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| <b>Infineon</b><br>technologies<br><br><b>HiRel Discrete &amp; MW Semiconductors</b> | ESCC Comp. No.: 520503301R   | Page: 1  |
|  | Wafer Lot: VE810011  | Rep.No.: VE810011TID<br>Issue: Iss. 1, Aug. 2021 |
|  | <b>Total Dose Steady-State Irradiation Test Report</b><br><b>BUY65CS08J-01(ES)</b> |  |

## §1 COVER SHEET

### • Component and Test Identification

|                       |                                    |
|-----------------------|------------------------------------|
| <b>Comp. Type</b>     | BUY65CS08J-01(ES)                  |
| <b>ESCC Comp. No.</b> | 520503301R                         |
| <b>Lot Ident.</b>     | Wafer Lot No. VE810011             |
|                       | Assembly Lot n.a.                  |
|                       | ESA Date Code n.a.                 |
|                       | Radiation Testing Level R: 100kRad |
| <b>Test data</b>      | Test Plan TPIFX1827B               |
|                       | Tested Sample Serial No.s 61-78    |
|                       | Control Sample Serial No.s R93-R97 |

### • Applicable Documents

|  |  |
|--|--|
| <b>Detail Specification</b>            | ESCC 5205/033 Issue 1, May 2020                      |
| <b>Generic Specification</b>           | ESCC 5000 Issue 10, Feb. 2021                        |
| <b>Process Identification Document</b> | A63500-L5491-P000_Detail_PID_BUY25CS_9               |
| <b>Irradiation Specification</b>       | ESCC Basic Specification No. 22900 Iss. 5, June 2016 |

### • Manufacturer / Facility

|                               |   |
|-------------------------------|---|
| <b>Silicon Die</b>            | Infineon Technologies Austria AG<br>Siemensstrasse 2, 9500 Villach, Austria |
| <b>Assembly &amp; Testing</b> | Infineon Technologies AG<br>Am Campeon 1-15, D 85579 Neubiberg, Germany     |

### • Report Issue, Date / Manufacturers Signatures

Iss. 1, Aug. 2021

Total Number of Pages:

10 plus Appendix

| Process            | Department    | Name             | Signatures |
|--------------------|---------------|------------------|------------|
| Chip Assembly      | PSS RFS D HIR | M. Hildebrandt   |            |
| Test Management    | PSS RFS D HIR | D. Schwertberger |            |
| Project Management | PSS RFS D HIR | Dr. T. Chirila   |            |
| HiRel Management   | PSS RFS D HIR | Dr. B. Eisener   |            |



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### §3 SCOPE AND TEST INFORMATION

This Test Report describes Total Dose Steady-State Irradiation (TID) tests and results of radiation-hardened power MOSFETs from Infineon Technologies, types BUY65CS08J-01(ES), in accordance to Chart F2 - Production Control Para. 5.2.5 in ESCC Generic Specification 5000.

This report contains the Total Dose Steady-State Irradiation Test results of wafer lot VE810011 for type BUY65CS08J-01(ES) (ESCC detail specification No. 5205/033).

Test campaign TID 58 has been performed at the facility JS-9000 in Germany on the 6.7.2021.

The read and record data from the electrical measurements of the tested and control samples is given in §7.2 of this report.

### §4 IRRADIATION FACILITY – JS-9000

The JS-9000 irradiator is a pallet facility designed to irradiate large volumes of palletized products. The irradiation source is Co60.

For irradiations in this facility the samples are placed in an aluminium-lead container as recommended in ESCC 22900 §4.1.2. The irradiation field in the container has been determined by means of dose mapping. Dose rate across the field where the samples are placed varies from 97% to 102.6% which is in the +/-10% allowed window.

Total Dose performance is measured during the test with alanine dosimeters and recorded in the test report. Irradiation takes place at room temperature.

