-1.104E-2
Average-3σ (Bias2)	---	-2.682E-3	-4.991E-3	-8.575E-3	-2.134E-2
Average (OFF)	---	1.256E-2	7.856E-3	5.127E-3	-7.315E-3
σ (OFF)	---	4.939E-3	5.654E-3	5.807E-3	6.992E-3
Average+3σ (OFF)	---	2.738E-2	2.482E-2	2.255E-2	1.366E-2
Average-3σ (OFF)	---	-2.254E-3	-9.105E-3	-1.229E-2	-2.829E-2

190 MeV proton / detailed results

4. BVr

Ta=25°C; Ir=100µA



190 MeV proton / detailed results

BVr . (V) **Min = 7.0**

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	39.54	39.51	39.51	39.52	39.54
N° 2 (Bias1)	41.61	41.51	41.53	41.60	41.66
N° 3 (Bias1)	38.45	38.41	38.43	38.49	38.52
N° 4 (Bias1)	37.85	37.81	37.82	37.88	37.90
N° 5 (Bias1)	42.80	42.76	42.79	42.84	42.89
N° 6 (Bias1)	43.15	43.11	43.12	43.19	43.24
N° 7 (Bias2)	38.00	37.98	37.99	37.98	37.98
N° 8 (Bias2)	23.46	23.41	23.41	23.41	23.37
N° 9 (Bias2)	37.63	37.63	37.64	37.60	37.60
N° 10 (Bias2)	39.86	39.85	39.86	39.88	39.83
N° 11 (Bias2)	26.24	26.25	26.25	26.25	26.23
N° 12 (OFF)	38.71	38.44	38.50	38.50	38.56
N° 13 (OFF)	37.44	37.21	37.27	37.27	37.29
N° 14 (OFF)	23.62	23.47	23.48	23.48	23.48
N° 15 (OFF)	37.70	37.37	37.39	37.39	37.39
N° 16 (OFF)	44.33	43.87	43.88	43.89	43.87

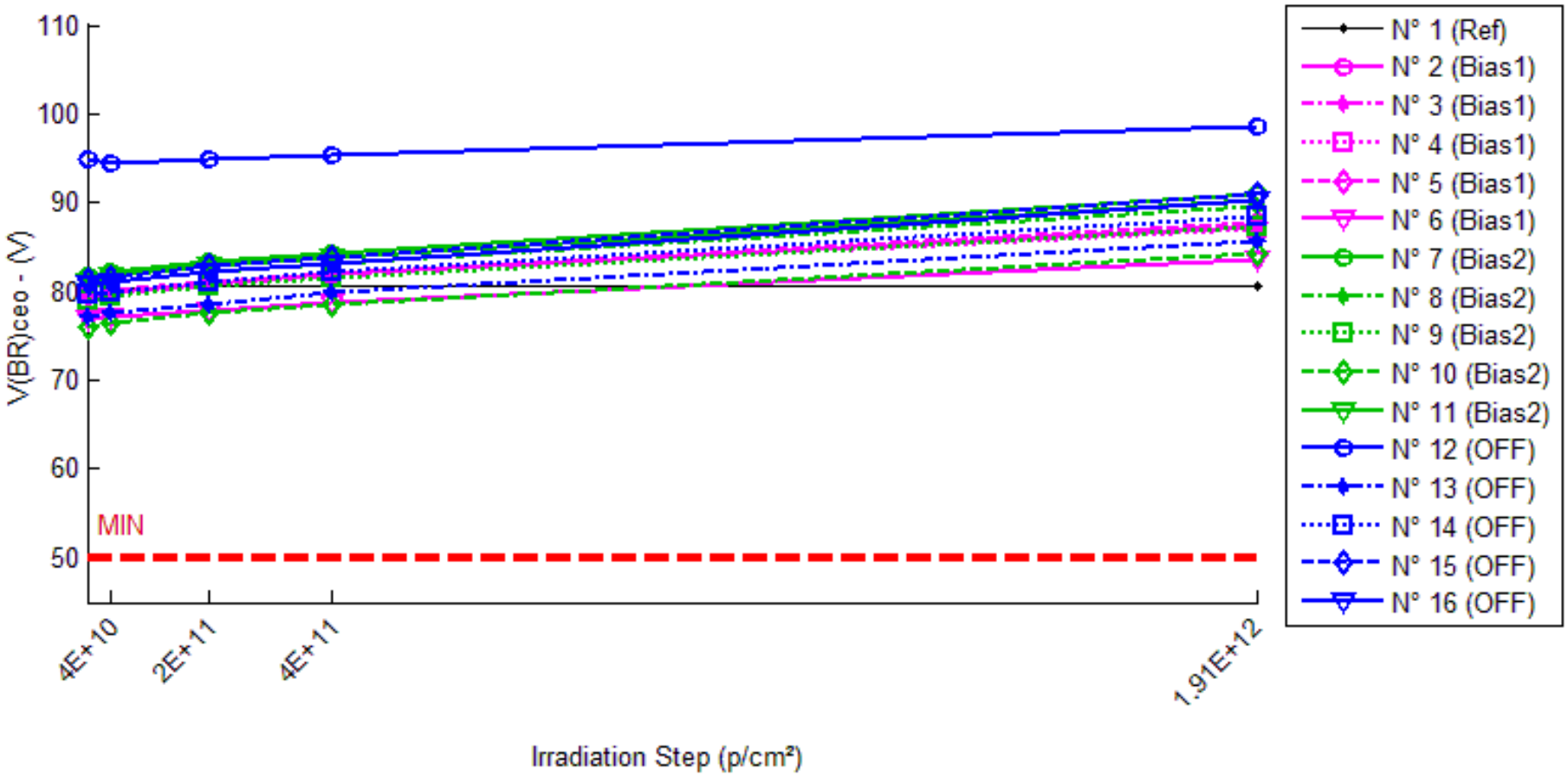
Delta [BVr]

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	---	-2.755E-2	-2.447E-2	-1.862E-2	6.020E-3
N° 2 (Bias1)	---	-9.558E-2	-8.230E-2	-1.472E-2	5.015E-2
N° 3 (Bias1)	---	-4.317E-2	-2.809E-2	3.430E-2	6.465E-2
N° 4 (Bias1)	---	-4.562E-2	-3.236E-2	2.296E-2	5.233E-2
N° 5 (Bias1)	---	-4.276E-2	-7.920E-3	4.187E-2	8.380E-2
N° 6 (Bias1)	---	-4.131E-2	-3.160E-2	3.959E-2	9.144E-2
N° 7 (Bias2)	---	-1.913E-2	-1.393E-2	-2.442E-2	-1.939E-2
N° 8 (Bias2)	---	-4.742E-2	-4.855E-2	-4.951E-2	-9.009E-2
N° 9 (Bias2)	---	-8.720E-3	4.630E-3	-3.107E-2	-3.782E-2
N° 10 (Bias2)	---	-4.290E-3	2.100E-3	2.173E-2	-2.426E-2
N° 11 (Bias2)	---	1.266E-2	1.785E-2	1.451E-2	-2.610E-3
N° 12 (OFF)	---	-2.670E-1	-2.074E-1	-2.041E-1	-1.516E-1
N° 13 (OFF)	---	-2.333E-1	-1.734E-1	-1.695E-1	-1.554E-1
N° 14 (OFF)	---	-1.458E-1	-1.359E-1	-1.408E-1	-1.364E-1
N° 15 (OFF)	---	-3.285E-1	-3.140E-1	-3.078E-1	-3.100E-1
N° 16 (OFF)	---	-4.608E-1	-4.534E-1	-4.451E-1	-4.669E-1
Average (Bias1)	---	-5.369E-2	-3.645E-2	2.480E-2	6.847E-2
σ (Bias1)	---	2.347E-2	2.751E-2	2.327E-2	1.853E-2
Average+3σ (Bias1)	---	1.672E-2	4.606E-2	9.460E-2	1.241E-1
Average-3σ (Bias1)	---	-1.241E-1	-1.190E-1	-4.500E-2	1.289E-2
Average (Bias2)	---	-1.338E-2	-7.580E-3	-1.375E-2	-3.483E-2
σ (Bias2)	---	2.222E-2	2.554E-2	3.062E-2	3.336E-2
Average+3σ (Bias2)	---	5.327E-2	6.903E-2	7.810E-2	6.524E-2
Average-3σ (Bias2)	---	-8.003E-2	-8.419E-2	-1.056E-1	-1.349E-1
Average (OFF)	---	-2.871E-1	-2.568E-1	-2.534E-1	-2.441E-1
σ (OFF)	---	1.174E-1	1.284E-1	1.244E-1	1.432E-1
Average+3σ (OFF)	---	6.525E-2	1.283E-1	1.197E-1	1.855E-1
Average-3σ (OFF)	---	-6.394E-1	-6.419E-1	-6.265E-1	-6.736E-1

190 MeV proton / detailed results

5. V(BR)ceo

Ta=25°C; Ic=1mA; Ib=0; If=0



190 MeV proton / detailed results

V(BR)ceo . (V) **Min = 50.0**

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	80.55	80.49	80.50	80.51	80.52
N° 2 (Bias1)	79.63	79.89	80.95	81.94	87.41
N° 3 (Bias1)	79.20	79.59	80.61	81.76	87.55
N° 4 (Bias1)	79.58	79.89	80.83	81.80	87.03
N° 5 (Bias1)	79.66	80.05	81.02	82.00	87.83
N° 6 (Bias1)	76.83	77.15	77.92	78.82	83.54
N° 7 (Bias2)	81.70	82.13	83.28	84.33	90.95
N° 8 (Bias2)	80.54	81.04	82.16	83.25	89.63
N° 9 (Bias2)	78.91	79.36	80.62	81.53	87.41
N° 10 (Bias2)	75.92	76.46	77.60	78.56	84.33
N° 11 (Bias2)	81.18	81.79	82.92	83.95	90.19
N° 12 (OFF)	94.94	94.43	94.95	95.35	98.53
N° 13 (OFF)	77.12	77.54	78.64	79.87	85.72
N° 14 (OFF)	79.68	79.85	81.10	82.11	88.44
N° 15 (OFF)	81.36	81.63	82.93	83.95	91.06
N° 16 (OFF)	80.90	81.09	82.21	83.23	90.23

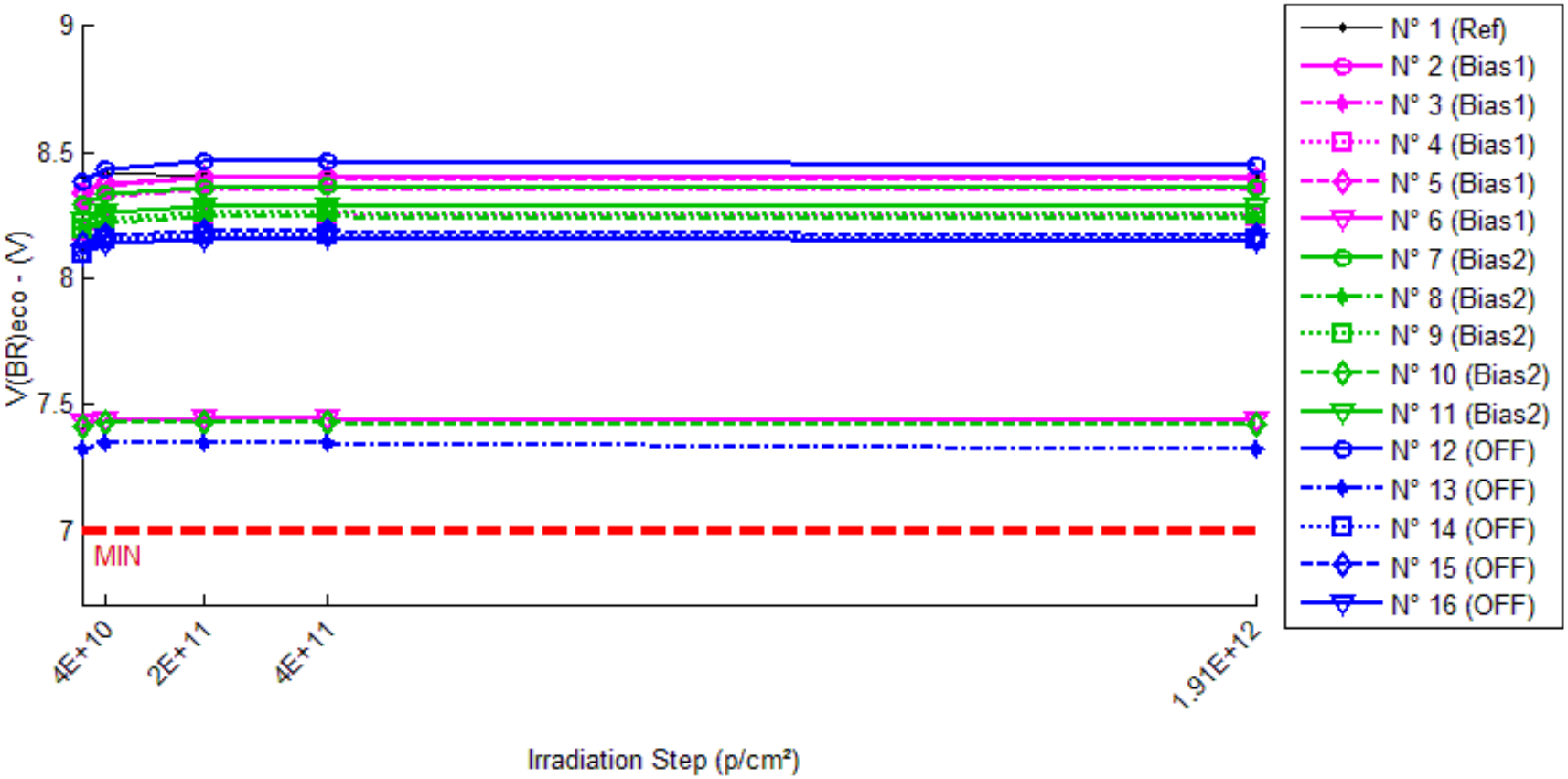
Delta [V(BR)ceo]

