DOCUMENT

document title/ titre du document

EVALUATION OF STM POWER MOSFET:

^{60}Co TID TEST RESULTS ON PART TYPE STRH60N20FSY3

(N-CHANNEL 200V 60A)

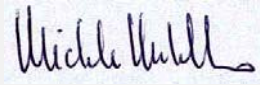
prepared by/*préparé par* M.Muschitiello TEC-QEC

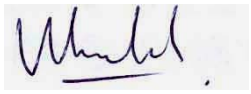
reference/*réference* ESA TEC-QEC RA0572
issue/*édition* 1
revision/*révision* 1
date of issue/*date d'édition* 14 September 2010
status/*état* Issued
Document type/*type de document* Radiation Test Report
Distribution/*distribution*

European Space Agency
Agence spatiale européenne

ESTEC
Keplerlaan 1 - 2201 AZ Noordwijk - The Netherlands
Tel. (31) 71 5656565 - Fax (31) 71 5656040

APPROVAL

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

approved by *approuvé by*	Véronique Ferlet-Cavrois TEC-QEC		date *date*	14 September 2010

CHANGE LOG

reason for change */raison du changement*	issue/*issue*	revision/*revision*	date/*date*
New document	1	1	14 September 2010

CHANGE RECORD

Issue: 1 Revision: 1

reason for change/*raison du changement*	page(s)/*page(s)*	paragraph(s)/*paragraph(s)*

TABLE OF CONTENTS

Test Report Number	**ESA_QEC RA0572**
Project	European Component Initiative - phase I Critical Components
SCC Component no.	***n/a***
Component Designation	STRH60N20FSY3
Irradiation Spec. no.	ESA/SCC 22900
Family	N-Channel Power MOSFET
Group	Silicon
Package	TO3
Component Specification	STRH60N20FSY3 ***> preliminary datasheet <*** *Rev. 1, dated January 2006.*
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)	Date code 30946A. Diffusion Lot nr. 3922168
Serial Number of samples	001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 011, 012, 013, 014, 015, 016, 017, 018, 019, 20, 21, 22, 23, 24, [034 reference device]
Irradiation Measurement schedule: Bias conditions: Circuit Reference: Temp °C: Duration:	0, 3, 10, 20, 30, 50, 75, 85, 110 krad(Si) +/- 10% 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} = +160V, 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} = +200V, V_{GS} = -20V ***(*) BC4*** - s/n's 020, 021, 022, 023, 024: V_{DS} = +200V, 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 160V, Vgs 0V , I_{DSS} @ Vds 200V, 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.
Facility Source: Energy: Dose Rate: Absorbing Material:	ESA/ESTEC ^{60}Co (gamma) 1.173 MeV 1.332 MeV 5.9 rad(Si)/min N/A

Thickness: Temperature °C:	N/A 20 ± 3
Dosimetry / Calibration method.	Calibrated NE2571, 0.6cc air ionisation chamber s/n 3322. Calibrated Farmer 2670 dosimeter s/n 109.
Annealing	30 hours at Room Temperature 77 hours at Room Temperature 166 hours at Room Temperature
Ageing	5 hours at 100 °C 8 hours at 100 °C 24 hours at 100 °C 54 hours at 100 °C 76 hours at 100 °C 99 hours at 100 °C 188 hours at 100 °C 355 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} = +160V, V_{GS} = 0V ***BC3*** - s/n's 001, 002, 003, 004, 005: V_{DS} = 0V, V_{GS} = 0V ***(*) BC4*** - s/n's 020, 021, 022, 023, 024: V_{DS} = +200V, V_{GS} = -20V ***BC5*** - s/n's 018, 019: V_{DS} = 0V, V_{GS} = +12V
Bias Circuit Reference	Fig.1

(*) Note: At the first intermediate measurement, s/n 006 and s/n 007, biased with V_{DS} = +200V, V_{GS} = -20V, were found failing. The early failures were induced by mishandling of the parts during the test set-up. The irradiation and the subsequent Annealing and Ageing for bias condition B4 was executed on other five devices s/n's 020, 021, 022, 023 and 024, instead.

1 INTRODUCTION

The following document contains the conditions and the results of the total dose test campaign for the radiation evaluation of the discrete N-Channel PowerMOS, based on type STRH60N20FSY3, manufactured by STM.
This test was conducted on prototypes from diffusion lot number 3922168, packaged in TO3, date code 30946A, provided by the manufacturer.
Following the test results and findings related to similar N-Channel Power MOS previously tested (see test reports RA555, RA556, RA557, RA558 for details), the ageing /annealing was performed with several intermediate electrical tests in order to better evaluate the recovery/rebound of the device performances after the irradiation steps.

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 STRH60N20FSY3 > preliminary datasheet < rev. 1, dated January 2006.

AD 5 ESCC Generic Specification 5000, Issue 5 July 2009

3 TEST DESCRIPTION

Thirty six devices, POWER MOSFET based on type STRH60N20FSY3, 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 initially irradiated. At the first intermediate measurement step, devices 06 and 07 failed. The failures, not radiation related, were probably due to mishandling or the failed parts could belong to the weak population of the lot since the devices under test were not screened before radiation test.
Five more devices (sn's 20-24) have been used to replace them with same applied bias condition and no more similar failure were experienced.

Table 1 also summarises 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} = +200V, V_{GS} = -20V, Bias Condition **BC4**) At the first intermediate measurement step, these two devices have been found failing. The failures were probably due to mishandling. Five more devices have been used to replace them (sn's 20-24)
008-012	Biased during ^{60}Co irradiation (V_{DS} = +160V, 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
020-024	Biased during ^{60}Co irradiation (V_{DS} = +200V, V_{GS} = -20V, Bias Condition **BC4**) Devices replacing the s/n 06 and 07 found failed at the first intermediate test due to mishandling.
025-036	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

The actual radiation test steps are reported in: Table 2 for bias conditions BC1, BC2, BC3 and BC5 and Table 3 for bias condition BC4

Table 2 Irradiation Test Plan - Bias Conditions BC1, BC2,BC3 and BC5

Step	Total Dose (Si) krad	Dose Rate (Si)rad/min
(Pre irradiation) 0	==	==
Irradiation step # 1	2,821	5.86
Irradiation step # 2	10,000	5.89
Irradiation step # 3	17,363	5.83
Irradiation step # 4	26,499	5.84
Irradiation step # 5	49,322	5.89
Irradiation step # 6	75,111	5.89
Irradiation step # 7	85,011	5.91
Irradiation step #8	109,707	5.93

Table 3 Irradiation Test Plan – Bias Condition BC4

Step	Total Dose (Si) krad	Dose Rate (Si)rad/min
(Pre irradiation) 0	==	==
Irradiation step # 1	7,364	5.77
Irradiation step # 2	16,500	5.81
Irradiation step # 3	39,323	5.89
Irradiation step # 4	50,247	5.91
Irradiation step # 5	75,012	5.90
Irradiation step # 6	99,215	5.90

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 166 hours in total). Subsequently the devices were aged at 100°C for 830 hrs in order to fully investigate the time dependent effects observed on similar devices (e.g. N-Ch mosfet STRH40N6SY3, see report nr.RA558). During the entire anneal/ageing, the same bias conditions applied during the TID test were maintained. Table 4 reports the annealing/ageing sequence detail.

Table 4 Anneal/ageing sequence

Step	Temperature	Duration
Anneal	Room temperature	30.00 hours
Anneal	Room temperature	77.00 hours
Anneal	Room temperature	166.00 hours
Ageing	100 °C	4.60 hours
Ageing	100 °C	8.10 hours
Ageing	100 °C	24.80 hours
Ageing	100 °C	53.70 hours
Ageing	100 °C	76.30 hours
Ageing	100 °C	99.00 hours
Ageing	100 °C	187.80 hours
Ageing	100 °C	355.30 hours
Ageing	100 °C	545.80 hours
Ageing	100 °C	830.30 hours

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

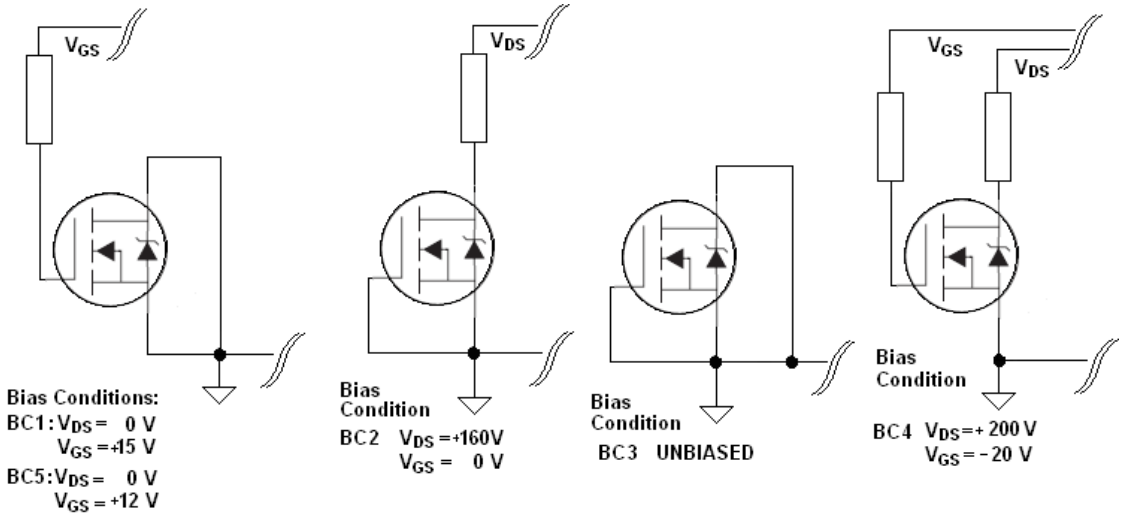


Figure 1 Biasing circuits for TID test and anneal/ageing sequence.

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 5.

Table 5 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 160V, Vgs 0V			10	µA	3413	V_{DS} = 160V V_{GS} = 0V
(a) 4	IDSS @ Vds 200V, Vgs 0V			10	µA	3413	V_{DS} = 200V 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		0.044	Ohm	3421	V_{GS} = 10V I_{DS} = 40A
(a) 10	VDS(on) - D-S On-Voltage	Drain-Source On voltage		880	mV	3405	V_{GS} = 10V I_{DS} = 20A
(a) 11	V(BR)DSS @I_D=100uA	V_{DS} Breakdown	200		V	3407	V_{GS} = 0V I_{DS} = 100uA
(a) 12	V(BR)DSS @I_D=250uA		200		V	3407	V_{GS} = 0V I_{DS} = 250uA
13	V(BR)DSS @I_D=1mA		200		V	3407	V_{GS} = 0V I_{DS} = 1mA
(a) 14	VSD - Inverse Diode Fwd. Volt.	Fwd voltage inverse diode		1500	mV	4011	I_{SD} = 40A V_{GS} = 0V
(a) 15	ID(on) - On-State Drain Current	Drain-Source max On current	60		A	3413	V_{GS} = 10V V_{DS} = 10V

(a) Parameter not listed in Manufacturer datasheet AD 4.
(b) The actual test conditions deviate from Manufacturer Test Condition Log HG6F.tst, dated 09.09.2009 due to test equipment limitation.

Parameters from nr.0 to nr.15 have been measured by using Unimet M3000 (s/n 0639001) Automatic Test Equipment.

4.2 Thermal conditions

All irradiations and measurements were performed at room temperature (20 ± 3 °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 6 to Table 21. Test ended with a registered Total Dose of 99 krad(Si) for devices under BC4 bias condition and 110 krad(Si) for the remaining Bias Conditions. At the end of the last irradiation step, electrical measurements were performed and the devices were tested again after each annealing (at room temperature) and ageing (at 100°C) steps as listed in Table 4. During the entire annealing, the irradiated devices were biased employing the same test board.

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 expanded uncertainty has been calculated by using [1] below, with a coverage factor of 2.

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

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

Significant data from tables Table 6 to Table 21, have been plotted in Figure 2 to Figure 33.

4.4.1 Electrical Measurement Data

Table 6 I_{GSS_F1} Gate Leakage Current (fwd) [nA] vs: ^{60}Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:		100.0	[nA]

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs								
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
001	0.779	0.017	0.902	0.563	0.669	0.513	0.978	0.819	0.533	1.186	0.985	0.027	0.581	0.628	0.424	0.096	0.362	0.073	0.203	0.124	0.067	0.090
002	0.053	0.552	0.542	0.535	0.531	0.034	0.011	0.613	1.027	0.736	0.128	0.122	0.121	1.169	0.088	1.122	0.294	0.409	0.089	0.120	0.565	0.433
003	0.383	0.155	0.612	0.004	0.619	0.862	1.114	1.137	0.653	0.708	0.254	0.812	1.140	0.083	0.203	0.048	0.502	0.504	0.101	0.105	0.001	0.560
004	0.500	1.168	0.502	0.361	0.124	0.033	0.706	0.070	0.415	0.722	1.033	0.131	0.691	0.316	0.140	0.361	0.944	0.635	0.735	0.119	0.028	0.021
005	0.170	0.040	0.550	0.161	0.239	0.341	0.980	0.705	0.557	0.084	0.108	0.504	0.402	0.055	1.107	0.168	0.013	0.121	0.537	0.051	0.774	0.034
006	0.808																					
007	0.306																					
008	0.944	0.281	0.024	0.547	0.061	0.876	0.332	0.639	0.049	0.440	1.112	0.124	1.152	0.399	0.120	0.754	0.569	0.713	0.211	0.119	0.451	0.116
009	0.431	0.107	0.332	0.106	1.080	0.999	0.343	0.689	0.483	0.816	0.610	0.100	0.780	1.063	0.064	0.431	0.046	0.252	0.337	0.111	0.022	0.196
010	1.007	0.075	0.470	0.643	0.105	0.100	0.083	0.937	1.004	0.051	0.059	0.025	0.115	0.297	0.280	0.473	0.014	0.547	1.136	0.053	0.006	1.055
011	0.091	0.264	0.004	0.842	0.412	0.233	0.976	0.375	0.854	0.646	0.060	0.106	0.004	0.359	1.102	0.618	0.375	0.749	0.235	0.016	0.319	0.037
012	0.745	0.280	0.170	0.204	0.389	0.728	0.095	1.071	0.211	0.546	1.035	0.013	1.162	1.047	0.111	0.032	0.153	0.627	0.068	0.132	0.109	0.055
013	0.472	0.648	0.189	0.041	1.018	0.762	0.499	0.652	0.253	0.317	0.074	0.273	0.119	0.436	0.105	0.046	0.114	0.250	0.501	0.120	0.764	0.200
014	0.715	0.001	0.032	0.017	0.664	0.119	0.101	0.272	0.287	0.855	0.061	0.841	0.150	0.703	0.357	0.071	0.790	1.133	0.258	0.105	0.286	0.375
015	0.020	0.267	0.086	0.360	0.006	0.884	1.087	0.130	0.226	0.049	0.674	0.083	0.247	0.139	0.057	0.965	0.629	1.056	1.184	0.075	0.759	0.610
016	0.961	0.390	0.691	0.093	0.107	0.852	0.894	0.557	0.030	0.616	0.767	0.119	0.738	0.912	0.788	0.870	0.294	0.154	0.777	0.106	0.952	0.889
017	0.246	0.027	0.125	0.038	0.285	0.058	0.001	0.464	0.068	1.031	0.600	0.904	0.170	0.288	0.161	0.543	0.279	0.135	0.197	0.101	0.696	0.085
018	0.745	0.263	0.006	0.014	0.778	0.074	0.038	0.320	0.100	0.064	0.661	0.362	0.097	0.058	0.108	0.823	0.089	0.575	0.033	0.126	0.127	0.699
019	0.907	0.713	0.190	1.030	0.529	0.026	1.051	0.121	1.073	0.060	0.049	0.256	0.115	0.388	0.580	0.414	0.301	0.602	0.778	0.090	0.584	0.131
034	0.240	0.180	0.529	0.286	0.069	0.674	0.906	0.021	0.252	0.077	0.826	0.106	0.149	0.148	0.687	0.229	0.824	0.219	0.136	0.113	0.084	0.649

	0	7.4	16.5	39.3	50.2	75.0	99.2			30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
020	0.093	0.893	0.174	0.077	0.123	0.352	1.127			0.199	0.982	0.819	0.885	0.279	0.782	0.090	0.238	0.784	0.034	0.005	0.018	1.323
021	0.161	0.296	0.126	0.903	0.629	0.030	0.215			1.195	0.039	1.119	0.685	0.773	0.126	0.044	0.079	0.017	0.030	0.121	0.091	0.669
022	0.343	0.099	0.664	0.670	0.225	0.052	0.157			0.111	1.216	0.169	0.076	1.163	0.715	0.669	0.024	0.022	0.431	0.128	0.112	0.069
023	0.066	0.877	0.004	0.040	0.018	0.937	0.019			1.309	0.892	0.849	0.098	0.048	0.978	0.566	0.728	0.438	0.760	0.087	0.016	0.718
024	0.337	0.400	0.793	0.331	0.005	0.359	0.916			0.959	0.686	0.102	1.020	0.051	0.728	0.172	0.891	0.152	0.011	0.072	0.084	1.131

Reference device **Mean value:** **0.35** **Expanded uncertainty (k=2):** **± 83.55 % (± 0.29nA)**

Red values: greater than max limit	*Bias Conditions:*	*(1) V_{DS}=0V V_{GS}=+15V*	*(2) V_{DS}=+160V V_{GS}= 0V*	*(3) V_{DS}=0V V_{GS}= 0V*	*(4) V_{DS}=200V V_{GS}=-20V*	*(5) V_{DS}=0V V_{GS}=+12V*
Dark red Values: lower than min limits	*s/n's:*	*013,014,015,016,017*	*008,009,010,011,012*	*001,002,003,004,005*	*006,007,020,021,022,023,024*	*018,019*

Figure 2 I_{GSS_F1} Gate Leakage Current (fwd) [nA] vs: ^{60}Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	*Min.*	*Max.*	*Unit*
Applicable limits:		**100.0**	**[nA]**

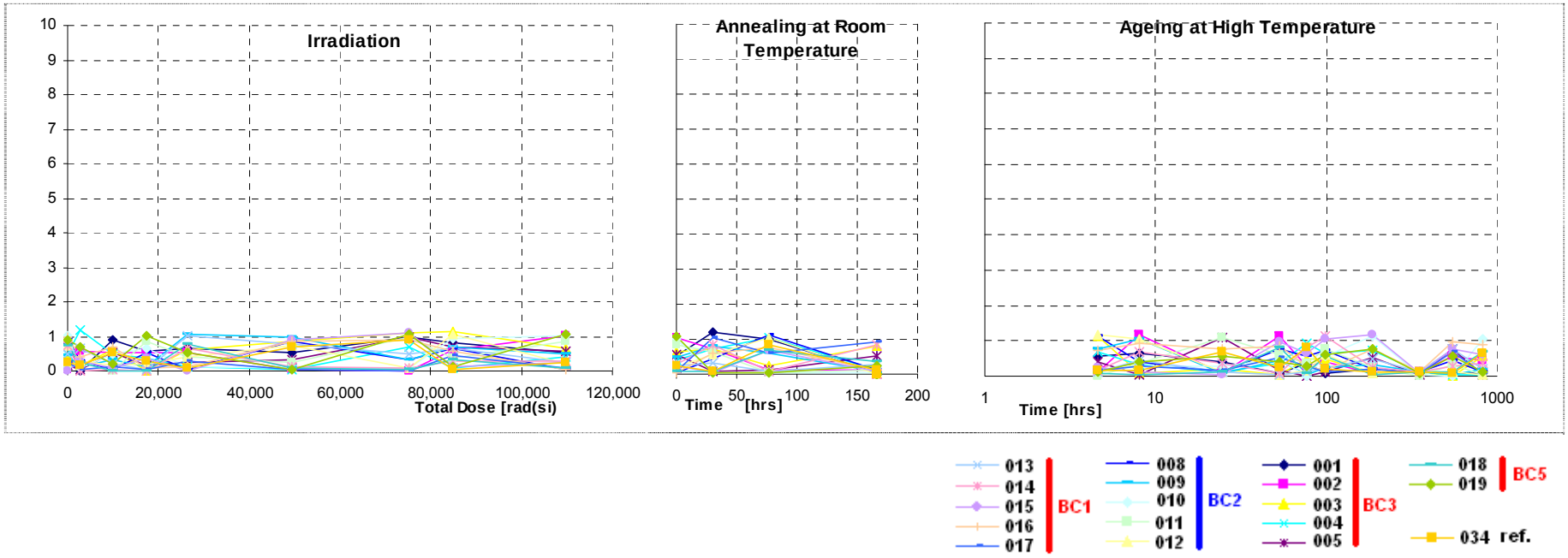


Figure 3 I_{GSS_F1} Gate Leakage Current (fwd) [nA] vs: ^{60}Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	*Min.*	*Max.*	*Unit*
Applicable limits:		**100.0**	**[nA]**

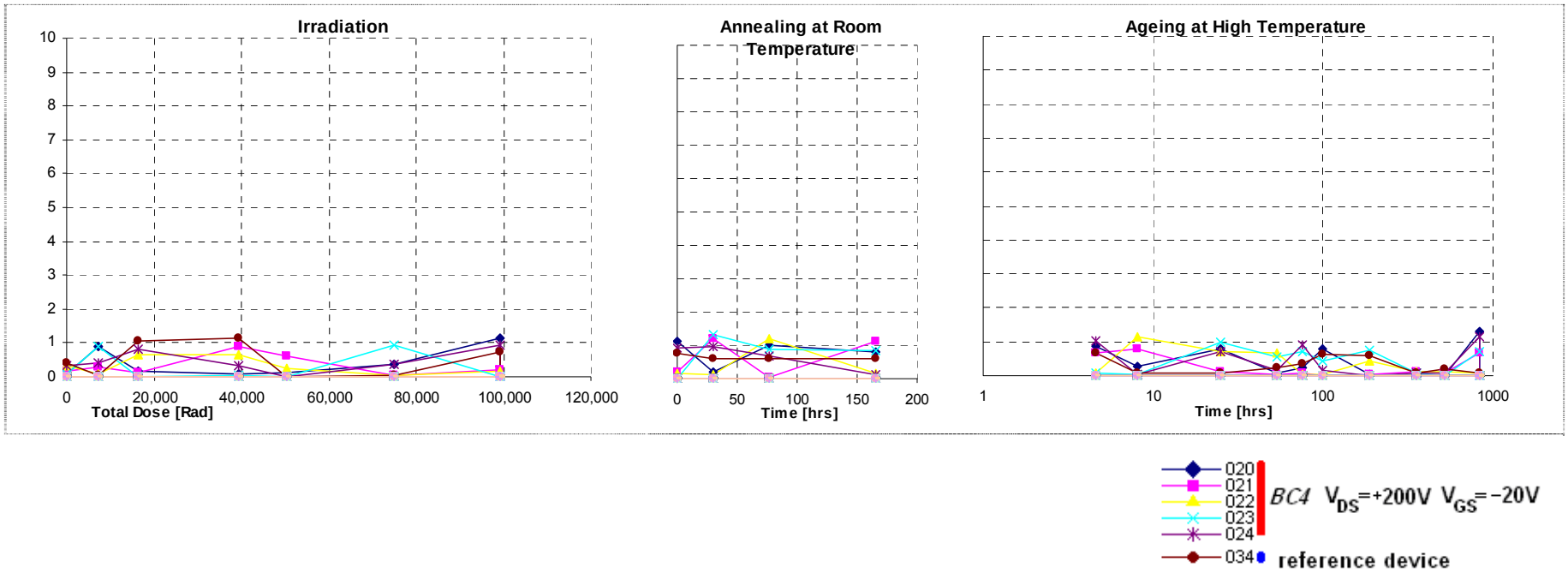


Table 7 IGSS_R1 Gate Leakage Current (rev) [nA] vs 60Co Irradiation Total Dose [rad (Si)]], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:		100.0	[nA]

SEE NOTE ON NEXT PAGE

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs								
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
001	0.400	1.088	1.721	2.795	3.570	6.187	8.284	7.636	10.340	8.985	9.641	13.856	6.097	5.682	5.504	6.312	6.016	5.971	5.808	4.934	4.773	5.488
002	0.729	0.281	51.399	1.170	1.503	2.256	2.292	2.985	3.919	3.375	6.812	3.595	3.111	1.728	2.625	1.504	1.830	1.671	2.167	1.709	1.659	1.547
003	0.234	1.425	1.965	3.490	5.742	4.725	7.827	4.431	7.813	5.423	3.535	4.334	3.972	4.194	4.586	3.753	3.879	3.088	3.448	2.800	3.018	3.385
004	0.233	5.945	7.854	9.303	11.529	15.570	20.708	17.886	21.896	25.420	15.338	14.303	12.555	11.933	11.590	12.010	9.648	10.399	9.286	9.103	9.133	9.913
005	0.726	5.472	1.777	**122.650**	10.657	29.696	16.651	29.016	14.802	17.458	15.156	12.237	10.601	10.351	9.352	9.984	9.408	9.314	8.590	7.942	7.807	8.339
006	0.237																					
007	0.932																					
008	0.708	2.414	2.284	3.787	4.525	7.136	8.212	1.573	20.343	6.775	7.259	6.135	5.164	6.125	6.103	4.300	4.458	4.755	5.408	3.742	3.772	4.293
009	0.841	6.645	9.576	10.775	11.571	15.059	18.898	14.172	12.447	16.396	13.516	11.279	10.029	9.085	10.399	8.797	9.274	9.156	8.772	7.666	7.532	8.255
010	0.710	3.821	18.852	5.579	29.564	11.383	**386.409**	11.039	14.762	14.522	11.101	9.255	9.884	8.990	9.118	7.471	8.534	7.009	6.798	8.356	6.500	6.096
011	0.563	1.174	1.196	1.651	6.689	22.573	5.131	45.650	4.765	4.234	4.618	4.401	4.472	4.189	2.741	2.794	3.803	2.867	3.535	2.324	2.468	3.245
012	0.121	8.434	12.386	11.888	15.141	17.457	26.144	19.875	18.280	2.550	14.377	13.967	11.951	11.332	11.774	10.289	10.804	10.289	10.192	8.599	8.670	9.190
013	0.437	3.821	16.185	36.865	51.374	99.272	95.232	**104.159**	92.095	72.078	50.429	45.330	31.150	28.131	23.730	21.575	20.668	19.951	18.606	17.052	16.794	20.086
014	0.181	3.158	9.366	18.090	30.065	93.066	61.446	53.952	76.232	30.147	23.334	23.079	18.653	15.443	13.616	12.719	10.629	10.289	10.838	9.228	9.353	11.113
015	0.385	7.622	31.001	65.033	98.090	**108.819**	**172.797**	97.391	**202.066**	90.814	66.297	51.260	47.464	42.752	35.034	30.516	29.636	28.064	27.350	25.711	26.478	28.958
016	0.599	7.871	29.247	49.679	89.543	**156.506**	**156.902**	96.678	**110.938**	87.928	68.398	47.608	43.675	39.617	32.365	29.860	28.964	27.898	27.077	24.977	25.293	28.288
017	0.103	2.064	11.920	23.811	44.514	65.400	74.295	73.884	74.562	41.634	35.140	30.254	27.091	23.823	19.528	16.709	16.786	15.896	15.327	13.198	13.382	13.785
018	0.210	0.182	1.673	13.033	10.480	30.702	42.760	5.674	50.538	27.698	29.995	21.171	17.735	15.624	13.082	11.150	11.944	10.870	10.399	8.985	9.023	9.843
019	0.466	0.763	5.659	2.959	3.614	14.324	18.143	20.163	24.589	16.739	14.708	9.682	8.661	6.988	6.098	5.382	6.342	5.741	4.731	4.436	4.147	5.016
034	0.454	1.397	1.237	2.328	2.058	1.060	5.125	1.561	0.941	0.915	0.944	1.906	1.960	1.530	0.777	1.497	0.160	1.680	1.312	0.451	0.703	0.697

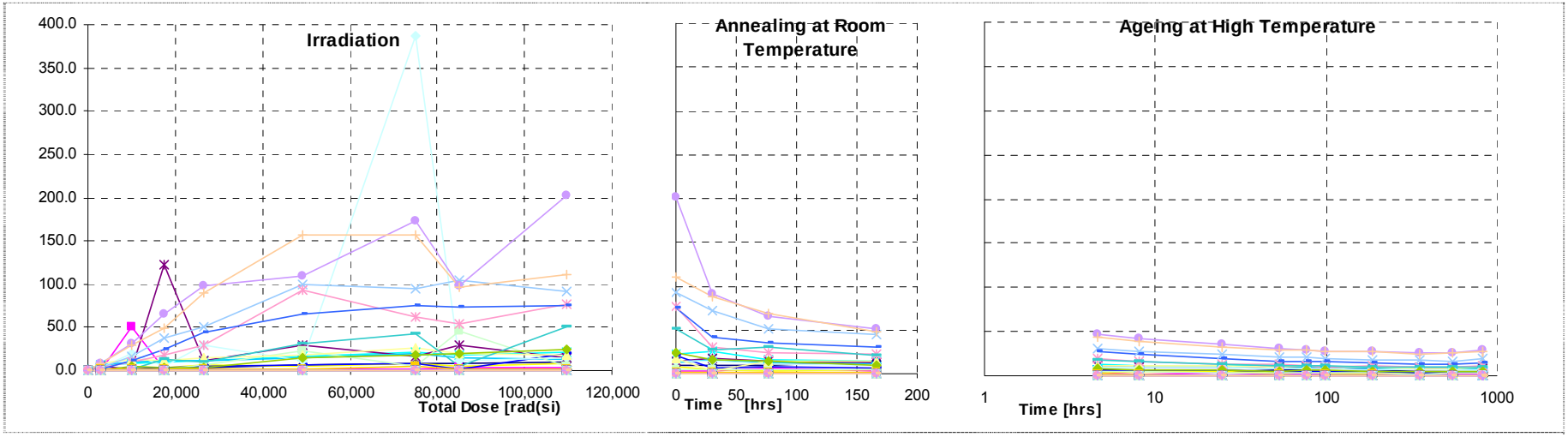
	0	7.4	16.5	39.3	50.2	75.0	99.2			30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
020	3.580	0.142	0.303	0.091	0.078	0.001	0.011			0.084	0.402	0.295	0.384	0.846	0.129	0.325	0.099	0.230	0.362	0.053	0.087	0.193
021	4.982	37.843	0.222	0.204	0.074	6.189	0.807			0.297	0.991	0.014	0.146	0.239	0.664	0.240	0.886	0.173	0.415	0.009	0.085	0.240
022	3.406	0.318	0.047	0.084	1.242	0.771	0.044			0.013	0.214	0.645	0.300	0.145	0.364	0.247	0.606	0.498	5.063	0.049	0.034	1.227
023	7.824	0.079	0.087	0.357	0.061	0.054	1.023			0.029	0.271	0.006	0.491	0.503	0.549	0.283	0.261	0.100	0.068	0.065	0.065	0.304
024	3.649	1.061	18.089	0.304	0.884	0.587	0.214			0.083	0.043	0.132	0.529	0.808	0.221	0.074	0.090	0.636	1.012	0.065	0.137	0.396

Reference device **Mean value:** **1.80** **Expanded uncertainty (k=2):** **± 76.33 % (± 1.37nA)**

Red values: greater than max limit	*Bias Conditions:*	*(1) V_{DS}=0V V_{GS}=+15V*	*(2) V_{DS}=+160V V_{GS}= 0V*	*(3) V_{DS}=0V V_{GS}= 0V*	*(4) V_{DS}=200V V_{GS}=-20V*	*(5) V_{DS}=0V V_{GS}=+12V*
Dark red Values: lower than min limits	*s/n's:*	*013,014,015,016,017*	*008,009,010,011,012*	*001,002,003,004,005*	*006,007,020,021,022,023,024*	*018,019*

Figure 4 IGSS_R1 Gate Leakage Current (rev) [nA] vs 60Co Irradiation Total Dose [rad (Si)]], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	*Min.*	*Max.*	*Unit*
Applicable limits:		**100.0**	**[nA]**



Note: Marginal out of specification measurements, followed by unexpected recovery on s/n 005 and s/n 010 are believed not only to be a TID related effect.

