Irradiation Test
Report
COTS parts

Total Ionization Dose (TID)

Reference no.:	KN-DLR-TID-250214-01B
Dose Rate:	0.01 - 0.1 rad (Si) / s

Device Under Test (DUT)

Part:	LTC2052HV
Description:	Quad Zero-Drift Operational Amplifiers
Factory:	Linear Technology Corporation, USA
Date Code (DC):	0613

Performed by Spectrum ARC GmbH

Prepared by:	Dr. Michael Schlüter
Checked by:	Radiation team
Date:	04.08.2015

TABLE OF CONTENT

1. OVERVIEW

1.1. PURPOSE

Report:	Irradiation test report for information only
Effect:	Total Ionizing Dose (TID)
Test specification:	ESCC-22900
Customer:	KN / DLR

1.2. DUT / SAMPLE

Part:	LTC2052HV
Description:	Quad Zero-Drift Operational Amplifiers
Factory:	Linear Technology Corporation, USA
Technology:	CMOS
Detail specification:	data sheet
Qual. Level:	COTS
Date Code no.:	0613
Lot no.:	not provided by customer
Device marking:	not provided by customer
Package:	16-SSOP
Quantity:	11 (1 reference & 10 irradiated: 5 on, 5 off)
Serial no.:	not provided by customer

1.3. ELECTRICAL MEASUREMENTS

Test hardware:	UNIMET M3000
Electrical parameters:	38 parameters, e.g. supply current, offset voltage, offset current, bias current, CCMR, slew rate, large signal gain, output swing See chapter 5

1.4. IRRADIATION

Date:	03.04.2015 - 30.04.2015
Irradiation source:	Co-60 gamma ray (1,3 MeV), see chapter 4
TID rate:	0.01 and 0.1 rad (Si) / s
TID final:	65 krad (Si)
TID steps:	8 (no. of irradiation steps only). See chapter 3
Bias condition:	ON/OFF-Mode. See chapter 4

1-5. TEMPERATURE

Irradiation test:	19.6 ± 0.3 °C
Annealing I & II:	20 ± 2 °C & 100 ± 2 °C respectively

1.6. RESULTS

Summary:	an comparative analysis of all tested parameters in chapter 2
Measurement details:	incl. Statistical analysis for each parameter in chapter 6

TEST RESULTS SUMMARY

ABSTRACT

A Total Ionizing Dose (TID) test with a dose rate of 0.01 rad/s (steps 1 to 6) followed by 0.1 rad/s (steps 7 and 8) has been done in order to verify the electrical behavior of the LTC2052 from Linear Technology up to a TID of 65 krad (Si). Accordingly to ESCC-22900 a group of 10 parts (5 biased on, 5 biased off) have been irradiated and electrical measurements have been performed at 8 intermediate TID values. Finally post-irradiation aging effects can be analyzed after successive annealing* done at 20°C (24 hours) and 100°C (7 days).

RESULTS

All parts are full functional up to 65 krad (Si).
Some paramters were out of spec even before irradiation test. Degradation of all parameters except Is-, $V+_{O,1,2,3\&4}$ and $CMRR_{1,2,3\&4}$ have been observed. Most parameters show a strong degradation after step 6.

To evaluate the TID degradation (if any) four index levels have been introduced:

(A) OK, no significant changees (<10%):	all parts	infill:	
(B) Degradation within specification Min-Max:	at least one part	infill:	
(C) Out of specification:	at least one part	infill:	
(D) No functionality:	at least one part	symbol:	X

The table below summarizes the TID tolerances of all parameters accordingly to the index level definition. The right column shows the worst case (wc) index level.

no.	Parameter	mode	Step 0	1	2	3	4	5	6	7	8	9	10	WC index
1	I_s^+	on												C
		off												C
2	I_s^-	on												A
		off												A
3	$V_{OS,1}$	on												C
		off												C
4	$I_{B,1}$	on												C
		off												C
5	$I_{OS,1}$	on												C
		off												C
6	$CMRR_1$	on												A
		off												A
7	SR^+_1	on												B
		off												B
8	SR^-_1	on												B
		off												B
9	$A_{VO,1}$	on												C
		off												C
10	$V^+_{O,1}$	on												A
		off												A
11	$V^-_{O,1}$	on												C
		off												C
12	$V_{OS,2}$	on												C
		off												C
13	$I_{B,2}$	on												C
		off												C
14	$I_{OS,2}$	on												C
		off												C
15	$CMRR_2$	on												A
		off												A
16	SR^+_2	on												B
		off												B
17	SR^-_2	on												B
		off												B
18	$A_{VO,2}$	on												C
		off												C
19	$V^+_{O,2}$	on												A
		off												A
20	$V^-_{O,2}$	on												C
		off												C

Note: Annealing values are for information purposes only and not a criteria for a Lot acceptance test.

RESULTS (CONTINUED)

(A) OK, no significant changees (<10%):	all parts	infill:	
(B) Degradation within specification Min-Max:	at least one part	infill:	
(C) Out of specification:	at least one part	infill:	
(D) No functionality:	at least one part	symbol:	X

no.	Parameter	mode	Step 0	1	2	3	4	5	6	7	8	9	10	WC index
21	$V_{OS,3}$	on												C
		off												C
22	$I_{B,3}$	on												C
		off												C
23	$I_{OS,3}$	on												C
		off												C
24	$CMRR_3$	on												A
		off												A
25	SR^+_3	on												B
		off												B
26	SR^-_3	on												B
		off												B
27	$A_{VO,3}$	on												C
		off												C
28	$V^+_{O,3}$	on												A
		off												A
29	$V^-_{O,3}$	on												C
		off												C
30	$V_{OS,4}$	on												C
		off												C
31	$I_{B,4}$	on												C
		off												C
32	$I_{OS,4}$	on												C
		off												C
33	$CMRR_4$	on												A
		off												A
34	SR^+_4	on												B
		off												A
35	SR^-_4	on												B
		off												B
36	$A_{VO,4}$	on												C
		off												C
37	$V^+_{O,4}$	on												A
		off												A
38	$V^-_{O,4}$	on												C
		off												C

Note: Annealing values are for information purposes only and not a criteria for a Lot acceptance test.

3. TEST SCHEDULE

- Test start time (incl. preliminary measurements): 2015-04-03 15:20 CEST
- Test finish time: 2015-05-08 15:00 CEST

3.1. IRRADIATION

- Irradiation start time: 2015-04-03 15:20 CEST
- Irradiation stop time: 2015-04-30 13:16 CEST

TID rate: 0.01 rad / s

TID rate: 0.1 rad / s

Temperature during irradiation: 19.6 ± 0.3 °C

										Unit
Step no.	0	1	2	3	4	5	6	7	8	-
TID	**0**	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	krad(Si)
Dose step	3.391	2.277	3.247	2.322	3.117	2.381	32.077	15.940		krad(Si)
Rad-time	4:01:06	2:18:14	3:22:58	2:20:03	3:19:41	2:22:49	03:20:24	01:21:55		d:h:m *
M-time	n.a.	1:22	1:52	1:40	1:40	2:06	2:32	1:55	n.a.	h:m *

The Rad-time is the irradiation exposition time.

The M-time is the irradiation break time between irradiation steps due to electrical measurements.

n.a.: not applicable

3.2. ANNEALING

Annealing start time: 2015-04-30 13:16 CEST

Annealing stop time: 2015-05-08 15:00 CEST

Final accumulated TID is: 65 krad(Si)

No more irradiation

			Unit
Step no.	9	10	-
Temperature	**20 ± 2**	**100 ± 2**	°C
Ann-time	1:00:02	7:00:11	d:h:m *
M-time	1:21	1:37	h:m *

The Ann-time is the annealing time.

The M-time is the break time due to electrical measurements.

Note:

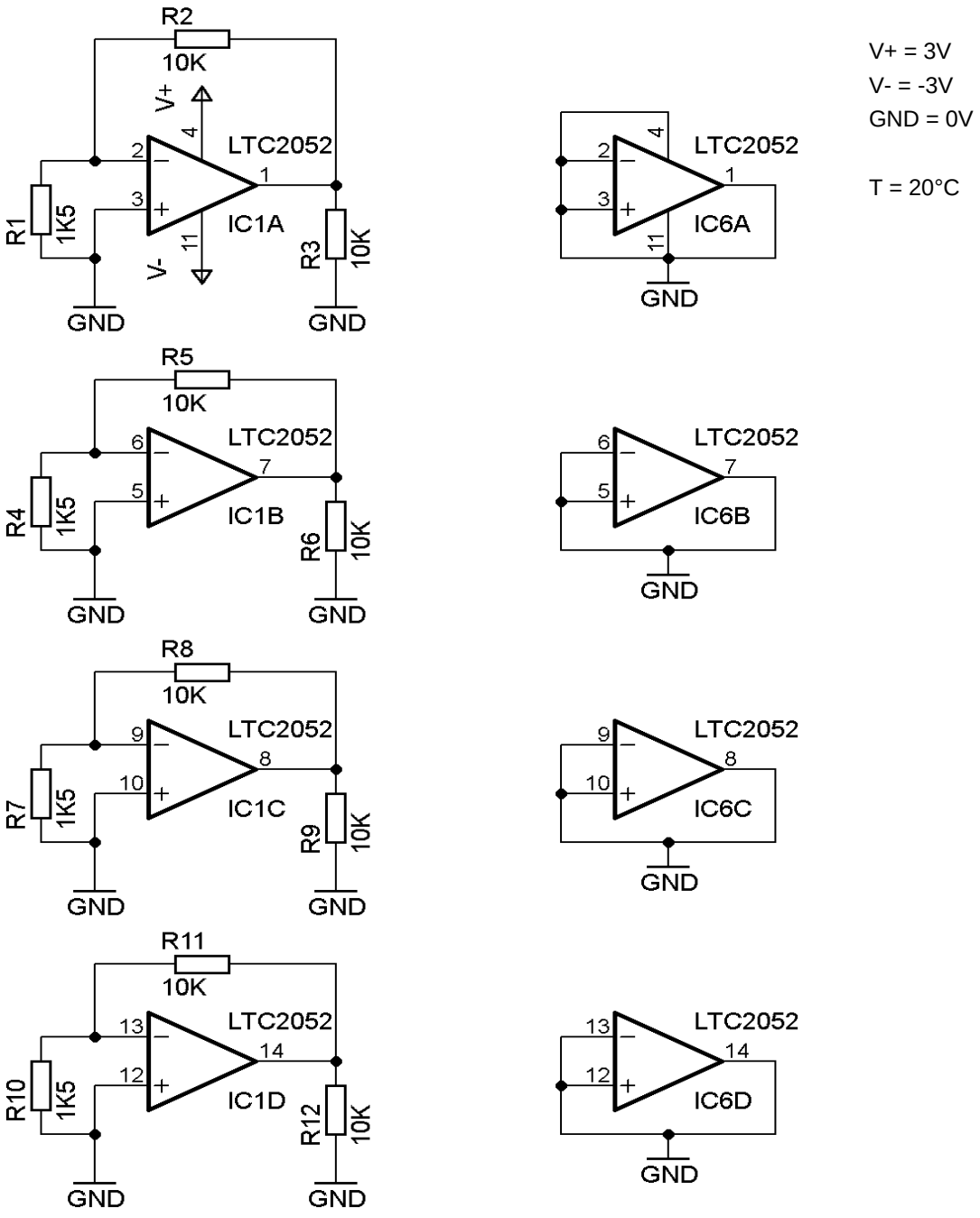
*) The time is measured in days (d), hours (h) and minutes (m).

4. TEST CONDITIONS

4.1. BIAS CONDITIONS

The following bias configuration were used during Irradiation and Annealing.
5 parts were biased in static ON-Mode and 5 parts were biased in static OFF-Mode.

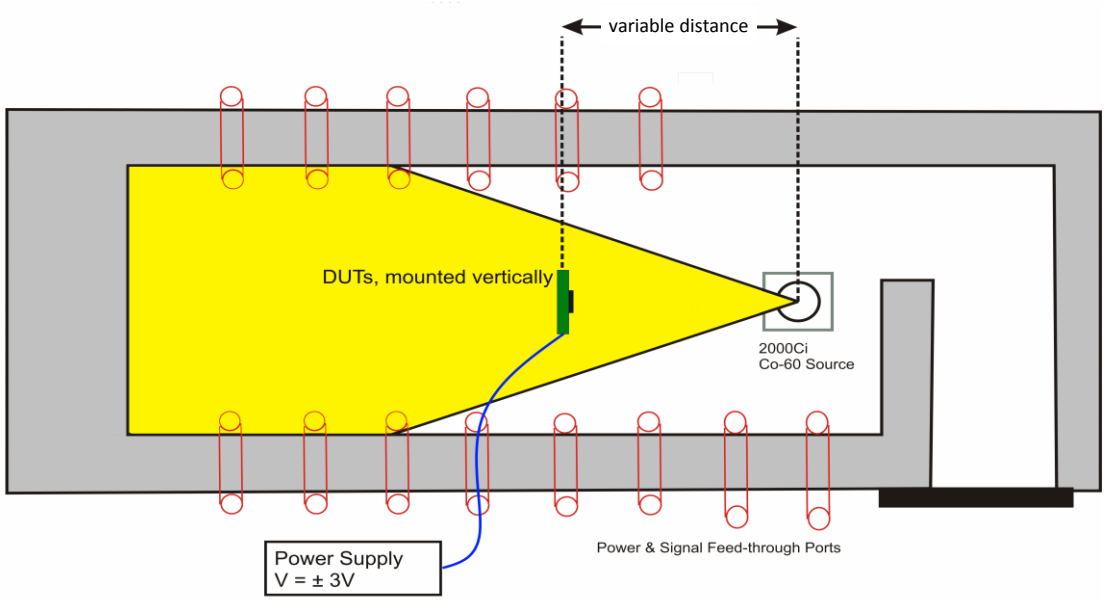
ON mode **OFF mode**



V+ = 3V
V- = -3V
GND = 0V

T = 20°C

4.2. IRRADIATION CONDITIONS



The figure above shows the irradiation configuration. The 10 irradiated devices, referred to as DUT, were soldered onto small adapter boards for easy exchangability during testing. A large PCB, referred to as biasing board, is populated with the on mode resistors, 4mm sockets for power, and pin headers to connect to the adapter boards.
All biasing boards are mounted vertically on a wooden board with the devices facing the Cobalt-60 source.
The distance between the irradiator and the DUTs has been changed in order to establish a dose rate of 0.01 rad/s during steps 1 to 6 followed by 0.1 rad/s for the steps 7 and 8.
The DUTs in on mode are connected to a high precision power supply (HAMEG HMP4040)

Irradiator (details see annex):

4.3. ANNEALING CONDITIONS

- **Annealing I:** Biasing as indicated above during 24 hours at 20 ± 2 °C. Temperature regulated via room air conditioning (room temperature).
- **Annealing II:** Biasing as indicated above during 7 days at 100 ± 2 °C. Temperature electronically regulated in a oven.

5. TESTED PARAMETERS

All electrical measurements were made within 2 hours after termination of the irradiation step (ESCC-22900).

Following electrical measurements have been tested accordingly to the test plan provided by the customer:

no.	Parameter name	Symbol	Test conditions	Min	Max.	Unit
1	Positive Supply Current	I_S^+	V^+ = 5V; V^- = -5V	0	6	mA
2	Negative Supply Current	I_S^-	V^+ = 5V; V^- = -5V	0	6	mA
3	Offset Voltage of Amplifier 1	$V_{OS,1}$	V^+ = 5V; V^- = -5V	-0.003	0.003	mV
4	Input Bias Current of Amplifier 1	$I_{B,1}$	V^+ = 5V; V^- = -5V	-0.15	0.15	nA
5	Input Offset Current of Amplifier 1	$I_{OS,1}$	V^+ = 5V; V^- = -5V	-0.3	0.3	nA
6	Common Mode Rejection Ratio of Amplifier 1	$CMRR_1$	V^+ = 5V; V^- = -5V	125	-	dB
7	Positive Slew Rate of Amplifier 1	SR^+_1	V^+ = 5V; V^- = -5V	2	-	V/µs
8	Negative Slew Rate of Amplifier 1	SR^-_1	V^+ = 5V; V^- = -5V	2	-	V/µs
9	Large Signal Voltage Gain of Amplifier 1	$A_{VO,1}$	V^+ = 5V; V^- = -5V	125	-	dB
10	Positive Output Voltage Swing of Amplifier 1	$V^+_{O,1}$	V^+ = 5V; V^- = -5V	4.9	-	V
11	Negative Output Voltage Swing of Amplifier 1	$V^-_{O,1}$	V^+ = 5V; V^- = -5V	-	-4.9	V
12	Offset Voltage of Amplifier 2	$V_{OS,2}$	V^+ = 5V; V^- = -5V	-0.003	0.003	mV
13	Input Bias Current of Amplifier 2	$I_{B,2}$	V^+ = 5V; V^- = -5V	-0.15	0.15	nA
14	Input Offset Current of Amplifier 2	$I_{OS,2}$	V^+ = 5V; V^- = -5V	-0.3	0.3	nA
15	Common Mode Rejection Ratio of Amplifier 2	$CMRR_2$	V^+ = 5V; V^- = -5V	125	-	dB
16	Positive Slew Rate of Amplifier 2	SR^+_2	V^+ = 5V; V^- = -5V	2	-	V/µs
17	Negative Slew Rate of Amplifier 2	SR^-_2	V^+ = 5V; V^- = -5V	2	-	V/µs
18	Large Signal Voltage Gain of Amplifier 2	$A_{VO,2}$	V^+ = 5V; V^- = -5V	125	-	dB
19	Positive Output Voltage Swing of Amplifier 2	$V^+_{O,2}$	V^+ = 5V; V^- = -5V	4.9	-	V
20	Negative Output Voltage Swing of Amplifier 2	$V^-_{O,2}$	V^+ = 5V; V^- = -5V	-	-4.9	V

Notes:

The device consists of four operational amplifiers with a common power supply. Hence, the op-amp characteristics are provided for each amplifier. The supply currents are provided for the whole device.

Where applicable, values for operation at T_A = 25°C have been derived from the datasheet.

Ambient temperature during irradiation was 19.6 ± 0.3 °C, ambient temperature during testing was 20 ± 2 °C.

5. TESTED PARAMETERS (CONTINUED)

no.	Parameter name	Symbol	Test conditions	Min	Max.	Unit
21	Offset Voltage of Amplifier 3	$V_{OS,3}$	V^+ = 5V; V^- = -5V	-0.003	0.003	mV
22	Input Bias Current of Amplifier 3	$I_{B,3}$	V^+ = 5V; V^- = -5V	-0.15	0.15	nA
23	Input Offset Current of Amplifier 3	$I_{OS,3}$	V^+ = 5V; V^- = -5V	-0.3	0.3	nA
24	Common Mode Rejection Ratio of Amplifier 3	$CMRR_3$	V^+ = 5V; V^- = -5V	125	-	dB
25	Positive Slew Rate of Amplifier 3	SR^+_3	V^+ = 5V; V^- = -5V	2	-	V/µs
26	Negative Slew Rate of Amplifier 3	SR^-_3	V^+ = 5V; V^- = -5V	2	-	V/µs
27	Large Signal Voltage Gain of Amplifier 3	$A_{VO,3}$	V^+ = 5V; V^- = -5V	125	-	dB
28	Positive Output Voltage Swing of Amplifier 3	$V^+_{O,3}$	V^+ = 5V; V^- = -5V	4.9	-	V
29	Negative Output Voltage Swing of Amplifier 3	$V^-_{O,3}$	V^+ = 5V; V^- = -5V	-	-4.9	V
30	Offset Voltage of Amplifier 4	$V_{OS,4}$	V^+ = 5V; V^- = -5V	-0.003	0.003	mV
31	Input Bias Current of Amplifier 4	$I_{B,4}$	V^+ = 5V; V^- = -5V	-0.15	0.15	nA
32	Input Offset Current of Amplifier 4	$I_{OS,4}$	V^+ = 5V; V^- = -5V	-0.3	0.3	nA
33	Common Mode Rejection Ratio of Amplifier 4	$CMRR_4$	V^+ = 5V; V^- = -5V	125	-	dB
34	Positive Slew Rate of Amplifier 4	SR^+_4	V^+ = 5V; V^- = -5V	2	-	V/µs
35	Negative Slew Rate of Amplifier 4	SR^-_4	V^+ = 5V; V^- = -5V	2	-	V/µs
36	Large Signal Voltage Gain of Amplifier 4	$A_{VO,4}$	V^+ = 5V; V^- = -5V	125	-	dB
37	Positive Output Voltage Swing of Amplifier 4	$V^+_{O,4}$	V^+ = 5V; V^- = -5V	4.9	-	V
38	Negative Output Voltage Swing of Amplifier 4	$V^-_{O,4}$	V^+ = 5V; V^- = -5V	-	-4.9	V

Notes:

The device consists of four operational amplifiers with a common power supply. Hence, the op-amp characteristics are provided for each amplifier. The supply currents are provided for the whole device.

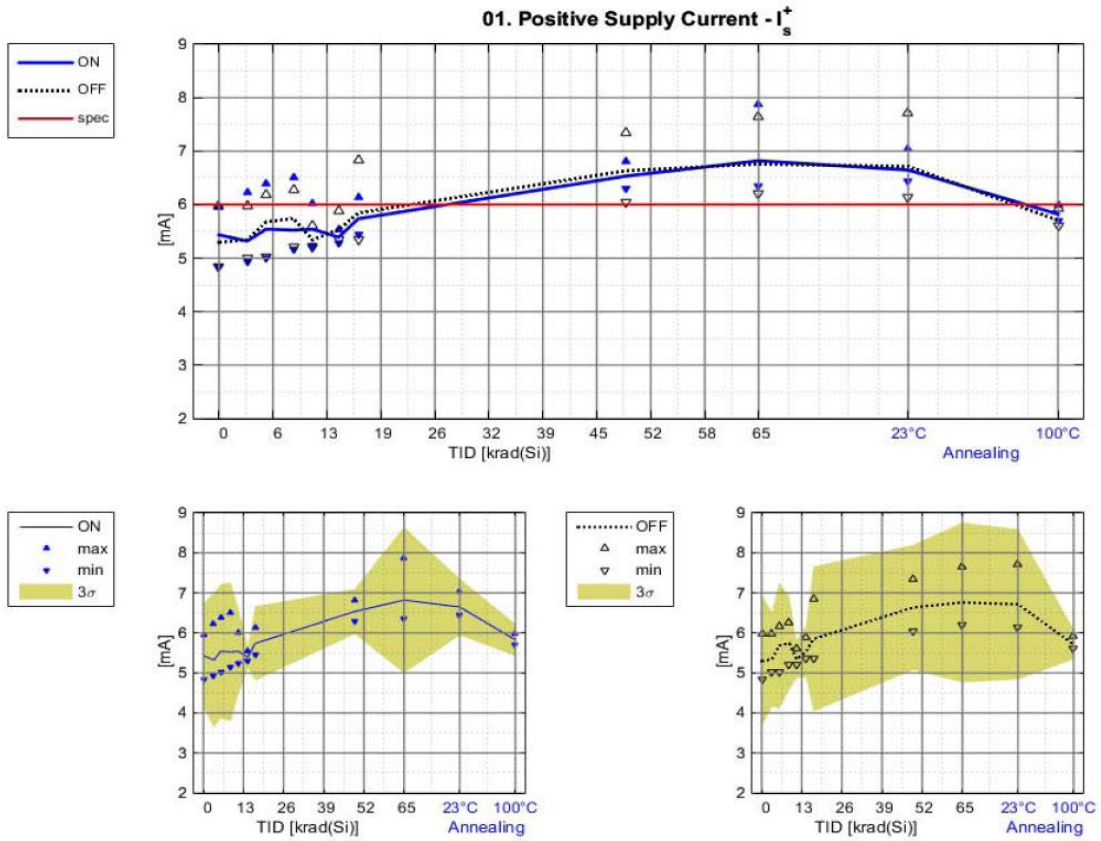
Where applicable, values for operation at T_A = 25°C have been derived from the datasheet.

Ambient temperature during irradiation was 19.6 ± 0.3 °C, ambient temperature during testing was 20 ± 2 °C.

The following chapter 6 shows the electrical measurements for each parameter in detail.

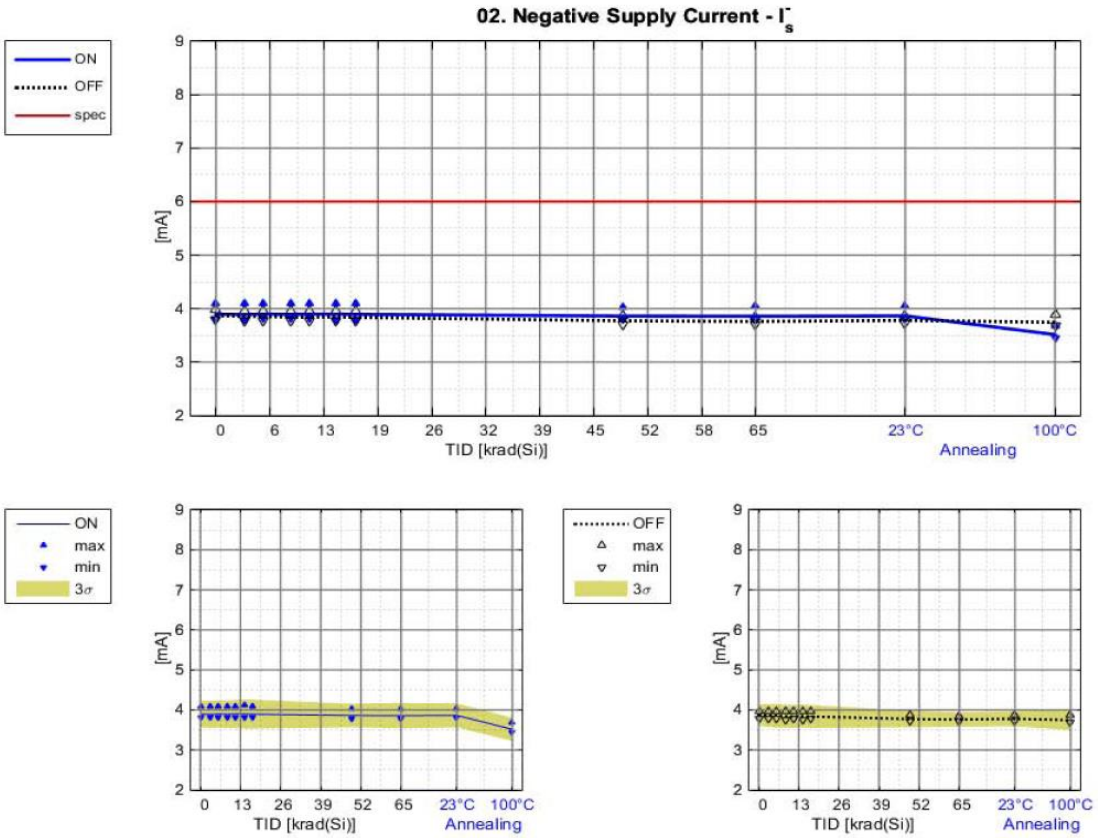
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			2. Positive Supply Current									I_S^+		unit mA
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max									6		mA
			Min									-		mA
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn1	5.945	6.228	6.390	6.519	6.022	5.534	5.655	6.810	7.872	7.046	5.988	mA
		sn2	5.303	5.494	5.609	5.180	5.844	5.387	5.466	6.519	6.662	6.551	5.763	mA
		sn3	5.312	4.966	5.068	5.159	5.290	5.374	5.446	6.440	6.487	6.664	5.737	mA
		sn4	5.764	4.927	5.006	5.539	5.226	5.291	5.978	6.305	6.338	6.528	5.686	mA
		sn5	4.849	4.974	5.635	5.222	5.319	5.375	6.138	6.589	6.742	6.445	5.943	mA
	OFF	sn6	4.830	5.975	5.015	6.269	5.240	5.351	5.988	6.867	6.246	6.891	5.675	mA
		sn7	5.022	5.115	5.769	5.577	5.600	5.552	5.607	7.338	7.647	6.350	5.644	mA
		sn8	5.972	5.155	5.263	5.919	5.386	5.502	6.835	6.708	6.407	7.718	5.925	mA
		sn9	4.839	5.470	6.179	5.734	5.221	5.886	5.357	6.040	6.202	6.134	5.612	mA
		sn10	5.807	5.007	6.168	5.217	5.260	5.372	5.445	6.214	7.297	6.475	5.694	mA
	reference	sn11	5.029	5.557	5.044	5.499	5.494	5.989	5.004	5.502	5.507	5.376	4.991	mA
Statistical analysis [see annex]	ON	Max	5.945	6.228	6.390	6.519	6.022	5.534	6.138	6.810	7.872	7.046	5.988	mA
		Min	4.849	4.927	5.006	5.159	5.226	5.291	5.446	6.305	6.338	6.445	5.686	mA
		Mean	**5.435**	**5.318**	**5.542**	**5.524**	**5.540**	**5.392**	**5.737**	**6.533**	**6.820**	**6.647**	**5.823**	mA
		St. dev	0.431	0.560	0.558	0.577	0.366	0.088	0.310	0.188	0.608	0.236	0.134	mA
		Lmax	6.617	6.853	7.071	7.107	6.543	5.634	6.586	7.047	8.489	7.295	6.190	mA
		Lmin	4.252	3.782	4.012	3.941	4.538	5.151	4.887	6.018	5.152	5.998	5.457	mA
	OFF	Max	5.972	5.975	6.179	6.269	5.600	5.886	6.835	7.338	7.647	7.718	5.925	mA
		Min	4.830	5.007	5.015	5.217	5.221	5.351	5.357	6.040	6.202	6.134	5.612	mA
		Mean	**5.294**	**5.344**	**5.679**	**5.743**	**5.341**	**5.533**	**5.846**	**6.633**	**6.760**	**6.714**	**5.710**	mA
		St. dev	0.552	0.392	0.527	0.391	0.158	0.215	0.603	0.521	0.666	0.626	0.124	mA
		Lmax	6.808	6.420	7.124	6.816	5.776	6.122	7.500	8.061	8.587	8.429	6.050	mA
		Lmin	3.780	4.269	4.234	4.671	4.907	4.943	4.192	5.206	4.933	4.998	5.370	mA