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	---	-6.303E-2	-4.982E-2	-4.168E-2	-3.279E-2
N° 2 (Bias1)	---	2.557E-1	1.317E+0	2.307E+0	7.779E+0
N° 3 (Bias1)	---	3.968E-1	1.410E+0	2.566E+0	8.351E+0
N° 4 (Bias1)	---	3.091E-1	1.254E+0	2.221E+0	7.451E+0
N° 5 (Bias1)	---	3.892E-1	1.350E+0	2.338E+0	8.168E+0
N° 6 (Bias1)	---	3.143E-1	1.085E+0	1.987E+0	6.705E+0
N° 7 (Bias2)	---	4.309E-1	1.581E+0	2.626E+0	9.247E+0
N° 8 (Bias2)	---	4.961E-1	1.616E+0	2.704E+0	9.089E+0
N° 9 (Bias2)	---	4.578E-1	1.714E+0	2.620E+0	8.502E+0
N° 10 (Bias2)	---	5.383E-1	1.672E+0	2.635E+0	8.410E+0
N° 11 (Bias2)	---	6.086E-1	1.739E+0	2.771E+0	9.011E+0
N° 12 (OFF)	---	-5.136E-1	8.620E-3	4.064E-1	3.585E+0
N° 13 (OFF)	---	4.194E-1	1.523E+0	2.746E+0	8.595E+0
N° 14 (OFF)	---	1.629E-1	1.416E+0	2.424E+0	8.761E+0
N° 15 (OFF)	---	2.660E-1	1.565E+0	2.582E+0	9.694E+0
N° 16 (OFF)	---	1.877E-1	1.308E+0	2.328E+0	9.332E+0
Average (Bias1)	---	3.330E-1	1.283E+0	2.284E+0	7.691E+0
σ (Bias1)	---	5.942E-2	1.245E-1	2.089E-1	6.520E-1
Average+3σ (Bias1)	---	5.112E-1	1.656E+0	2.911E+0	9.647E+0
Average-3σ (Bias1)	---	1.547E-1	9.095E-1	1.657E+0	5.735E+0
Average (Bias2)	---	5.063E-1	1.664E+0	2.671E+0	8.852E+0
σ (Bias2)	---	7.007E-2	6.601E-2	6.504E-2	3.727E-1
Average+3σ (Bias2)	---	7.165E-1	1.862E+0	2.866E+0	9.970E+0
Average-3σ (Bias2)	---	2.961E-1	1.466E+0	2.476E+0	7.734E+0
Average (OFF)	---	1.045E-1	1.164E+0	2.097E+0	7.993E+0
σ (OFF)	---	3.597E-1	6.535E-1	9.585E-1	2.503E+0
Average+3σ (OFF)	---	1.184E+0	3.124E+0	4.973E+0	1.550E+1
Average-3σ (OFF)	---	-9.746E-1	-7.966E-1	-7.782E-1	4.831E-1

190 MeV proton / detailed results

6. V(BR)eco

Ta=25°C; Ic=10µA



190 MeV proton / detailed results

V(BR)eco . (V) **Min = 7.0**

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	8.412	8.413	8.412	8.412	8.411
N° 2 (Bias1)	8.342	8.378	8.402	8.404	8.397
N° 3 (Bias1)	8.289	8.327	8.355	8.357	8.353
N° 4 (Bias1)	8.189	8.222	8.248	8.250	8.246
N° 5 (Bias1)	8.332	8.369	8.397	8.401	8.396
N° 6 (Bias1)	7.431	7.441	7.447	7.444	7.435
N° 7 (Bias2)	8.297	8.336	8.362	8.366	8.360
N° 8 (Bias2)	8.194	8.223	8.243	8.246	8.240
N° 9 (Bias2)	8.199	8.236	8.259	8.263	8.257
N° 10 (Bias2)	7.411	7.427	7.434	7.433	7.423
N° 11 (Bias2)	8.229	8.262	8.286	8.290	8.286
N° 12 (OFF)	8.381	8.437	8.463	8.466	8.449
N° 13 (OFF)	7.322	7.346	7.347	7.346	7.327
N° 14 (OFF)	8.098	8.152	8.171	8.173	8.157
N° 15 (OFF)	8.138	8.173	8.190	8.192	8.174
N° 16 (OFF)	8.095	8.140	8.159	8.162	8.145

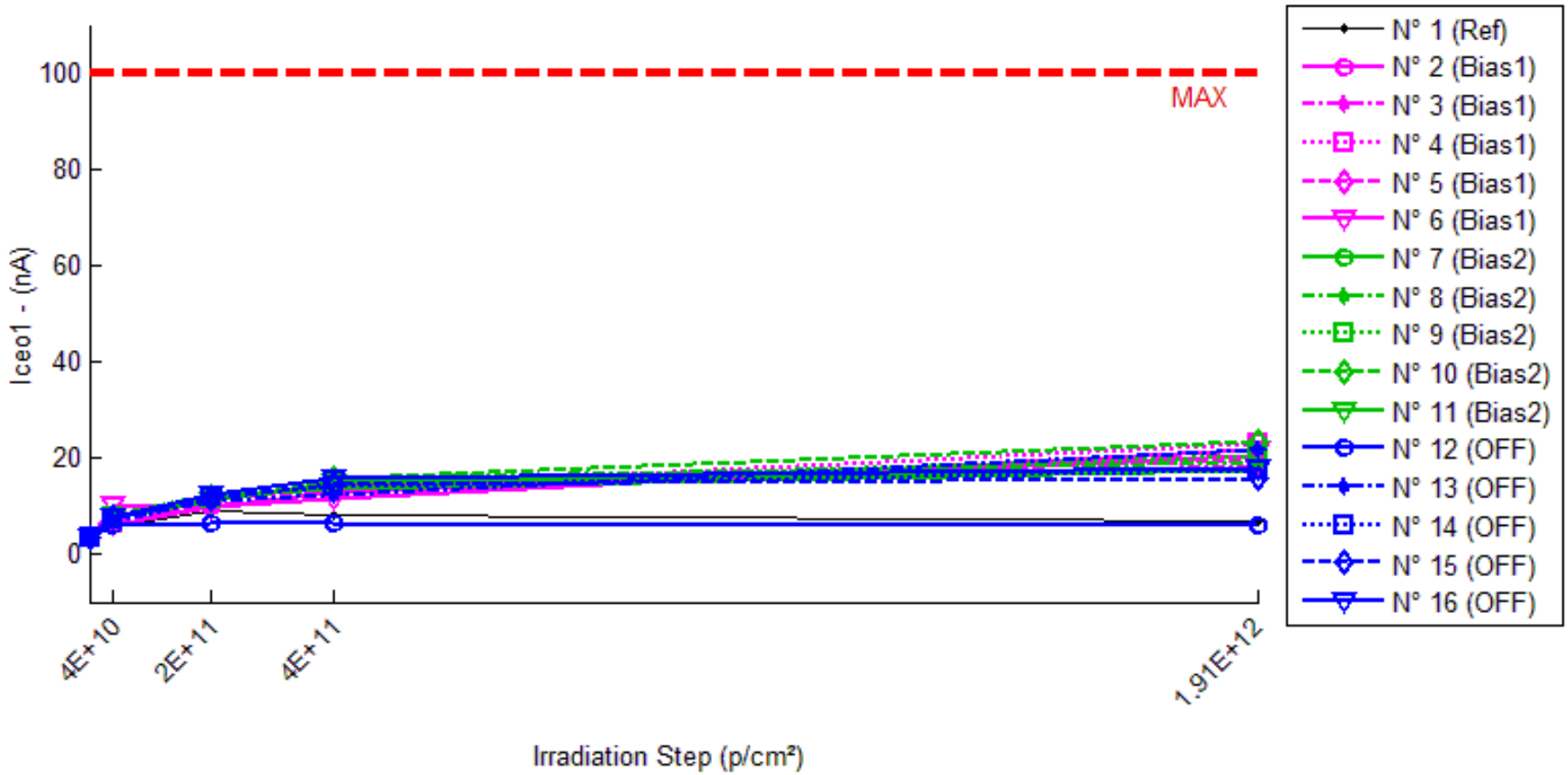
Delta [V(BR)eco]

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	---	6.560E-4	2.600E-4	-1.140E-4	-9.870E-4
N° 2 (Bias1)	---	3.586E-2	5.990E-2	6.142E-2	5.509E-2
N° 3 (Bias1)	---	3.824E-2	6.603E-2	6.834E-2	6.445E-2
N° 4 (Bias1)	---	3.294E-2	5.828E-2	6.029E-2	5.639E-2
N° 5 (Bias1)	---	3.649E-2	6.480E-2	6.845E-2	6.376E-2
N° 6 (Bias1)	---	1.020E-2	1.559E-2	1.288E-2	4.126E-3
N° 7 (Bias2)	---	3.832E-2	6.455E-2	6.874E-2	6.287E-2
N° 8 (Bias2)	---	2.914E-2	4.946E-2	5.221E-2	4.615E-2
N° 9 (Bias2)	---	3.718E-2	6.056E-2	6.394E-2	5.845E-2
N° 10 (Bias2)	---	1.545E-2	2.261E-2	2.139E-2	1.216E-2
N° 11 (Bias2)	---	3.298E-2	5.686E-2	6.107E-2	5.716E-2
N° 12 (OFF)	---	5.560E-2	8.161E-2	8.427E-2	6.824E-2
N° 13 (OFF)	---	2.459E-2	2.568E-2	2.456E-2	5.647E-3
N° 14 (OFF)	---	5.462E-2	7.308E-2	7.521E-2	5.965E-2
N° 15 (OFF)	---	3.498E-2	5.207E-2	5.407E-2	3.649E-2
N° 16 (OFF)	---	4.510E-2	6.474E-2	6.712E-2	5.020E-2
Average (Bias1)	---	3.075E-2	5.292E-2	5.428E-2	4.876E-2
σ (Bias1)	---	1.164E-2	2.112E-2	2.345E-2	2.531E-2
Average+3σ (Bias1)	---	6.567E-2	1.163E-1	1.246E-1	1.247E-1
Average-3σ (Bias1)	---	-4.183E-3	-1.044E-2	-1.608E-2	-2.716E-2
Average (Bias2)	---	3.061E-2	5.081E-2	5.347E-2	4.736E-2
σ (Bias2)	---	9.220E-3	1.671E-2	1.892E-2	2.061E-2
Average+3σ (Bias2)	---	5.828E-2	1.009E-1	1.102E-1	1.092E-1
Average-3σ (Bias2)	---	2.954E-3	6.706E-4	-3.279E-3	-1.448E-2
Average (OFF)	---	4.298E-2	5.944E-2	6.105E-2	4.404E-2
σ (OFF)	---	1.324E-2	2.179E-2	2.322E-2	2.449E-2
Average+3σ (OFF)	---	8.270E-2	1.248E-1	1.307E-1	1.175E-1
Average-3σ (OFF)	---	3.246E-3	-5.937E-3	-8.607E-3	-2.941E-2

190 MeV proton / detailed results

7. Iceo1

Ta=25°C; Vce=50V; If=0



190 MeV proton / detailed results

Iceo1 . (nA) **Max = 100.0**

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	3.550	5.491	9.116	7.887	6.704
N° 2 (Bias1)	3.517	5.969	9.975	12.863	20.244
N° 3 (Bias1)	3.487	6.211	10.093	13.310	18.463
N° 4 (Bias1)	3.479	6.486	10.983	13.803	23.069
N° 5 (Bias1)	3.483	6.593	11.061	14.152	19.740
N° 6 (Bias1)	3.240	10.238	9.968	11.445	21.582
N° 7 (Bias2)	3.420	7.704	12.031	13.479	17.386
N° 8 (Bias2)	3.537	7.909	12.552	15.722	19.108
N° 9 (Bias2)	3.501	7.612	11.506	14.441	20.424
N° 10 (Bias2)	3.610	7.669	12.050	15.550	23.200
N° 11 (Bias2)	3.398	7.557	11.104	14.810	18.004
N° 12 (OFF)	3.828	6.082	6.442	6.439	5.889
N° 13 (OFF)	3.232	6.914	10.989	12.514	21.629
N° 14 (OFF)	3.469	7.290	11.750	14.029	17.410
N° 15 (OFF)	3.272	7.509	11.394	14.463	15.799
N° 16 (OFF)	3.589	7.466	12.260	15.630	17.802

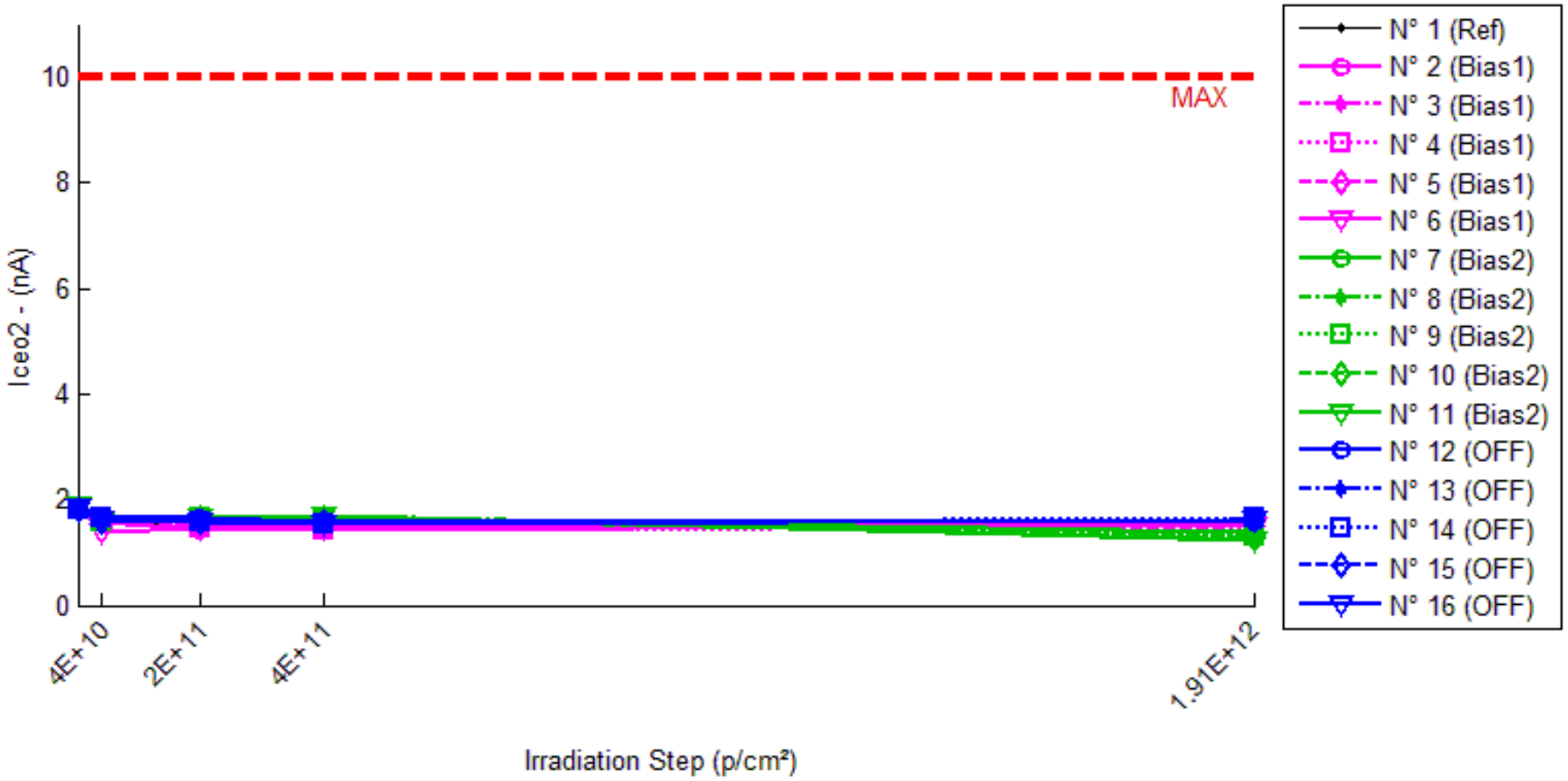
Delta [Iceo1]