Figure 5 IGSS_R1 Gate Leakage Current (rev) [nA] vs 60Co Irradiation Total Dose [rad (Si)]], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	*Min.*	*Max.*	*Unit*
Applicable limits:		**100.0**	**[nA]**

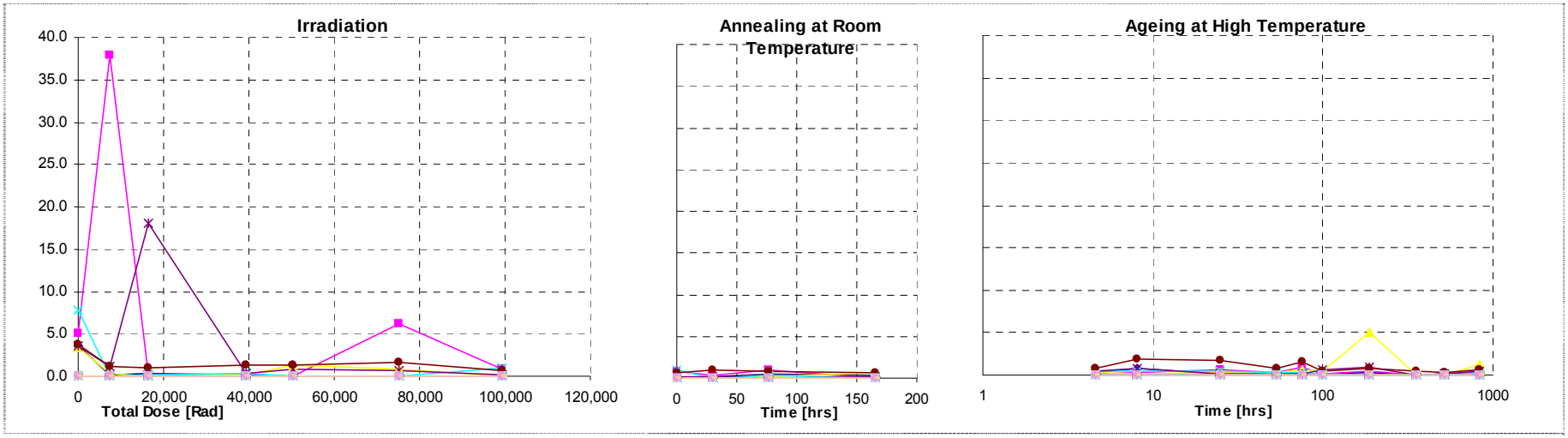


Table 8 IDSS @ VDS 5V, VGS 0V, Drain Current (off state) [nA] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:		10,000.0	[nA]

Parameter not listed in Manufacturer data sheet

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs							
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
001	0.1	3.0	13.3	27.0	42.2	99.9	135.1	168.2	209.3	212.1	201.8	217.4	172.2	140.9	127.1	103.5	103.2	114.1	123.4	78.0	74.2	54.4
002	0.0	3.6	15.0	29.5	46.7	119.0	146.3	185.2	227.9	223.7	232.8	280.4	181.0	155.1	131.0	105.6	102.7	114.1	122.6	77.1	70.2	49.0
003	0.1	3.1	14.3	27.5	42.7	155.6	128.6	165.9	207.9	194.1	202.6	267.1	181.4	149.2	131.6	108.2	104.3	115.9	124.0	79.8	74.3	55.5
004	0.0	2.9	14.9	29.7	45.9	120.7	144.3	179.7	223.9	207.1	231.8	234.9	188.0	151.2	130.7	106.1	103.5	112.4	119.1	74.6	70.5	50.5
005	0.0	3.5	13.5	27.9	42.8	108.4	135.2	166.5	211.3	207.6	210.7	233.2	179.6	148.1	131.2	106.9	105.2	109.5	111.5	74.2	75.2	53.6
006	0.1																					
007	0.0																					
008	0.1	4.1	13.7	24.6	35.1	79.8	68.2	80.7	78.1	78.7	77.3	83.4	96.5	68.1	42.7	30.6	28.7	28.5	28.5	16.1	14.8	18.1
009	0.0	4.5	14.2	24.0	34.2	81.8	67.2	78.1	76.3	78.1	74.4	81.2	98.6	69.9	43.4	32.3	31.2	30.0	29.2	16.5	15.1	18.5
010	0.1	4.3	14.5	24.7	35.2	108.4	68.9	80.0	78.2	77.0	76.5	84.4	105.2	72.1	45.6	33.6	32.8	32.8	32.8	17.5	15.4	17.4
011	0.1	4.0	14.2	24.8	35.3	95.6	68.4	79.4	78.2	76.9	78.4	88.1	102.0	70.8	45.2	33.6	32.3	31.0	31.2	17.1	15.5	17.1
012	0.1	3.6	13.7	23.8	34.1	79.0	67.9	77.3	76.9	75.8	77.6	86.6	91.2	66.1	42.1	32.4	30.1	26.5	25.0	16.1	15.0	17.4
013	0.0	11.8	55.7	60.2	79.6	208.0	314.1	792.0	3,796.0	2,896.	2,911.	2,128.	676.0	606.0	694.0	618.0	669.4	695.9	763.2	536.7	505.3	455.1
014	0.1	11.6	61.6	60.1	79.9	194.3	424.9	1,771.0	**74,589.**	**61,053**	**48,849**	**35,732**	**25,149.**	**21,639.**	**11,991.**	3,568.0	1,664.0	1,280.0	765.1	530.9	564.2	441.6
015	0.1	11.8	60.4	58.8	78.7	195.8	335.8	745.0	**17,560.**	**12,935**	**11,265**	6,658.	3,112.0	2,341.0	699.0	603.0	667.4	728.9	757.9	531.2	555.7	428.8
016	0.1	12.4	60.8	58.5	79.0	194.5	363.0	950.0	6,316.0	4,647.	5,844.	2,906.	926.0	767.0	718.0	625.0	687.3	791.7	823.7	562.0	557.5	429.3
017	0.0	11.7	59.4	59.0	79.5	204.9	311.9	673.0	7,548.0	5,829.	4,652.	3,231.	1,510.0	1,232.0	676.0	604.0	658.1	711.4	744.6	537.3	551.5	412.2
018	0.1	9.7	52.0	55.7	73.0	180.9	330.2	846.2	9,615.0	6,947.	5,338.	3,548.	1,084.0	606.0	637.0	563.0	590.9	637.6	649.2	474.3	527.5	277.4
019	0.1	10.4	54.6	58.6	79.2	195.5	341.8	980.3	**10,937.**	7,682.	6,714.	4,552.	1,830.0	1,382.0	864.0	596.0	625.3	672.6	660.8	505.9	551.8	275.2
034	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0

	0	7.4	16.5	39.3	50.2	75.0	99.2			30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
020	0.2	11.9	22.1	53.0	56.7	74.9	225.8			184.6	184.1	0.2	106.9	100.5	73.4	57.1	55.8	54.6	55.4	40.3	42.5	50.3
021	0.0	12.5	24.7	58.8	64.3	82.0	201.2			167.4	173.4	0.2	105.6	97.7	70.8	55.4	55.9	57.9	62.9	42.2	45.9	62.9
022	0.1	12.0	24.1	56.0	62.0	87.9	335.0			271.4	276.5	0.2	112.0	97.9	74.1	56.8	57.6	59.0	62.4	42.1	45.7	58.0
023	0.1	12.3	23.7	54.0	60.1	78.5	273.4			221.9	257.7	0.2	112.9	94.5	73.5	56.7	57.4	59.3	62.5	41.9	44.4	56.6
024	0.1	12.5	23.5	53.4	56.1	73.8	225.7			187.3	188.2	0.2	115.2	95.0	74.0	54.3	53.7	53.9	56.6	39.0	44.4	53.7

Reference device **Mean value:** 0.05 **Expanded uncertainty (k=2):** ± 109.99 % (± 0.05nA)

Red values: greater than max limit	*Bias Conditions:*	*(1) V_{DS}=0V V_{GS}=+15V*	*(2) V_{DS}=+160V V_{GS}= 0V*	*(3) V_{DS}=0V V_{GS}= 0V*	*(4) V_{DS}=200V V_{GS}=-20V*	*(5) V_{DS}=0V V_{GS}=+12V*
Dark red Values: lower than min limits	*s/n's:*	*013,014,015,016,017*	*008,009,010,011,012*	*001,002,003,004,005*	*006,007,020,021,022,023,024*	*018,019*

Figure 6 IDSS @ VDS 5V, VGS 0V, Drain Current (off state) [nA] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	*Min.*	*Max.*	*Unit*
Applicable limits:		**10,000.0**	**[nA]**

Parameter not listed in Manufacturer data sheet

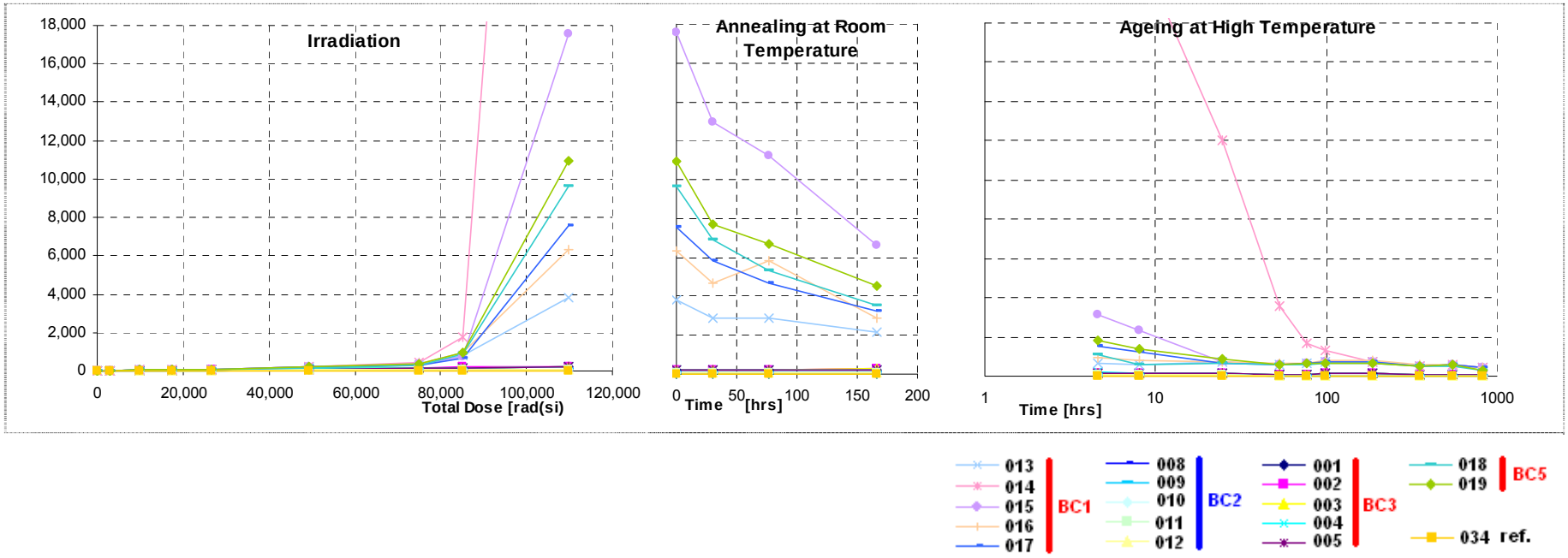


Figure 7 IDSS @ VDS 5V, VGS 0V, Drain Current (off state) [nA] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:		10,000.0	[nA]

Parameter not listed in Manufacturer data sheet

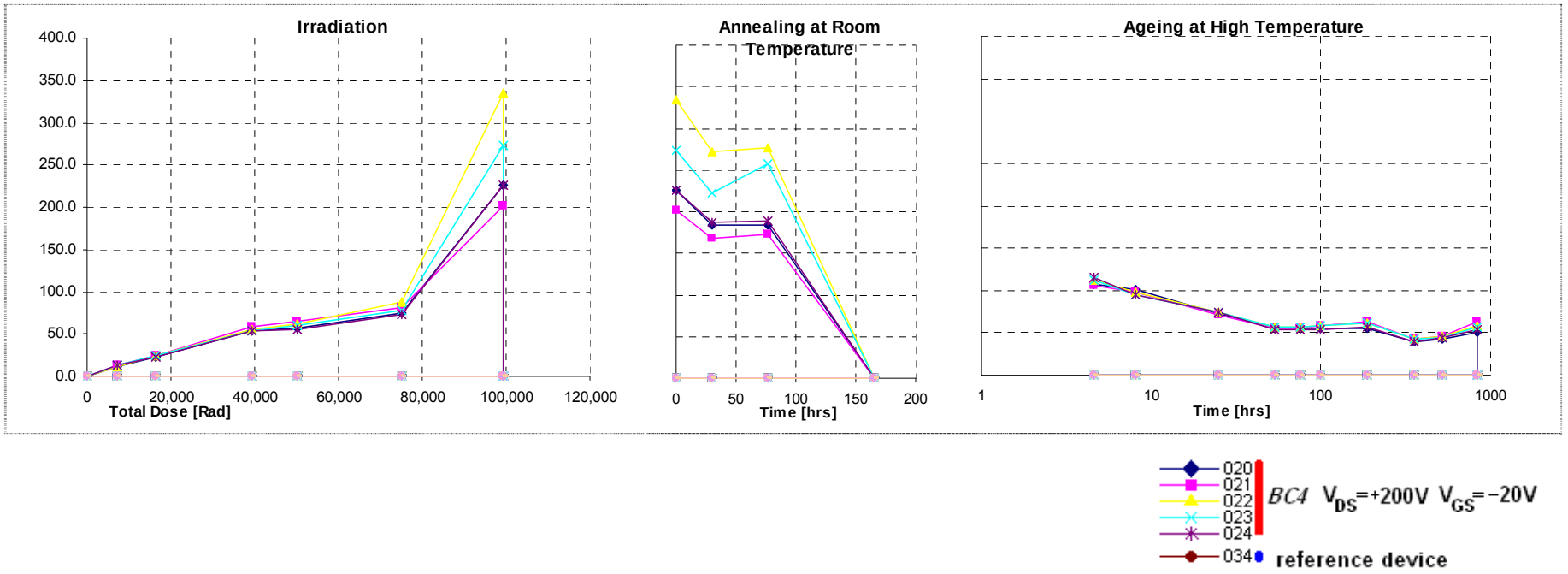


Table 9 IDSS @ VDS 160V, VGS 0V, Drain Current (off state) [nA] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:		10,000.0	[nA]

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs							
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
001	0.3	6.1	25.3	49.5	74.0	158.3	195.8	237.1	279.0	277.2	261.0	276.1	193.3	157.1	140.4	114.4	113.4	125.2	135.2	86.1	82.5	60.9
002	0.7	6.8	27.9	52.8	81.1	186.0	210.8	258.3	301.5	290.6	298.6	352.6	203.3	172.8	145.1	116.6	112.8	125.3	134.9	85.3	78.3	54.8
003	0.3	6.7	27.0	50.7	75.8	243.7	189.1	235.4	279.0	256.0	263.3	338.0	203.8	166.5	145.5	118.8	114.7	126.7	135.5	87.7	82.1	62.3
004	0.4	5.5	27.6	53.0	78.9	186.3	206.6	249.4	295.2	268.8	296.3	296.8	211.7	169.4	145.5	118.3	114.3	125.0	132.0	83.0	79.4	56.9
005	0.4	6.6	25.4	50.6	74.1	168.7	194.1	232.4	279.0	269.6	269.7	294.1	202.2	165.8	145.3	118.5	116.2	120.8	123.1	82.9	83.6	60.2
006	0.6																					
007	0.4																					
008	0.6	9.3	26.4	46.4	62.1	123.3	138.5	174.6	191.3	184.9	178.4	185.5	134.6	86.6	48.4	33.3	31.5	31.2	31.1	17.6	16.5	20.2
009	0.6	9.5	26.7	46.2	61.0	126.6	138.9	171.1	187.8	185.4	173.8	182.8	144.5	93.4	51.6	35.5	34.6	33.1	32.4	18.8	16.9	21.0
010	0.1	9.8	27.5	46.7	62.2	166.2	143.0	175.4	193.5	184.2	178.7	189.6	152.5	95.0	53.0	36.7	36.3	35.7	36.0	19.2	16.9	19.7
011	0.2	9.7	27.0	46.7	62.7	147.5	139.6	171.9	191.9	181.9	181.9	197.1	146.0	91.9	51.8	36.6	35.4	34.4	34.4	18.7	17.1	18.9
012	0.4	8.6	26.4	46.0	61.1	122.6	135.9	166.2	187.9	179.0	178.9	193.1	134.0	88.3	49.3	35.3	33.3	29.2	27.6	17.6	16.5	19.5
013	0.7	17.8	75.1	154.6	260.9	1,097.0	3,115.0	6,228.0	12,602.	9,960.	10,722	8,111.	3,344.0	2,889.0	2,541.0	1,932.0	1,869.0	1,768.0	1,632.0	1,214.3	1,087.6	954.1
014	0.6	18.0	83.4	155.4	263.9	1,070.0	3,257.0	6,813.0	93,995.	77,445	62,613	46,299	31,348.	26,938.	15,508.	5,293.0	3,019.0	2,496.0	1,586.0	1,205.5	1,216.1	928.4
015	0.6	18.0	81.7	153.0	262.2	1,137.0	3,328.0	5,484.0	28,650.	21,693	20,773	13,283	6,272.0	5,028.0	2,669.0	1,968.0	1,923.0	1,858.0	1,627.0	1,240.4	1,230.2	926.1
016	0.4	18.6	81.9	151.3	263.3	1,256.0	3,367.0	6,530.0	15,344.	12,017	14,722	8,853.	3,780.0	3,240.0	2,675.0	2,011.0	1,958.0	1,932.0	1,692.0	1,300.7	1,228.1	923.3
017	0.4	17.8	81.2	155.2	269.1	1,152.0	3,018.0	5,450.0	16,746.	13,211	11,847	9,120.	4,419.0	3,752.0	2,589.0	1,964.0	1,901.0	1,825.0	1,626.0	1,251.2	1,220.1	887.8
018	0.4	14.6	69.2	135.2	231.6	874.0	2,116.0	4,083.9	16,708.	13,060	11,108	8,418.	3,428.0	2,555.0	2,236.0	1,693.0	1,616.0	1,558.0	1,397.0	1,045.9	1,106.3	681.6
019	0.5	15.5	71.7	140.5	244.8	1,011.0	2,142.0	4,005.5	18,515.	13,919	13,123	9,588.	4,273.0	3,449.0	2,450.0	1,690.0	1,625.0	1,560.0	1,362.0	1,065.9	1,107.9	649.4
034	0.4	0.4	0.4	0.3	0.6	0.3	0.6	0.4	0.6	0.5	0.2	0.4	0.3	0.6	0.5	0.6	0.7	0.5	0.6	0.6	0.6	0.5

	0	7.4	16.5	39.3	50.2	75.0	99.2			30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
020	0.8	22.9	44.0	119.0	134.5	181.1	372.4			324.2	330.6	370.0	227.1	212.8	159.2	126.1	125.0	124.3	125.7	90.0	90.1	81.0
021	0.7	23.5	47.4	128.0	152.4	202.4	353.2			313.3	331.2	337.0	232.8	211.8	160.6	124.2	126.4	132.1	138.4	90.2	87.7	86.2
022	0.5	24.1	47.2	124.0	146.7	213.3	495.0			431.1	445.9	392.0	240.5	209.7	164.1	125.8	128.7	133.7	138.1	90.6	89.0	81.0
023	0.5	23.7	45.8	120.0	140.7	190.6	429.1			371.2	445.2	390.0	245.2	204.1	163.9	127.3	129.8	135.3	139.9	91.4	90.1	84.5
024	0.2	23.9	45.6	120.0	134.7	184.9	378.0			334.8	345.8	354.0	248.6	204.2	164.8	124.4	124.1	127.1	130.0	86.2	90.0	79.3

Reference device **Mean value:** 0.45 **Expanded uncertainty (k=2):** ± 29.08 % (± 0.13nA)

Red values: greater than max limit	*Bias Conditions:*	*(1) V_{DS}=0V V_{GS}=+15V*	*(2) V_{DS}=+160V V_{GS}= 0V*	*(3) V_{DS}=0V V_{GS}= 0V*	*(4) V_{DS}=200V V_{GS}=-20V*	*(5) V_{DS}=0V V_{GS}=+12V*
Dark red Values: lower than min limits	*s/n's:*	*013,014,015,016,017*	*008,009,010,011,012*	*001,002,003,004,005*	*006,007,020,021,022,023,024*	*018,019*

Figure 8 IDSS @ VDS 160V, VGS 0V, Drain Current (off state) [nA] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:		10,000.0	[nA]

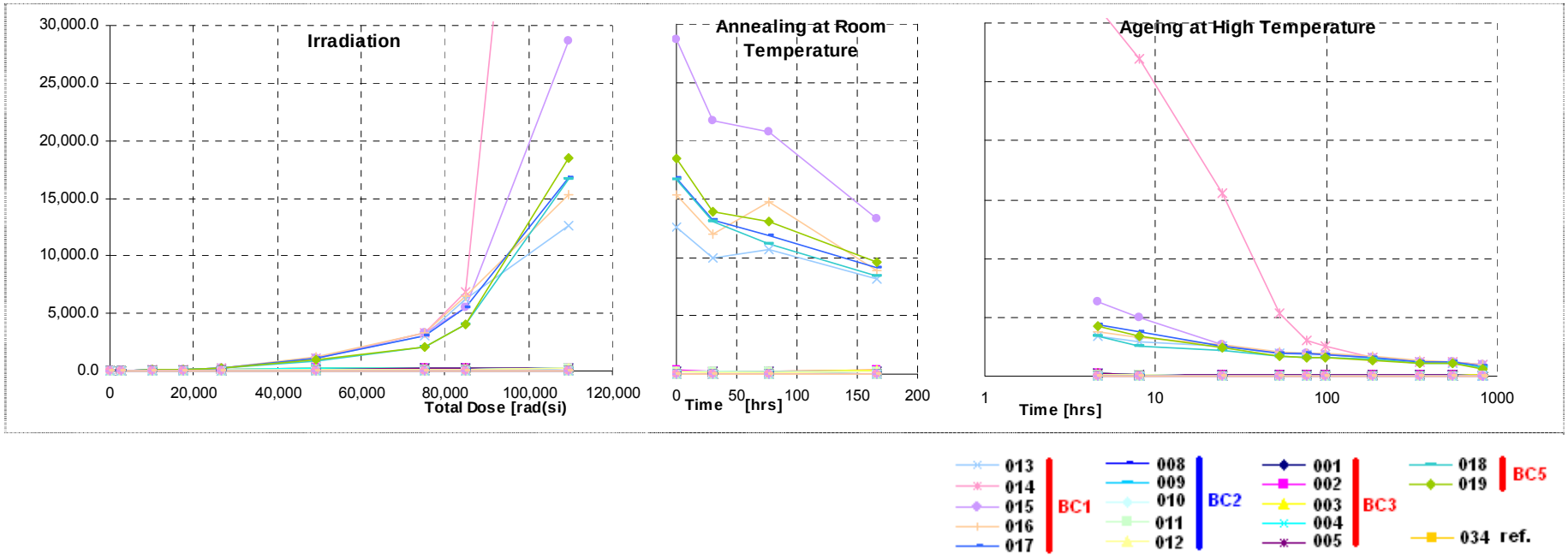


Figure 9 IDSS @ VDS 160V, VGS 0V, Drain Current (off state) [nA] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:		10,000.0	[nA]

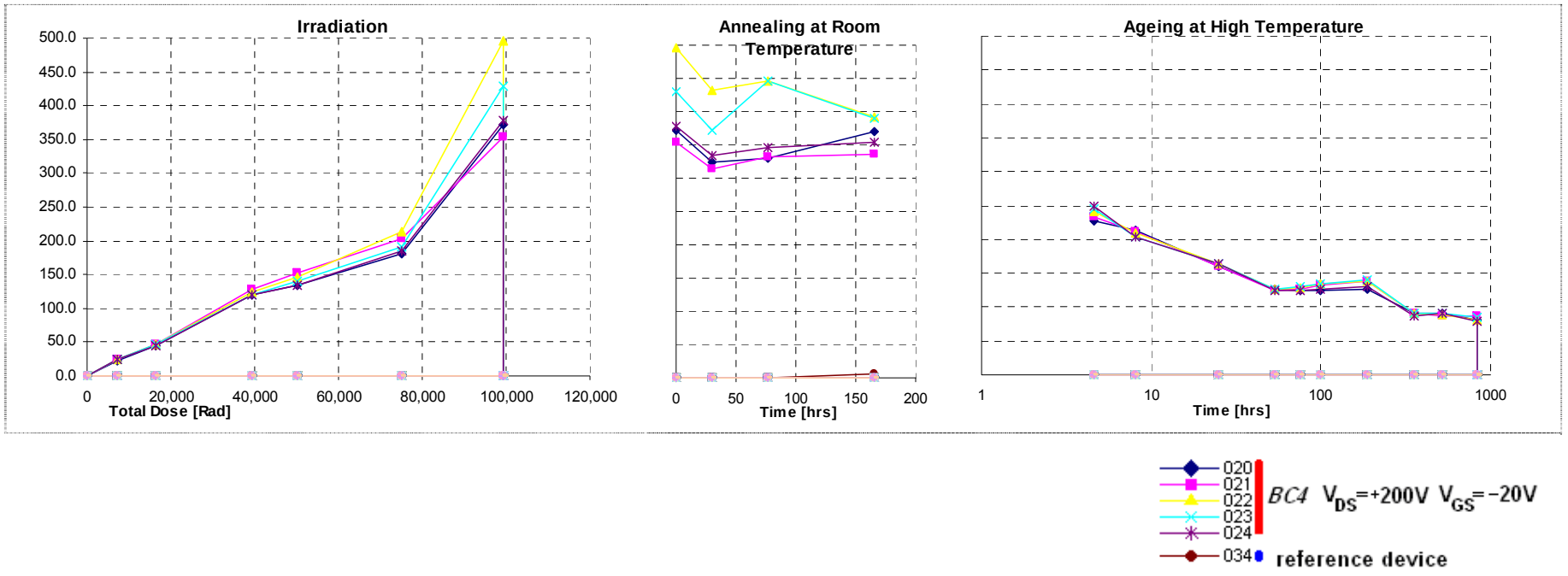


Table 10 IDSS @ VDS 200V, VGS 0V, Drain Current (off state) [nA] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:		10,000.0	[nA]