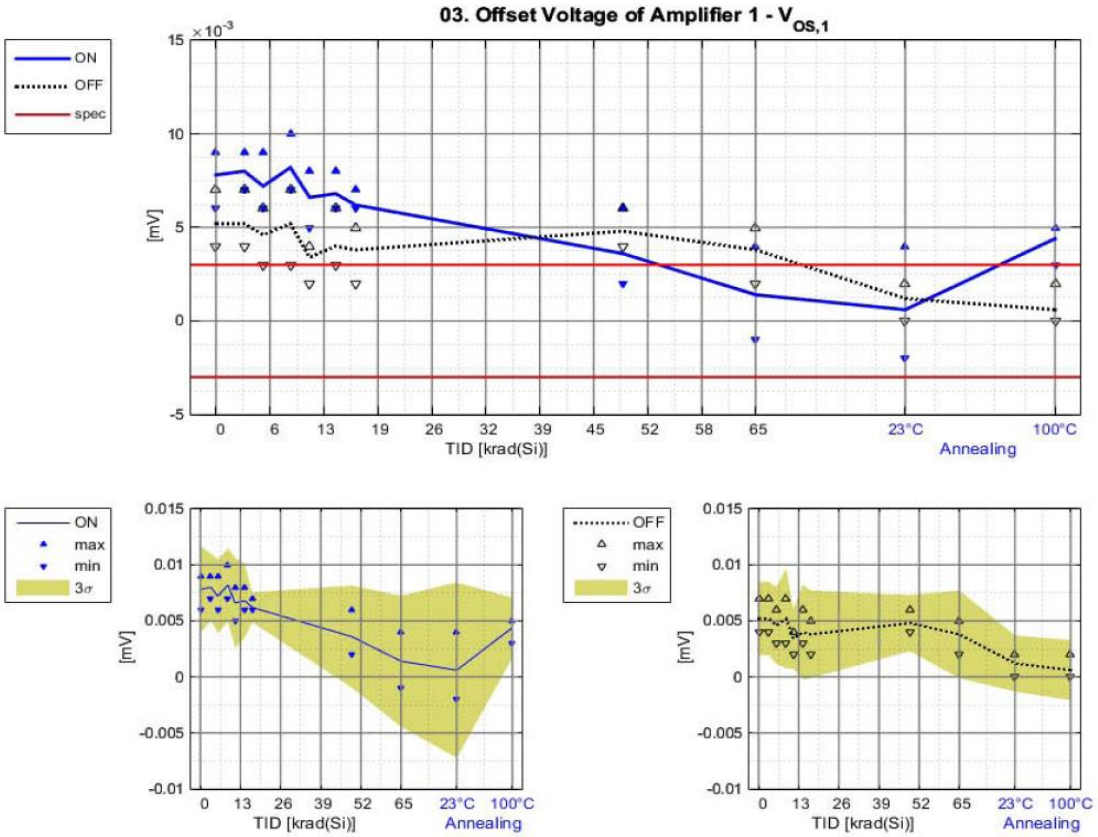
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			2. Negative Supply Current									I_S^-		unit mA
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max									6		mA
			Min									-		mA
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn1	4.089	4.088	4.098	4.093	4.099	4.108	4.101	4.032	4.044	4.041	3.677	mA
		sn2	3.872	3.851	3.854	3.863	3.872	3.862	3.859	3.850	3.830	3.842	3.463	mA
		sn3	3.846	3.843	3.841	3.826	3.823	3.822	3.819	3.796	3.809	3.815	3.455	mA
		sn4	3.806	3.802	3.817	3.811	3.811	3.807	3.801	3.797	3.782	3.797	3.444	mA
		sn5	3.869	3.863	3.877	3.871	3.880	3.884	3.887	3.832	3.823	3.828	3.530	mA
	OFF	sn6	3.794	3.780	3.766	3.764	3.768	3.762	3.767	3.728	3.720	3.834	3.747	mA
		sn7	3.971	3.962	3.966	3.965	3.970	3.970	3.959	3.859	3.839	3.740	3.698	mA
		sn8	3.963	3.959	3.958	3.925	3.912	3.934	3.920	3.835	3.809	3.861	3.888	mA
		sn9	3.824	3.811	3.806	3.789	3.780	3.792	3.767	3.729	3.724	3.738	3.700	mA
		sn10	3.798	3.778	3.777	3.768	3.766	3.780	3.767	3.710	3.706	3.727	3.688	mA
	reference	sn11	3.850	3.839	3.843	3.839	3.843	3.847	3.848	3.840	3.849	3.865	3.848	mA
Statistical analysis [see annex]	ON	Max	4.089	4.088	4.098	4.093	4.099	4.108	4.101	4.032	4.044	4.041	3.677	mA
		Min	3.806	3.802	3.817	3.811	3.811	3.807	3.801	3.796	3.782	3.797	3.444	mA
		Mean	**3.896**	**3.889**	**3.897**	**3.893**	**3.897**	**3.897**	**3.893**	**3.861**	**3.858**	**3.865**	**3.514**	mA
		St. dev	0.111	0.113	0.114	0.115	0.117	0.122	0.121	0.098	0.106	0.100	0.097	mA
		Lmax	4.200	4.200	4.211	4.207	4.217	4.231	4.225	4.130	4.148	4.139	3.780	mA
		Lmin	3.592	3.579	3.584	3.578	3.577	3.562	3.562	3.592	3.567	3.590	3.247	mA
	OFF	Max	3.971	3.962	3.966	3.965	3.970	3.970	3.959	3.859	3.839	3.861	3.888	mA
		Min	3.794	3.778	3.766	3.764	3.766	3.762	3.767	3.710	3.706	3.727	3.688	mA
		Mean	**3.870**	**3.858**	**3.855**	**3.842**	**3.839**	**3.848**	**3.836**	**3.772**	**3.760**	**3.780**	**3.744**	mA
		St. dev	0.089	0.094	0.099	0.095	0.095	0.097	0.095	0.069	0.060	0.063	0.084	mA
		Lmax	4.115	4.117	4.127	4.104	4.101	4.113	4.098	3.962	3.924	3.952	3.973	mA
		Lmin	3.625	3.599	3.583	3.581	3.578	3.582	3.574	3.582	3.595	3.608	3.515	mA



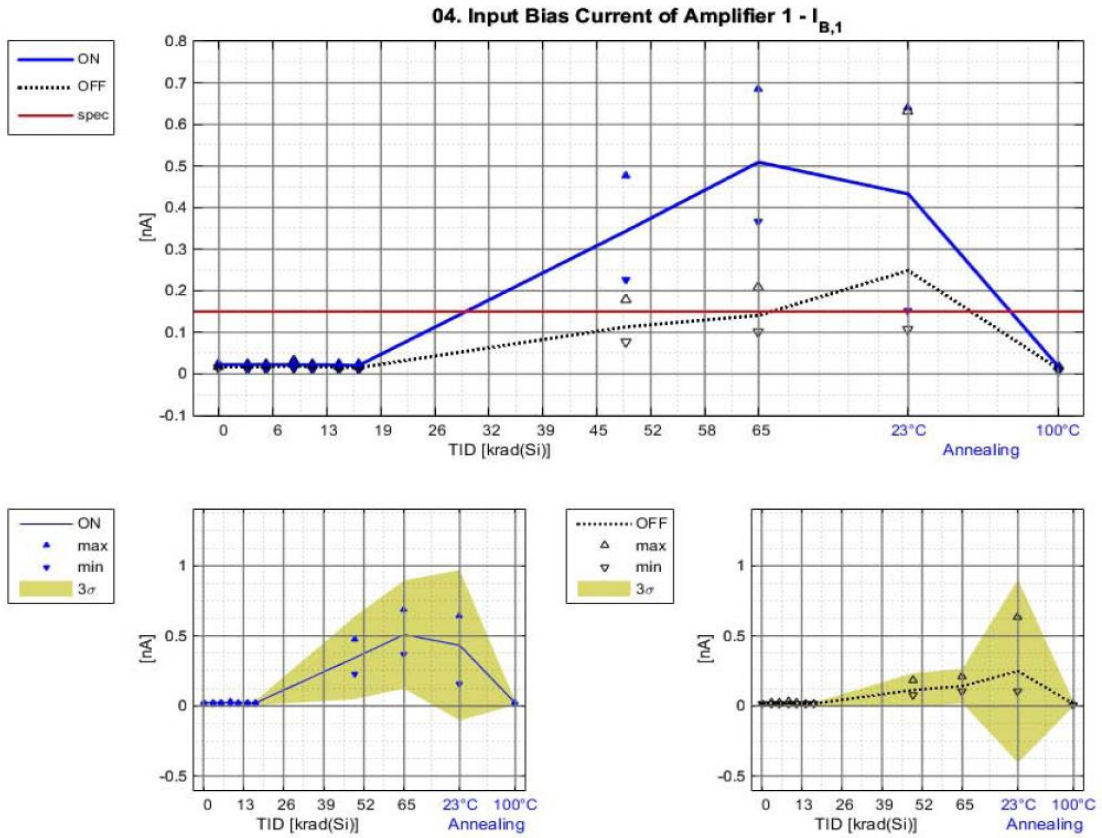
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			3. Offset Voltage of Amplifier 1									$V_{OS,1}$		unit mV
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max										0.003	mV
			Min										-0.003	mV
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn1	0.009	0.009	0.009	0.010	0.008	0.008	0.006	0.006	0.004	0.002	0.005	mV
		sn2	0.009	0.009	0.007	0.008	0.008	0.008	0.007	0.004	0.002	0.001	0.005	mV
		sn3	0.007	0.007	0.007	0.008	0.006	0.006	0.006	0.002	0.000	-0.002	0.005	mV
		sn4	0.006	0.007	0.006	0.007	0.005	0.006	0.006	0.003	-0.001	-0.002	0.004	mV
		sn5	0.008	0.008	0.007	0.008	0.006	0.006	0.006	0.003	0.002	0.004	0.003	mV
	OFF	sn6	0.007	0.007	0.005	0.007	0.004	0.006	0.005	0.005	0.005	0.000	0.002	mV
		sn7	0.005	0.005	0.006	0.006	0.004	0.005	0.005	0.006	0.005	0.002	0.000	mV
		sn8	0.005	0.005	0.004	0.005	0.004	0.003	0.004	0.004	0.003	0.002	0.000	mV
		sn9	0.004	0.004	0.003	0.003	0.002	0.003	0.002	0.004	0.004	0.001	0.000	mV
		sn10	0.005	0.005	0.005	0.005	0.003	0.003	0.003	0.005	0.002	0.001	0.001	mV
	reference	sn11	0.003	0.004	0.003	0.003	0.002	0.002	0.003	0.004	0.003	0.001	0.000	mV
Statistical analysis [see annex]	ON	Max	0.009	0.009	0.009	0.010	0.008	0.008	0.007	0.006	0.004	0.004	0.005	mV
		Min	0.006	0.007	0.006	0.007	0.005	0.006	0.006	0.002	-0.001	-0.002	0.003	mV
		Mean	**0.008**	**0.008**	**0.007**	**0.008**	**0.007**	**0.007**	**0.006**	**0.004**	**0.001**	**0.001**	**0.004**	mV
		St. dev	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.002	0.002	0.003	0.001	mV
		Lmax	0.011	0.011	0.010	0.011	0.010	0.010	0.007	0.008	0.007	0.008	0.007	mV
		Lmin	0.004	0.005	0.004	0.005	0.003	0.004	0.005	-0.001	-0.004	-0.007	0.002	mV
	OFF	Max	0.007	0.007	0.006	0.007	0.004	0.006	0.005	0.006	0.005	0.002	0.002	mV
		Min	0.004	0.004	0.003	0.003	0.002	0.003	0.002	0.004	0.002	0.000	0.000	mV
		Mean	**0.005**	**0.005**	**0.005**	**0.005**	**0.003**	**0.004**	**0.004**	**0.005**	**0.004**	**0.001**	**0.001**	mV
		St. dev	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	mV
		Lmax	0.008	0.008	0.008	0.009	0.006	0.008	0.007	0.007	0.007	0.003	0.003	mV
		Lmin	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.003	0.000	-0.001	-0.002	mV



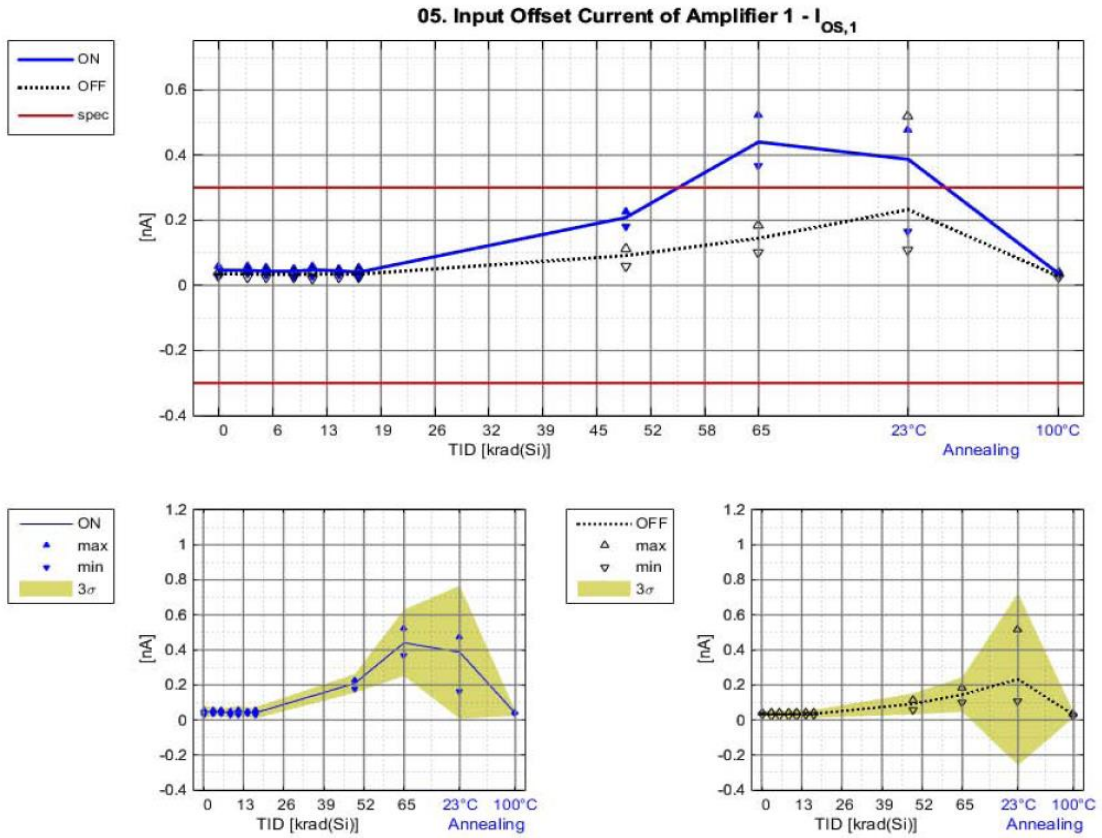
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			4. Input Bias Current of Amplifier 1									$I_{B,1}$		unit nA
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max										0.15	nA
			Min										-0.15	nA
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	3.39	5.67	8.92	11.24	14.35	16.74	48.81	64.75	0	0	krad (Si)
Electrical measurements [sn: serial number]	ON	sn1	0.033	0.026	0.033	0.033	0.032	0.034	0.035	0.382	0.461	0.431	0.027	nA
		sn2	0.024	0.028	0.027	0.024	0.026	0.030	0.026	0.218	0.264	0.281	0.025	nA
		sn3	0.030	0.030	0.030	0.033	0.035	0.034	0.034	0.213	0.267	0.283	0.027	nA
		sn4	0.026	0.026	0.028	0.023	0.028	0.030	0.033	0.152	0.200	0.220	0.026	nA
		sn5	0.017	0.019	0.019	0.018	0.021	0.023	0.024	0.306	0.375	0.079	0.018	nA
	OFF	sn6	0.017	0.015	0.018	0.020	0.018	0.019	0.019	0.047	0.054	0.399	0.020	nA
		sn7	0.022	0.025	0.029	0.051	0.027	0.028	0.027	0.127	0.125	0.058	0.019	nA
		sn8	0.023	0.025	0.021	0.023	0.023	0.024	0.026	0.072	0.073	0.131	0.030	nA
		sn9	0.022	0.022	0.023	0.021	0.025	0.026	0.026	0.053	0.057	0.059	0.024	nA
		sn10	0.023	0.020	0.020	0.019	0.018	0.023	0.024	0.061	0.070	0.072	0.008	nA
	reference	sn11	0.024	0.022	0.025	0.021	0.021	0.024	0.024	0.022	0.023	0.021	0.021	nA
Statistical analysis [see annex]	ON	Max	0.033	0.030	0.033	0.033	0.035	0.034	0.035	0.382	0.461	0.431	0.027	nA
		Min	0.017	0.019	0.019	0.018	0.021	0.023	0.024	0.152	0.200	0.079	0.018	nA
		Mean	**0.026**	**0.026**	**0.027**	**0.026**	**0.028**	**0.030**	**0.030**	**0.254**	**0.313**	**0.259**	**0.025**	nA
		St. dev	0.006	0.004	0.005	0.007	0.005	0.004	0.005	0.090	0.104	0.127	0.004	nA
		Lmax	0.043	0.037	0.042	0.044	0.043	0.043	0.044	0.501	0.598	0.607	0.035	nA
		Lmin	0.009	0.014	0.013	0.008	0.014	0.018	0.017	0.007	0.029	-0.090	0.014	nA
	OFF	Max	0.023	0.025	0.029	0.051	0.027	0.028	0.027	0.127	0.125	0.399	0.030	nA
		Min	0.017	0.015	0.018	0.019	0.018	0.019	0.019	0.047	0.054	0.058	0.008	nA
		Mean	**0.021**	**0.021**	**0.022**	**0.027**	**0.022**	**0.024**	**0.024**	**0.072**	**0.076**	**0.144**	**0.020**	nA
		St. dev	0.003	0.004	0.004	0.014	0.004	0.003	0.003	0.032	0.029	0.146	0.008	nA
		Lmax	0.028	0.033	0.034	0.064	0.033	0.033	0.033	0.160	0.154	0.544	0.042	nA
		Lmin	0.015	0.010	0.011	-0.011	0.011	0.015	0.016	-0.016	-0.003	-0.256	-0.002	nA



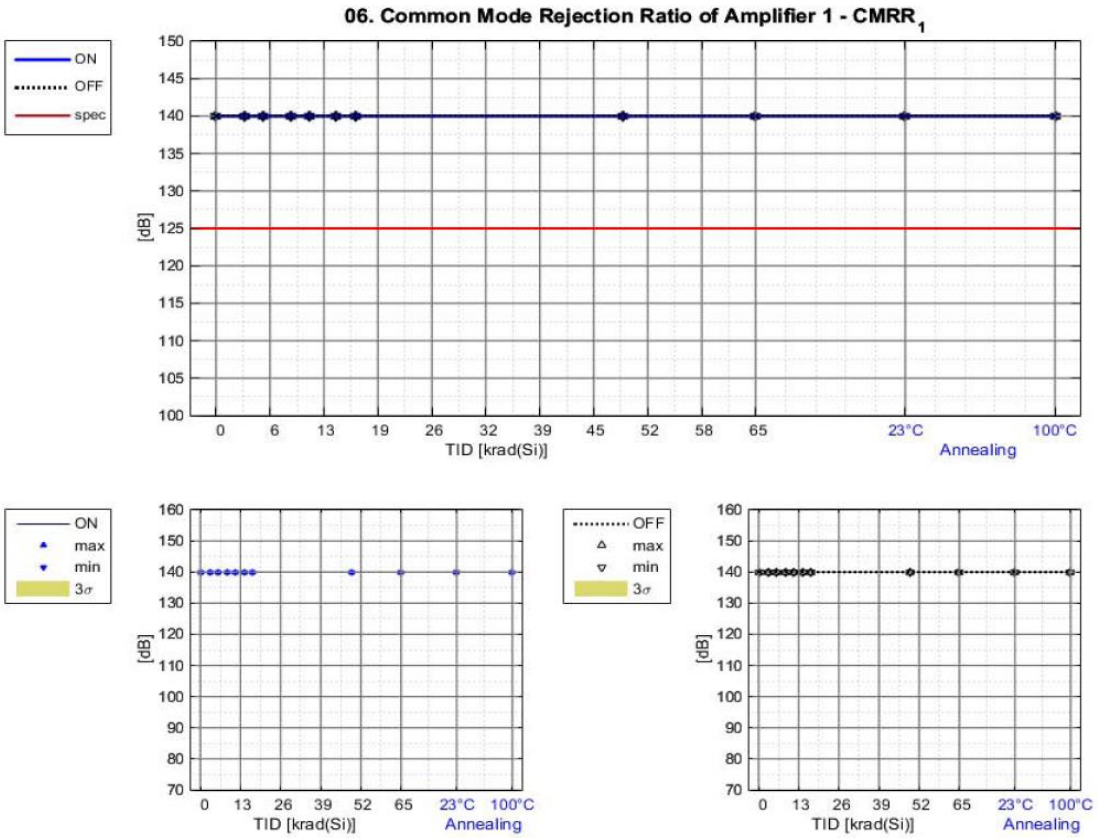
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			5. Input Offset Current of Amplifier 1									$I_{OS,1}$		unit nA
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max										0.3	nA
			Min										-0.3	nA
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn1	0.052	0.059	0.054	0.047	0.057	0.053	0.055	0.216	0.522	0.476	0.044	nA
		sn2	0.051	0.042	0.044	0.048	0.046	0.042	0.035	0.204	0.408	0.429	0.036	nA
		sn3	0.057	0.048	0.046	0.053	0.051	0.046	0.044	0.214	0.418	0.456	0.036	nA
		sn4	0.046	0.046	0.039	0.042	0.054	0.051	0.041	0.180	0.366	0.409	0.039	nA
		sn5	0.027	0.036	0.034	0.027	0.030	0.032	0.026	0.227	0.488	0.165	0.032	nA
	OFF	sn6	0.032	0.024	0.024	0.024	0.020	0.025	0.025	0.093	0.127	0.519	0.024	nA
		sn7	0.039	0.038	0.039	0.037	0.035	0.040	0.040	0.113	0.186	0.157	0.026	nA
		sn8	0.040	0.042	0.036	0.040	0.042	0.033	0.035	0.089	0.151	0.204	0.031	nA
		sn9	0.037	0.033	0.039	0.037	0.041	0.042	0.043	0.060	0.099	0.109	0.036	nA
		sn10	0.030	0.037	0.030	0.028	0.038	0.032	0.029	0.102	0.160	0.174	0.025	nA
	reference	sn11	0.041	0.039	0.040	0.038	0.032	0.039	0.040	0.035	0.039	0.037	0.043	nA
Statistical analysis [see annex]	ON	Max	0.057	0.059	0.054	0.053	0.057	0.053	0.055	0.227	0.522	0.476	0.044	nA
		Min	0.027	0.036	0.034	0.027	0.030	0.032	0.026	0.180	0.366	0.165	0.032	nA
		Mean	**0.047**	**0.046**	**0.043**	**0.043**	**0.048**	**0.045**	**0.040**	**0.208**	**0.440**	**0.387**	**0.037**	nA
		St. dev	0.012	0.008	0.008	0.010	0.011	0.008	0.011	0.018	0.063	0.127	0.004	nA
		Lmax	0.078	0.069	0.064	0.071	0.077	0.068	0.070	0.257	0.614	0.734	0.050	nA
		Lmin	0.015	0.023	0.023	0.016	0.018	0.022	0.011	0.160	0.267	0.040	0.025	nA
	OFF	Max	0.040	0.042	0.039	0.040	0.042	0.042	0.043	0.113	0.186	0.519	0.036	nA
		Min	0.030	0.024	0.024	0.024	0.020	0.025	0.025	0.060	0.099	0.109	0.024	nA
		Mean	**0.036**	**0.035**	**0.034**	**0.033**	**0.035**	**0.034**	**0.034**	**0.091**	**0.145**	**0.233**	**0.028**	nA
		St. dev	0.004	0.007	0.007	0.007	0.009	0.007	0.007	0.020	0.033	0.164	0.005	nA
		Lmax	0.048	0.054	0.051	0.052	0.060	0.053	0.055	0.146	0.235	0.682	0.042	nA
		Lmin	0.024	0.016	0.016	0.014	0.011	0.016	0.014	0.037	0.054	-0.216	0.015	nA



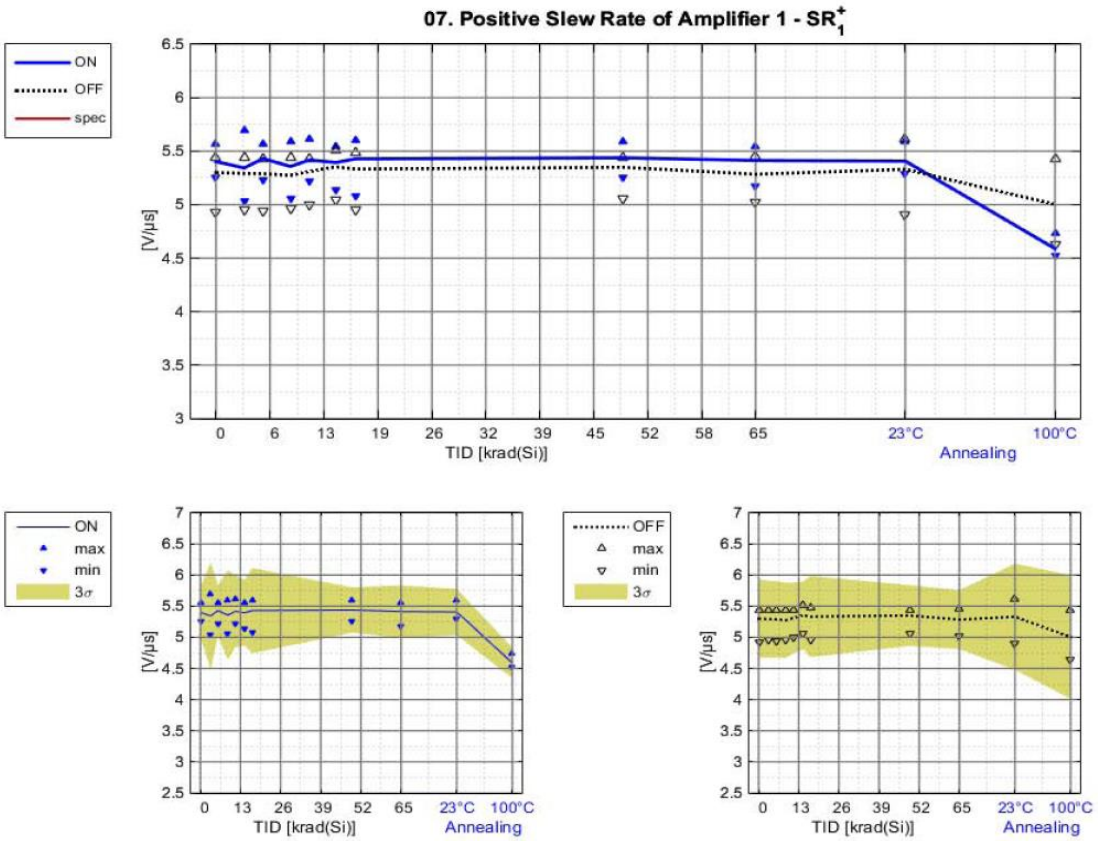
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			6. Common Mode Rejection Ratio of Amplifier 1									$CMRR_1$		unit dB
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max										-	dB
			Min										125	dB
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn1	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn2	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn3	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn4	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn5	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
	OFF	sn6	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn7	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn8	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn9	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn10	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
	reference	sn11	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
Statistical analysis [see annex]	ON	Max	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Min	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Mean	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	dB
		St. dev	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	dB
		Lmax	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Lmin	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
	OFF	Max	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Min	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Mean	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	dB
		St. dev	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	dB
		Lmax	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Lmin	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB



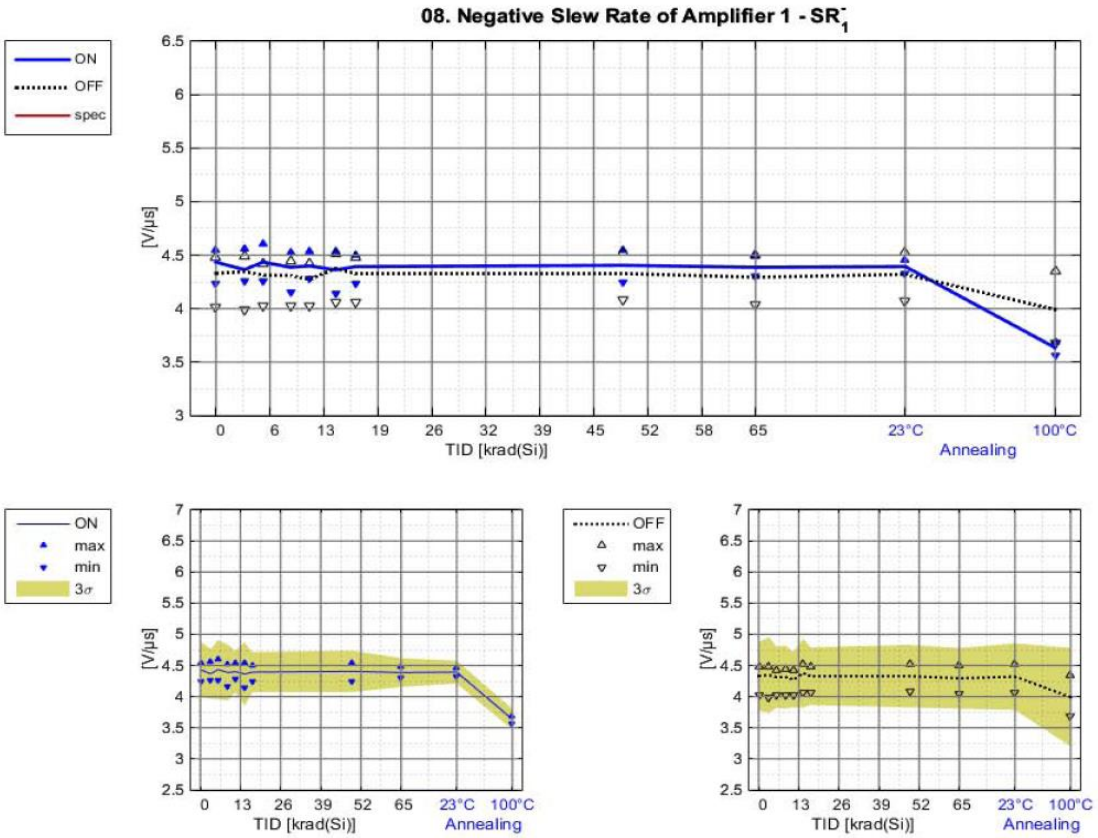
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			7. Positive Slew Rate of Amplifier 1									SR^{+}_{1}		unit V/µs
TEST CONDITIONS			V^{+} = 5V; V^{-} = -5V											
SPECIFICATION LIMITS [see test plan]			Max									-		V/µs
			Min									2		V/µs
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn1	5.468	5.495	5.562	5.549	5.590	5.495	5.562	5.468	5.549	5.590	4.732	V/µs
		sn2	5.251	5.039	5.364	5.143	5.226	5.275	5.300	5.251	5.415	5.288	4.559	V/µs
		sn3	5.275	5.051	5.226	5.062	5.214	5.143	5.085	5.441	5.178	5.300	4.559	V/µs
		sn4	5.455	5.441	5.495	5.441	5.618	5.549	5.590	5.590	5.455	5.455	4.523	V/µs
		sn5	5.562	5.689	5.508	5.590	5.441	5.508	5.604	5.441	5.468	5.402	4.569	V/µs
	OFF	sn6	4.929	4.950	4.940	4.961	4.994	5.051	4.950	5.062	5.028	5.618	5.428	V/µs
		sn7	5.389	5.251	5.402	5.428	5.428	5.481	5.428	5.441	5.300	4.907	4.634	V/µs
		sn8	5.441	5.441	5.428	5.351	5.428	5.376	5.376	5.441	5.288	5.364	5.190	V/µs
		sn9	5.338	5.428	5.275	5.190	5.275	5.351	5.428	5.376	5.351	5.214	4.712	V/µs
		sn10	5.402	5.389	5.402	5.441	5.428	5.508	5.481	5.428	5.455	5.549	5.051	V/µs
	reference	sn11	5.288	5.131	5.251	5.155	5.251	5.325	5.202	5.190	5.364	5.288	5.300	V/µs
Statistical analysis [see annex]	ON	Max	5.562	5.689	5.562	5.590	5.618	5.549	5.604	5.590	5.549	5.590	4.732	V/µs
		Min	5.251	5.039	5.226	5.062	5.214	5.143	5.085	5.251	5.178	5.288	4.523	V/µs
		Mean	**5.402**	**5.343**	**5.431**	**5.357**	**5.418**	**5.394**	**5.428**	**5.438**	**5.413**	**5.407**	**4.588**	V/µs
		St. dev	0.134	0.287	0.136	0.240	0.193	0.176	0.229	0.121	0.140	0.124	0.082	V/µs
		Lmax	5.769	6.131	5.803	6.016	5.946	5.878	6.055	5.771	5.797	5.747	4.814	V/µs
		Lmin	5.035	4.555	5.059	4.698	4.889	4.910	4.801	5.105	5.029	5.067	4.363	V/µs
	OFF	Max	5.441	5.441	5.428	5.441	5.428	5.508	5.481	5.441	5.455	5.618	5.428	V/µs
		Min	4.929	4.950	4.940	4.961	4.994	5.051	4.950	5.062	5.028	4.907	4.634	V/µs
		Mean	**5.300**	**5.292**	**5.289**	**5.274**	**5.311**	**5.353**	**5.333**	**5.350**	**5.284**	**5.330**	**5.003**	V/µs
		St. dev	0.211	0.205	0.204	0.202	0.189	0.182	0.217	0.163	0.158	0.285	0.331	V/µs
		Lmax	5.877	5.855	5.849	5.827	5.829	5.852	5.928	5.797	5.717	6.111	5.911	V/µs
		Lmin	4.723	4.729	4.729	4.721	4.792	4.855	4.737	4.903	4.852	4.549	4.095	V/µs



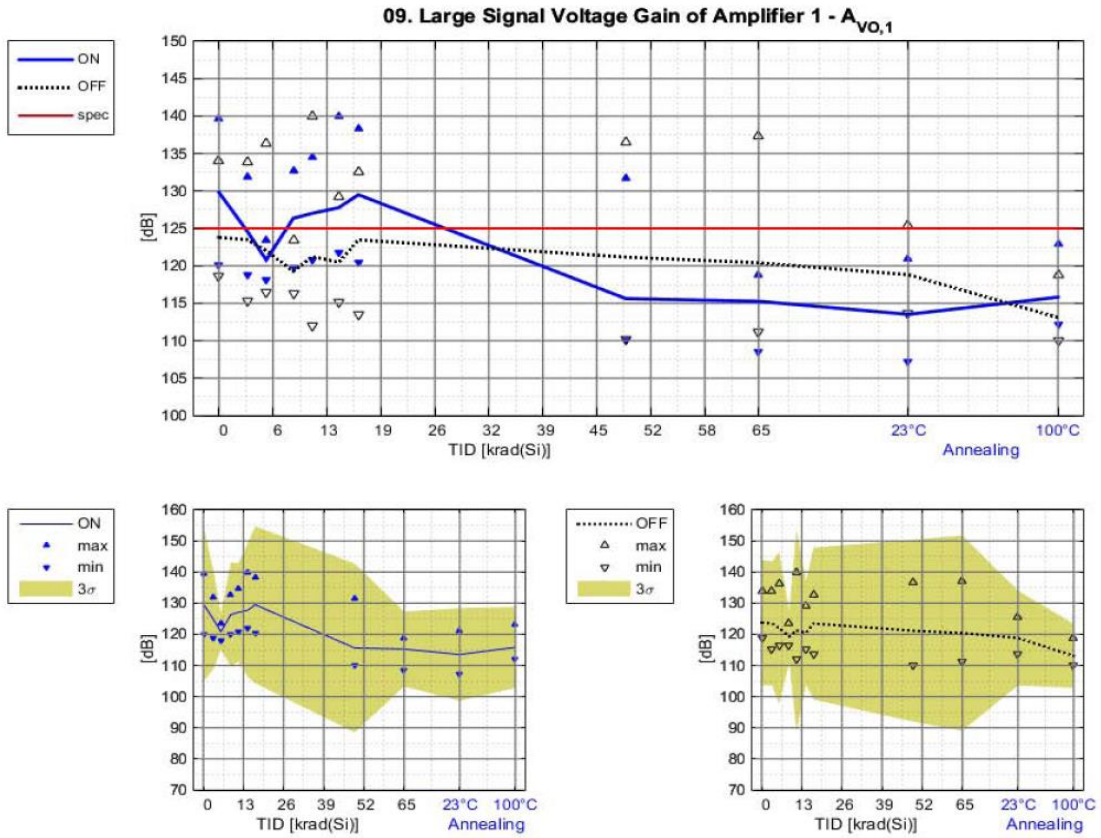
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			8. Negative Slew Rate of Amplifier 1									SR^-_1		unit V/µs
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max									-		V/µs
			Min									2		V/µs
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn1	4.550	4.257	4.523	4.442	4.442	4.433	4.390	4.373	4.373	4.451	3.692	V/µs
		sn2	4.314	4.257	4.274	4.323	4.290	4.225	4.356	4.390	4.306	4.382	3.686	V/µs
		sn3	4.233	4.306	4.257	4.155	4.282	4.140	4.233	4.249	4.323	4.323	3.557	V/µs
		sn4	4.550	4.559	4.606	4.523	4.541	4.541	4.496	4.550	4.442	4.460	3.614	V/µs
		sn5	4.523	4.442	4.514	4.487	4.442	4.469	4.487	4.460	4.487	4.348	3.626	V/µs
	OFF	sn6	4.014	3.993	4.021	4.021	4.029	4.058	4.065	4.080	4.043	4.460	4.348	V/µs
		sn7	4.331	4.373	4.356	4.314	4.331	4.407	4.348	4.298	4.282	4.072	3.679	V/µs
		sn8	4.478	4.487	4.416	4.390	4.265	4.496	4.373	4.433	4.323	4.290	4.036	V/µs
		sn9	4.433	4.469	4.373	4.382	4.314	4.407	4.373	4.306	4.323	4.257	3.791	V/µs
		sn10	4.390	4.407	4.399	4.442	4.425	4.514	4.478	4.523	4.496	4.523	4.102	V/µs
	reference	sn11	4.478	4.331	4.373	4.306	4.241	4.356	4.356	4.390	4.348	4.306	4.323	V/µs
Statistical analysis [see annex]	ON	Max	4.550	4.559	4.606	4.523	4.541	4.541	4.496	4.550	4.487	4.460	3.692	V/µs
		Min	4.233	4.257	4.257	4.155	4.282	4.140	4.233	4.249	4.306	4.323	3.557	V/µs
		Mean	**4.434**	**4.364**	**4.435**	**4.386**	**4.399**	**4.362**	**4.392**	**4.404**	**4.386**	**4.393**	**3.635**	V/µs
		St. dev	0.150	0.133	0.159	0.150	0.111	0.171	0.108	0.111	0.077	0.061	0.056	V/µs
		Lmax	4.844	4.728	4.870	4.796	4.704	4.830	4.688	4.710	4.598	4.560	3.788	V/µs
		Lmin	4.024	4.001	3.999	3.976	4.095	3.893	4.097	4.099	4.174	4.225	3.482	V/µs
	OFF	Max	4.478	4.487	4.416	4.442	4.425	4.514	4.478	4.523	4.496	4.523	4.348	V/µs
		Min	4.014	3.993	4.021	4.021	4.029	4.058	4.065	4.080	4.043	4.072	3.679	V/µs
		Mean	**4.329**	**4.346**	**4.313**	**4.310**	**4.273**	**4.376**	**4.327**	**4.328**	**4.293**	**4.320**	**3.991**	V/µs
		St. dev	0.184	0.203	0.165	0.168	0.148	0.185	0.155	0.167	0.163	0.178	0.264	V/µs
		Lmax	4.835	4.901	4.765	4.770	4.679	4.883	4.752	4.787	4.739	4.809	4.716	V/µs
		Lmin	3.824	3.790	3.861	3.850	3.867	3.870	3.902	3.869	3.848	3.831	3.267	V/µs



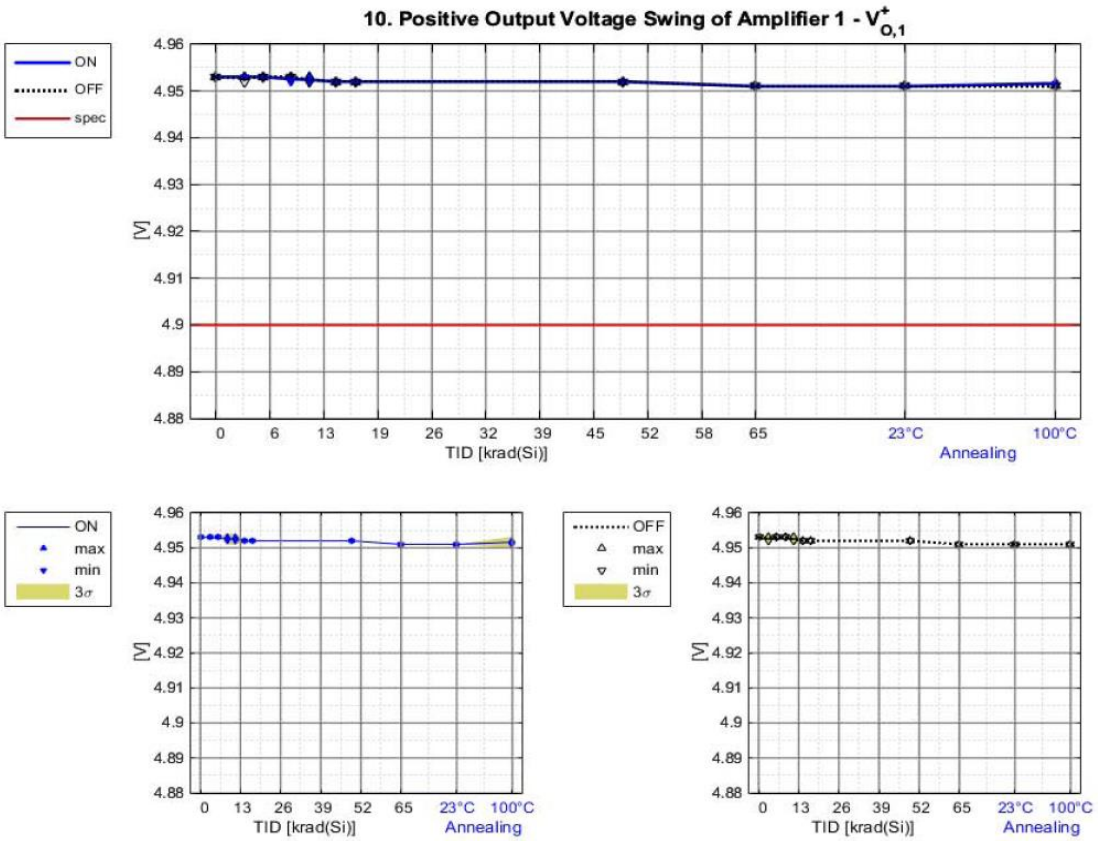
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			9. Large Signal Voltage Gain of Amplifier 1									$A_{VO,1}$		unit dB
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max									-		dB
			Min									125		dB
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn1	137.091	131.896	121.300	132.663	134.580	127.391	134.724	113.280	118.741	113.436	123.009	dB
		sn2	127.939	121.147	123.472	131.361	129.502	126.066	133.443	112.235	116.749	113.913	114.908	dB
		sn3	120.121	124.037	120.981	125.706	124.506	121.822	120.587	109.971	117.506	111.977	112.770	dB
		sn4	124.155	118.741	118.145	119.783	120.796	123.522	120.410	110.968	108.576	107.224	112.187	dB
		sn5	139.686	127.265	120.009	122.232	125.745	140.000	138.303	131.637	114.735	121.026	116.189	dB
	OFF	sn6	119.035	115.385	116.478	117.864	112.068	115.149	113.506	110.216	111.239	117.086	112.184	dB
		sn7	118.695	123.438	136.272	123.462	117.367	116.239	132.549	117.284	112.227	125.428	111.063	dB
		sn8	127.406	123.256	117.010	120.445	117.182	120.745	129.483	136.581	137.284	113.668	118.788	dB
		sn9	133.959	121.552	119.320	118.369	119.596	129.281	116.814	122.665	119.881	122.811	110.001	dB
		sn10	119.868	133.795	121.048	116.293	140.000	120.843	124.978	119.101	121.394	115.061	113.402	dB
	reference	sn11	117.822	140.000	121.063	135.172	124.016	120.803	132.381	131.337	120.601	121.811	131.869	dB
Statistical analysis [see annex]	ON	Max	139.686	131.896	123.472	132.663	134.580	140.000	138.303	131.637	118.741	121.026	123.009	dB
		Min	120.121	118.741	118.145	119.783	120.796	121.822	120.410	109.971	108.576	107.224	112.187	dB
		Mean	**129.798**	**124.617**	**120.781**	**126.349**	**127.026**	**127.760**	**129.493**	**115.618**	**115.261**	**113.515**	**115.813**	dB
		St. dev	8.365	5.170	1.943	5.600	5.244	7.177	8.402	9.042	4.010	4.963	4.334	dB
		Lmax	152.736	138.792	126.108	141.706	141.405	147.440	152.533	140.411	126.258	127.123	127.698	dB
		Lmin	106.861	110.442	115.455	110.992	112.647	108.081	106.454	90.825	104.265	99.907	103.927	dB
	OFF	Max	133.959	133.795	136.272	123.462	140.000	129.281	132.549	136.581	137.284	125.428	118.788	dB
		Min	118.695	115.385	116.478	116.293	112.068	115.149	113.506	110.216	111.239	113.668	110.001	dB
		Mean	**123.793**	**123.485**	**122.026**	**119.287**	**121.243**	**120.451**	**123.466**	**121.169**	**120.405**	**118.811**	**113.088**	dB
		St. dev	6.716	6.628	8.173	2.766	10.842	5.569	8.131	9.735	10.453	5.081	3.429	dB
		Lmax	142.209	141.658	144.435	126.871	150.973	135.722	145.761	147.864	149.067	132.743	122.490	dB
		Lmin	105.376	105.312	99.616	111.702	91.513	105.181	101.171	94.475	91.743	104.878	103.685	dB



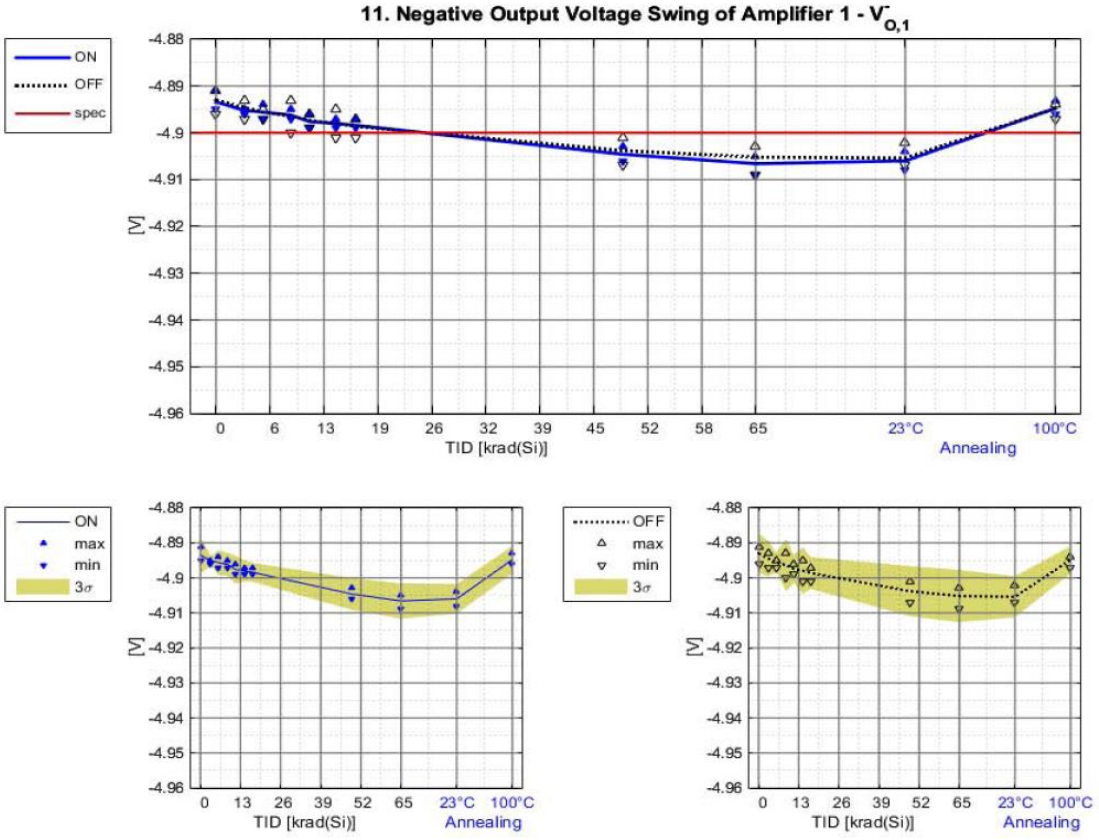
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			10. Positive Output Voltage Swing of Amplifier 1									$V^+_{O,1}$		unit V
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max									-		V
			Min									4.9		V
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn1	4.953	4.953	4.953	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.952	V
		sn2	4.953	4.953	4.953	4.953	4.952	4.952	4.952	4.952	4.951	4.951	4.952	V
		sn3	4.953	4.953	4.953	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.951	V
		sn4	4.953	4.953	4.953	4.953	4.953	4.952	4.952	4.952	4.951	4.951	4.952	V
		sn5	4.953	4.953	4.953	4.953	4.953	4.952	4.952	4.952	4.951	4.951	4.951	V
	OFF	sn6	4.953	4.953	4.953	4.953	4.952	4.952	4.952	4.952	4.951	4.951	4.951	V
		sn7	4.953	4.953	4.953	4.953	4.953	4.952	4.952	4.952	4.951	4.951	4.951	V
		sn8	4.953	4.953	4.953	4.953	4.952	4.952	4.952	4.952	4.951	4.951	4.951	V
		sn9	4.953	4.952	4.953	4.953	4.952	4.952	4.952	4.952	4.951	4.951	4.951	V
		sn10	4.953	4.953	4.953	4.953	4.953	4.952	4.952	4.952	4.951	4.951	4.951	V
	reference	sn11	4.953	4.953	4.953	4.953	4.953	4.953	4.953	4.953	4.952	4.952	4.953	V
Statistical analysis [see annex]	ON	Max	4.953	4.953	4.953	4.953	4.953	4.952	4.952	4.952	4.951	4.951	4.952	V
		Min	4.953	4.953	4.953	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.951	V
		Mean	**4.953**	**4.953**	**4.953**	**4.953**	**4.952**	**4.952**	**4.952**	**4.952**	**4.951**	**4.951**	**4.952**	V
		St. dev	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001	V
		Lmax	4.953	4.953	4.953	4.954	4.954	4.952	4.952	4.952	4.951	4.951	4.953	V
		Lmin	4.953	4.953	4.953	4.951	4.951	4.952	4.952	4.952	4.951	4.951	4.950	V
	OFF	Max	4.953	4.953	4.953	4.953	4.953	4.952	4.952	4.952	4.951	4.951	4.951	V
		Min	4.953	4.952	4.953	4.953	4.952	4.952	4.952	4.952	4.951	4.951	4.951	V
		Mean	**4.953**	**4.953**	**4.953**	**4.953**	**4.952**	**4.952**	**4.952**	**4.952**	**4.951**	**4.951**	**4.951**	V
		St. dev	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	V
		Lmax	4.953	4.954	4.953	4.953	4.954	4.952	4.952	4.952	4.951	4.951	4.951	V
		Lmin	4.953	4.952	4.953	4.953	4.951	4.952	4.952	4.952	4.951	4.951	4.951	V



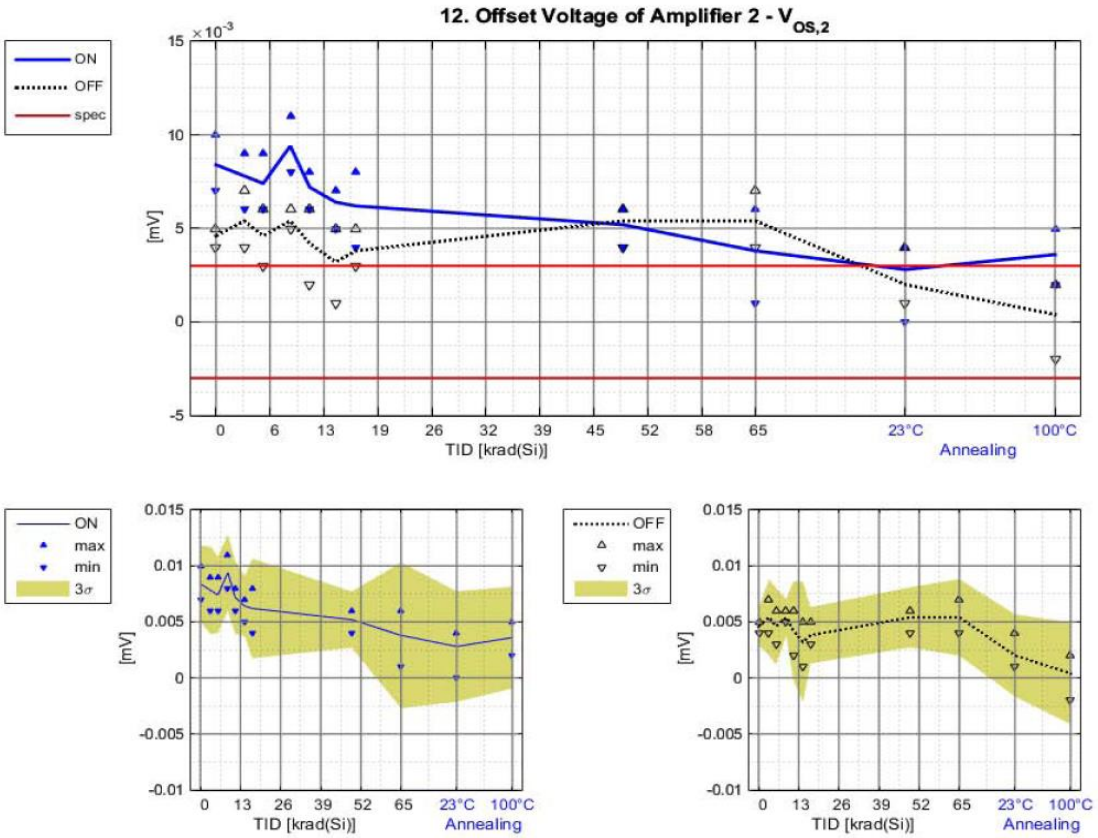
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			11. Negative Output Voltage Swing of Amplifier 1									$V^-_{O,1}$		unit V
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max									-4.9		V
			Min									-		V
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn1	-4,895	-4,895	-4,896	-4,897	-4,899	-4,898	-4,899	-4,905	-4,907	-4,906	-4,896	V
		sn2	-4,891	-4,895	-4,896	-4,895	-4,897	-4,897	-4,899	-4,903	-4,905	-4,906	-4,893	V
		sn3	-4,894	-4,895	-4,897	-4,897	-4,899	-4,899	-4,899	-4,906	-4,907	-4,908	-4,895	V
		sn4	-4,892	-4,896	-4,894	-4,895	-4,896	-4,899	-4,897	-4,903	-4,905	-4,906	-4,894	V
		sn5	-4,895	-4,895	-4,895	-4,897	-4,897	-4,897	-4,898	-4,906	-4,909	-4,904	-4,896	V
	OFF	sn6	-4,891	-4,893	-4,895	-4,893	-4,896	-4,895	-4,898	-4,901	-4,903	-4,907	-4,894	V
		sn7	-4,893	-4,895	-4,895	-4,897	-4,899	-4,899	-4,899	-4,905	-4,906	-4,902	-4,894	V
		sn8	-4,893	-4,893	-4,895	-4,896	-4,896	-4,898	-4,897	-4,904	-4,903	-4,906	-4,895	V
		sn9	-4,892	-4,895	-4,896	-4,896	-4,898	-4,897	-4,898	-4,902	-4,905	-4,906	-4,894	V
		sn10	-4,896	-4,897	-4,897	-4,900	-4,898	-4,901	-4,901	-4,907	-4,909	-4,906	-4,897	V
	reference	sn11	-4,895	-4,892	-4,893	-4,894	-4,893	-4,893	-4,893	-4,893	-4,892	-4,892	-4,895	V
Statistical analysis [see annex]	ON	Max	-4891.000	-4895.000	-4894.000	-4895.000	-4896.000	-4897.000	-4897.000	-4903.000	-4905.000	-4904.000	-4893.000	V
		Min	-4895.000	-4896.000	-4897.000	-4897.000	-4899.000	-4899.000	-4899.000	-4906.000	-4909.000	-4908.000	-4896.000	V
		Mean	**-4893.400**	**-4895.200**	**-4895.600**	**-4896.200**	**-4897.600**	**-4898.000**	**-4898.400**	**-4904.600**	**-4906.600**	**-4906.000**	**-4894.800**	V
		St. dev	1.817	0.447	1.140	1.095	1.342	1.000	0.894	1.517	1.673	1.414	1.304	V
		Lmax	-4888.419	-4893.974	-4892.474	-4893.196	-4893.921	-4895.258	-4895.947	-4900.442	-4902.012	-4902.122	-4891.225	V
		Lmin	-4898.381	-4896.426	-4898.726	-4899.204	-4901.279	-4900.742	-4900.853	-4908.758	-4911.188	-4909.878	-4898.375	V
	OFF	Max	-4891.000	-4893.000	-4895.000	-4893.000	-4896.000	-4895.000	-4897.000	-4901.000	-4903.000	-4902.000	-4894.000	V
		Min	-4896.000	-4897.000	-4897.000	-4900.000	-4899.000	-4901.000	-4901.000	-4907.000	-4909.000	-4907.000	-4897.000	V
		Mean	**-4893.000**	**-4894.600**	**-4895.600**	**-4896.400**	**-4897.400**	**-4898.000**	**-4898.600**	**-4903.800**	**-4905.200**	**-4905.400**	**-4894.800**	V
		St. dev	1.871	1.673	0.894	2.510	1.342	2.236	1.517	2.387	2.490	1.949	1.304	V
		Lmax	-4887.870	-4890.012	-4893.147	-4889.518	-4893.721	-4891.869	-4894.442	-4897.254	-4898.372	-4900.055	-4891.225	V
		Lmin	-4898.130	-4899.188	-4898.053	-4903.282	-4901.079	-4904.131	-4902.758	-4910.346	-4912.028	-4910.745	-4898.375	V