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	---	1.941E+0	5.567E+0	4.337E+0	3.154E+0
N° 2 (Bias1)	---	2.452E+0	6.458E+0	9.345E+0	1.673E+1
N° 3 (Bias1)	---	2.724E+0	6.606E+0	9.822E+0	1.498E+1
N° 4 (Bias1)	---	3.007E+0	7.504E+0	1.032E+1	1.959E+1
N° 5 (Bias1)	---	3.111E+0	7.579E+0	1.067E+1	1.626E+1
N° 6 (Bias1)	---	6.998E+0	6.728E+0	8.205E+0	1.834E+1
N° 7 (Bias2)	---	4.284E+0	8.610E+0	1.006E+1	1.397E+1
N° 8 (Bias2)	---	4.372E+0	9.015E+0	1.218E+1	1.557E+1
N° 9 (Bias2)	---	4.112E+0	8.005E+0	1.094E+1	1.692E+1
N° 10 (Bias2)	---	4.059E+0	8.440E+0	1.194E+1	1.959E+1
N° 11 (Bias2)	---	4.159E+0	7.706E+0	1.141E+1	1.461E+1
N° 12 (OFF)	---	-5.746E+0	-5.386E+0	-5.389E+0	-5.939E+0
N° 13 (OFF)	---	-6.317E+0	-2.243E+0	-7.181E-1	8.398E+0
N° 14 (OFF)	---	-8.179E+0	-3.718E+0	-1.440E+0	1.941E+0
N° 15 (OFF)	---	-6.762E+0	-2.878E+0	1.915E-1	1.527E+0
N° 16 (OFF)	---	-1.012E+1	-5.329E+0	-1.959E+0	2.132E-1
Average (Bias1)	---	3.658E+0	6.975E+0	9.673E+0	1.718E+1
σ (Bias1)	---	1.885E+0	5.264E-1	9.620E-1	1.808E+0
Average+3σ (Bias1)	---	9.312E+0	8.554E+0	1.256E+1	2.260E+1
Average-3σ (Bias1)	---	-1.996E+0	5.396E+0	6.787E+0	1.176E+1
Average (Bias2)	---	4.197E+0	8.355E+0	1.131E+1	1.613E+1
σ (Bias2)	---	1.286E-1	5.129E-1	8.475E-1	2.232E+0
Average+3σ (Bias2)	---	4.583E+0	9.894E+0	1.385E+1	2.283E+1
Average-3σ (Bias2)	---	3.811E+0	6.817E+0	8.765E+0	9.436E+0
Average (OFF)	---	-7.425E+0	-3.911E+0	-1.863E+0	1.228E+0
σ (OFF)	---	1.756E+0	1.421E+0	2.130E+0	5.109E+0
Average+3σ (OFF)	---	-2.158E+0	3.509E-1	4.528E+0	1.655E+1
Average-3σ (OFF)	---	-1.269E+1	-8.172E+0	-8.254E+0	-1.410E+1

190 MeV proton / detailed results

8. Iceo2

Ta=25°C; Vce=5V; If=0



190 MeV proton / detailed results

Iceo2 . (nA) **Max = 10.0**

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	1.830	1.666	1.434	1.406	1.533
N° 2 (Bias1)	1.845	1.598	1.442	1.423	1.543
N° 3 (Bias1)	1.832	1.688	1.518	1.443	1.567
N° 4 (Bias1)	1.837	1.646	1.454	1.440	1.494
N° 5 (Bias1)	1.821	1.603	1.478	1.447	1.499
N° 6 (Bias1)	1.883	1.402	1.480	1.485	1.502
N° 7 (Bias2)	1.850	1.628	1.650	1.652	1.399
N° 8 (Bias2)	1.866	1.587	1.600	1.687	1.291
N° 9 (Bias2)	1.829	1.582	1.649	1.658	1.295
N° 10 (Bias2)	1.795	1.583	1.659	1.650	1.256
N° 11 (Bias2)	1.889	1.597	1.642	1.692	1.246
N° 12 (OFF)	1.841	1.643	1.639	1.579	1.582
N° 13 (OFF)	1.828	1.625	1.567	1.529	1.612
N° 14 (OFF)	1.833	1.650	1.590	1.557	1.639
N° 15 (OFF)	1.817	1.577	1.588	1.584	1.605
N° 16 (OFF)	1.843	1.610	1.588	1.534	1.611

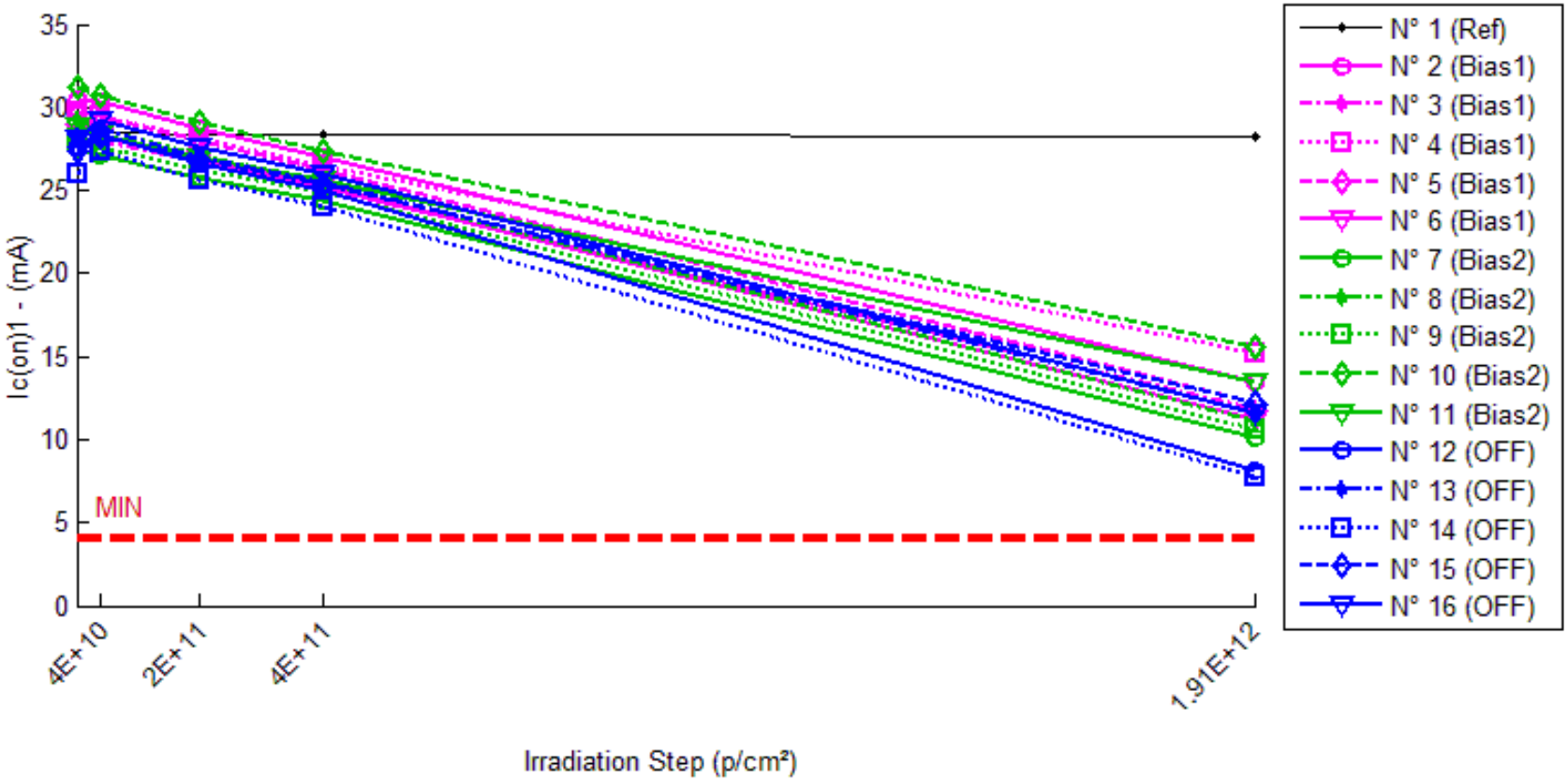
Delta [Iceo2]

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	---	-1.636E-1	-3.960E-1	-4.244E-1	-2.966E-1
N° 2 (Bias1)	---	-2.461E-1	-4.022E-1	-4.211E-1	-3.017E-1
N° 3 (Bias1)	---	-1.444E-1	-3.140E-1	-3.895E-1	-2.659E-1
N° 4 (Bias1)	---	-1.909E-1	-3.825E-1	-3.962E-1	-3.422E-1
N° 5 (Bias1)	---	-2.180E-1	-3.423E-1	-3.734E-1	-3.221E-1
N° 6 (Bias1)	---	-4.809E-1	-4.034E-1	-3.985E-1	-3.811E-1
N° 7 (Bias2)	---	-2.223E-1	-2.008E-1	-1.986E-1	-4.510E-1
N° 8 (Bias2)	---	-2.796E-1	-2.668E-1	-1.793E-1	-5.756E-1
N° 9 (Bias2)	---	-2.466E-1	-1.805E-1	-1.713E-1	-5.337E-1
N° 10 (Bias2)	---	-2.119E-1	-1.357E-1	-1.452E-1	-5.390E-1
N° 11 (Bias2)	---	-2.920E-1	-2.474E-1	-1.969E-1	-6.427E-1
N° 12 (OFF)	---	1.502E+0	1.498E+0	1.438E+0	1.441E+0
N° 13 (OFF)	---	1.497E+0	1.438E+0	1.401E+0	1.483E+0
N° 14 (OFF)	---	1.517E+0	1.457E+0	1.424E+0	1.506E+0
N° 15 (OFF)	---	1.460E+0	1.470E+0	1.467E+0	1.488E+0
N° 16 (OFF)	---	1.466E+0	1.445E+0	1.391E+0	1.468E+0
Average (Bias1)	---	-2.561E-1	-3.689E-1	-3.957E-1	-3.226E-1
σ (Bias1)	---	1.312E-1	3.938E-2	1.725E-2	4.319E-2
Average+3σ (Bias1)	---	1.374E-1	-2.507E-1	-3.440E-1	-1.930E-1
Average-3σ (Bias1)	---	-6.495E-1	-4.870E-1	-4.475E-1	-4.522E-1
Average (Bias2)	---	-2.505E-1	-2.062E-1	-1.783E-1	-5.484E-1
σ (Bias2)	---	3.489E-2	5.250E-2	2.183E-2	6.969E-2
Average+3σ (Bias2)	---	-1.458E-1	-4.874E-2	-1.128E-1	-3.393E-1
Average-3σ (Bias2)	---	-3.552E-1	-3.637E-1	-2.438E-1	-7.575E-1
Average (OFF)	---	1.488E+0	1.462E+0	1.424E+0	1.477E+0
σ (OFF)	---	2.454E-2	2.368E-2	3.029E-2	2.436E-2
Average+3σ (OFF)	---	1.562E+0	1.533E+0	1.515E+0	1.551E+0
Average-3σ (OFF)	---	1.415E+0	1.391E+0	1.333E+0	1.404E+0

190 MeV proton / detailed results

9. Ic(on)1

Ta=25°C; Vce=5V; If=10mA



190 MeV proton / detailed results

Ic(on)1 . (mA) **Min = 4.0**

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	28.348	28.440	28.401	28.341	28.266
N° 2 (Bias1)	30.456	30.364	28.758	26.946	13.447
N° 3 (Bias1)	28.125	27.941	26.736	25.071	11.877
N° 4 (Bias1)	29.757	29.500	28.151	26.510	15.145
N° 5 (Bias1)	29.785	29.486	27.955	26.198	12.203
N° 6 (Bias1)	28.514	28.274	26.910	25.222	11.284
N° 7 (Bias2)	27.526	27.155	25.763	24.351	10.143
N° 8 (Bias2)	29.254	28.743	27.153	25.515	11.156
N° 9 (Bias2)	28.061	27.654	26.296	24.927	10.609
N° 10 (Bias2)	31.221	30.683	29.048	27.382	15.611
N° 11 (Bias2)	28.837	28.317	27.012	25.599	13.496
N° 12 (OFF)	27.623	28.324	26.584	24.967	8.087
N° 13 (OFF)	28.198	28.721	27.034	25.488	11.590
N° 14 (OFF)	26.060	27.330	25.590	24.004	7.752
N° 15 (OFF)	27.398	28.277	26.852	25.430	12.190
N° 16 (OFF)	28.140	29.234	27.593	25.980	11.631