Parameter not listed in Manufacturer data sheet

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs							
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
001	0.468	8.641	37.721	73.101	106.285	212.018	249.385	296.546	340.082	338.76	319.12	337.67	228.49	185.67	164.61	133.94	132.79	146.77	158.32	101.37	96.818	71.694
002	0.588	9.906	42.062	79.402	118.944	253.801	272.176	328.324	371.201	359.00	368.17	433.29	240.28	203.83	169.74	136.89	132.30	146.88	157.42	100.02	91.867	64.626
003	0.396	9.089	40.318	75.877	110.710	325.251	243.029	297.269	341.481	314.75	323.47	413.07	239.99	195.71	170.70	139.36	134.09	148.10	158.14	102.88	95.898	72.741
004	0.456	8.362	40.788	77.545	113.006	248.997	263.394	313.756	361.355	331.02	363.83	364.11	252.17	201.81	172.05	140.01	135.84	147.38	155.37	98.547	94.113	68.076
005	0.727	9.137	37.437	73.319	104.375	222.254	244.403	288.364	338.167	327.23	328.06	357.20	239.67	196.25	171.87	139.85	137.10	142.32	144.52	97.667	98.754	71.721
006	0.380																					
007	0.631																					
008	0.603	12.509	29.986	51.431	70.103	142.341	161.406	203.461	221.928	213.79	206.11	212.18	148.93	96.149	54.289	37.349	35.996	35.239	35.874	20.175	18.664	22.975
009	0.587	12.879	30.523	50.885	69.244	146.898	162.350	200.811	219.811	216.45	202.81	211.18	160.65	105.30	58.562	40.166	39.363	37.974	37.029	21.061	19.381	24.216
010	0.504	13.261	31.095	51.391	70.938	192.792	168.024	205.685	225.933	214.34	207.74	218.41	169.77	106.25	59.858	41.709	41.104	41.063	41.211	21.868	19.445	22.569
011	0.686	12.884	30.831	51.469	70.923	169.957	162.336	200.402	222.648	210.26	210.14	225.56	160.70	101.90	58.006	41.340	40.499	38.948	39.107	20.904	19.140	22.188
012	0.589	11.338	29.481	50.530	68.989	141.923	159.078	194.816	218.613	206.83	207.27	221.09	147.97	98.335	55.043	39.756	36.974	32.892	30.891	19.633	18.268	22.684
013	0.556	23.619	99.727	193.357	317.429	1,316.0	3,855.0	7,752.0	16,255.	12,781	13,618	10,243	3,923.0	3,355.0	2,913.0	2,211.0	2,135.0	2,017.0	1,858.0	1,343.0	1,243.2	1,090.5
014	0.329	23.691	109.466	192.908	319.168	1,275.0	3,993.0	8,362.0	109,385	90,054	72,742	53,863	35,910.	30,821.	17,701.	6,030.0	3,420.0	2,825.0	1,790.0	1,320.0	1,385.0	1,050.9
015	0.590	24.123	107.606	190.046	317.869	1,363.0	4,146.0	6,917.0	35,221.	26,604	25,524	16,383	7,370.0	5,876.0	3,077.0	2,265.0	2,208.0	2,131.0	1,864.0	1,383.0	1,455.0	1,065.0
016	0.650	24.718	107.606	187.592	320.132	1,504.0	4,231.0	8,247.0	19,809.	15,468	18,731	11,286	4,510.0	3,837.0	3,118.0	2,336.0	2,269.0	2,235.0	1,955.0	1,434.0	1,495.0	1,072.4
017	0.760	24.196	106.760	193.501	326.078	1,375.0	3,708.0	6,773.0	21,056.	16,516	14,743	11,363	5,176.0	4,372.0	2,959.0	2,237.0	2,160.0	2,071.0	1,842.0	1,360.0	1,418.0	1,009.7
018	0.714	19.684	90.835	168.638	281.756	1,041.0	2,542.0	4,753.5	20,133.	15,727	13,390	10,172	3,965.0	2,940.0	2,550.0	1,926.0	1,834.0	1,768.0	1,583.0	1,189.3	1,255.8	775.50
019	0.606	20.753	93.681	176.226	298.367	1,201.0	2,566.0	4,952.3	22,213.	16,698	15,739	11,495	4,931.0	3,973.0	2,781.0	1,918.0	1,840.0	1,766.0	1,541.0	1,209.0	1,254.6	737.30
034	0.700	0.719	0.544	0.830	0.739	0.698	0.467	0.790	0.410	0.630	0.711	0.811	0.660	0.680	0.822	0.659	0.615	0.659	0.769	0.622	0.550	0.995

	0	7.4	16.5	39.3	50.2	75.0	99.2			30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
020	1.0	27.7	48.8	138.0	158.7	211.8	438.7			379.4	386.0	428.0	262.6	247.0	179.9	142.3	139.6	138.0	138.9	98.7	98.8	91.4
021	0.9	27.3	52.6	149.0	178.4	235.4	414.0			365.8	385.5	389.0	268.5	246.6	180.6	139.8	141.5	147.0	153.0	98.7	96.5	96.6
022	0.3	28.2	52.2	142.0	170.9	246.0	577.1			500.5	516.5	448.0	273.1	239.6	181.2	139.0	141.8	146.7	149.9	97.7	96.2	90.0
023	0.4	27.8	50.6	140.0	166.1	221.8	507.2			436.5	520.7	453.0	283.0	238.4	184.7	143.7	145.7	151.0	154.8	100.4	99.4	95.5
024	0.3	28.1	50.9	139.0	158.8	216.1	445.0			391.8	403.9	410.0	286.7	238.2	186.4	140.4	139.4	142.1	143.5	94.6	99.2	89.2

Reference device **Mean value:** 0.66 **Expanded uncertainty (k=2):** ± 22.36 % (± 0.15nA)

Red values: greater than max limit	*Bias Conditions:*	*(1) V_{DS}=0V V_{GS}=+15V*	*(2) V_{DS}=+160V V_{GS}= 0V*	*(3) V_{DS}=0V V_{GS}= 0V*	*(4) V_{DS}=200V V_{GS}=-20V*	*(5) V_{DS}=0V V_{GS}=+12V*
Dark red Values: lower than min limits	*s/n's:*	*013,014,015,016,017*	*008,009,010,011,012*	*001,002,003,004,005*	*006,007,020,021,022,023,024*	*018,019*

Figure 10 IDSS @ VDS 200V, VGS 0V, Drain Current (off state) [nA] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:		10,000.0	[nA]

Parameter not listed in Manufacturer data sheet

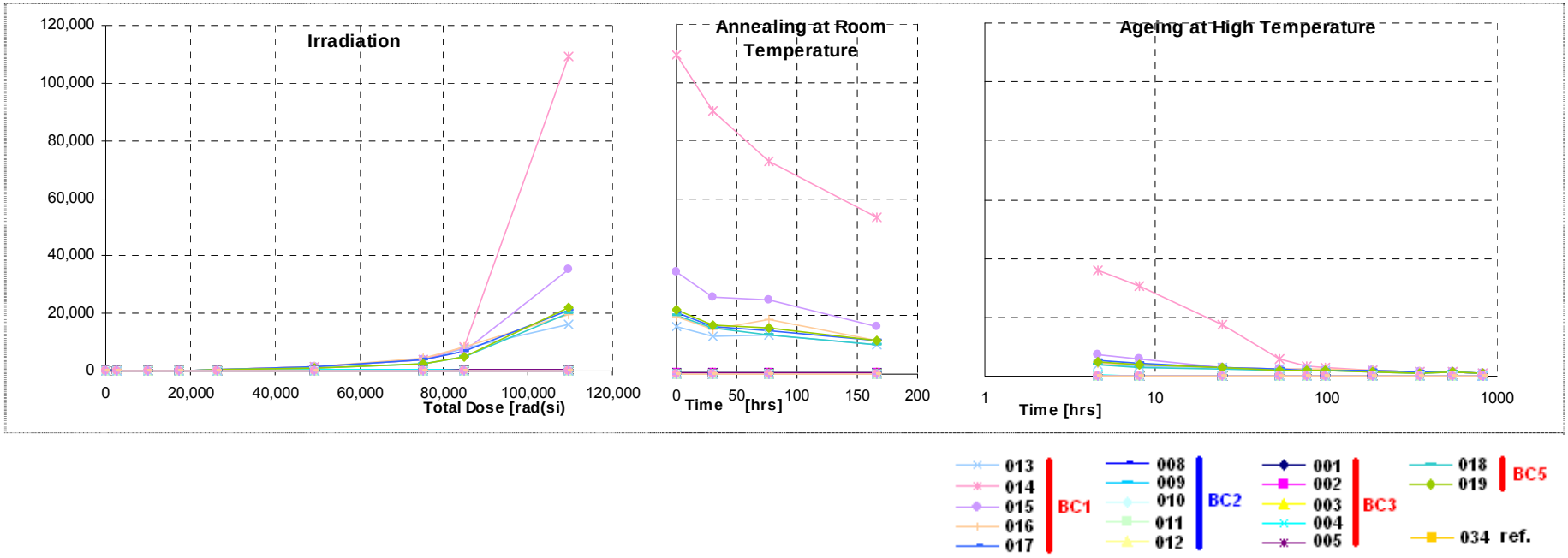


Figure 11 IDSS @ VDS 200V, VGS 0V, Drain Current (off state) [nA] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:		10,000.0	[nA]

Parameter not listed in Manufacturer data sheet

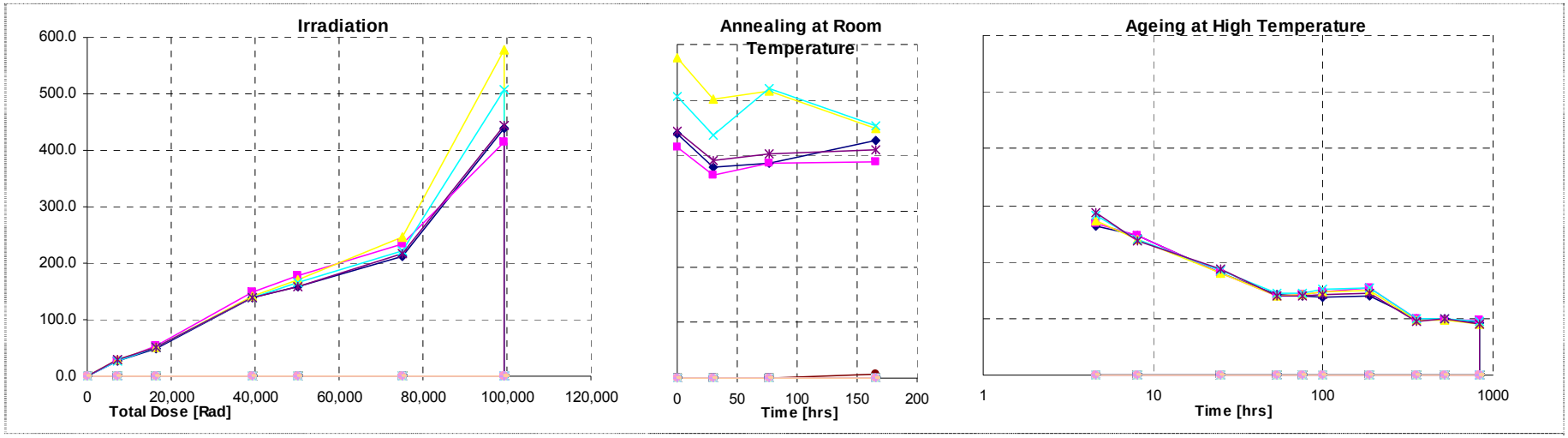


Table 11 VGS_th @ IDS 0.01 mA, Gate Threshold Voltage [mV] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:	2000	4,500.0	[mV]

Parameter not listed in Manufacturer data sheet

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs								
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
001	3,502.4	3,416.8	3,240.5	3,062.7	2,864.5	2,388.6	1,986.4	1,832.8	1,540.3	1,531.	1,521.	1,502.	1,958.4	2,055.8	2,191.9	2,294.2	2,326.1	2,341.2	2,397.4	2,515.2	2,564.2	2,631.4
002	3,511.9	3,418.5	3,245.6	3,059.6	2,854.8	2,387.2	1,985.1	1,817.8	1,539.6	1,529.	1,513.	1,495.	1,976.1	2,063.9	2,218.5	2,320.6	2,362.5	2,385.5	2,440.6	2,548.3	2,610.1	2,687.8
003	3,141.9	3,078.2	2,940.6	2,810.5	2,666.4	2,228.8	1,917.8	1,765.8	1,484.3	1,486.	1,469.	1,429.	1,878.8	1,969.8	2,104.6	2,186.7	2,229.9	2,242.9	2,291.7	2,386.8	2,435.1	2,494.3
004	3,533.0	3,434.6	3,271.5	3,087.6	2,891.6	2,399.3	2,003.3	1,847.8	1,554.1	1,547.	1,534.	1,516.	1,979.6	2,077.1	2,236.5	2,336.7	2,378.8	2,396.6	2,455.8	2,579.4	2,630.3	2,695.8
005	3,524.1	3,436.1	3,255.4	3,077.1	2,867.3	2,394.2	2,005.9	1,845.9	1,540.8	1,537.	1,524.	1,504.	1,949.9	2,046.9	2,195.5	2,292.6	2,340.6	2,363.2	2,422.9	2,533.6	2,572.6	2,651.6
006	3,521.4																					
007	3,527.1																					
008	3,480.0	3,403.9	3,221.8	3,035.5	2,837.4	2,361.0	1,940.4	1,787.4	1,487.0	1,478.	1,463.	1,445.	1,935.2	2,027.9	2,144.9	2,242.5	2,288.9	2,299.6	2,360.6	2,501.7	2,559.1	2,621.1
009	3,557.8	3,476.9	3,301.1	3,118.9	2,923.4	2,449.3	2,050.8	1,887.6	1,595.8	1,591.	1,574.	1,555.	2,011.9	2,094.7	2,211.3	2,313.3	2,347.4	2,366.9	2,443.0	2,573.5	2,627.5	2,684.8
010	3,508.8	3,432.4	3,247.1	3,071.9	2,860.6	2,345.8	1,974.8	1,805.1	1,497.5	1,496.	1,484.	1,460.	1,939.3	2,032.4	2,159.3	2,255.3	2,292.8	2,303.1	2,381.1	2,517.6	2,576.9	2,651.1
011	3,518.9	3,442.3	3,256.7	3,081.4	2,868.8	2,376.8	1,988.7	1,836.6	1,537.8	1,533.	1,521.	1,494.	1,951.5	2,043.8	2,167.9	2,258.9	2,304.5	2,317.1	2,393.1	2,532.7	2,587.8	2,655.6
012	3,506.1	3,439.6	3,253.5	3,063.9	2,856.4	2,372.1	1,981.7	1,825.3	1,508.4	1,515.	1,493.	1,463.	1,932.1	2,024.1	2,150.2	2,243.9	2,274.1	2,307.3	2,387.6	2,503.8	2,560.1	2,627.9
013	3,557.9	3,332.8	2,972.4	2,685.0	2,391.6	1,633.9	1,048.6	784.9	370.9	435.3	531.8	580.3	1,059.3	1,300.4	2,220.5	2,461.4	2,521.1	2,623.1	2,714.6	2,920.5	2,866.8	2,613.3
014	3,518.6	3,291.6	2,918.1	2,637.7	2,325.4	1,547.6	762.4	446.7	24.6	34.4	32.4	41.6	60.1	75.6	126.8	319.1	523.9	665.8	2,353.4	2,799.8	2,763.6	2,568.3
015	3,538.8	3,303.4	2,932.9	2,652.7	2,339.6	1,570.3	932.8	649.8	80.1	103.0	135.6	183.0	296.6	358.8	1,248.6	2,388.7	2,457.5	2,548.3	2,660.0	2,868.4	2,786.7	2,568.6
016	3,608.7	3,369.2	2,995.7	2,703.8	2,383.9	1,598.0	938.3	698.9	212.6	276.9	348.1	402.4	665.1	766.6	1,179.1	1,464.7	1,670.8	1,924.9	2,605.4	2,831.7	2,776.6	2,579.4
017	3,531.2	3,294.8	2,921.3	2,632.4	2,327.4	1,555.1	1,016.1	737.7	189.4	230.1	277.7	357.2	550.4	681.6	2,161.1	2,432.6	2,485.8	2,585.8	2,684.8	2,884.6	2,818.0	2,612.9
018	3,519.8	3,313.8	2,959.8	2,634.7	2,335.4	1,571.3	913.2	598.9	148.0	198.2	267.1	340.6	687.5	1,020.0	2,101.8	2,409.9	2,486.1	2,558.6	2,680.7	2,849.9	2,763.6	1,777.8
019	3,533.6	3,315.6	2,948.0	2,625.3	2,316.4	1,530.3	931.1	564.5	113.8	174.4	220.1	268.3	462.3	529.4	743.3	1,281.6	2,051.8	2,479.6	2,619.1	2,784.0	2,707.9	1,770.3
034	3,529.6	3,512.4	3,524.1	3,527.7	3,537.4	3,499.3	3,530.1	3,512.6	3,522.5	3,523.	3,513.	3,518.	3,526.9	3,522.9	3,514.0	3,530.9	3,529.4	3,532.7	3,517.5	3,533.8	3,519.3	3,520.3

	0	7.4	16.5	39.3	50.2	75.0	99.2			30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
020	3,544.2	3,208.2	2,890.4	2,130.5	1,793.5	1,211.3	601.9			643.8	658.8	690.1	995.4	1,022.6	1,127.3	1,277.6	1,358.6	1,435.6	1,629.9	1,784.1	1,862.6	1,993.8
021	3,535.8	3,206.6	2,879.9	2,140.3	1,800.3	1,216.0	648.0			683.2	695.9	738.3	1,176.3	1,230.3	1,393.8	1,543.6	1,607.0	1,637.0	1,751.1	1,921.2	2,004.2	2,117.9
022	3,454.8	3,120.3	2,790.2	2,030.0	1,685.2	1,076.7	523.6			565.4	565.9	624.6	1,039.8	1,097.1	1,243.9	1,397.8	1,448.3	1,489.9	1,614.1	1,777.3	1,866.5	1,992.9
023	3,506.7	3,157.6	2,827.1	2,067.9	1,745.5	1,144.6	562.3			605.7	611.6	650.3	1,051.9	1,124.0	1,248.3	1,401.4	1,467.0	1,512.1	1,631.7	1,798.6	1,893.8	2,013.4
024	3,547.6	3,202.8	2,878.9	2,126.4	1,801.8	1,211.5	612.1			648.8	663.3	700.9	1,000.8	1,047.7	1,182.1	1,436.6	1,514.6	1,556.6	1,683.0	1,840.9	1,916.1	2,051.8

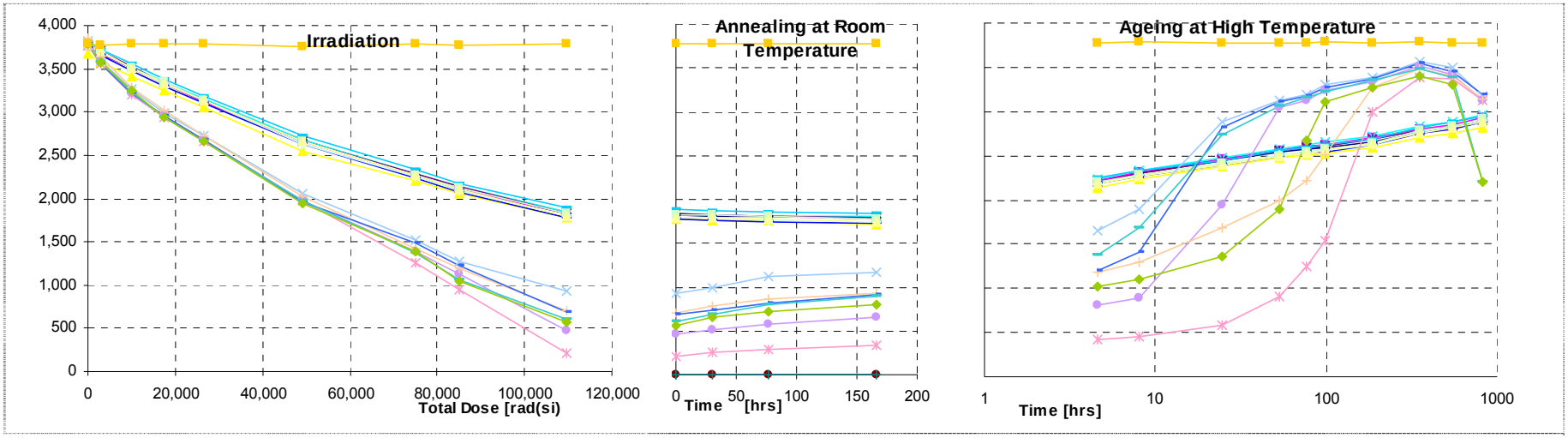
Reference device **Mean value:** 3 521.75 **Expanded uncertainty (k=2):** ± 0.33 % (± 11.69mV)

Red values: greater than max limit Dark red Values: lower than min limits	Bias Conditions: s/n's:	(1) V_{DS}=0V V_{GS}=+15V 013,014,015,016,017	(2) V_{DS}=+160V V_{GS}= 0V 008,009,010,011,012	(3) V_{DS}=0V V_{GS}= 0V 001,002,003,004,005	(4) V_{DS}=200V V_{GS}=-20V 006,007,020,021,022,023,024	(5) V_{DS}=0V V_{GS}=+12V 018,019

Figure 12 VGS_th @ IDS 0.01 mA, Gate Threshold Voltage [mV] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	*Min.*	*Max.*	*Unit*
Applicable limits:	**2000**	**4,500.0**	**[mV]**

Parameter not listed in Manufacturer data sheet



Time dependent effects were clearly visible during the ageing sequence affecting devices in Bias conditions BC1 and BC5.

Figure 13 VGS_th @ IDS 0.01 mA, Gate Threshold Voltage [mV] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	*Min.*	*Max.*	*Unit*
Applicable limits:	**2000**	**4,500.0**	**[mV]**

Parameter not listed in Manufacturer data sheet

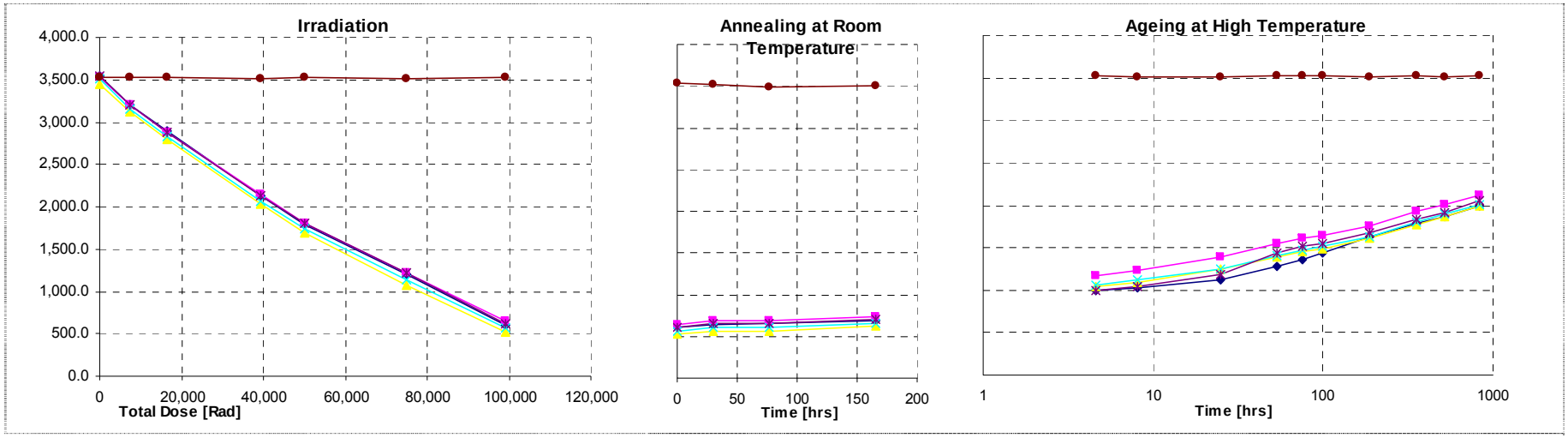


Table 12 VGS_th @ IDS 0.10 mA, Gate Threshold Voltage [mV] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:	2000	4,500.0	[mV]

Parameter not listed in Manufacturer data sheet

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs							
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
001	3,750.1	3,680.3	3,502.2	3,329.1	3,126.6	2,670.2	2,267.6	2,112.7	1,828.1	1,807.	1,810.	1,791.	2,206.3	2,297.5	2,439.8	2,539.3	2,575.1	2,598.3	2,653.4	2,768.6	2,821.0	2,890.8
002	3,754.1	3,669.4	3,503.4	3,323.6	3,125.9	2,661.0	2,266.0	2,114.0	1,828.6	1,818.	1,804.	1,777.	2,219.8	2,310.8	2,468.6	2,564.0	2,611.2	2,623.8	2,696.7	2,806.7	2,856.4	2,935.2
003	3,674.3	3,583.5	3,419.3	3,243.8	3,046.6	2,551.1	2,209.1	2,055.9	1,771.6	1,767.	1,753.	1,715.	2,137.6	2,231.1	2,376.5	2,474.2	2,515.6	2,530.8	2,590.6	2,705.1	2,752.2	2,824.4
004	3,783.7	3,693.9	3,531.4	3,348.5	3,150.0	2,677.0	2,288.5	2,140.4	1,841.8	1,830.	1,814.	1,801.	2,232.0	2,324.4	2,479.1	2,580.4	2,628.8	2,652.8	2,719.7	2,835.0	2,882.2	2,957.1
005	3,768.6	3,699.2	3,519.4	3,335.1	3,136.4	2,668.3	2,279.6	2,130.9	1,835.3	1,828.	1,812.	1,787.	2,200.8	2,296.1	2,447.3	2,551.4	2,591.2	2,607.3	2,680.5	2,791.4	2,833.0	2,902.7
006	3,773.3																					
007	3,781.4																					
008	3,734.6	3,659.9	3,483.6	3,303.2	3,098.3	2,632.8	2,234.6	2,073.5	1,772.4	1,761.	1,741.	1,727.	2,180.9	2,269.7	2,393.6	2,491.1	2,534.6	2,549.4	2,626.4	2,753.0	2,809.1	2,876.9
009	3,805.9	3,730.4	3,561.4	3,381.3	3,186.4	2,721.6	2,330.1	2,178.6	1,887.8	1,872.	1,857.	1,838.	2,252.5	2,328.8	2,453.3	2,550.9	2,588.7	2,616.2	2,690.8	2,822.8	2,887.3	2,947.9
010	3,774.3	3,684.4	3,509.5	3,327.6	3,131.8	2,628.7	2,256.3	2,091.3	1,794.6	1,786.	1,766.	1,743.	2,184.3	2,275.5	2,403.4	2,502.3	2,540.5	2,557.0	2,631.0	2,770.4	2,836.8	2,904.9
011	3,773.6	3,698.1	3,513.9	3,341.7	3,134.8	2,661.6	2,276.9	2,122.6	1,829.9	1,820.	1,801.	1,776.	2,200.3	2,282.2	2,409.1	2,501.7	2,538.4	2,569.2	2,641.0	2,781.3	2,841.0	2,914.1
012	3,770.8	3,694.9	3,508.4	3,329.9	3,130.8	2,655.1	2,263.5	2,104.3	1,797.4	1,791.	1,778.	1,749.	2,183.3	2,266.1	2,396.2	2,488.2	2,527.9	2,558.1	2,633.1	2,758.1	2,814.4	2,884.6
013	3,814.3	3,597.9	3,258.5	2,994.0	2,723.2	2,054.1	1,523.9	1,281.3	935.7	995.2	1,118.	1,172.	1,658.7	1,899.6	2,885.0	3,132.3	3,188.3	3,297.6	3,384.9	3,566.0	3,493.9	3,177.9
014	3,771.0	3,556.0	3,201.6	2,941.3	2,666.1	1,973.3	1,256.6	948.0	213.7	252.6	286.1	340.3	414.7	448.2	581.8	912.6	1,241.6	1,534.2	2,991.0	3,389.8	3,371.8	3,132.8
015	3,796.9	3,569.7	3,219.6	2,960.5	2,676.0	1,978.2	1,395.3	1,123.1	468.8	519.4	577.2	649.4	803.0	886.6	1,950.9	3,050.2	3,132.6	3,231.1	3,338.1	3,515.2	3,419.6	3,128.9
016	3,859.8	3,635.6	3,281.6	3,017.1	2,727.8	2,019.3	1,416.2	1,183.9	702.4	782.5	867.4	921.6	1,188.9	1,291.9	1,687.1	1,988.7	2,217.3	2,517.6	3,272.1	3,474.6	3,401.3	3,135.4
017	3,782.5	3,559.6	3,212.1	2,948.6	2,669.6	1,965.3	1,489.4	1,225.9	683.1	742.9	813.7	908.0	1,196.6	1,409.8	2,823.1	3,115.2	3,180.8	3,277.8	3,374.8	3,541.1	3,456.5	3,182.7
018	3,771.1	3,573.6	3,235.6	2,937.5	2,666.1	1,977.2	1,374.9	1,056.6	603.9	693.0	799.4	902.4	1,381.7	1,688.7	2,742.5	3,067.8	3,151.2	3,229.6	3,349.1	3,477.9	3,385.6	2,205.5
019	3,787.6	3,582.9	3,241.4	2,935.9	2,659.2	1,936.9	1,385.6	1,037.6	564.4	654.1	721.6	796.7	1,025.8	1,094.9	1,353.8	1,900.6	2,672.6	3,107.7	3,268.1	3,399.0	3,309.4	2,196.0
034	3,785.8	3,771.8	3,782.4	3,785.1	3,783.6	3,757.4	3,788.7	3,773.6	3,782.4	3,782.	3,768.	3,775.	3,778.8	3,785.7	3,768.4	3,779.9	3,775.8	3,781.8	3,773.6	3,790.3	3,778.2	3,778.6

