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DOCUMENT

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EVALUATION OF STM POWER MOSFET:

^{60}Co TID TEST RESULTS ON PART TYPE STRH100N6FSY3

(N-CHANNEL 60V 80A)

prepared by/*préparé par* M.Muschitiello TEC-QEC

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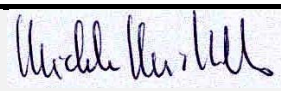
APPROVAL

author *auteur*	Michele Muschitiello TEC-QEC		date *date*	14 September 2010

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Test Report Number	**ESA_QEC RA0555**
Project	European Component Initiative - phase I Critical Components
SCC Component no.	***n/a***
Component Designation	STRH100N6FSY3
Irradiation Spec. no.	ESA/SCC 22900
Family	N-Channel Power MOSFET
Group	Silicon
Package	TO3
Component Specification	STRH100N6FSY3 Issue 1, Rev. - 04/05/2009
Test House Name	ESA / ESTEC
Irradiation Test Plan Number	*TEST PLAN FOR TID EVALUATION STM POWER MOSFETS (draft status), rev.D 31.07.2009*
Manufacturer name	STM
Application type of Acceptance	n/a
Date Code (diffusion lot)	Diffusion Lot nr. 3844737E
Serial Number of samples	001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 011, 012, 013, 014, 015, 016, 017, 018, 019, [034 reference device]
Irradiation Measurement schedule: Bias conditions: Circuit Reference: Temp °C: Duration:	0, 6, 15, 22.5, 30, 55, 70, 110 krad(Si) Total Dose ***BC1*** - s/n's 013, 014, 015, 016, 017: V_{DS} = 0V, V_{GS} = +15V ***BC2*** - s/n's 008, 009, 010, 011, 012: V_{DS} = +48V, V_{GS} = 0V ***BC3*** - s/n's 001, 002, 003, 004, 005: V_{DS} = 0V, V_{GS} = 0V ***BC4*** - s/n's 006, 007: V_{DS} = +60V, V_{GS} = -20V ***BC5*** - s/n's 018, 019: V_{DS} = 0V, V_{GS} = +12V Fig.1 Room temperature 20 ± 5 300 hours
Electrical Measurement Parameters:	I_{GSS_F1}, I_{GSS_R1} I_{DSS} @ Vds 5V, Vgs 0V, I_{DSS} @ Vds 48V, Vgs 0V , I_{DSS} @ Vds 60V, Vgs 0V V_{GS_th} @ Id 0.01 mA, V_{GS_th} @ Id 0.10 mA, V_{GS_th} @ Id 0.25 mA, V_{GS_th} @ Id 1.00 mA $V_{(BR)DSS}$ @Id=100uA, $V_{(BR)DSS}$ @Id=250uA, $V_{(BR)DSS}$ @Id=1mA R_{DS}(on) – Drain Source On-Resistance V_{SD} - Inverse Diode Fwd. Volt. V_{DS}(on) – Drain Source On-Voltage, $I_{D(on)}$ - On-State Drain Current. Gate Charge Qg, Qgs, Qgd
Facility Source: Energy: Dose Rate: Absorbing Material: Thickness:	ESA/ESTEC ^{60}Co (gamma) 1.173 MeV 1.332 MeV 5.9 rad(Si)/min N/A N/A

Temperature °C:	20 ± 3
Dosimetry / Calibration method.	Calibrated NE2571, 0.6cc air ionisation chamber s/n 3112 Calibrated Farmer 2670 dosimeter s/n 109.
Annealing / Ageing	6 hours at Room Temperature 21 hours at Room Temperature 140 hours at Room Temperature 168 hours at 100 °C
Biasing conditions	***BC1*** - s/n's 013, 014, 015, 016, 017: V_{DS} = 0V, V_{GS} = +15V ***BC2*** - s/n's 008, 009, 010, 011, 012: V_{DS} = +48V, V_{GS} = 0V ***BC3*** - s/n's 001, 002, 003, 004, 005: V_{DS} = 0V, V_{GS} = 0V ***BC4*** - s/n's 006, 007: V_{DS} = +60V, V_{GS} = -20V ***BC5*** - s/n's 018, 019: V_{DS} = 0V, V_{GS} = +12V
Bias Circuit Reference	Fig.1

1 INTRODUCTION

The following document contains the conditions and the results of the total dose test campaign for the evaluation of the radiation tolerance of the discrete N-Channel PowerMOS, based on type STRH100N6FSY3, manufactured by STM.
This test was conducted on prototypes from diffusion lot number 3844737E, packaged in TO3, provided by the manufacturer.

2 APPLICABLE DOCUMENTS

AD 1. ESA-ESTEC QEC document: TEST PLAN FOR TID EVALUATION STM POWER MOSFETS (draft status), rev.D 31.07.2009.
AD 2. ESA/SCC 22900 “Total Dose Steady-State Irradiation Test Method”, issue 3.
AD 3. Qualification program of N. And P. channel Rad-Hard Power Mosfets, STMicrolectronics RNS/PB/0907101ce Rev.03, March 12th 2009
AD 4. Detail specification (draft status), STRH100N6FSY3 issue 1 rev.- 04.05.2009
AD 5. ESCC Generic Specification 5000, Issue 5 July 2009

3 TEST DESCRIPTION

Thirty five devices, POWER MOSFET based on type STRH100N6FSY3, manufactured by STM have been received for TID testing at the ESTEC ^{60}Co facility. All the devices have been electrically tested (go/no go) and the serialised as shown in Table 1.

According to the Evaluation Test Plan [AD 1], nineteen devices have been irradiated. Table 1 summarise the information on test sample.

Table 1 received samples and their usage.

S/n's	Description
001-005	Unbiased during ^{60}Co irradiation (Bias Condition **BC3**)
006-007	Biased during ^{60}Co irradiation (V_{DS} = +60V, V_{GS} = -20V, Bias Condition **BC4**)
008-012	Biased during ^{60}Co irradiation (V_{DS} = + 48V, V_{GS} = 0V, Bias Condition **BC2**)
013-017	Biased during ^{60}Co irradiation (V_{DS} = 0V, V_{GS} = +15V, Bias Condition **BC1**)
018-019	Biased during ^{60}Co irradiation (V_{DS} = 0V, V_{GS} = +12V, Bias Condition **BC5**)
34	Reference device (not irradiated) - Electrically tested before and after each intermediate measurement run at irradiation step completion
35	Used for Gate Charge Measurement Set-up (not Irradiated).
020-033	Passed initial go/no go electrical measurements. Not Irradiated

Refer to TID Evaluation test plan [AD 1] for more details on test conditions.

4 RADIATION TEST PLAN

The actual radiation test steps are reported in Table 2.

Table 2 Irradiation Test Plan

Step	Total Dose (Si) krad	Dose Rate (Si)rad/min
(Pre irradiation) 0	==	==
Irradiation step # 1	6.20	5.44
Irradiation step # 2	15.00	5.52
Irradiation step # 3	22.50	5.65
Irradiation step # 4	30.06	5.70
Irradiation step # 5	55.00	5.81
Irradiation step # 6	70.07	5.77
Irradiation step # 7	110.50	5.81

At the completion of each irradiation step, intermediate electrical measurements were carried out according to the next paragraph. Fig.1 shows the bias circuits used during the irradiation.

At the end of the final irradiation run, all devices were electrically measured and annealed at room temperature (for 167 hours in total) and subsequently aged at 100°C (168 hrs), maintaining the same bias conditions applied during the TID test.
Table 3 reports the annealing/ageing sequence detail.

Table 3 Anneal/ageing sequence

Step	Temperature	Duration
Anneal	Room temperature	6 hours
Anneal	Room temperature	21 hours
Anneal	Room temperature	140 hours
Ageing	100 °C	168 hours

At the completion of each anneal/ageing step, all devices were electrically tested.

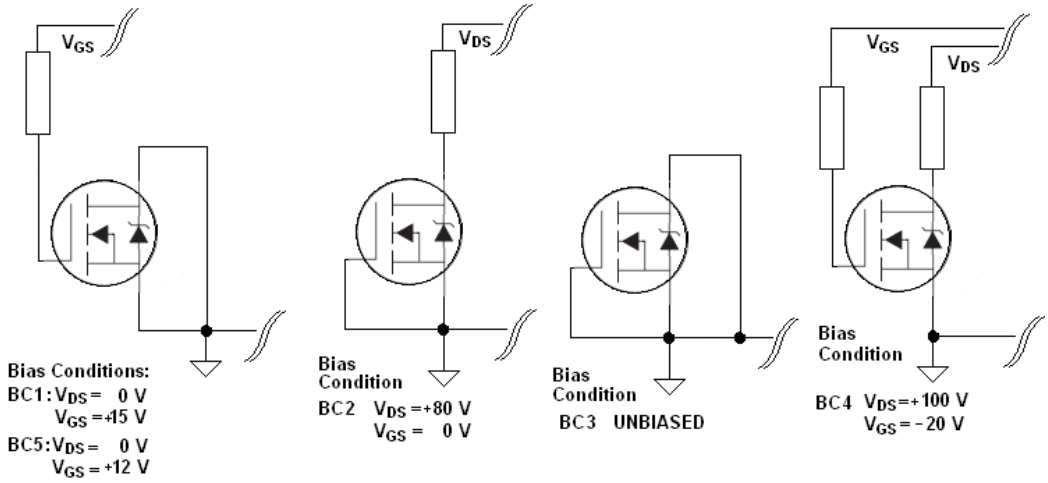


Fig.1 Radiation Test Biasing circuits.

4.1 Measurement set-up

No In-situ measurements were performed during irradiation. The measured parameters, the test conditions and the adopted Min-Max limits (pass/fail criteria) are listed in Table 4.

Table 4 Measured Parameters, Min-Max Limits and Test conditions

nr.	Parameter	Note	Limits		Unit	Mil-Std-750 test method	Test conditions
			Min.	Max.			
0	IGSS_F1	Gate Leakage Current (fwd)		100	nA	3411	V_{GS} = +20V
1	IGSS_R1	Gate Leakage Current (rev.)		100	nA	3411	V_{GS} = -20V
(a) 2	IDSS @ Vds 5V, Vgs 0V	Drain Current (off state)		10	µA	3413	V_{DS} = 5V V_{GS} = 0V
3	IDSS @ Vds 48V, Vgs 0V			10	µA	3413	V_{DS} = 48V V_{GS} = 0V
4	IDSS @ Vds 60V, Vgs 0V			1	mA	3413	V_{DS} = 60V V_{GS} = 0V
(a) 5	VGS_th @ I_D 0.01 mA	Gate threshold voltage	2000	4500	mV	3403	V_{DS} = V_{GS} I_D = 0.01mA
(a) 6	VGS_th @ I_D 0.10 mA		2000	4500	mV	3403	V_{DS} = V_{GS} I_D = 0.1mA
(a) 7	VGS_th @ I_D 0.25 mA		2000	4500	mV	3403	V_{DS} = V_{GS} I_D = 0.25mA
8	VGS_th @ I_D 1.00 mA		2000	4500	mV	3403	V_{DS} = V_{GS} I_D = 1mA
(b) 9	RDS(on) - D-S On-Resistance	Drain-Source On resistance		0.0135	Ohm	3421	*V_{GS} = 10V* *I_{DS} = 40A*
(a) 10	VDS(on) - D-S On-Voltage	Drain-Source On voltage		680	mV	3405	V_{GS} = 10V I_{DS} = 40A
(a) 11	V(BR)DSS @I_D=100uA	V_{DS} Breakdown	60		V	3407	V_{GS} = 0V I_{DS} = 100uA
(a) 12	V(BR)DSS @I_D=250uA		60		V	3407	V_{GS} = 0V I_{DS} = 250uA
(a) 13	V(BR)DSS @I_D=1mA		60		V	3407	V_{GS} = 0V I_{DS} = 1mA
(b) 14	VSD - Inverse Diode Fwd. Volt.	Fwd voltage inverse diode		1500	mV	4011	I_{SD} = 50A V_{GS} = 0V
(a) 15	ID(on) - On-State Drain Current	Drain-Source max On current	80		A	3413	V_{GS} = 10V V_{DS} = 10V
16	Q_G Total Gate Charge	Gate Charge switch-on characteristics	120	180	nC	3471	I_G = 1mA, V_{GS} = 12 V V_{DS}= 30V, I_{DS} = 40A
*(c)*17	Q_{GS} Gate – Source Charge		n.d.	n.d.	nC		
*(c)*18	Q_{GD} Gate – Drain Charge		n.d.	n.d.	nC		

(a) Parameter not listed in table 2.4.1. of Detail specification (draft status), STRH100N6FSY3 issue 1 rev.-.
(b) Test Conditions deviate from table 2.4.1. of (Detail specification (draft status), STRH100N6FSY3 issue 1 rev.- due to test equipment limitation.
(c) Min-Max limits not defined in table 2.4.1. of Detail specification (draft status), STRH100N6FSY3 issue 1 rev.-

Parameters from nr.0 to nr.15 have been measured by using Unimet M3000 Automatic Test Equipment.

Parameters from nr.16 to nr.18 (Gate Charge) have been measured according to the test set-up schematized in Figure 2. More details are reported in paragraph 4.4.2 *GATE CHARGE WAVEFORMS*.

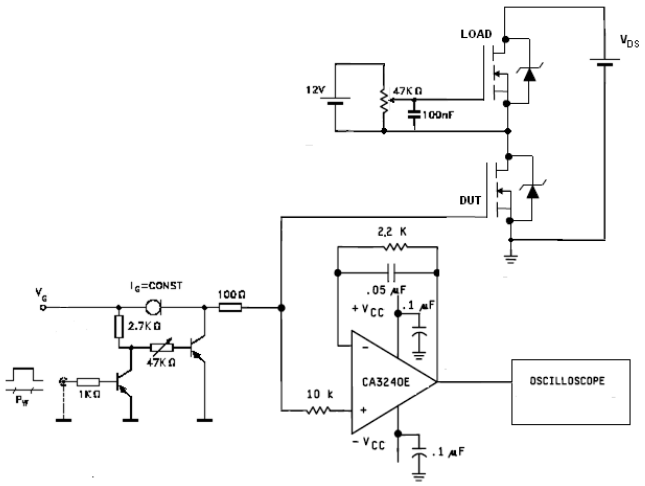


Figure 2 Gate Charge measurement circuit.

4.2 Thermal conditions

All irradiations and measurements were performed at room temperature (20 ± 3 ^{o}C). The environmental conditions were continuously monitored.

4.3 Dosimetry

Calibrated NE2571, 0.6cc air ionisation s/n 3112 chamber, read by calibrated Farmer 2670 s/n 109 dosimeter was used to measure the Total Ionising Dose.

4.4 Test Results

All measurement results are reported from Table 5 to Table 23. Test ended with a registered Total Dose of 110.5 krad(Si). At the end of the last irradiation step, electrical measurements were performed and the devices were tested again after 6, 21 and 140 hours annealing at room temperature. During the entire annealing, the irradiated devices were biased employing the same test board.
After the annealing, the samples went through accelerated ageing for 168 hrs at 100°C under the same bias conditions.

Following the accelerated ageing test, full parametric measurements were performed.

Electrical Measurement uncertainty values, reported in table footnotes, were estimated by observing the variations in the reference device (s/n 34) parameters, during the entire test campaign. Uncertainty has been calculated by using [1] below, with a coverage factor of 3.

[1] $$u = \frac{s}{\sqrt{n}},$$

u = estimated overall uncertainty
s = standard deviation
n= number of observations

Significant data from tables have been plotted from Table 5 to Figure 21. Data, taken during and after the annealing/ageing sequence, have been plotted on the same graph with a gap between the TID X axis scale and the annealing/ageing time scale (arbitrarily set).

Details on the extracted gate charge parameters are reported in paragraph 4.4.2 *GATE CHARGE WAVEFORMS*.

4.4.1 *Electrical Measurement Data*

Table 5 – I_{GSS_F1} Gate Leakage Current (fwd) [nA] vs ^{60}Co Irradiation Total Dose [rad (Si)]

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:		100.0	[nA]

Detailed results - Measurement data in [nA]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C	Applied Bias Condition
001	0.549	0.310	0.073	0.040	0.131	0.269	0.016	0.226	0.065	0.617	0.036	0.031	(V_{DS} 0V, V_{GS} 0V)
002	0.459	0.210	0.039	0.109	0.324	0.593	0.351	0.674	0.427	0.058	0.121	0.314	(V_{DS} 0V, V_{GS} 0V)
003	0.006	0.320	0.518	0.549	0.236	0.542	0.211	0.047	0.353	0.001	0.066	0.053	(V_{DS} 0V, V_{GS} 0V)
004	0.357	0.054	0.011	0.227	0.411	0.079	0.047	0.041	0.523	0.420	0.270	0.069	(V_{DS} 0V, V_{GS} 0V)
005	0.735	0.293	0.170	0.058	0.208	0.096	0.171	0.103	0.044	0.084	0.404	0.164	(V_{DS} 0V, V_{GS} 0V)
006	0.200	0.402	0.053	0.267	0.061	0.560	0.090	0.312	0.246	0.209	0.166	0.239	(V_{DS} +60V, V_{GS} -20V)
007	0.701	0.371	0.663	0.629	0.397	0.090	0.053	0.709	0.493	0.026	0.203	0.362	(V_{DS} +60V, V_{GS} -20V)
008	0.657	0.110	0.065	0.217	0.193	0.231	0.416	0.070	0.019	0.039	0.339	0.088	(V_{DS} +48V, V_{GS} 0V)
009	0.176	0.323	0.519	0.488	0.279	0.232	0.469	0.453	0.214	0.427	0.354	0.040	(V_{DS} +48V, V_{GS} 0V)
010	0.734	0.625	0.648	0.049	0.427	0.136	0.601	0.096	0.053	0.016	0.110	0.101	(V_{DS} +48V, V_{GS} 0V)
011	0.585	0.109	0.402	0.030	0.369	0.339	0.327	0.056	0.053	0.534	0.078	0.133	(V_{DS} +48V, V_{GS} 0V)
012	0.343	0.010	0.367	0.125	0.210	0.528	0.318	0.005	0.356	0.341	0.536	0.271	(V_{DS} +48V, V_{GS} 0V)
013	0.067	0.687	0.258	0.265	0.029	0.505	0.361	0.036	0.440	0.091	0.133	0.303	(V_{DS} 0V, V_{GS} +15V)
014	0.440	0.394	0.001	0.360	0.662	0.358	0.008	0.148	0.652	0.449	0.032	0.053	(V_{DS} 0V, V_{GS} +15V)
015	0.285	0.039	0.386	0.173	0.027	0.156	0.369	0.514	0.690	0.231	0.757	0.104	(V_{DS} 0V, V_{GS} +15V)
016	0.052	0.707	0.040	0.013	0.087	0.044	0.683	0.284	0.009	0.011	0.714	0.282	(V_{DS} 0V, V_{GS} +15V)
017	0.030	0.537	0.183	0.041	0.356	0.691	0.284	0.180	0.054	0.047	0.047	0.196	(V_{DS} 0V, V_{GS} +15V)
018	0.015	0.522	0.546	0.224	0.134	0.042	0.370	0.670	0.073	0.494	0.039	0.041	(V_{DS} 0V, V_{GS} +12V)
019	0.171	0.069	0.007	0.461	0.499	0.310	0.405	0.159	0.351	0.645	0.324	0.714	(V_{DS} 0V, V_{GS} +12V)
034	0.310	0.097	0.719	0.521	0.588	0.232	0.289	0.503	0.265	0.461	0.017	0.684	Reference device

Reference device **Mean value:** 0.391 **Estimated uncertainty:** ± 49.57 % (± 0.194 nA)

Red values: greater than max limit
Dark red Values: lower than min limits

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:		100.0	[nA]

I_{GSS_F1} Gate Leakage Current (fwd) [nA] vs ^{60}Co Irradiation Total Dose [rad (Si)]

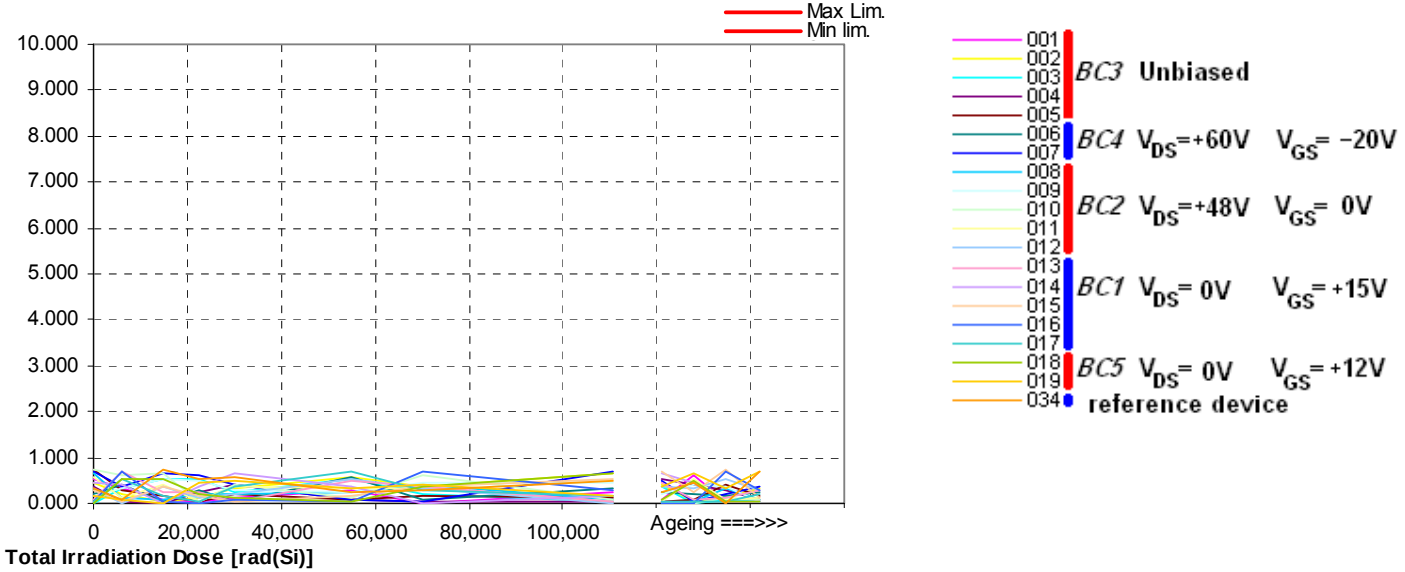


Figure 3 Data from Table 5

Table 6 – I_{GSS_R1} Gate Leakage Current (rev) [nA] vs ^{60}Co Irradiation Total Dose [rad (Si)]

STRH100N6FSY3	*Min.*	*Max.*	*Unit*
Applicable limits:		100.0	[nA]