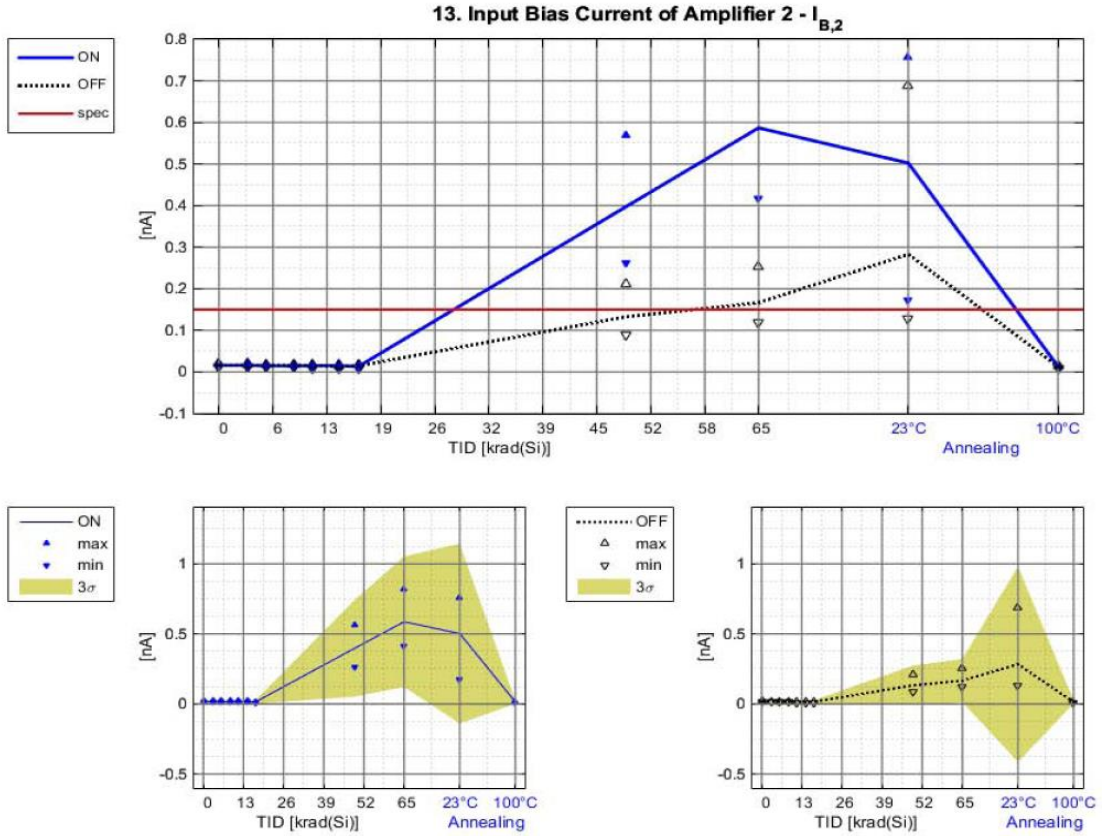
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			12. Offset Voltage of Amplifier 2									$V_{OS,2}$		unit mV
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max										-0.003	mV
			Min										-0.003	mV
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn12	0.009	0.008	0.007	0.010	0.008	0.007	0.006	0.006	0.006	0.003	0.004	mV
		sn13	0.010	0.009	0.009	0.011	0.008	0.007	0.008	0.006	0.005	0.004	0.005	mV
		sn14	0.008	0.009	0.008	0.009	0.008	0.007	0.007	0.005	0.005	0.003	0.005	mV
		sn15	0.008	0.007	0.006	0.008	0.006	0.005	0.006	0.005	0.001	0.000	0.002	mV
		sn16	0.007	0.006	0.007	0.009	0.006	0.006	0.004	0.004	0.002	0.004	0.002	mV
	OFF	sn17	0.005	0.006	0.005	0.006	0.006	0.005	0.004	0.006	0.007	0.001	0.002	mV
		sn18	0.005	0.005	0.006	0.006	0.005	0.005	0.004	0.006	0.006	0.002	0.001	mV
		sn19	0.004	0.004	0.004	0.005	0.004	0.001	0.003	0.005	0.005	0.004	0.000	mV
		sn20	0.004	0.005	0.003	0.005	0.002	0.002	0.003	0.004	0.004	0.002	-0.002	mV
		sn21	0.005	0.007	0.005	0.005	0.004	0.003	0.005	0.006	0.005	0.001	0.001	mV
	reference	sn22	0.005	0.005	0.005	0.005	0.003	0.004	0.003	0.006	0.005	0.001	0.000	mV
Statistical analysis [see annex]	ON	Max	0.010	0.009	0.009	0.011	0.008	0.007	0.008	0.006	0.006	0.004	0.005	mV
		Min	0.007	0.006	0.006	0.008	0.006	0.005	0.004	0.004	0.001	0.000	0.002	mV
		Mean	**0.008**	**0.008**	**0.007**	**0.009**	**0.007**	**0.006**	**0.006**	**0.005**	**0.004**	**0.003**	**0.004**	mV
		St. dev	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	mV
		Lmax	0.012	0.011	0.011	0.013	0.010	0.009	0.010	0.007	0.010	0.007	0.008	mV
		Lmin	0.005	0.004	0.004	0.006	0.004	0.004	0.002	0.003	-0.002	-0.002	-0.001	mV
	OFF	Max	0.005	0.007	0.006	0.006	0.006	0.005	0.005	0.006	0.007	0.004	0.002	mV
		Min	0.004	0.004	0.003	0.005	0.002	0.001	0.003	0.004	0.004	0.001	-0.002	mV
		Mean	**0.005**	**0.005**	**0.005**	**0.005**	**0.004**	**0.003**	**0.004**	**0.005**	**0.005**	**0.002**	**0.000**	mV
		St. dev	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.002	mV
		Lmax	0.006	0.009	0.008	0.007	0.008	0.008	0.006	0.008	0.009	0.005	0.005	mV
		Lmin	0.003	0.002	0.001	0.004	0.000	-0.002	0.002	0.003	0.002	-0.001	-0.004	mV



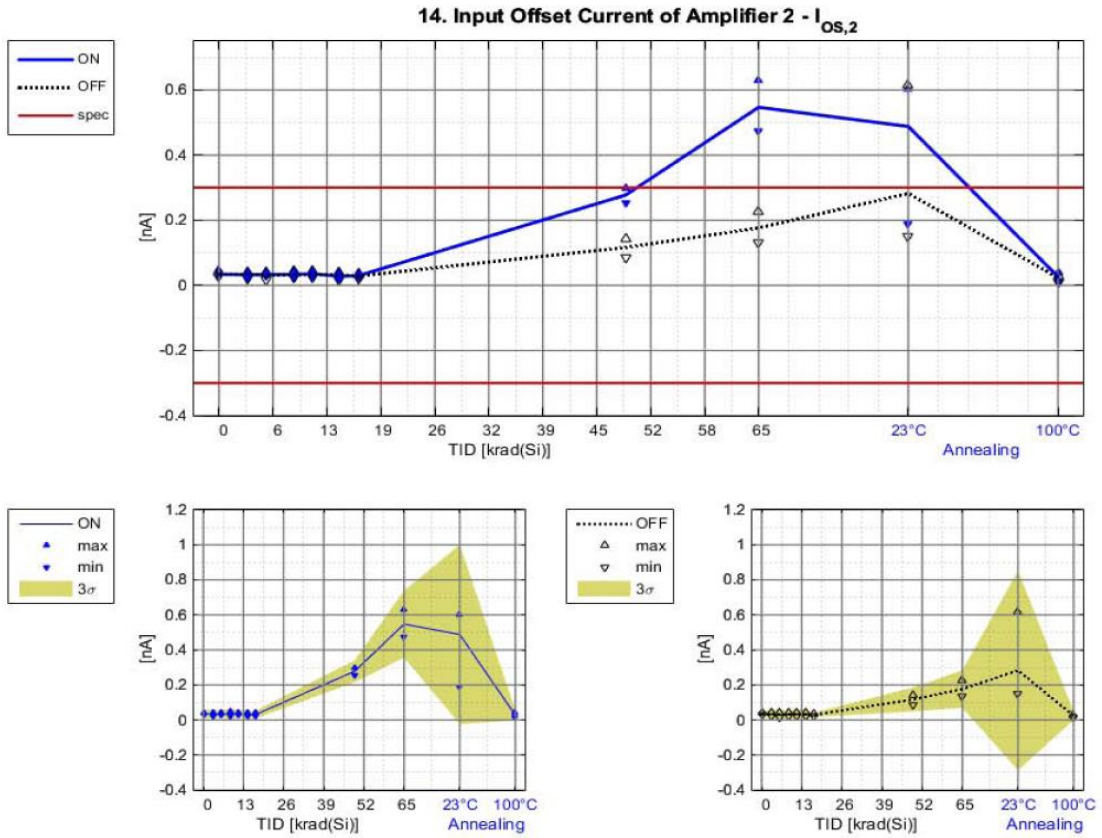
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			13. Input Bias Current of Amplifier 2									$I_{B,2}$		unit nA
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max										0.15	nA
			Min										-0.15	nA
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn12	0.014	0.015	0.011	0.014	0.015	0.013	0.013	0.568	0.820	0.758	0.009	nA
		sn13	0.012	0.013	0.014	0.012	0.011	0.012	0.010	0.376	0.537	0.575	0.009	nA
		sn14	0.022	0.024	0.022	0.020	0.021	0.022	0.019	0.341	0.508	0.546	0.017	nA
		sn15	0.018	0.016	0.016	0.015	0.017	0.016	0.014	0.261	0.416	0.459	0.015	nA
		sn16	0.014	0.012	0.013	0.012	0.013	0.013	0.010	0.439	0.653	0.173	0.016	nA
	OFF	sn17	0.016	0.018	0.018	0.019	0.015	0.016	0.017	0.113	0.141	0.687	0.010	nA
		sn18	0.018	0.018	0.018	0.018	0.018	0.016	0.018	0.212	0.254	0.155	0.016	nA
		sn19	0.020	0.018	0.017	0.019	0.018	0.015	0.016	0.128	0.158	0.276	0.015	nA
		sn20	0.013	0.015	0.014	0.013	0.015	0.013	0.014	0.088	0.120	0.127	0.014	nA
		sn21	0.012	0.013	0.012	0.012	0.010	0.010	0.009	0.122	0.160	0.170	0.010	nA
	reference	sn22	0.012	0.010	0.013	0.011	0.012	0.008	0.011	0.012	0.010	0.015	0.009	nA
Statistical analysis [see annex]	ON	Max	0.022	0.024	0.022	0.020	0.021	0.022	0.019	0.568	0.820	0.758	0.017	nA
		Min	0.012	0.012	0.011	0.012	0.011	0.012	0.010	0.261	0.416	0.173	0.009	nA
		Mean	**0.016**	**0.016**	**0.015**	**0.015**	**0.015**	**0.015**	**0.013**	**0.397**	**0.587**	**0.502**	**0.013**	nA
		St. dev	0.004	0.005	0.004	0.003	0.004	0.004	0.004	0.115	0.155	0.214	0.004	nA
		Lmax	0.027	0.029	0.027	0.024	0.026	0.026	0.023	0.713	1.013	1.089	0.024	nA
		Lmin	0.005	0.003	0.004	0.006	0.005	0.004	0.003	0.081	0.161	-0.084	0.003	nA
	OFF	Max	0.020	0.018	0.018	0.019	0.018	0.016	0.018	0.212	0.254	0.687	0.016	nA
		Min	0.012	0.013	0.012	0.012	0.010	0.010	0.009	0.088	0.120	0.127	0.010	nA
		Mean	**0.016**	**0.016**	**0.016**	**0.016**	**0.015**	**0.014**	**0.015**	**0.133**	**0.167**	**0.283**	**0.013**	nA
		St. dev	0.003	0.002	0.003	0.003	0.003	0.003	0.004	0.047	0.051	0.233	0.003	nA
		Lmax	0.025	0.023	0.023	0.026	0.024	0.021	0.025	0.261	0.308	0.921	0.021	nA
		Lmin	0.007	0.010	0.008	0.007	0.006	0.007	0.005	0.004	0.026	-0.355	0.005	nA



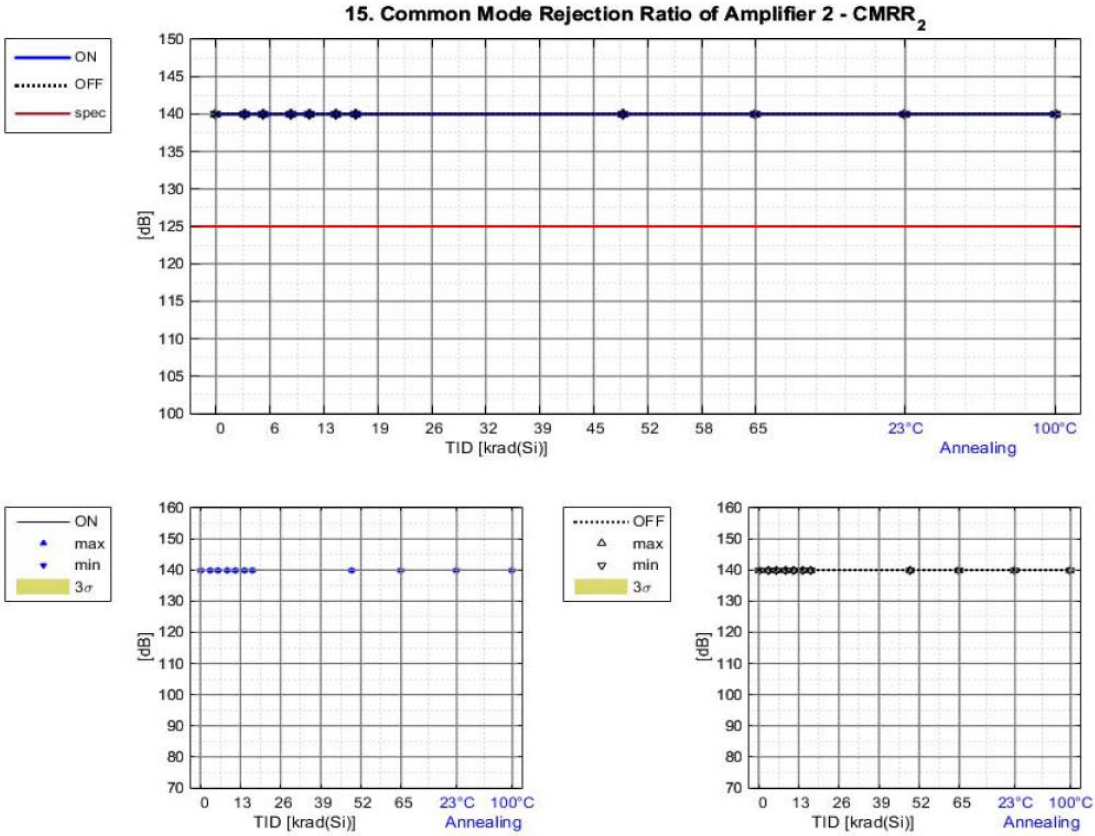
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			14. Input Offset Current of Amplifier 2									$I_{OS,2}$		unit nA
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max										0.3	nA
			Min										-0.3	nA
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn12	0.033	0.032	0.032	0.036	0.035	0.022	0.025	0.299	0.631	0.604	0.021	nA
		sn13	0.026	0.021	0.027	0.022	0.027	0.024	0.024	0.292	0.539	0.583	0.015	nA
		sn14	0.046	0.042	0.045	0.049	0.046	0.040	0.041	0.259	0.503	0.541	0.040	nA
		sn15	0.034	0.038	0.034	0.032	0.039	0.033	0.033	0.252	0.473	0.524	0.024	nA
		sn16	0.031	0.030	0.027	0.028	0.030	0.024	0.025	0.286	0.589	0.188	0.032	nA
	OFF	sn17	0.039	0.037	0.040	0.035	0.035	0.034	0.032	0.115	0.160	0.616	0.011	nA
		sn18	0.034	0.041	0.032	0.032	0.039	0.040	0.032	0.144	0.225	0.188	0.030	nA
		sn19	0.040	0.038	0.036	0.042	0.044	0.037	0.030	0.104	0.168	0.250	0.030	nA
		sn20	0.027	0.030	0.032	0.023	0.024	0.030	0.028	0.087	0.132	0.149	0.025	nA
		sn21	0.030	0.021	0.017	0.029	0.024	0.018	0.022	0.133	0.197	0.209	0.023	nA
	reference	sn22	0.028	0.020	0.028	0.022	0.021	0.025	0.024	0.023	0.028	0.018	0.019	nA
Statistical analysis [see annex]	ON	Max	0.046	0.042	0.045	0.049	0.046	0.040	0.041	0.299	0.631	0.604	0.040	nA
		Min	0.026	0.021	0.027	0.022	0.027	0.022	0.024	0.252	0.473	0.188	0.015	nA
		Mean	**0.034**	**0.033**	**0.033**	**0.033**	**0.035**	**0.029**	**0.030**	**0.278**	**0.547**	**0.488**	**0.026**	nA
		St. dev	0.007	0.008	0.007	0.010	0.008	0.008	0.007	0.021	0.064	0.171	0.010	nA
		Lmax	0.054	0.055	0.053	0.061	0.056	0.050	0.050	0.335	0.722	0.956	0.053	nA
		Lmin	0.014	0.011	0.013	0.006	0.015	0.008	0.009	0.220	0.372	0.020	0.000	nA
	OFF	Max	0.040	0.041	0.040	0.042	0.044	0.040	0.032	0.144	0.225	0.616	0.030	nA
		Min	0.027	0.021	0.017	0.023	0.024	0.018	0.022	0.087	0.132	0.149	0.011	nA
		Mean	**0.034**	**0.033**	**0.031**	**0.032**	**0.033**	**0.032**	**0.029**	**0.117**	**0.176**	**0.282**	**0.024**	nA
		St. dev	0.006	0.008	0.009	0.007	0.009	0.009	0.004	0.023	0.036	0.190	0.008	nA
		Lmax	0.049	0.055	0.055	0.052	0.058	0.055	0.040	0.179	0.274	0.803	0.045	nA
		Lmin	0.019	0.011	0.008	0.013	0.009	0.008	0.017	0.054	0.079	-0.239	0.002	nA



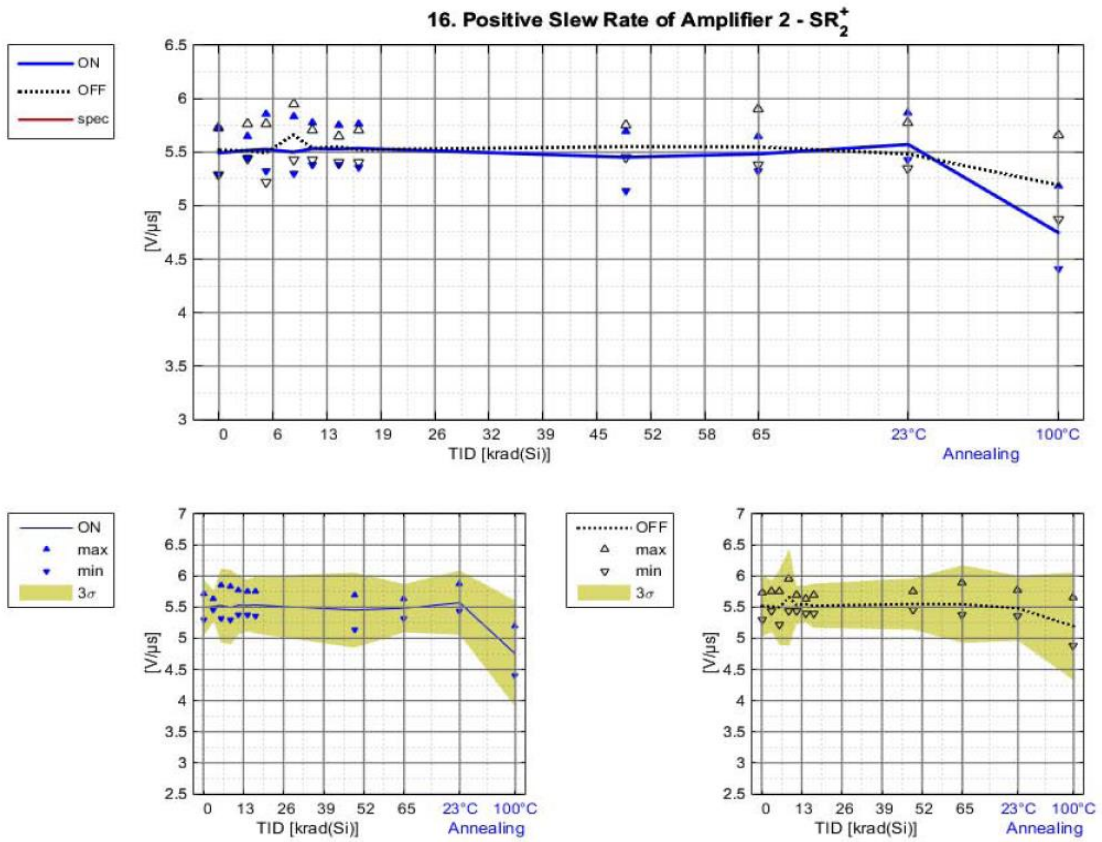
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			15. Common Mode Rejection Ratio of Amplifier 2									$CMRR_2$		unit dB
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max										-	dB
			Min										125	dB
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn12	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn13	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn14	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn15	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn16	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
	OFF	sn17	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn18	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn19	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn20	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn21	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
	reference	sn22	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
Statistical analysis [see annex]	ON	Max	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Min	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Mean	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	dB
		St. dev	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	dB
		Lmax	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Lmin	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
	OFF	Max	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Min	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Mean	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	dB
		St. dev	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	dB
		Lmax	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Lmin	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB



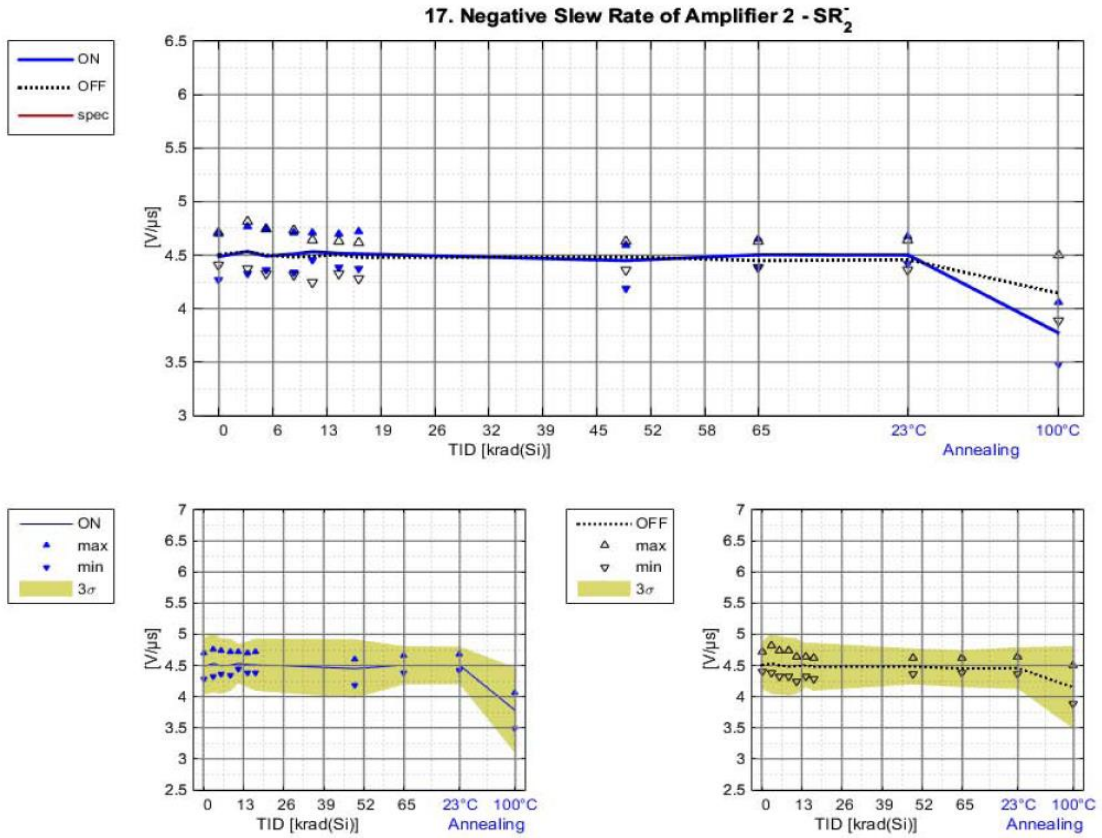
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			16. Positive Slew Rate of Amplifier 2									SR^+_2		unit V/µs
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max									-		V/µs
			Min									2		V/µs
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn12	5.718	5.549	5.852	5.837	5.777	5.747	5.762	5.689	5.646	5.867	5.190	V/µs
		sn13	5.481	5.455	5.455	5.455	5.604	5.521	5.604	5.428	5.402	5.428	4.792	V/µs
		sn14	5.455	5.481	5.455	5.455	5.455	5.455	5.468	5.549	5.576	5.562	4.673	V/µs
		sn15	5.521	5.646	5.549	5.455	5.455	5.549	5.481	5.455	5.468	5.521	4.407	V/µs
		sn16	5.288	5.455	5.325	5.300	5.376	5.376	5.364	5.143	5.325	5.481	4.683	V/µs
	OFF	sn17	5.562	5.455	5.481	5.535	5.495	5.521	5.455	5.455	5.455	5.351	5.190	V/µs
		sn18	5.732	5.762	5.762	5.945	5.521	5.646	5.703	5.646	5.898	5.481	5.155	V/µs
		sn19	5.562	5.455	5.562	5.945	5.703	5.632	5.576	5.747	5.576	5.777	5.660	V/µs
		sn20	5.288	5.441	5.214	5.455	5.428	5.402	5.402	5.455	5.376	5.351	4.875	V/µs
		sn21	5.455	5.455	5.455	5.428	5.535	5.549	5.481	5.455	5.441	5.455	5.085	V/µs
	reference	sn22	5.313	5.119	5.300	5.143	5.441	5.364	5.313	5.338	5.313	5.338	5.376	V/µs
Statistical analysis [see annex]	ON	Max	5.718	5.646	5.852	5.837	5.777	5.747	5.762	5.689	5.646	5.867	5.190	V/µs
		Min	5.288	5.455	5.325	5.300	5.376	5.376	5.364	5.143	5.325	5.428	4.407	V/µs
		Mean	**5.493**	**5.517**	**5.527**	**5.500**	**5.533**	**5.530**	**5.536**	**5.453**	**5.483**	**5.572**	**4.749**	V/µs
		St. dev	0.154	0.082	0.198	0.200	0.159	0.139	0.152	0.201	0.129	0.172	0.284	V/µs
		Lmax	5.915	5.741	6.071	6.048	5.970	5.910	5.954	6.004	5.838	6.044	5.529	V/µs
		Lmin	5.070	5.293	4.983	4.953	5.097	5.149	5.118	4.902	5.129	5.099	3.969	V/µs
	OFF	Max	5.732	5.762	5.762	5.945	5.703	5.646	5.703	5.747	5.898	5.777	5.660	V/µs
		Min	5.288	5.441	5.214	5.428	5.428	5.402	5.402	5.455	5.376	5.351	4.875	V/µs
		Mean	**5.520**	**5.514**	**5.495**	**5.662**	**5.536**	**5.550**	**5.523**	**5.552**	**5.549**	**5.483**	**5.193**	V/µs
		St. dev	0.163	0.139	0.198	0.262	0.102	0.098	0.119	0.137	0.208	0.175	0.288	V/µs
		Lmax	5.967	5.895	6.037	6.379	5.816	5.820	5.849	5.927	6.119	5.962	5.983	V/µs
		Lmin	5.072	5.132	4.952	4.944	5.257	5.280	5.198	5.176	4.979	5.004	4.403	V/µs



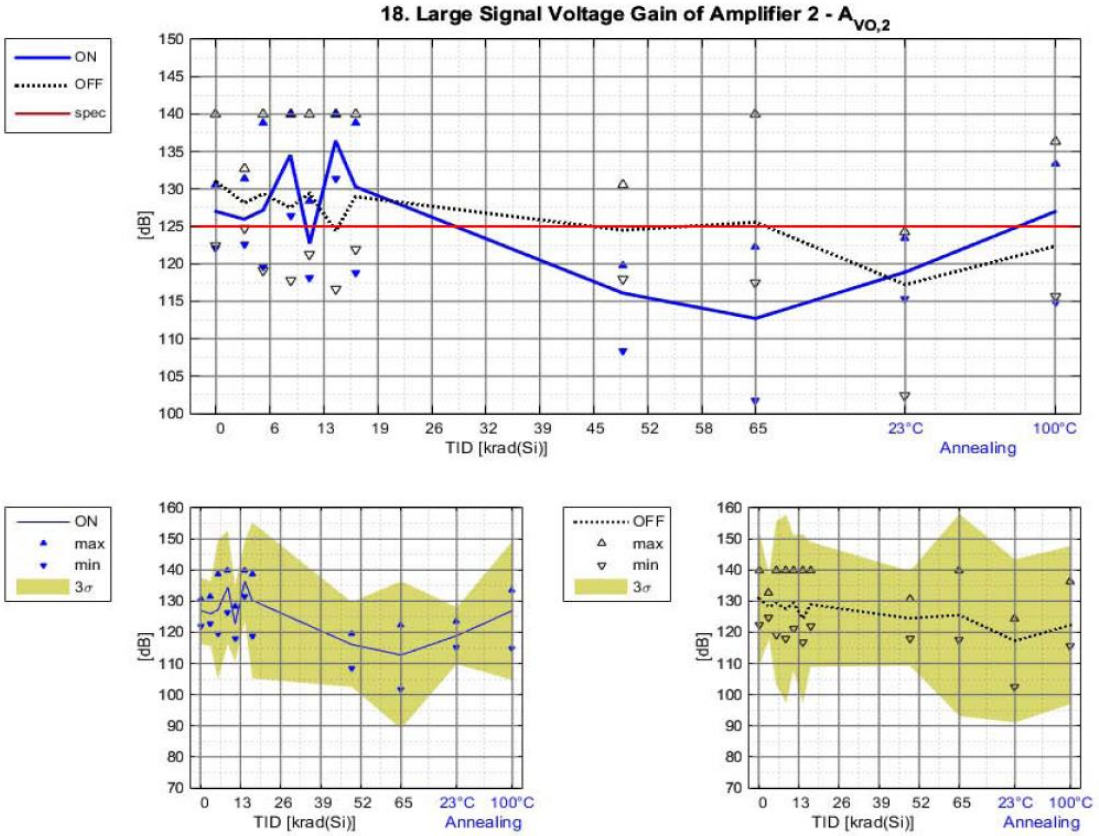
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			17. Negative Slew Rate of Amplifier 2									SR^-_2		unit V/µs
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max									-		V/µs
			Min									2		V/µs
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn12	4.702	4.762	4.742	4.712	4.712	4.702	4.722	4.597	4.654	4.673	4.065	V/µs
		sn13	4.460	4.523	4.416	4.469	4.496	4.559	4.487	4.442	4.442	4.425	3.930	V/µs
		sn14	4.469	4.487	4.425	4.460	4.469	4.433	4.373	4.487	4.523	4.505	3.759	V/µs
		sn15	4.523	4.569	4.505	4.569	4.532	4.505	4.569	4.532	4.514	4.460	3.486	V/µs
		sn16	4.274	4.331	4.365	4.339	4.451	4.382	4.407	4.186	4.382	4.442	3.632	V/µs
	OFF	sn17	4.523	4.487	4.496	4.416	4.523	4.469	4.469	4.505	4.399	4.416	4.095	V/µs
		sn18	4.712	4.813	4.742	4.732	4.644	4.634	4.615	4.625	4.625	4.365	4.087	V/µs
		sn19	4.416	4.496	4.514	4.487	4.514	4.587	4.569	4.487	4.425	4.644	4.496	V/µs
		sn20	4.407	4.373	4.323	4.314	4.241	4.331	4.282	4.365	4.407	4.390	3.883	V/µs
		sn21	4.460	4.496	4.425	4.460	4.523	4.505	4.460	4.433	4.390	4.469	4.163	V/µs
	reference	sn22	4.249	4.290	4.365	4.274	4.249	4.348	4.339	4.290	4.274	4.356	4.290	V/µs
Statistical analysis [see annex]	ON	Max	4.702	4.762	4.742	4.712	4.712	4.702	4.722	4.597	4.654	4.673	4.065	V/µs
		Min	4.274	4.331	4.365	4.339	4.451	4.382	4.373	4.186	4.382	4.425	3.486	V/µs
		Mean	**4.486**	**4.534**	**4.491**	**4.510**	**4.532**	**4.516**	**4.512**	**4.449**	**4.503**	**4.501**	**3.774**	V/µs
		St. dev	0.153	0.156	0.149	0.139	0.105	0.124	0.140	0.158	0.102	0.101	0.230	V/µs
		Lmax	4.906	4.961	4.900	4.892	4.820	4.856	4.895	4.881	4.783	4.777	4.406	V/µs
		Lmin	4.065	4.108	4.081	4.128	4.244	4.176	4.128	4.016	4.223	4.225	3.143	V/µs
	OFF	Max	4.712	4.813	4.742	4.732	4.644	4.634	4.615	4.625	4.625	4.644	4.496	V/µs
		Min	4.407	4.373	4.323	4.314	4.241	4.331	4.282	4.365	4.390	4.365	3.883	V/µs
		Mean	**4.504**	**4.533**	**4.500**	**4.482**	**4.489**	**4.505**	**4.479**	**4.483**	**4.449**	**4.457**	**4.145**	V/µs
		St. dev	0.125	0.165	0.155	0.155	0.149	0.117	0.128	0.096	0.099	0.112	0.223	V/µs
		Lmax	4.847	4.985	4.924	4.906	4.897	4.827	4.831	4.747	4.721	4.763	4.755	V/µs
		Lmin	4.160	4.081	4.076	4.058	4.081	4.184	4.127	4.219	4.177	4.151	3.535	V/µs