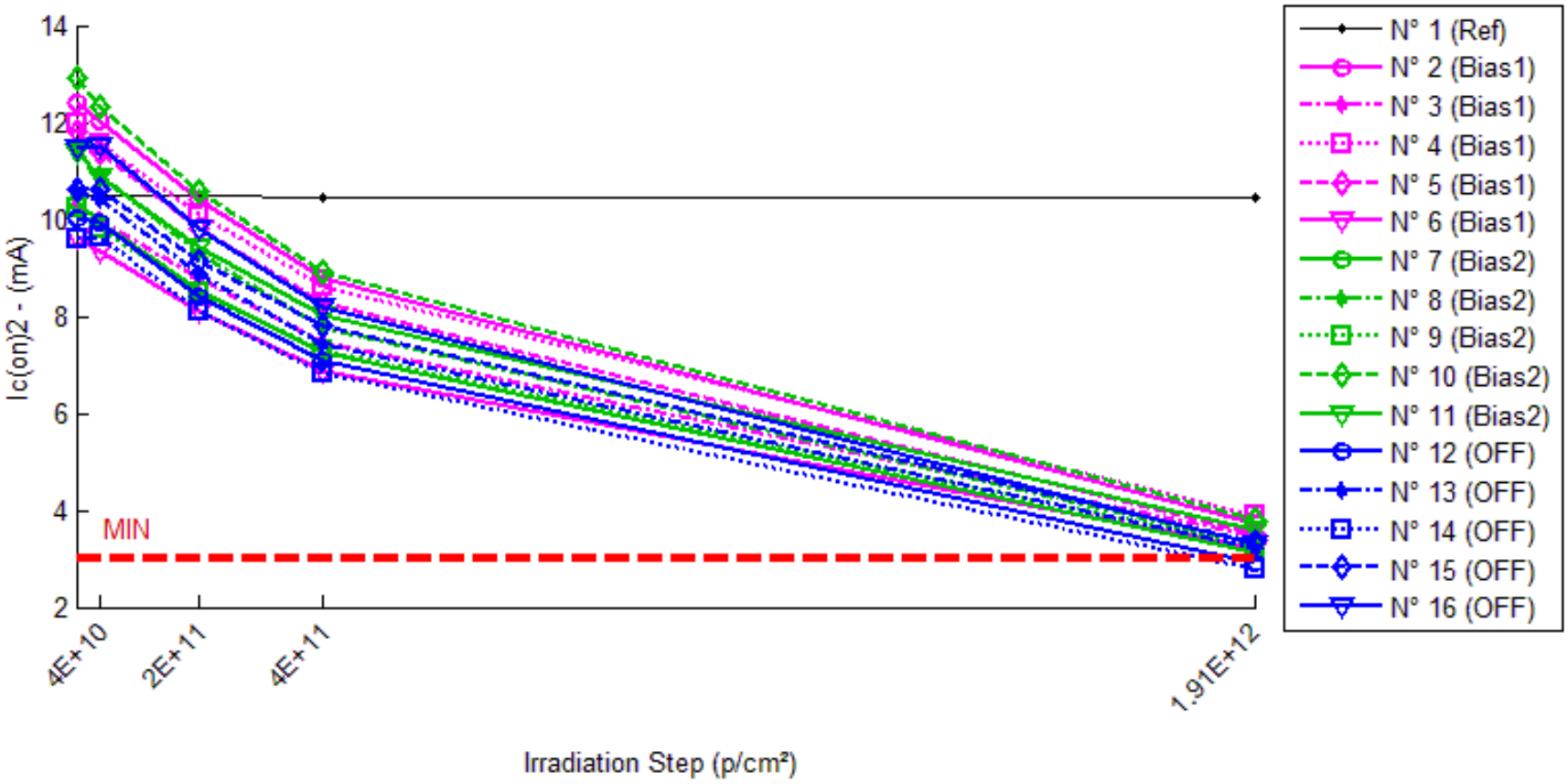
Delta [Ic(on)1]

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	---	9.191E-2	5.327E-2	-6.750E-3	-8.172E-2
N° 2 (Bias1)	---	-9.209E-2	-1.698E+0	-3.510E+0	-1.701E+1
N° 3 (Bias1)	---	-1.845E-1	-1.389E+0	-3.054E+0	-1.625E+1
N° 4 (Bias1)	---	-2.575E-1	-1.606E+0	-3.247E+0	-1.461E+1
N° 5 (Bias1)	---	-2.991E-1	-1.830E+0	-3.587E+0	-1.758E+1
N° 6 (Bias1)	---	-2.396E-1	-1.604E+0	-3.292E+0	-1.723E+1
N° 7 (Bias2)	---	-3.706E-1	-1.763E+0	-3.175E+0	-1.738E+1
N° 8 (Bias2)	---	-5.107E-1	-2.101E+0	-3.739E+0	-1.810E+1
N° 9 (Bias2)	---	-4.075E-1	-1.765E+0	-3.134E+0	-1.745E+1
N° 10 (Bias2)	---	-5.380E-1	-2.174E+0	-3.839E+0	-1.561E+1
N° 11 (Bias2)	---	-5.197E-1	-1.825E+0	-3.238E+0	-1.534E+1
N° 12 (OFF)	---	7.006E-1	-1.040E+0	-2.656E+0	-1.954E+1
N° 13 (OFF)	---	5.230E-1	-1.163E+0	-2.710E+0	-1.661E+1
N° 14 (OFF)	---	1.271E+0	-4.696E-1	-2.056E+0	-1.831E+1
N° 15 (OFF)	---	8.794E-1	-5.456E-1	-1.967E+0	-1.521E+1
N° 16 (OFF)	---	1.095E+0	-5.468E-1	-2.159E+0	-1.651E+1
Average (Bias1)	---	-2.146E-1	-1.625E+0	-3.338E+0	-1.654E+1
σ (Bias1)	---	7.988E-2	1.612E-1	2.139E-1	1.182E+0
Average+3σ (Bias1)	---	2.509E-2	-1.142E+0	-2.696E+0	-1.299E+1
Average-3σ (Bias1)	---	-4.542E-1	-2.109E+0	-3.979E+0	-2.008E+1
Average (Bias2)	---	-4.693E-1	-1.926E+0	-3.425E+0	-1.678E+1
σ (Bias2)	---	7.506E-2	1.966E-1	3.364E-1	1.224E+0
Average+3σ (Bias2)	---	-2.442E-1	-1.336E+0	-2.416E+0	-1.310E+1
Average-3σ (Bias2)	---	-6.945E-1	-2.515E+0	-4.434E+0	-2.045E+1
Average (OFF)	---	8.937E-1	-7.530E-1	-2.309E+0	-1.723E+1
σ (OFF)	---	2.990E-1	3.226E-1	3.480E-1	1.694E+0
Average+3σ (OFF)	---	1.791E+0	2.149E-1	-1.265E+0	-1.215E+1
Average-3σ (OFF)	---	-3.236E-3	-1.721E+0	-3.354E+0	-2.232E+1

190 MeV proton / detailed results

10.Ic(on)2

Ta=25°C; Vce=0.4V; If=10mA



190 MeV proton / detailed results

Ic(on)2 . (mA) **Min = 3.0**

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	10.462	10.489	10.478	10.460	10.434
N° 2 (Bias1)	12.414	12.041	10.409	8.775	3.712
N° 3 (Bias1)	10.297	9.966	8.782	7.463	3.468
N° 4 (Bias1)	11.982	11.568	10.118	8.630	3.882
N° 5 (Bias1)	11.813	11.376	9.814	8.270	3.523
N° 6 (Bias1)	9.658	9.331	8.123	6.893	3.213
N° 7 (Bias2)	10.346	9.928	8.539	7.265	3.146
N° 8 (Bias2)	11.443	10.916	9.289	7.785	3.288
N° 9 (Bias2)	10.253	9.829	8.494	7.291	3.259
N° 10 (Bias2)	12.896	12.314	10.556	8.911	3.790
N° 11 (Bias2)	11.364	10.858	9.438	8.036	3.613
N° 12 (OFF)	10.038	9.944	8.419	7.080	2.910
N° 13 (OFF)	10.566	10.391	8.861	7.446	3.223
N° 14 (OFF)	9.590	9.650	8.125	6.815	2.783
N° 15 (OFF)	10.604	10.603	9.146	7.788	3.353
N° 16 (OFF)	11.473	11.514	9.793	8.212	3.286

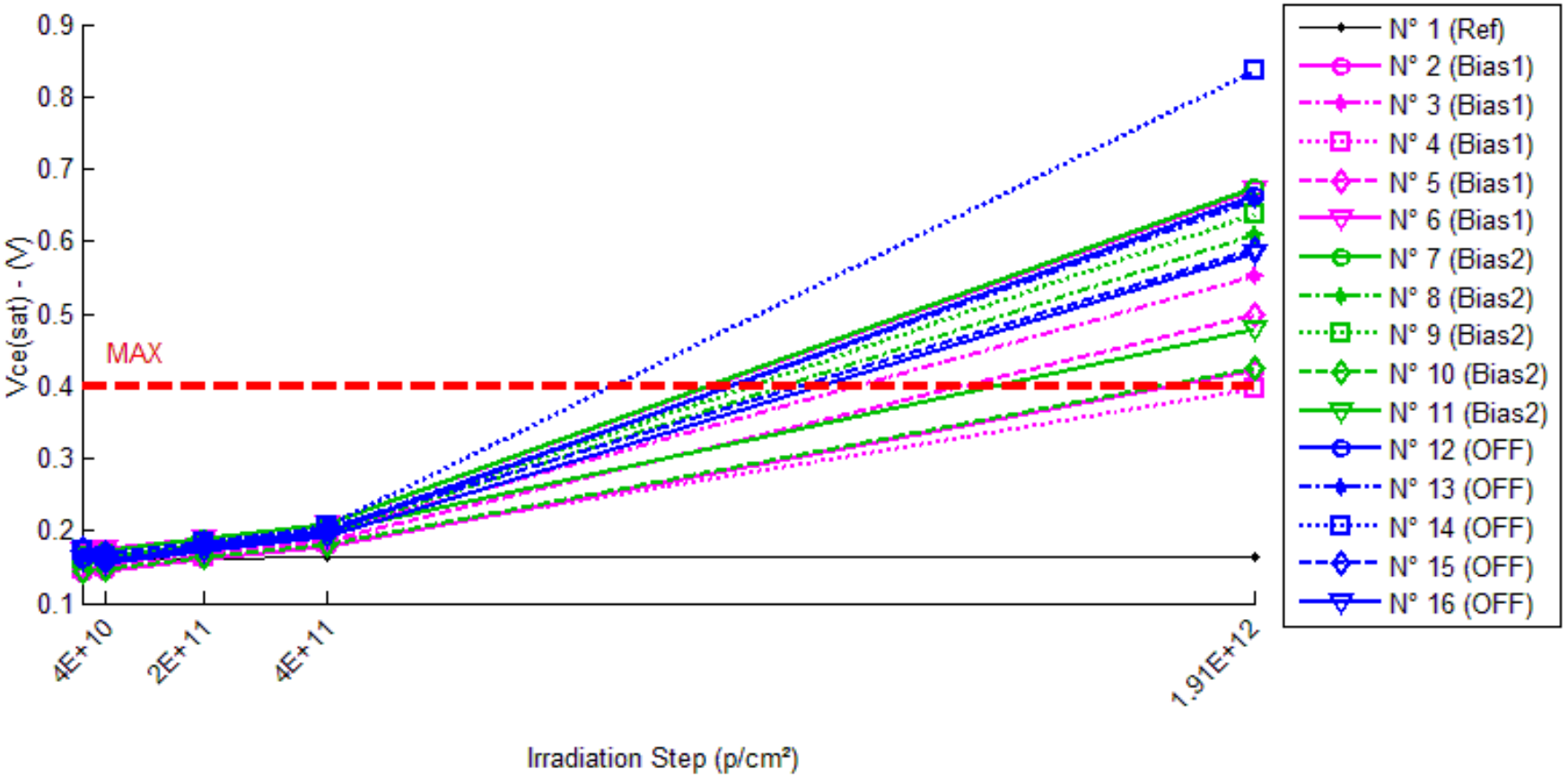
Delta [Ic(on)2]

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	---	2.700E-2	1.607E-2	-1.760E-3	-2.716E-2
N° 2 (Bias1)	---	-3.726E-1	-2.005E+0	-3.638E+0	-8.702E+0
N° 3 (Bias1)	---	-3.305E-1	-1.514E+0	-2.834E+0	-6.828E+0
N° 4 (Bias1)	---	-4.140E-1	-1.864E+0	-3.351E+0	-8.099E+0
N° 5 (Bias1)	---	-4.372E-1	-1.999E+0	-3.543E+0	-8.290E+0
N° 6 (Bias1)	---	-3.271E-1	-1.536E+0	-2.765E+0	-6.445E+0
N° 7 (Bias2)	---	-4.189E-1	-1.807E+0	-3.082E+0	-7.201E+0
N° 8 (Bias2)	---	-5.271E-1	-2.154E+0	-3.658E+0	-8.155E+0
N° 9 (Bias2)	---	-4.240E-1	-1.759E+0	-2.962E+0	-6.994E+0
N° 10 (Bias2)	---	-5.825E-1	-2.340E+0	-3.985E+0	-9.106E+0
N° 11 (Bias2)	---	-5.058E-1	-1.926E+0	-3.328E+0	-7.751E+0
N° 12 (OFF)	---	-9.440E-2	-1.620E+0	-2.959E+0	-7.128E+0
N° 13 (OFF)	---	-1.756E-1	-1.705E+0	-3.120E+0	-7.344E+0
N° 14 (OFF)	---	5.942E-2	-1.465E+0	-2.775E+0	-6.807E+0
N° 15 (OFF)	---	-1.470E-3	-1.458E+0	-2.816E+0	-7.251E+0
N° 16 (OFF)	---	4.118E-2	-1.679E+0	-3.260E+0	-8.186E+0
Average (Bias1)	---	-3.763E-1	-1.784E+0	-3.226E+0	-7.673E+0
σ (Bias1)	---	4.914E-2	2.430E-1	4.037E-1	9.799E-1
Average+3σ (Bias1)	---	-2.288E-1	-1.055E+0	-2.015E+0	-4.733E+0
Average-3σ (Bias1)	---	-5.237E-1	-2.513E+0	-4.438E+0	-1.061E+1
Average (Bias2)	---	-4.917E-1	-1.997E+0	-3.403E+0	-7.841E+0
σ (Bias2)	---	6.996E-2	2.450E-1	4.204E-1	8.419E-1
Average+3σ (Bias2)	---	-2.818E-1	-1.262E+0	-2.142E+0	-5.316E+0
Average-3σ (Bias2)	---	-7.016E-1	-2.732E+0	-4.664E+0	-1.037E+1
Average (OFF)	---	-3.417E-2	-1.586E+0	-2.986E+0	-7.343E+0
σ (OFF)	---	9.890E-2	1.173E-1	2.045E-1	5.132E-1
Average+3σ (OFF)	---	2.625E-1	-1.234E+0	-2.372E+0	-5.804E+0
Average-3σ (OFF)	---	-3.309E-1	-1.937E+0	-3.600E+0	-8.883E+0

190 MeV proton / detailed results

11.Vce(sat)

Ta=25°C; If=50mA; Ic=10mA



190 MeV proton / detailed results

Vce(sat) . (V) **Max = 0.4**

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	0.162	0.162	0.162	0.163	0.163
N° 2 (Bias1)	0.142	0.144	0.160	0.179	0.422
N° 3 (Bias1)	0.160	0.163	0.178	0.199	0.552
N° 4 (Bias1)	0.148	0.151	0.165	0.184	0.396
N° 5 (Bias1)	0.148	0.151	0.167	0.187	0.498
N° 6 (Bias1)	0.171	0.174	0.189	0.210	0.671
N° 7 (Bias2)	0.167	0.172	0.189	0.208	0.674
N° 8 (Bias2)	0.156	0.161	0.178	0.198	0.608
N° 9 (Bias2)	0.160	0.165	0.182	0.201	0.637
N° 10 (Bias2)	0.143	0.148	0.164	0.182	0.425
N° 11 (Bias2)	0.160	0.165	0.181	0.199	0.480
N° 12 (OFF)	0.162	0.159	0.177	0.198	0.662
N° 13 (OFF)	0.165	0.162	0.180	0.201	0.657
N° 14 (OFF)	0.172	0.164	0.184	0.207	0.835
N° 15 (OFF)	0.174	0.169	0.185	0.203	0.588
N° 16 (OFF)	0.162	0.156	0.173	0.193	0.585