Detailed results - Measurement data in [nA]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C	Applied Bias Condition
001	0.429	0.189	0.577	0.312	0.210	0.492	0.437	0.490	0.048	0.417	0.558	0.242	(V_{DS} 0V, V_{GS} 0V)
002	0.017	0.573	0.281	0.896	0.101	0.007	0.090	0.055	0.071	1.074	0.638	0.109	(V_{DS} 0V, V_{GS} 0V)
003	0.513	0.535	0.390	0.111	0.005	0.324	0.309	0.391	0.275	0.305	0.237	0.174	(V_{DS} 0V, V_{GS} 0V)
004	0.805	0.817	0.928	1.382	0.648	1.241	1.326	1.814	0.582	0.606	1.382	1.490	(V_{DS} 0V, V_{GS} 0V)
005	0.301	0.017	0.203	0.522	0.409	0.251	0.218	0.019	0.186	0.185	0.057	0.248	(V_{DS} 0V, V_{GS} 0V)
006	0.343	0.108	0.465	0.168	0.016	0.097	0.090	0.233	0.154	0.546	0.182	0.126	(V_{DS} +60V, V_{GS} -20V)
007	0.291	0.287	0.128	0.421	0.149	9.932	0.096	0.297	0.268	0.211	0.471	0.125	(V_{DS} +60V, V_{GS} -20V)
008	0.426	0.259	0.189	0.098	0.219	0.529	0.010	0.183	0.558	0.288	0.190	0.012	(V_{DS} +48V, V_{GS} 0V)
009	0.148	0.067	0.105	0.063	0.233	0.279	0.259	0.013	0.158	0.172	0.164	0.427	(V_{DS} +48V, V_{GS} 0V)
010	0.362	0.297	0.176	0.076	0.097	0.171	0.134	0.399	0.216	0.676	0.163	0.342	(V_{DS} +48V, V_{GS} 0V)
011	0.513	0.529	0.384	0.372	0.109	0.002	0.082	0.427	0.143	0.301	0.005	0.274	(V_{DS} +48V, V_{GS} 0V)
012	0.076	0.129	0.335	0.016	0.059	0.409	0.406	0.019	0.067	0.055	0.096	0.115	(V_{DS} +48V, V_{GS} 0V)
013	0.350	0.033	0.548	0.723	0.107	0.410	0.219	0.921	0.046	0.638	0.849	0.331	(V_{DS} 0V, V_{GS} +15V)
014	0.225	0.368	0.472	0.049	0.378	0.297	0.815	0.972	0.005	0.026	0.147	0.442	(V_{DS} 0V, V_{GS} +15V)
015	0.196	0.241	0.030	0.254	0.283	1.711	0.856	0.206	0.190	0.823	0.097	0.528	(V_{DS} 0V, V_{GS} +15V)
016	0.044	0.298	0.557	2.071	0.303	1.117	0.101	0.134	0.518	0.272	0.070	0.696	(V_{DS} 0V, V_{GS} +15V)
017	0.625	0.021	0.629	0.093	0.148	0.378	0.802	1.066	0.504	0.545	0.316	0.043	(V_{DS} 0V, V_{GS} +15V)
018	0.519	0.526	0.414	0.196	0.352	0.999	0.955	0.051	0.664	0.094	0.649	0.516	(V_{DS} 0V, V_{GS} +12V)
019	0.222	0.600	0.475	0.243	0.014	0.633	0.231	0.557	0.386	0.122	0.695	0.152	(V_{DS} 0V, V_{GS} +12V)
034	0.045	0.318	0.321	0.466	0.375	0.552	0.263	0.467	0.267	0.131	0.141	0.481	**Reference device**

Reference device **Mean value:** **0.319** **Estimated uncertainty:** **± 42.94 % (± 0.137 nA)**

Red values: greater than max limit
Dark red Values: lower than min limits

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:		100.0	[nA]

I_{GSS_R1} Gate Leakage Current (rev) [nA] vs ^{60}Co Irradiation Total Dose [rad (Si)]

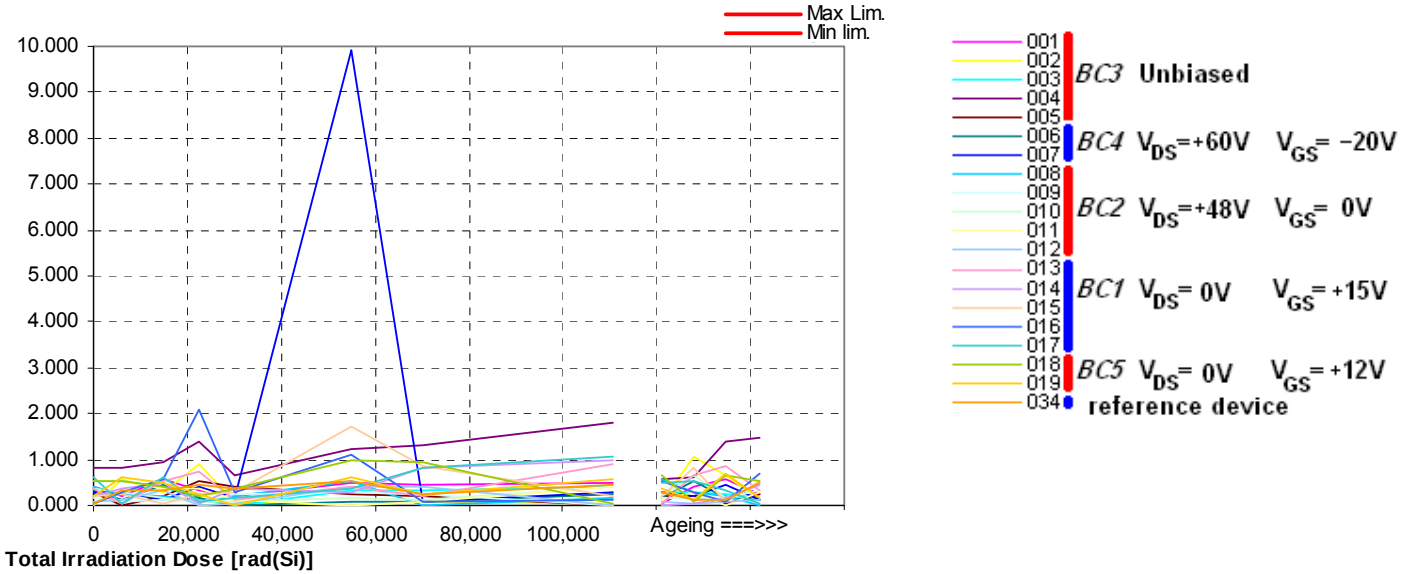


Figure 4 Data from Table 6

Table 7 – I_{DSS} @ V_{DS} 5V, V_{GS} 0V, Drain Current (off state) [nA] vs ^{60}Co Irradiation Total Dose [rad (Si)]

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:		10'000	[nA]

Detailed results - Measurement data in [nA]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C	Applied Bias Condition
001	0.154	14.231	32.985	76.355	86.657	164.716	254.688	299.656	235.177	245.938	222.564	56.673	(V_{DS} 0V, V_{GS} 0V)
002	0.201	15.736	38.722	88.124	102.586	178.454	286.842	300.846	287.036	285.842	257.857	50.491	(V_{DS} 0V, V_{GS} 0V)
003	0.016	14.353	34.923	79.397	92.378	161.125	279.568	273.300	255.931	263.101	245.383	61.079	(V_{DS} 0V, V_{GS} 0V)
004	0.005	15.733	38.174	87.828	115.204	174.144	295.216	301.321	285.874	291.789	275.454	49.329	(V_{DS} 0V, V_{GS} 0V)
005	0.098	14.521	35.826	84.120	95.376	159.916	271.691	273.596	260.339	263.876	256.596	50.481	(V_{DS} 0V, V_{GS} 0V)
006	0.014	4.949	10.413	23.457	26.774	51.055	72.567	55.579	47.642	49.659	50.582	43.579	(V_{DS} +60V, V_{GS} -20V)
007	0.051	5.023	10.337	23.404	26.047	50.103	71.993	53.149	49.711	50.842	52.703	42.484	(V_{DS} +60V, V_{GS} -20V)
008	0.114	6.704	14.701	31.434	34.805	61.974	98.664	102.106	101.874	99.409	89.996	19.585	(V_{DS} +48V, V_{GS} 0V)
009	0.129	7.380	16.288	35.860	39.217	69.685	108.196	107.788	106.859	104.621	96.671	20.201	(V_{DS} +48V, V_{GS} 0V)
010	0.061	7.048	14.987	33.576	36.665	66.812	100.794	106.648	106.872	102.330	91.227	20.004	(V_{DS} +48V, V_{GS} 0V)
011	0.131	6.660	15.067	32.888	35.479	63.722	100.736	101.115	101.964	103.123	92.176	20.581	(V_{DS} +48V, V_{GS} 0V)
012	0.005	6.668	14.356	32.110	34.383	62.602	96.779	100.515	99.772	101.065	91.223	20.209	(V_{DS} +48V, V_{GS} 0V)
013	0.044	46.409	41.766	68.708	67.345	117.266	182.664	350.521	258.075	266.074	231.870	310.151	(V_{DS} 0V, V_{GS} +15V)
014	0.179	48.026	41.677	72.617	70.624	122.608	191.242	349.808	278.365	313.689	257.665	315.449	(V_{DS} 0V, V_{GS} +15V)
015	0.127	47.334	40.668	70.258	69.198	119.543	186.821	353.657	285.742	280.303	244.250	313.562	(V_{DS} 0V, V_{GS} +15V)
016	0.161	48.611	42.538	72.856	69.455	121.780	195.716	333.296	286.882	286.067	258.015	319.671	(V_{DS} 0V, V_{GS} +15V)
017	0.070	47.958	41.640	71.758	69.209	118.255	188.898	310.291	279.123	283.854	254.251	315.959	(V_{DS} 0V, V_{GS} +15V)
018	0.079	51.531	48.324	75.836	72.325	134.279	206.484	448.869	383.257	384.025	293.003	316.645	(V_{DS} 0V, V_{GS} +12V)
019	0.036	46.508	41.002	68.685	66.640	119.323	195.640	425.910	368.074	356.308	293.317	305.900	(V_{DS} 0V, V_{GS} +12V)
034	0.002	0.035	0.005	0.092	0.101	0.014	0.103	0.161	0.014	0.037	0.165	0.075	Reference device

Reference device **Mean value:** 0.067 **Estimated uncertainty:** ± 75.16 % (± 0.05 nA)

Red values: greater than max limit
Dark red Values: lower than min limits

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:		10'000	[nA]

I_{DSS} @ V_{DS} 5V, V_{GS} 0V, Drain Current (off state) [nA] vs ^{60}Co Irradiation Total Dose [rad (Si)]

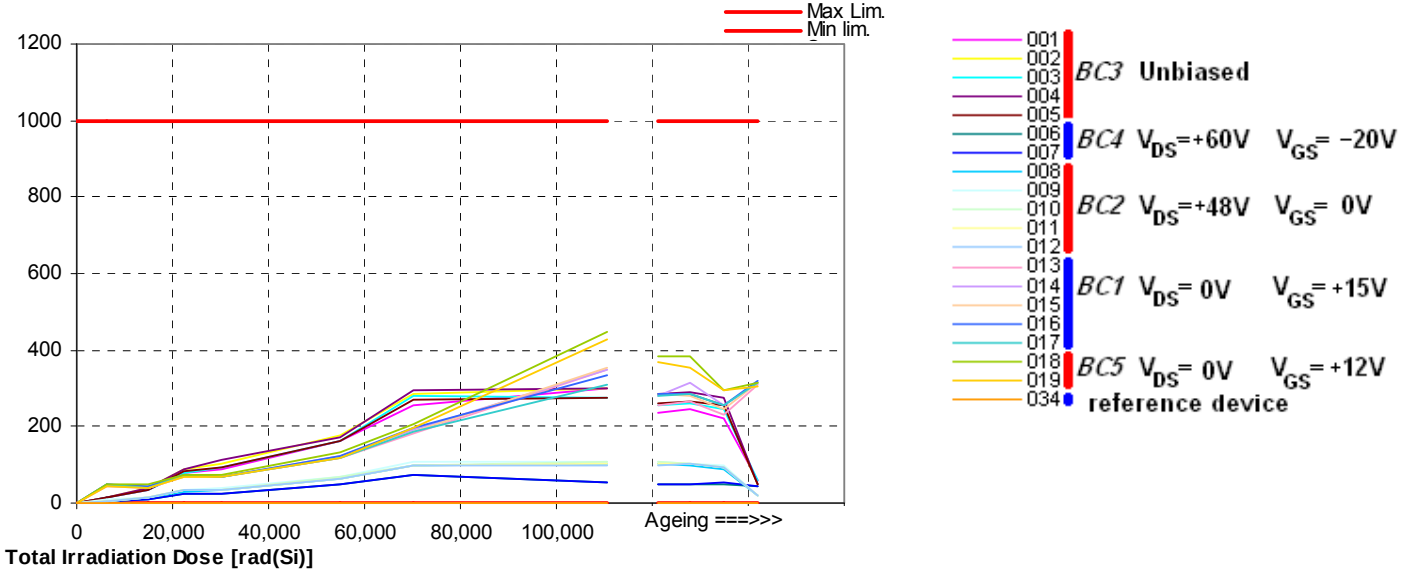


Figure 5 Data from Table 7

Table 8 – I_{DSS} @ V_{DS} 48V, V_{GS} 0V, Drain Current (off state) [nA] vs ^{60}Co Irradiation Total Dose [rad (Si)]

STRH100N6FSY3	*Min.*	*Max.*	*Unit*
Applicable limits:		10'000	[nA]

Detailed results - Measurement data in [nA]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C	Applied Bias Condition
001	0.20	17.78	41.92	95.44	108.13	198.10	302.96	444.90	348.23	340.62	286.42	72.75	(V_{DS} 0V, V_{GS} 0V)
002	0.72	20.26	56.12	127.64	156.80	263.55	399.92	533.87	486.88	452.17	368.99	79.71	(V_{DS} 0V, V_{GS} 0V)
003	0.28	17.99	46.69	104.73	127.02	255.85	465.10	792.58	630.87	618.96	460.96	84.80	(V_{DS} 0V, V_{GS} 0V)
004	0.57	19.08	47.23	109.58	141.48	212.87	354.15	464.45	428.74	410.44	355.32	63.09	(V_{DS} 0V, V_{GS} 0V)
005	0.65	17.40	44.66	105.15	118.38	193.72	322.50	426.65	386.49	368.16	331.12	65.36	(V_{DS} 0V, V_{GS} 0V)
006	0.61	8.26	12.44	26.82	30.97	58.55	84.55	110.72	96.40	97.38	92.10	48.12	(V_{DS} +60V, V_{GS} -20V)
007	0.09	6.75	12.57	26.17	29.82	57.57	83.54	103.47	97.40	97.39	92.41	47.05	(V_{DS} +60V, V_{GS} -20V)
008	0.23	10.19	20.04	41.48	45.86	77.40	120.63	139.42	130.70	124.38	108.52	22.12	(V_{DS} +48V, V_{GS} 0V)
009	0.04	11.17	22.17	46.49	50.35	85.36	129.79	156.02	141.55	134.62	117.39	23.11	(V_{DS} +48V, V_{GS} 0V)
010	0.25	10.81	19.84	43.19	47.14	81.66	121.00	147.81	138.60	128.99	109.68	22.88	(V_{DS} +48V, V_{GS} 0V)
011	0.43	10.78	20.04	43.18	46.83	79.00	121.89	141.86	132.49	131.38	111.06	23.32	(V_{DS} +48V, V_{GS} 0V)
012	0.17	9.97	19.16	41.42	44.71	77.26	117.39	136.00	126.22	125.47	108.88	23.40	(V_{DS} +48V, V_{GS} 0V)
013	0.68	55.89	132.71	312.68	370.50	1,077.27	1,512.00	2,385.00	2,275.00	2,634.00	2,077.00	795.10	(V_{DS} 0V, V_{GS} +15V)
014	0.18	56.90	135.37	332.57	390.87	1,144.61	1,972.00	3,111.00	2,707.00	3,062.00	2,419.00	822.90	(V_{DS} 0V, V_{GS} +15V)
015	0.60	56.27	132.75	323.01	384.11	1,112.77	3,160.00	4,984.00	3,616.00	4,021.00	2,820.00	852.89	(V_{DS} 0V, V_{GS} +15V)
016	0.10	58.31	137.45	331.01	384.22	1,133.57	3,119.00	4,919.00	3,604.00	4,005.00	2,909.00	869.71	(V_{DS} 0V, V_{GS} +15V)
017	0.92	57.24	135.32	329.43	385.11	1,114.56	3,102.00	4,893.00	3,572.00	4,019.00	2,862.00	869.70	(V_{DS} 0V, V_{GS} +15V)
018	0.90	61.87	143.85	329.46	381.28	1,131.93	1,992.00	3,142.00	2,710.00	3,117.00	2,393.00	785.44	(V_{DS} 0V, V_{GS} +12V)
019	0.36	56.54	131.28	304.98	356.41	1,029.43	2,839.00	4,477.00	3,278.00	3,714.00	2,784.00	822.59	(V_{DS} 0V, V_{GS} +12V)
034	0.78	0.85	0.51	0.62	1.01	0.51	0.21	0.97	0.41	0.93	1.03	0.76	Reference device

Reference device **Mean value:** 0.715 **Estimated uncertainty:** ± 31.91 % (± 0.228 nA)

Red values: greater than max limit
Dark red Values: lower than min limits

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:		10'000	[nA]

I_{DSS} @ V_{DS} 48V, V_{GS} 0V, Drain Current (off state) [nA] vs ^{60}Co Irradiation Total Dose [rad (Si)]

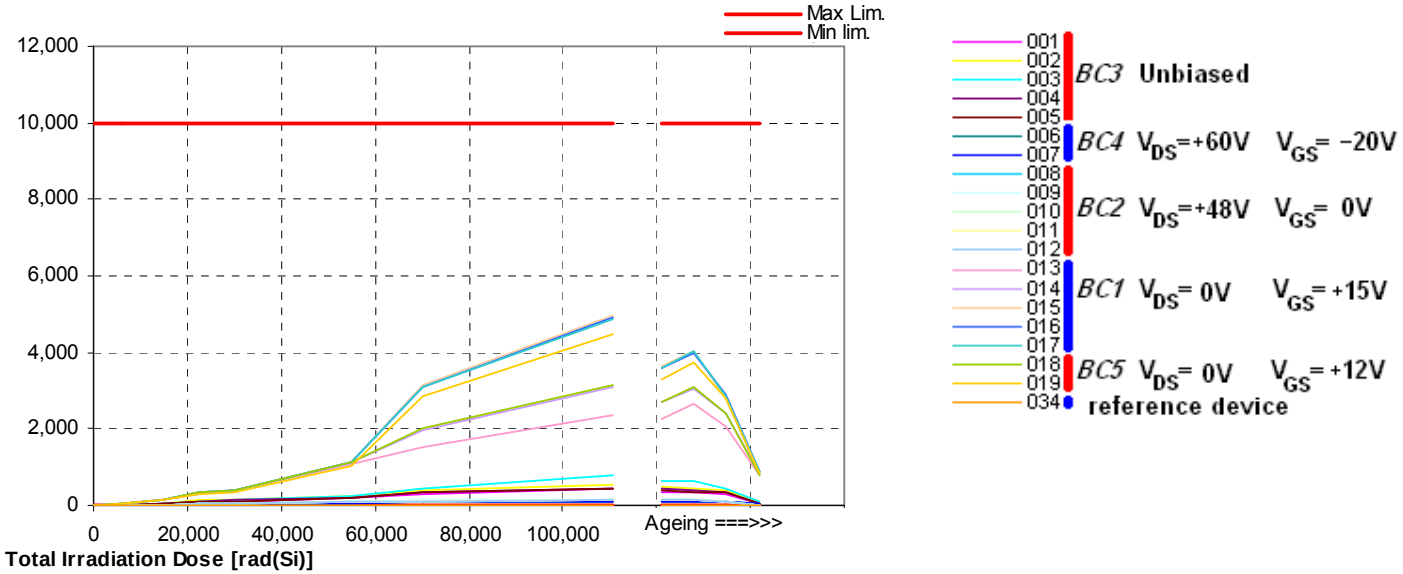


Figure 6 Data from Table 8

Table 9 – I_{DSS} @ V_{DS} 60V, V_{GS} 0V, Drain Current (off state) [nA] vs ^{60}Co Irradiation Total Dose [rad (Si)]

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:		1E6	[nA]

Detailed results - Measurement data in [nA]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C	Applied Bias Condition
001	0.89	19.48	46.38	105.36	120.00	222.63	338.60	491.85	387.29	379.75	319.44	84.33	(V_{DS} 0V, V_{GS} 0V)
002	1.46	26.12	78.39	161.22	198.09	341.60	506.21	704.18	627.09	583.86	471.96	107.77	(V_{DS} 0V, V_{GS} 0V)
003	0.98	23.08	62.64	134.31	188.85	492.69	891.39	1,498.15	1,364.00	1,368.31	1,165.10	124.68	(V_{DS} 0V, V_{GS} 0V)
004	0.64	21.14	51.70	117.69	154.64	243.11	400.42	544.20	498.01	473.16	411.51	72.80	(V_{DS} 0V, V_{GS} 0V)
005	0.57	20.85	48.83	113.39	130.44	215.73	358.68	469.11	426.32	406.76	366.80	75.47	(V_{DS} 0V, V_{GS} 0V)
006	0.07	8.82	17.03	31.51	36.23	65.80	95.51	126.55	110.70	112.32	105.69	54.08	(V_{DS} +60V, V_{GS} -20V)
007	0.53	8.64	16.67	31.90	36.09	64.87	95.14	118.21	112.61	111.79	107.71	53.04	(V_{DS} +60V, V_{GS} -20V)
008	0.32	12.29	25.15	48.33	50.64	84.04	130.08	149.58	141.17	133.71	116.83	23.47	(V_{DS} +48V, V_{GS} 0V)
009	0.45	14.30	27.04	52.55	56.79	92.44	139.84	167.01	152.33	144.45	128.52	24.74	(V_{DS} +48V, V_{GS} 0V)
010	0.59	12.76	25.44	50.29	53.60	89.36	131.59	159.02	148.52	138.51	119.06	24.80	(V_{DS} +48V, V_{GS} 0V)
011	0.68	13.14	24.91	50.15	51.85	85.63	132.09	152.23	142.52	141.48	120.58	25.30	(V_{DS} +48V, V_{GS} 0V)
012	0.54	12.00	24.16	48.36	49.98	83.88	126.71	243.49	209.02	233.84	206.51	24.55	(V_{DS} +48V, V_{GS} 0V)
013	0.5	63.1	146.8	347.4	418.0	1,265.2	4,600.0	13,505	12,979	3,189	2,660	909.94	(V_{DS} 0V, V_{GS} +15V)
014	0.5	65.8	151.5	371.7	441.3	2,708.0	6,710.7	22,213	22,188	21,672	20,516	949.44	(V_{DS} 0V, V_{GS} +15V)
015	0.2	64.8	148.6	360.0	433.9	2,804.7	6,372.9	24,049	23,945	23,550	22,114	987.70	(V_{DS} 0V, V_{GS} +15V)
016	0.2	67.7	153.6	371.0	436.0	3,307.8	7,722.8	29,096	28,948	28,872	27,118	1,006.79	(V_{DS} 0V, V_{GS} +15V)
017	0.1	65.5	150.5	366.1	432.8	2,501.7	8,310.8	33,126	32,572	11,325	3,548	1,001.33	(V_{DS} 0V, V_{GS} +15V)
018	0.1	69.2	160.2	367.6	430.3	4,307.9	13,432	99,358	98,476	97,842	96,208	903.67	(V_{DS} 0V, V_{GS} +12V)
019	0.4	63.3	144.5	339.8	403.3	1,212.3	9,310.7	45,153	44,997	44,484	43,768	950.01	(V_{DS} 0V, V_{GS} +12V)
034	0.276	0.300	0.659	0.507	0.362	0.322	0.887	0.789	0.029	0.740	0.029	0.812	**Reference device**

Reference device **Mean value:** 0.476 **Estimated uncertainty:** ± 54.62 % (± 0.26 nA)

Note that the max limit of 1 mA has been expressed in nA (1E6 nA), the same unit used to represent the measured values.