	0	7.4	16.5	39.3	50.2	75.0	99.2			30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
020	3,804.7	3,477.8	3,155.4	2,432.6	2,107.0	1,536.9	936.9			936.87	971.9	996.1	1,378.8	1,415.8	1,549.2	1,692.6	1,769.3	1,827.4	1,977.4	2,116.7	2,200.9	2,317.8
021	3,795.0	3,465.4	3,152.9	2,437.4	2,110.6	1,548.3	974.6			974.56	1,015.	1,033.	1,510.1	1,577.1	1,739.3	1,886.0	1,938.3	1,971.4	2,076.8	2,232.4	2,324.8	2,415.6
022	3,716.3	3,375.1	3,059.4	2,326.5	1,994.0	1,414.6	846.9			846.93	881.8	891.3	1,368.4	1,432.9	1,597.2	1,733.6	1,792.0	1,823.0	1,933.8	2,093.6	2,177.7	2,291.3
023	3,757.5	3,417.7	3,097.6	2,369.1	2,054.7	1,469.9	889.8			889.81	927.7	937.3	1,386.1	1,452.9	1,606.8	1,746.3	1,812.9	1,851.3	1,958.5	2,121.6	2,203.1	2,306.3
024	3,799.7	3,464.8	3,144.0	2,427.5	2,108.6	1,532.5	946.6			946.62	980.1	1,001.	1,392.9	1,453.9	1,605.9	1,802.1	1,867.8	1,907.3	2,024.9	2,175.8	2,243.1	2,357.3

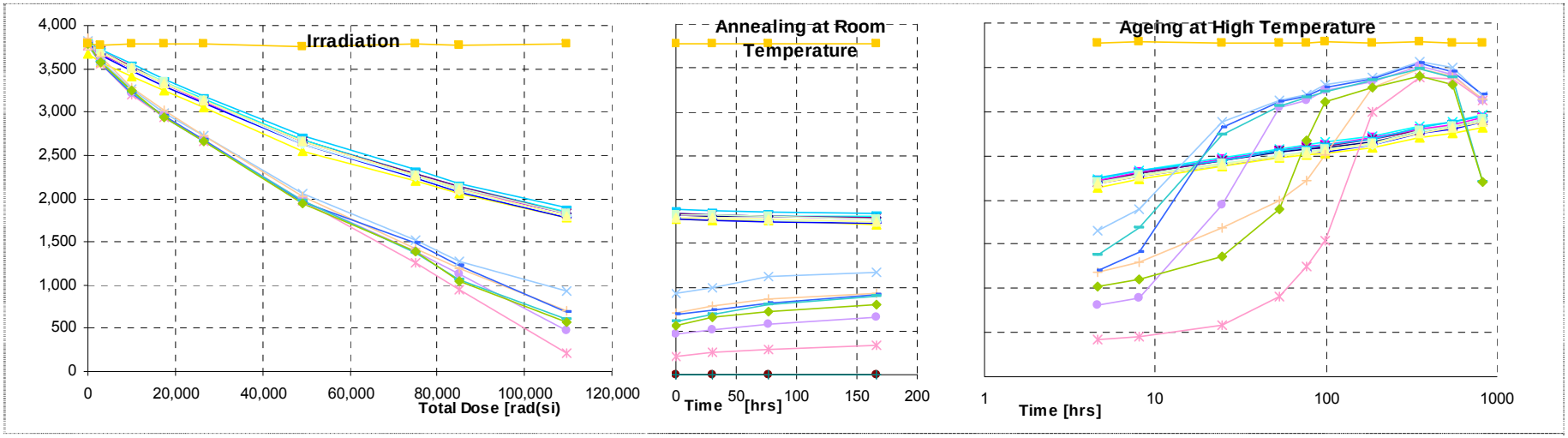
Reference device **Mean value:** 3 778.98 **Expanded uncertainty (k=2):** ± 0.26 % (± 9.79mV)

Red values: greater than max limit *Dark red Values: lower than min limits*	*Bias Conditions:* *s/n's:*	*(1) V_{DS}=0V V_{GS}=+15V* *013,014,015,016,017*	*(2) V_{DS}=+160V V_{GS}= 0V* *008,009,010,011,012*	*(3) V_{DS}=0V V_{GS}= 0V* *001,002,003,004,005*	*(4) V_{DS}=200V V_{GS}=-20V* *006,007,020,021,022,023,024*	*(5) V_{DS}=0V V_{GS}=+12V* *018,019*

Figure 14 VGS_th @ IDS 0.10 mA, Gate Threshold Voltage [mV] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	*Min.*	*Max.*	*Unit*
Applicable limits:	**2000**	**4,500.0**	**[mV]**

Parameter not listed in Manufacturer data sheet



Time dependent effects were clearly visible during the ageing sequence affecting devices in Bias conditions BC1 and BC5.

Figure 15 VGS_th @ IDS 0.10 mA, Gate Threshold Voltage [mV] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	*Min.*	*Max.*	*Unit*
Applicable limits:	**2000**	**4,500.0**	**[mV]**

Parameter not listed in Manufacturer data sheet

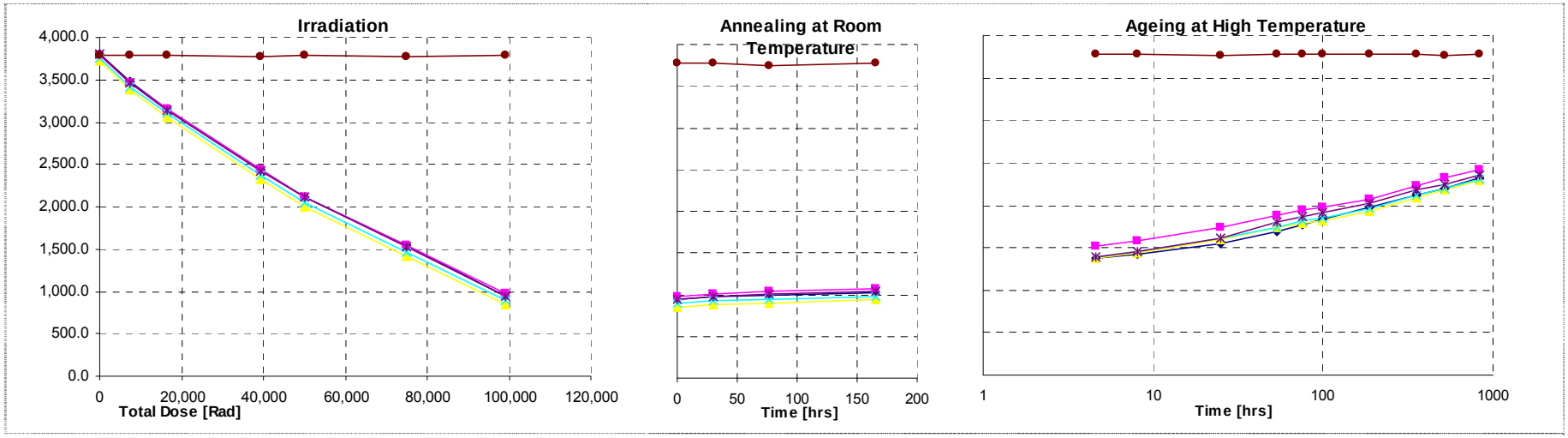


Table 13 VGS_th @ IDS 0.25 mA, Gate Threshold Voltage [mV] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:	2000	4,500.0	[mV]

Parameter not listed in Manufacturer data sheet

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs								
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
001	3,857.4	3,775.8	3,609.2	3,430.2	3,232.6	2,782.0	2,381.6	2,236.1	1,946.3	1,934.	1,924.	1,900.	2,310.3	2,397.6	2,541.3	2,640.3	2,673.9	2,697.8	2,755.0	2,869.1	2,921.3	2,997.1
002	3,854.9	3,772.1	3,603.0	3,431.9	3,232.6	2,774.6	2,386.1	2,226.5	1,947.8	1,941.	1,920.	1,894.	2,326.6	2,404.6	2,563.1	2,662.1	2,705.9	2,724.1	2,793.7	2,904.6	2,965.1	3,034.6
003	3,792.9	3,710.9	3,535.9	3,362.7	3,166.9	2,676.1	2,327.1	2,180.6	1,896.5	1,886.	1,878.	1,824.	2,246.7	2,334.3	2,483.8	2,579.4	2,618.1	2,636.9	2,703.3	2,813.1	2,863.6	2,935.1
004	3,885.1	3,801.1	3,635.4	3,451.6	3,257.7	2,797.3	2,408.7	2,254.3	1,971.1	1,959.	1,932.	1,924.	2,326.6	2,423.2	2,580.4	2,683.5	2,722.5	2,744.1	2,813.7	2,932.3	2,981.3	3,054.4
005	3,874.5	3,802.1	3,626.3	3,444.8	3,246.2	2,785.9	2,400.7	2,257.5	1,957.9	1,949.	1,934.	1,912.	2,302.6	2,396.3	2,541.8	2,644.8	2,682.6	2,713.1	2,784.2	2,881.8	2,935.6	3,010.9
006	3,881.6																					
007	3,878.6																					
008	3,840.6	3,757.5	3,588.3	3,406.8	3,209.7	2,746.1	2,350.8	2,186.4	1,895.9	1,880.	1,864.	1,844.	2,277.6	2,367.6	2,486.6	2,588.1	2,625.6	2,646.0	2,724.4	2,857.8	2,915.4	2,974.9
009	3,917.9	3,831.5	3,658.6	3,483.1	3,294.1	2,837.4	2,447.0	2,297.0	2,005.5	1,988.	1,980.	1,953.	2,355.8	2,431.6	2,554.7	2,645.7	2,690.4	2,714.9	2,795.1	2,927.8	2,983.3	3,049.2
010	3,875.4	3,788.9	3,617.4	3,435.4	3,232.3	2,748.5	2,375.6	2,213.2	1,914.9	1,903.	1,888.	1,864.	2,290.9	2,379.5	2,504.8	2,598.7	2,640.6	2,661.5	2,740.2	2,876.1	2,937.5	3,010.2
011	3,869.8	3,791.3	3,621.7	3,442.9	3,244.0	2,771.7	2,397.2	2,238.4	1,953.7	1,943.	1,919.	1,894.	2,295.7	2,379.0	2,504.8	2,602.3	2,637.5	2,662.4	2,744.8	2,884.5	2,946.4	3,010.2
012	3,866.1	3,793.6	3,618.3	3,431.4	3,237.8	2,770.6	2,376.9	2,218.8	1,925.9	1,912.	1,897.	1,863.	2,284.4	2,370.1	2,494.6	2,589.0	2,621.1	2,661.4	2,733.1	2,855.4	2,914.9	2,989.4
013	3,915.1	3,701.3	3,371.9	3,127.6	2,866.1	2,237.2	1,735.1	1,500.3	1,163.9	1,234.	1,356.	1,429.	1,935.8	2,179.7	3,210.1	3,482.1	3,543.6	3,650.5	3,738.0	3,907.9	3,828.0	3,453.2
014	3,866.9	3,661.5	3,322.3	3,071.6	2,805.8	2,148.4	1,481.1	1,180.7	421.3	460.4	503.3	564.9	651.4	689.9	846.3	1,236.4	1,681.1	2,036.4	3,327.6	3,694.2	3,674.8	3,414.7
015	3,892.0	3,672.4	3,335.6	3,087.3	2,819.2	2,150.8	1,602.9	1,330.2	694.7	751.9	815.9	894.7	1,068.8	1,156.4	2,325.9	3,365.9	3,467.5	3,564.6	3,670.9	3,854.1	3,751.3	3,414.9
016	3,960.1	3,741.7	3,397.1	3,142.4	2,867.5	2,197.8	1,618.1	1,389.6	926.5	999.7	1,096.	1,156.	1,436.3	1,546.6	1,943.3	2,254.2	2,508.4	2,835.9	3,625.1	3,817.6	3,732.4	3,427.9
017	3,881.5	3,666.0	3,330.1	3,079.3	2,805.8	2,153.0	1,690.5	1,435.8	936.3	994.9	1,080.	1,179.	1,516.9	1,763.0	3,137.0	3,456.6	3,524.8	3,618.9	3,728.7	3,883.0	3,789.0	3,469.0
018	3,873.6	3,682.4	3,351.5	3,068.7	2,804.3	2,150.0	1,573.7	1,263.6	829.5	935.7	1,043.	1,153.	1,708.3	2,000.0	3,053.7	3,387.3	3,473.3	3,567.3	3,675.0	3,805.9	3,700.6	2,405.8
019	3,885.5	3,687.6	3,356.2	3,060.4	2,795.6	2,114.4	1,585.2	1,237.6	785.3	882.9	961.6	1,034.	1,306.9	1,388.8	1,667.1	2,240.5	2,994.4	3,444.9	3,624.4	3,746.4	3,648.0	2,395.1
034	3,886.6	3,872.8	3,883.6	3,881.7	3,888.7	3,863.9	3,883.1	3,877.3	3,881.8	3,881.	3,868.	3,874.	3,876.6	3,887.3	3,867.9	3,877.4	3,878.8	3,878.9	3,877.0	3,889.8	3,877.5	3,878.3

	0	7.4	16.5	39.3	50.2	75.0	99.2			30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
020	3,904.6	3,579.2	3,268.3	2,557.4	2,237.7	1,675.8	1,081.1			1,120.	1,138.	1,172.	1,532.5	1,577.5	1,723.5	1,867.4	1,935.5	1,988.4	2,119.4	2,266.5	2,331.8	2,444.1
021	3,897.1	3,576.6	3,271.1	2,565.9	2,248.1	1,686.2	1,114.8			1,157.	1,174.	1,217.	1,658.7	1,717.9	1,897.2	2,030.8	2,081.6	2,114.6	2,216.4	2,369.0	2,449.8	2,545.8
022	3,813.7	3,487.7	3,167.0	2,449.9	2,125.9	1,550.9	984.8			1,020.	1,039.	1,091.	1,508.6	1,576.6	1,742.9	1,882.0	1,932.9	1,963.8	2,073.6	2,226.1	2,310.8	2,415.6
023	3,858.2	3,527.4	3,212.4	2,501.9	2,180.2	1,609.2	1,032.6			1,069.	1,078.	1,126.	1,539.8	1,600.1	1,757.0	1,897.6	1,958.6	1,991.3	2,100.5	2,254.2	2,333.3	2,444.3
024	3,899.9	3,569.8	3,259.5	2,558.9	2,245.3	1,681.3	1,089.6			1,126.	1,146.	1,185.	1,555.7	1,616.9	1,775.8	1,956.1	2,022.8	2,059.6	2,163.7	2,309.8	2,381.1	2,488.3

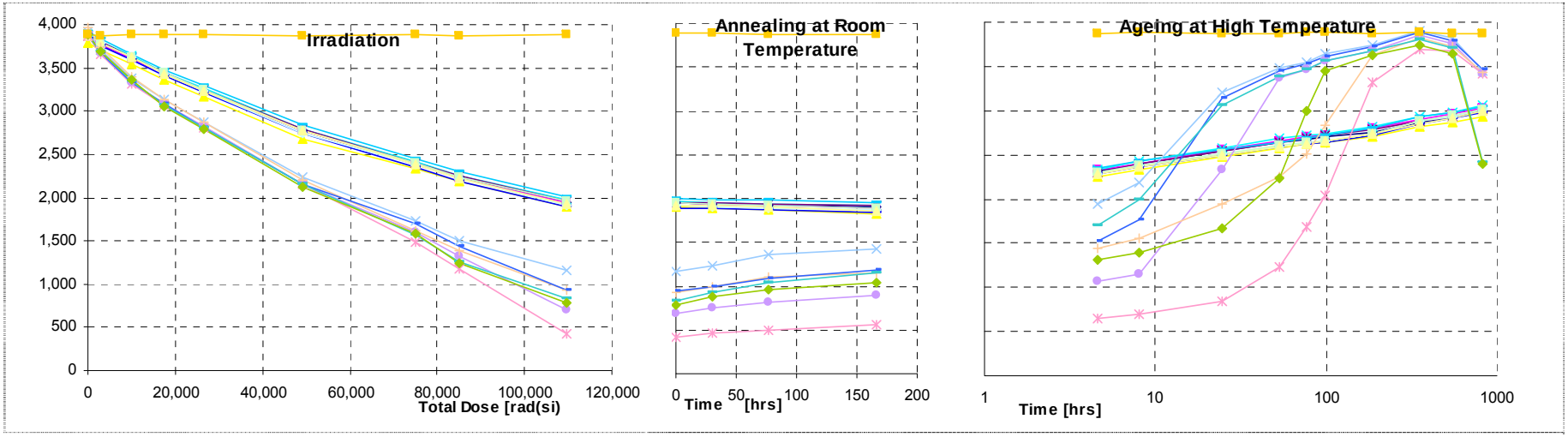
Reference device **Mean value:** 3 879.94 **Expanded uncertainty (k=2):** ± 0.2 % (± 7.64mV)

Red values: greater than max limit	*Bias Conditions:*	*(1) V_{DS}=0V V_{GS}=+15V*	*(2) V_{DS}=+160V V_{GS}= 0V*	*(3) V_{DS}=0V V_{GS}= 0V*	*(4) V_{DS}=200V V_{GS}=-20V*	*(5) V_{DS}=0V V_{GS}=+12V*
Dark red Values: lower than min limits	*s/n's:*	*013,014,015,016,017*	*008,009,010,011,012*	*001,002,003,004,005*	*006,007,020,021,022,023,024*	*018,019*

Figure 16 VGS_th @ IDS 0.25 mA, Gate Threshold Voltage [mV] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	*Min.*	*Max.*	*Unit*
Applicable limits:	**2000**	**4,500.0**	**[mV]**

Parameter not listed in Manufacturer data sheet



Time dependent effects were clearly visible during the ageing sequence affecting devices in Bias conditions BC1 and BC5.

Figure 17 VGS_th @ IDS 0.25 mA, Gate Threshold Voltage [mV] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	*Min.*	*Max.*	*Unit*
Applicable limits:	**2000**	**4,500.0**	**[mV]**

Parameter not listed in Manufacturer data sheet

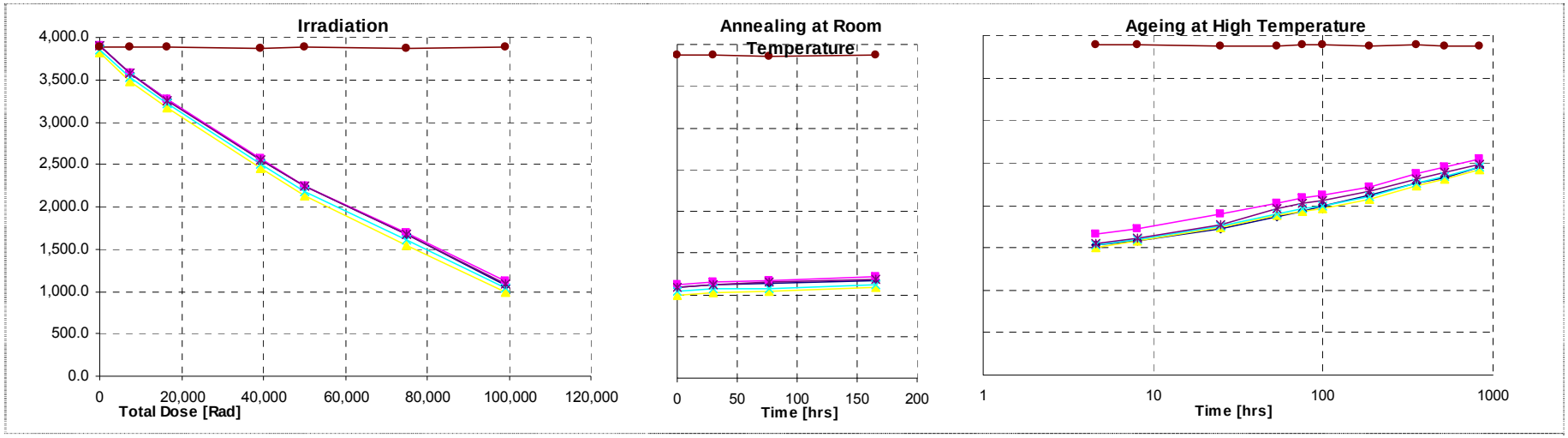


Table 14 VGS_th @ IDS 1.0 mA, Gate Threshold Voltage [mV] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	*Min.*	*Max.*	*Unit*
Applicable limits:	**2000**	**4,500.0**	**[mV]**

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs								
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
001	4,008.6	3,931.4	3,766.6	3,585.1	3,394.3	2,948.4	2,564.1	2,413.2	2,130.8	2,117.	2,105.	2,079.	2,460.4	2,547.1	2,693.3	2,793.4	2,825.4	2,849.1	2,907.4	3,023.4	3,076.6	3,142.8
002	4,003.4	3,925.2	3,761.2	3,589.4	3,387.4	2,950.5	2,561.3	2,411.9	2,137.6	2,118.	2,099.	2,081.	2,476.3	2,554.4	2,712.3	2,809.8	2,857.4	2,881.2	2,947.1	3,062.5	3,114.3	3,193.4
003	3,953.4	3,871.3	3,695.4	3,529.6	3,330.1	2,847.3	2,509.6	2,358.6	2,083.4	2,066.	2,053.	2,014.	2,397.7	2,485.3	2,636.8	2,729.6	2,771.9	2,794.8	2,859.9	2,969.0	3,021.9	3,093.0
004	4,032.3	3,950.6	3,788.1	3,611.4	3,420.4	2,968.0	2,581.1	2,432.9	2,151.6	2,140.	2,119.	2,097.	2,480.4	2,566.3	2,731.5	2,832.7	2,877.8	2,893.7	2,964.1	3,084.4	3,141.4	3,210.1
005	4,028.2	3,951.9	3,778.9	3,605.6	3,411.6	2,954.6	2,578.6	2,435.2	2,147.4	2,134.	2,114.	2,087.	2,456.3	2,538.9	2,696.6	2,795.9	2,839.6	2,860.9	2,932.2	3,041.0	3,089.5	3,162.9
006	4,028.5																					
007	4,037.3																					
008	3,989.8	3,914.9	3,738.3	3,570.0	3,370.5	2,921.3	2,523.7	2,369.6	2,083.2	2,063.	2,048.	2,025.	2,435.6	2,511.5	2,634.6	2,730.3	2,778.1	2,795.8	2,879.3	3,008.7	3,070.3	3,134.9
009	4,059.9	3,982.9	3,822.6	3,646.7	3,453.8	3,016.7	2,620.5	2,475.8	2,195.4	2,173.	2,158.	2,134.	2,508.4	2,578.8	2,702.3	2,793.1	2,831.0	2,864.4	2,951.1	3,081.4	3,140.9	3,202.0
010	4,023.3	3,940.8	3,771.3	3,596.4	3,401.5	2,920.9	2,559.7	2,394.1	2,104.3	2,091.	2,072.	2,046.	2,441.2	2,526.4	2,655.4	2,751.6	2,787.3	2,806.9	2,894.5	3,027.9	3,092.1	3,171.3
011	4,017.4	3,948.2	3,775.6	3,598.2	3,409.3	2,950.0	2,575.6	2,421.2	2,141.1	2,123.	2,099.	2,080.	2,447.1	2,523.9	2,650.5	2,747.1	2,787.1	2,815.8	2,898.4	3,036.3	3,095.8	3,166.2
012	4,021.8	3,949.1	3,772.5	3,598.3	3,400.1	2,946.0	2,554.2	2,400.3	2,110.0	2,092.	2,075.	2,045.	2,431.3	2,518.0	2,642.1	2,731.9	2,769.7	2,806.1	2,896.0	3,009.3	3,072.1	3,139.6
013	4,063.8	3,867.8	3,550.9	3,317.8	3,072.6	2,492.0	2,035.8	**1,809.9**	**1,517.5**	**1,588.**	**1,730.**	**1,798.**	2,344.1	2,573.0	3,638.9	3,913.6	3,982.6	4,088.0	4,175.0	4,319.9	4,231.8	3,822.2
014	4,019.8	3,822.8	3,497.6	3,264.0	3,011.6	2,408.1	**1,813.1**	**1,540.9**	**827.7**	**873.4**	**916.5**	**989.2**	**1,106.4**	**1,157.5**	**1,350.6**	**1,911.4**	2,651.1	3,110.5	3,850.9	4,131.6	4,088.8	3,772.9
015	4,040.8	3,838.8	3,514.6	3,275.5	3,026.0	2,412.8	**1,910.0**	**1,650.9**	**1,106.0**	**1,161.**	**1,237.**	**1,316.**	**1,552.6**	**1,681.8**	2,993.6	3,782.7	3,879.2	3,972.1	4,088.6	4,248.2	4,139.5	3,774.2
016	4,109.5	3,903.6	3,581.2	3,338.8	3,080.0	2,460.7	**1,923.9**	**1,702.2**	**1,276.9**	**1,359.**	**1,461.**	**1,527.**	**1,849.0**	**1,969.6**	2,409.6	2,763.9	3,059.1	3,421.3	4,056.7	4,233.9	4,146.6	3,797.3
017	4,031.4	3,828.1	3,504.6	3,265.8	3,016.4	2,414.9	**1,998.6**	**1,757.1**	**1,328.9**	**1,408.**	**1,500.**	**1,611.**	2,061.6	2,321.3	3,547.1	3,866.9	3,939.7	4,038.9	4,143.3	4,292.2	4,188.8	3,832.6
018	4,026.5	3,842.0	3,525.8	3,248.7	3,005.8	2,398.3	**1,870.4**	**1,566.5**	**1,186.3**	**1,306.**	**1,431.**	**1,556.**	2,192.1	2,442.4	3,484.4	3,812.8	3,900.8	3,984.8	4,090.5	4,206.4	4,086.9	2,683.6
019	4,039.4	3,854.8	3,526.1	3,252.8	3,001.9	2,373.2	**1,885.1**	**1,547.2**	**1,137.4**	**1,251.**	**1,355.**	**1,440.**	**1,819.3**	**1,918.9**	2,306.1	2,927.3	3,542.3	3,885.9	4,072.8	4,179.3	4,068.1	2,681.2
034	4,036.4	4,020.7	4,030.9	4,034.3	4,040.9	4,008.1	4,040.8	4,033.6	4,035.9	4,033.	4,024.	4,024.	4,034.9	4,037.1	4,022.6	4,029.5	4,029.8	4,035.4	4,027.9	4,040.0	4,026.5	4,031.6

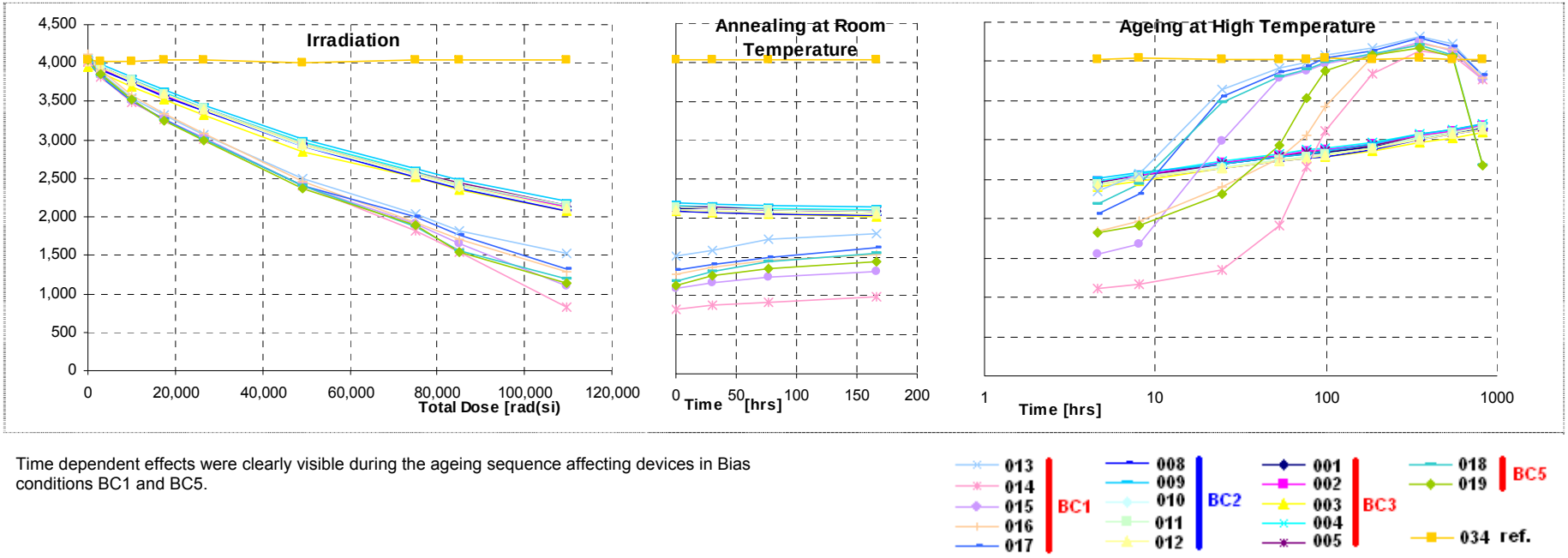
	0	7.4	16.5	39.3	50.2	75.0	99.2			30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
020	4,057.4	3,745.1	3,440.9	2,753.2	2,446.3	**1,893.9**	**1,301.4**			**1,347.**	**1,369.**	**1,405.**	**1,785.8**	**1,830.8**	**1,994.3**	2,128.2	2,192.3	2,234.3	2,348.4	2,477.6	2,549.4	2,643.2
021	4,047.8	3,740.3	3,435.0	2,758.9	2,449.8	**1,904.1**	**1,342.1**			**1,375.**	**1,396.**	**1,447.**	**1,890.5**	**1,947.4**	2,127.6	2,262.3	2,306.2	2,334.8	2,435.8	2,573.5	2,647.9	2,734.5
022	3,966.6	3,649.0	3,340.3	2,644.1	2,331.0	**1,766.3**	**1,206.2**			**1,246.**	**1,252.**	**1,309.**	**1,733.9**	**1,800.2**	**1,976.1**	2,105.1	2,158.9	2,185.0	2,289.9	2,431.8	2,506.4	2,604.6
023	4,011.6	3,693.9	3,383.9	2,692.7	2,384.9	**1,822.4**	**1,248.0**			**1,282.**	**1,296.**	**1,350.**	**1,763.7**	**1,827.1**	**1,999.5**	2,136.4	2,186.8	2,220.7	2,315.8	2,464.8	2,535.5	2,628.1
024	4,048.9	3,735.5	3,435.3	2,749.9	2,441.4	**1,893.3**	**1,320.9**			**1,341.**	**1,370.**	**1,414.**	**1,798.6**	**1,869.4**	2,042.3	2,203.3	2,258.7	2,290.0	2,390.2	2,522.2	2,593.7	2,689.7

Reference device **Mean value:** **4 031.29** **Expanded uncertainty (k=2):** **± 0.26 % (± 10.59mV)**

Red values: greater than max limit ***Dark red Values: lower than min limits***	*Bias Conditions:* *s/n's:*	*(1) V_{DS}=0V V_{GS}=+15V* *013,014,015,016,017*	*(2) V_{DS}=+160V V_{GS}= 0V* *008,009,010,011,012*	*(3) V_{DS}=0V V_{GS}= 0V* *001,002,003,004,005*	*(4) V_{DS}=200V V_{GS}=-20V* *006,007,020,021,022,023,024*	*(5) V_{DS}=0V V_{GS}=+12V* *018,019*

Figure 18 VGS_th @ IDS 1.0 mA, Gate Threshold Voltage [mV] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	*Min.*	*Max.*	*Unit*
Applicable limits:	**2000**	**4,500.0**	**[mV]**



Time dependent effects were clearly visible during the ageing sequence affecting devices in Bias conditions BC1 and BC5.