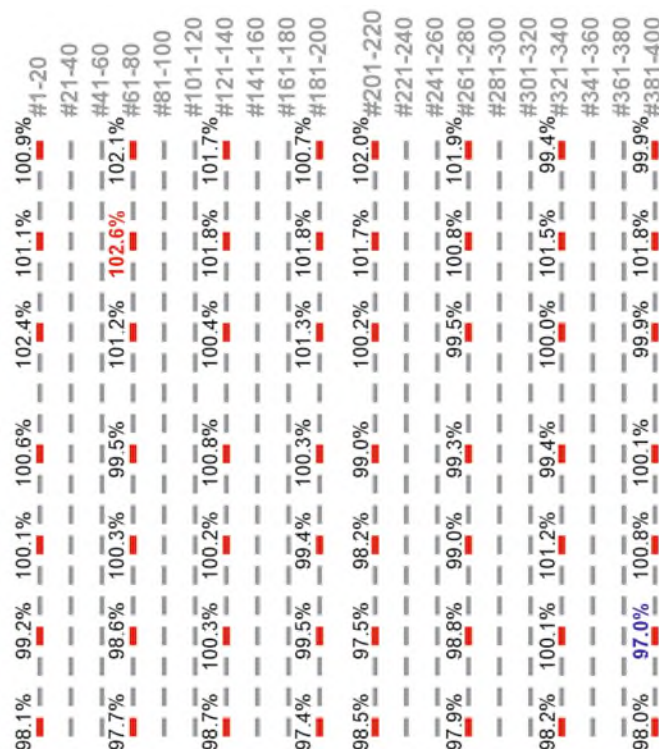


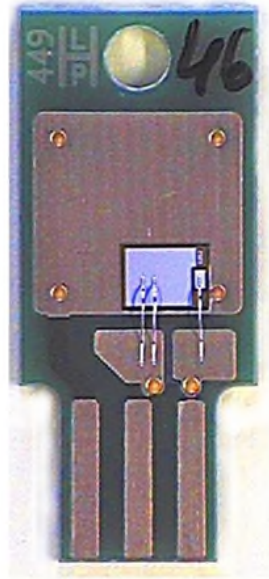
Fig. 1: Measured gamma intensity within the container at marked sample positions. Maximum and minimum measured intensities are marked – 102.6% and 97.0%.

### §5 DEVICES MARKINGS AND SAMPLE PREPARATION

|  |  |  |
|--|--|--|
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In order to contact devices with the test sockets on bias boards, chips have been soldered with AuZn solder material and bonded with 125µm Al wires to respective 3-pin PCB-TO-adaptor boards to connect Gate/Drain/Source contacts of the MOSFETs.

Devices' numbers are written on the PCB with a permanent marker. The number correlates in the sample list to the lot and wafer number.



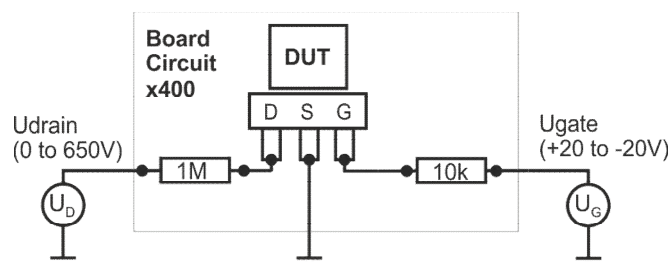
**Fig. 2:** Die mounted on PCB for TID testing – soldered and wire-bonded

## §6 IRRADIATION CONDITIONS

The irradiation step had a duration of 3h 55 min at a dose rate of 41.3 krad/h which yields a total ionizing dose of 162 krad.

The tested devices were electrically biased according to the table below (remote test):

| Electrical Bias Condition | Bias Circuit | Supply voltages |       |        |
|---------------------------|--------------|-----------------|-------|--------|
|                           |              | Gate            | Drain | Source |
| C1                        | Fig. 3       | +20 V           | 0 V   | 0 V    |
| C2                        | Fig. 3       | -20 V           | 0 V   | 0 V    |
| C3                        | Fig. 3       | 0 V             | 650 V | 0 V    |



**Fig. 3** Bias circuit for TID tests

|  |  |  |
|--|--|--|
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## §7 IRRADIATION TEST SEQUENCE

Irradiation- anneal- and electrical measurement steps follow the FLOW CHART FOR QUALIFICATION AND LOT ACCEPTANCE TESTING of Basic Specifications ESCC22900.

The test data is documented in an Infineon internal data package. It includes a summary listing total submitted and rejected numbers of components to the performed processes and tests.

The following table certifies which tests have been actually performed and certifies the availability of data.