Red values: greater than max limit
Dark red Values: lower than min limits

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:		1E6	[nA]

I_{DSS} @ V_{DS} 60V, V_{GS} 0V, Drain Current (off state) [nA] vs ^{60}Co Irradiation Total Dose [rad (Si)]

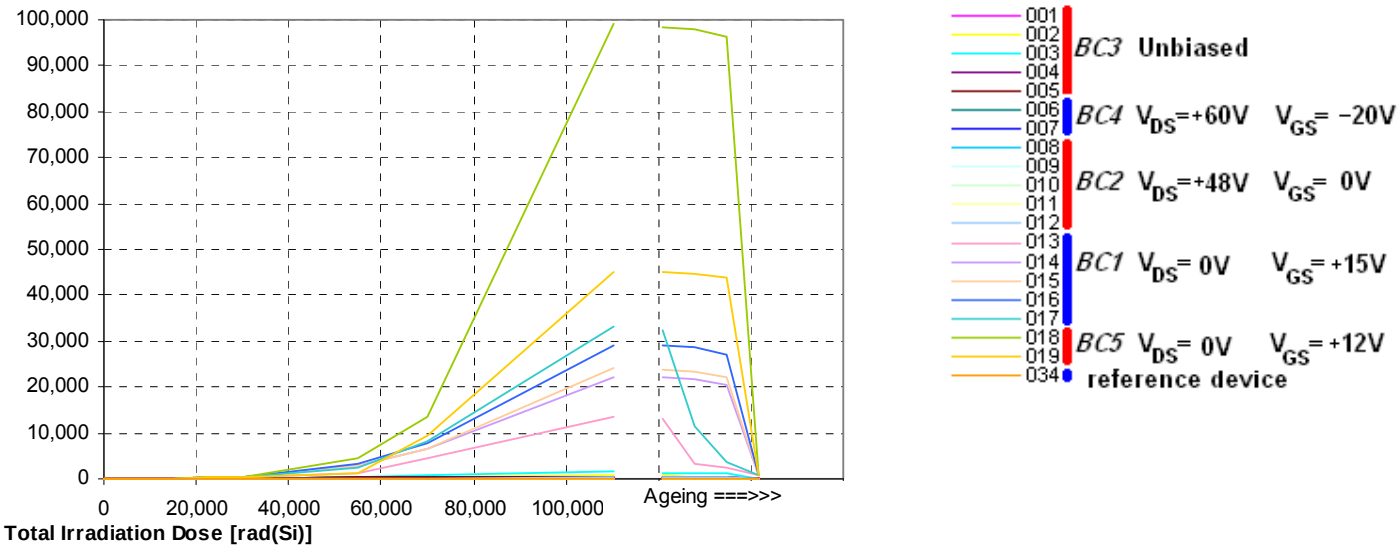


Figure 7 Data from Table 9

Table 10 – V_{GS_th} @ I_{DS} 0.01 mA, Gate Threshold Voltage [mV] vs ^{60}Co Irradiation Total Dose [rad (Si)]

STRH100N6FSY3	*Min.*	*Max.*	*Unit*
Applicable limits:	2'000	4'500	[mV]

Detailed results - Measurement data in [mV]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C	Applied Bias Condition
001	3,710.88	3,466.88	3,193.88	2,929.50	2,751.00	2,203.75	**1,939.69**	**1,406.00**	**1,471.00**	**1,458.13**	**1,491.25**	2,838.69	(V_{DS} 0V, V_{GS} 0V)
002	2,080.56	2,003.31	**1,930.38**	**1,881.44**	**1,854.00**	**1,726.88**	**1,596.56**	**1,196.38**	**1,230.94**	**1,242.75**	**1,274.69**	**1,929.31**	(V_{DS} 0V, V_{GS} 0V)
003	2,235.19	2,139.69	2,028.38	2,021.88	**1,965.50**	**1,885.44**	**1,728.50**	**1,321.69**	**1,359.88**	**1,360.63**	**1,390.25**	2,134.06	(V_{DS} 0V, V_{GS} 0V)
004	2,171.94	2,087.88	**1,988.44**	**1,919.88**	**1,888.38**	**1,742.13**	**1,613.75**	**1,215.56**	**1,264.63**	**1,254.50**	**1,282.44**	**1,952.06**	(V_{DS} 0V, V_{GS} 0V)
005	3,757.31	3,490.19	3,209.81	2,930.06	2,751.50	2,195.81	**1,875.56**	**1,366.81**	**1,396.50**	**1,394.75**	**1,412.38**	2,854.19	(V_{DS} 0V, V_{GS} 0V)
006	3,761.31	3,641.94	3,523.81	3,362.88	3,280.63	2,968.63	2,771.63	2,360.81	2,379.06	2,382.56	2,461.13	3,028.31	(V_{DS} +60V, V_{GS} -20V)
007	3,798.25	3,662.19	3,541.69	3,387.63	3,305.31	2,989.31	2,791.88	2,397.13	2,402.88	2,408.63	2,480.88	3,055.94	(V_{DS} +60V, V_{GS} -20V)
008	3,506.56	3,284.63	3,028.63	2,775.94	2,608.69	2,079.69	**1,789.94**	**1,282.50**	**1,316.13**	**1,304.69**	**1,322.63**	2,742.38	(V_{DS} +48V, V_{GS} 0V)
009	3,731.94	3,479.88	3,201.00	2,911.56	2,736.81	2,165.69	**1,856.25**	**1,315.44**	**1,359.50**	**1,341.94**	**1,353.75**	2,882.00	(V_{DS} +48V, V_{GS} 0V)
010	3,672.81	3,423.38	3,144.25	2,869.31	2,690.81	2,121.38	**1,816.75**	**1,286.69**	**1,331.44**	**1,313.06**	**1,333.19**	2,810.75	(V_{DS} +48V, V_{GS} 0V)
011	3,730.56	3,470.31	3,199.00	2,918.88	2,748.94	2,176.81	**1,872.63**	**1,346.88**	**1,383.31**	**1,359.94**	**1,371.06**	2,846.56	(V_{DS} +48V, V_{GS} 0V)
012	3,609.13	3,364.19	3,087.88	2,824.63	2,651.81	2,088.44	**1,789.63**	**1,280.38**	**1,320.63**	**1,302.06**	**1,317.13**	2,740.69	(V_{DS} +48V, V_{GS} 0V)
013	3,651.56	3,326.69	3,033.81	2,746.50	2,582.81	2,098.94	**1,748.81**	**1,183.81**	**1,219.56**	**1,291.75**	**1,521.00**	3,622.31	(V_{DS} 0V, V_{GS} +15V)
014	3,702.56	3,385.00	3,072.25	2,781.56	2,607.44	2,133.63	**1,769.56**	**1,203.56**	**1,230.19**	**1,276.56**	**1,539.31**	3,677.44	(V_{DS} 0V, V_{GS} +15V)
015	3,577.81	3,260.75	3,000.81	2,742.56	2,556.63	2,113.50	**1,772.81**	**1,206.38**	**1,233.13**	**1,317.56**	**1,553.50**	3,687.25	(V_{DS} 0V, V_{GS} +15V)
016	3,718.63	3,397.94	3,086.50	2,790.63	2,627.94	2,136.44	**1,780.25**	**1,228.00**	**1,244.25**	**1,307.38**	**1,560.06**	3,684.13	(V_{DS} 0V, V_{GS} +15V)
017	3,676.69	3,350.44	3,050.13	2,763.06	2,583.50	2,105.75	**1,753.50**	**1,211.75**	**1,211.81**	**1,293.13**	**1,535.56**	3,627.38	(V_{DS} 0V, V_{GS} +15V)
018	3,658.00	3,323.81	2,997.94	2,686.63	2,505.06	**1,961.63**	**1,588.31**	**1,031.69**	**1,027.00**	**1,094.75**	**1,329.69**	3,625.50	(V_{DS} 0V, V_{GS} +12V)
019	3,701.06	3,352.75	3,014.44	2,703.81	2,514.94	**1,979.38**	**1,602.19**	**1,026.38**	**1,041.00**	**1,111.13**	**1,318.63**	3,622.38	(V_{DS} 0V, V_{GS} +12V)
034	3,790.75	3,750.50	3,770.44	3,721.13	3,739.19	3,740.50	3,711.19	3,758.81	3,767.06	3,750.75	3,769.00	3,781.13	Reference device

Reference device **Mean value:** 3,754.20 **Estimated uncertainty:** ± 0.54 % (± 20.415 mV)

Red values: greater than max limit
Dark red Values: lower than min limits

STRH100N6FSY3	*Min.*	*Max.*	*Unit*
Applicable limits:	2'000	4'500	[mV]

V_{GS_th} @ I_{DS} 0.01 mA, Gate Threshold Voltage [mV] vs ^{60}Co Irradiation Total Dose [rad (Si)]

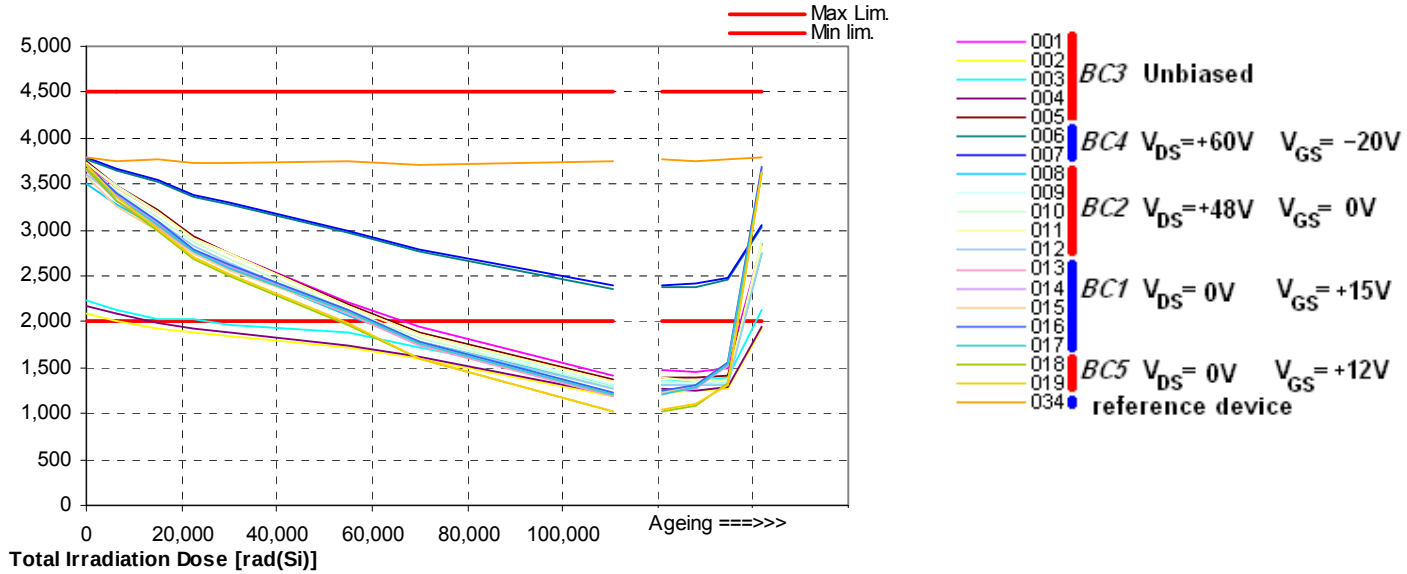


Figure 8 Data from Table 10

Table 11 – V_{GS_th} @ I_{DS} 0.10 mA, Gate Threshold Voltage [mV] vs ^{60}Co Irradiation Total Dose [rad (Si)]

STRH100N6FSY3	*Min.*	*Max.*	*Unit*
Applicable limits:	2'000	4'500	[mV]

Detailed results - Measurement data in [mV]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C	Applied Bias Condition
001	3,980.69	3,747.19	3,480.38	3,231.75	3,057.56	2,524.50	2,279.50	**1,756.19**	**1,811.94**	**1,800.63**	**1,818.25**	3,113.00	(V_{DS} 0V, V_{GS} 0V)
002	3,135.75	3,033.25	2,917.25	2,805.44	2,698.56	2,276.63	2,026.81	**1,556.75**	**1,592.63**	**1,594.81**	**1,617.56**	2,850.94	(V_{DS} 0V, V_{GS} 0V)
003	3,827.06	3,597.69	3,345.63	3,121.56	2,959.75	2,453.50	2,164.13	**1,691.88**	**1,727.31**	**1,715.44**	**1,742.19**	3,039.75	(V_{DS} 0V, V_{GS} 0V)
004	3,027.19	2,937.19	2,847.63	2,746.94	2,655.00	2,290.19	2,033.13	**1,575.13**	**1,615.69**	**1,611.44**	**1,634.13**	2,788.06	(V_{DS} 0V, V_{GS} 0V)
005	4,023.38	3,769.69	3,503.13	3,237.69	3,054.50	2,522.06	2,215.50	**1,730.44**	**1,748.19**	**1,743.69**	**1,748.25**	3,135.94	(V_{DS} 0V, V_{GS} 0V)
006	4,049.75	3,918.25	3,802.75	3,658.50	3,567.69	3,275.81	3,090.81	2,700.31	2,705.13	2,717.00	2,787.25	3,342.25	(V_{DS} +60V, V_{GS} -20V)
007	4,063.94	3,938.56	3,827.88	3,675.06	3,591.94	3,299.13	3,114.63	2,734.13	2,732.00	2,745.13	2,810.63	3,369.94	(V_{DS} +60V, V_{GS} -20V)
008	3,886.69	3,651.06	3,380.88	3,131.19	2,953.38	2,417.69	2,119.00	**1,623.75**	**1,658.94**	**1,641.00**	**1,645.88**	3,035.50	(V_{DS} +48V, V_{GS} 0V)
009	3,998.38	3,760.13	3,484.69	3,222.06	3,043.50	2,494.31	2,196.94	**1,665.25**	**1,706.38**	**1,686.00**	**1,690.38**	3,154.19	(V_{DS} +48V, V_{GS} 0V)
010	3,937.75	3,695.88	3,435.13	3,171.00	2,992.00	2,438.00	2,149.44	**1,640.31**	**1,672.25**	**1,652.81**	**1,663.56**	3,081.69	(V_{DS} +48V, V_{GS} 0V)
011	3,994.69	3,755.06	3,481.25	3,228.56	3,053.06	2,501.63	2,205.25	**1,696.06**	**1,730.69**	**1,704.38**	**1,705.06**	3,119.69	(V_{DS} +48V, V_{GS} 0V)
012	3,888.38	3,648.06	3,383.00	3,123.00	2,947.75	2,415.31	2,120.88	**1,630.75**	**1,658.38**	**1,636.50**	**1,641.19**	3,016.31	(V_{DS} +48V, V_{GS} 0V)
013	3,923.75	3,639.94	3,363.44	3,104.06	2,951.13	2,535.56	2,211.38	**1,726.19**	**1,744.38**	**1,825.38**	2,059.88	4,162.50	(V_{DS} 0V, V_{GS} +15V)
014	3,978.81	3,686.50	3,412.75	3,147.56	2,982.75	2,562.81	2,245.38	**1,762.63**	**1,767.56**	**1,826.00**	2,087.19	4,237.25	(V_{DS} 0V, V_{GS} +15V)
015	3,987.06	3,682.81	3,412.50	3,146.75	2,982.94	2,572.88	2,255.81	**1,761.69**	**1,777.38**	**1,849.63**	2,109.31	4,239.50	(V_{DS} 0V, V_{GS} +15V)
016	3,985.75	3,693.38	3,409.25	3,155.00	2,999.13	2,569.75	2,253.00	**1,780.25**	**1,783.69**	**1,854.00**	2,110.25	4,227.25	(V_{DS} 0V, V_{GS} +15V)
017	3,950.13	3,655.81	3,375.44	3,120.75	2,956.25	2,538.81	2,221.88	**1,760.69**	**1,751.50**	**1,829.38**	2,078.94	4,172.63	(V_{DS} 0V, V_{GS} +15V)
018	3,927.75	3,626.13	3,324.75	3,052.63	2,875.44	2,410.81	2,078.00	**1,594.44**	**1,569.19**	**1,649.00**	**1,891.69**	4,183.31	(V_{DS} 0V, V_{GS} +12V)
019	3,965.00	3,658.06	3,344.69	3,069.63	2,889.50	2,418.81	2,074.50	**1,576.44**	**1,570.75**	**1,646.63**	**1,876.06**	4,180.38	(V_{DS} 0V, V_{GS} +12V)
034	4,060.00	4,023.31	4,044.19	3,998.81	4,023.81	4,023.13	3,985.75	4,033.19	4,041.88	4,025.75	4,040.88	4,056.38	Reference device

Reference device **Mean value:** 4,029.76 **Estimated uncertainty:** ± 0.46 % (± 18.73 mV)

Red values: greater than max limit
Dark red Values: lower than min limits

STRH100N6FSY3	*Min.*	*Max.*	*Unit*
Applicable limits:	2'000	4'500	[mV]

V_{GS_th} @ I_{DS} 0.10 mA, Gate Threshold Voltage [mV] vs ^{60}Co Irradiation Total Dose [rad (Si)]

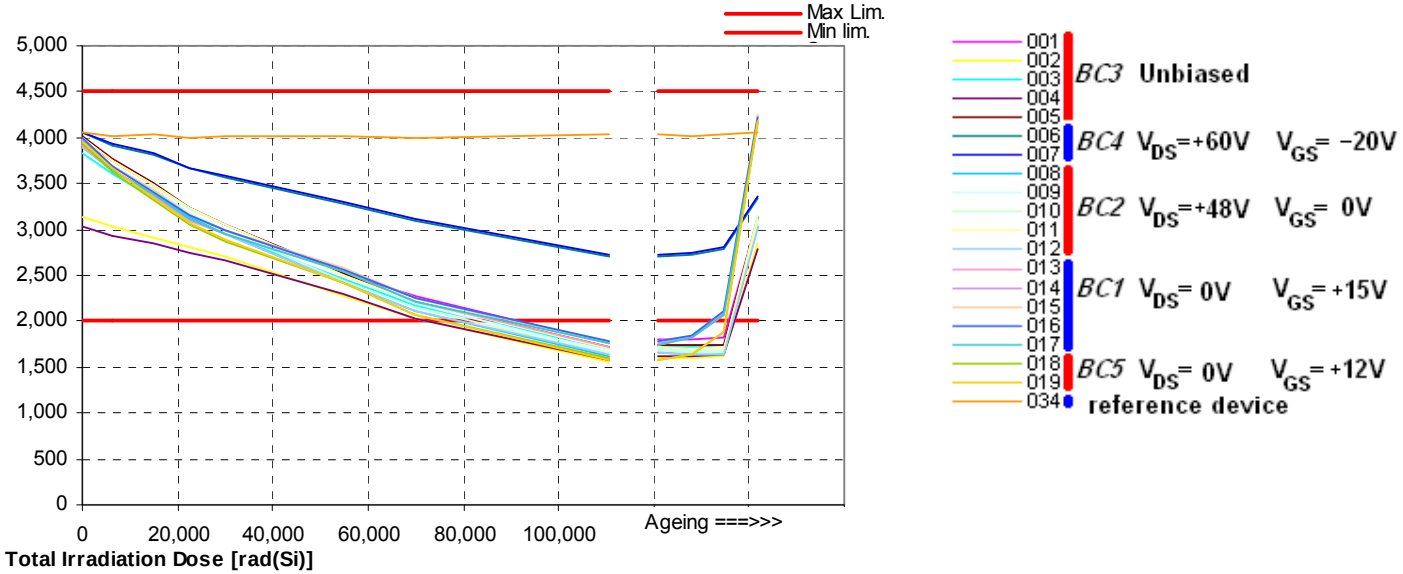


Figure 9 Data from Table 11

Table 12 – V_{GS_th} @ I_{DS} 0.25 mA, Gate Threshold Voltage [mV] vs ^{60}Co Irradiation Total Dose [rad (Si)]

STRH100N6FSY3	*Min.*	*Max.*	*Unit*
Applicable limits:	2'000	4'500	[mV]

Detailed results - Measurement data in [mV]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C	Applied Bias Condition
001	4,085.06	3,863.63	3,598.75	3,356.44	3,183.44	2,662.19	2,417.94	**1,904.13**	**1,956.88**	**1,945.75**	**1,965.00**	3,221.38	(V_{DS} 0V, V_{GS} 0V)
002	3,674.63	3,504.13	3,293.25	3,086.06	2,931.13	2,448.38	2,187.00	**1,718.06**	**1,745.56**	**1,738.81**	**1,761.56**	3,094.44	(V_{DS} 0V, V_{GS} 0V)
003	4,025.31	3,783.38	3,527.63	3,288.06	3,123.94	2,612.31	2,315.56	**1,845.63**	**1,878.31**	**1,870.25**	**1,888.25**	3,180.38	(V_{DS} 0V, V_{GS} 0V)
004	3,580.19	3,445.69	3,269.38	3,070.19	2,917.13	2,463.56	2,192.00	**1,730.88**	**1,761.19**	**1,759.81**	**1,777.81**	3,060.13	(V_{DS} 0V, V_{GS} 0V)
005	4,125.00	3,884.94	3,617.25	3,354.38	3,171.50	2,655.19	2,355.19	**1,880.94**	**1,894.56**	**1,890.13**	**1,894.75**	3,249.81	(V_{DS} 0V, V_{GS} 0V)
006	4,153.81	4,027.88	3,913.75	3,773.06	3,694.00	3,406.13	3,218.06	2,843.50	2,847.06	2,852.56	2,922.25	3,480.25	(V_{DS} +60V, V_{GS} -20V)
007	4,170.88	4,056.94	3,939.38	3,796.56	3,711.38	3,424.38	3,243.75	2,869.81	2,865.75	2,875.69	2,943.25	3,497.63	(V_{DS} +60V, V_{GS} -20V)
008	3,996.38	3,769.88	3,505.00	3,250.88	3,081.19	2,553.69	2,262.25	**1,777.38**	**1,804.81**	**1,782.00**	**1,783.19**	3,154.06	(V_{DS} +48V, V_{GS} 0V)
009	4,107.00	3,873.38	3,603.44	3,348.06	3,174.31	2,627.56	2,336.75	**1,820.19**	**1,856.50**	**1,835.13**	**1,832.56**	3,269.31	(V_{DS} +48V, V_{GS} 0V)
010	4,046.56	3,809.31	3,542.38	3,293.06	3,119.50	2,577.69	2,300.44	**1,789.44**	**1,814.00**	**1,798.56**	**1,802.25**	3,196.00	(V_{DS} +48V, V_{GS} 0V)
011	4,099.38	3,865.06	3,600.19	3,353.94	3,176.13	2,641.00	2,346.06	**1,843.75**	**1,875.38**	**1,851.38**	**1,845.31**	3,237.94	(V_{DS} +48V, V_{GS} 0V)
012	3,992.00	3,762.13	3,495.75	3,247.44	3,078.88	2,548.44	2,266.31	**1,773.50**	**1,803.38**	**1,783.19**	**1,780.13**	3,124.63	(V_{DS} +48V, V_{GS} 0V)
013	4,032.56	3,759.06	3,492.69	3,251.38	3,099.19	2,716.44	2,415.69	**1,970.50**	**1,983.50**	2,060.69	2,309.75	4,487.38	(V_{DS} 0V, V_{GS} +15V)
014	4,084.25	3,812.44	3,545.63	3,294.25	3,143.13	2,753.38	2,447.13	2,011.56	2,008.63	2,067.81	2,339.81	**4,565.38**	(V_{DS} 0V, V_{GS} +15V)
015	4,085.69	3,814.88	3,552.81	3,303.13	3,147.63	2,763.13	2,461.88	2,003.50	2,013.13	2,099.25	2,362.00	**4,566.75**	(V_{DS} 0V, V_{GS} +15V)
016	4,095.38	3,815.69	3,550.75	3,304.06	3,151.50	2,761.31	2,458.00	2,024.38	2,024.75	2,094.50	2,360.63	**4,556.63**	(V_{DS} 0V, V_{GS} +15V)
017	4,054.31	3,785.13	3,506.81	3,266.88	3,114.25	2,725.94	2,427.00	2,004.38	**1,990.69**	2,067.25	2,331.25	4,496.50	(V_{DS} 0V, V_{GS} +15V)
018	4,028.94	3,748.00	3,464.75	3,199.56	3,035.56	2,593.63	2,281.88	**1,841.69**	**1,814.00**	**1,893.81**	2,137.69	**4,526.56**	(V_{DS} 0V, V_{GS} +12V)
019	4,075.13	3,772.88	3,480.69	3,212.44	3,047.56	2,603.56	2,280.25	**1,817.44**	**1,809.25**	**1,893.38**	2,125.50	**4,520.25**	(V_{DS} 0V, V_{GS} +12V)
034	4,167.94	4,133.00	4,153.56	4,112.56	4,134.69	4,133.38	4,106.88	4,141.50	4,151.19	4,134.69	4,153.94	4,166.19	Reference device