Figure 19 VGS_th @ IDS 1.0 mA, Gate Threshold Voltage [mV] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	*Min.*	*Max.*	*Unit*
Applicable limits:	**2000**	**4,500.0**	**[mV]**

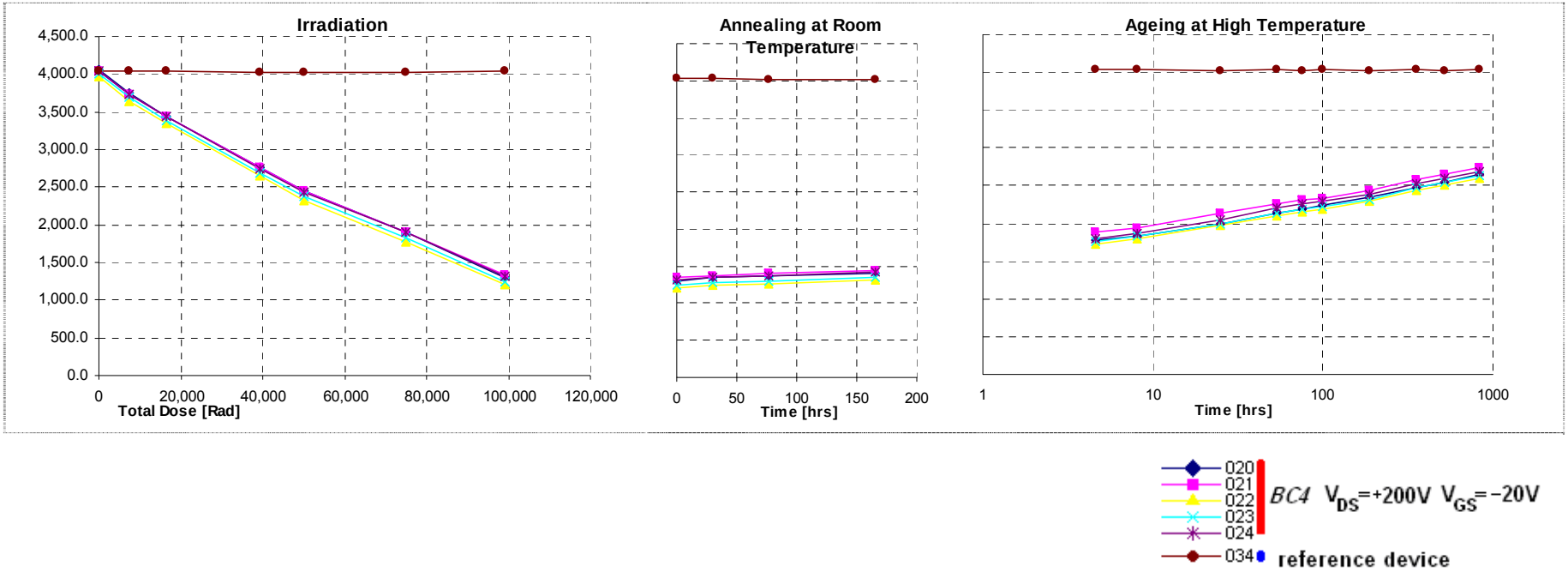


Table 15 RDS(on) Drain-Source On-Resistance [mOhm] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	*Min.*	*Max.*	*Unit*
Applicable limits:	**0**	**44.0**	**[mOhm]**

Test conditions deviate from data sheet requirements due to test equipment limitation. Applied Test Conditions: V_G = 10V, I_D=40A

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs								
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
001	46.0	46.0	45.0	45.0	45.0	46.0	46.0	46.0	46.0	46.0	45.0	46.0	45.0	45.0	45.0	44.0	45.0	45.0	46.0	45.0	45.0	44.0
002	48.0	48.0	47.0	47.0	47.0	48.0	47.0	48.0	47.0	47.0	47.0	48.0	47.0	46.0	46.0	46.0	46.0	47.0	48.0	47.0	47.0	46.0
003	46.0	47.0	46.0	46.0	45.0	48.0	45.0	46.0	46.0	45.0	46.0	47.0	46.0	45.0	45.0	45.0	45.0	46.0	46.0	45.0	45.0	45.0
004	46.0	46.0	46.0	46.0	46.0	47.0	46.0	46.0	46.0	46.0	47.0	47.0	46.0	45.0	46.0	45.0	45.0	46.0	47.0	45.0	46.0	45.0
005	46.0	47.0	45.0	47.0	45.0	46.0	45.0	45.0	46.0	45.0	45.0	46.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	46.0	45.0	44.0
006	44.0																					
007	45.0																					
008	46.0	46.0	45.0	45.0	45.0	46.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	44.0	45.0	44.0	45.0	45.0	46.0	45.0	45.0	45.0
009	45.0	46.0	45.0	44.0	44.0	45.0	44.0	45.0	45.0	44.0	44.0	45.0	44.0	44.0	44.0	44.0	44.0	45.0	45.0	44.0	44.0	44.0
010	45.0	45.0	44.0	44.0	44.0	46.0	44.0	45.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	45.0	45.0	44.0	44.0	43.0
011	48.0	47.0	47.0	47.0	46.0	48.0	46.0	47.0	46.0	46.0	46.0	47.0	46.0	46.0	46.0	46.0	46.0	47.0	48.0	46.0	46.0	46.0
012	47.0	46.0	46.0	46.0	46.0	47.0	46.0	46.0	46.0	46.0	46.0	46.0	45.0	45.0	45.0	45.0	46.0	46.0	46.0	45.0	45.0	45.0
013	45.0	45.0	46.0	45.0	44.0	46.0	44.0	45.0	45.0	45.0	45.0	45.0	45.0	44.0	45.0	45.0	45.0	46.0	46.0	45.0	45.0	45.0
014	48.0	47.0	48.0	47.0	47.0	48.0	47.0	48.0	47.0	47.0	48.0	48.0	49.0	48.0	49.0	49.0	50.0	50.0	51.0	49.0	50.0	49.0
015	45.0	45.0	45.0	44.0	44.0	46.0	44.0	45.0	45.0	45.0	45.0	45.0	46.0	46.0	46.0	46.0	47.0	47.0	47.0	46.0	47.0	46.0
016	43.0	43.0	43.0	42.0	42.0	44.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	44.0	44.0	44.0	43.0	43.0
017	47.0	47.0	47.0	46.0	46.0	48.0	46.0	47.0	47.0	47.0	47.0	47.0	48.0	47.0	49.0	48.0	49.0	49.0	50.0	48.0	49.0	48.0
018	47.0	47.0	47.0	46.0	46.0	48.0	47.0	47.0	47.0	47.0	47.0	48.0	48.0	48.0	49.0	48.0	48.0	49.0	49.0	48.0	49.0	47.0
019	47.0	47.0	47.0	47.0	47.0	48.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	48.0	48.0	47.0	47.0	46.0
034	45.0	46.0	45.0	45.0	45.0	46.0	45.0	46.0	46.0	46.0	46.0	46.0	46.0	45.0	46.0	46.0	46.0	45.0	46.0	45.0	46.0	46.0

	0	7.4	16.5	39.3	50.2	75.0	99.2			30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
020	46.0	45.0	44.0	45.0	45.0	45.0	45.0			45.0	45.0	46.0	44.0	44.0	45.0	44.0	44.0	45.0	45.0	44.0	44.0	44.0
021	44.0	44.0	43.0	44.0	45.0	44.0	44.0			44.0	44.0	44.0	43.0	43.0	43.0	43.0	43.0	44.0	44.0	43.0	43.0	43.0
022	46.0	46.0	45.0	46.0	46.0	46.0	48.0			46.0	46.0	46.0	45.0	45.0	45.0	45.0	45.0	46.0	46.0	45.0	45.0	45.0
023	45.0	45.0	44.0	45.0	45.0	45.0	45.0			45.0	46.0	46.0	44.0	44.0	44.0	44.0	44.0	45.0	45.0	44.0	44.0	44.0
024	46.0	46.0	45.0	46.0	46.0	46.0	45.0			45.0	46.0	46.0	45.0	45.0	45.0	45.0	45.0	46.0	46.0	45.0	45.0	45.0

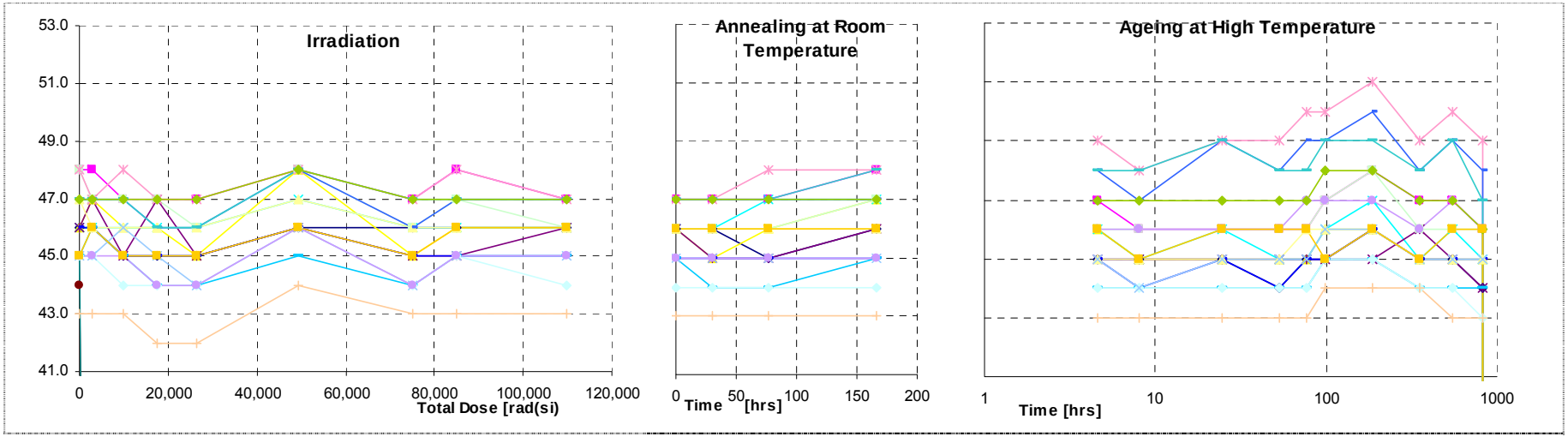
Reference device **Mean value:** **45.4** **Expanded uncertainty (k=2):** **± 1.17 %**

Red values: greater than max limit ***Dark red Values: lower than min limits***	*Bias Conditions:* *s/n's:*	*(1) V_{DS}=0V V_{GS}=+15V* *013,014,015,016,017*	*(2) V_{DS}=+160V V_{GS}= 0V* *008,009,010,011,012*	*(3) V_{DS}=0V V_{GS}= 0V* *001,002,003,004,005*	*(4) V_{DS}=200V V_{GS}=-20V* *006,007,020,021,022,023,024*	*(5) V_{DS}=0V V_{GS}=+12V* *018,019*

Figure 20 RDS(on) Drain-Source On-Resistance [mOhm] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	*Min.*	*Max.*	*Unit*
Applicable limits:	**0**	**44.0**	**[mOhm]**

Test conditions deviate from data sheet requirements due to test equipment limitation. Applied Test Conditions: V_G = 10V, I_D=40A



Test conditions deviate from data sheet requirements due to test equipment limitation. The Applied Test Conditions are: V_G = 10V, I_D=40A.

No evidence of parameter trend versus TID and/or Bias conditions and time was found.

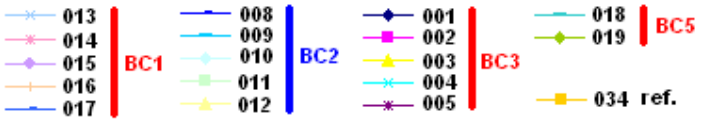
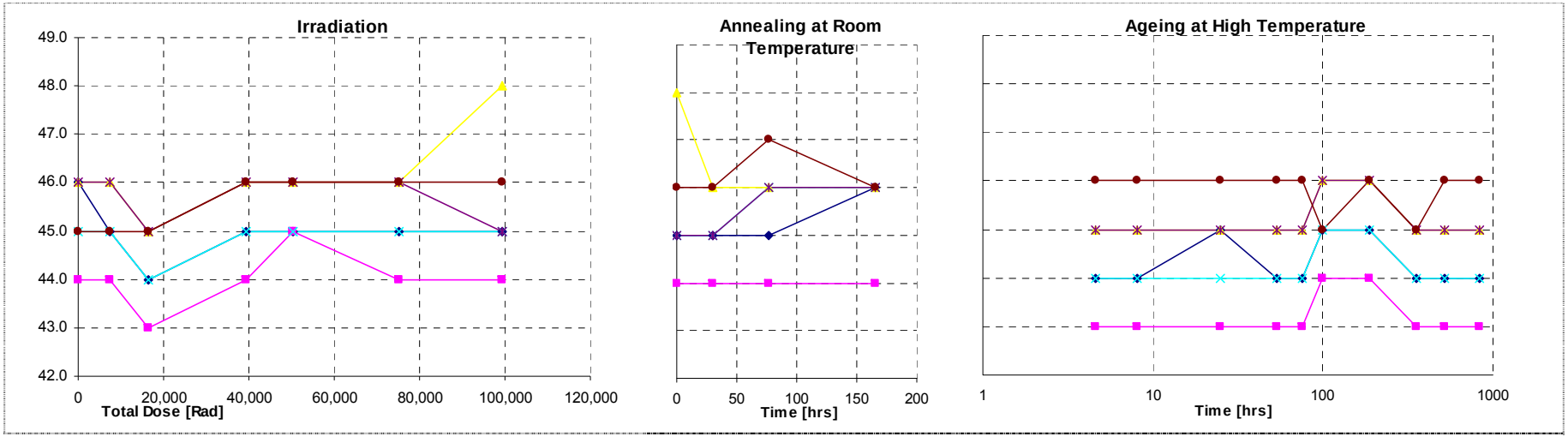


Figure 21 RDS(on) Drain-Source On-Resistance [mOhm] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:	0	44.0	[mOhm]

Test conditions deviate from data sheet requirements due to test equipment limitation. Applied Test Conditions: V_G = 10V, I_D=40A



Test conditions deviate from data sheet requirements due to test equipment limitation. The Applied Test Conditions are: V_G = 10V, I_D=40A.

No evidence of parameter trend versus TID and/or Bias conditions and time was found.

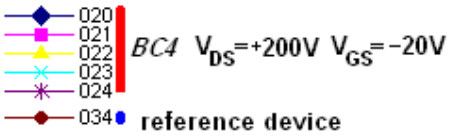


Table 16 VSD(on) Inverse Diode Forward Voltage [mV] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:		1500.0	[mV]

Parameter not listed in Manufacturer data sheet

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs							
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
001	1,063.8	1,064.4	1,057.7	1,055.1	1,055.2	1,048.3	1,074.9	1,047.6	1,040.3	1,050.	1,048.	1,045.	1,045.4	1,040.3	1,045.4	1,040.9	1,052.9	1,050.8	1,046.3	1,046.9	1,049.9	1,056.6
002	1,064.7	1,067.2	1,066.3	1,060.6	1,054.4	1,054.4	1,081.1	1,060.0	1,044.3	1,057.	1,056.	1,048.	1,054.0	1,044.3	1,057.9	1,045.4	1,052.8	1,053.0	1,056.3	1,057.0	1,044.9	1,054.6
003	1,065.4	1,065.0	1,057.2	1,057.1	1,050.1	1,041.6	1,053.2	1,047.6	1,044.4	1,048.	1,052.	1,042.	1,046.7	1,043.1	1,050.4	1,037.7	1,050.5	1,049.5	1,050.0	1,046.4	1,052.7	1,052.0
004	1,065.5	1,058.8	1,062.5	1,063.8	1,057.8	1,048.1	1,057.0	1,055.5	1,042.3	1,057.	1,041.	1,051.	1,052.0	1,044.4	1,057.3	1,045.6	1,056.7	1,062.3	1,052.2	1,052.7	1,059.2	1,057.9
005	1,071.4	1,067.5	1,068.0	1,067.1	1,062.6	1,061.1	1,062.4	1,051.6	1,046.7	1,061.	1,050.	1,049.	1,048.7	1,045.1	1,050.9	1,042.3	1,056.8	1,058.2	1,048.6	1,087.9	1,052.0	1,054.3
006	1,060.6																					
007	1,069.7																					
008	1,062.4	1,059.6	1,061.6	1,059.0	1,061.7	1,043.9	1,065.3	1,047.0	1,042.4	1,053.	1,038.	1,052.	1,048.0	1,043.0	1,050.3	1,038.4	1,051.1	1,051.2	1,047.9	1,051.6	1,052.6	1,052.5
009	1,072.4	1,066.9	1,059.4	1,064.8	1,054.5	1,045.5	1,061.8	1,047.4	1,041.8	1,062.	1,039.	1,048.	1,047.6	1,042.3	1,054.0	1,038.8	1,056.8	1,050.9	1,048.3	1,050.4	1,055.8	1,056.8
010	1,059.4	1,061.3	1,054.2	1,052.2	1,052.0	1,041.4	1,051.3	1,045.0	1,033.9	1,049.	1,038.	1,043.	1,045.5	1,035.2	1,043.9	1,033.8	1,050.5	1,046.2	1,037.9	1,047.4	1,050.4	1,050.2
011	1,084.3	1,066.5	1,068.6	1,056.6	1,061.8	1,050.3	1,060.0	1,047.5	1,042.0	1,054.	1,041.	1,054.	1,055.4	1,048.2	1,049.8	1,045.5	1,057.9	1,055.2	1,048.5	1,056.8	1,049.4	1,058.1
012	1,063.0	1,063.9	1,066.0	1,059.2	1,067.8	1,053.6	1,066.2	1,047.6	1,044.7	1,063.	1,048.	1,046.	1,048.4	1,039.5	1,050.3	1,040.9	1,055.3	1,054.5	1,050.8	1,047.5	1,055.4	1,057.1
013	1,070.6	1,062.3	1,088.8	1,061.4	1,060.5	1,051.1	1,055.1	1,047.4	1,054.5	1,050.	1,049.	1,056.	1,069.8	1,057.7	1,070.7	1,062.0	1,078.3	1,077.2	1,069.3	1,077.1	1,071.5	1,069.9
014	1,072.7	1,068.8	1,068.8	1,065.3	1,060.1	1,059.9	1,069.8	1,056.7	1,050.5	1,057.	1,049.	1,054.	1,070.8	1,061.7	1,073.1	1,063.5	1,076.6	1,076.4	1,072.7	1,076.7	1,076.7	1,071.2
015	1,071.6	1,066.0	1,069.0	1,064.4	1,069.7	1,056.9	1,063.0	1,056.5	1,049.0	1,068.	1,051.	1,059.	1,070.5	1,063.3	1,072.1	1,066.1	1,099.1	1,072.5	1,073.1	1,075.9	1,071.1	1,068.2
016	1,071.9	1,067.0	1,071.4	1,064.8	1,069.1	1,062.3	1,085.7	1,057.4	1,065.1	1,054.	1,046.	1,062.	1,066.9	1,059.6	1,069.8	1,066.4	1,084.8	1,079.1	1,079.0	1,095.2	1,074.5	1,071.7
017	1,069.0	1,067.0	1,064.0	1,072.9	1,060.7	1,068.8	1,064.1	1,052.2	1,053.2	1,052.	1,048.	1,055.	1,070.2	1,060.2	1,071.3	1,062.6	1,075.3	1,076.7	1,070.9	1,072.3	1,072.0	1,072.8
018	1,068.0	1,071.9	1,072.1	1,071.7	1,063.9	1,049.9	1,065.9	1,048.6	1,054.5	1,052.	1,042.	1,057.	1,069.8	1,060.9	1,072.0	1,062.9	1,075.8	1,074.1	1,074.3	1,069.8	1,073.2	1,058.0
019	1,060.7	1,061.9	1,061.0	1,067.3	1,058.8	1,055.3	1,054.7	1,048.1	1,045.9	1,048.	1,039.	1,054.	1,066.0	1,055.2	1,065.0	1,069.6	1,076.6	1,072.4	1,070.6	1,068.6	1,068.1	1,062.8
034	1,067.7	1,068.4	1,065.5	1,075.2	1,057.3	1,060.4	1,078.3	1,067.7	1,084.9	1,072.	1,057.	1,068.	1,075.4	1,060.5	1,069.8	1,057.1	1,069.8	1,075.4	1,067.8	1,065.9	1,067.5	1,065.0

	0	7.4	16.5	39.3	50.2	75.0	99.2			30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
020	1,062.0	1,066.4	1,060.4	1,052.5	1,056.5	1,041.9	1,045.4			1,052.	1,030.	1,041.	1,046.3	1,034.8	1,043.2	1,038.1	1,051.3	1,053.2	1,043.6	1,046.6	1,043.4	1,046.6
021	1,060.6	1,073.8	1,060.1	1,058.2	1,069.4	1,047.8	1,048.3			1,046.	1,038.	1,043.	1,051.2	1,039.9	1,049.1	1,042.7	1,057.1	1,053.8	1,048.3	1,051.5	1,047.2	1,052.3
022	1,064.3	1,068.6	1,053.6	1,099.4	1,061.6	1,041.4	1,108.3			1,044.	1,037.	1,040.	1,048.2	1,032.5	1,039.7	1,032.9	1,050.4	1,049.7	1,036.9	1,041.7	1,037.7	1,047.0
023	1,065.3	1,070.6	1,063.3	1,053.5	1,065.4	1,041.3	1,050.8			1,045.	1,037.	1,045.	1,051.5	1,041.8	1,045.1	1,039.9	1,055.6	1,049.6	1,041.2	1,046.6	1,051.4	1,048.4
024	1,078.5	1,080.3	1,069.7	1,061.7	1,074.4	1,049.1	1,044.8			1,051.	1,049.	1,050.	1,057.9	1,050.9	1,056.4	1,050.6	1,064.0	1,061.4	1,055.2	1,059.2	1,062.5	1,061.8

Reference device **Mean value:** 1 069.46 **Expanded uncertainty (k=2):** ± 0.81 % (± 8.68mV)

Red values: greater than max limit ***Dark red Values: lower than min limits***	*Bias Conditions: s/n's:*	*(1) V_{DS}=0V V_{GS}=+15V 013,014,015,016,017*	*(2) V_{DS}=+160V V_{GS}= 0V 008,009,010,011,012*	*(3) V_{DS}=0V V_{GS}= 0V 001,002,003,004,005*	*(4) V_{DS}=200V V_{GS}=-20V 006,007,020,021,022,023,024*	*(5) V_{DS}=0V V_{GS}=+12V 018,019*

Figure 22 VSD(on) Inverse Diode Forward Voltage [mV] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:		1500.0	[mV]

Parameter not listed in Manufacturer data sheet

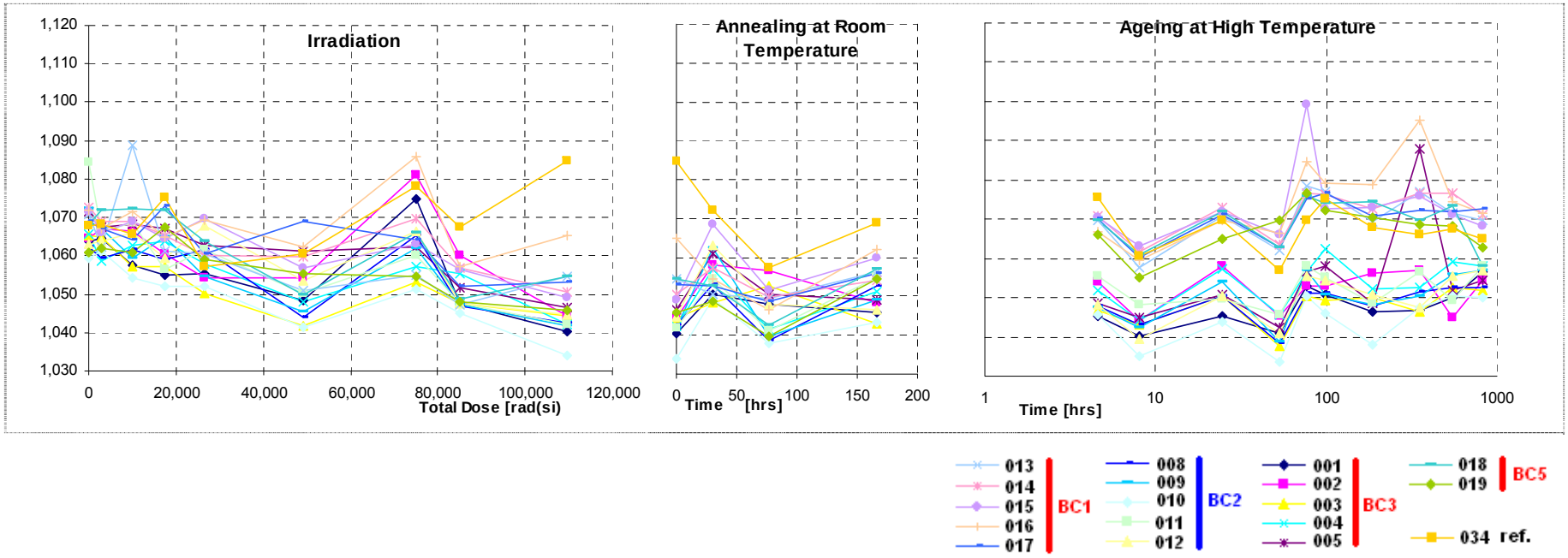


Figure 23 VSD(on) Inverse Diode Forward Voltage [mV] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:		1500.0	[mV]

Parameter not listed in Manufacturer data sheet

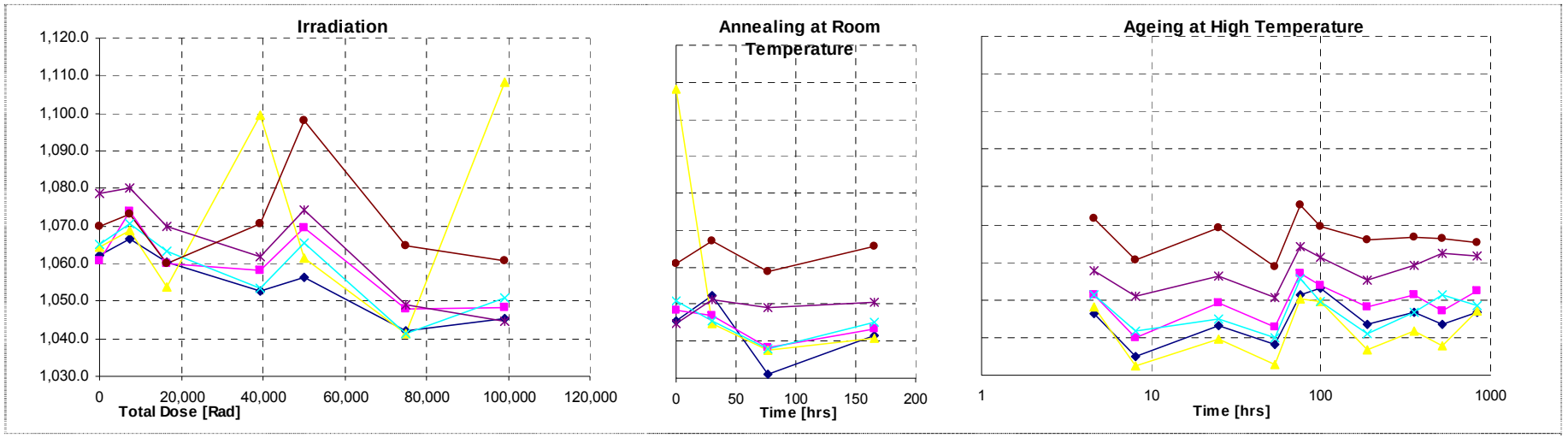


Table 17 $V_{(BR)DSS}$ @I_{DS}=100uA – V_{DS} Breakdown Voltage [V] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:	200		[V]