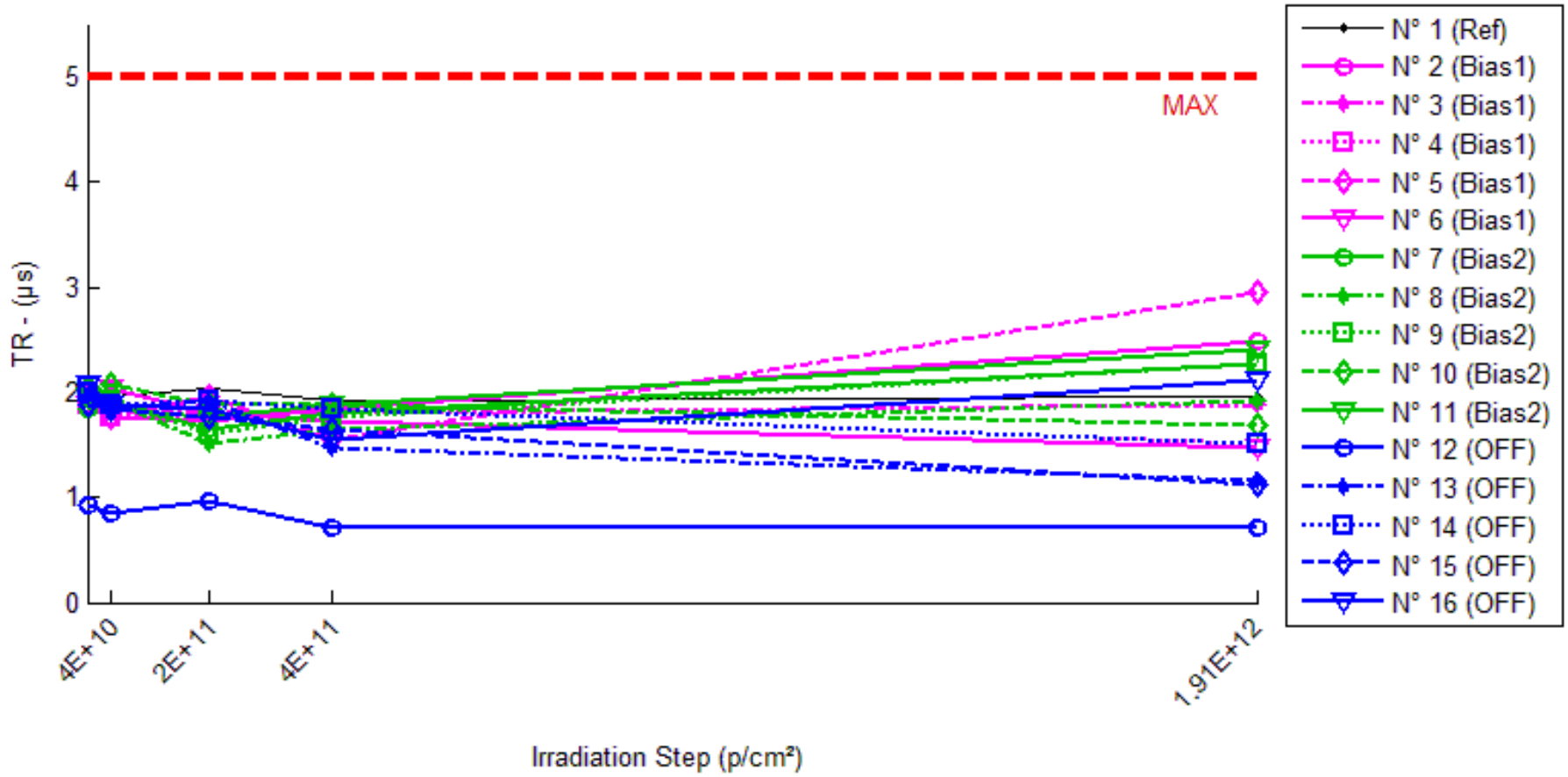
Delta [Vce(sat)]

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	---	-4.590E-4	-1.818E-4	2.255E-4	6.545E-4
N° 2 (Bias1)	---	2.666E-3	1.814E-2	3.740E-2	2.800E-1
N° 3 (Bias1)	---	3.336E-3	1.832E-2	3.884E-2	3.918E-1
N° 4 (Bias1)	---	3.339E-3	1.760E-2	3.582E-2	2.480E-1
N° 5 (Bias1)	---	3.593E-3	1.935E-2	3.918E-2	3.502E-1
N° 6 (Bias1)	---	2.989E-3	1.799E-2	3.898E-2	5.001E-1
N° 7 (Bias2)	---	4.811E-3	2.169E-2	4.130E-2	5.065E-1
N° 8 (Bias2)	---	5.145E-3	2.224E-2	4.240E-2	4.520E-1
N° 9 (Bias2)	---	5.033E-3	2.197E-2	4.136E-2	4.772E-1
N° 10 (Bias2)	---	4.918E-3	2.102E-2	3.894E-2	2.813E-1
N° 11 (Bias2)	---	5.222E-3	2.075E-2	3.930E-2	3.205E-1
N° 12 (OFF)	---	-3.020E-3	1.557E-2	3.575E-2	5.004E-1
N° 13 (OFF)	---	-2.624E-3	1.561E-2	3.579E-2	4.921E-1
N° 14 (OFF)	---	-8.013E-3	1.209E-2	3.415E-2	6.630E-1
N° 15 (OFF)	---	-4.819E-3	1.097E-2	2.940E-2	4.146E-1
N° 16 (OFF)	---	-5.598E-3	1.129E-2	3.058E-2	4.230E-1
Average (Bias1)	---	3.185E-3	1.828E-2	3.804E-2	3.540E-1
σ (Bias1)	---	3.606E-4	6.561E-4	1.427E-3	9.936E-2
Average+3σ (Bias1)	---	4.267E-3	2.025E-2	4.232E-2	6.521E-1
Average-3σ (Bias1)	---	2.103E-3	1.631E-2	3.376E-2	5.593E-2
Average (Bias2)	---	5.026E-3	2.153E-2	4.066E-2	4.075E-1
σ (Bias2)	---	1.664E-4	6.318E-4	1.478E-3	1.002E-1
Average+3σ (Bias2)	---	5.525E-3	2.343E-2	4.509E-2	7.080E-1
Average-3σ (Bias2)	---	4.527E-3	1.964E-2	3.623E-2	1.070E-1
Average (OFF)	---	-4.815E-3	1.310E-2	3.313E-2	4.986E-1
σ (OFF)	---	2.171E-3	2.303E-3	2.976E-3	9.980E-2
Average+3σ (OFF)	---	1.699E-3	2.001E-2	4.206E-2	7.980E-1
Average-3σ (OFF)	---	-1.133E-2	6.197E-3	2.421E-2	1.992E-1

190 MeV proton / detailed results

12.TR

Ta=25°C; Vce=5V; If=2mA; RL=100 Ohms



190 MeV proton / detailed results

TR . (µs) **Max = 5.0**

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	1.80	1.96	2.04	1.92	1.96
N° 2 (Bias1)	1.88	1.76	1.72	1.84	2.48
N° 3 (Bias1)	1.96	1.88	1.80	1.80	1.88
N° 4 (Bias1)	1.88	1.76	1.76	1.84	1.52
N° 5 (Bias1)	2.00	1.76	1.96	1.56	2.96
N° 6 (Bias1)	1.88	2.04	1.80	1.72	1.48
N° 7 (Bias2)	1.84	1.92	1.64	1.80	2.28
N° 8 (Bias2)	1.92	1.92	1.52	1.64	1.92
N° 9 (Bias2)	2.00	1.92	1.60	1.76	2.28
N° 10 (Bias2)	2.04	2.08	1.88	1.88	1.68
N° 11 (Bias2)	1.96	1.84	1.76	1.88	2.40
N° 12 (OFF)	0.92	0.84	0.96	0.72	0.72
N° 13 (OFF)	1.96	1.84	1.92	1.48	1.16
N° 14 (OFF)	2.00	1.88	1.92	1.84	1.52
N° 15 (OFF)	1.88	1.84	1.76	1.64	1.12
N° 16 (OFF)	2.08	1.88	1.84	1.56	2.12

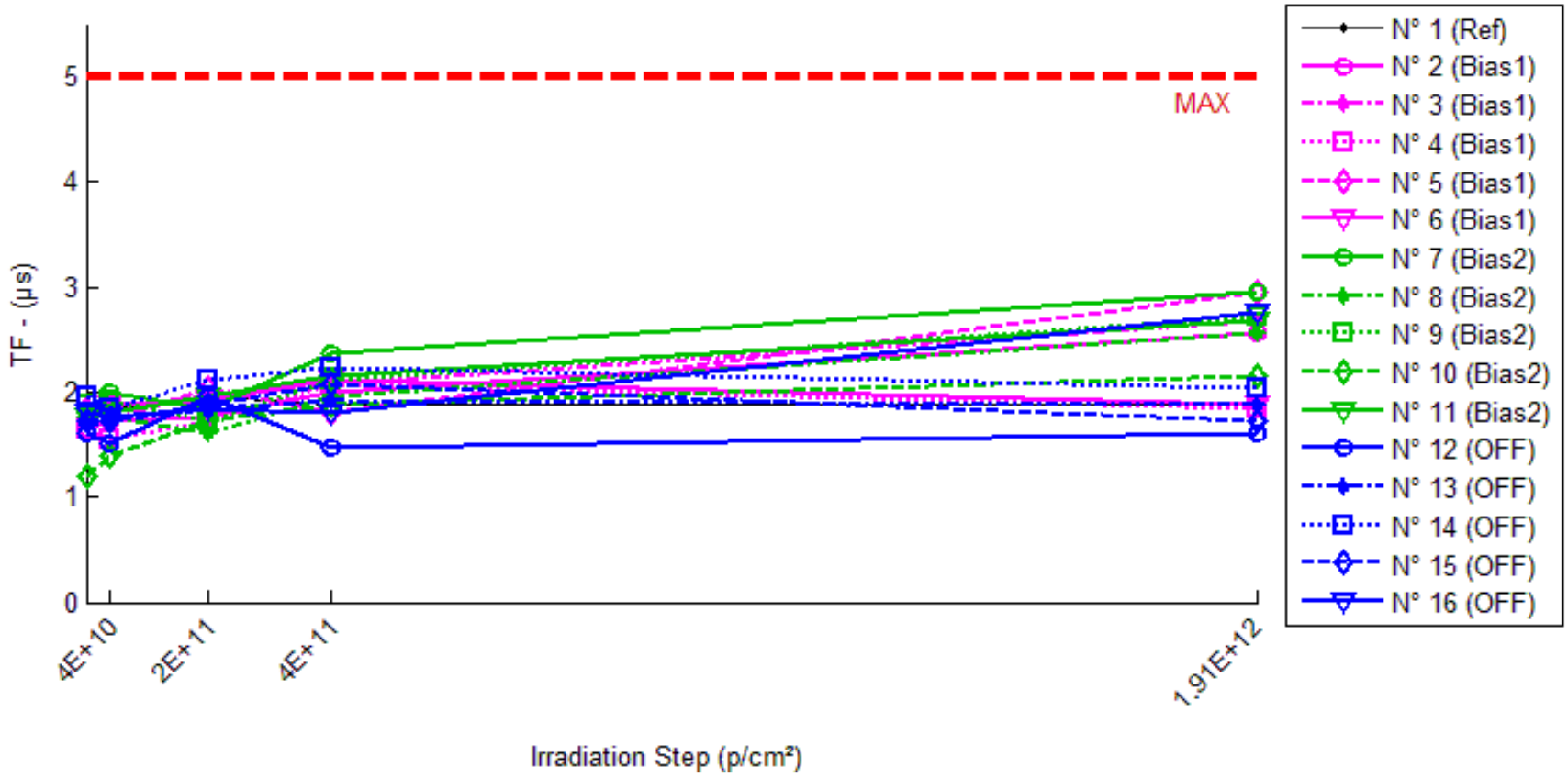
Delta [TR]

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	---	1.600E-1	2.400E-1	1.200E-1	1.600E-1
N° 2 (Bias1)	---	-1.200E-1	-1.600E-1	-4.000E-2	6.000E-1
N° 3 (Bias1)	---	-8.000E-2	-1.600E-1	-1.600E-1	-8.000E-2
N° 4 (Bias1)	---	-1.200E-1	-1.200E-1	-4.000E-2	-3.600E-1
N° 5 (Bias1)	---	-2.400E-1	-4.000E-2	-4.400E-1	9.600E-1
N° 6 (Bias1)	---	1.600E-1	-8.000E-2	-1.600E-1	-4.000E-1
N° 7 (Bias2)	---	8.000E-2	-2.000E-1	-4.000E-2	4.400E-1
N° 8 (Bias2)	---	0.000E+0	-4.000E-1	-2.800E-1	0.000E+0
N° 9 (Bias2)	---	-8.000E-2	-4.000E-1	-2.400E-1	2.800E-1
N° 10 (Bias2)	---	4.000E-2	-1.600E-1	-1.600E-1	-3.600E-1
N° 11 (Bias2)	---	-1.200E-1	-2.000E-1	-8.000E-2	4.400E-1
N° 12 (OFF)	---	-8.000E-2	4.000E-2	-2.000E-1	-2.000E-1
N° 13 (OFF)	---	-1.200E-1	-4.000E-2	-4.800E-1	-8.000E-1
N° 14 (OFF)	---	-1.200E-1	-8.000E-2	-1.600E-1	-4.800E-1
N° 15 (OFF)	---	-4.000E-2	-1.200E-1	-2.400E-1	-7.600E-1
N° 16 (OFF)	---	-2.000E-1	-2.400E-1	-5.200E-1	4.000E-2
Average (Bias1)	---	-8.000E-2	-1.120E-1	-1.680E-1	1.440E-1
σ (Bias1)	---	1.470E-1	5.215E-2	1.635E-1	6.070E-1
Average+3σ (Bias1)	---	3.609E-1	4.446E-2	3.224E-1	1.965E+0
Average-3σ (Bias1)	---	-5.209E-1	-2.685E-1	-6.584E-1	-1.677E+0
Average (Bias2)	---	-1.600E-2	-2.720E-1	-1.600E-1	1.600E-1
σ (Bias2)	---	8.295E-2	1.180E-1	1.020E-1	3.418E-1
Average+3σ (Bias2)	---	2.328E-1	8.195E-2	1.459E-1	1.185E+0
Average-3σ (Bias2)	---	-2.648E-1	-6.259E-1	-4.659E-1	-8.653E-1
Average (OFF)	---	-1.120E-1	-8.800E-2	-3.200E-1	-4.400E-1
σ (OFF)	---	5.933E-2	1.035E-1	1.673E-1	3.611E-1
Average+3σ (OFF)	---	6.599E-2	2.226E-1	1.820E-1	6.433E-1
Average-3σ (OFF)	---	-2.900E-1	-3.986E-1	-8.220E-1	-1.523E+0