Reference device **Mean value:** 4,140.79 **Estimated uncertainty:** ± 0.4 % (± 16.44 mV)

Red values: greater than max limit
Dark red Values: lower than min limits

STRH100N6FSY3	*Min.*	*Max.*	*Unit*
Applicable limits:	**2'000**	**4'500**	**[mV]**

V_{GS_th} @ I_{DS} 0.25 mA, Gate Threshold Voltage [mV] vs ^{60}Co Irradiation Total Dose [rad (Si)]

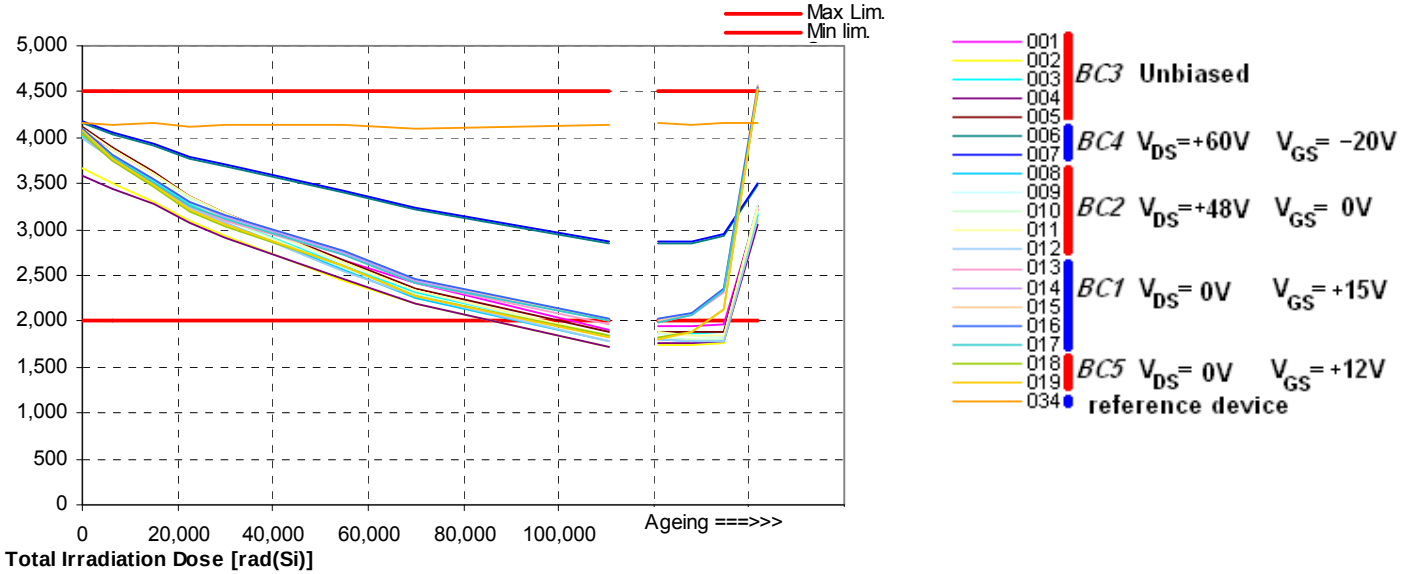


Figure 10 Data from Table 12

Table 13 – V_{GS_th} @ I_{DS} 1.0 mA, Gate Threshold Voltage [mV] vs ^{60}Co Irradiation Total Dose [rad (Si)]

STRH100N6FSY3	*Min.*	*Max.*	*Unit*
Applicable limits:	2'000	4'500	[mV]

Detailed results - Measurement data in [mV]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C	Applied Bias Condition
001	4,251.69	4,027.69	3,778.06	3,541.69	3,367.81	2,873.19	2,627.81	2,142.38	2,184.50	2,171.75	2,176.50	3,392.81	(V_{DS} 0V, V_{GS} 0V)
002	4,053.25	3,831.63	3,583.56	3,342.88	3,171.38	2,678.81	2,413.63	**1,953.56**	**1,977.25**	**1,972.31**	**1,984.75**	3,321.94	(V_{DS} 0V, V_{GS} 0V)
003	4,213.06	3,984.50	3,731.25	3,487.69	3,324.75	2,830.56	2,545.56	2,078.81	2,108.63	2,102.44	2,109.06	3,362.00	(V_{DS} 0V, V_{GS} 0V)
004	4,058.81	3,846.25	3,597.19	3,364.44	3,179.13	2,701.63	2,428.88	**1,967.75**	2,002.69	**1,995.44**	**1,999.31**	3,305.25	(V_{DS} 0V, V_{GS} 0V)
005	4,283.25	4,056.44	3,792.81	3,542.00	3,369.81	2,863.88	2,572.44	2,121.44	2,128.69	2,117.81	2,121.75	3,421.06	(V_{DS} 0V, V_{GS} 0V)
006	4,309.25	4,197.56	4,091.13	3,954.81	3,873.31	3,600.19	3,421.31	3,054.44	3,051.81	3,059.69	3,120.00	3,675.56	(V_{DS} +60V, V_{GS} -20V)
007	4,329.63	4,216.13	4,110.69	3,968.50	3,896.94	3,622.06	3,443.94	3,087.50	3,075.13	3,082.88	3,144.19	3,694.44	(V_{DS} +60V, V_{GS} -20V)
008	4,159.31	3,939.06	3,682.25	3,441.50	3,270.25	2,766.06	2,482.13	2,002.81	2,026.88	2,003.44	**1,998.88**	3,318.00	(V_{DS} +48V, V_{GS} 0V)
009	4,266.25	4,046.94	3,785.13	3,538.56	3,365.50	2,842.69	2,552.63	2,056.94	2,086.75	2,062.75	2,049.19	3,437.00	(V_{DS} +48V, V_{GS} 0V)
010	4,204.56	3,982.38	3,721.19	3,476.19	3,307.06	2,788.38	2,511.50	2,026.69	2,049.31	2,028.50	2,019.06	3,361.94	(V_{DS} +48V, V_{GS} 0V)
011	4,256.56	4,039.88	3,783.88	3,537.44	3,362.94	2,847.25	2,565.44	2,075.25	2,101.88	2,078.63	2,061.38	3,400.69	(V_{DS} +48V, V_{GS} 0V)
012	4,151.50	3,931.25	3,673.06	3,427.25	3,261.44	2,756.06	2,475.00	2,008.50	2,027.94	**1,999.00**	**1,990.63**	3,288.94	(V_{DS} +48V, V_{GS} 0V)
013	4,179.44	3,935.44	3,696.25	3,465.88	3,324.06	2,988.88	2,713.63	2,333.75	2,331.69	2,416.69	2,665.94	**4,916.44**	(V_{DS} 0V, V_{GS} +15V)
014	4,240.81	3,993.19	3,740.19	3,512.75	3,371.31	3,027.56	2,757.81	2,377.38	2,369.06	2,432.13	2,710.00	**4,995.56**	(V_{DS} 0V, V_{GS} +15V)
015	4,265.00	4,009.00	3,755.56	3,526.44	3,379.81	3,035.56	2,763.56	2,371.19	2,372.75	2,455.50	2,727.81	**4,997.94**	(V_{DS} 0V, V_{GS} +15V)
016	4,250.63	3,999.06	3,746.88	3,522.81	3,377.13	3,037.81	2,762.94	2,399.25	2,376.81	2,458.50	2,732.06	**4,995.44**	(V_{DS} 0V, V_{GS} +15V)
017	4,210.88	3,961.56	3,711.94	3,481.25	3,338.75	3,003.56	2,723.94	2,370.38	2,341.31	2,424.19	2,693.81	**4,927.81**	(V_{DS} 0V, V_{GS} +15V)
018	4,192.38	3,930.06	3,662.38	3,419.44	3,262.19	2,882.69	2,589.69	2,212.44	2,177.63	2,265.63	2,520.81	**4,979.88**	(V_{DS} 0V, V_{GS} +12V)
019	4,236.19	3,958.44	3,677.13	3,431.25	3,270.44	2,883.75	2,584.44	2,173.81	2,161.25	2,246.25	2,492.94	**4,964.81**	(V_{DS} 0V, V_{GS} +12V)
034	4,328.81	4,300.31	4,313.81	4,282.13	4,297.06	4,297.50	4,267.56	4,305.44	4,308.56	4,299.38	4,316.19	4,322.06	Reference device

Reference device **Mean value:** 4,303.24 **Estimated uncertainty:** ± 0.34 % (± 14.618 mV)

Red values: greater than max limit
Dark red Values: lower than min limits

STRH100N6FSY3	*Min.*	*Max.*	*Unit*
Applicable limits:	2'000	4'500	[mV]

V_{GS_th} @ I_{DS} 1.0 mA, Gate Threshold Voltage [mV] vs ^{60}Co Irradiation Total Dose [rad (Si)]

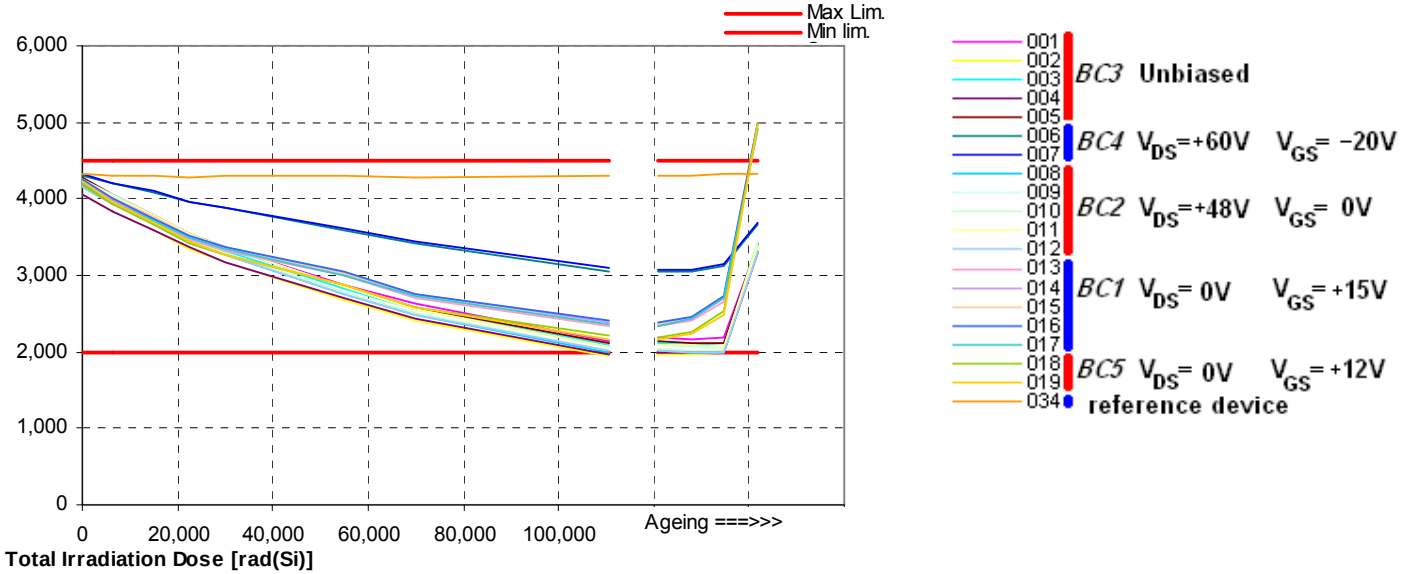


Figure 11 Data from Table 13

Table 14 – RDS(on) Drain-Source On-Resistance [Ohm] vs ^{60}Co Irradiation Total Dose [rad (Si)]

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:		0.0135	[Ohm]

Detailed results - Measurement data in [Ohm]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C	Applied Bias Condition
001	0.015	0.015	0.015	0.016	0.015	0.016	0.016	0.016	0.016	0.016	0.015	0.015	(V_{DS} 0V, V_{GS} 0V)
002	0.016	0.016	0.016	0.017	0.016	0.016	0.016	0.017	0.016	0.016	0.016	0.016	(V_{DS} 0V, V_{GS} 0V)
003	0.015	0.015	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.015	0.015	(V_{DS} 0V, V_{GS} 0V)
004	0.015	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.015	(V_{DS} 0V, V_{GS} 0V)
005	0.015	0.015	0.015	0.016	0.016	0.015	0.016	0.016	0.016	0.015	0.016	0.015	(V_{DS} 0V, V_{GS} 0V)
006	0.015	0.016	0.015	0.016	0.015	0.016	0.016	0.015	0.015	0.015	0.015	0.015	(V_{DS} +60V, V_{GS} -20V)
007	0.015	0.015	0.015	0.016	0.016	0.016	0.016	0.015	0.015	0.015	0.015	0.015	(V_{DS} +60V, V_{GS} -20V)
008	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.015	(V_{DS} +48V, V_{GS} 0V)
009	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.015	(V_{DS} +48V, V_{GS} 0V)
010	0.015	0.015	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.015	0.015	(V_{DS} +48V, V_{GS} 0V)
011	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.015	(V_{DS} +48V, V_{GS} 0V)
012	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.015	(V_{DS} +48V, V_{GS} 0V)
013	0.015	0.015	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017	(V_{DS} 0V, V_{GS} +15V)
014	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017	(V_{DS} 0V, V_{GS} +15V)
015	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017	(V_{DS} 0V, V_{GS} +15V)
016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017	(V_{DS} 0V, V_{GS} +15V)
017	0.015	0.016	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017	(V_{DS} 0V, V_{GS} +15V)
018	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017	(V_{DS} 0V, V_{GS} +12V)
019	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017	(V_{DS} 0V, V_{GS} +12V)
034	0.015	0.016	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.015	**Reference device**

Reference device **Mean value:** 0.0160 **Estimated uncertainty:** ± 2.5 %

Red values: greater than max limit
Dark red Values: lower than min limits

Note: the observed out of max limits are not accounted as failure since (due to test equipment limitation) the applied Test Conditions deviate from table 2.4.1. of the detail specification (draft status) STRH100N6FSY3 issue 1, while the maximum limit there specified was still maintained.
The parameter measurement was maintained to monitor its TID sensitivity.

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:		0.0135	[Ohm]

RDS(on) Drain-Source On-Resistance [Ohm] vs ^{60}Co Irradiation Total Dose [rad (Si)]

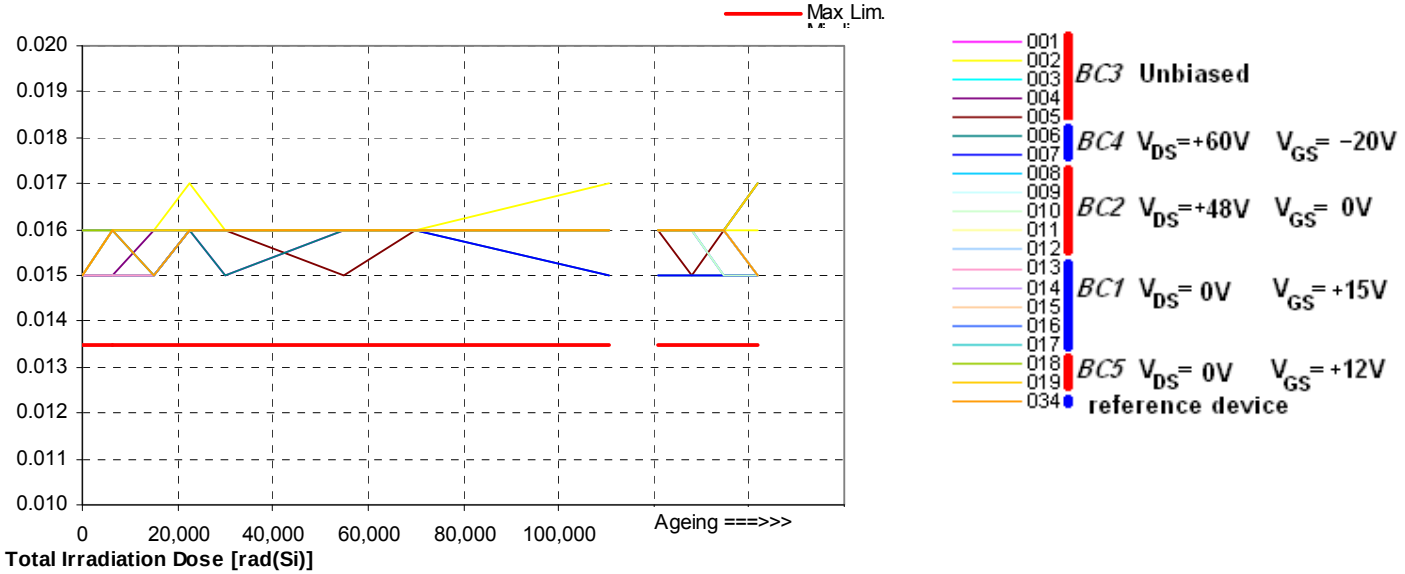


Figure 12 Data from Table 14

Due to test equipment limitation, the following deviation from Detail Spec. Test condition, have been applied:

Required test conditions	Actual Test conditions
I_D = 40A V_{GS} = 12 V	I_D = 40A V_{GS} = 10 V

Table 15 – V_{SD}(on) Inverse Diode Forward Voltage [mV] vs ^{60}Co Irradiation Total Dose [rad (Si)]

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:		1'500	[mV]

Detailed results - Measurement data in [mV]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C	Applied Bias Condition
001	1,179.17	1,172.80	1,173.18	1,165.55	1,163.96	1,166.36	1,160.99	1,170.32	1,163.20	1,167.82	1,175.25	1,179.24	(V_{DS} 0V, V_{GS} 0V)
002	1,195.83	1,194.92	1,192.82	1,185.55	1,184.41	1,171.27	1,176.84	1,185.10	1,180.00	1,186.25	1,188.96	1,194.60	(V_{DS} 0V, V_{GS} 0V)
003	1,173.28	1,182.10	1,175.78	1,170.36	1,166.89	1,169.58	1,159.30	1,168.13	1,160.47	1,168.86	1,173.37	1,178.58	(V_{DS} 0V, V_{GS} 0V)
004	1,177.27	1,185.04	1,177.86	1,171.80	1,169.15	1,167.01	1,166.25	1,169.81	1,170.15	1,166.82	1,175.10	1,180.76	(V_{DS} 0V, V_{GS} 0V)
005	1,176.55	1,177.60	1,172.96	1,166.12	1,164.21	1,159.87	1,156.23	1,169.13	1,159.92	1,163.13	1,164.81	1,172.88	(V_{DS} 0V, V_{GS} 0V)
006	1,181.63	1,183.09	1,183.11	1,178.83	1,173.81	1,176.33	1,170.21	1,171.91	1,172.94	1,164.68	1,177.52	1,185.10	(V_{DS} +60V, V_{GS} -20V)
007	1,179.87	1,179.11	1,179.79	1,173.43	1,172.71	1,173.69	1,169.05	1,175.27	1,164.17	1,165.19	1,170.61	1,180.23	(V_{DS} +60V, V_{GS} -20V)
008	1,184.21	1,189.68	1,185.85	1,177.05	1,171.31	1,173.60	1,165.36	1,180.36	1,171.16	1,165.40	1,175.53	1,179.60	(V_{DS} +48V, V_{GS} 0V)
009	1,181.82	1,184.49	1,184.03	1,177.37	1,175.74	1,174.43	1,165.46	1,175.34	1,171.72	1,167.39	1,174.79	1,181.99	(V_{DS} +48V, V_{GS} 0V)
010	1,177.14	1,177.06	1,174.26	1,172.48	1,166.53	1,167.50	1,160.08	1,166.78	1,162.41	1,159.17	1,171.48	1,172.99	(V_{DS} +48V, V_{GS} 0V)
011	1,187.20	1,188.92	1,188.92	1,183.67	1,178.62	1,180.80	1,171.80	1,182.90	1,179.53	1,175.42	1,188.47	1,191.08	(V_{DS} +48V, V_{GS} 0V)
012	1,182.90	1,184.38	1,184.36	1,174.34	1,174.92	1,177.94	1,165.27	1,178.58	1,168.75	1,166.42	1,174.91	1,178.67	(V_{DS} +48V, V_{GS} 0V)
013	1,181.38	1,180.02	1,180.57	1,177.88	1,173.86	1,181.63	1,164.96	1,182.77	1,174.02	1,175.00	1,193.13	1,201.40	(V_{DS} 0V, V_{GS} +15V)
014	1,181.38	1,181.59	1,185.19	1,181.53	1,175.70	1,181.23	1,172.92	1,187.52	1,177.84	1,175.27	1,188.69	1,207.29	(V_{DS} 0V, V_{GS} +15V)
015	1,187.31	1,190.64	1,186.78	1,179.41	1,180.04	1,185.47	1,176.40	1,187.48	1,182.22	1,179.60	1,191.50	1,207.99	(V_{DS} 0V, V_{GS} +15V)
016	1,188.09	1,185.83	1,189.77	1,181.86	1,178.56	1,179.77	1,170.97	1,181.29	1,180.95	1,178.79	1,184.81	1,205.97	(V_{DS} 0V, V_{GS} +15V)
017	1,180.32	1,188.11	1,186.16	1,178.83	1,174.75	1,179.56	1,171.67	1,181.57	1,182.63	1,178.58	1,186.42	1,195.42	(V_{DS} 0V, V_{GS} +15V)
018	1,188.86	1,182.60	1,184.53	1,180.34	1,179.39	1,181.36	1,174.83	1,182.14	1,191.69	1,177.46	1,188.47	1,209.38	(V_{DS} 0V, V_{GS} +12V)
019	1,194.24	1,186.76	1,184.00	1,174.49	1,176.10	1,180.44	1,173.60	1,181.82	1,190.47	1,175.27	1,192.92	1,204.00	(V_{DS} 0V, V_{GS} +12V)
034	1,192.97	1,191.12	1,187.27	1,178.39	1,178.62	1,185.89	1,179.77	1,188.03	1,188.67	1,182.18	1,193.71	1,191.50	Reference device