Parameter not listed in Manufacturer data sheet

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs							
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
001	247.2	247.6	246.8	246.7	246.6	247.2	246.4	246.5	246.2	246.1	245.9	245.9	247.0	246.2	246.7	246.4	246.7	247.5	247.8	247.5	247.0	246.3
002	245.6	249.8	249.4	249.1	249.0	249.3	248.5	249.0	248.7	248.6	248.6	249.3	249.3	249.2	249.2	249.0	248.9	250.0	250.7	249.5	249.5	248.9
003	244.6	248.5	248.1	248.0	247.2	250.2	246.8	247.6	246.8	247.0	247.0	248.2	248.0	247.9	248.2	248.1	248.2	248.1	249.3	248.2	248.7	248.1
004	243.7	243.7	245.7	245.4	245.1	245.9	244.8	244.9	244.5	244.3	244.8	244.8	245.5	245.3	245.2	244.8	245.7	245.7	246.3	245.7	246.2	245.1
005	244.1	246.5	243.4	243.4	243.3	243.9	242.8	243.0	242.7	242.5	242.7	242.8	243.5	243.0	243.5	243.1	243.5	243.8	244.4	243.3	243.4	242.7
006	239.5																					
007	243.6																					
008	244.0	247.6	247.0	246.7	246.0	246.5	245.3	246.0	244.7	245.0	245.0	245.2	245.6	245.9	246.2	245.9	246.2	247.1	247.4	246.5	246.7	246.8
009	242.7	244.6	243.9	243.5	243.0	243.5	241.5	242.5	241.8	241.7	241.5	242.0	243.2	242.7	243.2	243.0	243.4	244.0	244.4	243.3	243.4	243.5
010	243.1	243.2	242.8	242.0	241.9	243.4	241.3	241.3	241.1	240.6	240.6	241.2	242.2	241.3	242.1	241.7	241.9	243.0	243.9	242.8	242.5	241.9
011	244.4	249.6	249.4	249.2	248.7	249.3	247.1	247.7	247.1	247.0	247.3	247.6	248.3	247.6	248.5	248.1	248.5	249.2	249.9	248.4	248.4	248.3
012	246.2	246.0	245.8	245.3	245.2	245.7	244.1	244.4	243.4	243.5	243.6	244.2	244.9	244.5	244.7	244.9	245.0	245.6	245.7	245.1	245.5	244.2
013	242.2	244.2	243.2	242.3	240.5	239.4	235.8	235.5	233.7	234.0	234.5	235.0	236.2	236.1	237.9	237.9	238.6	238.9	239.9	239.5	239.6	239.6
014	247.7	250.6	250.4	248.4	246.8	245.1	240.8	240.5	**156.9**	217.8	238.8	240.2	240.4	240.4	241.1	241.7	242.7	243.5	245.0	244.2	245.0	244.5
015	242.0	242.1	241.2	239.6	238.5	237.6	233.3	232.9	231.0	231.4	232.3	232.4	233.1	233.2	234.2	235.5	235.9	236.8	237.2	236.7	236.9	237.0
016	232.8	232.4	231.6	230.4	228.9	228.1	224.8	224.6	221.5	222.7	223.2	223.8	225.7	225.7	225.9	225.1	225.9	226.5	228.7	228.1	228.8	228.5
017	243.9	247.9	247.0	246.0	244.6	242.9	238.5	238.6	237.2	237.2	237.7	237.6	238.9	238.9	240.6	241.0	241.4	241.9	242.8	242.3	243.0	242.7
018	244.8	249.0	248.3	247.2	245.6	244.3	240.3	240.1	238.1	238.6	238.7	239.1	240.8	240.8	242.1	242.5	242.5	243.1	243.9	243.3	244.5	243.8
019	243.1	248.2	247.5	246.2	245.0	243.7	240.2	240.0	238.0	238.8	239.1	239.0	240.5	240.4	241.1	241.1	242.1	242.9	243.7	243.3	244.6	243.9
034	242.2	242.7	242.7	241.9	242.4	243.2	241.8	242.9	242.6	242.4	243.4	242.7	242.2	241.9	242.2	242.6	242.4	242.4	242.7	243.2	242.6	242.3

	0	7.4	16.5	39.3	50.2	75.0	99.2			30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
020	243.6	243.8	243.0	242.8	242.2	241.2	240.7			240.6	240.7	241.6	240.8	241.0	240.9	240.6	241.2	241.4	242.0	241.3	241.8	242.1
021	241.6	241.6	240.5	240.0	239.6	239.4	238.4			238.2	238.6	238.7	239.3	239.3	239.7	238.8	239.8	240.1	240.5	239.7	240.0	239.9
022	246.3	249.5	248.6	248.3	248.1	247.5	246.8			246.4	247.1	246.9	247.4	247.5	247.6	247.2	247.4	248.1	249.4	247.9	248.0	248.1
023	243.0	242.5	242.0	241.3	240.7	240.1	239.1			239.0	240.3	240.2	240.5	239.9	240.5	240.4	240.9	241.0	242.1	240.3	241.2	240.8
024	243.6	242.9	242.2	241.6	241.3	240.4	239.9			239.9	240.4	240.4	240.9	241.0	241.3	240.7	241.5	241.4	241.9	240.7	241.2	241.8

Reference device **Mean value:** **242.50** **Expanded uncertainty (k=2):** **± 0.19 % (± 0.46V)**

Red values: greater than max limit ***Dark red Values: lower than min limits***	*Bias Conditions: s/n's:*	*(1) V_{DS}=0V V_{GS}=+15V 013,014,015,016,017*	*(2) V_{DS}=+160V V_{GS}= 0V 008,009,010,011,012*	*(3) V_{DS}=0V V_{GS}= 0V 001,002,003,004,005*	*(4) V_{DS}=200V V_{GS}=-20V 006,007,020,021,022,023,024*	*(5) V_{DS}=0V V_{GS}=+12V 018,019*

Figure 24 V(BR)DSS @IDS=100uA – VDS Breakdown Voltage [V] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	*Min.*	*Max.*	*Unit*
Applicable limits:	**200**		**[V]**

Parameter not listed in Manufacturer data sheet

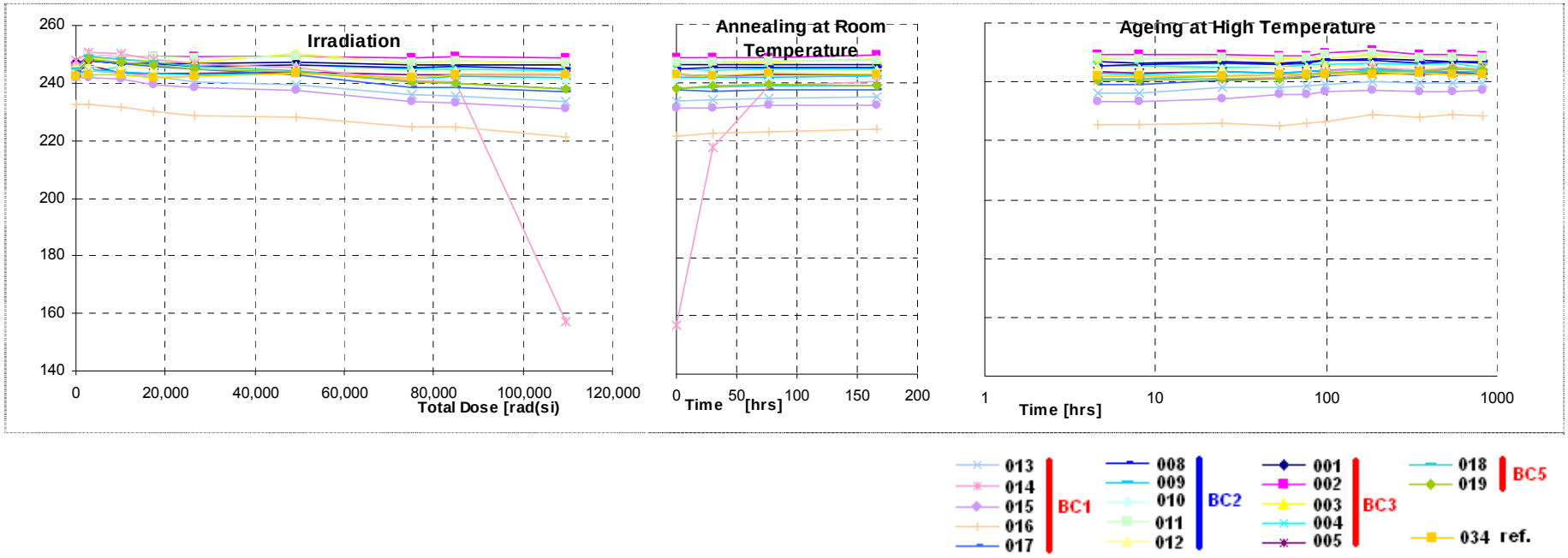


Figure 25 V(BR)DSS @IDS=100uA – VDS Breakdown Voltage [V] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:	200		[V]

Parameter not listed in Manufacturer data sheet

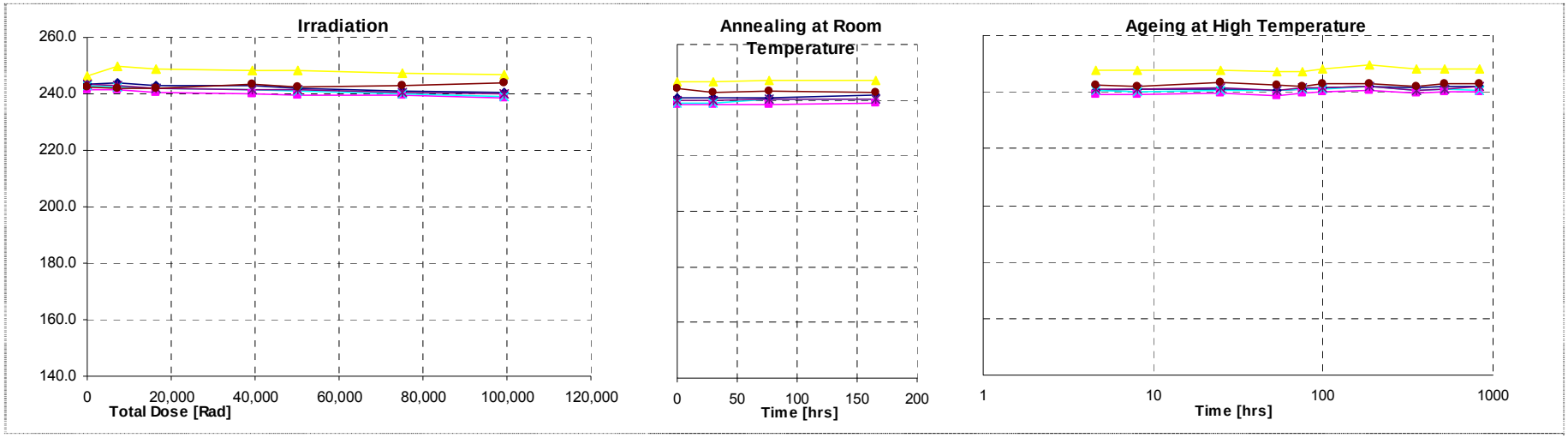


Table 18 V(BR)DSS @IDS=250uA – VDS Breakdown Voltage [V] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:	200		[V]

Parameter not listed in Manufacturer data sheet

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs							
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
001	246.4	247.1	246.7	246.6	246.6	246.9	246.4	246.5	246.1	246.3	246.2	246.7	246.9	246.6	246.5	246.1	246.7	247.1	247.7	246.7	246.9	246.3
002	244.8	250.1	249.3	249.4	248.9	249.6	248.5	248.9	248.5	248.1	248.4	249.4	249.6	249.1	249.5	248.8	249.5	249.7	250.5	249.6	249.6	248.8
003	246.2	248.8	247.8	247.9	247.8	249.9	247.3	247.6	247.0	247.1	247.3	248.1	248.3	248.0	247.9	247.8	248.4	248.8	248.9	248.0	248.2	247.6
004	244.7	243.9	245.7	245.7	245.2	245.9	244.7	244.9	244.9	244.2	244.6	245.2	245.7	245.2	245.3	245.1	245.6	245.8	246.6	245.6	245.9	245.1
005	243.7	246.3	243.3	243.7	243.1	243.7	242.8	242.8	242.3	242.5	242.5	242.6	243.5	243.0	243.5	243.1	243.3	243.6	243.8	243.4	243.9	242.8
006	239.7																					
007	243.5																					
008	245.8	247.5	247.3	246.6	246.2	246.6	245.2	245.7	245.0	244.9	245.0	245.4	245.8	245.5	246.1	245.7	246.2	246.7	247.6	246.6	246.6	246.5
009	243.0	244.7	243.7	243.6	243.6	243.3	241.7	242.4	241.8	241.9	242.0	242.1	243.1	242.8	243.2	242.6	243.3	243.9	244.7	243.5	243.0	243.4
010	243.1	243.4	242.3	242.2	241.9	243.5	240.4	241.1	240.6	240.4	240.1	241.0	241.8	241.8	242.1	241.9	242.6	242.9	243.9	242.1	242.4	241.8
011	244.4	249.5	249.3	248.8	248.7	249.1	247.4	247.7	247.2	247.2	247.1	247.5	248.5	247.8	248.4	248.0	248.8	249.3	250.1	248.9	248.6	248.5
012	246.8	246.0	245.7	245.5	244.7	245.3	244.1	244.4	243.6	243.8	243.7	244.2	245.1	244.5	244.9	244.9	245.3	245.7	246.0	245.2	245.2	244.8
013	242.8	243.9	242.7	242.3	240.5	239.3	235.9	235.8	233.8	233.7	234.7	234.9	237.0	236.6	237.9	237.9	238.7	239.1	240.0	239.1	239.3	239.7
014	245.4	250.4	249.6	248.5	246.6	245.1	241.1	240.9	239.6	240.0	241.0	240.5	241.3	240.7	242.0	242.5	243.2	244.0	245.4	244.5	245.5	245.2
015	242.1	242.3	241.5	240.1	238.8	237.2	233.5	233.5	231.9	231.9	232.1	232.5	233.7	233.2	235.2	235.5	236.2	236.9	237.5	237.1	237.7	237.4
016	232.8	232.3	232.0	230.5	229.0	228.3	224.8	225.1	223.1	223.3	223.8	224.2	225.6	225.3	226.1	226.0	226.6	227.6	228.7	228.3	229.1	228.6
017	243.7	248.1	246.8	245.5	244.4	243.2	239.7	239.0	236.9	237.6	238.0	238.3	239.5	239.7	240.9	241.3	241.8	242.2	243.1	242.9	243.2	243.2
018	244.9	249.0	248.4	247.2	246.1	244.5	241.1	240.8	238.6	238.8	239.2	239.7	241.6	241.1	242.7	242.8	243.0	243.9	244.5	243.7	244.9	244.0
019	243.5	248.3	247.3	246.4	245.2	243.7	240.4	240.2	238.0	238.2	239.1	239.1	241.0	240.6	241.6	241.9	242.3	242.8	243.5	243.2	244.3	243.8
034	242.6	243.3	242.9	242.6	242.3	243.7	242.4	242.9	242.8	242.8	243.2	243.3	242.7	242.8	243.5	242.7	243.1	242.8	243.1	242.8	242.9	243.0

	0	7.4	16.5	39.3	50.2	75.0	99.2			30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
020	243.9	243.7	243.1	242.8	242.2	241.3	240.4			239.9	240.7	241.5	240.8	241.3	241.4	241.0	241.0	241.4	242.2	241.8	242.0	241.7
021	242.2	241.3	240.9	240.4	240.0	239.2	238.4			238.2	238.7	239.0	239.2	239.5	239.7	239.2	239.5	240.1	241.1	239.9	240.3	240.4
022	247.5	249.8	248.9	248.2	248.2	247.7	246.5			246.7	247.2	247.3	247.4	247.5	247.9	247.5	247.7	248.2	249.0	247.9	248.1	247.8
023	243.3	242.5	241.7	240.9	241.0	239.9	239.2			239.3	240.8	240.2	240.2	239.9	240.7	239.8	240.4	240.8	241.6	240.3	240.9	241.0
024	243.2	242.8	242.3	241.9	241.3	240.5	239.6			240.0	240.4	240.6	241.0	240.8	241.3	241.2	241.2	241.7	242.1	241.4	241.6	241.2

Reference device **Mean value:** 242.8 **Expanded uncertainty (k=2):** ± 0.17 % (± 0.42V)

Red values: greater than max limit ***Dark red Values: lower than min limits***	*Bias Conditions: s/n's:*	*(1) V_{DS}=0V V_{GS}=+15V 013,014,015,016,017*	*(2) V_{DS}=+160V V_{GS}= 0V 008,009,010,011,012*	*(3) V_{DS}=0V V_{GS}= 0V 001,002,003,004,005*	*(4) V_{DS}=200V V_{GS}=-20V 006,007,020,021,022,023,024*	*(5) V_{DS}=0V V_{GS}=+12V 018,019*

Figure 26 V(BR)DSS @IDS=250uA – VDS Breakdown Voltage [V] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	*Min.*	*Max.*	*Unit*
Applicable limits:	**200**		**[V]**

Parameter not listed in Manufacturer data sheet

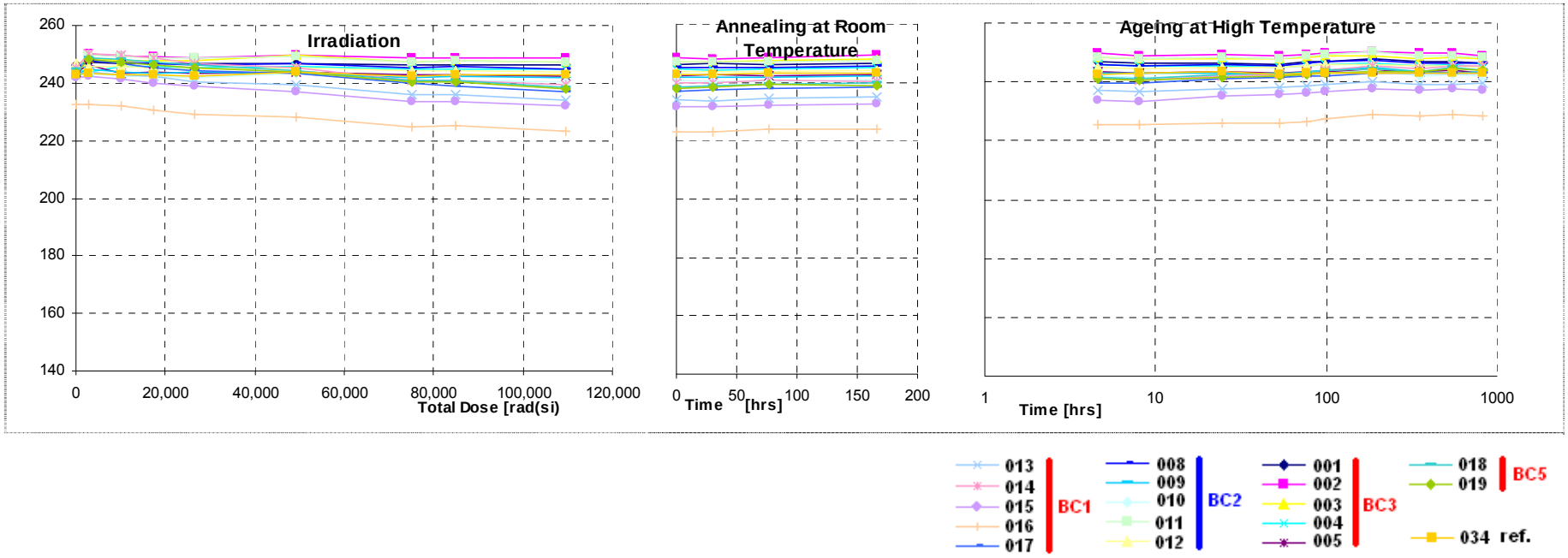


Figure 27 V(BR)DSS @IDS=250uA – VDS Breakdown Voltage [V] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:	200		[V]

Parameter not listed in Manufacturer data sheet

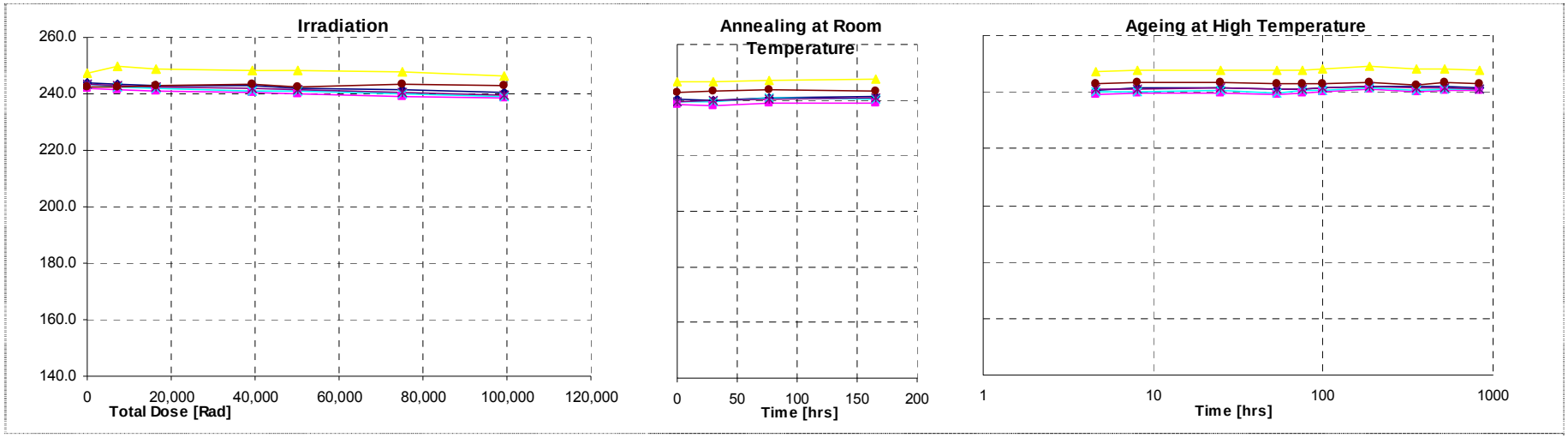


Table 19 V(BR)DSS @IDS=1mA – VDS Breakdown Voltage [V] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:	200		[V]

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs								
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
001	247.3	247.4	247.0	246.8	246.6	247.0	246.2	246.5	246.3	246.3	246.1	246.3	246.9	246.5	246.6	246.5	246.9	247.2	248.2	247.1	247.2	246.4
002	245.8	250.1	249.4	249.3	248.7	249.9	248.3	249.1	248.5	248.4	248.5	249.4	249.4	249.2	249.0	249.2	249.2	249.6	250.7	249.5	249.8	248.8
003	247.2	248.6	248.2	248.3	247.6	249.9	247.1	247.6	247.3	247.2	247.3	248.4	248.4	247.7	248.0	247.9	248.1	248.3	249.2	248.2	248.4	247.6
004	245.4	244.2	245.4	245.5	245.4	246.1	245.0	245.1	244.6	244.4	245.0	245.0	246.0	245.1	245.4	245.2	245.3	245.8	246.6	245.7	245.8	245.1
005	244.2	246.4	243.7	243.9	243.2	244.2	243.0	243.5	243.1	242.7	242.8	243.1	244.0	243.4	243.5	243.2	243.6	244.1	244.5	243.7	243.9	243.2
006	240.0																					
007	243.6																					
008	246.7	247.5	247.1	246.9	246.5	246.4	245.2	245.6	244.8	245.0	245.0	245.2	246.2	246.0	246.5	246.0	246.4	247.0	247.8	246.4	246.6	246.8
009	244.2	244.8	243.8	243.8	243.2	243.4	242.2	242.6	241.9	241.7	241.7	242.1	243.1	243.1	243.1	243.3	243.7	244.1	244.4	243.5	243.4	243.5
010	243.4	243.4	242.6	242.6	241.9	243.3	241.2	241.4	240.6	240.8	240.7	241.0	242.1	241.6	242.2	242.0	242.4	243.1	243.8	242.6	242.1	242.1
011	245.5	249.7	249.4	248.8	248.3	249.5	247.2	247.6	247.2	246.7	247.0	247.4	248.3	248.1	248.5	248.3	248.8	249.3	250.5	248.6	248.9	248.4
012	246.6	246.2	246.0	245.6	245.1	245.3	244.4	244.8	243.7	243.6	244.0	244.7	244.9	244.6	245.1	245.2	245.6	245.7	246.2	245.2	245.5	245.2
013	243.5	243.9	243.2	242.3	240.6	239.4	236.0	235.7	234.2	234.2	234.5	235.1	237.1	237.2	238.3	238.5	238.7	239.3	240.3	239.6	239.9	240.4
014	246.5	250.5	250.0	248.2	247.0	245.4	241.7	241.6	240.0	240.2	241.3	241.2	242.6	242.5	243.5	244.0	244.6	245.1	246.2	245.3	246.1	245.8
015	242.6	242.4	241.6	240.1	238.9	237.5	234.0	233.7	231.9	232.0	232.3	233.0	234.6	234.5	236.1	236.4	236.8	237.1	238.1	237.6	238.3	237.9
016	233.4	233.4	232.5	231.0	229.9	228.5	225.5	225.5	223.9	224.0	224.3	224.7	226.8	226.8	227.6	227.5	228.3	228.8	229.6	229.0	229.3	229.0
017	244.8	248.5	247.2	246.0	244.3	243.2	239.5	239.3	237.6	237.9	238.4	238.5	241.0	240.9	242.0	242.4	242.6	243.2	243.9	243.5	244.3	243.6
018	245.8	249.0	248.3	247.3	246.2	244.6	241.3	241.2	239.4	239.8	239.7	240.2	242.3	242.2	243.5	243.3	243.9	244.3	245.1	244.5	245.4	245.2
019	244.8	248.3	247.4	246.3	244.9	243.8	240.7	240.4	238.4	238.7	239.4	239.3	241.2	241.1	242.0	242.1	242.7	243.5	243.9	243.4	244.6	243.8
034	244.0	244.7	244.1	244.0	243.8	245.1	243.8	244.5	244.2	243.9	244.5	244.3	244.2	244.1	244.5	244.2	244.3	244.0	244.0	243.8	244.5	244.3

	0	7.4	16.5	39.3	50.2	75.0	99.2			30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
020	244.8	243.8	243.1	242.5	242.3	241.3	240.4			240.6	240.9	241.5	241.2	241.4	241.3	240.7	241.3	241.8	242.3	241.6	242.1	242.0
021	242.4	242.0	240.7	240.6	240.5	239.5	238.5			238.2	239.0	239.2	239.5	239.6	239.8	239.5	239.6	240.4	241.1	240.0	240.2	240.4
022	248.2	249.6	248.8	248.5	248.4	247.7	246.5			246.6	247.2	247.1	247.6	247.5	247.9	247.3	247.7	248.3	249.0	248.1	248.1	248.0
023	243.1	242.8	241.8	241.2	241.1	240.2	239.1			239.3	240.6	240.3	240.6	240.2	240.5	240.4	240.6	240.9	241.6	240.7	241.0	241.0
024	243.6	243.4	242.3	242.3	241.8	240.7	240.0			240.0	240.5	240.7	241.0	240.9	241.3	240.9	241.4	241.8	242.2	241.4	241.8	241.7

Reference device **Mean value:** 244.2 **Expanded uncertainty (k=2):** ± 0.17 % (± 0.42V)

Red values: greater than max limit	*Bias Conditions:*	*(1) V_{DS}=0V V_{GS}=+15V*	*(2) V_{DS}=+160V V_{GS}= 0V*	*(3) V_{DS}=0V V_{GS}= 0V*	*(4) V_{DS}=200V V_{GS}=-20V*	*(5) V_{DS}=0V V_{GS}=+12V*
Dark red Values: lower than min limits	*s/n's:*	*013,014,015,016,017*	*008,009,010,011,012*	*001,002,003,004,005*	*006,007,020,021,022,023,024*	*018,019*

Figure 28 V(BR)DSS @IDS=1mA – VDS Breakdown Voltage [V] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	*Min.*	*Max.*	*Unit*
Applicable limits:	**200**		**[V]**