**TID Test Overview**

| Process / Test                            | Perfor-<br>med | Data<br>Avail. | Remarks / Notes                     |
|---|----------------|----------------|-------------------------------------|
| Serialisation                             | x              | x              |                                     |
| Initial electrical measurements – pre-TID | x              | x              | Acc. Table 2, DC in ESCC Det. Spec. |
| Irradiation in one step                   | x              | x              | Conditions specified in §6          |
| Parameter Drift Values – post-TID         | x              | x              | Acc. §2.10.2 in ESCC Det. Spec.     |
| Room temperature anneal for 24 hours      | x              | x              | Same bias as during irradiation     |
| Parameter Drift Values – 24h@RT           | x              | x              | Acc. §2.10.2 in ESCC Det. Spec.     |
| Accelerated aging: 168 hours at 100°C     | x              | x              | Same bias as during irradiation     |
| Parameter Drift Values – 168h@100°C       | x              | x              | Acc. §2.10.2 in ESCC Det. Spec.     |
| Check for Lot Failure                     | x              | x              |                                     |

### §7.1 ATTRIBUTES RECORD OF MEASUREMENTS, TESTS AND INSPECTIONS

The following table gives the results of the total dose steady-state irradiation tests actually performed in terms of total quantity to test, rejected quantity in test, pass quantity in test.

**Attributes Record of Measurements, Tests and Inspections Performed**

| Process / Test                | to Test | Fail. | Pass | Data   | Remarks / Notes,<br>S/Ns of Failures and WDs |
|-------------------------------|---------|-------|------|--------|--|
| Initial Measurements          | 23      | 0     | 23   | avail. | 5 control samples included                   |
| Irradiation / Drift Value     | 23      | 0     | 23   | avail. | 5 control samples included                   |
| 24h @ RT anneal / Drift Value | 23      | 0     | 23   | avail. | 5 control samples included                   |
| 168h @ 100°C / Drift Value    | 23      | 0     | 23   | avail. | 5 control samples included                   |

**Sample distribution within the bias conditions**

| Item   | Qty | Part Notation in R&R Tables |                    |
|--|-----|-----------------------------|--------------------|
|  |     | Subgroup                    | Part SG S/Ns       |
| BUY65CS08J-01(ES) silicon chips used for C1 condition                                  | 6   | C1                          | #61,64,67,70,73,76 |
| BUY65CS08J-01(ES) silicon chips used for C2 condition                                  | 6   | C2                          | #62,65,68,71,74,77 |
| BUY65CS08J-01(ES) silicon chips used for C3 condition                                  | 6   | C3                          | #63,66,69,72,75,78 |
| BUY65CS08J-01(ES) silicon chips used as control samples (not irradiated, not annealed) | 5   | control                     | #R93-R97           |

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## §7.2 READ AND RECORD DATA OF ELECTRICAL MEASUREMENTS

This documentation contains the data from all tested parts and control samples.

### §7.2.1 INITIAL MEASUREMENTS (TABLE 2, DC)

| S/N | V(BR)DSS<br>[V] | VGS(th)<br>[V] | IGSS<br>[nA] | IGSS-<br>[nA] | IDSS<br>[uA] | RDS(ON)<br>[mOhm] | VSD<br>[V] | WaferLot/WaferNo. |
|-----|-----------------|----------------|--------------|---------------|--------------|-------------------|------------|-------------------|
| min | 650             | 2              |              |               |              |                   |            |                   |
| max |                 | 4              | 100          | 100           | 25           | 450               | 1.2        |                   |
| 61  | 744             | 3.23           | 1.4          | 1.3           | 0.002        | 374               | 0.923      | VE810011 #1       |
| 62  | 730             | 3.22           | 0.2          | 2.0           | 0.003        | 363               | 0.925      | VE810011 #1       |
| 63  | 748             | 3.30           | 0.5          | 1.5           | 0.003        | 368               | 0.925      | VE810011 #1       |
| 64  | 744             | 3.31           | 1.1          | 0.7           | 0.003        | 372               | 0.924      | VE810011 #1       |
| 65  | 745             | 3.33           | 0.5          | 0.9           | 0.003        | 372               | 0.924      | VE810011 #1       |
| 66  | 742             | 3.32           | 1.0          | 0.4           | 0.003        | 372               | 0.923      | VE810011 #1       |
| 67  | 749             | 3.23           | 0.6          | 0.9           | 0.002        | 385               | 0.926      | VE810011 #6       |
| 68  | 747             | 3.21           | 0.4          | 0.6           | 0.003        | 371               | 0.925      | VE810011 #6       |
| 69  | 750             | 3.26           | 0.4          | 0.0           | 0.003        | 372               | 0.925      | VE810011 #6       |
| 70  | 757             | 3.26           | 0.0          | 1.2           | 0.003        | 376               | 0.925      | VE810011 #6       |
| 71  | 754             | 3.30           | 0.5          | 0.9           | 0.003        | 375               | 0.926      | VE810011 #6       |
| 72  | 753             | 3.29           | 0.4          | 1.3           | 0.003        | 375               | 0.924      | VE810011 #6       |
| 73  | 742             | 3.25           | 0.6          | 0.9           | 0.002        | 376               | 0.926      | VE810011 #7       |
| 74  | 726             | 3.23           | 0.4          | 1.3           | 0.003        | 363               | 0.923      | VE810011 #7       |
| 75  | 734             | 3.28           | 0.1          | 1.6           | 0.003        | 361               | 0.925      | VE810011 #7       |
| 76  | 722             | 3.26           | 0.2          | 0.6           | 0.003        | 369               | 0.923      | VE810011 #7       |
| 77  | 725             | 3.28           | 0.4          | 1.3           | 0.003        | 368               | 0.924      | VE810011 #7       |
| 78  | 725             | 3.27           | 1.1          | 0.9           | 0.003        | 369               | 0.925      | VE810011 #7       |
| R93 | 722             | 3.18           | 0.4          | 0.9           | 0.002        | 372               | 0.928      |                   |
| R94 | 721             | 3.17           | 0.9          | 0.5           | 0.003        | 373               | 0.930      |                   |
| R95 | 738             | 3.22           | 1.0          | 1.2           | 0.002        | 368               | 0.930      |                   |
| R96 | 746             | 3.22           | 0.4          | 0.7           | 0.003        | 373               | 0.929      |                   |
| R97 | 721             | 3.23           | 0.7          | 0.8           | 0.002        | 369               | 0.929      |                   |