190 MeV proton / detailed results

13.TF

Ta=25°C; Vce=5V; If=2mA; RL=100 Ohms



190 MeV proton / detailed results

TF . (µs) **Max = 5.0**

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	1.72	1.84	1.96	1.88	1.88
N° 2 (Bias1)	1.64	1.72	1.76	2.00	2.56
N° 3 (Bias1)	1.88	1.84	1.96	2.08	2.68
N° 4 (Bias1)	1.64	1.56	1.72	2.08	1.84
N° 5 (Bias1)	1.80	1.72	2.04	1.80	2.96
N° 6 (Bias1)	1.80	1.88	1.92	2.12	1.88
N° 7 (Bias2)	1.76	2.00	1.84	2.36	2.96
N° 8 (Bias2)	1.68	1.76	1.60	1.96	2.56
N° 9 (Bias2)	1.88	1.92	1.72	2.12	2.72
N° 10 (Bias2)	1.20	1.40	1.72	1.88	2.16
N° 11 (Bias2)	1.76	1.80	1.96	2.16	2.68
N° 12 (OFF)	1.60	1.52	1.96	1.48	1.60
N° 13 (OFF)	1.68	1.72	1.84	1.92	1.88
N° 14 (OFF)	1.96	1.84	2.12	2.24	2.04
N° 15 (OFF)	1.72	1.72	1.88	2.08	1.72
N° 16 (OFF)	1.80	1.76	1.84	1.80	2.76

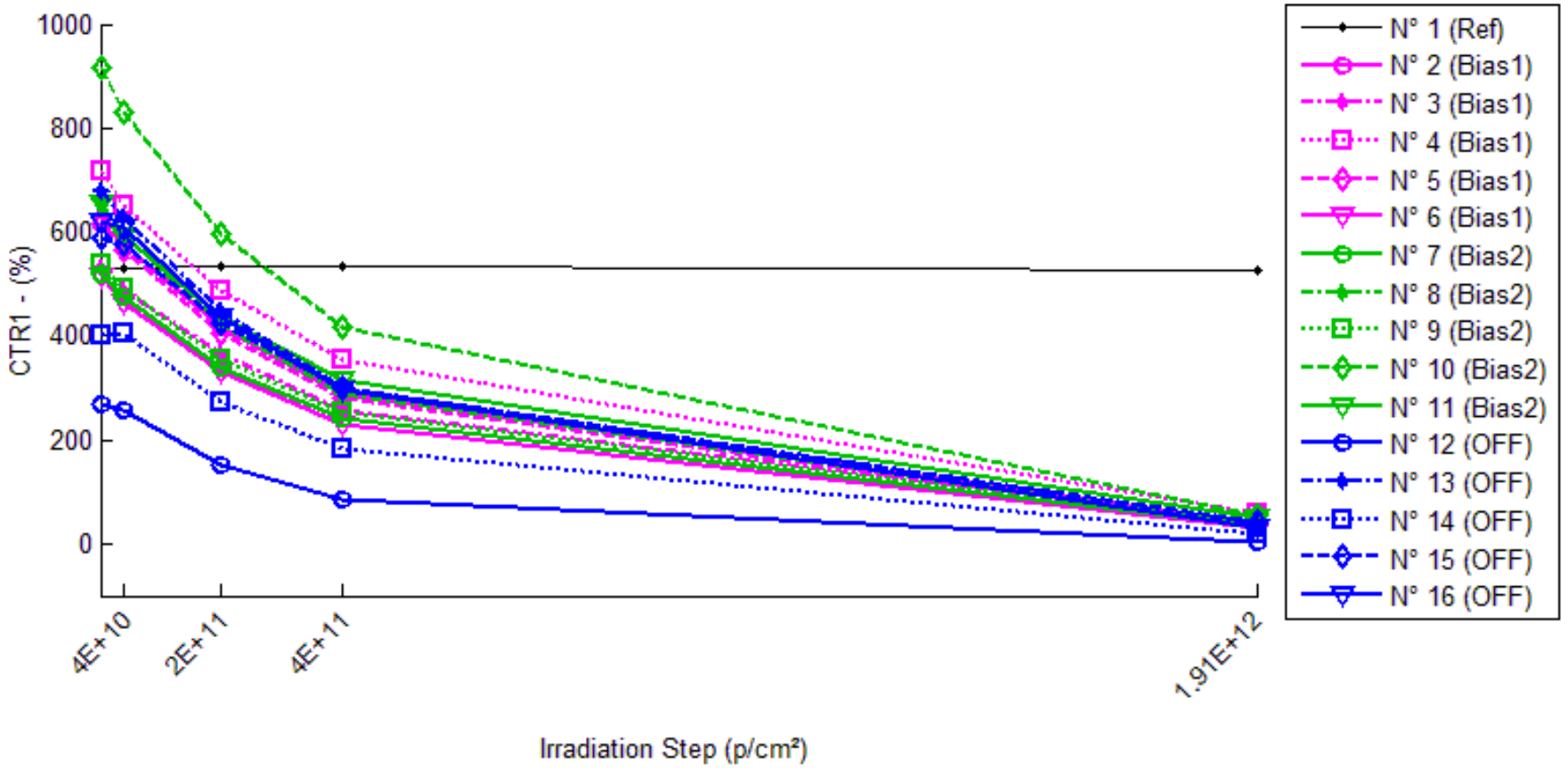
Delta [TF]

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	---	1.200E-1	2.400E-1	1.600E-1	1.600E-1
N° 2 (Bias1)	---	8.000E-2	1.200E-1	3.600E-1	9.200E-1
N° 3 (Bias1)	---	-4.000E-2	8.000E-2	2.000E-1	8.000E-1
N° 4 (Bias1)	---	-8.000E-2	8.000E-2	4.400E-1	2.000E-1
N° 5 (Bias1)	---	-8.000E-2	2.400E-1	0.000E+0	1.160E+0
N° 6 (Bias1)	---	8.000E-2	1.200E-1	3.200E-1	8.000E-2
N° 7 (Bias2)	---	2.400E-1	8.000E-2	6.000E-1	1.200E+0
N° 8 (Bias2)	---	8.000E-2	-8.000E-2	2.800E-1	8.800E-1
N° 9 (Bias2)	---	4.000E-2	-1.600E-1	2.400E-1	8.400E-1
N° 10 (Bias2)	---	2.000E-1	5.200E-1	6.800E-1	9.600E-1
N° 11 (Bias2)	---	4.000E-2	2.000E-1	4.000E-1	9.200E-1
N° 12 (OFF)	---	-8.000E-2	3.600E-1	-1.200E-1	0.000E+0
N° 13 (OFF)	---	4.000E-2	1.600E-1	2.400E-1	2.000E-1
N° 14 (OFF)	---	-1.200E-1	1.600E-1	2.800E-1	8.000E-2
N° 15 (OFF)	---	0.000E+0	1.600E-1	3.600E-1	0.000E+0
N° 16 (OFF)	---	-4.000E-2	4.000E-2	0.000E+0	9.600E-1
Average (Bias1)	---	-8.000E-3	1.280E-1	2.640E-1	6.320E-1
σ (Bias1)	---	8.198E-2	6.573E-2	1.711E-1	4.694E-1
Average+3σ (Bias1)	---	2.379E-1	3.252E-1	7.773E-1	2.040E+0
Average-3σ (Bias1)	---	-2.539E-1	-6.918E-2	-2.493E-1	-7.761E-1
Average (Bias2)	---	1.200E-1	1.120E-1	4.400E-1	9.600E-1
σ (Bias2)	---	9.381E-2	2.674E-1	1.939E-1	1.414E-1
Average+3σ (Bias2)	---	4.014E-1	9.143E-1	1.022E+0	1.384E+0
Average-3σ (Bias2)	---	-1.614E-1	-6.903E-1	-1.417E-1	5.357E-1
Average (OFF)	---	-4.000E-2	1.760E-1	1.520E-1	2.480E-1
σ (OFF)	---	6.325E-2	1.152E-1	2.028E-1	4.063E-1
Average+3σ (OFF)	---	1.497E-1	5.217E-1	7.603E-1	1.467E+0
Average-3σ (OFF)	---	-2.297E-1	-1.697E-1	-4.563E-1	-9.710E-1

190 MeV proton / detailed results

14.CTR1

Ta=25°C; Vce=5V; If=1mA



190 MeV proton / detailed results

CTR1 . (%)

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	531.57	529.02	532.64	532.79	525.07
N° 2 (Bias1)	616.85	576.75	416.47	289.87	37.92
N° 3 (Bias1)	529.75	486.32	364.40	257.68	43.64
N° 4 (Bias1)	716.86	650.77	487.86	353.26	57.96
N° 5 (Bias1)	626.97	563.50	403.53	281.17	36.02
N° 6 (Bias1)	513.04	462.09	331.99	229.87	32.60
N° 7 (Bias2)	517.75	474.31	340.29	240.51	32.65
N° 8 (Bias2)	660.42	597.84	420.56	286.38	34.28
N° 9 (Bias2)	536.98	491.24	353.54	254.09	37.37
N° 10 (Bias2)	916.39	831.71	597.33	417.93	54.17
N° 11 (Bias2)	655.65	591.31	436.37	315.29	49.73
N° 12 (OFF)	268.03	256.82	151.68	85.31	4.90
N° 13 (OFF)	679.88	627.64	447.54	301.66	39.90
N° 14 (OFF)	400.58	404.76	274.16	183.22	18.90
N° 15 (OFF)	588.01	575.24	424.62	300.33	42.08
N° 16 (OFF)	617.94	607.02	434.85	296.32	32.03

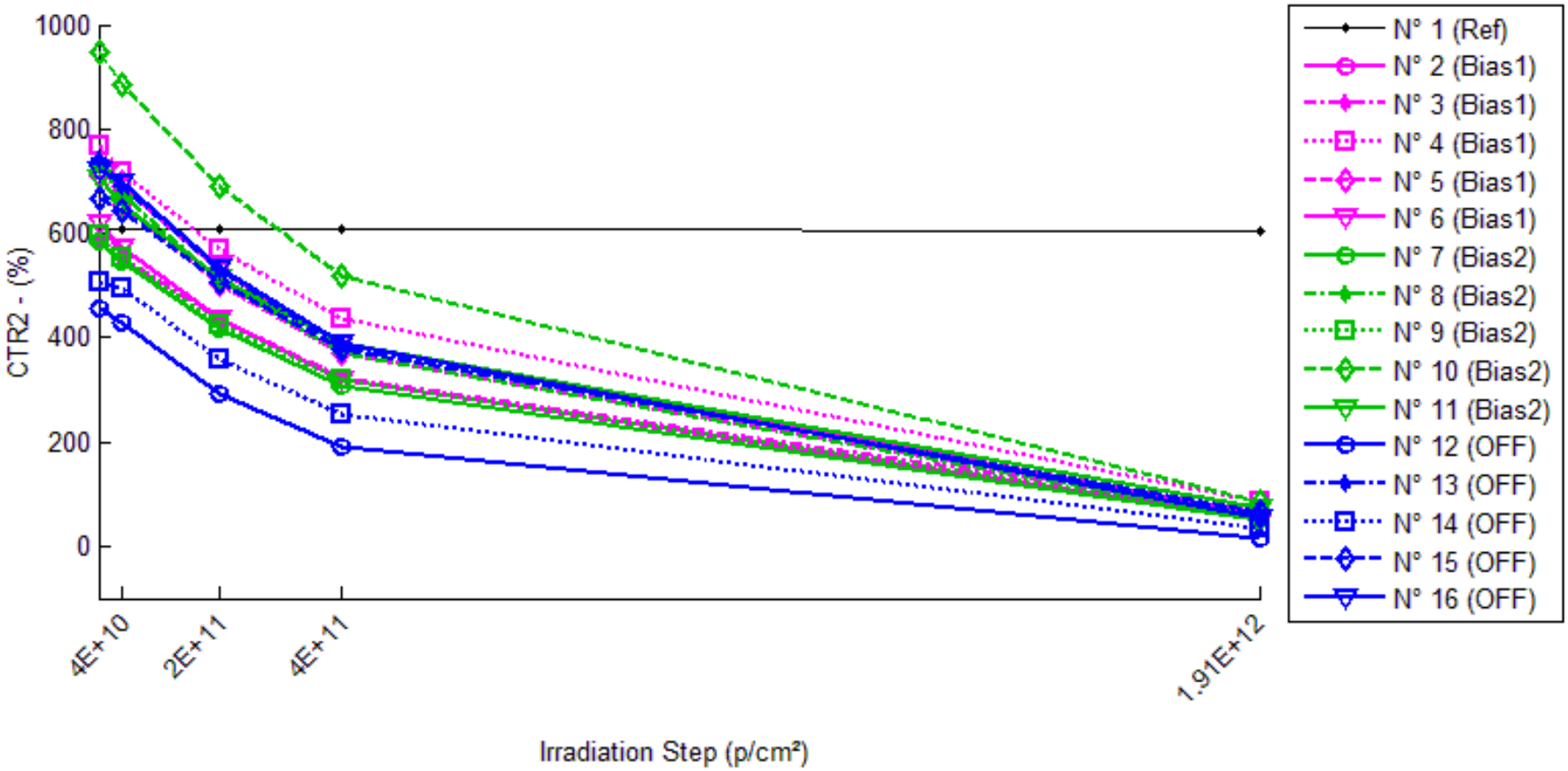
1/Delta [CTR1]

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	---	9.068E-6	-3.808E-6	-4.307E-6	2.327E-5
N° 2 (Bias1)	---	1.127E-4	7.800E-4	1.829E-3	2.475E-2
N° 3 (Bias1)	---	1.686E-4	8.566E-4	1.993E-3	2.103E-2
N° 4 (Bias1)	---	1.417E-4	6.548E-4	1.436E-3	1.586E-2
N° 5 (Bias1)	---	1.796E-4	8.832E-4	1.962E-3	2.616E-2
N° 6 (Bias1)	---	2.149E-4	1.063E-3	2.401E-3	2.872E-2
N° 7 (Bias2)	---	1.769E-4	1.007E-3	2.226E-3	2.869E-2
N° 8 (Bias2)	---	1.585E-4	8.636E-4	1.978E-3	2.766E-2
N° 9 (Bias2)	---	1.734E-4	9.662E-4	2.073E-3	2.490E-2
N° 10 (Bias2)	---	1.111E-4	5.829E-4	1.302E-3	1.737E-2
N° 11 (Bias2)	---	1.660E-4	7.664E-4	1.646E-3	1.858E-2
N° 12 (OFF)	---	1.628E-4	2.862E-3	7.990E-3	2.003E-1
N° 13 (OFF)	---	1.224E-4	7.636E-4	1.844E-3	2.359E-2
N° 14 (OFF)	---	-2.574E-5	1.151E-3	2.962E-3	5.043E-2
N° 15 (OFF)	---	3.777E-5	6.544E-4	1.629E-3	2.206E-2
N° 16 (OFF)	---	2.909E-5	6.813E-4	1.756E-3	2.961E-2
Average (Bias1)	---	1.635E-4	8.475E-4	1.924E-3	2.330E-2
σ (Bias1)	---	3.869E-5	1.496E-4	3.468E-4	5.006E-3
Average+3σ (Bias1)	---	2.796E-4	1.296E-3	2.965E-3	3.832E-2
Average-3σ (Bias1)	---	4.744E-5	3.988E-4	8.835E-4	8.286E-3
Average (Bias2)	---	1.572E-4	8.373E-4	1.845E-3	2.344E-2
σ (Bias2)	---	2.671E-5	1.703E-4	3.708E-4	5.195E-3
Average+3σ (Bias2)	---	2.373E-4	1.348E-3	2.958E-3	3.903E-2
Average-3σ (Bias2)	---	7.705E-5	3.265E-4	7.327E-4	7.856E-3
Average (OFF)	---	6.528E-5	1.222E-3	3.236E-3	6.520E-2
σ (OFF)	---	7.605E-5	9.379E-4	2.711E-3	7.638E-2
Average+3σ (OFF)	---	2.934E-4	4.036E-3	1.137E-2	2.944E-1
Average-3σ (OFF)	---	-1.629E-4	-1.591E-3	-4.895E-3	-1.639E-1