Reference device **Mean value:** 1,186.51 **Estimated uncertainty:** ± 0.41 % (± 4.82 mV)

Red values: greater than max limit
Dark red Values: lower than min limits

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:		1'500	[mV]

V_{SD}(on) Inverse Diode Forward Voltage [mV] vs ^{60}Co Irradiation Total Dose [rad (Si)]

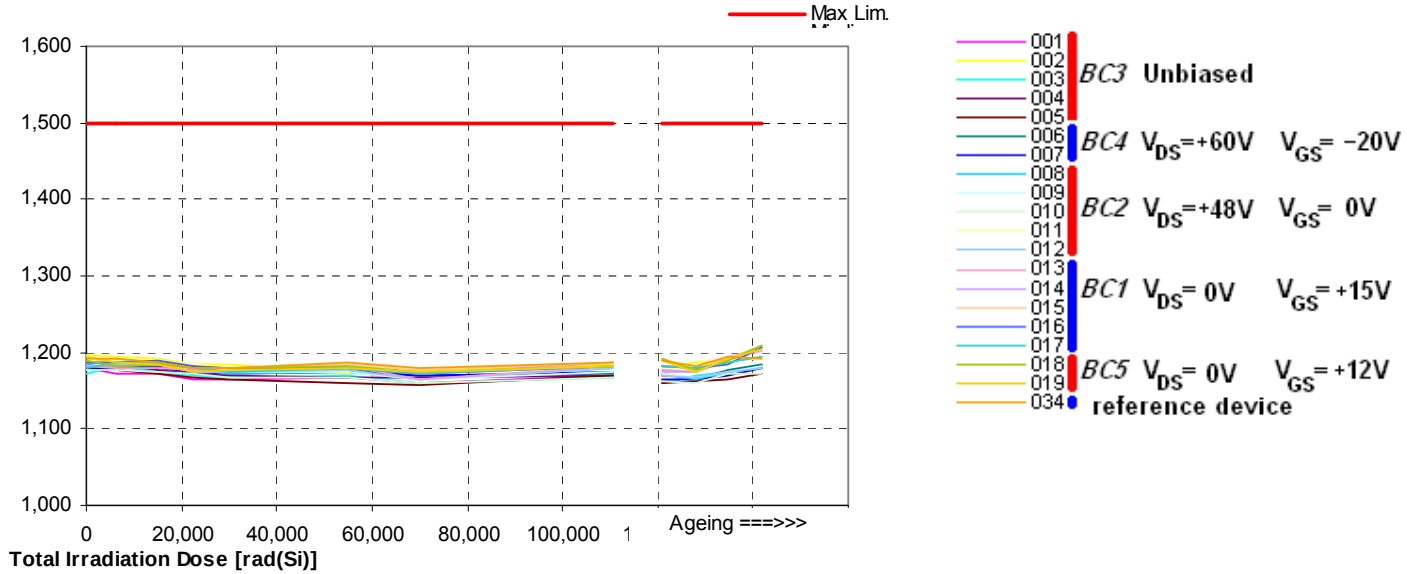


Figure 13 Data from Table 15

Table 16 – $V_{(BR)DSS}$ @I_{DS}=100uA – VDS Breakdown Voltage [V] vs ^{60}Co Irradiation Total Dose [rad (Si)]

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:	60		[V]

Detailed results - Measurement data in [V]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C	Applied Bias Condition
001	68.306	67.523	65.700	66.053	65.171	65.303	64.965	64.335	64.320	64.117	64.511	64.905	(V_{DS} 0V, V_{GS} 0V)
002	68.074	68.317	66.120	67.421	67.226	65.561	65.242	64.219	64.237	65.468	64.448	64.162	(V_{DS} 0V, V_{GS} 0V)
003	67.699	67.676	66.184	66.026	65.719	64.811	64.954	63.986	64.350	64.639	64.196	64.185	(V_{DS} 0V, V_{GS} 0V)
004	69.098	67.162	67.144	67.103	66.821	66.041	66.030	65.242	65.036	65.520	64.935	66.143	(V_{DS} 0V, V_{GS} 0V)
005	67.343	66.791	65.389	65.797	64.823	64.297	64.365	64.099	63.619	63.919	63.727	65.047	(V_{DS} 0V, V_{GS} 0V)
006	67.793	67.639	67.530	65.700	65.711	66.881	65.618	64.451	64.410	64.091	65.014	64.856	(V_{DS} +60V, V_{GS} -20V)
007	65.940	67.429	67.005	65.805	65.700	65.220	65.250	64.477	64.552	64.500	65.839	66.079	(V_{DS} +60V, V_{GS} -20V)
008	67.766	66.623	66.390	66.506	66.008	65.775	66.829	64.380	64.560	64.766	64.624	67.564	(V_{DS} +48V, V_{GS} 0V)
009	66.011	66.180	65.797	66.109	65.539	64.789	65.310	64.076	64.245	64.069	64.541	65.055	(V_{DS} +48V, V_{GS} 0V)
010	67.965	66.469	67.249	66.214	66.420	65.501	65.546	64.710	64.905	64.935	64.845	65.884	(V_{DS} +48V, V_{GS} 0V)
011	68.243	66.709	66.604	66.641	65.985	65.651	65.760	64.721	65.051	64.729	66.495	67.740	(V_{DS} +48V, V_{GS} 0V)
012	64.039	63.979	63.863	64.088	63.555	63.098	63.034	61.946	62.153	62.258	62.164	62.801	(V_{DS} +48V, V_{GS} 0V)
013	67.271	68.108	65.303	64.804	63.671	61.421	60.585	**58.804**	**59.093**	**59.209**	**59.348**	63.255	(V_{DS} 0V, V_{GS} +15V)
014	67.939	65.389	65.880	64.268	62.970	61.148	60.323	**58.343**	**58.204**	**58.781**	**58.886**	62.828	(V_{DS} 0V, V_{GS} +15V)
015	68.186	65.670	64.474	64.297	63.188	61.174	60.255	**58.110**	**58.309**	**58.609**	**58.946**	62.948	(V_{DS} 0V, V_{GS} +15V)
016	67.886	67.226	63.877	63.844	63.071	60.506	**59.985**	**57.795**	**57.851**	**57.855**	**58.414**	62.284	(V_{DS} 0V, V_{GS} +15V)
017	66.930	66.165	65.055	64.612	63.431	61.451	60.615	**58.627**	**58.789**	**58.733**	**59.441**	63.259	(V_{DS} 0V, V_{GS} +15V)
018	68.213	66.994	65.933	64.361	63.578	61.470	60.983	**58.744**	**59.040**	**59.017**	**59.561**	63.135	(V_{DS} 0V, V_{GS} +12V)
019	67.864	65.543	64.837	64.207	63.157	61.193	60.229	**58.133**	**58.358**	**58.339**	**58.541**	62.602	(V_{DS} 0V, V_{GS} +12V)
034	67.241	66.143	66.086	67.867	67.455	67.657	66.424	67.601	67.425	66.214	67.894	67.575	Reference device

Reference device **Mean value:** 67.13 **Estimated uncertainty:** ± 0.91 % (± 0.61 V)

Red values: greater than max limit
Dark red Values: lower than min limits

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:	100		[V]

$V_{(BR)DSS}$ @I_{DS}=100uA – VDS Breakdown Voltage [V] vs ^{60}Co Irradiation Total Dose [rad (Si)]

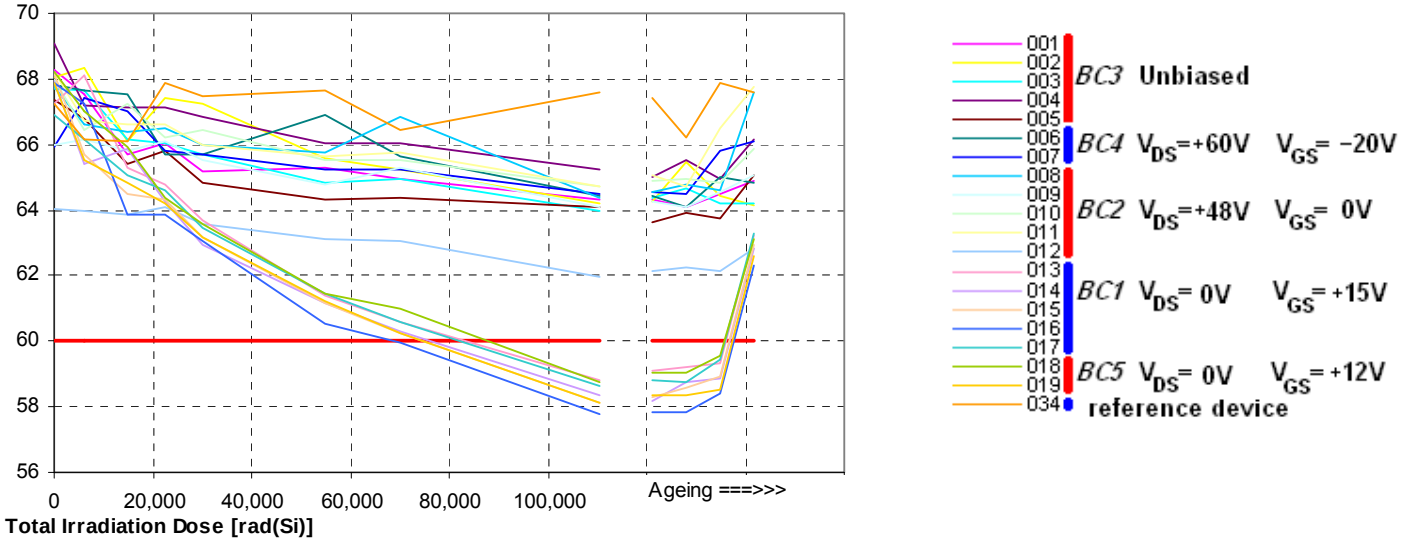


Figure 14 Data from Table 16

Table 17 – $V_{(BR)DSS}$ @I_{DS}=250uA – VDS Breakdown Voltage [V] vs ^{60}Co Irradiation Total Dose [rad (Si)]

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:	60		[V]

Detailed results - Measurement data in [V]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C	Applied Bias Condition
001	68.355	68.224	67.024	67.009	67.493	65.670	65.430	65.381	64.871	64.751	64.744	64.669	(V_{DS} 0V, V_{GS} 0V)
002	69.008	67.830	69.266	66.881	67.793	66.233	65.888	65.074	65.505	65.974	65.014	66.034	(V_{DS} 0V, V_{GS} 0V)
003	68.738	67.095	67.091	66.544	66.705	65.659	66.135	64.766	65.460	64.920	65.464	65.089	(V_{DS} 0V, V_{GS} 0V)
004	69.386	68.295	69.180	67.976	66.870	66.866	66.405	65.809	65.618	66.188	66.094	65.468	(V_{DS} 0V, V_{GS} 0V)
005	66.739	68.306	67.733	66.547	66.525	65.640	65.362	64.448	64.148	64.230	64.729	64.774	(V_{DS} 0V, V_{GS} 0V)
006	68.509	68.272	68.385	67.313	67.969	66.161	65.610	66.431	64.856	64.954	65.329	65.951	(V_{DS} +60V, V_{GS} -20V)
007	67.290	67.886	66.532	68.047	66.368	66.214	66.589	65.719	65.606	64.729	66.532	66.960	(V_{DS} +60V, V_{GS} -20V)
008	68.426	68.636	67.294	66.604	66.968	66.487	66.514	65.677	65.782	65.726	65.269	67.076	(V_{DS} +48V, V_{GS} 0V)
009	68.407	67.984	66.754	66.964	68.198	67.241	66.510	65.055	64.811	65.528	65.449	66.127	(V_{DS} +48V, V_{GS} 0V)
010	67.575	68.378	66.922	67.290	67.849	66.784	66.368	65.074	65.501	65.100	65.299	67.721	(V_{DS} +48V, V_{GS} 0V)
011	68.404	68.415	67.466	68.299	67.421	66.694	67.425	65.880	65.959	66.191	65.336	67.676	(V_{DS} +48V, V_{GS} 0V)
012	66.499	66.716	66.143	66.802	65.903	65.070	65.479	64.912	64.601	64.999	65.483	66.896	(V_{DS} +48V, V_{GS} 0V)
013	68.884	67.511	66.127	65.685	65.006	62.332	62.029	**59.445**	**59.711**	60.191	60.218	64.099	(V_{DS} 0V, V_{GS} +15V)
014	68.164	67.429	65.809	64.575	64.043	61.875	61.181	**58.789**	**59.220**	**59.404**	**59.711**	63.892	(V_{DS} 0V, V_{GS} +15V)
015	68.392	66.743	65.505	64.834	63.802	61.841	61.369	**58.928**	**59.209**	**59.734**	60.161	63.356	(V_{DS} 0V, V_{GS} +15V)
016	68.227	67.609	65.306	64.759	64.343	61.860	60.889	**59.085**	**59.182**	**59.407**	**59.813**	63.135	(V_{DS} 0V, V_{GS} +15V)
017	68.580	68.141	67.050	65.359	65.152	62.456	61.418	**59.400**	**59.168**	60.045	**59.951**	63.956	(V_{DS} 0V, V_{GS} +15V)
018	68.441	66.566	65.689	65.422	64.594	61.901	61.492	**59.123**	**59.509**	**60.000**	**59.891**	63.716	(V_{DS} 0V, V_{GS} +12V)
019	68.831	66.971	65.093	64.268	64.376	62.220	60.780	**58.822**	**58.841**	**59.599**	**59.554**	63.315	(V_{DS} 0V, V_{GS} +12V)
034	68.198	68.280	67.883	67.560	68.587	67.178	66.919	68.359	68.096	67.980	68.164	68.321	Reference device

Reference device **Mean value:** 67.96 **Estimated uncertainty:** ± 0.64 % (± 0.434 V)

Red values: greater than max limit
Dark red Values: lower than min limits

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:	60		[V]

$V_{(BR)DSS}$ @I_{DS}=250uA – VDS Breakdown Voltage [V] vs ^{60}Co Irradiation Total Dose [rad (Si)]

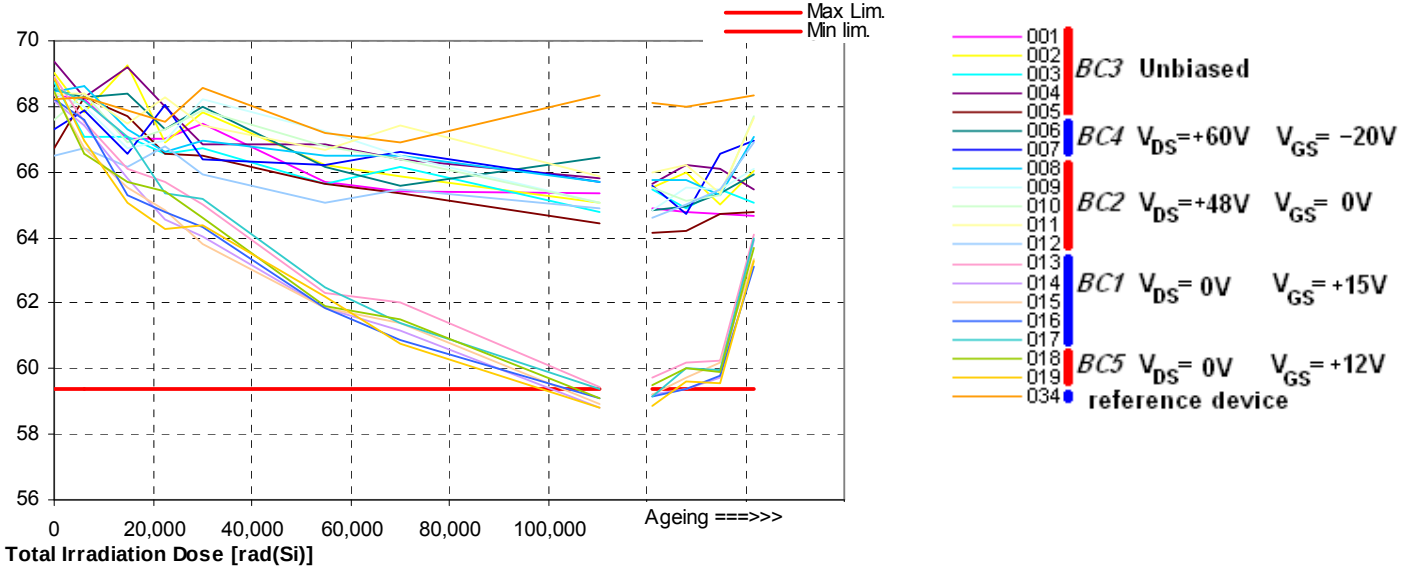


Figure 15 Data from Table 17

Table 18 – $V_{(BR)DSS}$ @I_{DS}= 1 mA – VDS Breakdown Voltage [V] vs ^{60}Co Irradiation Total Dose [rad (Si)]

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:	60		[V]

Detailed results - Measurement data in [V]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C	Applied Bias Condition
001	68.483	68.584	68.336	68.767	68.321	67.946	67.853	67.519	67.207	67.196	67.433	65.468	(V_{DS} 0V, V_{GS} 0V)
002	69.071	69.218	69.116	69.098	68.824	68.374	68.561	67.950	67.800	67.657	67.954	65.760	(V_{DS} 0V, V_{GS} 0V)
003	68.888	69.214	68.888	69.266	68.738	68.400	68.291	67.545	67.493	67.774	67.586	65.715	(V_{DS} 0V, V_{GS} 0V)
004	69.555	69.382	69.146	69.709	69.262	68.722	69.053	68.404	68.235	68.246	68.302	66.045	(V_{DS} 0V, V_{GS} 0V)
005	68.336	68.407	67.867	68.306	67.969	67.523	67.448	67.103	66.900	66.825	67.001	65.085	(V_{DS} 0V, V_{GS} 0V)
006	68.145	68.336	68.078	68.340	68.194	67.567	67.605	67.290	66.859	66.844	67.050	67.072	(V_{DS} +60V, V_{GS} -20V)
007	68.040	68.378	68.085	68.272	68.025	67.774	67.688	66.889	67.103	66.773	66.581	67.095	(V_{DS} +60V, V_{GS} -20V)
008	68.722	68.707	68.201	68.636	68.419	67.871	68.126	67.448	67.519	67.564	67.425	67.916	(V_{DS} +48V, V_{GS} 0V)
009	68.449	68.280	68.288	68.666	68.362	67.684	68.066	67.185	67.290	67.297	67.076	67.853	(V_{DS} +48V, V_{GS} 0V)
010	68.558	68.599	68.276	68.584	68.378	68.010	67.976	67.391	67.684	67.380	67.237	67.718	(V_{DS} +48V, V_{GS} 0V)
011	68.513	68.599	68.063	68.479	68.302	67.864	67.894	67.072	67.234	67.538	67.451	68.032	(V_{DS} +48V, V_{GS} 0V)
012	68.524	68.494	68.445	68.752	68.546	68.295	68.205	67.410	67.136	67.354	67.009	67.920	(V_{DS} +48V, V_{GS} 0V)
013	68.782	68.580	67.219	67.080	66.041	64.324	63.469	61.425	61.965	62.332	62.554	65.644	(V_{DS} 0V, V_{GS} +15V)
014	68.531	67.976	67.129	66.757	65.708	63.964	63.154	60.889	61.421	61.852	62.287	65.655	(V_{DS} 0V, V_{GS} +15V)
015	68.400	67.987	67.189	66.671	65.685	64.279	63.244	61.193	61.402	61.680	61.826	65.479	(V_{DS} 0V, V_{GS} +15V)
016	68.610	67.815	67.230	66.731	65.936	63.851	63.266	61.095	61.271	61.590	61.609	65.310	(V_{DS} 0V, V_{GS} +15V)
017	69.101	68.621	67.778	67.339	66.427	64.774	63.829	61.534	61.624	62.329	62.381	66.131	(V_{DS} 0V, V_{GS} +15V)
018	68.272	67.751	67.290	66.836	66.011	64.031	62.970	60.668	61.316	61.639	61.714	65.655	(V_{DS} 0V, V_{GS} +12V)
019	68.704	68.078	67.095	66.802	65.970	64.099	63.319	61.118	61.294	61.714	61.796	65.332	(V_{DS} 0V, V_{GS} +12V)
034	68.089	68.738	68.265	68.843	68.644	68.430	68.734	68.182	68.130	68.336	68.209	68.100	Reference device

Reference device **Mean value:** 68.39 **Estimated uncertainty:** ± 0.35 % (± 0.24 V)

Red values: greater than max limit
Dark red Values: lower than min limits

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:	60		[V]

$V_{(BR)DSS}$ @I_{DS}= 1mA – VDS Breakdown Voltage [V] vs ^{60}Co Irradiation Total Dose [rad (Si)]

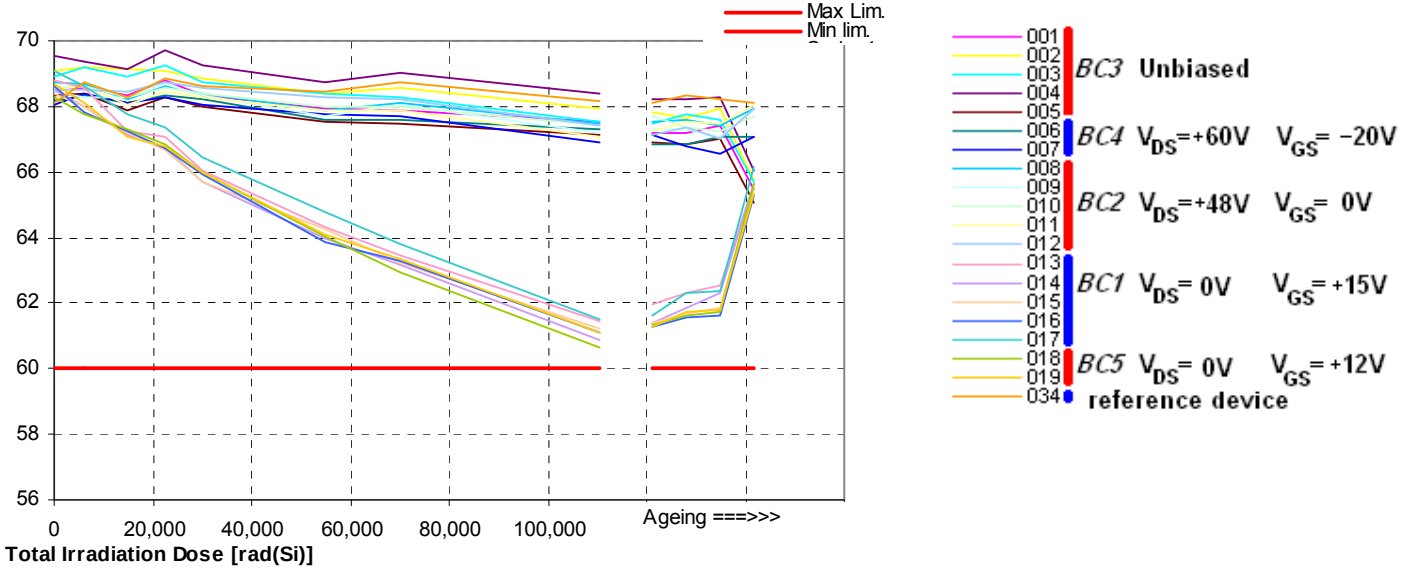


Figure 16 Data from Table 18

Table 19 – V_{DS}(on) Drain-Source On Voltage [mV] vs ^{60}Co Irradiation Total Dose [rad (Si)]