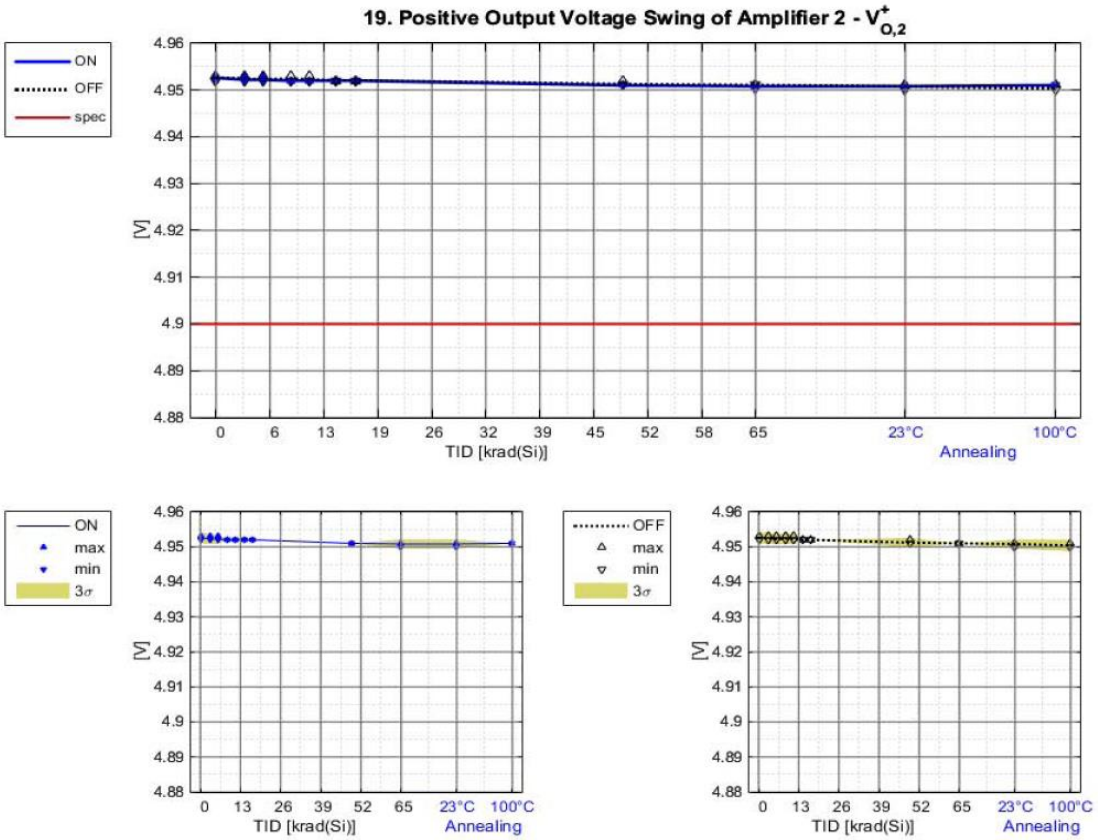
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			18. Large Signal Voltage Gain of Amplifier 2									$A_{VO,2}$		unit dB
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max									-		dB
			Min									125		dB
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn12	130.426	122.611	119.558	130.015	128.313	140.000	138.887	116.685	122.240	117.269	125.465	dB
		sn13	130.538	127.054	129.562	140.000	124.585	131.386	136.856	119.750	116.911	120.094	132.271	dB
		sn14	126.557	125.002	138.770	126.458	119.357	140.000	131.896	118.865	108.311	118.430	133.380	dB
		sn15	125.365	123.694	125.378	140.000	123.131	138.374	118.799	116.869	114.268	115.307	128.869	dB
		sn16	122.129	131.392	122.647	136.185	118.123	132.409	125.027	108.289	101.797	123.373	114.863	dB
	OFF	sn17	131.361	124.791	140.000	140.000	133.104	122.701	140.000	128.090	117.461	102.467	115.643	dB
		sn18	140.000	132.632	119.075	136.057	140.000	120.579	129.018	118.001	118.264	121.316	117.392	dB
		sn19	124.814	125.428	135.365	124.872	126.787	140.000	127.344	130.628	140.000	124.285	136.403	dB
		sn20	136.324	130.881	130.122	118.724	125.967	121.985	126.430	124.428	134.403	121.656	124.090	dB
		sn21	122.512	126.899	122.217	117.848	121.316	116.644	122.019	121.331	117.632	116.434	118.242	dB
	reference	sn22	117.668	119.149	140.000	120.417	115.889	123.198	116.135	116.786	119.296	116.685	118.724	dB
Statistical analysis [see annex]	ON	Max	130.538	131.392	138.770	140.000	128.313	140.000	138.887	119.750	122.240	123.373	133.380	dB
		Min	122.129	122.611	119.558	126.458	118.123	131.386	118.799	108.289	101.797	115.307	114.863	dB
		Mean	**127.003**	**125.951**	**127.183**	**134.532**	**122.702**	**136.434**	**130.293**	**116.092**	**112.705**	**118.895**	**126.970**	dB
		St. dev	3.565	3.463	7.448	6.085	4.104	4.209	8.357	4.553	7.895	3.051	7.444	dB
		Lmax	136.780	135.446	147.605	151.217	133.955	147.976	153.207	128.575	134.354	127.259	147.380	dB
		Lmin	117.226	116.455	106.761	117.846	111.449	124.891	107.379	103.608	91.057	110.530	106.559	dB
	OFF	Max	140.000	132.632	140.000	140.000	140.000	140.000	140.000	130.628	140.000	124.285	136.403	dB
		Min	122.512	124.791	119.075	117.848	121.316	116.644	122.019	118.001	117.461	102.467	115.643	dB
		Mean	**131.002**	**128.126**	**129.356**	**127.500**	**129.435**	**124.382**	**128.962**	**124.496**	**125.552**	**117.232**	**122.354**	dB
		St. dev	7.413	3.457	8.756	10.082	7.246	9.039	6.691	5.068	10.821	8.727	8.470	dB
		Lmax	151.328	137.605	153.364	155.144	149.304	149.167	147.309	138.391	155.224	141.161	145.578	dB
		Lmin	110.677	118.647	105.347	99.856	109.565	99.596	110.616	110.600	95.880	93.302	99.130	dB



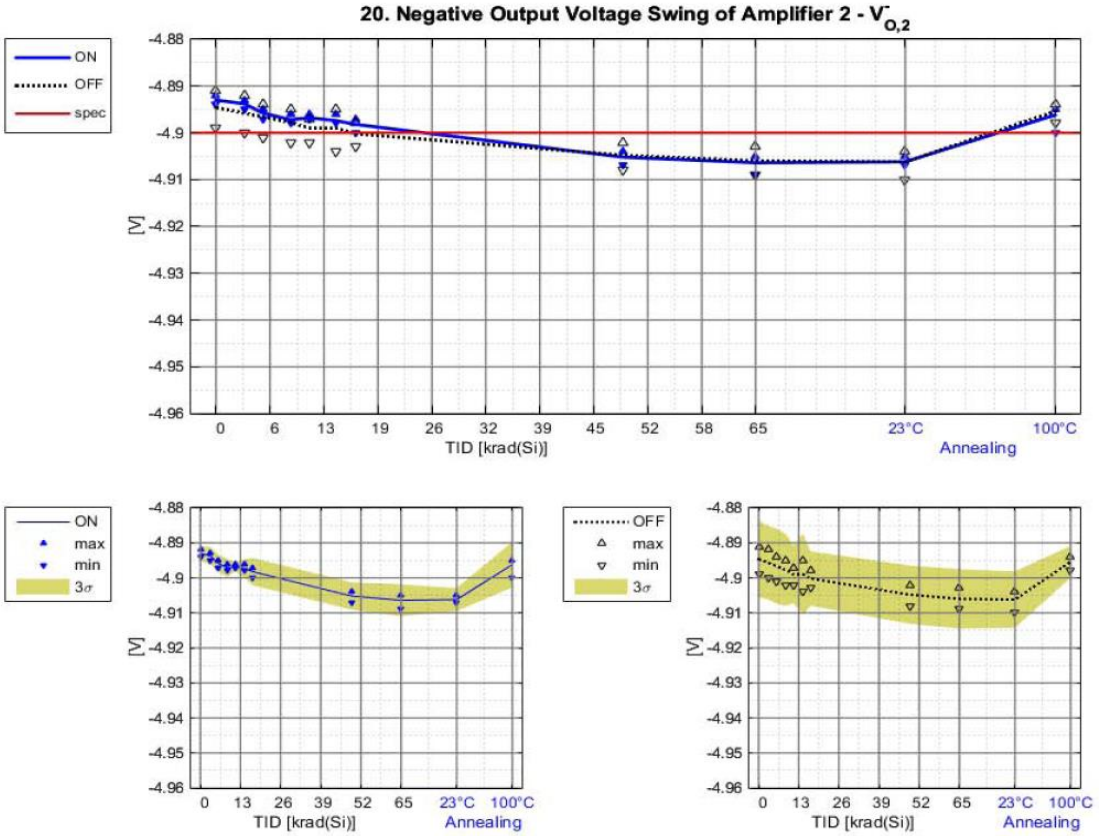
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			19. Positive Output Voltage Swing of Amplifier 2									$V^+_{O,2}$		unit V
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max									-		V
			Min									4.9		V
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn12	4.952	4.952	4.952	4.952	4.952	4.952	4.952	4.951	4.950	4.950	4.951	V
		sn13	4.952	4.952	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.951	4.951	V
		sn14	4.953	4.952	4.953	4.952	4.952	4.952	4.952	4.951	4.951	4.951	4.951	V
		sn15	4.953	4.952	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.951	4.951	V
		sn16	4.953	4.953	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.951	4.951	V
	OFF	sn17	4.952	4.952	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.950	4.951	V
		sn18	4.953	4.953	4.953	4.953	4.953	4.952	4.952	4.951	4.951	4.951	4.950	V
		sn19	4.952	4.952	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.951	4.951	V
		sn20	4.953	4.952	4.952	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.950	V
		sn21	4.953	4.953	4.952	4.953	4.952	4.952	4.952	4.951	4.951	4.951	4.950	V
	reference	sn22	4.952	4.952	4.952	4.952	4.952	4.952	4.952	4.952	4.952	4.951	4.952	V
Statistical analysis [see annex]	ON	Max	4.953	4.953	4.953	4.952	4.952	4.952	4.952	4.951	4.951	4.951	4.951	V
		Min	4.952	4.952	4.952	4.952	4.952	4.952	4.952	4.951	4.950	4.950	4.951	V
		Mean	**4.953**	**4.952**	**4.952**	**4.952**	**4.952**	**4.952**	**4.952**	**4.951**	**4.951**	**4.951**	**4.951**	V
		St. dev	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	V
		Lmax	4.954	4.953	4.953	4.952	4.952	4.952	4.952	4.951	4.952	4.952	4.951	V
		Lmin	4.951	4.951	4.951	4.952	4.952	4.952	4.952	4.951	4.950	4.950	4.951	V
	OFF	Max	4.953	4.953	4.953	4.953	4.953	4.952	4.952	4.952	4.951	4.951	4.951	V
		Min	4.952	4.952	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.950	4.950	V
		Mean	**4.953**	**4.952**	**4.952**	**4.952**	**4.952**	**4.952**	**4.952**	**4.951**	**4.951**	**4.951**	**4.950**	V
		St. dev	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	V
		Lmax	4.954	4.954	4.953	4.954	4.953	4.952	4.952	4.952	4.951	4.952	4.952	V
		Lmin	4.951	4.951	4.951	4.951	4.951	4.952	4.952	4.950	4.951	4.950	4.949	V



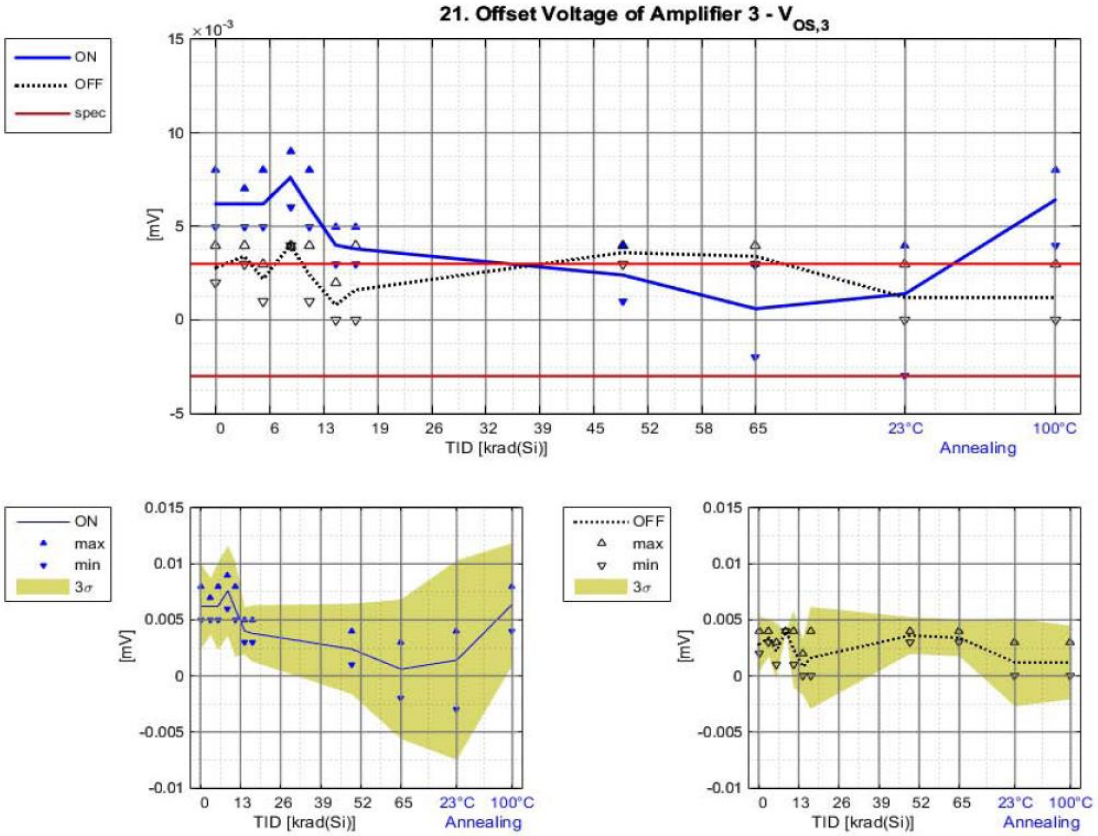
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			20. Negative Output Voltage Swing of Amplifier 2									$V^-_{O,2}$		unit V
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max									-4.9		V
			Min									-		V
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn12	-4.893	-4.895	-4.897	-4.898	-4.897	-4.898	-4.899	-4.907	-4.909	-4.907	-4.896	V
		sn13	-4.894	-4.894	-4.895	-4.897	-4.896	-4.898	-4.900	-4.905	-4.906	-4.907	-4.895	V
		sn14	-4.892	-4.893	-4.896	-4.897	-4.897	-4.897	-4.897	-4.904	-4.905	-4.905	-4.895	V
		sn15	-4.893	-4.893	-4.896	-4.896	-4.897	-4.896	-4.897	-4.904	-4.906	-4.905	-4.895	V
		sn16	-4.893	-4.894	-4.895	-4.898	-4.897	-4.898	-4.898	-4.906	-4.906	-4.907	-4.900	V
	OFF	sn17	-4.893	-4.894	-4.894	-4.895	-4.897	-4.896	-4.899	-4.902	-4.904	-4.908	-4.895	V
		sn18	-4.898	-4.899	-4.900	-4.901	-4.902	-4.902	-4.903	-4.908	-4.909	-4.904	-4.895	V
		sn19	-4.899	-4.900	-4.901	-4.902	-4.902	-4.904	-4.903	-4.907	-4.909	-4.910	-4.898	V
		sn20	-4.892	-4.892	-4.894	-4.896	-4.897	-4.895	-4.898	-4.902	-4.903	-4.905	-4.894	V
		sn21	-4.891	-4.894	-4.894	-4.895	-4.897	-4.898	-4.898	-4.905	-4.905	-4.904	-4.895	V
	reference	sn22	-4.893	-4.893	-4.894	-4.893	-4.893	-4.894	-4.895	-4.893	-4.892	-4.893	-4.892	V
Statistical analysis [see annex]	ON	Max	-4.892	-4.893	-4.895	-4.896	-4.896	-4.896	-4.897	-4.904	-4.905	-4.905	-4.895	V
		Min	-4.894	-4.895	-4.897	-4.898	-4.897	-4.898	-4.900	-4.907	-4.909	-4.907	-4.900	V
		Mean	**-4.893**	**-4.894**	**-4.896**	**-4.897**	**-4.897**	**-4.897**	**-4.898**	**-4.905**	**-4.906**	**-4.906**	**-4.896**	V
		St. dev	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.002	0.001	0.002	V
		Lmax	-4.891	-4.892	-4.894	-4.895	-4.896	-4.895	-4.895	-4.902	-4.902	-4.903	-4.890	V
		Lmin	-4.895	-4.896	-4.898	-4.899	-4.898	-4.900	-4.902	-4.909	-4.911	-4.909	-4.902	V
	OFF	Max	-4.891	-4.892	-4.894	-4.895	-4.897	-4.895	-4.898	-4.902	-4.903	-4.904	-4.894	V
		Min	-4.899	-4.900	-4.901	-4.902	-4.902	-4.904	-4.903	-4.908	-4.909	-4.910	-4.898	V
		Mean	**-4.895**	**-4.896**	**-4.897**	**-4.898**	**-4.899**	**-4.899**	**-4.900**	**-4.905**	**-4.906**	**-4.906**	**-4.895**	V
		St. dev	0.004	0.003	0.004	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.002	V
		Lmax	-4.885	-4.886	-4.887	-4.888	-4.891	-4.888	-4.893	-4.897	-4.898	-4.899	-4.891	V
		Lmin	-4.905	-4.905	-4.906	-4.907	-4.907	-4.910	-4.907	-4.912	-4.914	-4.914	-4.900	V



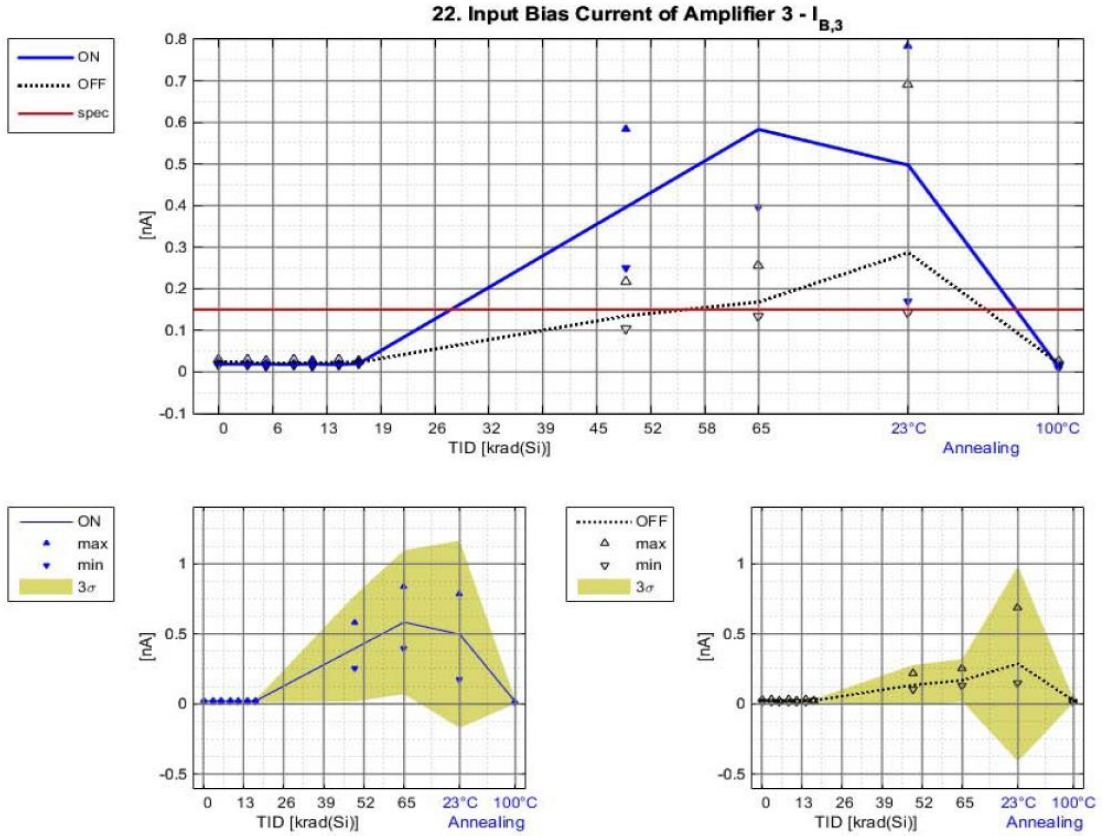
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			21. Offset Voltage of Amplifier 3									$V_{OS,3}$		unit mV
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max										0.003	mV
			Min										-0.003	mV
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn23	0.008	0.007	0.007	0.009	0.008	0.005	0.005	0.004	0.003	0.004	0.008	mV
		sn24	0.007	0.007	0.008	0.009	0.007	0.004	0.004	0.003	0.002	0.002	0.008	mV
		sn25	0.006	0.006	0.006	0.007	0.005	0.004	0.004	0.001	-0.001	0.000	0.007	mV
		sn26	0.005	0.006	0.005	0.007	0.005	0.003	0.003	0.001	-0.002	-0.003	0.005	mV
		sn27	0.005	0.005	0.005	0.006	0.005	0.004	0.003	0.003	0.001	0.004	0.004	mV
	OFF	sn28	0.004	0.004	0.002	0.004	0.003	0.002	0.004	0.003	0.004	0.000	0.003	mV
		sn29	0.002	0.004	0.003	0.004	0.004	0.000	0.001	0.004	0.004	0.003	0.001	mV
		sn30	0.003	0.003	0.003	0.004	0.002	0.001	0.001	0.004	0.003	0.002	0.001	mV
		sn31	0.002	0.003	0.001	0.004	0.002	0.001	0.002	0.004	0.003	0.000	0.001	mV
		sn32	0.003	0.003	0.002	0.004	0.001	0.000	0.000	0.003	0.003	0.001	0.000	mV
	reference	sn33	0.001	0.001	0.000	0.002	-0.001	-0.001	0.000	0.002	0.002	-0.001	-0.001	mV
Statistical analysis [see annex]	ON	Max	0.008	0.007	0.008	0.009	0.008	0.005	0.005	0.004	0.003	0.004	0.008	mV
		Min	0.005	0.005	0.005	0.006	0.005	0.003	0.003	0.001	-0.002	-0.003	0.004	mV
		Mean	**0.006**	**0.006**	**0.006**	**0.008**	**0.006**	**0.004**	**0.004**	**0.002**	**0.001**	**0.001**	**0.006**	mV
		St. dev	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.003	0.002	mV
		Lmax	0.010	0.008	0.010	0.011	0.010	0.006	0.006	0.006	0.006	0.010	0.011	mV
		Lmin	0.003	0.004	0.003	0.004	0.002	0.002	0.002	-0.001	-0.005	-0.007	0.001	mV
	OFF	Max	0.004	0.004	0.003	0.004	0.004	0.002	0.004	0.004	0.004	0.003	0.003	mV
		Min	0.002	0.003	0.001	0.004	0.001	0.000	0.000	0.003	0.003	0.000	0.000	mV
		Mean	**0.003**	**0.003**	**0.002**	**0.004**	**0.002**	**0.001**	**0.002**	**0.004**	**0.003**	**0.001**	**0.001**	mV
		St. dev	0.001	0.001	0.001	0.000	0.001	0.001	0.002	0.001	0.001	0.001	0.001	mV
		Lmax	0.005	0.005	0.004	0.004	0.006	0.003	0.006	0.005	0.005	0.005	0.004	mV
		Lmin	0.001	0.002	0.000	0.004	-0.001	-0.001	-0.003	0.002	0.002	-0.002	-0.002	mV



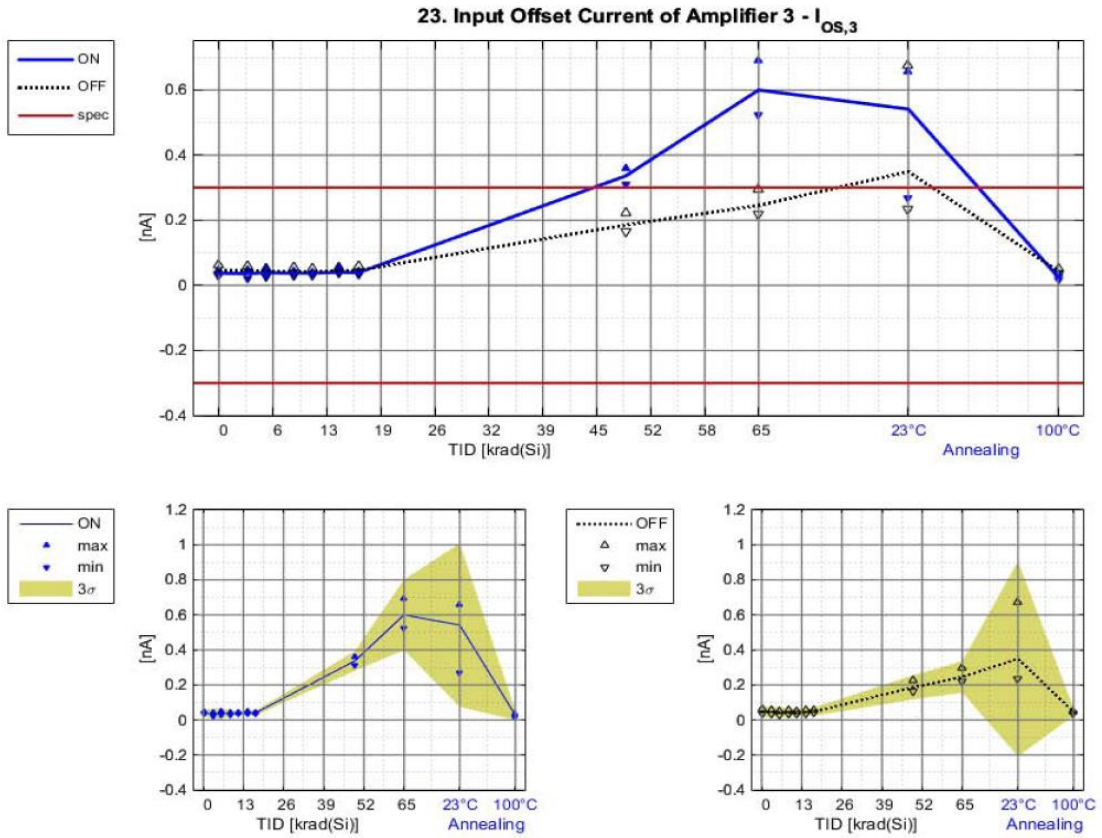
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			22. Input Bias Current of Amplifier 3									$I_{B,3}$		unit nA
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max										0.15	nA
			Min										-0.15	nA
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn23	0.017	0.017	0.016	0.018	0.018	0.014	0.018	0.585	0.840	0.785	0.011	nA
		sn24	0.017	0.018	0.017	0.014	0.016	0.016	0.017	0.370	0.531	0.563	0.010	nA
		sn25	0.019	0.021	0.019	0.019	0.021	0.018	0.020	0.332	0.494	0.532	0.012	nA
		sn26	0.023	0.021	0.022	0.021	0.023	0.022	0.023	0.250	0.395	0.435	0.017	nA
		sn27	0.019	0.019	0.020	0.019	0.018	0.020	0.021	0.443	0.655	0.171	0.019	nA
	OFF	sn28	0.023	0.020	0.017	0.019	0.018	0.022	0.022	0.107	0.136	0.691	0.024	nA
		sn29	0.019	0.018	0.014	0.017	0.015	0.018	0.020	0.218	0.257	0.151	0.020	nA
		sn30	0.026	0.025	0.023	0.021	0.023	0.025	0.024	0.128	0.159	0.281	0.019	nA
		sn31	0.031	0.029	0.027	0.030	0.028	0.029	0.028	0.103	0.134	0.144	0.028	nA
		sn32	0.024	0.023	0.020	0.019	0.021	0.021	0.022	0.118	0.156	0.167	0.018	nA
	reference	sn33	0.027	0.027	0.024	0.027	0.026	0.030	0.026	0.027	0.025	0.028	0.030	nA
Statistical analysis [see annex]	ON	Max	0.023	0.021	0.022	0.021	0.023	0.022	0.023	0.585	0.840	0.785	0.019	nA
		Min	0.017	0.017	0.016	0.014	0.016	0.014	0.017	0.250	0.395	0.171	0.010	nA
		Mean	**0.019**	**0.019**	**0.019**	**0.018**	**0.019**	**0.018**	**0.020**	**0.396**	**0.583**	**0.497**	**0.014**	nA
		St. dev	0.002	0.002	0.002	0.003	0.003	0.003	0.002	0.127	0.171	0.223	0.004	nA
		Lmax	0.026	0.024	0.025	0.025	0.027	0.027	0.026	0.743	1.052	1.108	0.025	nA
		Lmin	0.012	0.014	0.012	0.011	0.012	0.009	0.013	0.049	0.114	-0.114	0.003	nA
	OFF	Max	0.031	0.029	0.027	0.030	0.028	0.029	0.028	0.218	0.257	0.691	0.028	nA
		Min	0.019	0.018	0.014	0.017	0.015	0.018	0.020	0.103	0.134	0.144	0.018	nA
		Mean	**0.025**	**0.023**	**0.020**	**0.021**	**0.021**	**0.023**	**0.023**	**0.135**	**0.168**	**0.287**	**0.022**	nA
		St. dev	0.004	0.004	0.005	0.005	0.005	0.004	0.003	0.048	0.051	0.233	0.004	nA
		Lmax	0.037	0.035	0.034	0.035	0.035	0.034	0.032	0.265	0.308	0.925	0.033	nA
		Lmin	0.013	0.011	0.006	0.007	0.007	0.012	0.015	0.004	0.029	-0.351	0.010	nA