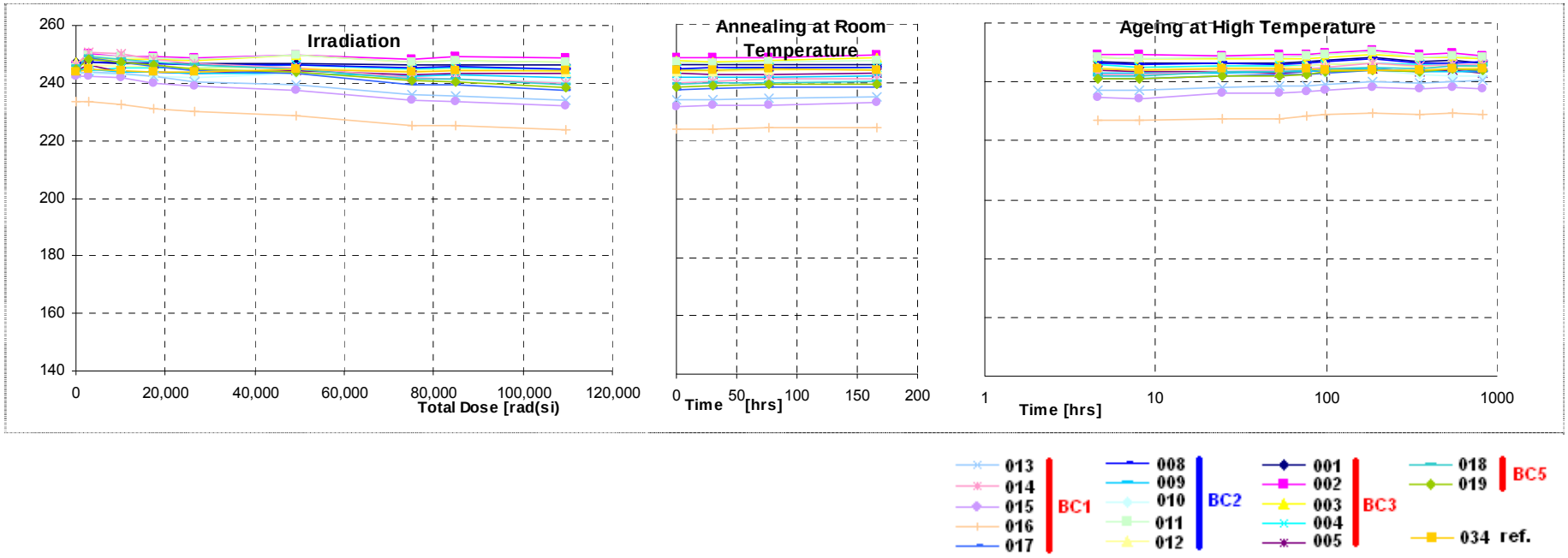


Figure 29 V(BR)DSS @IDS=1mA – VDS Breakdown Voltage [V] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:	200		[V]

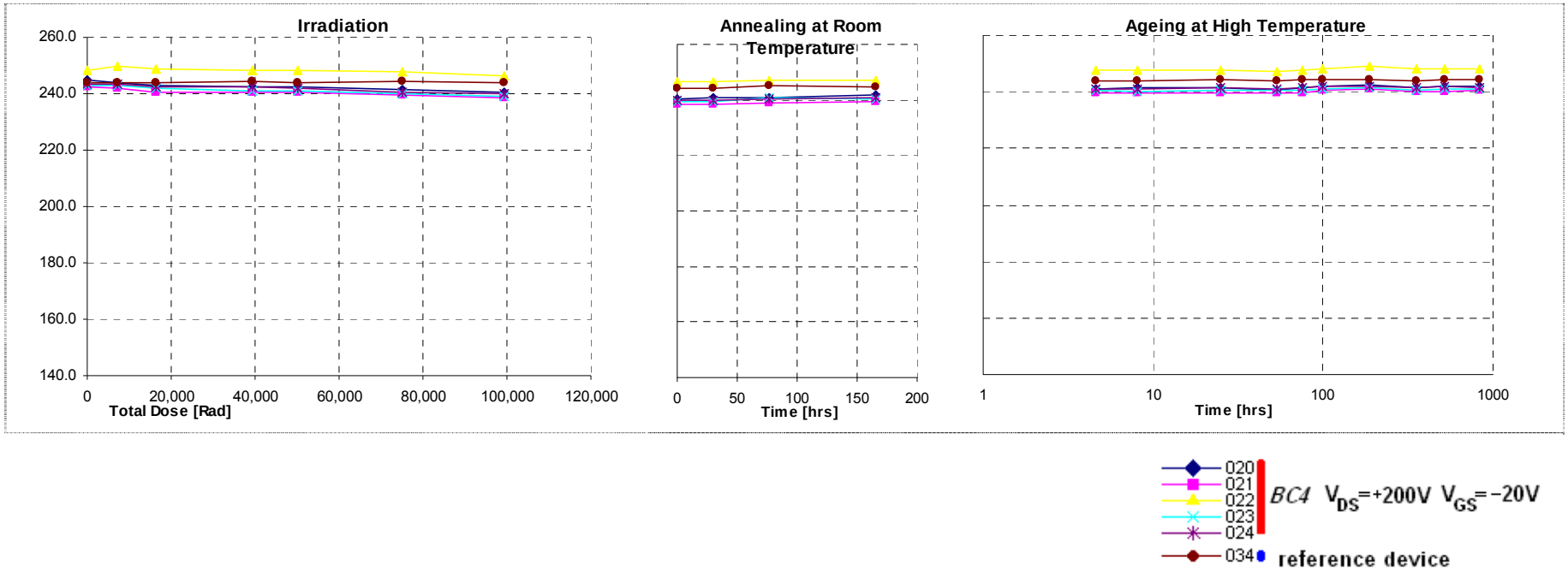


Table 20 VDS(on) Drain-Source On Voltage [mV] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:		880.0	[mV]

Parameter not listed in Manufacturer data sheet
Test limit based on $R_{DS(ON)}$ resistance limit of 0.044Ohm

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs							
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
001	897.6	908.3	895.6	891.1	897.4	909.1	905.4	897.2	904.8	903.3	893.7	904.6	904.6	897.5	885.7	885.6	878.9	883.7	901.9	908.6	881.6	887.9
002	926.8	940.9	932.2	926.9	920.2	948.0	944.3	938.7	930.8	926.3	927.6	953.4	953.4	923.4	916.4	920.9	909.6	915.4	923.1	943.8	914.9	923.9
003	903.9	918.3	901.8	897.5	901.2	950.6	902.2	900.4	904.6	893.6	899.1	929.8	929.8	900.3	889.3	895.1	883.8	891.3	903.7	911.7	894.2	891.9
004	906.2	904.9	894.4	896.3	899.9	924.6	902.4	906.0	911.4	904.0	914.9	919.3	919.3	907.8	891.6	897.4	893.6	895.7	897.7	917.9	889.2	893.9
005	896.8	911.3	890.3	899.1	890.8	913.6	891.9	900.4	896.9	897.8	900.4	908.4	908.4	891.7	879.3	885.7	883.5	879.6	887.3	896.1	875.6	887.6
006	868.1																					
007	876.4																					
008	896.1	901.1	896.1	892.8	888.3	901.6	890.6	896.6	889.8	887.6	892.8	897.7	897.7	885.3	873.3	885.1	872.7	879.4	892.1	907.3	873.3	875.7
009	882.6	893.4	883.2	885.3	872.6	899.9	878.1	884.1	886.3	881.8	874.4	883.4	883.4	874.8	867.8	873.3	863.6	868.6	883.0	896.7	866.8	860.9
010	871.7	888.3	873.8	866.9	864.8	912.8	870.8	880.1	868.3	876.4	869.6	873.8	873.8	870.4	866.6	864.5	856.4	872.8	886.6	897.6	867.4	861.3
011	933.1	923.5	921.0	916.2	906.8	938.7	904.6	919.7	917.9	916.8	907.1	915.4	915.4	913.9	897.9	910.5	897.3	911.6	918.8	932.0	899.3	904.2
012	910.2	910.1	902.4	900.3	908.3	919.4	899.1	907.8	898.5	914.1	910.0	908.3	908.3	901.8	888.8	897.2	884.9	899.5	904.1	907.5	896.6	893.8
013	879.8	879.6	885.4	883.0	879.1	909.9	887.3	889.7	888.7	883.6	884.7	893.5	893.5	884.4	877.9	889.1	883.1	891.1	898.3	906.7	882.8	885.0
014	929.3	925.8	938.6	924.9	920.9	955.8	931.1	929.1	931.1	931.0	948.6	941.3	941.3	950.0	936.1	964.1	957.4	972.1	977.6	983.4	959.3	970.6
015	877.1	881.6	889.9	881.8	876.1	899.5	872.6	883.2	880.1	883.0	887.2	890.5	890.5	905.3	899.9	909.1	913.8	919.6	921.9	934.0	902.8	917.8
016	836.8	852.0	850.6	841.4	839.1	864.7	844.3	859.2	853.1	840.3	849.9	857.1	857.1	859.5	853.2	854.3	848.7	857.4	869.6	869.7	862.0	852.1
017	914.6	914.9	911.2	915.4	904.9	934.1	911.9	916.4	913.6	910.9	922.1	933.3	933.3	934.0	926.9	944.8	935.6	947.1	957.5	968.1	946.1	945.7
018	911.3	917.0	910.8	915.5	906.6	941.1	911.1	925.7	920.9	930.7	926.4	929.5	929.5	938.3	928.8	943.8	943.5	946.8	950.0	951.1	932.8	948.8
019	926.8	929.6	925.1	917.9	918.8	943.9	922.7	928.1	931.4	925.4	930.9	927.6	927.6	934.1	920.0	927.9	924.5	921.9	932.9	942.4	921.6	933.9
034	893.9	913.8	899.0	893.8	899.7	918.4	908.1	903.6	904.9	908.9	912.8	904.8	904.8	905.5	901.2	911.8	907.6	901.6	896.6	909.3	894.1	900.4

	0	7.4	16.5	39.3	50.2	75.0	99.2			30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
020	903.0	888.0	887.5	889.8	901.9	895.1	897.6			890.6	897.6	905.8	869.0	876.6	882.3	879.4	878.6	891.4	893.5	876.3	877.8	874.3
021	877.6	873.6	858.9	880.6	884.4	867.1	873.9			869.5	870.3	876.4	848.9	852.6	858.3	847.1	853.7	870.8	878.0	855.8	856.0	861.8
022	901.4	900.0	886.8	899.8	914.3	915.6	896.8			899.6	912.2	913.0	883.0	889.1	896.6	885.0	893.3	900.4	899.0	882.9	889.5	881.0
023	897.9	893.9	880.1	886.2	903.8	893.9	899.0			891.5	911.7	905.7	880.5	869.1	880.3	868.6	878.6	885.6	893.6	876.2	881.9	878.6
024	906.4	896.8	888.9	901.0	900.3	902.6	892.6			901.3	902.1	918.8	888.8	888.6	894.8	888.2	881.1	900.1	906.6	886.5	888.2	881.6

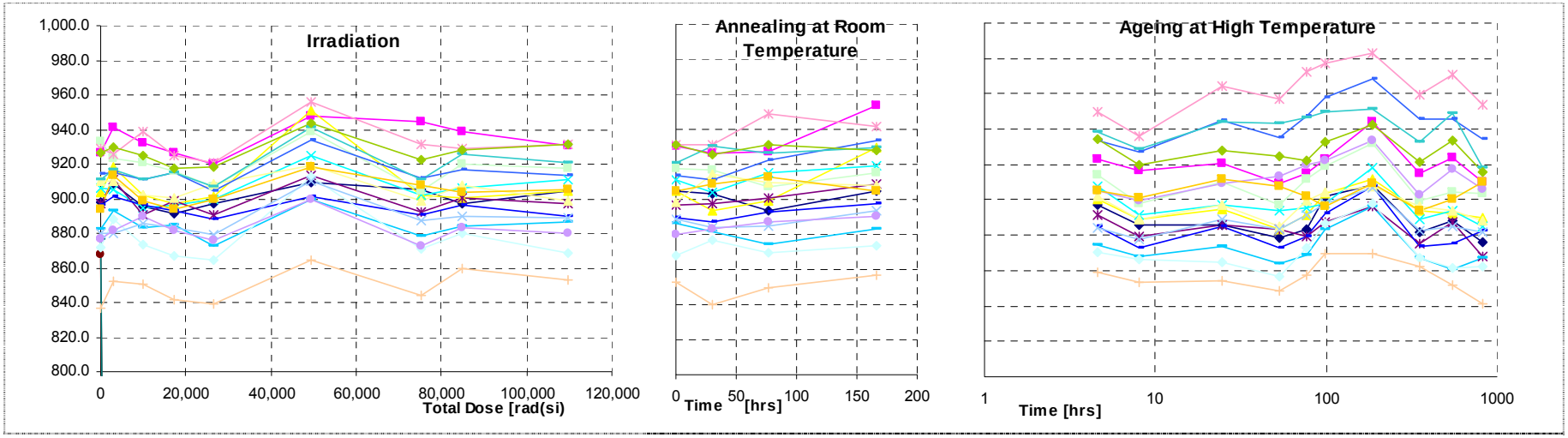
Reference device **Mean value:** **903.9** **Expanded uncertainty (k=2):** **± 0.93 % (± 8.45mV)**

Red values: greater than max limit	*Bias Conditions:*	*(1) V_{DS}=0V V_{GS}=+15V*	*(2) V_{DS}=+160V V_{GS}= 0V*	*(3) V_{DS}=0V V_{GS}= 0V*	*(4) V_{DS}=200V V_{GS}=-20V*	*(5) V_{DS}=0V V_{GS}=+12V*
Dark red Values: lower than min limits	*s/n's:*	*013,014,015,016,017*	*008,009,010,011,012*	*001,002,003,004,005*	*006,007,020,021,022,023,024*	*018,019*

Figure 30 VDS(on) Drain-Source On Voltage [mV] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:		880.0	[mV]

Parameter not listed in Manufacturer data sheet
Test limit based on $R_{DS(ON)}$ resistance limit of 0.044Ohm

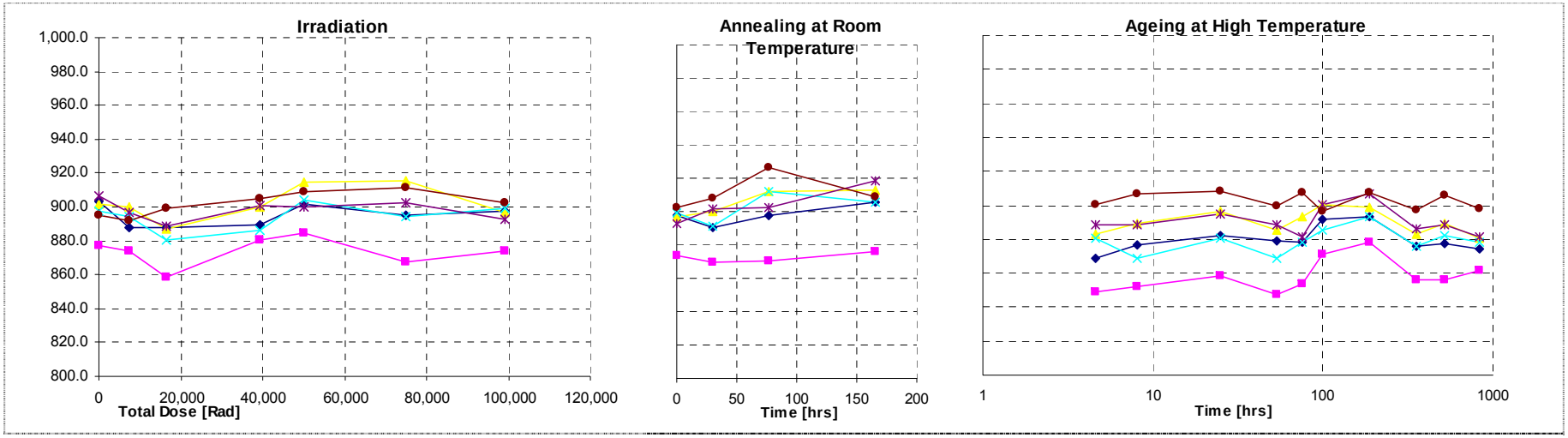


No evidence of parameter trend versus TID and/or Bias conditions and time was found.

Figure 31 VDS(on) Drain-Source On Voltage [mV] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:		880.0	[mV]

Parameter not listed in Manufacturer data sheet
Test limit based on $R_{DS(ON)}$ resistance limit of 0.044Ohm



No evidence of parameter trend versus TID and/or Bias conditions and time was found.

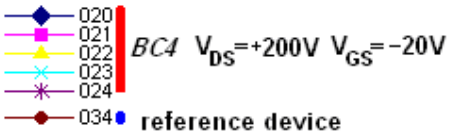


Table 21 $I_{DS(on)}$ Drain-Source On Current [A] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:		60	[A]

Parameter not listed in Manufacturer data sheet

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs							
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
001	73.9	72.9	73.4	73.8	73.7	73.5	72.8	73.4	73.5	73.5	73.5	73.3	73.8	73.6	73.4	73.6	73.6	73.2	72.9	72.8	72.8	73.0
002	73.2	73.1	72.9	73.4	73.1	72.9	72.5	72.5	72.5	72.9	73.2	72.6	73.1	73.3	72.8	73.1	73.0	72.5	72.1	72.2	72.1	72.3
003	73.7	73.2	73.7	73.8	73.7	72.9	73.8	73.4	72.9	73.5	73.5	73.1	73.7	73.5	73.1	73.4	73.4	73.0	72.6	72.5	72.7	72.8
004	73.5	73.5	73.6	73.6	73.3	73.1	73.4	73.1	73.1	72.8	73.2	73.2	73.3	73.4	72.9	73.2	72.9	72.5	72.4	72.4	72.4	72.6
005	73.8	73.1	73.9	73.9	73.3	73.5	73.6	73.8	73.5	73.0	73.7	73.6	73.6	74.0	73.5	73.6	73.3	73.2	72.8	72.7	72.6	72.9
006	74.5																					
007	74.1																					
008	73.7	73.7	74.1	73.9	73.8	73.6	73.5	73.7	73.7	73.5	73.8	73.6	73.7	73.9	73.6	73.6	73.6	73.1	72.9	72.8	73.2	73.0
009	73.8	73.9	74.1	74.3	74.3	73.9	74.1	73.7	74.2	73.9	73.9	73.9	73.9	74.4	73.7	73.7	73.7	73.4	73.3	73.1	73.4	73.2
010	74.2	73.9	74.3	74.4	74.2	73.5	74.0	74.0	74.2	74.1	74.3	73.9	74.3	74.4	73.7	73.9	73.5	73.3	73.0	73.3	73.3	73.7
011	72.8	73.0	73.3	73.3	73.3	72.7	72.8	73.0	73.2	72.7	73.2	72.8	73.4	73.5	72.8	72.9	72.6	72.5	72.0	72.3	72.4	72.5
012	73.6	73.4	73.6	74.0	73.5	73.3	73.4	73.5	73.6	73.2	73.4	73.3	73.5	73.6	73.4	73.1	72.9	72.7	72.6	72.6	72.8	72.8
013	74.3	74.0	74.4	74.3	73.8	73.7	73.5	73.9	74.1	73.9	74.0	73.8	73.8	73.9	73.1	73.2	72.9	72.6	72.5	72.6	72.7	72.9
014	73.0	72.7	72.9	73.2	73.1	72.1	73.0	72.7	72.9	72.5	72.5	72.5	72.2	72.7	71.4	71.8	71.3	71.0	71.0	71.1	71.0	71.4
015	74.0	73.8	74.1	74.1	74.0	73.4	73.7	73.9	73.9	73.6	73.8	73.9	73.2	73.3	72.6	72.7	72.4	72.2	72.0	72.1	71.9	72.6
016	74.9	74.6	74.8	75.0	75.0	74.5	74.5	74.7	74.9	74.7	74.7	74.6	74.1	74.4	73.9	74.2	73.6	73.4	73.2	73.3	73.4	73.8
017	73.4	73.1	73.4	73.5	73.4	72.6	73.5	73.0	73.3	72.9	73.0	73.0	72.6	72.7	71.9	72.1	71.5	71.2	71.2	71.3	71.2	71.7
018	73.1	72.7	73.2	73.3	73.6	73.0	73.3	73.0	73.2	72.9	72.8	72.9	72.5	72.5	71.8	71.8	71.8	71.6	71.3	71.2	71.3	72.5
019	73.4	73.2	73.4	73.7	73.6	73.2	73.6	73.2	73.2	73.3	73.1	73.3	73.1	73.3	72.6	72.6	72.5	72.1	72.0	72.0	72.0	72.9
034	74.0	73.5	73.8	73.8	73.9	73.5	73.8	73.6	73.4	73.7	73.4	73.7	73.9	73.8	73.4	73.6	73.5	73.4	73.2	73.1	73.0	73.4

	0	7.4	16.5	39.3	50.2	75.0	99.2			30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
020	73.8	74.2	74.2	74.2	73.7	74.0	73.8			74.0	73.9	73.8	74.0	74.2	73.5	73.8	73.5	73.3	73.1	73.1	72.9	73.5
021	73.9	74.4	74.6	74.5	73.8	74.1	74.5			74.5	74.3	74.2	74.6	74.9	74.0	74.3	74.2	73.9	73.5	73.6	73.6	73.9
022	73.5	73.9	73.9	73.8	72.9	73.6	74.0			73.7	73.5	73.7	73.9	74.0	73.3	73.7	73.2	73.0	72.8	72.8	72.8	73.2
023	73.9	74.2	74.4	74.0	73.3	73.8	73.5			74.1	73.8	73.8	73.9	74.1	73.5	73.6	73.6	73.2	73.1	73.2	73.1	73.4
024	73.8	73.5	73.7	73.6	72.9	73.4	73.9			73.6	73.5	73.4	73.7	73.6	73.1	73.2	73.1	72.7	72.6	72.8	72.5	72.7

Reference device **Mean value:** **73.7** **Expanded uncertainty (k=2):** **± 0.29 % (± 0.21A)**

Red values: greater than max limit Dark red Values: lower than min limits	Bias Conditions: s/n's:	(1) V_{DS}=0V V_{GS}=+15V 013,014,015,016,017	(2) V_{DS}=+160V V_{GS}= 0V 008,009,010,011,012	(3) V_{DS}=0V V_{GS}= 0V 001,002,003,004,005	(4) V_{DS}=200V V_{GS}=-20V 006,007,020,021,022,023,024	(5) V_{DS}=0V V_{GS}=+12V 018,019

Figure 32 $I_{DS(on)}$ Drain-Source On Current [A] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:		60	[A]

Parameter not listed in Manufacturer data sheet

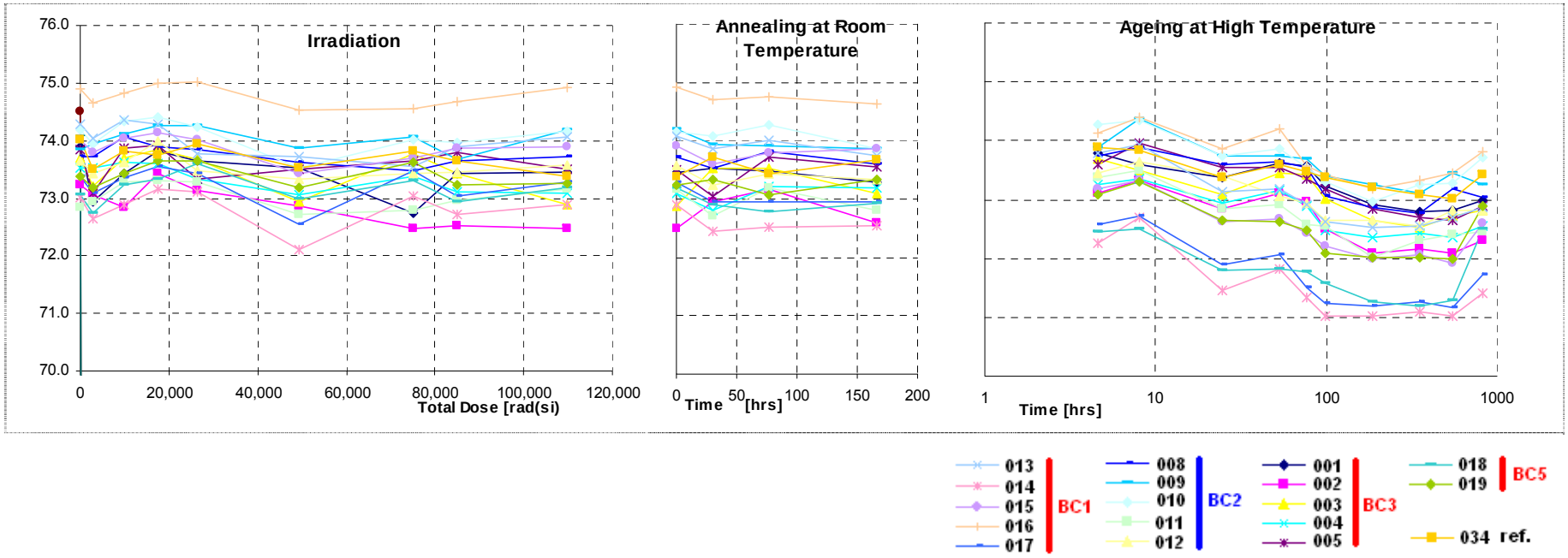
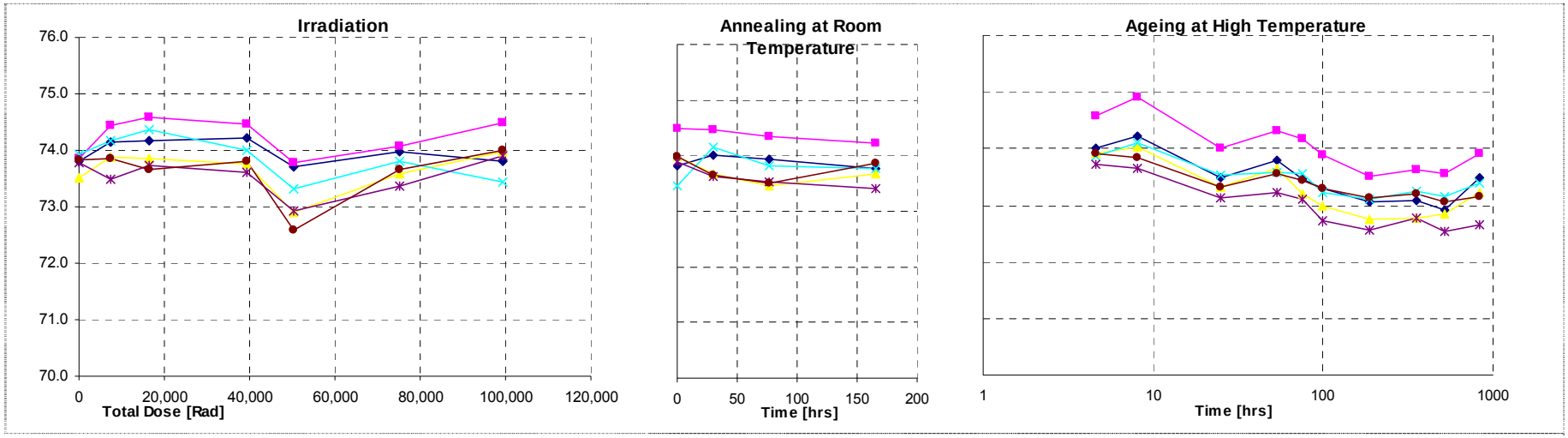


Figure 33 $I_{DS(on)}$ Drain-Source On Current [A] vs 60Co Irradiation Total Dose [rad (Si)], anneal time [hrs] at R.T. and ageing time [hrs] at 100°C

STRH40N6SY3	Min.	Max.	Unit
Applicable limits:		60	[A]

Parameter not listed in Manufacturer data sheet



5 SUMMARY OF TEST RESULTS

Two devices, s/n 006 and 007, failed catastrophically after 2.8krad(Si). Both devices were biased at V_{DS}=200V, V_{GS}=-20V (BC4). Failed devices were replaced by other five devices and no more catastrophic failures were observed up to 99 krad(Si) for bias condition BC4 and 110. krad(Si) for all the other bias conditions. The parameter degradations, induced by gamma radiation, are summarized in Table 23, Table 24 and in Table 25.

Table 23 reports the total doses, recorded before and after the *out of limit* condition, aggregated by the applied bias conditions described in Table 22:

Table 22 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} = +160V, V_{GS} = 0V	008, 009, 010, 011, 012
BC3	V_{DS} = 0V, V_{GS} = 0V	001, 002, 003, 004, 005
BC4	V_{DS} = +200V, V_{GS} = -20V	020, 021, 022, 023, 024
BC5	V_{DS} = 0V, V_{GS} = +12V	018, 019

Table 23 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*
1	IGSS_R1 @ V_{GS} = -20V	**26.5**	49.3	110.0	-	110.0	-	99.2	-	110.0	-
(a) 2	IDSS @ V_{DS} 5V, V_{GS} 0V	**85.0**	110.0	110.0	-	110.0	-	99.2	-	**85.0**	110.0
(a) 3	IDSS @ Vds 160V, Vgs 0V	**85.0**	110.0	110.0	-	110.0	-	99.2	-	**85.0**	110.0
4	IDSS @ Vds 200V, Vgs 0V	**85.0**	110.0	110.0	-	110.0	-	99.2	-	**85.0**	110.0
(a) 5	VGS_th @ I_D 0.01 mA	**26.5**	49.3	**49.3**	75.1	**49.3**	75.1	**39.3**	50.2	**55.0**	70.1
(a) 6	VGS_th @ I_D 0.10 mA	**26.5**	49.3	**85.0**	110.0	**85.0**	110.0	**39.3**	50.2	**26.5**	49.3
(a) 7	VGS_th @ I_D 0.25 mA	**49.3**	75.1	**85.0**	110.0	**85.0**	110.0	**50.2**	75.0	**49.3**	75.1
8	VGS_th @ I_D 1.00 mA	**49.3**	75.1	110.0	-	110.0	-	**50.2**	75.0	**49.3**	75.1
(a) 11	V(BR)DSS @I_D=100uA	**85.0**	110.0	110.0	-	110.0	-	110.0	-	110.0	-

(a) Parameter not listed in Manufacturer data sheet AD 4

Note that Table 23 and Table 24 list only the parameters showing an "out of limit" condition. Refer to Table 25 for a description of the behaviour of all parameters.