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:	-	680	[mV]

Detailed results - Measurement data in [mV]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C	Applied Bias Condition
001	621.88	628.56	629.50	646.19	635.44	634.63	646.31	644.25	640.88	638.00	631.50	616.75	(V_{DS} 0V, V_{GS} 0V)
002	649.69	666.81	652.06	678.13	671.94	669.50	678.38	672.00	673.00	672.75	667.94	649.88	(V_{DS} 0V, V_{GS} 0V)
003	616.69	633.63	635.75	642.13	635.88	632.81	642.56	640.75	641.75	638.63	633.38	614.00	(V_{DS} 0V, V_{GS} 0V)
004	625.06	631.50	630.94	660.38	651.13	645.88	655.88	646.00	653.63	646.00	641.69	622.50	(V_{DS} 0V, V_{GS} 0V)
005	619.00	628.56	625.88	643.31	632.44	628.00	651.88	642.38	638.81	638.56	637.19	620.69	(V_{DS} 0V, V_{GS} 0V)
006	631.38	630.56	626.44	645.44	634.81	638.38	649.19	636.88	631.38	629.63	628.69	620.38	(V_{DS} +60V, V_{GS} -20V)
007	624.00	629.44	631.94	650.44	632.25	642.00	642.19	630.56	632.94	632.69	632.44	619.63	(V_{DS} +60V, V_{GS} -20V)
008	631.75	652.00	636.44	662.56	642.88	642.13	660.88	645.19	632.31	633.69	639.00	623.50	(V_{DS} +48V, V_{GS} 0V)
009	632.63	648.56	640.13	660.38	640.06	647.94	649.75	649.75	642.13	635.13	640.56	620.81	(V_{DS} +48V, V_{GS} 0V)
010	627.13	634.50	627.44	648.81	646.69	648.50	656.25	642.56	638.75	637.00	628.63	618.63	(V_{DS} +48V, V_{GS} 0V)
011	640.56	644.44	648.25	657.25	652.31	649.75	656.69	653.69	638.13	646.19	644.38	628.81	(V_{DS} +48V, V_{GS} 0V)
012	638.94	644.44	639.50	655.13	651.75	650.50	654.13	643.88	638.69	638.63	638.31	622.19	(V_{DS} +48V, V_{GS} 0V)
013	628.63	629.81	626.63	650.06	636.94	650.25	650.13	654.19	648.94	651.31	656.06	678.13	(V_{DS} 0V, V_{GS} +15V)
014	628.81	639.19	641.38	656.94	639.69	650.75	660.50	657.31	653.88	662.19	650.13	**684.38**	(V_{DS} 0V, V_{GS} +15V)
015	624.25	643.44	639.81	659.38	646.31	656.50	656.25	653.63	652.00	653.94	658.75	**684.69**	(V_{DS} 0V, V_{GS} +15V)
016	627.56	647.94	637.88	657.56	648.50	650.44	659.44	656.75	646.63	654.94	657.88	**681.13**	(V_{DS} 0V, V_{GS} +15V)
017	619.88	644.63	637.69	655.06	636.69	641.50	656.44	646.19	646.94	644.13	643.69	670.50	(V_{DS} 0V, V_{GS} +15V)
018	631.31	644.06	647.38	658.88	653.38	654.38	658.88	653.25	655.75	662.13	656.69	**693.00**	(V_{DS} 0V, V_{GS} +12V)
019	632.13	638.88	630.13	655.50	637.63	652.38	656.13	651.88	642.75	650.81	641.13	**681.63**	(V_{DS} 0V, V_{GS} +12V)
034	627.50	648.81	637.94	655.94	650.63	643.38	656.56	643.63	635.31	647.81	628.19	624.56	Reference device

Reference device **Mean value:** 641.69 **Estimated uncertainty:** ± 1.48 % (± 9.53 mV)

Red values: greater than max limit
Dark red Values: lower than min limits

Note: *Max limit set at 680mV. The limit has bees determined as follows:* $V_{DS(on)max} = R_{DS(on)\ max\ recorded} * I_{DS\ Test}$

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:	-	680	[mV]

V_{DS}(on) Drain-Source On Voltage [mV] vs ^{60}Co Irradiation Total Dose [rad (Si)]

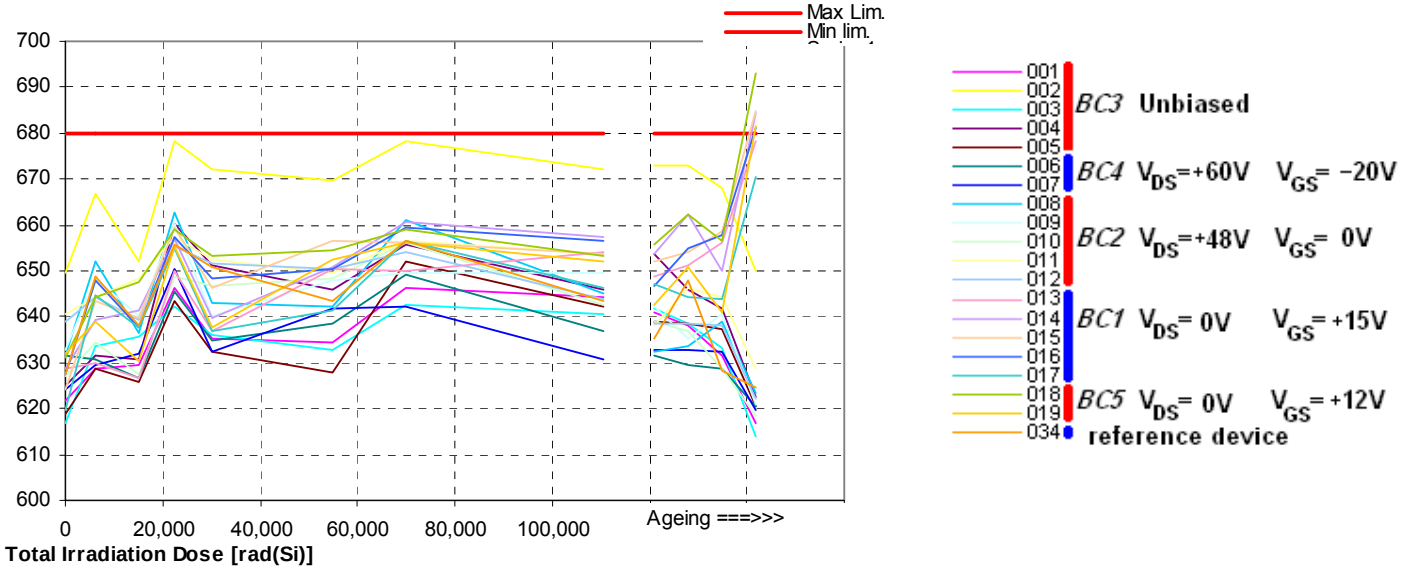


Figure 17 Data from Table 19

Note: ***Max limit set at 680mV. The limit has bees determined as follows:*** $V_{DS(on)max} = R_{DS(on)\ max\ recorded} * I_{DS\ Test}$

Table 20 – I_{DS}(on) Drain-Source On Current [A] vs ^{60}Co Irradiation Total Dose [rad (Si)]

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:	80		[A]

Detailed results - Measurement data in [A]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C	Applied Bias Condition
001	86.52	86.15	86.37	86.09	86.24	86.05	86.05	85.76	86.13	85.86	85.97	85.38	(V_{DS} 0V, V_{GS} 0V)
002	86.46	86.48	86.37	86.20	86.85	86.12	86.30	85.82	86.21	86.27	86.32	85.55	(V_{DS} 0V, V_{GS} 0V)
003	86.73	86.45	86.64	86.27	86.84	86.51	86.05	85.72	86.49	86.39	85.78	85.40	(V_{DS} 0V, V_{GS} 0V)
004	86.93	86.61	86.57	86.59	86.72	86.52	86.42	86.24	86.42	86.57	86.41	85.51	(V_{DS} 0V, V_{GS} 0V)
005	86.68	86.56	86.66	86.30	86.60	86.37	86.41	85.58	86.26	86.43	86.07	85.67	(V_{DS} 0V, V_{GS} 0V)
006	86.81	86.78	86.29	86.56	86.63	86.69	86.42	86.08	86.97	86.83	86.65	85.83	(V_{DS} +60V, V_{GS} -20V)
007	85.95	86.24	86.66	86.10	86.48	86.33	86.21	86.07	86.50	86.47	86.27	85.66	(V_{DS} +60V, V_{GS} -20V)
008	86.33	85.78	86.83	86.69	86.35	86.75	86.67	86.13	86.90	86.40	86.58	85.68	(V_{DS} +48V, V_{GS} 0V)
009	86.47	86.34	86.76	86.45	86.55	86.16	86.28	86.46	87.10	86.46	86.10	85.67	(V_{DS} +48V, V_{GS} 0V)
010	86.47	87.01	86.86	86.37	86.58	86.31	86.74	86.05	86.44	86.55	86.36	85.40	(V_{DS} +48V, V_{GS} 0V)
011	86.40	86.28	86.32	86.40	86.02	85.98	85.85	85.97	86.26	85.84	86.20	84.68	(V_{DS} +48V, V_{GS} 0V)
012	86.18	86.38	86.57	86.20	86.57	86.20	86.00	86.30	86.70	86.86	86.30	85.79	(V_{DS} +48V, V_{GS} 0V)
013	86.87	86.80	86.85	86.58	86.95	86.90	86.32	86.07	86.74	87.10	86.00	84.77	(V_{DS} 0V, V_{GS} +15V)
014	86.43	86.36	86.37	86.36	86.73	86.52	86.10	86.01	86.61	86.36	85.73	84.77	(V_{DS} 0V, V_{GS} +15V)
015	86.73	86.45	86.57	85.91	86.75	86.36	86.45	86.19	86.41	86.51	85.73	84.85	(V_{DS} 0V, V_{GS} +15V)
016	87.05	86.90	87.03	86.40	86.46	86.67	86.29	85.99	86.71	86.52	86.27	84.79	(V_{DS} 0V, V_{GS} +15V)
017	87.11	86.73	86.96	86.44	86.84	86.86	86.53	86.25	87.03	86.54	86.25	85.21	(V_{DS} 0V, V_{GS} +15V)
018	86.19	86.60	86.78	86.50	86.73	86.24	86.24	85.95	86.70	86.56	86.09	84.81	(V_{DS} 0V, V_{GS} +12V)
019	86.44	86.60	86.47	85.97	86.88	85.53	86.47	86.07	86.86	86.73	86.07	84.96	(V_{DS} 0V, V_{GS} +12V)
034	86.60	86.57	86.44	86.36	86.71	86.57	86.28	86.05	86.78	86.23	86.29	85.64	Reference device

Reference device **Mean value:** 86.38 **Estimated uncertainty:** ± 0.32 % (± 0.273 A)

Red values: greater than max limit
Dark red Values: lower than min limits

STRH100N6FSY3	Min.	Max.	Unit
Applicable limits:	80		[A]

I_{DS}(on) Drain-Source On Current [A] vs ^{60}Co Irradiation Total Dose [rad (Si)]

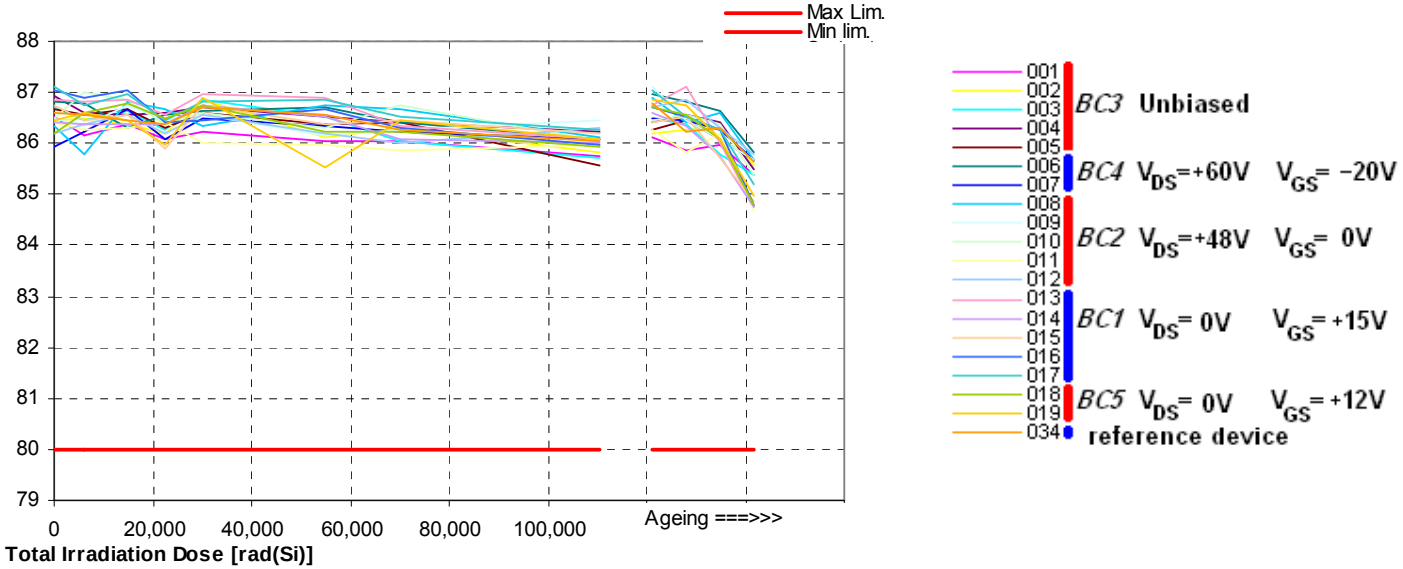


Figure 18 Data from Table 20

Table 21 – Qg Total Gate Charge [nCoulomb] vs ^{60}Co Irradiation Total Dose [rad (Si)]:

STRH100N6FSY3	*Min.*	*Max.*	*Unit*
Applicable limits:	120	180	[nC]

Detailed results - Measurement data in [nC]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C	Applied Bias Condition
001	147.76	150.69	151.60	153.41	152.96	155.60	157.11	161.27	161.00	160.04	158.18	152.76	(V_{DS} 0V, V_{GS} 0V)
002	140.37	143.33	144.48	145.81	145.68	147.88	149.80	153.26	153.13	152.70	150.58	145.00	(V_{DS} 0V, V_{GS} 0V)
003	145.95	148.96	150.07	151.43	151.41	153.90	155.63	159.27	159.10	158.51	156.65	151.03	(V_{DS} 0V, V_{GS} 0V)
004	143.97	146.99	148.10	149.31	149.34	151.52	153.60	157.21	157.05	156.47	154.52	148.68	(V_{DS} 0V, V_{GS} 0V)
005	143.32	146.23	147.46	148.75	148.68	151.10	152.69	156.37	156.19	155.59	153.78	148.29	(V_{DS} 0V, V_{GS} 0V)
006	144.93	147.67	148.60	149.91	149.61	152.43	154.25	158.43	158.35	158.09	156.97	153.99	(V_{DS} +60V, V_{GS} -20V)
007	145.49	148.30	149.14	150.55	150.46	153.04	154.80	158.96	158.93	158.83	157.34	154.49	(V_{DS} +60V, V_{GS} -20V)
008	146.10	148.90	149.69	150.95	150.72	153.03	154.58	158.39	158.26	157.79	156.77	152.20	(V_{DS} +48V, V_{GS} 0V)
009	146.89	149.82	150.64	152.06	151.76	154.14	155.72	159.64	159.51	159.04	157.84	153.10	(V_{DS} +48V, V_{GS} 0V)
010	146.04	148.84	149.61	151.02	150.71	153.21	154.68	158.65	158.49	157.96	156.79	152.23	(V_{DS} +48V, V_{GS} 0V)
011	147.45	150.29	151.27	152.59	152.22	154.66	156.18	160.07	159.96	159.55	158.24	153.91	(V_{DS} +48V, V_{GS} 0V)
012	146.01	148.81	149.53	151.00	150.52	153.00	154.49	158.27	158.15	157.71	156.51	152.37	(V_{DS} +48V, V_{GS} 0V)
013	146.07	153.25	159.45	165.26	168.85	**182.81**	**190.11**	**204.10**	**203.57**	**201.69**	**196.67**	167.20	(V_{DS} 0V, V_{GS} +15V)
014	147.69	155.02	161.18	167.34	170.98	**185.04**	**192.07**	**207.32**	**206.70**	**204.57**	**198.47**	169.29	(V_{DS} 0V, V_{GS} +15V)
015	148.01	155.19	161.56	167.33	171.01	**185.43**	**192.50**	**209.07**	**208.53**	**206.63**	**200.37**	170.27	(V_{DS} 0V, V_{GS} +15V)
016	148.15	155.33	161.66	167.79	171.25	**186.29**	**192.46**	**209.60**	**208.92**	**206.55**	**200.68**	170.30	(V_{DS} 0V, V_{GS} +15V)
017	145.80	153.01	159.46	165.47	168.95	**183.05**	**190.15**	**206.73**	**206.09**	**203.83**	**197.47**	168.33	(V_{DS} 0V, V_{GS} +15V)
018	146.73	153.83	160.07	166.00	169.48	**184.00**	**190.47**	**207.36**	**206.27**	**202.44**	**198.21**	167.55	(V_{DS} 0V, V_{GS} +12V)
019	147.42	154.69	161.13	167.33	170.64	**184.91**	**191.98**	**208.87**	**208.22**	**205.95**	**200.01**	170.59	(V_{DS} 0V, V_{GS} +12V)
034	146.40	148.12	147.71	148.21	147.02	146.95	147.58	148.30	148.21	147.91	147.25	147.67	Reference device

Reference device **Mean value:** **147.6** **Estimated uncertainty:** **± 0.35 % (± 0.52 nC)**

Red values: greater than max limit
Dark red Values: lower than min limits

STRH100N6FSY3	*Min.*	*Max.*	*Unit*
Applicable limits:	**120**	**180**	**[nC]**

Qg Total Gate Charge [nCoulomb] vs ^{60}Co Irradiation Total Dose [rad (Si)]

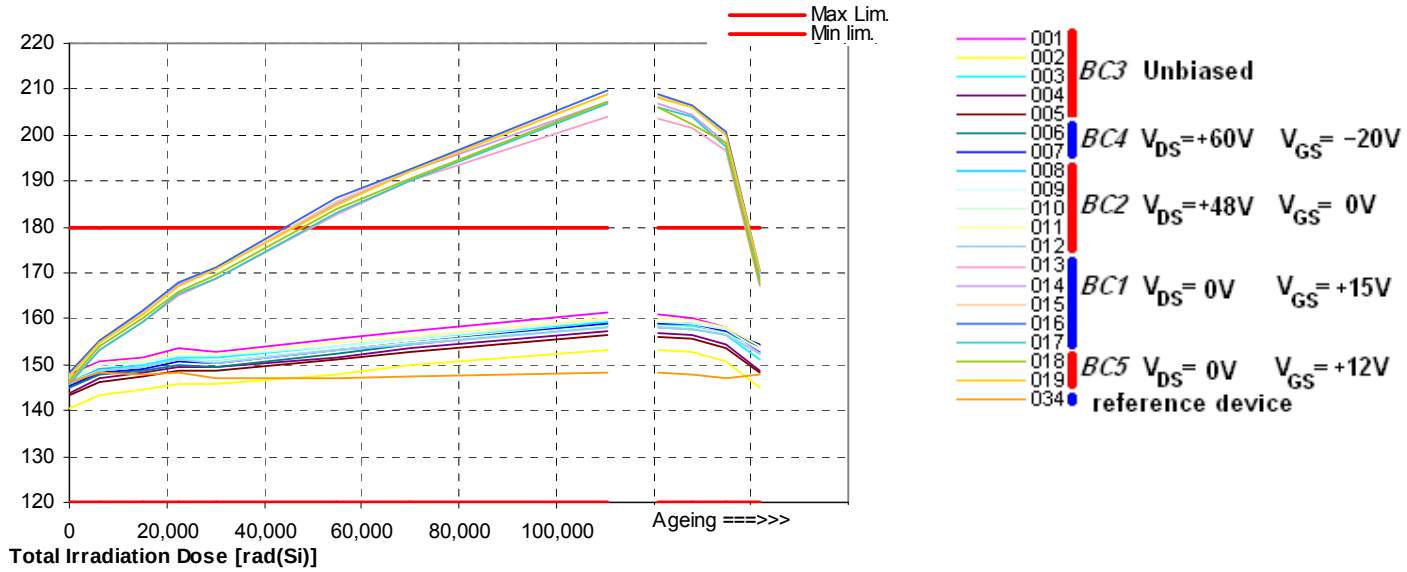


Figure 19 Data from Table 21

Table 22 – Qgs Gate Source Charge [nCoulomb] vs ^{60}Co Irradiation Total Dose [rad (Si)]:

STRH100N6FSY3	*Min.*	*Max.*	*Unit*
Applicable limits:	Tbd	Tbd	[nC]

Detailed results - Measurement data in [nC]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C	Applied Bias Condition
001	30.89	29.79	28.47	27.65	26.97	24.21	23.74	21.81	21.80	21.76	21.65	26.14	(V_{DS} 0V, V_{GS} 0V)
002	28.66	27.58	26.33	25.40	24.64	22.35	21.33	19.93	19.96	20.05	19.77	24.31	(V_{DS} 0V, V_{GS} 0V)
003	30.53	29.52	28.06	27.07	26.42	23.86	23.05	20.99	21.04	21.23	21.01	25.52	(V_{DS} 0V, V_{GS} 0V)
004	29.27	28.32	27.23	26.15	25.72	23.15	22.48	20.95	20.90	20.72	20.37	24.96	(V_{DS} 0V, V_{GS} 0V)
005	30.64	29.59	28.07	27.06	26.55	24.10	23.24	21.28	21.22	21.00	20.98	26.00	(V_{DS} 0V, V_{GS} 0V)
006	30.91	30.65	29.90	29.44	29.15	27.89	27.26	25.56	25.59	25.73	25.85	28.07	(V_{DS} +60V, V_{GS} -20V)
007	31.22	31.05	30.47	29.68	29.19	28.09	27.42	26.11	26.08	25.94	26.20	28.33	(V_{DS} +60V, V_{GS} -20V)
008	29.80	29.00	27.69	26.85	26.17	23.49	22.80	20.71	20.69	20.62	20.05	25.61	(V_{DS} +48V, V_{GS} 0V)
009	30.75	29.84	28.23	27.44	26.81	24.22	23.26	21.31	21.26	21.08	20.57	26.47	(V_{DS} +48V, V_{GS} 0V)
010	30.25	29.09	27.83	27.09	26.30	23.81	22.68	20.67	20.71	20.87	20.28	25.89	(V_{DS} +48V, V_{GS} 0V)
011	30.79	30.00	28.36	27.64	26.97	24.33	23.48	21.34	21.38	21.50	20.78	26.29	(V_{DS} +48V, V_{GS} 0V)
012	30.03	29.05	27.64	27.12	26.18	23.79	22.75	21.03	20.93	20.61	20.04	25.42	(V_{DS} +48V, V_{GS} 0V)
013	30.16	29.08	27.96	27.41	27.20	25.20	24.90	25.77	25.85	26.14	26.49	37.76	(V_{DS} 0V, V_{GS} +15V)
014	30.95	29.75	28.37	27.59	27.55	26.22	25.60	26.70	26.78	27.00	27.46	38.81	(V_{DS} 0V, V_{GS} +15V)
015	30.98	29.94	28.60	28.09	27.41	26.24	25.52	27.19	27.30	27.69	26.93	39.16	(V_{DS} 0V, V_{GS} +15V)
016	30.75	29.83	28.58	27.80	27.38	26.14	25.69	28.29	28.10	27.41	26.92	39.11	(V_{DS} 0V, V_{GS} +15V)
017	30.47	29.32	27.97	27.36	27.02	25.50	25.31	27.04	26.94	26.59	26.59	38.37	(V_{DS} 0V, V_{GS} +15V)
018	30.41	29.07	27.96	27.16	26.85	25.49	24.56	25.18	25.43	26.28	26.46	39.13	(V_{DS} 0V, V_{GS} +12V)
019	30.66	29.62	28.37	27.52	27.07	25.02	24.82	24.98	25.31	26.42	25.99	38.98	(V_{DS} 0V, V_{GS} +12V)
034	31.17	31.24	31.13	31.22	31.23	31.27	31.15	31.23	31.26	31.39	31.29	31.27	Reference device