190 MeV proton / detailed results

15.CTR2

Ta=25°C; Vce=5V; If=2mA



190 MeV proton / detailed results

CTR2 . (%)

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	608.18	607.47	609.38	609.53	605.21
N° 2 (Bias1)	731.21	688.42	531.35	391.48	63.43
N° 3 (Bias1)	590.15	551.71	436.46	324.93	64.49
N° 4 (Bias1)	769.46	716.94	570.00	435.95	86.39
N° 5 (Bias1)	708.66	654.26	501.21	368.91	58.11
N° 6 (Bias1)	619.30	572.10	436.46	317.57	53.30
N° 7 (Bias2)	585.15	545.15	415.10	308.21	50.87
N° 8 (Bias2)	729.83	673.68	510.20	369.27	55.38
N° 9 (Bias2)	596.18	555.11	425.69	320.95	56.68
N° 10 (Bias2)	947.25	886.38	689.77	517.64	85.86
N° 11 (Bias2)	707.35	654.69	515.51	390.73	75.47
N° 12 (OFF)	455.35	429.17	293.91	190.29	14.83
N° 13 (OFF)	739.21	689.69	528.69	380.48	61.73
N° 14 (OFF)	507.52	493.97	358.26	254.76	32.86
N° 15 (OFF)	666.50	644.90	504.75	378.77	65.19
N° 16 (OFF)	721.48	698.78	534.56	389.54	54.21

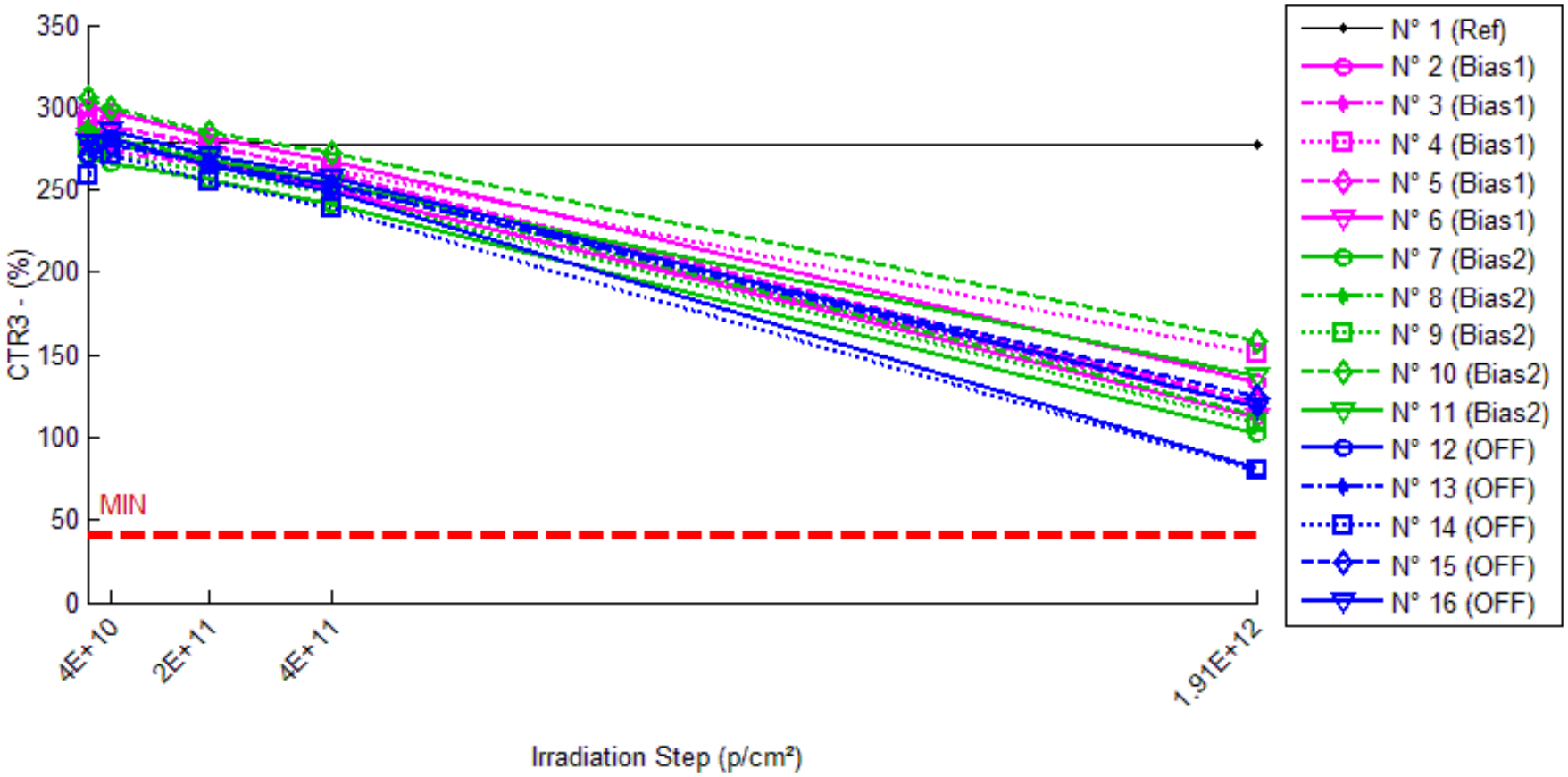
1/Delta [CTR2]

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	---	1.931E-6	-3.230E-6	-3.634E-6	8.087E-6
N° 2 (Bias1)	---	8.500E-5	5.144E-4	1.187E-3	1.440E-2
N° 3 (Bias1)	---	1.181E-4	5.967E-4	1.383E-3	1.381E-2
N° 4 (Bias1)	---	9.520E-5	4.548E-4	9.942E-4	1.028E-2
N° 5 (Bias1)	---	1.173E-4	5.841E-4	1.300E-3	1.580E-2
N° 6 (Bias1)	---	1.332E-4	6.764E-4	1.534E-3	1.715E-2
N° 7 (Bias2)	---	1.254E-4	7.001E-4	1.536E-3	1.795E-2
N° 8 (Bias2)	---	1.142E-4	5.898E-4	1.338E-3	1.669E-2
N° 9 (Bias2)	---	1.241E-4	6.717E-4	1.438E-3	1.597E-2
N° 10 (Bias2)	---	7.250E-5	3.941E-4	8.762E-4	1.059E-2
N° 11 (Bias2)	---	1.137E-4	5.261E-4	1.146E-3	1.184E-2
N° 12 (OFF)	---	1.339E-4	1.206E-3	3.059E-3	6.525E-2
N° 13 (OFF)	---	9.712E-5	5.387E-4	1.275E-3	1.485E-2
N° 14 (OFF)	---	5.405E-5	8.209E-4	1.955E-3	2.846E-2
N° 15 (OFF)	---	5.026E-5	4.808E-4	1.140E-3	1.384E-2
N° 16 (OFF)	---	4.502E-5	4.846E-4	1.181E-3	1.706E-2
Average (Bias1)	---	1.098E-4	5.653E-4	1.280E-3	1.429E-2
σ (Bias1)	---	1.937E-5	8.440E-5	2.037E-4	2.588E-3
Average+3σ (Bias1)	---	1.679E-4	8.185E-4	1.891E-3	2.205E-2
Average-3σ (Bias1)	---	5.164E-5	3.121E-4	6.685E-4	6.522E-3
Average (Bias2)	---	1.100E-4	5.764E-4	1.267E-3	1.461E-2
σ (Bias2)	---	2.164E-5	1.228E-4	2.617E-4	3.208E-3
Average+3σ (Bias2)	---	1.749E-4	9.448E-4	2.052E-3	2.423E-2
Average-3σ (Bias2)	---	4.505E-5	2.079E-4	4.815E-4	4.983E-3
Average (OFF)	---	7.608E-5	7.063E-4	1.722E-3	2.789E-2
σ (OFF)	---	3.842E-5	3.127E-4	8.175E-4	2.169E-2
Average+3σ (OFF)	---	1.913E-4	1.644E-3	4.175E-3	9.295E-2
Average-3σ (OFF)	---	-3.919E-5	-2.319E-4	-7.304E-4	-3.716E-2

190 MeV proton / detailed results

16.CTR3

Ta=25°C; Vce=5V; If=10mA



190 MeV proton / detailed results

CTR3 . (%)

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	278.18	279.05	278.30	277.93	277.54
N° 2 (Bias1)	299.49	297.57	281.99	267.52	134.04
N° 3 (Bias1)	275.97	273.94	265.33	249.03	118.15
N° 4 (Bias1)	291.40	288.88	275.66	262.98	150.67
N° 5 (Bias1)	292.02	289.03	277.46	260.01	121.31
N° 6 (Bias1)	279.78	277.08	266.93	250.37	112.42
N° 7 (Bias2)	270.55	266.34	256.04	241.99	102.50
N° 8 (Bias2)	286.93	281.66	269.81	253.58	113.88
N° 9 (Bias2)	275.64	271.30	261.27	247.73	108.16
N° 10 (Bias2)	305.78	300.26	284.52	271.93	158.85
N° 11 (Bias2)	282.46	277.79	268.32	254.38	137.10
N° 12 (OFF)	271.70	281.14	264.44	248.48	81.43
N° 13 (OFF)	277.04	281.30	265.34	253.33	118.73
N° 14 (OFF)	259.37	271.19	254.52	238.85	79.66
N° 15 (OFF)	270.11	277.27	266.54	252.73	124.44
N° 16 (OFF)	278.07	286.64	270.62	258.15	118.90

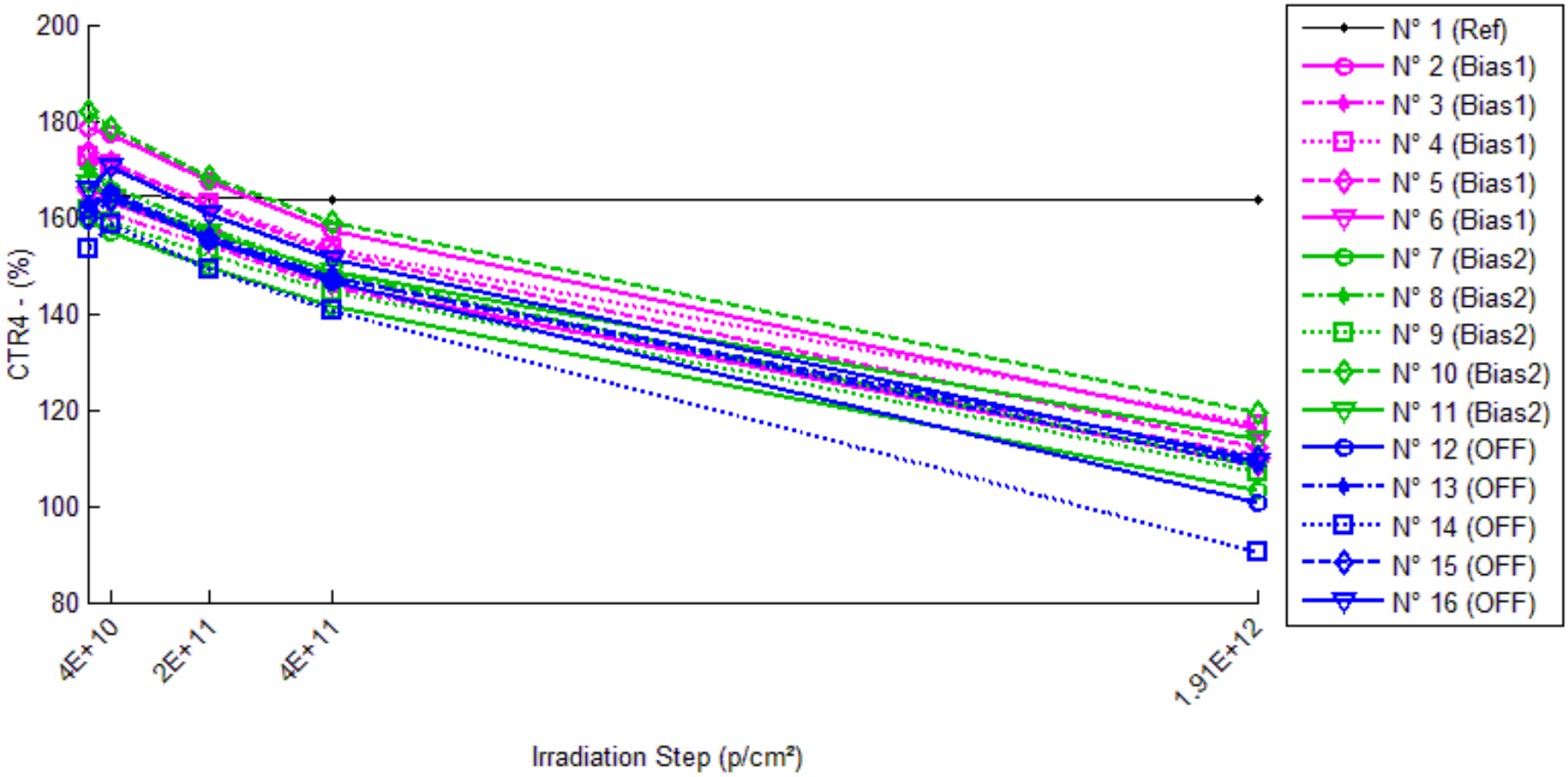
1/Delta [CTR3]