Table 24 Detail of Failures

nr.	Parameter	Bias conditions	Remarks	Table	Fig.
1	IGSS_R1 @ V_{GS} = -20V	**BC3**	S/n's 015 and -016 show an increasing trend with marginal failure starting from 49.3 krad(Si). Failures recovered after 30 hrs anneal at room temperature. Failures appeared weakly correlated to the received dose.	7	4
(a) 2	IDSS @ V_{DS} 5V, V_{GS} 0V	**BC1, BC5**	S/n's 014, 015 and 019 pass at 85.0krad(Si). S/n 019 failure recovered after 30hrs annealing at RT. S/n 015 failure recovered after 166 hrs annealing at R.T. S/n 014 failure recovered after 54 hrs H.T. ageing.	8	6
(a) 3	IDSS @ V_{DS} 160V, V_{GS} 0V	**BC1, BC5**	S/n's 013 to 017 and 018 to 019 pass at 85.0 krad(Si). S/n's 013 and 016 to 019 failures recovered after 166 hrs annealing at R.T. S/n 015 failure recovered after 5 hrs H.T. ageing. S/n 014 failure recovered after 54 hrs H.T. ageing.	9	8

(a) Parameter not listed in Manufacturer data sheet AD 4

Table 24 Detail of Failures **<< continued >>**

nr.	Parameter	Bias conditions	Remarks	Table	Fig.
4	IDSS @ V_{DS} 200V, V_{GS} 0V	**BC1, BC5**	S/n's 013 to 017 and 018 to 019 pass at 85 krad(Si). All Failures recovered after 5 hrs H.T. ageing except for device s/n 014 failure that recovered after 54 hrs H.T. ageing.	10	10
(a) 5	VGS_th @ I_D 0.01 mA	**BC1, BC5**	S/n's 013 to 017 and 018 to 019 passes at 26.5 krad(Si). Failures recovered after H.T. ageing of: 25 hrs for s/n' 013, 017 and s/n 18. 54 hrs for s/n 015, 76 hrs for s/n 019 188 hrs for s/n 14 and s/n 16. Evidence of rebound is observable in the recovery trends of all parts; s/n 018 and s/n 19 failed again after 830 hrs of ageing.	11	12
		BC2, BC3	S/n's 001 to 005 and 008 to 012 pass at 49.3 krad(Si). S/n 009 failure recovered after 5 hrs H.T. ageing and the remaining failures recovered after 8 hrs H.T. ageing.		12
		BC4	S/n's 020 to 024 pass at 39.3 krad(Si). S/n 021 failure recovered after 546 hrs H.T. ageing. S/n's , 023 and 024 failures recovered after 830 hrs H.T. ageing.		13
(a) 6	VGS_th @ I_D 0.10 mA	**BC1**	S/n's 014, 015, 017 pass at 26.5 krad(Si). S/n's 013 and 016 pass at 49.3krad(Si). Failures recovered after 25 hrs (s/n 013, 017), 54 hrs (s/n 015, 016) and 188 hrs (s/n 014) H.T. ageing. Evidence of rebound is observable in the recovery trends of all parts.	12	14
		BC5	S/n's 018 to 019 pass at 26.5 krad(Si). Failures recovered after 25 hrs(s/n 018) and 76 hrs H.T. ageing. Evidence of rebound is observable in the recovery trends of both parts		
		BC2, BC3	All devices passes at 85 krad(Si). Failures recovered after 5 hrs H.T. ageing .		
		BC4	S/n 022 pass at 39.3 krad(Si). S/n's 020, 021,023 and 024 passes at 50.2 krad(Si). S/n's 021 and 024 failures recovered after 188 hrs H.T. ageing. S/n's 020,022 and 023 failures recovered after 355 hrs H.T. ageing.		15
(a) 7	VGS_th @ I_D 0.25 mA	**BC1**	All s/n's pass at 49.3krad(Si). Failures recovered after 5 hrs (s/n 013), 25 hrs (s/n 015, 017), 54 hrs (s/n 015, 016) and 100 hrs (s/n 014) H.T. ageing. Evidence of rebound is observable in the recovery trends of all parts.	13	16
		BC5	S/n's 018 to 019 pass at 49.3 krad(Si). Failures recovered after 25 hrs(s/n 018) and 54 hrs (s/n 019) H.T. ageing. Evidence of rebound is observable in the recovery trends of both parts.		
		BC2, BC3	All devices passes at 85 krad(Si) except for s/n 009 that pass 110 krad(Si) and failed after 30 hrs R.T. annealing. All failures recovered after 5 hrs H.T. ageing .		
		BC4	All parts pass at 50.2 krad(Si). S/n's 020, 021,023 and 024 passes at 50.2 krad(Si). S/n's 021 failure recovered after 54 hrs H.T. ageing. S/n's 024 failure recovered after 76.hrs H.T. ageing. S/n's 020,022 and 023 failures recovered after 188 hrs H.T. ageing.		17

(a) Parameter not listed in Manufacturer data sheet AD 4

Table 24 Detail of Failures **<< continued >>**

nr.	Parameter	Bias conditions	Remarks	Table	Fig.
8	VGS_th @ I_D 1.00 mA	**BC1**	S/n's 014 to 017 pass at 49.3krad(Si). S/n's 013 pass at 85 krad(Si). Failures recovered after 5 hrs (s/n 013, 017), 25 hrs (s/n 015, 016), 76 hrs (s/n 014) H.T. ageing. Evidence of rebound is observable in the recovery trends of all parts.	14	18
		BC5	S/n's 018 to 019 pass at 49.3 krad(Si). Failures recovered after 5 hrs(s/n 018) and 25 hrs (s/n 019) H.T. ageing. Evidence of rebound is observable in the recovery trends of both parts.		
		BC4	All parts pass at 50.2 krad(Si). S/n's 020, 021,023 and 024 passes at 50.2 krad(Si). S/n's 021 and 024 failure recovered after 25 hrs H.T. ageing. S/n's 020,022 and 023 failures recovered after 54 hrs H.T. ageing.		19
(a) 11	V(BR)DSS @I_D=100uA	**BC1**	S/n's 014 pass at 85.0 krad(Si) failing at 110 krad(Si). Failure recovered after 30 hrs R.T. annealing.	17	24

(a) Parameter not listed in Manufacturer data sheet AD 4

The observations indicate the Gate Threshold Voltage V_{GSTH} @ 0.01mA most affected by the TID degradation with a worst case drift down to – 100% with respect to the initial value.

The Gate Threshold Voltage V_{GSTH} @ 1 mA can still be considered a representative parameter for degradation induced by TID. Failures of I_{DSS} and $V_{(BR)DSS}$ parameter essentially correlate with the observed shift of gate threshold voltage. Moreover, the same V_{GSTH} also exhibits 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 26 and Figure 34 are shown data trend of the normalized Gate Threshold Voltage (V_{GSTH} @ 1 mA) Drift in [%] vs TID and anneal/ageing sequence.

Table 25 Summary of TID test results up to 110.0krad(Si) (100 Krad for BC4 devices)

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	6	2,3
1	IGSS_R1	Weak evidence of dependence on TID and Bias Conditions. Some marginal failures have been observed followed by unexpected recovery on s/n 005 and s/n 010. They are believed essentially not TID related effect.	V_{DS}= 0V V_{GS}= +12/15V	7	4,5
(a)2	IDSS @ Vds 5V, Vgs 0V	Evidence of TID dependence. Evidence of Bias condition dependence.	V_{DS}= 0V V_{GS}= +12/15V	8	6,7
3	IDSS @ Vds 160V, Vgs 0V	Evidence of TID dependence. Evidence of Bias condition dependence.	V_{DS}= 0V V_{GS}= +12/15V	9	8,9
(a)4	IDSS @ Vds 200V, Vgs 0V	Evidence of TID dependence. Evidence of Bias condition dependence.	V_{DS}= 0V V_{GS}= +12/15V	10	10,11
(a)5	VGS_th @ I_D 0.01 mA	Clear TID dependence. Clear Bias condition dependence.	V_{DS}= 0V V_{GS}= +12/15V	11	12,13
(a)6	VGS_th @ I_D 0.10 mA	Clear TID dependence. Clear Bias condition dependence.	V_{DS}= 0V V_{GS}= +12/15V	12	14,15
(a)7	VGS_th @ I_D 0.25 mA	Clear TID dependence. Clear Bias condition dependence.	V_{DS}= 0V V_{GS}= +12/15V	13	16,17
8	VGS_th @ I_D 1.00 mA	Clear TID dependence. Clear Bias condition dependence.	V_{DS}= 0V V_{GS}= +12/15V	14	18,19
(*) (b)9	RDS(on) - D-S On-Resistance	No evidence TID dependence. No evidence of Bias condition dependence.	n/a	15	20,21
(*) (a)10	VDS(on) - D-S On-Voltage	No evidence TID dependence. No evidence of Bias condition dependence.	n/a	16	22,23
(a)11	V(BR)DSS @I_D=100uA	Weak Evidence of TID dependence. Weak evidence of Bias condition dependence.	V_{DS}= 0V V_{GS}= +15V	17	24,25
12	V(BR)DSS @I_D=250uA	Weak Evidence of TID dependence. Weak evidence of Bias condition dependence. All devices still within the limits	V_{DS}= 0V V_{GS}= +15V	18	26,27
13	V(BR)DSS @I_D=1mA	Weak Evidence of TID dependence. Weak evidence of Bias condition dependence. All devices still within the limits.	V_{DS}= 0V V_{GS}= +12/15V	19	28,29
(a)14	VSD - Inverse Diode Fwd. Volt.	No evidence TID dependence. No evidence of Bias condition dependence.	n/a	20	30,31
(a)15	ID(on) - On-State Drain Current	No evidence TID dependence. No evidence of Bias condition dependence.	n/a	21	32,33

(a) Parameter not listed in Manufacturer data sheet AD 4
(b) The actual test conditions deviate from Manufacturer Test Condition data sheet AD 4 due to test equipment limitation.

(*) Note that the tested devices are packaged in TO3 carriers. The different package together with deviation from required test condition due to test equipment limitation should be taken into the account for the observed out of limits in $RDS_{(ON)}$ resistance and $VDS_{(ON)}$.

Table 26 – V_{GS_th} @ I_{DS} 1.0 mA, Gate Threshold Voltage Drift from initial values [%] vs ^{60}Co Irradiation Total Dose [rad (Si)]

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

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs								
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
034	*0.00%*	*-0.39%*	*-0.14%*	*-0.05%*	*0.11%*	*-0.70%*	*0.11%*	*-0.07%*	*-0.01%*	*-0.07%*	*-0.29%*	*-0.29%*	*-0.04%*	*0.02%*	*-0.34%*	*-0.17%*	*-0.16%*	*-0.02%*	*-0.21%*	*0.09%*	*-0.25%*	*-0.12%*

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

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs								
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
013	0.0%	-4.8%	-12.6%	-18.4%	-24.4%	-38.7%	-49.9%	-55.5%	-62.7%	-60.9%	-57.4%	-55.7%	-42.3%	-36.7%	-10.5%	-3.7%	-2.0%	0.6%	2.7%	6.3%	4.1%	-5.9%
014	0.0%	-4.9%	-13.0%	-18.8%	-25.1%	-40.1%	-54.9%	-61.7%	-79.4%	-78.3%	-77.2%	-75.4%	-72.5%	-71.2%	-66.4%	-52.4%	-34.0%	-22.6%	-4.2%	2.8%	1.7%	-6.1%
015	0.0%	-5.0%	-13.0%	-18.9%	-25.1%	-40.3%	-52.7%	-59.1%	-72.6%	-71.3%	-69.4%	-67.4%	-61.6%	-58.4%	-25.9%	-6.4%	-4.0%	-1.7%	1.2%	5.1%	2.4%	-6.6%
016	0.0%	-5.0%	-12.9%	-18.8%	-25.1%	-40.1%	-53.2%	-58.6%	-68.9%	-66.9%	-64.4%	-62.8%	-55.0%	-52.1%	-41.4%	-32.7%	-25.6%	-16.7%	-1.3%	3.0%	0.9%	-7.6%
017	0.0%	-5.0%	-13.1%	-19.0%	-25.2%	-40.1%	-50.4%	-56.4%	-67.0%	-65.1%	-62.8%	-60.0%	-48.9%	-42.4%	-12.0%	-4.1%	-2.3%	0.2%	2.8%	6.5%	3.9%	-4.9%
Min		*-5.0%*	*-13.1%*	*-19.0%*	*-25.2%*	*-40.3%*	*-54.9%*	*-61.7%*	*-79.4%*	*-78.3%*	*-77.2%*	*-75.4%*	*-72.5%*	*-71.2%*	*-66.4%*	*-52.4%*	*-34.0%*	*-22.6%*	*-4.2%*	*2.8%*	*0.9%*	*-7.6%*
Max		*-4.8%*	*-12.6%*	*-18.4%*	*-24.4%*	*-38.7%*	*-49.9%*	*-55.5%*	*-62.7%*	*-60.9%*	*-57.4%*	*-55.7%*	*-42.3%*	*-36.7%*	*-10.5%*	*-3.7%*	*-2.0%*	*0.6%*	*2.8%*	*6.5%*	*4.1%*	*-4.9%*
Avg		*-5.0%*	*-12.9%*	*-18.8%*	*-25.0%*	*-39.9%*	*-52.2%*	*-58.3%*	*-70.1%*	*-68.5%*	*-66.2%*	*-64.3%*	*-56.0%*	*-52.2%*	*-31.2%*	*-19.9%*	*-13.6%*	*-8.1%*	*0.2%*	*4.7%*	*2.6%*	*-6.2%*
St.dev		*0.09%*	*0.18%*	*0.25%*	*0.32%*	*0.66%*	*2.06%*	*2.44%*	*6.31%*	*6.62%*	*7.47%*	*7.52%*	*11.64%*	*13.56%*	*23.29%*	*21.91%*	*15.14%*	*10.85%*	*2.98%*	*1.76%*	*1.39%*	*0.97%*

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

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs								
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
018	0.0%	-4.6%	-12.4%	-19.3%	-25.4%	-40.4%	-53.5%	-61.1%	-70.5%	-67.5%	-64.4%	-61.3%	-45.6%	-39.3%	-13.5%	-5.3%	-3.1%	-1.0%	1.6%	4.5%	1.5%	-33.4%
019	0.0%	-4.6%	-12.7%	-19.5%	-25.7%	-41.2%	-53.3%	-61.7%	-71.8%	-69.0%	-66.4%	-64.3%	-55.0%	-52.5%	-42.9%	-27.5%	-12.3%	-3.8%	0.8%	3.5%	0.7%	-33.6%
Avg		*-4.6%*	*-12.6%*	*-19.4%*	*-25.5%*	*-40.8%*	*-53.4%*	*-61.4%*	*-71.2%*	*-68.3%*	*-65.4%*	*-62.8%*	*-50.3%*	*-45.9%*	*-28.2%*	*-16.4%*	*-7.7%*	*-2.4%*	*1.2%*	*4.0%*	*1.1%*	*-33.5%*
St.dev		*0.01%*	*0.19%*	*0.11%*	*0.24%*	*0.57%*	*0.15%*	*0.43%*	*0.92%*	*1.04%*	*1.42%*	*2.13%*	*6.65%*	*9.30%*	*20.82%*	*15.72%*	*6.49%*	*1.95%*	*0.54%*	*0.71%*	*0.56%*	*0.19%*

Table 26 – 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 BC4 (V_{DS} 200V, V_{GS} -20V), detailed results - V_{GS_th} @ IDS 1.0 mA drift from Initial values in [%]

	Total Ionising Dose in krad (Si)							Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs									
	0	7.4	16.5	39.3	50.2	75.0	99.2	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
020	0.0%	-8.6%	-17.1%	-36.1%	-44.6%	-59.6%	-75.4%	-74.5%	-73.8%	-73.0%	-63.8%	-62.8%	-59.3%	-55.5%	-53.5%	-52.0%	-48.0%	-44.4%	-42.2%	-39.1%
021	0.0%	-8.7%	-16.9%	-35.8%	-44.4%	-59.2%	-74.3%	-73.2%	-72.8%	-71.6%	-60.2%	-58.4%	-54.2%	-50.3%	-48.9%	-48.1%	-45.3%	-41.2%	-38.7%	-36.3%
022	0.0%	-9.2%	-17.7%	-37.4%	-46.3%	-61.9%	-77.2%	-76.3%	-76.0%	-74.5%	-63.2%	-61.4%	-57.0%	-53.4%	-51.8%	-50.9%	-48.0%	-43.7%	-41.4%	-38.3%
023	0.0%	-9.0%	-17.6%	-37.0%	-45.3%	-60.9%	-76.3%	-75.3%	-75.1%	-73.9%	-63.1%	-61.3%	-57.2%	-53.5%	-51.8%	-50.7%	-47.9%	-43.5%	-41.4%	-38.6%
024	0.0%	-8.8%	-17.3%	-36.1%	-44.5%	-59.7%	-75.1%	-74.2%	-73.6%	-72.6%	-63.3%	-61.7%	-57.7%	-52.6%	-50.8%	-49.8%	-46.7%	-42.7%	-41.0%	-38.0%
Min		*-9.2%*	*-17.7%*	*-37.4%*	*-46.3%*	*-61.9%*	*-77.2%*	*-76.3%*	*-76.0%*	*-74.5%*	*-63.8%*	*-62.8%*	*-59.3%*	*-55.5%*	*-53.5%*	*-52.0%*	*-48.0%*	*-44.4%*	*-42.2%*	*-39.1%*
Max		*-8.6%*	*-16.9%*	*-35.8%*	*-44.4%*	*-59.2%*	*-74.3%*	*-73.2%*	*-72.8%*	*-71.6%*	*-60.2%*	*-58.4%*	*-54.2%*	*-50.3%*	*-48.9%*	*-48.1%*	*-45.3%*	*-41.2%*	*-38.7%*	*-36.3%*
Avg		*-8.9%*	*-17.3%*	*-36.5%*	*-45.0%*	*-60.3%*	*-75.7%*	*-74.7%*	*-74.3%*	*-73.1%*	*-62.7%*	*-61.1%*	*-57.1%*	*-53.1%*	*-51.4%*	*-50.3%*	*-47.2%*	*-43.1%*	*-40.9%*	*-38.1%*
St.dev		*0.25%*	*0.32%*	*0.68%*	*0.82%*	*1.13%*	*1.12%*	*1.15%*	*1.28%*	*1.10%*	*1.43%*	*1.62%*	*1.86%*	*1.88%*	*1.67%*	*1.47%*	*1.19%*	*1.22%*	*1.29%*	*1.05%*

Table 26 – 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 BC2 (V_{DS} +160V, V_{GS} 0V), detailed results - V_{GS_th} @ IDS 1.0 mA drift from Initial values in [%]

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs								
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
008	0.0%	-1.9%	-6.3%	-10.5%	-15.5%	-26.8%	-36.7%	-40.6%	-47.8%	-48.3%	-48.7%	-49.2%	-39.0%	-37.1%	-34.0%	-31.6%	-30.4%	-29.9%	-27.8%	-24.6%	-23.0%	-21.4%
009	0.0%	-1.9%	-5.8%	-10.2%	-14.9%	-25.7%	-35.5%	-39.0%	-45.9%	-46.5%	-46.8%	-47.4%	-38.2%	-36.5%	-33.4%	-31.2%	-30.3%	-29.4%	-27.3%	-24.1%	-22.6%	-21.1%
010	0.0%	-2.1%	-6.3%	-10.6%	-15.5%	-27.4%	-36.4%	-40.5%	-47.7%	-48.0%	-48.5%	-49.1%	-39.3%	-37.2%	-34.0%	-31.6%	-30.7%	-30.2%	-28.1%	-24.7%	-23.1%	-21.2%
011	0.0%	-1.7%	-6.0%	-10.4%	-15.1%	-26.6%	-35.9%	-39.7%	-46.7%	-47.1%	-47.7%	-48.2%	-39.1%	-37.2%	-34.0%	-31.6%	-30.6%	-29.9%	-27.9%	-24.4%	-22.9%	-21.2%
012	0.0%	-1.8%	-6.2%	-10.5%	-15.5%	-26.7%	-36.5%	-40.3%	-47.5%	-48.0%	-48.4%	-49.1%	-39.5%	-37.4%	-34.3%	-32.1%	-31.1%	-30.2%	-28.0%	-25.2%	-23.6%	-21.9%
Min		*-2.1%*	*-6.3%*	*-10.6%*	*-15.5%*	*-27.4%*	*-36.7%*	*-40.6%*	*-47.8%*	*-48.3%*	*-48.7%*	*-49.2%*	*-39.5%*	*-37.4%*	*-34.3%*	*-32.1%*	*-31.1%*	*-30.2%*	*-28.1%*	*-25.2%*	*-23.6%*	*-21.9%*
Max		*-1.7%*	*-5.8%*	*-10.2%*	*-14.9%*	*-25.7%*	*-35.5%*	*-39.0%*	*-45.9%*	*-46.5%*	*-46.8%*	*-47.4%*	*-38.2%*	*-36.5%*	*-33.4%*	*-31.2%*	*-30.3%*	*-29.4%*	*-27.3%*	*-24.1%*	*-22.6%*	*-21.1%*
Avg		*-1.9%*	*-6.1%*	*-10.5%*	*-15.3%*	*-26.6%*	*-36.2%*	*-40.0%*	*-47.1%*	*-47.6%*	*-48.0%*	*-48.6%*	*-39.0%*	*-37.1%*	*-33.9%*	*-31.6%*	*-30.6%*	*-29.9%*	*-27.8%*	*-24.6%*	*-23.1%*	*-21.4%*
St.dev		*0.12%*	*0.19%*	*0.17%*	*0.26%*	*0.61%*	*0.52%*	*0.66%*	*0.80%*	*0.75%*	*0.75%*	*0.79%*	*0.51%*	*0.35%*	*0.31%*	*0.31%*	*0.34%*	*0.32%*	*0.29%*	*0.40%*	*0.36%*	*0.34%*

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

	Total Ionising Dose in krad (Si)									Anneal at R.T. Time in hrs			Ageing at 100 °C Time in hrs								
	0	2.8	10.0	17.4	26.5	49.3	75.1	85.0	109.8	30	77	166	4.6	8.1	24.8	53.7	76.3	99	187.8	355.3	545.8	830.3
001	0.0%	-1.9%	-6.0%	-10.6%	-15.3%	-26.4%	-36.0%	-39.8%	-46.8%	-47.2%	-47.5%	-48.1%	-38.6%	-36.5%	-32.8%	-30.3%	-29.5%	-28.9%	-27.5%	-24.6%	-23.2%	-21.6%
002	0.0%	-2.0%	-6.1%	-10.3%	-15.4%	-26.3%	-36.0%	-39.8%	-46.6%	-47.1%	-47.6%	-48.0%	-38.1%	-36.2%	-32.3%	-29.8%	-28.6%	-28.0%	-26.4%	-23.5%	-22.2%	-20.2%
003	0.0%	-2.1%	-6.5%	-10.7%	-15.8%	-28.0%	-36.5%	-40.3%	-47.3%	-47.7%	-48.1%	-49.1%	-39.4%	-37.1%	-33.3%	-31.0%	-29.9%	-29.3%	-27.7%	-24.9%	-23.6%	-21.8%
004	0.0%	-2.0%	-6.1%	-10.4%	-15.2%	-26.4%	-36.0%	-39.7%	-46.6%	-46.9%	-47.4%	-48.0%	-38.5%	-36.4%	-32.3%	-29.8%	-28.6%	-28.2%	-26.5%	-23.5%	-22.1%	-20.4%
005	0.0%	-1.9%	-6.2%	-10.5%	-15.3%	-26.7%	-36.0%	-39.5%	-46.7%	-47.0%	-47.5%	-48.2%	-39.0%	-37.0%	-33.1%	-30.6%	-29.5%	-29.0%	-27.2%	-24.5%	-23.3%	-21.5%
Min		*-2.1%*	*-6.5%*	*-10.7%*	*-15.8%*	*-28.0%*	*-36.5%*	*-40.3%*	*-47.3%*	*-47.7%*	*-48.1%*	*-49.1%*	*-39.4%*	*-37.1%*	*-33.3%*	*-31.0%*	*-29.9%*	*-29.3%*	*-27.7%*	*-24.9%*	*-23.6%*	*-21.8%*
Max		*-1.9%*	*-6.0%*	*-10.3%*	*-15.2%*	*-26.3%*	*-36.0%*	*-39.5%*	*-46.6%*	*-46.9%*	*-47.4%*	*-48.0%*	*-38.1%*	*-36.2%*	*-32.3%*	*-29.8%*	*-28.6%*	*-28.0%*	*-26.4%*	*-23.5%*	*-22.1%*	*-20.2%*
Avg		*-2.0%*	*-6.2%*	*-10.5%*	*-15.4%*	*-26.8%*	*-36.1%*	*-39.8%*	*-46.8%*	*-47.2%*	*-47.6%*	*-48.3%*	*-38.7%*	*-36.6%*	*-32.7%*	*-30.3%*	*-29.2%*	*-28.7%*	*-27.0%*	*-24.2%*	*-22.9%*	*-21.1%*
St.dev		*0.08%*	*0.21%*	*0.14%*	*0.22%*	*0.70%*	*0.23%*	*0.31%*	*0.29%*	*0.31%*	*0.25%*	*0.45%*	*0.47%*	*0.41%*	*0.47%*	*0.51%*	*0.57%*	*0.54%*	*0.58%*	*0.65%*	*0.68%*	*0.72%*

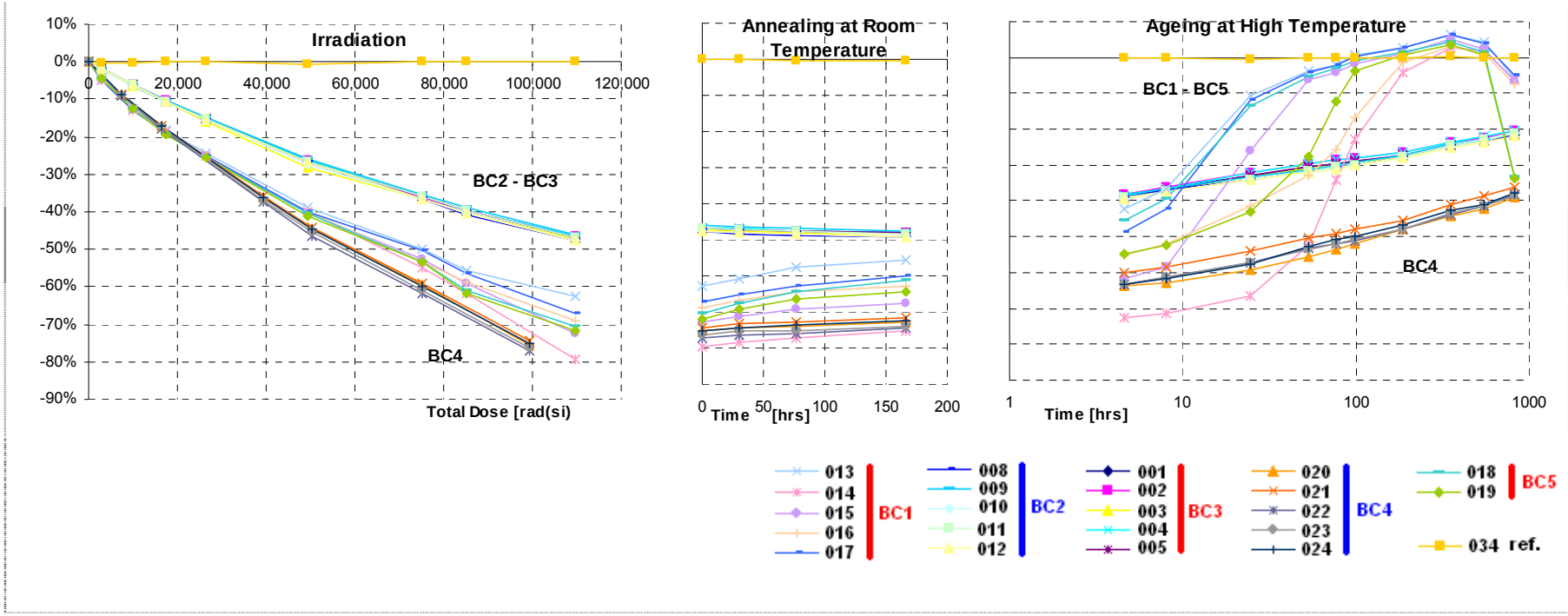


Figure 34 VGS_th @ IDS 1.0 mA, Gate Threshold Voltage Drift from initial values [%] vs 60Co Irradiation Total Dose [rad (Si)]

6 CONCLUSION

According to test results the conclusion of radiation test on STRH60N20FSY3 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 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).