Reference device **Mean value:** 31.24 **Estimated uncertainty:** ± 0.19 % (± 0.06 nC)

Red values: greater than max limit
Dark red Values: lower than min limits

STRH100N6FSY3	*Min.*	*Max.*	*Unit*
Applicable limits:	Tbd	Tbd	[nC]

Qgs Gate Source Charge [nCoulomb] vs ^{60}Co Irradiation Total Dose [rad (Si)]

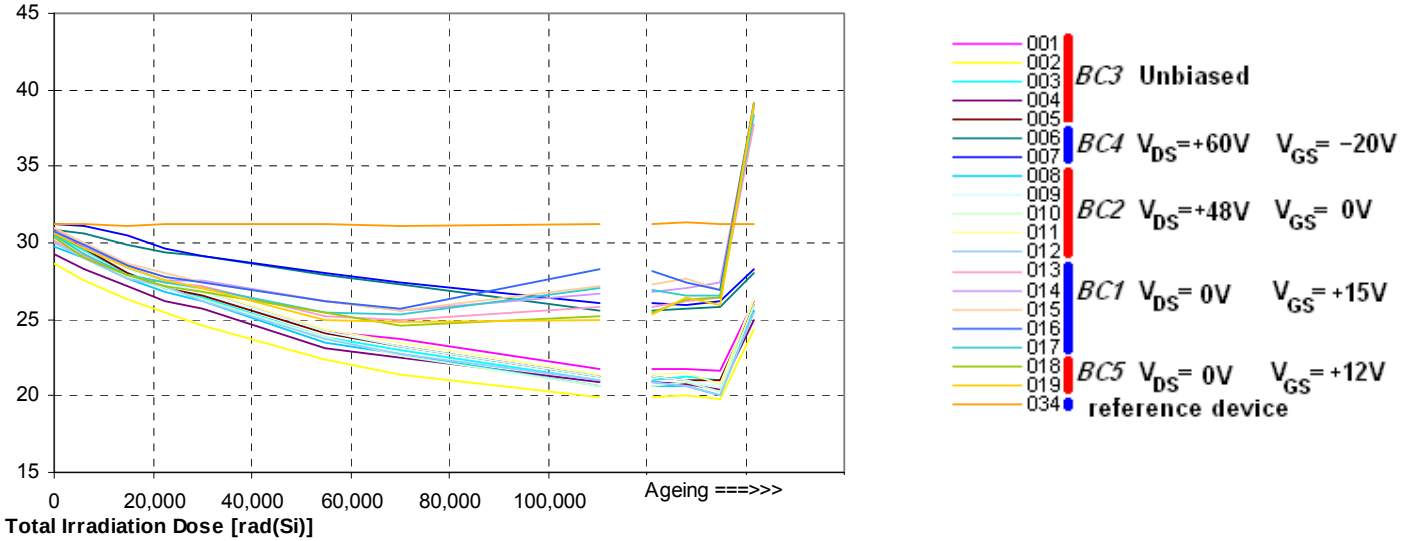


Figure 20 Data from Table 22

Table 23 – Qgd Gate Drain Charge [nCoulomb] vs ^{60}Co Irradiation Total Dose [rad (Si)]:

STRH100N6FSY3	*Min.*	*Max.*	*Unit*
Applicable limits:	Tbd	Tbd	[nC]

Detailed results - Measurement data in [nC]

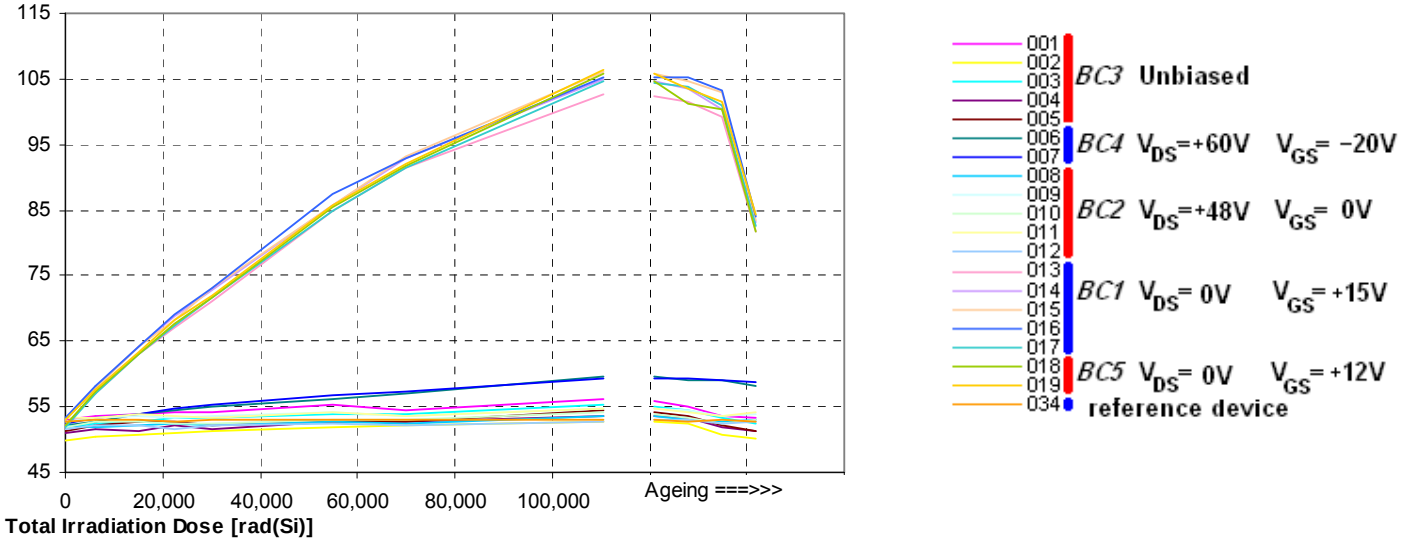
s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C	Applied Bias Condition
001	53.14	53.72	53.96	54.04	54.10	55.27	54.34	56.23	55.99	55.15	53.63	53.22	(V_{DS} 0V, V_{GS} 0V)
002	49.86	50.42	50.63	51.10	51.31	51.91	52.08	52.82	52.74	52.46	50.61	50.31	(V_{DS} 0V, V_{GS} 0V)
003	51.90	52.40	52.82	53.21	53.40	54.02	53.86	55.29	55.10	54.46	53.29	52.37	(V_{DS} 0V, V_{GS} 0V)
004	51.10	51.60	51.39	52.21	51.74	52.88	52.63	53.66	53.58	53.33	52.02	51.32	(V_{DS} 0V, V_{GS} 0V)
005	51.31	52.10	52.68	52.84	52.21	52.87	52.69	54.35	54.21	53.73	52.17	51.25	(V_{DS} 0V, V_{GS} 0V)
006	52.22	52.71	53.87	54.46	54.98	56.22	57.00	59.64	59.52	59.12	59.09	58.34	(V_{DS} +60V, V_{GS} -20V)
007	52.59	53.18	53.87	54.75	55.40	56.72	57.35	59.30	59.30	59.31	59.10	58.82	(V_{DS} +60V, V_{GS} -20V)
008	52.08	51.84	52.10	52.33	52.09	52.89	52.38	53.68	53.54	53.07	52.61	52.98	(V_{DS} +48V, V_{GS} 0V)
009	52.86	53.28	53.60	53.45	53.58	54.08	53.70	54.72	54.67	54.48	53.66	53.99	(V_{DS} +48V, V_{GS} 0V)
010	51.96	52.86	52.79	52.43	52.58	53.10	52.97	54.08	53.92	53.34	52.59	53.13	(V_{DS} +48V, V_{GS} 0V)
011	53.19	53.45	53.97	53.53	53.34	54.28	53.61	54.88	54.70	54.07	53.67	54.22	(V_{DS} +48V, V_{GS} 0V)
012	51.66	52.04	52.27	51.62	52.19	52.36	52.31	52.87	52.90	53.00	52.33	52.75	(V_{DS} +48V, V_{GS} 0V)
013	52.04	56.96	63.04	67.19	71.07	84.82	91.51	102.73	102.45	101.49	99.29	81.73	(V_{DS} 0V, V_{GS} +15V)
014	52.91	58.05	64.18	68.88	72.83	85.84	92.89	104.85	104.58	103.64	100.32	83.16	(V_{DS} 0V, V_{GS} +15V)
015	53.05	57.85	64.25	68.32	73.26	85.87	93.11	106.21	105.90	104.80	102.88	83.50	(V_{DS} 0V, V_{GS} +15V)
016	53.37	58.19	64.18	69.08	73.25	87.54	93.01	105.35	105.32	105.20	103.20	83.93	(V_{DS} 0V, V_{GS} +15V)
017	51.92	57.05	63.09	67.41	71.76	84.96	91.38	104.58	104.40	103.78	100.90	82.72	(V_{DS} 0V, V_{GS} +15V)
018	52.10	57.30	63.03	67.64	71.55	85.44	91.67	105.81	104.78	101.18	100.34	81.83	(V_{DS} 0V, V_{GS} +12V)
019	52.91	57.68	63.29	68.26	71.96	85.78	91.93	106.45	105.80	103.49	101.47	84.29	(V_{DS} 0V, V_{GS} +12V)
034	52.87	52.98	52.93	52.73	53.12	52.90	53.15	52.95	52.89	52.71	52.94	52.77	Reference device

Reference device **Mean value:** 52.91 **Estimated uncertainty:** ± 0.22 % (± 0.12 nC)

Red values: greater than max limit
Dark red Values: lower than min limits

STRH100N6FSY3	*Min.*	*Max.*	*Unit*
Applicable limits:	Tbd	Tbd	[nC]

Qgd Gate Drain Charge [nCoulomb] vs ^{60}Co Irradiation Total Dose [rad (Si)]



Data from irradiated devices

Figure 21

4.4.2 Gate Charge Waveforms

The total gate charge was measured according to MIL-STD-750 method 3471 cond.B, using test conditions as specified in Table 4 and the test circuit in Figure 2.

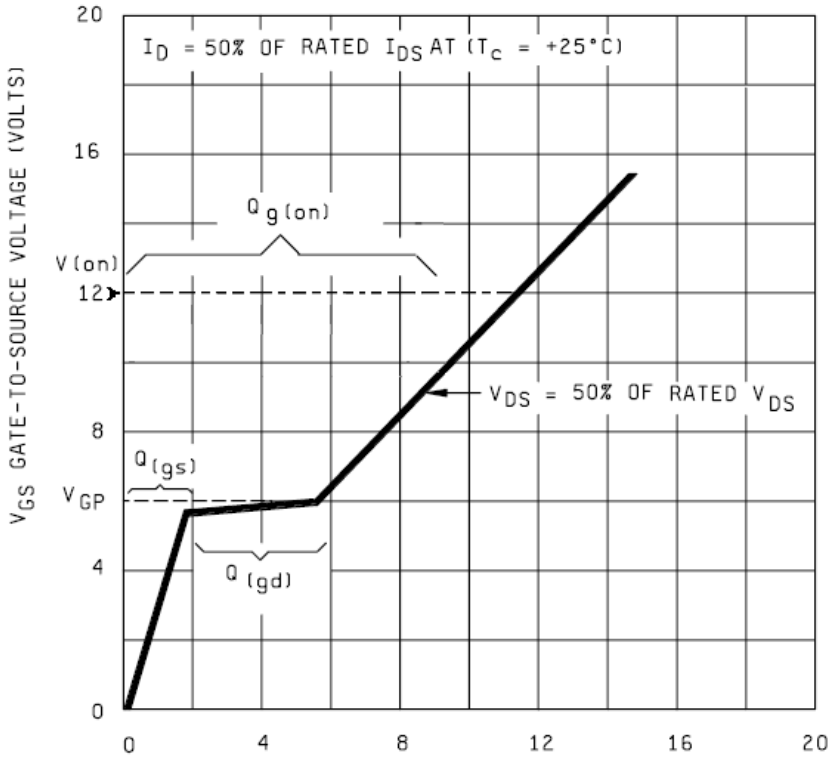


Figure 22 Gate Charge Waveform for N-channel MOSFET (Mil-Std-750E meth.3471) with the identification of Qg, Qgs and Qgd.

Figure 23 to Figure 28 show the measured Gate Voltage Waveforms grouped per bias condition.

For presentation plainness, only the initial and after TID waveform plus the waveform after the annealing and ageing, representative of the group behaviour have been plotted.

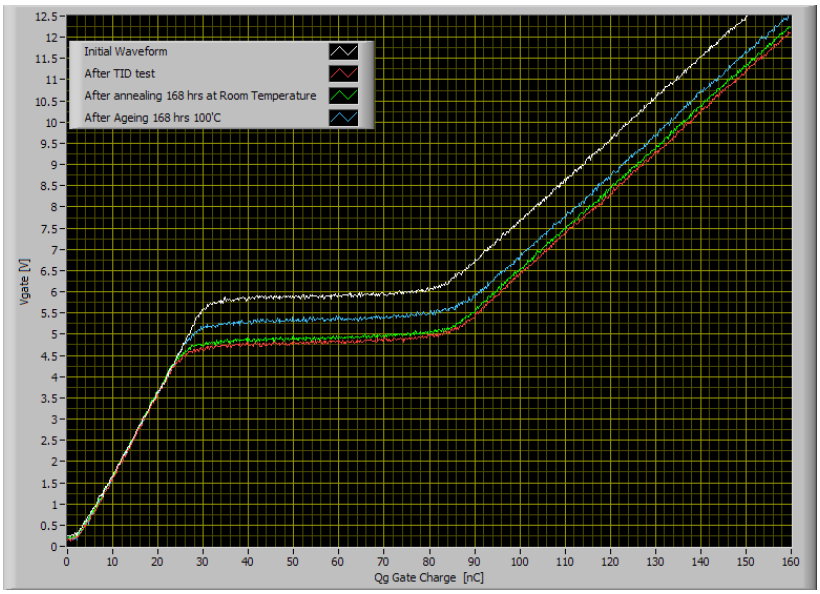


Figure 23

Gate charge waveforms

devices s/n 06 & s/n 07

Bias Conditions:

BC4 V_{GS} = -20V
V_{DS}= +60V

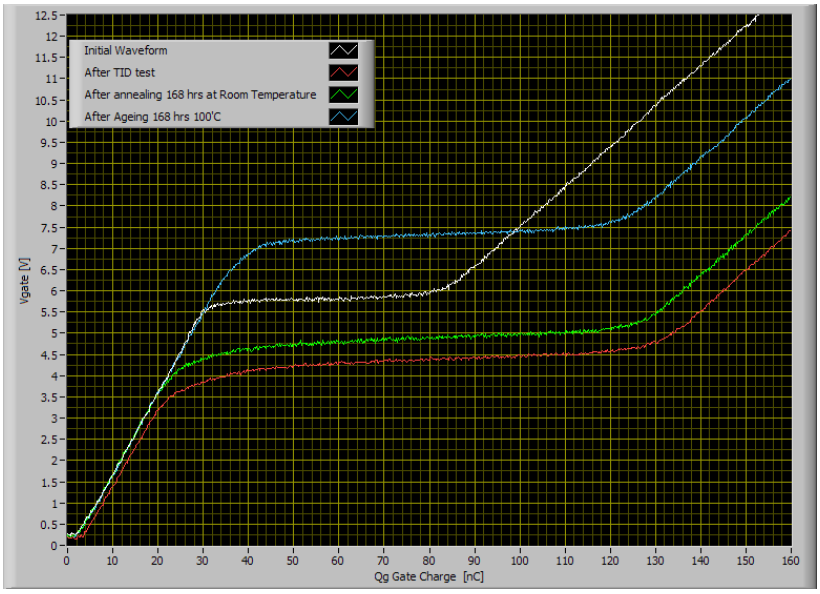


Figure 24

Gate charge waveforms

devices s/n 18 & s/n 19

Bias Conditions:

BC5 V_{GS} = +12V
V_{DS}= 0V

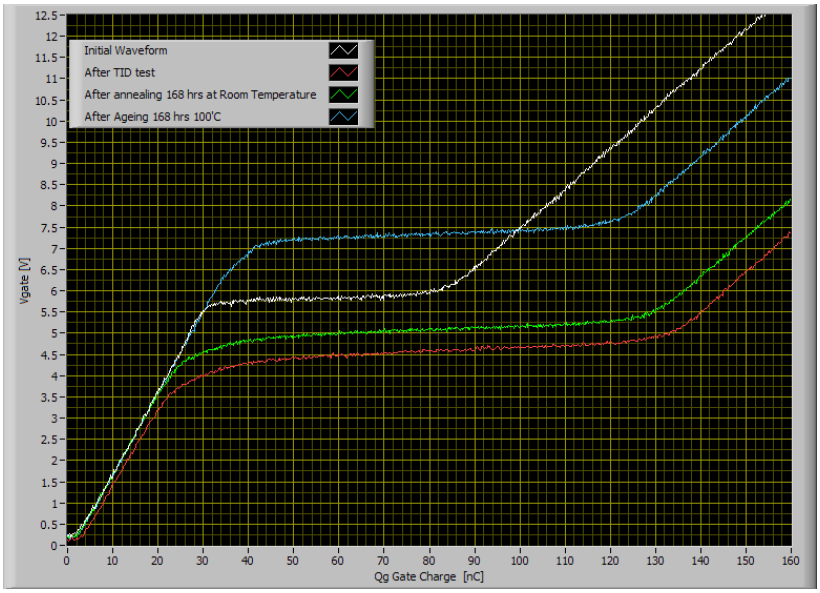


Figure 25

Gate charge waveforms

devices s/n 13 to s/n 17

Bias Conditions:

BC1 V_{GS} =+15V
V_{DS}= 0V

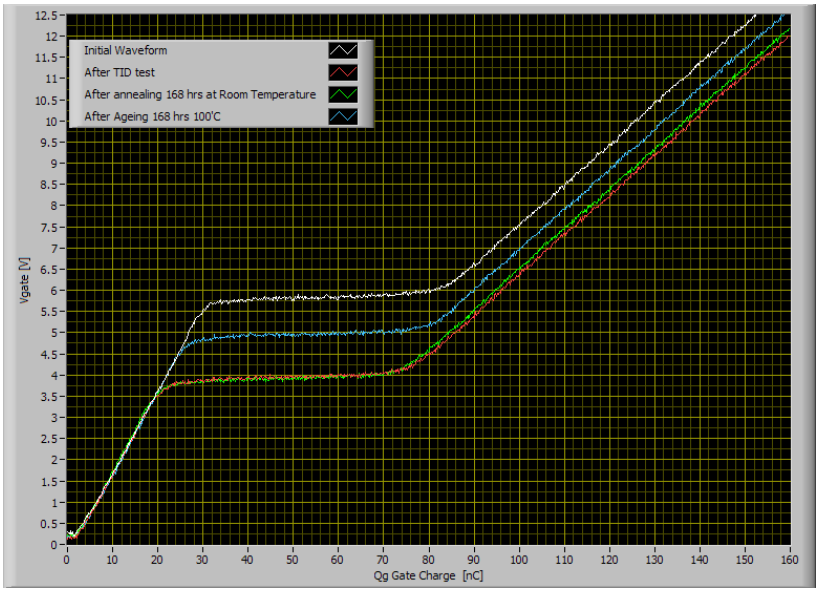


Figure 26

Gate charge waveforms

devices s/n 08 to s/n 12

Bias Conditions:

BC2 V_{GS} = 0V
V_{DS}= +48V

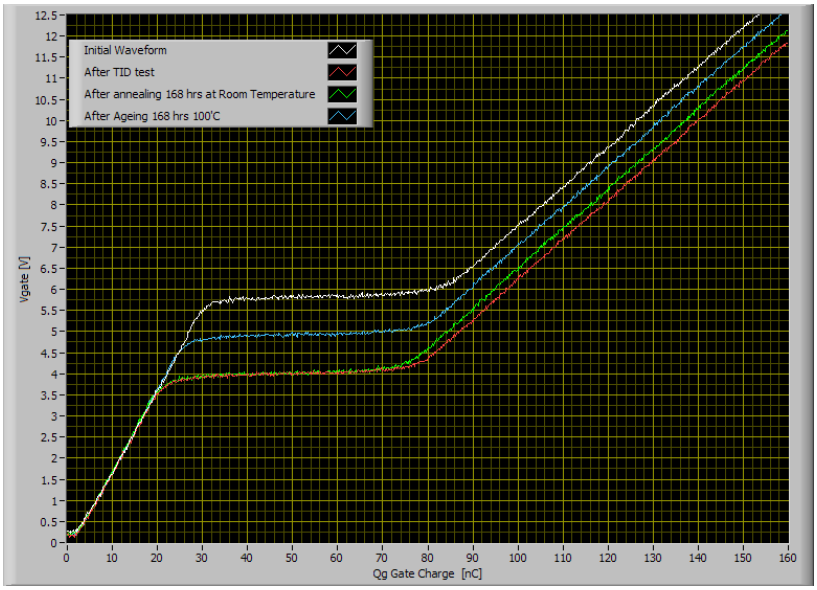


Figure 27

Gate charge waveforms

devices s/n 01 to s/n 05

Bias Conditions:

BC3 V_{GS} =0V
V_{DS}= 0V

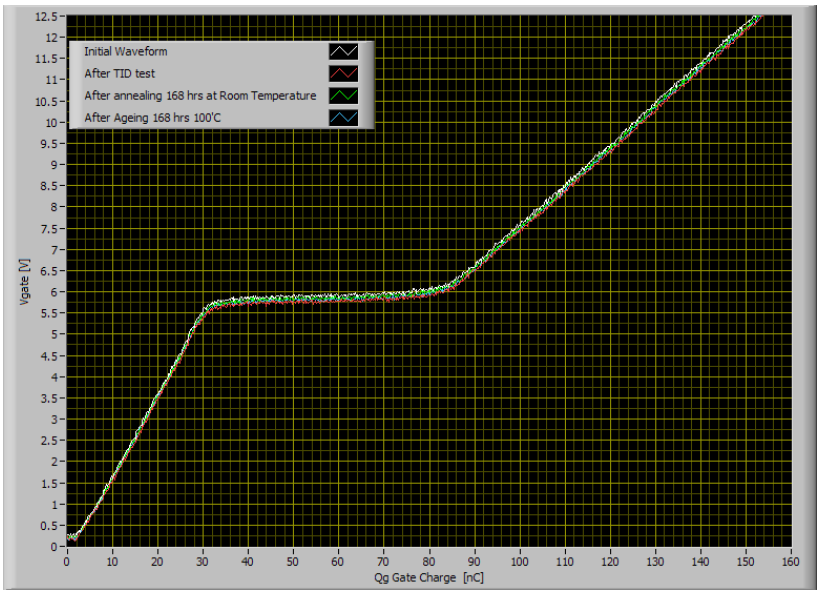


Figure 28

Gate charge waveforms

devices s/n34

Reference device

5 SUMMARY OF RESULTS

No catastrophic failures were observed up to 110.5 krad(Si). The parameter degradations induced by gamma radiation is summarized in Table 25, Table 26 and in Table 27.