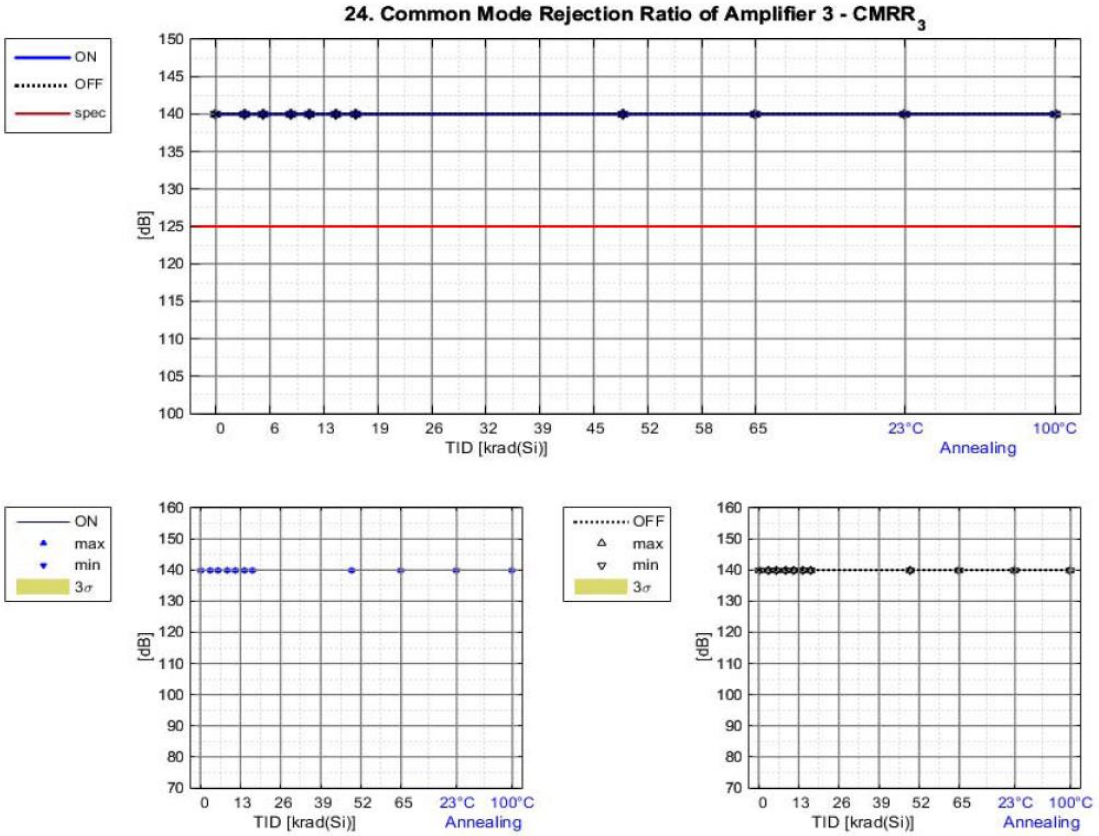
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			23. Input Offset Current of Amplifier 3									$I_{OS,3}$		unit nA
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max										0.3	nA
			Min										-0.3	nA
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn23	0.033	0.021	0.028	0.039	0.041	0.036	0.034	0.361	0.692	0.655	0.016	nA
		sn24	0.032	0.035	0.030	0.035	0.036	0.036	0.035	0.336	0.577	0.609	0.027	nA
		sn25	0.039	0.040	0.050	0.040	0.036	0.040	0.042	0.330	0.566	0.603	0.019	nA
		sn26	0.047	0.046	0.048	0.045	0.039	0.050	0.041	0.310	0.522	0.572	0.032	nA
		sn27	0.036	0.039	0.036	0.029	0.036	0.039	0.043	0.344	0.643	0.268	0.037	nA
	OFF	sn28	0.038	0.045	0.047	0.033	0.039	0.038	0.042	0.172	0.226	0.676	0.049	nA
		sn29	0.034	0.034	0.027	0.035	0.033	0.040	0.039	0.224	0.296	0.252	0.041	nA
		sn30	0.050	0.046	0.042	0.044	0.047	0.051	0.044	0.188	0.246	0.324	0.041	nA
		sn31	0.061	0.060	0.051	0.056	0.052	0.054	0.059	0.166	0.220	0.233	0.053	nA
		sn32	0.048	0.043	0.047	0.041	0.036	0.040	0.047	0.178	0.240	0.261	0.037	nA
	reference	sn33	0.051	0.048	0.051	0.050	0.052	0.050	0.058	0.051	0.049	0.056	0.057	nA
Statistical analysis [see annex]	ON	Max	0.047	0.046	0.050	0.045	0.041	0.050	0.043	0.361	0.692	0.655	0.037	nA
		Min	0.032	0.021	0.028	0.029	0.036	0.036	0.034	0.310	0.522	0.268	0.016	nA
		Mean	**0.037**	**0.036**	**0.038**	**0.038**	**0.038**	**0.040**	**0.039**	**0.336**	**0.600**	**0.541**	**0.026**	nA
		St. dev	0.006	0.009	0.010	0.006	0.002	0.006	0.004	0.019	0.067	0.156	0.009	nA
		Lmax	0.054	0.062	0.066	0.054	0.044	0.056	0.050	0.388	0.784	0.968	0.050	nA
		Lmin	0.021	0.011	0.011	0.021	0.031	0.024	0.028	0.285	0.416	0.115	0.002	nA
	OFF	Max	0.061	0.060	0.051	0.056	0.052	0.054	0.059	0.224	0.296	0.676	0.053	nA
		Min	0.034	0.034	0.027	0.033	0.033	0.038	0.039	0.166	0.220	0.233	0.037	nA
		Mean	**0.046**	**0.046**	**0.043**	**0.042**	**0.041**	**0.045**	**0.046**	**0.186**	**0.246**	**0.349**	**0.044**	nA
		St. dev	0.011	0.009	0.009	0.009	0.008	0.007	0.008	0.023	0.030	0.186	0.007	nA
		Lmax	0.075	0.071	0.069	0.067	0.063	0.065	0.067	0.249	0.328	0.859	0.062	nA
		Lmin	0.017	0.020	0.017	0.017	0.020	0.024	0.025	0.123	0.163	-0.160	0.026	nA



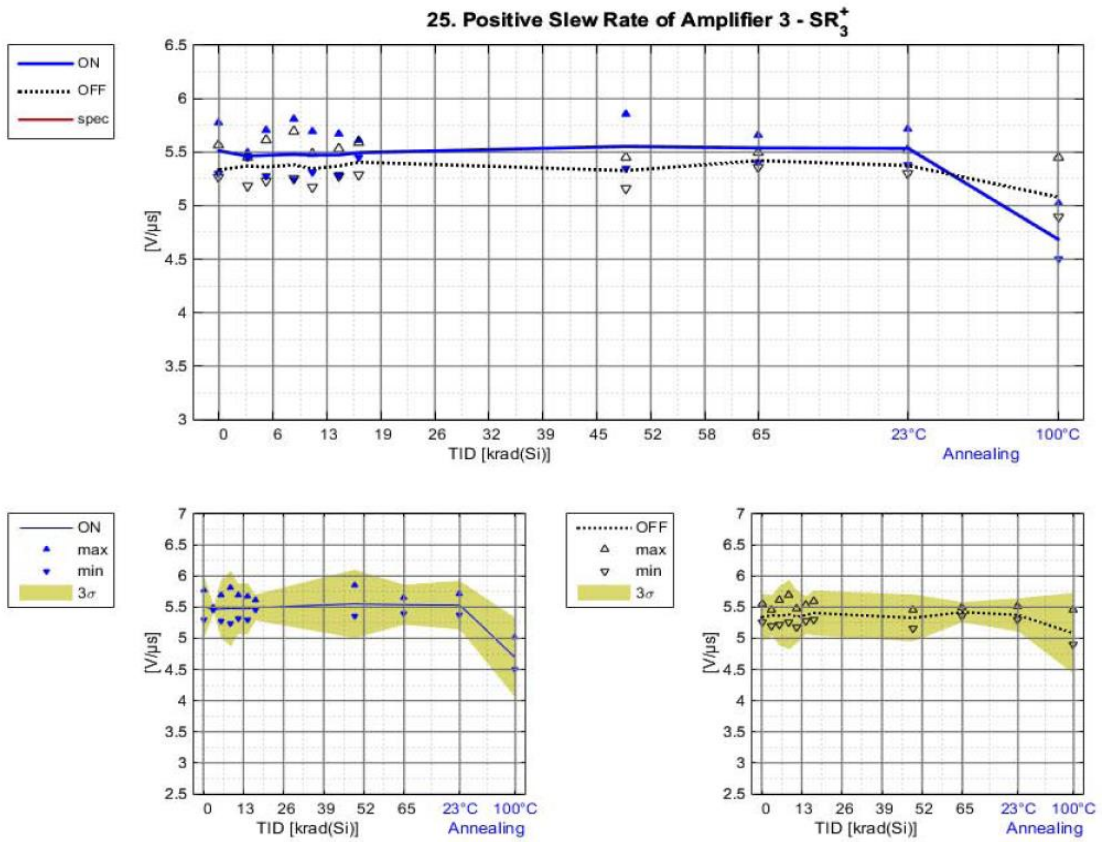
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			24. Common Mode Rejection Ratio of Amplifier 3									$CMRR_3$		unit dB
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max										-	dB
			Min										125	dB
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn23	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn24	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn25	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn26	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn27	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
	OFF	sn28	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn29	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn30	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn31	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn32	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
	reference	sn33	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
Statistical analysis [see annex]	ON	Max	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Min	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Mean	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	dB
		St. dev	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	dB
		Lmax	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Lmin	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
	OFF	Max	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Min	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Mean	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	dB
		St. dev	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	dB
		Lmax	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Lmin	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB



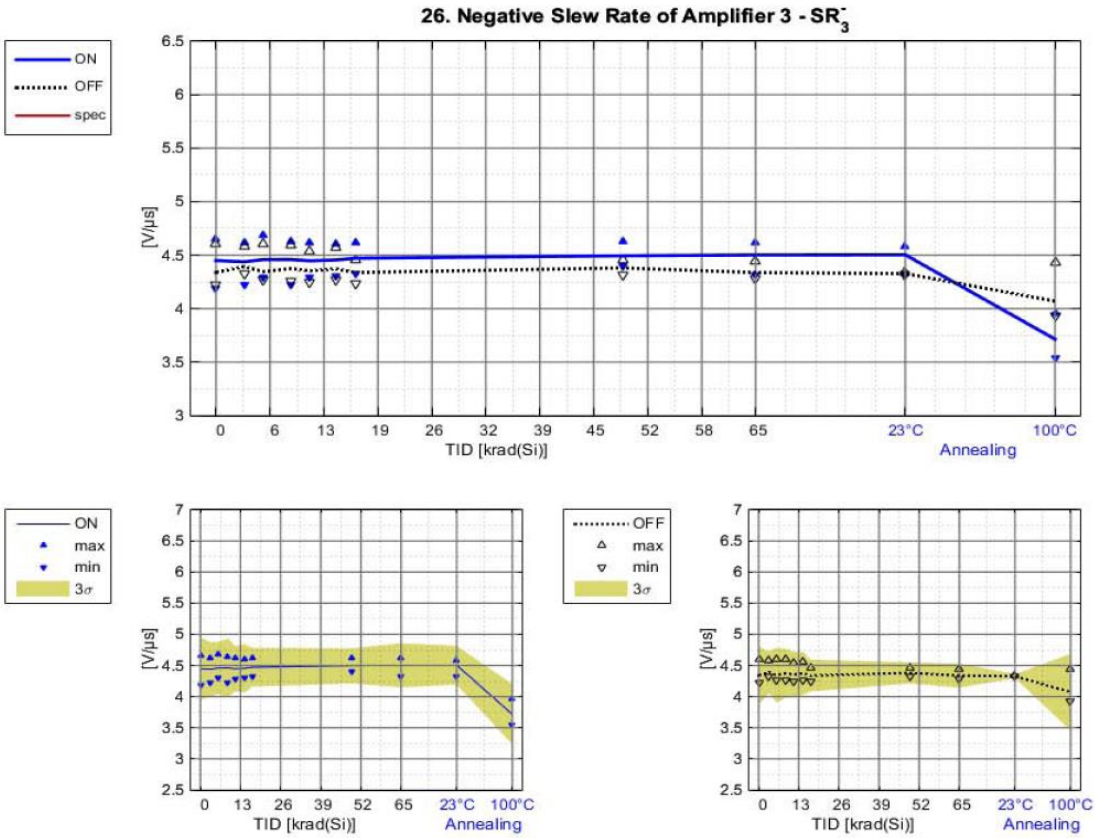
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			25. Positive Slew Rate of Amplifier 3									SR^{+}_{3}		unit V/µs
TEST CONDITIONS			V^{+} = 5V; V^{-} = -5V											
SPECIFICATION LIMITS [see test plan]			Max									-		V/µs
			Min									2		V/µs
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn23	5.777	5.495	5.703	5.806	5.689	5.675	5.618	5.852	5.660	5.718	5.028	V/µs
		sn24	5.590	5.455	5.468	5.455	5.455	5.468	5.481	5.508	5.590	5.604	4.732	V/µs
		sn25	5.468	5.455	5.481	5.455	5.455	5.481	5.455	5.549	5.590	5.495	4.654	V/µs
		sn26	5.428	5.455	5.428	5.441	5.455	5.455	5.468	5.508	5.455	5.481	4.514	V/µs
		sn27	5.300	5.455	5.275	5.239	5.313	5.288	5.455	5.351	5.402	5.376	4.505	V/µs
	OFF	sn28	5.263	5.389	5.226	5.275	5.178	5.275	5.288	5.300	5.455	5.300	4.994	V/µs
		sn29	5.562	5.455	5.618	5.689	5.481	5.535	5.590	5.455	5.495	5.313	5.051	V/µs
		sn30	5.300	5.455	5.402	5.263	5.202	5.338	5.455	5.455	5.364	5.521	5.455	V/µs
		sn31	5.275	5.190	5.275	5.428	5.441	5.313	5.376	5.263	5.376	5.351	4.897	V/µs
		sn32	5.275	5.364	5.288	5.251	5.428	5.389	5.325	5.166	5.415	5.389	5.006	V/µs
	reference	sn33	5.239	5.402	5.178	5.441	5.275	5.202	5.376	5.155	5.275	5.239	5.300	V/µs
Statistical analysis [see annex]	ON	Max	5.777	5.495	5.703	5.806	5.689	5.675	5.618	5.852	5.660	5.718	5.028	V/µs
		Min	5.300	5.455	5.275	5.239	5.313	5.288	5.455	5.351	5.402	5.376	4.505	V/µs
		Mean	**5.513**	**5.463**	**5.471**	**5.479**	**5.473**	**5.473**	**5.495**	**5.554**	**5.539**	**5.535**	**4.687**	V/µs
		St. dev	0.180	0.018	0.153	0.204	0.135	0.137	0.069	0.183	0.107	0.130	0.214	V/µs
		Lmax	6.007	5.512	5.892	6.040	5.844	5.850	5.686	6.056	5.832	5.892	5.272	V/µs
		Lmin	5.018	5.414	5.050	4.919	5.102	5.097	5.305	5.051	5.246	5.177	4.101	V/µs
	OFF	Max	5.562	5.455	5.618	5.689	5.481	5.535	5.590	5.455	5.495	5.521	5.455	V/µs
		Min	5.263	5.190	5.226	5.251	5.178	5.275	5.288	5.166	5.364	5.300	4.897	V/µs
		Mean	**5.335**	**5.371**	**5.362**	**5.381**	**5.346**	**5.370**	**5.407**	**5.328**	**5.421**	**5.375**	**5.081**	V/µs
		St. dev	0.128	0.109	0.157	0.187	0.144	0.101	0.120	0.126	0.055	0.089	0.217	V/µs
		Lmax	5.685	5.669	5.792	5.893	5.741	5.647	5.736	5.673	5.571	5.618	5.675	V/µs
		Lmin	4.985	5.073	4.931	4.870	4.951	5.093	5.078	4.982	5.271	5.131	4.486	V/µs



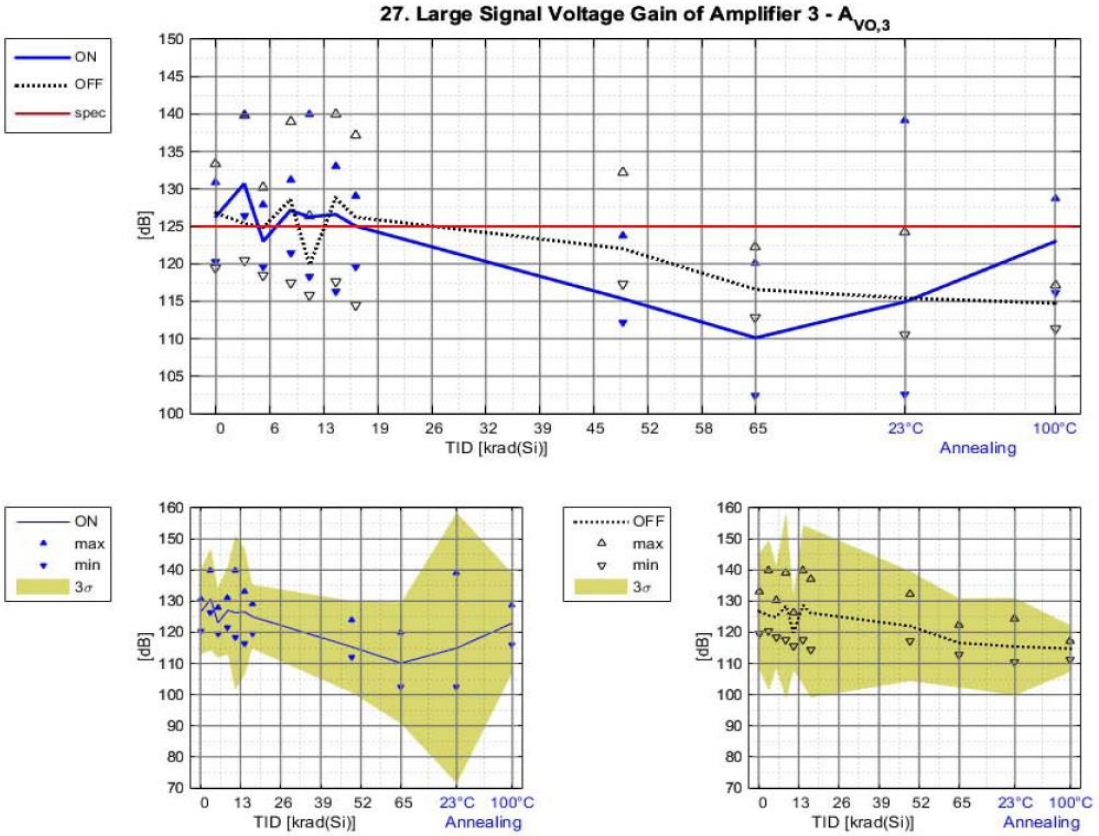
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			26. Negative Slew Rate of Amplifier 3									SR^-_3		unit V/µs
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max									-		V/µs
			Min									2		V/µs
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn23	4.654	4.615	4.683	4.634	4.615	4.606	4.615	4.625	4.615	4.587	3.958	V/µs
		sn24	4.496	4.382	4.451	4.496	4.382	4.331	4.460	4.532	4.532	4.541	3.741	V/µs
		sn25	4.460	4.496	4.416	4.407	4.460	4.505	4.469	4.505	4.469	4.514	3.734	V/µs
		sn26	4.451	4.469	4.442	4.541	4.487	4.523	4.487	4.407	4.578	4.550	3.597	V/µs
		sn27	4.186	4.225	4.298	4.217	4.290	4.306	4.323	4.399	4.314	4.323	3.541	V/µs
	OFF	sn28	4.265	4.382	4.282	4.314	4.249	4.323	4.339	4.399	4.348	4.314	3.972	V/µs
		sn29	4.606	4.587	4.606	4.597	4.541	4.569	4.460	4.460	4.442	4.323	4.021	V/µs
		sn30	4.257	4.323	4.265	4.257	4.241	4.265	4.290	4.339	4.282	4.339	4.433	V/µs
		sn31	4.348	4.348	4.282	4.365	4.365	4.339	4.365	4.314	4.323	4.339	3.930	V/µs
		sn32	4.217	4.323	4.290	4.339	4.373	4.365	4.233	4.390	4.290	4.323	3.993	V/µs
	reference	sn33	4.241	4.233	4.274	4.265	4.282	4.323	4.290	4.306	4.265	4.314	4.290	V/µs
Statistical analysis [see annex]	ON	Max	4.654	4.615	4.683	4.634	4.615	4.606	4.615	4.625	4.615	4.587	3.958	V/µs
		Min	4.186	4.225	4.298	4.217	4.290	4.306	4.323	4.399	4.314	4.323	3.541	V/µs
		Mean	**4.449**	**4.437**	**4.458**	**4.459**	**4.447**	**4.454**	**4.471**	**4.494**	**4.502**	**4.503**	**3.714**	V/µs
		St. dev	0.168	0.145	0.140	0.158	0.121	0.130	0.104	0.094	0.118	0.104	0.161	V/µs
		Lmax	4.911	4.835	4.842	4.893	4.779	4.810	4.755	4.751	4.826	4.788	4.157	V/µs
		Lmin	3.987	4.040	4.074	4.025	4.114	4.098	4.186	4.236	4.178	4.218	3.271	V/µs
	OFF	Max	4.606	4.587	4.606	4.597	4.541	4.569	4.460	4.460	4.442	4.339	4.433	V/µs
		Min	4.217	4.323	4.265	4.257	4.241	4.265	4.233	4.314	4.282	4.314	3.930	V/µs
		Mean	**4.339**	**4.393**	**4.345**	**4.374**	**4.354**	**4.372**	**4.337**	**4.380**	**4.337**	**4.328**	**4.070**	V/µs
		St. dev	0.157	0.111	0.146	0.131	0.122	0.116	0.085	0.057	0.064	0.011	0.206	V/µs
		Lmax	4.769	4.698	4.746	4.733	4.688	4.690	4.571	4.536	4.514	4.358	4.634	V/µs
		Lmin	3.908	4.087	3.944	4.016	4.020	4.054	4.104	4.225	4.160	4.297	3.506	V/µs



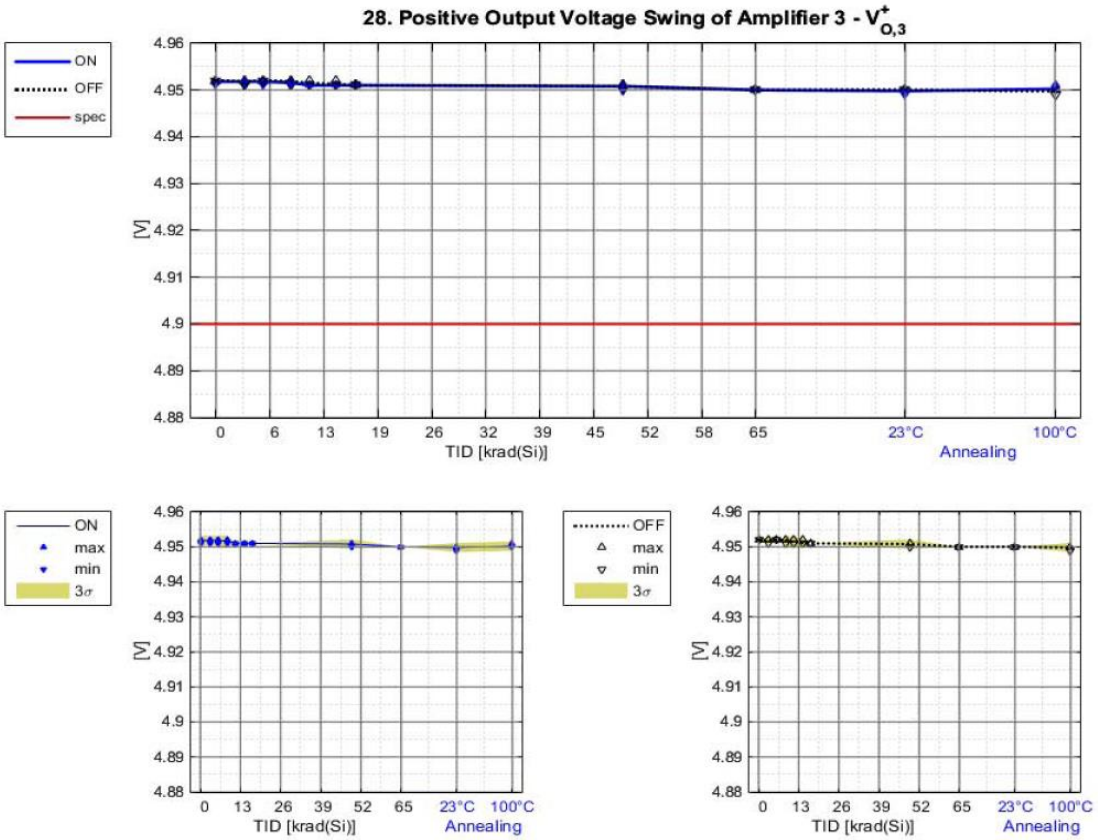
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			27. Large Signal Voltage Gain of Amplifier 3									$A_{VO,3}$		unit dB
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max									-		dB
			Min									125		dB
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn23	130.835	126.375	120.347	122.494	118.325	126.994	128.981	123.807	120.060	139.125	125.050	dB
		sn24	130.583	126.919	125.994	131.142	124.406	132.271	124.562	115.397	111.283	109.417	116.177	dB
		sn25	124.027	129.463	121.116	131.070	121.902	132.968	125.797	112.770	107.213	106.718	126.309	dB
		sn26	125.928	130.788	127.939	129.325	140.000	124.439	126.237	112.089	102.456	102.533	118.690	dB
		sn27	120.285	140.000	119.653	121.488	126.744	116.337	119.644	112.595	109.556	116.851	128.667	dB
	OFF	sn28	131.118	121.918	118.407	117.490	117.511	117.567	114.537	121.192	113.487	110.460	111.307	dB
		sn29	119.507	121.418	130.229	138.946	115.737	140.000	132.189	117.274	121.300	114.926	113.742	dB
		sn30	128.758	139.740	128.524	128.566	119.796	132.985	127.039	132.271	122.258	114.634	117.182	dB
		sn31	121.254	123.344	119.463	119.641	119.802	124.176	137.182	119.698	112.872	112.905	114.330	dB
		sn32	133.318	120.529	127.774	138.319	126.375	129.209	120.237	119.673	112.979	124.198	117.177	dB
	reference	sn33	114.275	114.233	114.006	114.975	116.244	114.594	121.308	117.714	115.563	113.547	114.728	dB
Statistical analysis [see annex]	ON	Max	130.835	140.000	127.939	131.142	140.000	132.968	128.981	123.807	120.060	139.125	128.667	dB
		Min	120.285	126.375	119.653	121.488	118.325	116.337	119.644	112.089	102.456	102.533	116.177	dB
		Mean	**126.332**	**130.709**	**123.010**	**127.104**	**126.275**	**126.602**	**125.044**	**115.332**	**110.114**	**114.929**	**122.979**	dB
		St. dev	4.483	5.501	3.713	4.737	8.283	6.761	3.424	4.909	6.474	14.497	5.301	dB
		Lmax	138.624	145.792	133.191	140.093	148.987	145.142	134.432	128.793	127.866	154.678	137.513	dB
		Lmin	114.039	115.626	112.829	114.115	103.564	108.062	115.657	101.871	92.361	75.179	108.444	dB
	OFF	Max	133.318	139.740	130.229	138.946	126.375	140.000	137.182	132.271	122.258	124.198	117.182	dB
		Min	119.507	120.529	118.407	117.490	115.737	117.567	114.537	117.274	112.872	110.460	111.307	dB
		Mean	**126.791**	**125.390**	**124.879**	**128.592**	**119.844**	**128.787**	**126.237**	**122.022**	**116.579**	**115.425**	**114.748**	dB
		St. dev	6.101	8.087	5.512	10.065	4.030	8.525	9.066	5.899	4.764	5.216	2.493	dB
		Lmax	143.521	147.563	139.992	156.190	130.895	152.162	151.095	138.197	129.643	129.728	121.582	dB
		Lmin	110.061	103.216	109.767	100.995	108.794	105.413	101.378	105.847	103.515	101.121	107.913	dB