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	---	-1.127E-5	-1.540E-6	3.153E-6	8.264E-6
N° 2 (Bias1)	---	2.152E-5	2.072E-4	3.991E-4	4.122E-3
N° 3 (Bias1)	---	2.690E-5	1.453E-4	3.920E-4	4.841E-3
N° 4 (Bias1)	---	2.982E-5	1.959E-4	3.708E-4	3.205E-3
N° 5 (Bias1)	---	3.539E-5	1.797E-4	4.216E-4	4.819E-3
N° 6 (Bias1)	---	3.472E-5	1.721E-4	4.198E-4	5.321E-3
N° 7 (Bias2)	---	5.840E-5	2.094E-4	4.362E-4	6.060E-3
N° 8 (Bias2)	---	6.513E-5	2.212E-4	4.583E-4	5.296E-3
N° 9 (Bias2)	---	5.801E-5	1.995E-4	4.088E-4	5.618E-3
N° 10 (Bias2)	---	6.014E-5	2.444E-4	4.071E-4	3.025E-3
N° 11 (Bias2)	---	5.943E-5	1.865E-4	3.907E-4	3.754E-3
N° 12 (OFF)	---	-1.236E-4	1.010E-4	3.440E-4	8.600E-3
N° 13 (OFF)	---	-5.467E-5	1.591E-4	3.377E-4	4.813E-3
N° 14 (OFF)	---	-1.681E-4	7.341E-5	3.313E-4	8.697E-3
N° 15 (OFF)	---	-9.557E-5	4.962E-5	2.546E-4	4.334E-3
N° 16 (OFF)	---	-1.076E-4	9.896E-5	2.775E-4	4.814E-3
Average (Bias1)	---	2.967E-5	1.800E-4	4.007E-4	4.462E-3
σ (Bias1)	---	5.750E-6	2.373E-5	2.106E-5	8.221E-4
Average+3σ (Bias1)	---	4.692E-5	2.512E-4	4.638E-4	6.928E-3
Average-3σ (Bias1)	---	1.242E-5	1.088E-4	3.375E-4	1.995E-3
Average (Bias2)	---	6.022E-5	2.122E-4	4.202E-4	4.750E-3
σ (Bias2)	---	2.869E-6	2.205E-5	2.682E-5	1.298E-3
Average+3σ (Bias2)	---	6.883E-5	2.783E-4	5.007E-4	8.643E-3
Average-3σ (Bias2)	---	5.161E-5	1.461E-4	3.397E-4	8.578E-4
Average (OFF)	---	-1.099E-4	9.641E-5	3.090E-4	6.251E-3
σ (OFF)	---	4.133E-5	4.084E-5	4.033E-5	2.197E-3
Average+3σ (OFF)	---	1.407E-5	2.189E-4	4.300E-4	1.284E-2
Average-3σ (OFF)	---	-2.339E-4	-2.612E-5	1.880E-4	-3.403E-4

190 MeV proton / detailed results

17.CTR4

Ta=25°C; Vce=5V; If=20mA



190 MeV proton / detailed results

CTR4 . (%)

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	163.93	164.42	164.01	163.80	163.62
N° 2 (Bias1)	178.67	177.24	167.64	157.30	116.11
N° 3 (Bias1)	161.92	160.71	154.31	145.45	110.25
N° 4 (Bias1)	172.35	170.76	162.68	153.46	116.78
N° 5 (Bias1)	173.25	171.33	162.53	152.37	111.95
N° 6 (Bias1)	164.68	163.01	155.34	145.98	108.13
N° 7 (Bias2)	159.28	156.82	149.40	141.69	103.24
N° 8 (Bias2)	169.90	166.73	157.78	148.27	108.48
N° 9 (Bias2)	161.62	159.13	151.95	144.58	107.16
N° 10 (Bias2)	181.76	178.33	168.49	158.75	119.20
N° 11 (Bias2)	166.91	164.16	156.86	148.67	113.89
N° 12 (OFF)	161.38	164.69	155.10	146.52	100.46
N° 13 (OFF)	162.88	165.23	155.79	147.24	108.49
N° 14 (OFF)	153.26	158.39	148.94	140.67	90.56
N° 15 (OFF)	159.69	163.62	155.49	147.41	109.81
N° 16 (OFF)	165.91	170.55	160.58	151.28	109.27

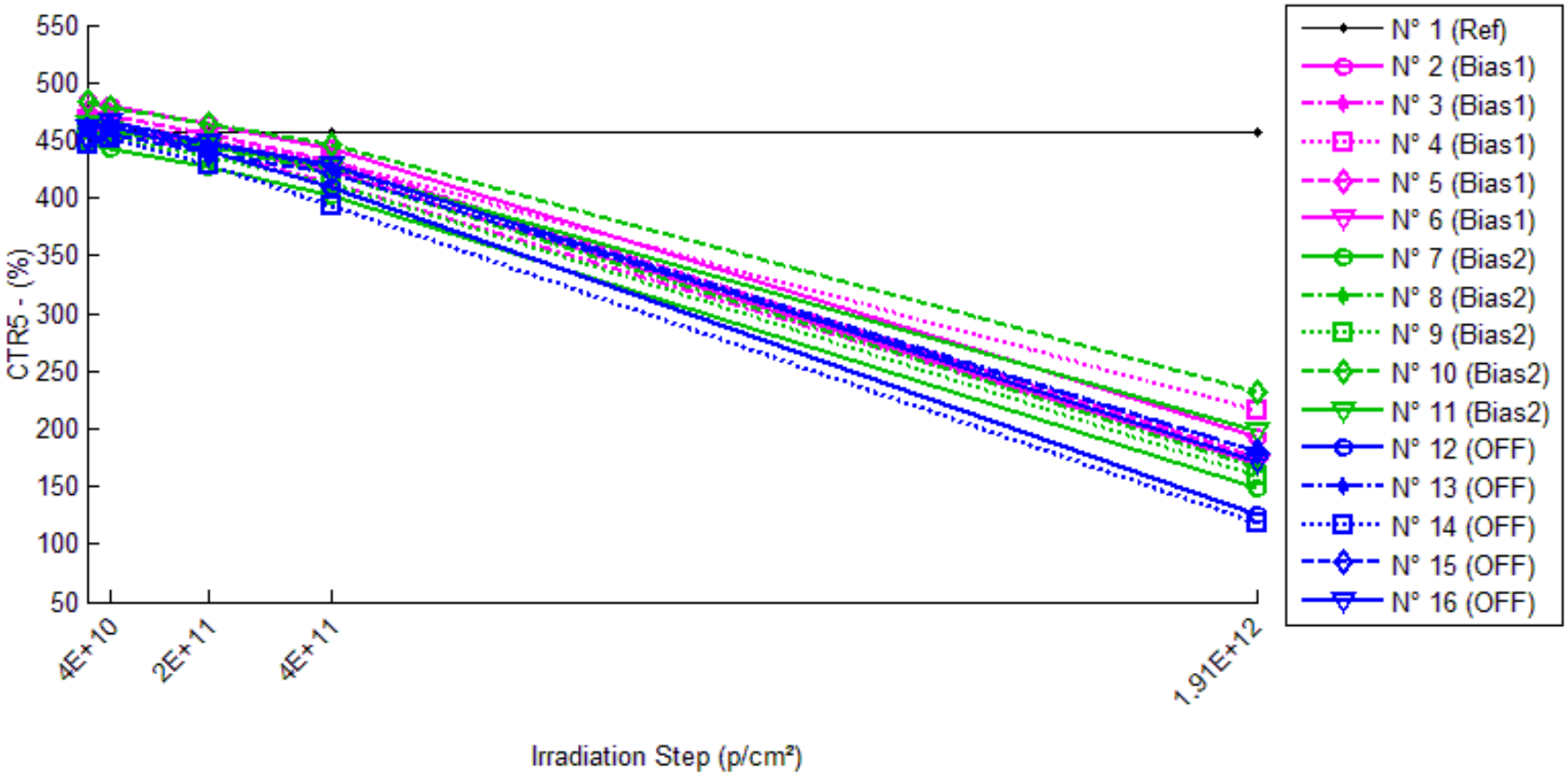
1/Delta [CTR4]

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	---	-1.808E-5	-2.864E-6	4.748E-6	1.142E-5
N° 2 (Bias1)	---	4.535E-5	3.683E-4	7.604E-4	3.016E-3
N° 3 (Bias1)	---	4.656E-5	3.046E-4	6.990E-4	2.894E-3
N° 4 (Bias1)	---	5.410E-5	3.448E-4	7.142E-4	2.761E-3
N° 5 (Bias1)	---	6.452E-5	3.808E-4	7.910E-4	3.161E-3
N° 6 (Bias1)	---	6.211E-5	3.651E-4	7.777E-4	3.176E-3
N° 7 (Bias2)	---	9.817E-5	4.150E-4	7.793E-4	3.407E-3
N° 8 (Bias2)	---	1.119E-4	4.519E-4	8.585E-4	3.333E-3
N° 9 (Bias2)	---	9.709E-5	3.938E-4	7.296E-4	3.145E-3
N° 10 (Bias2)	---	1.058E-4	4.333E-4	7.973E-4	2.887E-3
N° 11 (Bias2)	---	1.004E-4	3.841E-4	7.351E-4	2.789E-3
N° 12 (OFF)	---	-1.245E-4	2.510E-4	6.284E-4	3.757E-3
N° 13 (OFF)	---	-8.731E-5	2.796E-4	6.521E-4	3.078E-3
N° 14 (OFF)	---	-2.115E-4	1.892E-4	5.841E-4	4.517E-3
N° 15 (OFF)	---	-1.502E-4	1.694E-4	5.217E-4	2.845E-3
N° 16 (OFF)	---	-1.641E-4	2.003E-4	5.830E-4	3.124E-3
Average (Bias1)	---	5.453E-5	3.527E-4	7.485E-4	3.001E-3
σ (Bias1)	---	8.736E-6	2.985E-5	4.007E-5	1.770E-4
Average+3σ (Bias1)	---	8.074E-5	4.422E-4	8.687E-4	3.532E-3
Average-3σ (Bias1)	---	2.832E-5	2.631E-4	6.283E-4	2.470E-3
Average (Bias2)	---	1.027E-4	4.156E-4	7.800E-4	3.112E-3
σ (Bias2)	---	6.144E-6	2.784E-5	5.248E-5	2.700E-4
Average+3σ (Bias2)	---	1.211E-4	4.992E-4	9.374E-4	3.922E-3
Average-3σ (Bias2)	---	8.424E-5	3.321E-4	6.225E-4	2.302E-3
Average (OFF)	---	-1.475E-4	2.179E-4	5.939E-4	3.464E-3
σ (OFF)	---	4.618E-5	4.581E-5	5.001E-5	6.787E-4
Average+3σ (OFF)	---	-8.980E-6	3.553E-4	7.439E-4	5.500E-3
Average-3σ (OFF)	---	-2.860E-4	8.046E-5	4.438E-4	1.428E-3

190 MeV proton / detailed results

18.CTR5

Ta=25°C; Vce=30V; If=10mA



190 MeV proton / detailed results

CTR5 . (%)

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	457.38	458.17	457.28	457.03	456.28
N° 2 (Bias1)	482.72	480.33	463.98	443.61	193.01
N° 3 (Bias1)	458.38	455.71	440.26	412.78	171.56
N° 4 (Bias1)	467.75	464.99	450.57	432.13	216.25
N° 5 (Bias1)	474.05	470.68	454.53	431.30	174.27
N° 6 (Bias1)	464.43	461.21	446.24	423.16	170.55
N° 7 (Bias2)	447.97	443.08	426.92	402.39	148.46
N° 8 (Bias2)	465.66	460.54	444.10	421.92	165.82
N° 9 (Bias2)	457.87	452.44	435.96	411.97	158.77
N° 10 (Bias2)	483.65	478.02	463.37	446.54	231.86
N° 11 (Bias2)	463.50	459.12	444.85	426.50	197.59
N° 12 (OFF)	460.13	462.73	441.20	409.22	124.72
N° 13 (OFF)	462.35	463.10	445.79	426.63	180.00
N° 14 (OFF)	446.06	451.56	428.65	393.09	117.47
N° 15 (OFF)	450.89	454.86	439.72	421.09	180.42
N° 16 (OFF)	460.17	464.97	448.06	428.59	171.50

1/Delta [CTR5]

	0.p/cm²	4.0E10.p/cm²	2E11.p/cm²	4E11.p/cm²	1.91E12.p/cm²
N° 1 (Ref)	---	-3.777E-6	4.609E-7	1.679E-6	5.264E-6
N° 2 (Bias1)	---	1.033E-5	8.366E-5	1.826E-4	3.110E-3
N° 3 (Bias1)	---	1.280E-5	8.979E-5	2.410E-4	3.647E-3
N° 4 (Bias1)	---	1.265E-5	8.151E-5	1.762E-4	2.486E-3
N° 5 (Bias1)	---	1.513E-5	9.059E-5	2.091E-4	3.629E-3
N° 6 (Bias1)	---	1.506E-5	8.779E-5	2.100E-4	3.710E-3
N° 7 (Bias2)	---	2.463E-5	1.101E-4	2.529E-4	4.504E-3
N° 8 (Bias2)	---	2.387E-5	1.043E-4	2.226E-4	3.883E-3
N° 9 (Bias2)	---	2.621E-5	1.098E-4	2.433E-4	4.114E-3
N° 10 (Bias2)	---	2.434E-5	9.049E-5	1.718E-4	2.245E-3
N° 11 (Bias2)	---	2.059E-5	9.046E-5	1.872E-4	2.903E-3
N° 12 (OFF)	---	-1.221E-5	9.324E-5	2.703E-4	5.845E-3
N° 13 (OFF)	---	-3.503E-6	8.035E-5	1.811E-4	3.393E-3
N° 14 (OFF)	---	-2.731E-5	9.108E-5	3.021E-4	6.271E-3
N° 15 (OFF)	---	-1.931E-5	5.634E-5	1.570E-4	3.325E-3
N° 16 (OFF)	---	-2.246E-5	5.873E-5	1.601E-4	3.658E-3
Average (Bias1)	---	1.319E-5	8.667E-5	2.038E-4	3.316E-3
σ (Bias1)	---	1.993E-6	3.939E-6	2.580E-5	5.229E-4
Average+3σ (Bias1)	---	1.917E-5	9.849E-5	2.812E-4	4.885E-3
Average-3σ (Bias1)	---	7.215E-6	7.485E-5	1.264E-4	1.748E-3
Average (Bias2)	---	2.393E-5	1.010E-4	2.156E-4	3.530E-3
σ (Bias2)	---	2.065E-6	9.889E-6	3.512E-5	9.297E-4
Average+3σ (Bias2)	---	3.012E-5	1.307E-4	3.209E-4	6.319E-3
Average-3σ (Bias2)	---	1.773E-5	7.134E-5	1.102E-4	7.409E-4
Average (OFF)	---	-1.696E-5	7.595E-5	2.141E-4	4.498E-3
σ (OFF)	---	9.309E-6	1.752E-5	6.742E-5	1.437E-3
Average+3σ (OFF)	---	1.097E-5	1.285E-4	4.164E-4	8.810E-3
Average-3σ (OFF)	---	-4.489E-5	2.338E-5	1.187E-5	1.869E-4