Table 25 reports the total doses, recorded before and after the *out of limit* condition, aggregated by the bias condition applied, as described in Table 24:

Table 24 Bias condition descriptions

Bias Condition ID	Description	Irradiated s/n's
BC1	V_{DS} = 0V, V_{GS} = +15V	013, 014, 015, 016, 017
BC2	V_{DS} = +48V, V_{GS} = 0V	008, 009, 010, 011, 012
BC3	V_{DS} = 0V, V_{GS} = 0V	001, 002, 003, 004, 005
BC4	V_{DS} = +60V, V_{GS} = -20V	006, 007
BC5	V_{DS} = 0V, V_{GS} = +12V	018, 019

Table 25 TID levels, in [krad(Si)], before and after out of limit conditions per different BIAS conditions

nr.	Parameter	BC1		BC2		BC3		BC4		BC5	
		pass	*fail*	*pass*	*fail*	*pass*	*fail*	*pass*	*fail*	*pass*	*fail*
(a) 5	VGS_th @ I_D 0.01 mA	55.0	70.1	55.0	70.1	**6.2**	15.0	110.5	-	30.1	55.0
(a) 6	VGS_th @ I_D 0.10 mA	70.1	110.5	70.1	110.5	70.1	110.5	70.1	110.5	70.1	110.5
(a) 7	VGS_th @ I_D 0.25 mA	70.1	110.5	70.1	110.5	70.1	110.5	110.5	-	70.1	110.5
(b)8	VGS_th @ I_D 1.00 mA	110.5	H.T.B.	110.5	-	70.1	110.5	110.5	-	110.5	H.T.B.
(a)(b) 10	VDS(on) - D-S On-Voltage	110.5	H.T.B.	110.5	-	110.5	-	110.5	-	110.5	H.T.B.
(a) 11	V(BR)DSS @I_D=100uA	55.0	110.5	110.5	-	110.5	-	110.5	-	70.1	110.5
(a) 12	V(BR)DSS @I_D=250uA	70.1	110.5	110.5	-	110.5	-	110.5	-	70.1	110.5
16	Q_G Total Gate Charge	30.1	55.0	110.5	-	110.5	-	110.5	-	30.1	55.0
17	Q_{GS} Gate – Source Charge	*limits in D.S. STRH100N6FSY3, issue 1, rev.-: not defined*									
18	Q_{GD} Gate – Drain Charge										

(a) Parameter not listed in table 2.4.1. of Detail specification (draft status), STRH100N6FSY3 issue 1 rev.-
(b) HTB: High Temperature Bias – failing after ageing at high temperature (rebound)

Note that Table 25 and Table 26 list only the parameters showing an "out of limit" condition (or not defined limits). Refer to Table 27 for a description of the behaviour of all parameters.

Table 26 Detail of Failures

nr.	Parameter	Bias conditions	Remarks	Table	Fig.
(a) 5	VGS_th @ I_D 0.01 mA	**BC1 , BC2**	S/n's 008 to 017 pass at 55.0 krad (Si). Failures recovered after H.T. ageing.	10	8
		BC3	S/n's 002 and 005 pass at 6.2 krad(Si). S/n 003 pass at 22.5 krad(Si) S/n's 001 and 005 pass at 55 krad(Si). Sn's 001, 003 and 005. Failures recovered after H.T. ageing.		
		BC5	S/n's 018 and 019 pass at 30.1 krad(Si) Failures recovered after H.T. ageing.		
(a) 6	VGS_th @ I_D 0.10 mA	**BC1**	S/n's 013 to 017 pass at 70.1 krad(Si). Failures recovered after 168 hrs R.T. annealing.	11	9
		BC2, BC3 BC5	S/n's 001 to 005, 008 to 012 and 018 to 019 pass at 70.1 krad(Si). Failures recovered after H.T. ageing.		

(a) Parameter not listed in table 2.4.1. of Detail specification (draft status), STRH100N6FSY3 issue 1 rev.-

Table 26 Detail of Failures << continued >>

nr.	Parameter	Bias conditions	Remarks	Table	Fig.
(a) 7	VGS_th @ I_D 0.25 mA	**BC1**	S/n 013 pass 70.1 krad(Si) S/n 017 failed after 6 hrs annealing at R.T. S/n 013 and 017 recovered after 21 hrs annealing at R.T. S/n 014, 015 and 016 failed after H.T. ageing. All s/n's show evidence of rebound.	12	10
		BC2, BC3	S/n 008 to 012 and 001 to 005, pass 70.1 krad(Si) Failures recovered after H.T. ageing.		
		BC5	S/n 018 and 019 pass 70.1 krad(Si) S/n 018 and 019 recovered after 21 hrs annealing at R.T. S/n 018 and 019 failed after H.T. ageing (rebound)		
8	VGS_th @ I_D 1.00 mA	**BC1,BC5**	S/n's 013 to 019 failed after H.T. ageing (rebound)	13	11
		BC3	S/n's 002 and 004 pass at 70.1 krad(Si) Failures recovered after H.T. ageing.		
(a) 11	V(BR)DSS @I_D=100uA	**BC1, BC5**	S/n 016 pass at 55.0 krad(Si). S/n's 013 to 015, and 017 to 019 pass at 70.1 krad(Si). Failures recovered after 168 hrs R.T. annealing	16	14
(a) 12	V(BR)DSS @I_D=250uA	**BC1, BC5**	S/n's 013 to 017 and 018 to 019 pass at 70.1 krad(Si). Failures recovered after 168 hrs R.T. annealing	17	15
16	Q_G Total Gate Charge	**BC1**	S/n's 013 to 017 pass at 30.1 krad(Si). Failures recovered after 168 hrs R.T. annealing	21	19 25
		BC5	S/n's 018 and 019 pass at 30.1 krad(Si). Failures recovered after 168 hrs R.T. annealing		19 24

The observations indicate the Gate Threshold Voltage V_{GSTH} @ 0.01mA most affected by the TID degradation with a worst case drift of – 80% with respect to the initial value and two devices showing early failure.

The Gate Threshold Voltage V_{GSTH} @ 1 mA can still be considered a representative parameter for degradation induced by TID exhibiting also the inversion of degradation trend (rebound effect) after H.T. ageing for the bias conditions BC1 and BC5 (V_{DS}=0V and V_{GS} = +15V V_{GS}=+12V respectively).

In Table 28 and Figure 29 are shown the normalized Gate Threshold Voltage Drift in [%] vs TID and anneal/ageing sequence.

Table 27 Summary of TID test results up to 110.5krad(Si)

nr.	Parameter	Remarks	Worst Case Bias Condition	Table	Fig.
0	IGSS_F1	No evidence of TID dependence. No evidence of Bias condition dependence. All devices still within the limits.	n/a	5	3
1	IGSS_R1	No evidence of TID dependence. No evidence of Bias condition dependence. All devices still within the limits.	n/a	6	4
(a) 2	IDSS @ Vds 5V, Vgs 0V	Weak evidence of TID dependence. Weak evidence of Bias condition dependence. All devices still within the limits.	V_{DS}= 0V V_{GS}= +12/15V	7	5
3	IDSS @ Vds 48V, Vgs 0V	Evidence of TID dependence. Evidence of Bias condition dependence. All devices still within the limits.	V_{DS}= 0V V_{GS}= +12/15V	8	6
4	IDSS @ Vds 60V, Vgs 0V	Evidence of TID dependence. Evidence of Bias condition dependence. All devices still within the limits.	V_{DS}= 0V V_{GS}= +12V	9	7
(a) 5	VGS_th @ I_D 0.01 mA	Clear TID dependence. Clear Bias condition dependence.	V_{DS}= 0V V_{GS}= +12	10	8
(a) 6	VGS_th @ I_D 0.10 mA	Clear TID dependence. Clear Bias condition dependence.	V_{DS}= 0V V_{GS}= +12	11	9
(a) 7	VGS_th @ I_D 0.25 mA	Clear TID dependence. Clear Bias condition dependence.	V_{DS}= 0V V_{GS}= +12	12	10
8	VGS_th @ I_D 1.00 mA	Clear TID dependence. Clear Bias condition dependence.	V_{DS}= 0V V_{GS}= +12	13	11
(b) 9	RDS(on) - D-S On-Resistance	No evidence of TID dependence. No evidence of Bias condition dependence.	n/a	14	12
(a) 10	VDS(on) - D-S On-Voltage	Weak evidence of TID dependence. Weak evidence of Bias condition dependence.	V_{DS}= 0V V_{GS}= +12/15V	15	13
(a) 11	V(BR)DSS @I_D=100uA	Evidence of TID dependence. Clear Bias condition dependence. All devices still within the limits.	V_{DS}= 0V V_{GS}= +12/15V	16	14
(a) 12	V(BR)DSS @I_D=250uA	Evidence of TID dependence. Clear Bias condition dependence.	V_{DS}= 0V V_{GS}= +12/15V	17	15
(a) 13	V(BR)DSS @I_D=1mA	Evidence of TID dependence. Clear Bias condition dependence.	V_{DS}= 0V V_{GS}= +12/15V	18	16
(b) 14	VSD - Inverse Diode Fwd. Volt.	No evidence of TID dependence. No evidence of Bias condition dependence. All devices still within the limits.	n/a	19	17
(a) 15	ID(on) - On-State Drain Current	weak evidence of TID dependence. No evidence of Bias condition dependence. All devices still within the limits.	n/a	20	18
16	Q_G Total Gate Charge	Clear Evidence of TID dependence. Clear Evidence of Bias condition dependence.	V_{DS}= 0V V_{GS}= +12/15V	21	19
(c) 17	Q_{GS} Gate – Source Charge	Clear TID dependence. Clear Bias condition dependence.	V_{DS}= 0V V_{GS}= +12/15V	22	20
(c)18	Q_{GD} Gate – Drain Charge	Clear TID dependence. Clear Bias condition dependence.	V_{DS}= 0V V_{GS}= +12/15V	23	21

(a) Parameter not listed in table 2.4.1. of Detail specification (draft status), STRH100N6FSY3 issue 1 rev.-.
(b) Test Conditions deviate from table 2.4.1. of (Detail specification (draft status), STRH100N6FSY3 issue 1 rev.- due to test equipment limitation.
(c) Min-Max limits not defined in table 2.4.1. of Detail specification (draft status), STRH100N6FSY3 issue 1 rev.-

Table 28 – V_{GS_th} @ I_{DS} 1.0 mA, Gate Threshold Voltage Drift from initial values [%] vs ^{60}Co Irradiation Total Dose [rad (Si)]

a) Bias Condition BC5 (V_{DS} 0V, V_{GS} +12V), detailed results - V_{GS_th} @ IDS 1.0 mA drift from Initial values in [%]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C
018	0.00%	-6.26%	-12.64%	-18.44%	-22.19%	-31.24%	-38.23%	-47.23%	-48.06%	-45.96%	-39.87%	18.78%
019	0.00%	-6.56%	-13.20%	-19.00%	-22.80%	-31.93%	-38.99%	-48.68%	-48.98%	-46.97%	-41.15%	17.20%
Avg	*0.00%*	*-6.41%*	*-12.92%*	*-18.72%*	*-22.49%*	*-31.58%*	*-38.61%*	*-47.96%*	*-48.52%*	*-46.47%*	*-40.51%*	*17.99%*
St.dev	*0.00%*	*0.21%*	*0.39%*	*0.40%*	*0.43%*	*0.49%*	*0.54%*	*1.03%*	*0.65%*	*0.72%*	*0.91%*	*1.12%*

b) Bias Condition BC1 (V_{DS} 0V, V_{GS} +15V), detailed results - V_{GS_th} @ IDS 1.0 mA drift from Initial values in [%]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C
013	0.00%	-5.84%	-11.56%	-17.07%	-20.47%	-28.49%	-35.07%	-44.16%	-44.21%	-42.18%	-36.21%	17.63%
014	0.00%	-5.84%	-11.80%	-17.17%	-20.50%	-28.61%	-34.97%	-43.94%	-44.14%	-42.65%	-36.10%	17.80%
015	0.00%	-6.00%	-11.94%	-17.32%	-20.75%	-28.83%	-35.20%	-44.40%	-44.37%	-42.43%	-36.04%	17.18%
016	0.00%	-5.92%	-11.85%	-17.12%	-20.55%	-28.53%	-35.00%	-43.56%	-44.08%	-42.16%	-35.73%	17.52%
017	0.00%	-5.92%	-11.85%	-17.33%	-20.71%	-28.67%	-35.31%	-43.71%	-44.40%	-42.43%	-36.03%	17.03%
Min	*0.00%*	*-6.00%*	*-11.94%*	*-17.33%*	*-20.75%*	*-28.83%*	*-35.31%*	*-44.40%*	*-44.40%*	*-42.65%*	*-36.21%*	*17.03%*
Max	*0.00%*	*-5.84%*	*-11.56%*	*-17.07%*	*-20.47%*	*-28.49%*	*-34.97%*	*-43.56%*	*-44.08%*	*-42.16%*	*-35.73%*	*17.80%*
Avg	*0.00%*	*-5.90%*	*-11.80%*	*-17.20%*	*-20.60%*	*-28.63%*	*-35.11%*	*-43.95%*	*-44.24%*	*-42.37%*	*-36.02%*	*17.43%*
St.dev	*0.00%*	*0.07%*	*0.14%*	*0.12%*	*0.13%*	*0.13%*	*0.14%*	*0.34%*	*0.14%*	*0.20%*	*0.18%*	*0.32%*

c) Bias Condition BC2 (V_{DS} +48V, V_{GS} 0V), detailed results - V_{GS_th} @ IDS 1.0 mA drift from Initial values in [%]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C
008	0.00%	-5.30%	-11.47%	-17.26%	-21.38%	-33.50%	-40.32%	-51.85%	-51.27%	-51.83%	-51.94%	-20.23%
009	0.00%	-5.14%	-11.28%	-17.06%	-21.11%	-33.37%	-40.17%	-51.79%	-51.09%	-51.65%	-51.97%	-19.44%
010	0.00%	-5.28%	-11.50%	-17.32%	-21.35%	-33.68%	-40.27%	-51.80%	-51.26%	-51.75%	-51.98%	-20.04%
011	0.00%	-5.09%	-11.10%	-16.89%	-20.99%	-33.11%	-39.73%	-51.25%	-50.62%	-51.17%	-51.57%	-20.11%
012	0.00%	-5.31%	-11.52%	-17.45%	-21.44%	-33.61%	-40.38%	-51.62%	-51.15%	-51.85%	-52.05%	-20.78%
Min	*0.00%*	*-5.31%*	*-11.52%*	*-17.45%*	*-21.44%*	*-33.68%*	*-40.38%*	*-51.85%*	*-51.27%*	*-51.85%*	*-52.05%*	*-20.78%*
Max	*0.00%*	*-5.09%*	*-11.10%*	*-16.89%*	*-20.99%*	*-33.11%*	*-39.73%*	*-51.25%*	*-50.62%*	*-51.17%*	*-51.57%*	*-19.44%*
Avg	*0.00%*	*-5.22%*	*-11.37%*	*-17.20%*	*-21.25%*	*-33.45%*	*-40.17%*	*-51.66%*	*-51.08%*	*-51.65%*	*-51.90%*	*-20.12%*
St.dev	*0.00%*	*0.10%*	*0.18%*	*0.22%*	*0.19%*	*0.23%*	*0.26%*	*0.25%*	*0.27%*	*0.28%*	*0.19%*	*0.48%*

Table 28 – V_{GS_th} @ I_{DS} 1.0 mA, Gate Threshold Voltage Drift from initial values [%] vs ^{60}Co Irradiation Total Dose [rad (Si)] –< Continued >–

d) Bias Condition BC3 (V_{DS} 0V, V_{GS} 0V), detailed results - V_{GS_th} @ IDS 1.0 mA drift from Initial values in [%]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C
001	0.00%	-5.27%	-11.14%	-16.70%	-20.79%	-32.42%	-38.19%	-49.61%	-48.62%	-48.92%	-48.81%	-20.20%
002	0.00%	-5.47%	-11.59%	-17.53%	-21.76%	-33.91%	-40.45%	-51.80%	-51.22%	-51.34%	-51.03%	-18.04%
003	0.00%	-5.43%	-11.44%	-17.22%	-21.08%	-32.81%	-39.58%	-50.66%	-49.95%	-50.10%	-49.94%	-20.20%
004	0.00%	-5.24%	-11.37%	-17.11%	-21.67%	-33.44%	-40.16%	-51.52%	-50.66%	-50.84%	-50.74%	-18.57%
005	0.00%	-5.30%	-11.45%	-17.31%	-21.33%	-33.14%	-39.94%	-50.47%	-50.30%	-50.56%	-50.46%	-20.13%
Min	*0.00%*	*-5.47%*	*-11.59%*	*-17.53%*	*-21.76%*	*-33.91%*	*-40.45%*	*-51.80%*	*-51.22%*	*-51.34%*	*-51.03%*	*-20.20%*
Max	*0.00%*	*-5.24%*	*-11.14%*	*-16.70%*	*-20.79%*	*-32.42%*	*-38.19%*	*-49.61%*	*-48.62%*	*-48.92%*	*-48.81%*	*-18.04%*
Avg	*0.00%*	*-5.34%*	*-11.40%*	*-17.17%*	*-21.33%*	*-33.14%*	*-39.66%*	*-50.81%*	*-50.15%*	*-50.35%*	*-50.20%*	*-19.43%*
St.dev	*0.00%*	*0.10%*	*0.16%*	*0.31%*	*0.40%*	*0.57%*	*0.88%*	*0.88%*	*0.97%*	*0.92%*	*0.87%*	*1.04%*

e) Bias Condition BC4 (V_{DS} +60V, V_{GS} -20V), detailed results - V_{GS_th} @ IDS 1.0 mA drift from Initial values in [%]

s/n	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C
006	0.00%	-2.59%	-5.06%	-8.23%	-10.12%	-16.45%	-20.61%	-29.12%	-29.18%	-29.00%	-27.60%	-14.71%
007	0.00%	-2.62%	-5.06%	-8.34%	-9.99%	-16.34%	-20.46%	-28.69%	-28.97%	-28.80%	-27.38%	-14.67%
Avg	*0.00%*	*-2.61%*	*-5.06%*	*-8.28%*	*-10.05%*	*-16.40%*	*-20.53%*	*-28.90%*	*-29.08%*	*-28.90%*	*-27.49%*	*-14.69%*
St.dev	*0.00%*	*0.02%*	*0.00%*	*0.08%*	*0.09%*	*0.08%*	*0.11%*	*0.30%*	*0.15%*	*0.14%*	*0.15%*	*0.02%*

f) Reference device: V_{GS_th} @ IDS 1.0 mA drift from Initial values in [%]

	0	6'197	15'000	22'500	30'062	55'000	70'067	110'500	Annealing 6hrs RT	Annealing 21hrs RT	Annealing 139hrs RT	Ageing 168hrs 100'C
034	0.00%	-0.66%	-0.35%	-1.08%	-0.73%	-0.72%	-1.41%	-0.54%	-0.47%	-0.68%	-0.29%	-0.16%

VGS_th @ IDS 1.0 mA, Gate Threshold Voltage Drift from initial values [%] vs 60Co Irradiation Total Dose [rad (Si)]

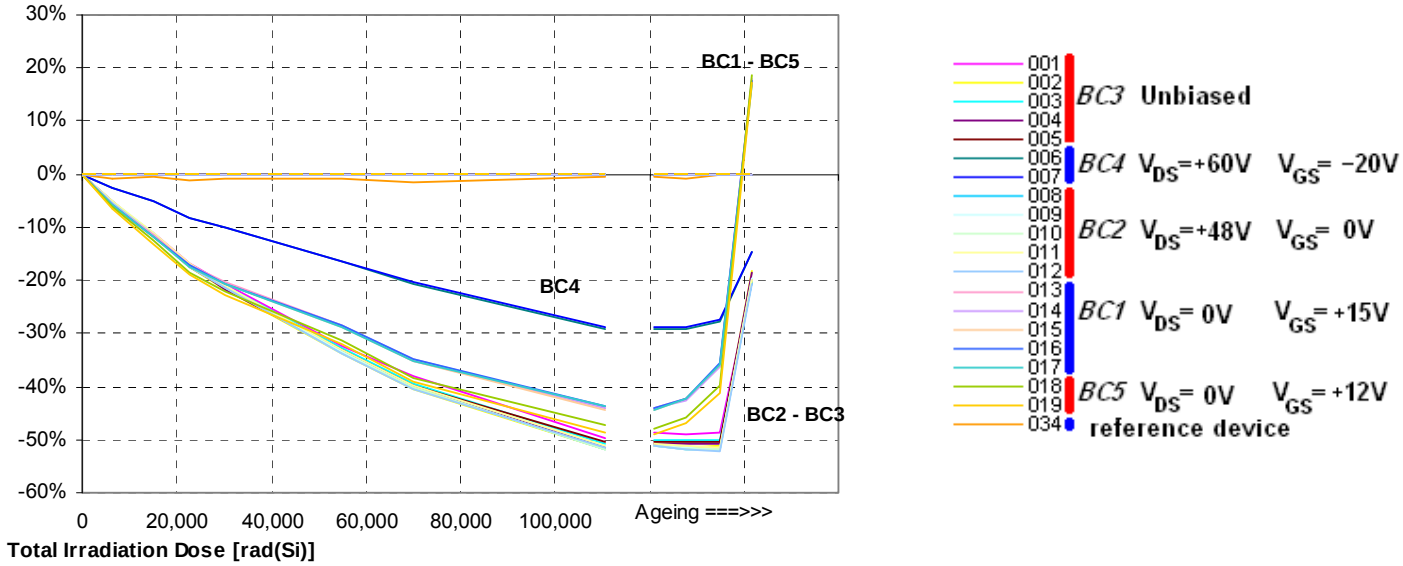


Figure 29

6 CONCLUSION

According to test results the conclusion of radiation test on STRH100N6FSY3 are summarized as in the following:

- The electrical parameters to be entered in the “Electrical Measurements for Total Dose Radiation Testing” section of the Detail Specification shall at least include:
  - V_{GSth} Gate Treshold Voltage
  - I_{DSS} Drain Current in Off State
  - $V_{BR(DSS)}$ VDS Breakdown Voltage
  - I_{GSS} Gate Leakage Current

- The bias conditions specified for TID testing shall include the following condition:
  - V_{DS}=0V, V_{GS} ≥ 12V (rated voltage for V_{DSON}).

- Radiation Test Plan for Lot acceptance Test shall include:
  - Low Dose Rate requirement (Window 2 per ESCC 22900)
  - Irradiation according to mission requirement with a minimum of 50Krad(Si).
  - Annealing at R.T. for 168hrs with intermediate electrical measurements after 24hrs.
  - Ageing at 85°C for 168 hrs minimum, with intermediate electrical measurements after 24hrs.
  - Bias condition shall be maintained during the entire test (including annealing/ageing) with duration of the interruption for electrical measurements kept as short as possible (<1hrs).