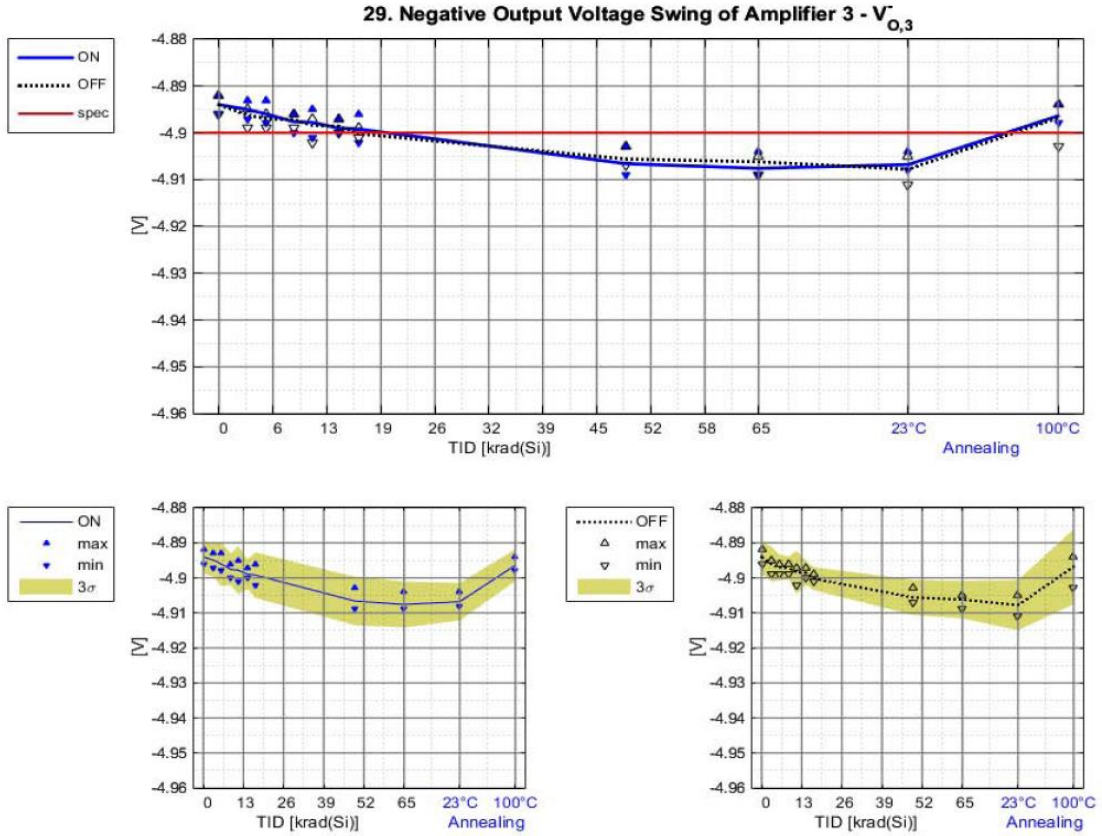
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			28. Positive Output Voltage Swing of Amplifier 3									$V^+_{O,3}$		unit V
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max									-		V
			Min									4.9		V
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn23	4.951	4.951	4.951	4.951	4.951	4.951	4.951	4.950	4.950	4.949	4.950	V
		sn24	4.952	4.952	4.952	4.952	4.951	4.951	4.951	4.951	4.950	4.950	4.950	V
		sn25	4.952	4.952	4.952	4.952	4.951	4.951	4.951	4.951	4.950	4.950	4.951	V
		sn26	4.952	4.952	4.952	4.951	4.951	4.951	4.951	4.951	4.950	4.950	4.950	V
		sn27	4.952	4.952	4.952	4.952	4.951	4.951	4.951	4.951	4.950	4.950	4.950	V
	OFF	sn28	4.952	4.951	4.952	4.951	4.951	4.951	4.951	4.951	4.950	4.950	4.950	V
		sn29	4.952	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.950	4.950	4.950	V
		sn30	4.952	4.952	4.952	4.952	4.951	4.951	4.951	4.950	4.950	4.950	4.950	V
		sn31	4.952	4.952	4.952	4.952	4.951	4.951	4.951	4.951	4.950	4.950	4.949	V
		sn32	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.951	4.950	4.950	4.950	V
	reference	sn33	4.952	4.951	4.952	4.952	4.952	4.952	4.951	4.952	4.951	4.951	4.951	V
Statistical analysis [see annex]	ON	Max	4.952	4.952	4.952	4.952	4.951	4.951	4.951	4.951	4.950	4.950	4.951	V
		Min	4.951	4.951	4.951	4.951	4.951	4.951	4.951	4.950	4.950	4.949	4.950	V
		Mean	**4.952**	**4.952**	**4.952**	**4.952**	**4.951**	**4.951**	**4.951**	**4.951**	**4.950**	**4.950**	**4.950**	V
		St. dev	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	V
		Lmax	4.953	4.953	4.953	4.953	4.951	4.951	4.951	4.952	4.950	4.951	4.951	V
		Lmin	4.951	4.951	4.951	4.950	4.951	4.951	4.951	4.950	4.950	4.949	4.949	V
	OFF	Max	4.952	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.950	4.950	4.950	V
		Min	4.952	4.951	4.952	4.951	4.951	4.951	4.951	4.950	4.950	4.950	4.949	V
		Mean	**4.952**	**4.952**	**4.952**	**4.952**	**4.951**	**4.951**	**4.951**	**4.951**	**4.950**	**4.950**	**4.950**	V
		St. dev	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	V
		Lmax	4.952	4.953	4.952	4.953	4.953	4.952	4.951	4.952	4.950	4.950	4.951	V
		Lmin	4.952	4.951	4.952	4.951	4.950	4.950	4.951	4.950	4.950	4.950	4.949	V



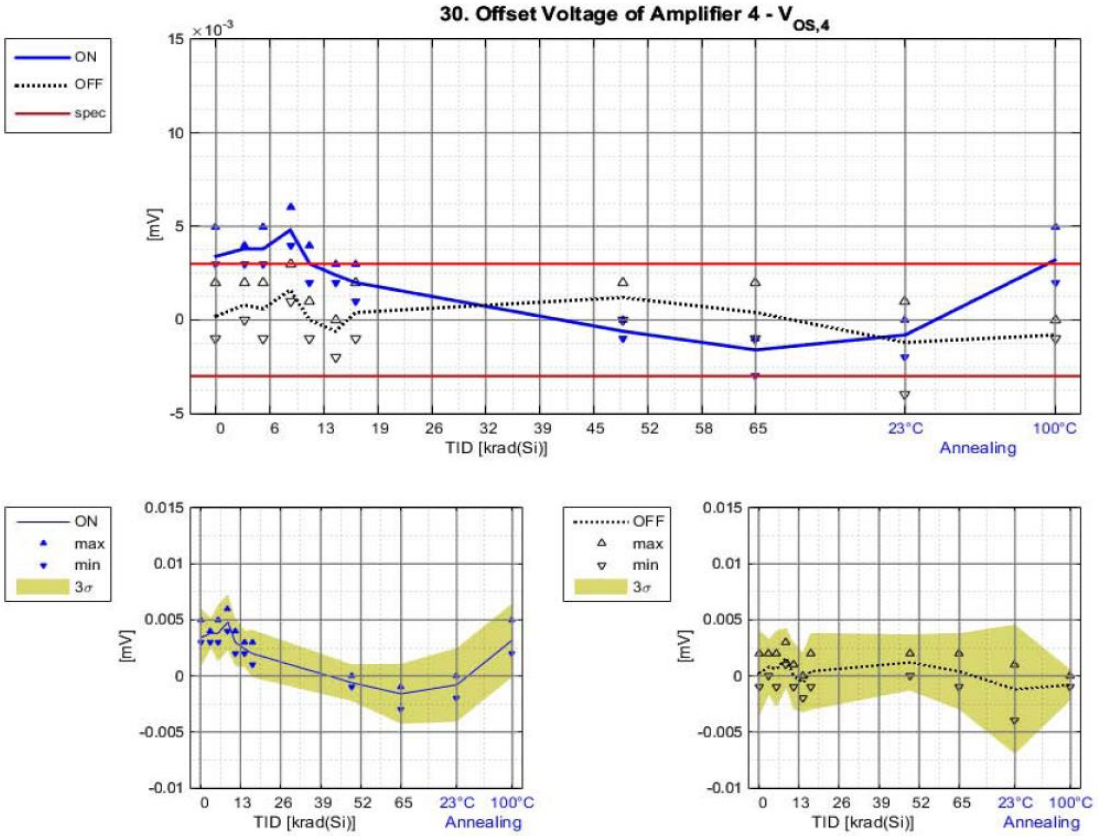
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			29. Negative Output Voltage Swing of Amplifier 3									$V^-_{O,3}$		unit V
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max									-4.9		V
			Min									-		V
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn23	-4.896	-4.897	-4.898	-4.900	-4.901	-4.900	-4.902	-4.909	-4.909	-4.908	-4.897	V
		sn24	-4.892	-4.894	-4.895	-4.896	-4.897	-4.900	-4.899	-4.908	-4.907	-4.906	-4.897	V
		sn25	-4.895	-4.896	-4.898	-4.898	-4.899	-4.900	-4.899	-4.907	-4.909	-4.908	-4.896	V
		sn26	-4.893	-4.893	-4.893	-4.897	-4.895	-4.897	-4.896	-4.903	-4.904	-4.904	-4.894	V
		sn27	-4.894	-4.895	-4.896	-4.897	-4.897	-4.898	-4.900	-4.906	-4.909	-4.908	-4.898	V
	OFF	sn28	-4.893	-4.896	-4.897	-4.897	-4.898	-4.898	-4.899	-4.906	-4.905	-4.909	-4.894	V
		sn29	-4.896	-4.899	-4.899	-4.899	-4.902	-4.900	-4.901	-4.907	-4.909	-4.906	-4.896	V
		sn30	-4.894	-4.896	-4.896	-4.897	-4.897	-4.899	-4.901	-4.907	-4.905	-4.911	-4.903	V
		sn31	-4.892	-4.895	-4.897	-4.896	-4.897	-4.897	-4.899	-4.903	-4.905	-4.905	-4.895	V
		sn32	-4.895	-4.895	-4.896	-4.897	-4.898	-4.899	-4.901	-4.905	-4.907	-4.908	-4.896	V
	reference	sn33	-4.893	-4.894	-4.894	-4.892	-4.894	-4.893	-4.891	-4.893	-4.893	-4.890	-4.892	V
Statistical analysis [see annex]	ON	Max	-4.892	-4.893	-4.893	-4.896	-4.895	-4.897	-4.896	-4.903	-4.904	-4.904	-4.894	V
		Min	-4.896	-4.897	-4.898	-4.900	-4.901	-4.900	-4.902	-4.909	-4.909	-4.908	-4.898	V
		Mean	**-4.894**	**-4.895**	**-4.896**	**-4.898**	**-4.898**	**-4.899**	**-4.899**	**-4.907**	**-4.908**	**-4.907**	**-4.896**	V
		St. dev	0.002	0.002	0.002	0.002	0.002	0.001	0.002	0.002	0.002	0.002	0.002	V
		Lmax	-4.890	-4.891	-4.890	-4.893	-4.892	-4.895	-4.893	-4.900	-4.902	-4.902	-4.892	V
		Lmin	-4.898	-4.899	-4.902	-4.902	-4.904	-4.903	-4.905	-4.913	-4.914	-4.912	-4.901	V
	OFF	Max	-4.892	-4.895	-4.896	-4.896	-4.897	-4.897	-4.899	-4.903	-4.905	-4.905	-4.894	V
		Min	-4.896	-4.899	-4.899	-4.899	-4.902	-4.900	-4.901	-4.907	-4.909	-4.911	-4.903	V
		Mean	**-4.894**	**-4.896**	**-4.897**	**-4.897**	**-4.898**	**-4.899**	**-4.900**	**-4.906**	**-4.906**	**-4.908**	**-4.897**	V
		St. dev	0.002	0.002	0.001	0.001	0.002	0.001	0.001	0.002	0.002	0.002	0.004	V
		Lmax	-4.890	-4.892	-4.894	-4.894	-4.893	-4.895	-4.897	-4.901	-4.901	-4.901	-4.887	V
		Lmin	-4.898	-4.901	-4.900	-4.900	-4.904	-4.902	-4.903	-4.910	-4.911	-4.914	-4.907	V



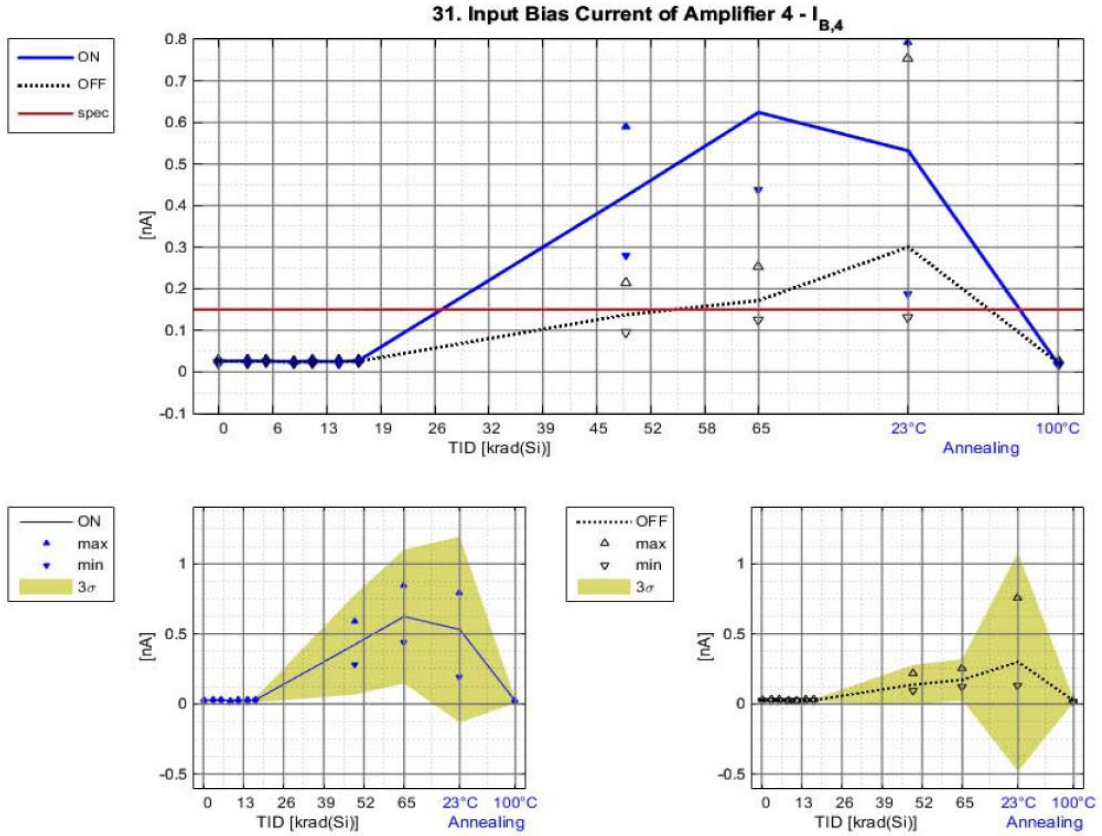
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			30. Offset Voltage of Amplifier 4									$V_{OS,4}$		unit mV
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max										0.003	mV
			Min										-0.003	mV
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn34	0.003	0.003	0.003	0.004	0.003	0.002	0.002	0.000	-0.001	0.000	0.003	mV
		sn35	0.005	0.004	0.005	0.006	0.004	0.003	0.002	-0.001	-0.001	-0.002	0.005	mV
		sn36	0.003	0.004	0.004	0.004	0.003	0.003	0.002	0.000	-0.001	0.000	0.003	mV
		sn37	0.003	0.004	0.004	0.005	0.002	0.002	0.003	-0.001	-0.003	-0.002	0.003	mV
		sn38	0.003	0.004	0.003	0.005	0.003	0.002	0.001	-0.001	-0.002	0.000	0.002	mV
	OFF	sn39	0.002	0.002	0.002	0.003	0.001	0.000	0.001	0.002	0.002	-0.004	-0.001	mV
		sn40	0.001	0.001	0.001	0.002	0.001	0.000	0.002	0.001	0.001	0.001	-0.001	mV
		sn41	-0.001	0.000	0.000	0.001	0.000	-0.002	0.000	0.001	-0.001	0.000	0.000	mV
		sn42	-0.001	0.000	-0.001	0.001	-0.001	-0.001	-0.001	0.000	0.000	-0.002	-0.001	mV
		sn43	0.000	0.001	0.001	0.001	-0.001	0.000	0.000	0.002	0.000	-0.001	-0.001	mV
	reference	sn44	0.001	0.001	0.000	0.001	-0.001	-0.001	0.000	0.001	0.001	-0.001	-0.001	mV
Statistical analysis [see annex]	ON	Max	0.005	0.004	0.005	0.006	0.004	0.003	0.003	0.000	-0.001	0.000	0.005	mV
		Min	0.003	0.003	0.003	0.004	0.002	0.002	0.001	-0.001	-0.003	-0.002	0.002	mV
		Mean	**0.003**	**0.004**	**0.004**	**0.005**	**0.003**	**0.002**	**0.002**	**-0.001**	**-0.002**	**-0.001**	**0.003**	mV
		St. dev	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	mV
		Lmax	0.006	0.005	0.006	0.007	0.005	0.004	0.004	0.001	0.001	0.002	0.006	mV
		Lmin	0.001	0.003	0.002	0.003	0.001	0.001	0.000	-0.002	-0.004	-0.004	0.000	mV
	OFF	Max	0.002	0.002	0.002	0.003	0.001	0.000	0.002	0.002	0.002	0.001	0.000	mV
		Min	-0.001	0.000	-0.001	0.001	-0.001	-0.002	-0.001	0.000	-0.001	-0.004	-0.001	mV
		Mean	**0.000**	**0.001**	**0.001**	**0.002**	**0.000**	**-0.001**	**0.000**	**0.001**	**0.000**	**-0.001**	**-0.001**	mV
		St. dev	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.000	mV
		Lmax	0.004	0.003	0.004	0.004	0.003	0.002	0.004	0.003	0.004	0.004	0.000	mV
		Lmin	-0.003	-0.001	-0.003	-0.001	-0.003	-0.003	-0.003	-0.001	-0.003	-0.006	-0.002	mV



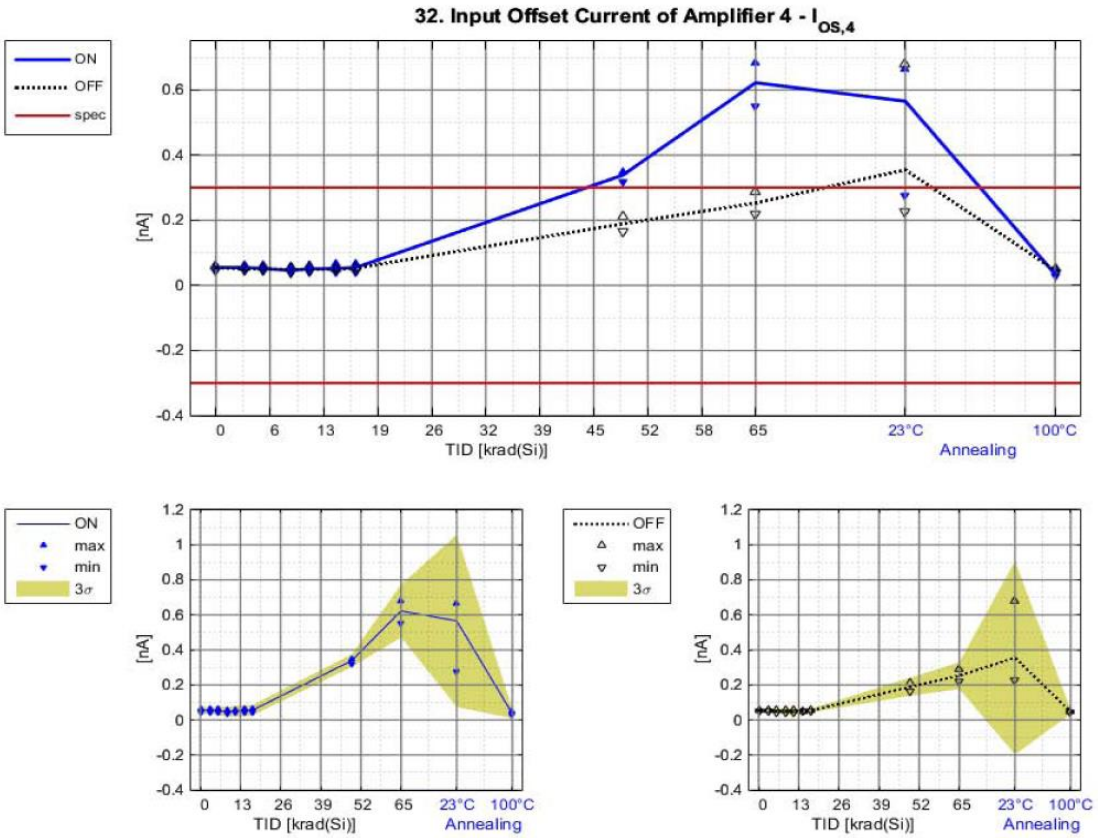
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			31. Input Bias Current of Amplifier 4									$I_{B,4}$		unit nA
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max										0.15	nA
			Min										-0.15	nA
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn34	0.017	0.020	0.023	0.023	0.024	0.020	0.022	0.589	0.846	0.793	0.016	nA
		sn35	0.029	0.028	0.028	0.028	0.027	0.028	0.028	0.387	0.555	0.590	0.019	nA
		sn36	0.031	0.032	0.032	0.028	0.032	0.030	0.033	0.369	0.561	0.597	0.026	nA
		sn37	0.030	0.031	0.026	0.028	0.027	0.028	0.031	0.280	0.439	0.490	0.017	nA
		sn38	0.022	0.023	0.020	0.019	0.019	0.019	0.021	0.489	0.719	0.188	0.017	nA
	OFF	sn39	0.030	0.030	0.030	0.024	0.028	0.029	0.029	0.110	0.140	0.755	0.018	nA
		sn40	0.025	0.021	0.025	0.021	0.025	0.024	0.026	0.215	0.252	0.155	0.027	nA
		sn41	0.027	0.023	0.024	0.024	0.023	0.025	0.027	0.140	0.174	0.276	0.020	nA
		sn42	0.026	0.025	0.028	0.026	0.025	0.027	0.023	0.094	0.124	0.132	0.024	nA
		sn43	0.026	0.026	0.026	0.023	0.024	0.021	0.023	0.129	0.169	0.182	0.023	nA
	reference	sn44	0.031	0.029	0.032	0.030	0.029	0.032	0.032	0.028	0.028	0.032	0.031	nA
Statistical analysis [see annex]	ON	Max	0.031	0.032	0.032	0.028	0.032	0.030	0.033	0.589	0.846	0.793	0.026	nA
		Min	0.017	0.020	0.020	0.019	0.019	0.019	0.021	0.280	0.439	0.188	0.016	nA
		Mean	**0.026**	**0.027**	**0.026**	**0.025**	**0.026**	**0.025**	**0.027**	**0.423**	**0.624**	**0.532**	**0.019**	nA
		St. dev	0.006	0.005	0.005	0.004	0.005	0.005	0.005	0.119	0.159	0.221	0.004	nA
		Lmax	0.042	0.041	0.038	0.036	0.039	0.039	0.042	0.749	1.060	1.138	0.030	nA
		Lmin	0.009	0.013	0.013	0.014	0.013	0.011	0.012	0.097	0.188	-0.075	0.008	nA
	OFF	Max	0.030	0.030	0.030	0.026	0.028	0.029	0.029	0.215	0.252	0.755	0.027	nA
		Min	0.025	0.021	0.024	0.021	0.023	0.021	0.023	0.094	0.124	0.132	0.018	nA
		Mean	**0.027**	**0.025**	**0.027**	**0.024**	**0.025**	**0.025**	**0.026**	**0.138**	**0.172**	**0.300**	**0.022**	nA
		St. dev	0.002	0.003	0.002	0.002	0.002	0.003	0.003	0.047	0.049	0.260	0.004	nA
		Lmax	0.032	0.034	0.033	0.029	0.030	0.034	0.033	0.266	0.307	1.013	0.032	nA
		Lmin	0.022	0.016	0.020	0.019	0.020	0.017	0.018	0.009	0.036	-0.413	0.013	nA



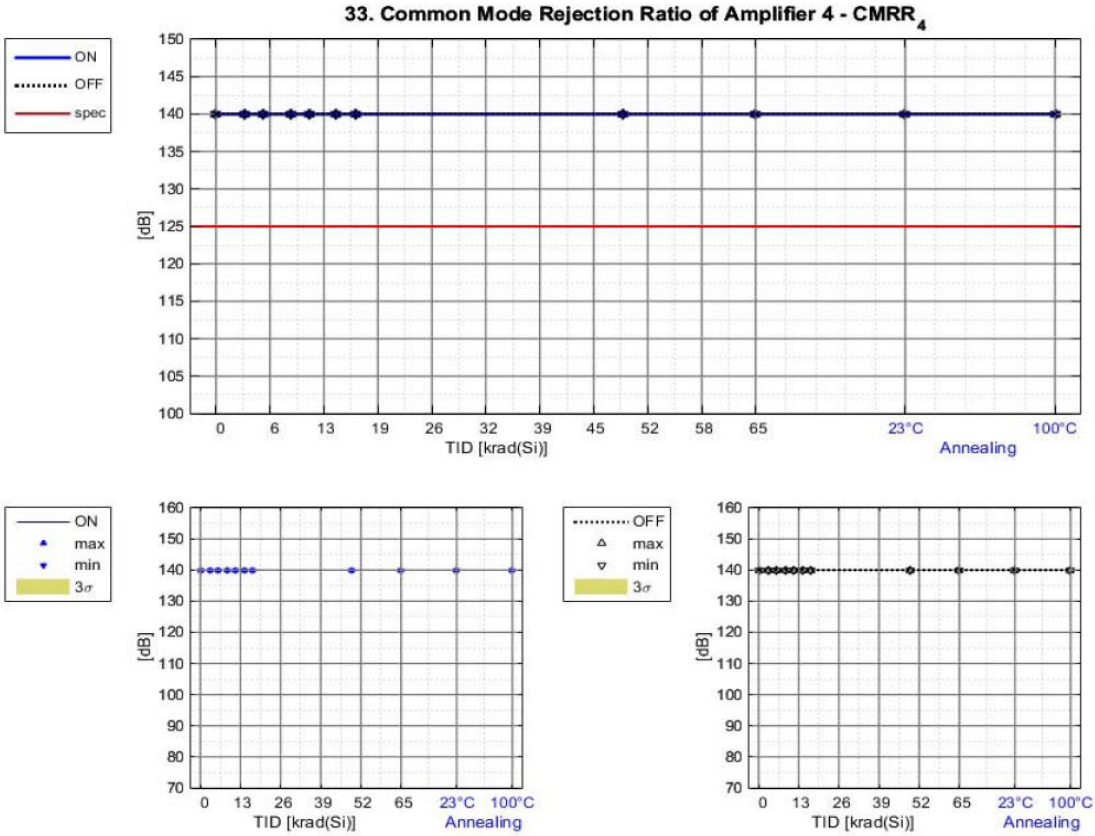
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			32. Input Offset Current of Amplifier 4									$I_{OS,4}$		unit nA
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max										0.3	nA
			Min										-0.3	nA
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn34	0.053	0.054	0.046	0.039	0.039	0.043	0.041	0.342	0.683	0.655	0.027	nA
		sn35	0.053	0.050	0.050	0.048	0.056	0.053	0.057	0.347	0.600	0.629	0.031	nA
		sn36	0.064	0.063	0.063	0.059	0.059	0.058	0.066	0.349	0.631	0.664	0.047	nA
		sn37	0.061	0.059	0.058	0.045	0.059	0.065	0.060	0.319	0.550	0.605	0.040	nA
		sn38	0.044	0.046	0.042	0.038	0.040	0.039	0.048	0.336	0.648	0.275	0.028	nA
	OFF	sn39	0.059	0.050	0.054	0.054	0.058	0.052	0.056	0.184	0.241	0.679	0.041	nA
		sn40	0.057	0.049	0.046	0.043	0.045	0.050	0.049	0.211	0.289	0.264	0.048	nA
		sn41	0.054	0.050	0.052	0.053	0.043	0.051	0.053	0.195	0.252	0.322	0.043	nA
		sn42	0.054	0.055	0.056	0.046	0.056	0.051	0.056	0.164	0.220	0.228	0.050	nA
		sn43	0.049	0.050	0.048	0.041	0.043	0.047	0.050	0.191	0.263	0.282	0.049	nA
	reference	sn44	0.060	0.058	0.056	0.055	0.060	0.061	0.057	0.057	0.059	0.065	0.065	nA
Statistical analysis [see annex]	ON	Max	0.064	0.063	0.063	0.059	0.059	0.065	0.066	0.349	0.683	0.664	0.047	nA
		Min	0.044	0.046	0.042	0.038	0.039	0.039	0.041	0.319	0.550	0.275	0.027	nA
		Mean	**0.055**	**0.054**	**0.052**	**0.046**	**0.051**	**0.052**	**0.054**	**0.339**	**0.622**	**0.566**	**0.035**	nA
		St. dev	0.008	0.007	0.009	0.008	0.010	0.011	0.010	0.012	0.050	0.164	0.009	nA
		Lmax	0.077	0.073	0.075	0.069	0.079	0.081	0.082	0.372	0.760	1.016	0.058	nA
		Lmin	0.033	0.036	0.028	0.023	0.023	0.022	0.027	0.306	0.484	0.116	0.011	nA
	OFF	Max	0.059	0.055	0.056	0.054	0.058	0.052	0.056	0.211	0.289	0.679	0.050	nA
		Min	0.049	0.049	0.046	0.041	0.043	0.047	0.049	0.164	0.220	0.228	0.041	nA
		Mean	**0.055**	**0.051**	**0.051**	**0.047**	**0.049**	**0.050**	**0.053**	**0.189**	**0.253**	**0.355**	**0.046**	nA
		St. dev	0.004	0.002	0.004	0.006	0.007	0.002	0.003	0.017	0.026	0.184	0.004	nA
		Lmax	0.065	0.057	0.063	0.063	0.069	0.055	0.062	0.236	0.323	0.860	0.057	nA
		Lmin	0.044	0.044	0.040	0.031	0.029	0.045	0.044	0.142	0.183	-0.150	0.035	nA



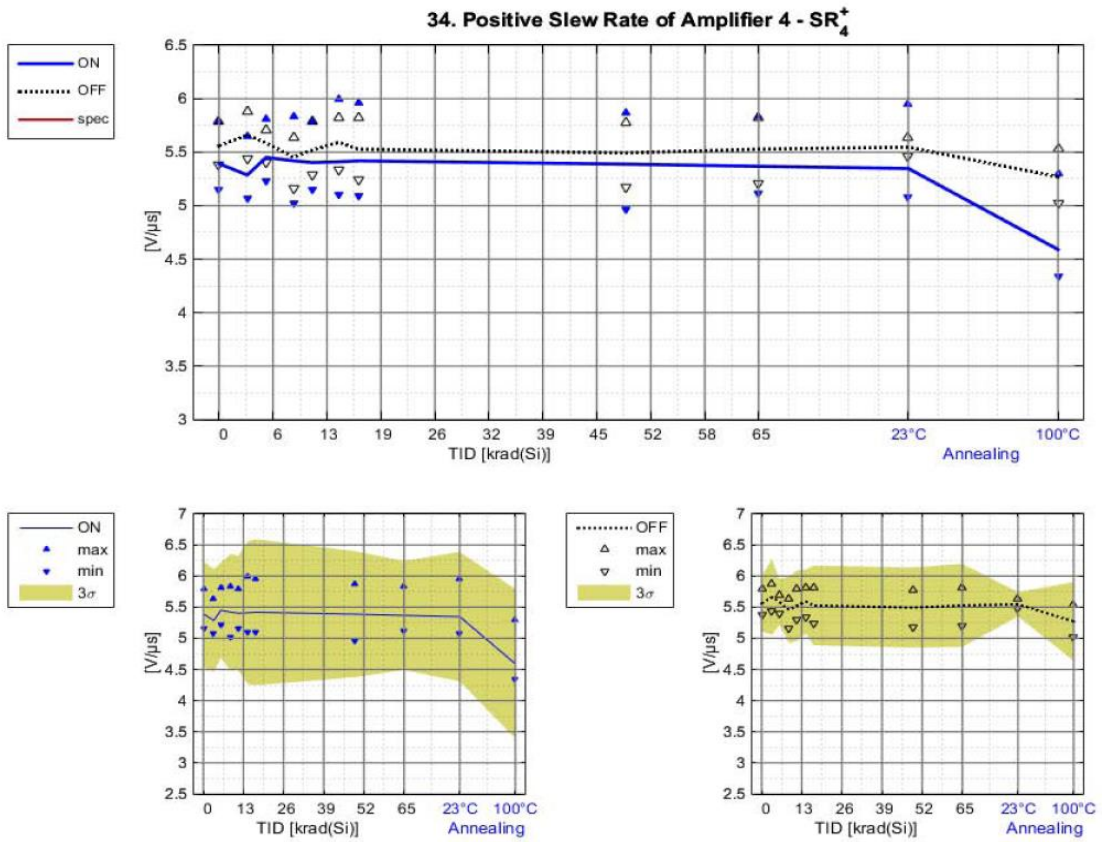
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			33. Common Mode Rejection Ratio of Amplifier 4									$CMRR_4$		unit dB
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max										-	dB
			Min										125	dB
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn34	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn35	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn36	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn37	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn38	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
	OFF	sn39	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn40	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn41	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn42	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		sn43	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
	reference	sn44	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
Statistical analysis [see annex]	ON	Max	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Min	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Mean	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	dB
		St. dev	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	dB
		Lmax	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Lmin	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
	OFF	Max	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Min	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Mean	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	**140.000**	dB
		St. dev	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	dB
		Lmax	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB
		Lmin	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	140.000	dB



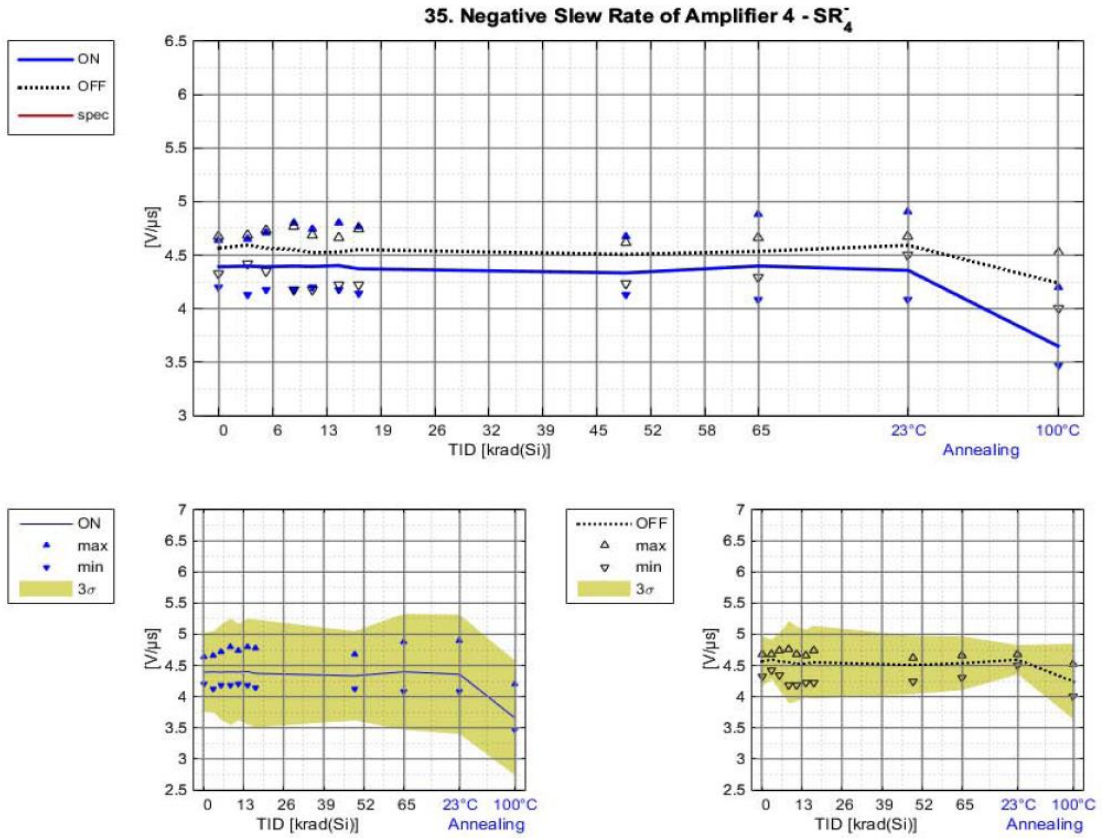
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			34. Positive Slew Rate of Amplifier 4									SR^+_4		unit V/µs
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max									-		V/µs
			Min									2		V/µs
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn34	5.792	5.646	5.806	5.576	5.792	5.992	5.960	5.867	5.837	5.945	5.300	V/µs
		sn35	5.155	5.073	5.300	5.428	5.214	5.119	5.108	4.961	5.119	5.085	4.390	V/µs
		sn36	5.190	5.073	5.288	5.239	5.178	5.108	5.096	5.202	5.263	5.263	4.460	V/µs
		sn37	5.239	5.119	5.226	5.017	5.155	5.226	5.226	5.455	5.166	5.131	4.339	V/µs
		sn38	5.590	5.521	5.632	5.837	5.675	5.604	5.703	5.455	5.455	5.313	4.460	V/µs
	OFF	sn39	5.549	5.882	5.660	5.562	5.604	5.576	5.468	5.535	5.576	5.468	5.364	V/µs
		sn40	5.792	5.455	5.646	5.455	5.792	5.821	5.821	5.777	5.821	5.590	5.338	V/µs
		sn41	5.376	5.441	5.402	5.166	5.288	5.338	5.239	5.178	5.202	5.632	5.535	V/µs
		sn42	5.562	5.806	5.703	5.455	5.455	5.618	5.618	5.521	5.481	5.535	5.017	V/µs
		sn43	5.521	5.718	5.521	5.632	5.468	5.604	5.495	5.455	5.562	5.508	5.096	V/µs
	reference	sn44	5.214	5.455	5.325	5.325	5.364	5.351	5.351	5.178	5.300	5.300	5.351	V/µs
Statistical analysis [see annex]	ON	Max	5.792	5.646	5.806	5.837	5.792	5.992	5.960	5.867	5.837	5.945	5.300	V/µs
		Min	5.155	5.073	5.226	5.017	5.155	5.108	5.096	4.961	5.119	5.085	4.339	V/µs
		Mean	**5.393**	**5.286**	**5.450**	**5.419**	**5.403**	**5.410**	**5.419**	**5.388**	**5.368**	**5.347**	**4.590**	V/µs
		St. dev	0.283	0.275	0.254	0.314	0.305	0.383	0.391	0.337	0.292	0.347	0.400	V/µs
		Lmax	6.168	6.042	6.148	6.279	6.240	6.459	6.491	6.313	6.169	6.298	5.687	V/µs
		Lmin	4.618	4.531	4.753	4.559	4.565	4.360	4.346	4.463	4.567	4.396	3.492	V/µs
	OFF	Max	5.792	5.882	5.703	5.632	5.792	5.821	5.821	5.777	5.821	5.632	5.535	V/µs
		Min	5.376	5.441	5.402	5.166	5.288	5.338	5.239	5.178	5.202	5.468	5.017	V/µs
		Mean	**5.560**	**5.660**	**5.586**	**5.454**	**5.521**	**5.591**	**5.528**	**5.493**	**5.528**	**5.547**	**5.270**	V/µs
		St. dev	0.149	0.202	0.123	0.178	0.188	0.172	0.213	0.214	0.222	0.065	0.211	V/µs
		Lmax	5.970	6.216	5.925	5.941	6.038	6.062	6.113	6.081	6.138	5.725	5.848	V/µs
		Lmin	5.150	5.105	5.248	4.967	5.005	5.120	4.943	4.905	4.919	5.368	4.692	V/µs



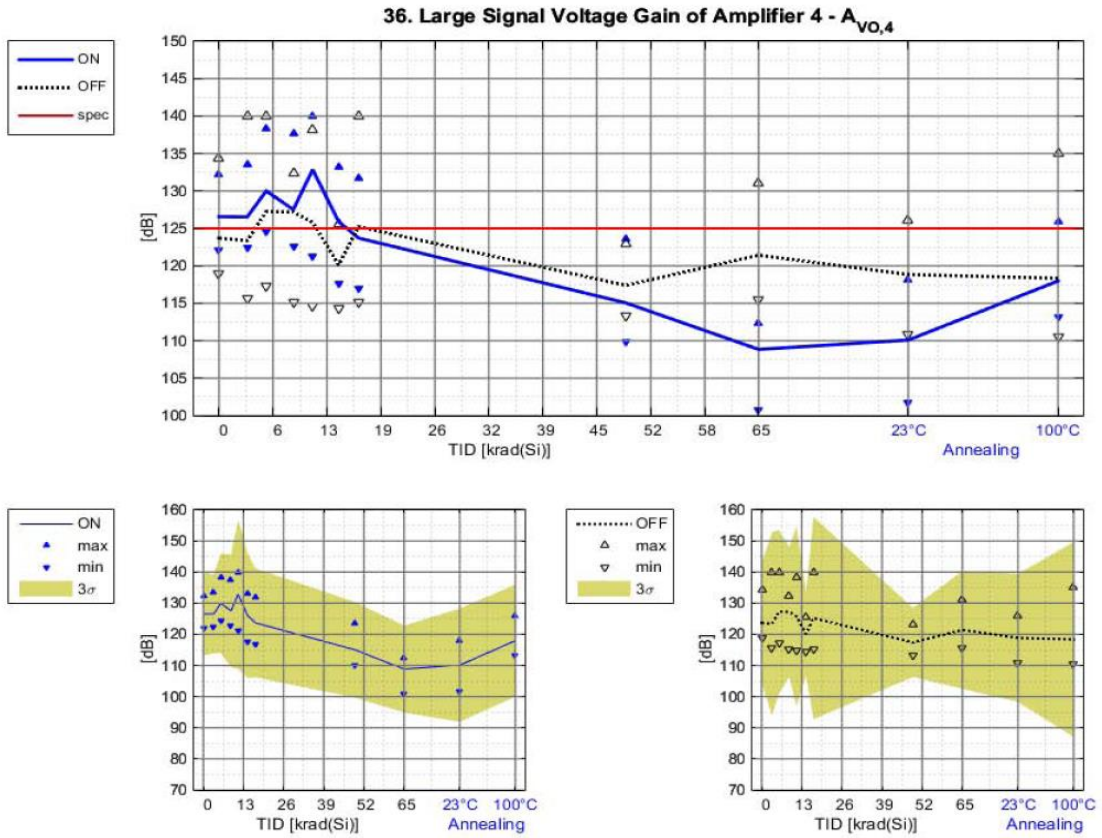
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			35. Negative Slew Rate of Amplifier 4									SR^-_4		unit V/µs
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max									-		V/µs
			Min									2		V/µs
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn34	4.644	4.654	4.712	4.803	4.742	4.803	4.772	4.673	4.886	4.907	4.194	V/µs
		sn35	4.202	4.257	4.178	4.178	4.241	4.178	4.147	4.125	4.087	4.080	3.475	V/µs
		sn36	4.257	4.365	4.274	4.225	4.194	4.178	4.202	4.163	4.265	4.210	3.569	V/µs
		sn37	4.257	4.132	4.178	4.186	4.194	4.257	4.155	4.210	4.249	4.298	3.480	V/µs
		sn38	4.597	4.578	4.615	4.597	4.597	4.597	4.587	4.496	4.505	4.290	3.529	V/µs
	OFF	sn39	4.615	4.625	4.606	4.606	4.569	4.569	4.615	4.597	4.663	4.505	4.365	V/µs
		sn40	4.673	4.683	4.732	4.762	4.683	4.654	4.742	4.615	4.634	4.673	4.171	V/µs
		sn41	4.331	4.416	4.348	4.178	4.178	4.217	4.225	4.233	4.298	4.673	4.523	V/µs
		sn42	4.606	4.663	4.654	4.634	4.634	4.663	4.625	4.550	4.532	4.578	4.007	V/µs
		sn43	4.597	4.587	4.487	4.578	4.559	4.541	4.550	4.541	4.550	4.532	4.132	V/µs
	reference	sn44	4.348	4.331	4.298	4.249	4.306	4.274	4.348	4.323	4.306	4.274	4.265	V/µs
Statistical analysis [see annex]	ON	Max	4.644	4.654	4.712	4.803	4.742	4.803	4.772	4.673	4.886	4.907	4.194	V/µs
		Min	4.202	4.132	4.178	4.178	4.194	4.178	4.147	4.125	4.087	4.080	3.475	V/µs
		Mean	**4.391**	**4.397**	**4.391**	**4.398**	**4.394**	**4.403**	**4.373**	**4.333**	**4.398**	**4.357**	**3.649**	V/µs
		St. dev	0.211	0.218	0.254	0.286	0.258	0.283	0.288	0.240	0.311	0.320	0.307	V/µs
		Lmax	4.970	4.994	5.087	5.182	5.100	5.178	5.164	4.990	5.250	5.234	4.491	V/µs
		Lmin	3.813	3.800	3.696	3.614	3.687	3.627	3.582	3.677	3.546	3.480	2.808	V/µs
	OFF	Max	4.673	4.683	4.732	4.762	4.683	4.663	4.742	4.615	4.663	4.673	4.523	V/µs
		Min	4.331	4.416	4.348	4.178	4.178	4.217	4.225	4.233	4.298	4.505	4.007	V/µs
		Mean	**4.564**	**4.595**	**4.565**	**4.552**	**4.525**	**4.529**	**4.551**	**4.507**	**4.535**	**4.592**	**4.240**	V/µs
		St. dev	0.134	0.107	0.151	0.220	0.200	0.182	0.195	0.156	0.144	0.078	0.204	V/µs
		Lmax	4.931	4.887	4.978	5.156	5.074	5.028	5.086	4.936	4.929	4.807	4.799	V/µs
		Lmin	4.197	4.303	4.153	3.947	3.976	4.029	4.016	4.078	4.141	4.378	3.680	V/µs



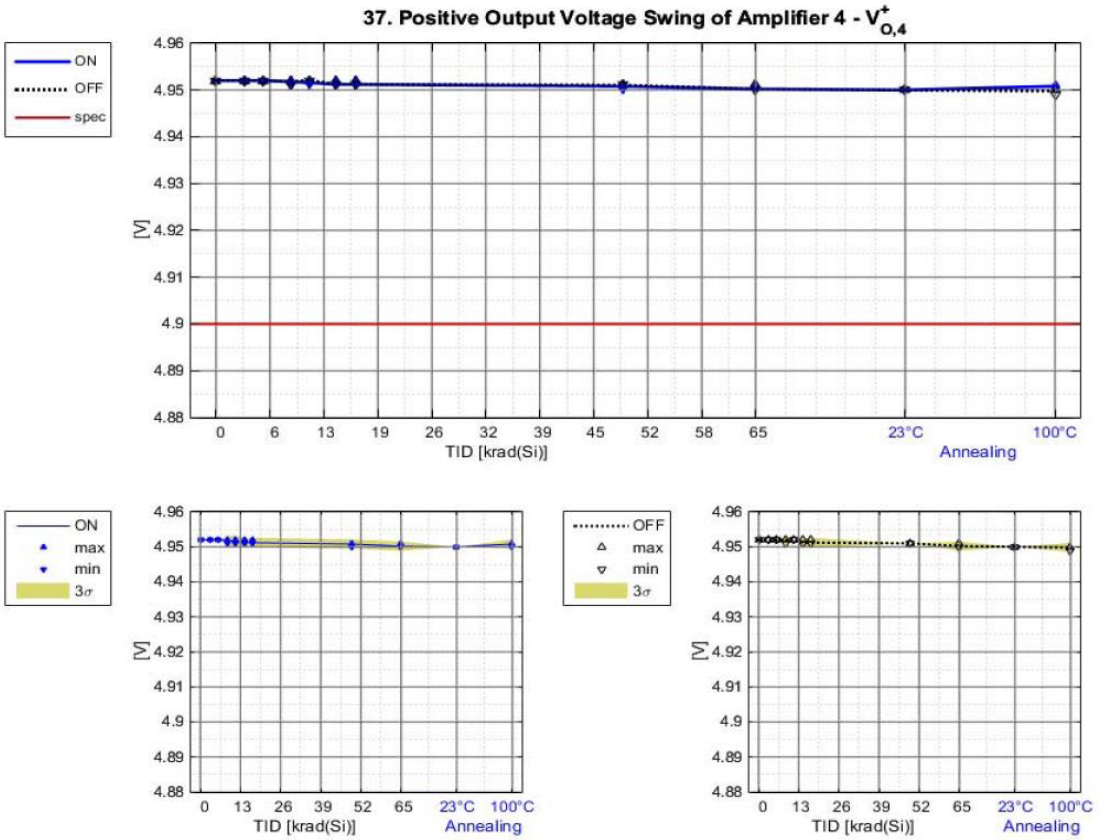
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			36. Large Signal Voltage Gain of Amplifier 4									$A_{VO,4}$		unit dB
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max										-	dB
			Min										125	dB
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn34	122.044	124.540	124.540	122.593	121.292	120.382	119.763	123.582	112.279	111.691	125.901	dB
		sn35	124.756	125.540	126.223	123.432	128.649	117.663	116.939	112.919	110.391	107.182	114.509	dB
		sn36	123.462	122.494	138.374	126.292	140.000	133.138	131.765	114.587	109.393	111.683	122.930	dB
		sn37	132.244	133.569	130.251	127.564	134.299	127.485	123.236	109.883	100.747	101.771	113.287	dB
		sn38	130.338	126.535	130.606	137.632	140.000	130.881	126.866	114.271	111.374	118.123	113.229	dB
	OFF	sn39	119.711	116.921	117.274	115.153	114.670	117.255	115.069	113.247	115.490	110.784	135.048	dB
		sn40	120.658	140.000	140.000	127.856	119.059	120.396	117.347	118.564	124.540	120.709	110.435	dB
		sn41	134.403	115.643	130.426	129.228	124.373	114.244	140.000	115.214	117.864	112.508	122.044	dB
		sn42	124.745	123.653	127.129	132.409	138.102	123.198	120.529	116.944	130.999	126.007	110.968	dB
		sn43	118.981	120.665	121.480	131.239	132.837	125.515	133.226	122.998	118.221	124.176	113.198	dB
	reference	sn44	126.264	126.237	116.372	118.054	122.406	123.169	120.644	124.473	131.288	122.052	126.831	dB
Statistical analysis [see annex]	ON	Max	132.244	133.569	138.374	137.632	140.000	133.138	131.765	123.582	112.279	118.123	125.901	dB
		Min	122.044	122.494	124.540	122.593	121.292	117.663	116.939	109.883	100.747	101.771	113.229	dB
		Mean	**126.569**	**126.536**	**129.999**	**127.503**	**132.848**	**125.910**	**123.714**	**115.048**	**108.837**	**110.090**	**117.971**	dB
		St. dev	4.467	4.206	5.353	6.016	7.993	6.671	5.842	5.120	4.649	6.068	5.998	dB
		Lmax	138.818	138.070	144.678	143.997	154.766	144.202	139.731	129.087	121.585	126.729	134.417	dB
		Lmin	114.319	115.002	115.320	111.008	110.930	107.618	107.696	101.010	96.089	93.451	101.526	dB
	OFF	Max	134.403	140.000	140.000	132.409	138.102	125.515	140.000	122.998	130.999	126.007	135.048	dB
		Min	118.981	115.643	117.274	115.153	114.670	114.244	115.069	113.247	115.490	110.784	110.435	dB
		Mean	**123.700**	**123.376**	**127.262**	**127.177**	**125.808**	**120.122**	**125.234**	**117.393**	**121.423**	**118.837**	**118.339**	dB
		St. dev	6.385	9.814	8.739	6.948	9.646	4.511	10.835	3.706	6.315	6.862	10.442	dB
		Lmax	141.208	150.286	151.224	146.229	152.259	132.490	154.943	127.554	138.740	137.651	146.971	dB
		Lmin	106.191	96.467	103.300	108.125	99.358	107.753	95.525	107.233	104.106	100.022	89.706	dB



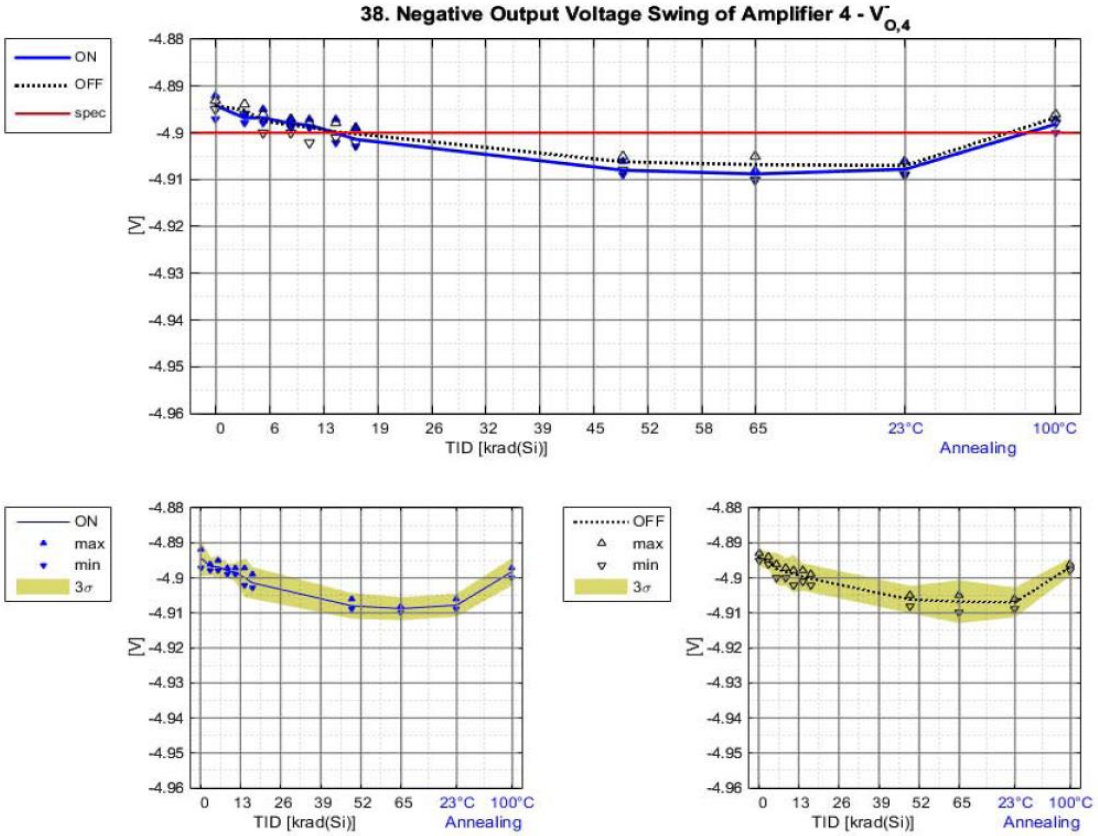
6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			37. Positive Output Voltage Swing of Amplifier 4									$V^+_{O,4}$		unit V
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max									-		V
			Min									4.9		V
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn34	4.952	4.952	4.952	4.951	4.951	4.951	4.951	4.951	4.950	4.950	4.951	V
		sn35	4.952	4.952	4.952	4.952	4.951	4.951	4.951	4.951	4.950	4.950	4.951	V
		sn36	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.951	4.950	4.950	4.950	V
		sn37	4.952	4.952	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.950	4.951	V
		sn38	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.950	4.950	4.950	4.951	V
	OFF	sn39	4.952	4.952	4.952	4.951	4.952	4.951	4.951	4.951	4.951	4.950	4.950	V
		sn40	4.952	4.952	4.952	4.952	4.952	4.952	4.952	4.951	4.950	4.950	4.950	V
		sn41	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.951	4.950	4.950	4.950	V
		sn42	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.951	4.950	4.950	4.949	V
		sn43	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.951	4.950	4.950	4.950	V
	reference	sn44	4.952	4.952	4.952	4.952	4.952	4.952	4.952	4.952	4.952	4.951	4.952	V
Statistical analysis [see annex]	ON	Max	4.952	4.952	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.950	4.951	V
		Min	4.952	4.952	4.952	4.951	4.951	4.951	4.951	4.950	4.950	4.950	4.950	V
		Mean	**4.952**	**4.952**	**4.952**	**4.952**	**4.952**	**4.951**	**4.951**	**4.951**	**4.950**	**4.950**	**4.951**	V
		St. dev	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	V
		Lmax	4.952	4.952	4.952	4.953	4.953	4.952	4.952	4.952	4.951	4.950	4.952	V
		Lmin	4.952	4.952	4.952	4.951	4.950	4.950	4.950	4.950	4.949	4.950	4.950	V
	OFF	Max	4.952	4.952	4.952	4.952	4.952	4.952	4.952	4.951	4.951	4.950	4.950	V
		Min	4.952	4.952	4.952	4.951	4.952	4.951	4.951	4.951	4.950	4.950	4.949	V
		Mean	**4.952**	**4.952**	**4.952**	**4.952**	**4.952**	**4.951**	**4.951**	**4.951**	**4.950**	**4.950**	**4.950**	V
		St. dev	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	V
		Lmax	4.952	4.952	4.952	4.953	4.952	4.952	4.952	4.951	4.951	4.950	4.951	V
		Lmin	4.952	4.952	4.952	4.951	4.952	4.950	4.950	4.951	4.949	4.950	4.949	V



6. ELECTRICAL MEASUREMENTS

TEST PARAMETER			38. Negative Output Voltage Swing of Amplifier 4									$V^-_{O,4}$		unit V
TEST CONDITIONS			V^+ = 5V; V^- = -5V											
SPECIFICATION LIMITS [see test plan]			Max									-4.9		V
			Min									-		V
TEST STEPS			Irradiation steps									Anneal I	Anneal II	
			20									20	100	°C
			0	**3.39**	**5.67**	**8.92**	**11.24**	**14.35**	**16.74**	**48.81**	**64.75**	**0**	**0**	krad (Si)
Electrical measurements [sn: serial number]	ON	sn34	-4.894	-4.897	-4.898	-4.898	-4.899	-4.900	-4.903	-4.908	-4.910	-4.909	-4.899	V
		sn35	-4.897	-4.896	-4.897	-4.899	-4.899	-4.902	-4.902	-4.909	-4.908	-4.908	-4.898	V
		sn36	-4.892	-4.896	-4.895	-4.897	-4.897	-4.897	-4.899	-4.906	-4.908	-4.908	-4.897	V
		sn37	-4.894	-4.897	-4.897	-4.898	-4.898	-4.900	-4.902	-4.908	-4.908	-4.908	-4.897	V
		sn38	-4.894	-4.898	-4.897	-4.898	-4.899	-4.901	-4.901	-4.909	-4.910	-4.906	-4.900	V
	OFF	sn39	-4.893	-4.894	-4.896	-4.897	-4.898	-4.899	-4.900	-4.905	-4.905	-4.908	-4.897	V
		sn40	-4.895	-4.896	-4.900	-4.899	-4.902	-4.901	-4.901	-4.908	-4.910	-4.906	-4.896	V
		sn41	-4.895	-4.896	-4.897	-4.897	-4.898	-4.900	-4.899	-4.905	-4.907	-4.909	-4.898	V
		sn42	-4.894	-4.895	-4.897	-4.899	-4.898	-4.898	-4.902	-4.906	-4.905	-4.906	-4.897	V
		sn43	-4.894	-4.895	-4.897	-4.900	-4.898	-4.901	-4.899	-4.907	-4.907	-4.906	-4.896	V
	reference	sn44	-4.901	-4.902	-4.903	-4.904	-4.902	-4.902	-4.902	-4.902	-4.903	-4.899	-4.903	V
Statistical analysis [see annex]	ON	Max	-4.892	-4.896	-4.895	-4.897	-4.897	-4.897	-4.899	-4.906	-4.908	-4.906	-4.897	V
		Min	-4.897	-4.898	-4.898	-4.899	-4.899	-4.902	-4.903	-4.909	-4.910	-4.909	-4.900	V
		Mean	**-4.894**	**-4.897**	**-4.897**	**-4.898**	**-4.898**	**-4.900**	**-4.901**	**-4.908**	**-4.909**	**-4.908**	**-4.898**	V
		St. dev	0.002	0.001	0.001	0.001	0.001	0.002	0.002	0.001	0.001	0.001	0.001	V
		Lmax	-4.889	-4.895	-4.894	-4.896	-4.896	-4.895	-4.897	-4.905	-4.906	-4.905	-4.895	V
		Lmin	-4.899	-4.899	-4.900	-4.900	-4.901	-4.905	-4.906	-4.911	-4.912	-4.911	-4.902	V
	OFF	Max	-4.893	-4.894	-4.896	-4.897	-4.898	-4.898	-4.899	-4.905	-4.905	-4.906	-4.896	V
		Min	-4.895	-4.896	-4.900	-4.900	-4.902	-4.901	-4.902	-4.908	-4.910	-4.909	-4.898	V
		Mean	**-4.894**	**-4.895**	**-4.897**	**-4.898**	**-4.899**	**-4.900**	**-4.900**	**-4.906**	**-4.907**	**-4.907**	**-4.897**	V
		St. dev	0.001	0.001	0.002	0.001	0.002	0.001	0.001	0.001	0.002	0.001	0.001	V
		Lmax	-4.892	-4.893	-4.893	-4.895	-4.894	-4.896	-4.897	-4.903	-4.901	-4.903	-4.895	V
		Lmin	-4.896	-4.897	-4.902	-4.902	-4.904	-4.903	-4.904	-4.910	-4.912	-4.911	-4.899	V



ANNEX

1 ESTEC Irradiation Test Campaign Details

see attached report

2 STATISTICAL ANALYSIS

Max, Min:	Parameter range limits Maximum (Max), Minimum (Min)
Mean value:	arithmetic average of a group of values
Lmax Lmin:	limits for a statistic calculation using very low sample size (n<10). Accordingly to MIL HDBK 814 those limits define that a parameter value is within this range with a probability P of 90% and a confidential level of 90%