### §7.2.2 ELECTRICAL MEASUREMENTS AFTER IRRADIATION

| S/N | Drift Deltas post irradiation |                |              |               |                |            | Absolute Values post irradiation |                |              |               |              |                   |            | Bias Cond. |
|-----|-------------------------------|----------------|--------------|---------------|----------------|------------|----------------------------------|----------------|--------------|---------------|--------------|-------------------|------------|------------|
|     | BV(DSS)<br>[%]                | VGS(th)<br>[%] | IGSS<br>[nA] | IGSS-<br>[nA] | RDS(ON)<br>[%] | VSD<br>[%] | BV(DSS)<br>[V]                   | VGS(th)<br>[V] | IGSS<br>[nA] | IGSS-<br>[nA] | IDSS<br>[uA] | RDS(ON)<br>[mOhm] | VSD<br>[V] |            |
| min | -20%                          | -50%           | -20nA        | -20nA         | -20%           | -10%       | 650                              | 2              |              |               |              |                   |            |            |
| max | +20%                          | +10%           | +20nA        | +20nA         | +20%           | +10%       |                                  | 4              | 100          | 100           | 25           | 450               | 1.2        |            |
| 61  | -0.6                          | -17.6          | -0.1         | -0.6          | -1.3           | -0.1       | 739                              | 2.66           | 1.3          | 0.7           | 0.635        | 369               | 0.923      | C1         |
| 62  | -0.0                          | -12.8          | 0.4          | -0.3          | -0.1           | 0.1        | 730                              | 2.81           | 0.6          | 1.7           | 0.019        | 363               | 0.926      | C2         |
| 63  | -0.1                          | -23.4          | -0.3         | 0.4           | -0.1           | -0.0       | 747                              | 2.53           | 0.2          | 1.9           | 0.807        | 368               | 0.924      | C3         |
| 64  | -0.7                          | -17.0          | 0.4          | -0.4          | -1.3           | 0.0        | 739                              | 2.75           | 1.5          | 0.3           | 0.524        | 367               | 0.924      | C1         |
| 65  | 0.0                           | -12.0          | 0.5          | -0.3          | 0.0            | 0.3        | 745                              | 2.93           | 1.0          | 0.6           | 0.019        | 372               | 0.926      | C2         |
| 66  | -0.1                          | -24.2          | -0.4         | 1.2           | -0.1           | -0.0       | 741                              | 2.52           | 0.5          | 1.6           | 0.828        | 371               | 0.922      | C3         |
| 67  | -0.6                          | -17.0          | 0.7          | -0.5          | -1.1           | -0.0       | 744                              | 2.68           | 1.4          | 0.4           | 0.440        | 380               | 0.925      | C1         |
| 68  | -0.0                          | -8.8           | 0.1          | 0.1           | -0.1           | 0.1        | 747                              | 2.93           | 0.5          | 0.7           | 0.020        | 371               | 0.926      | C2         |
| 69  | -0.1                          | -23.5          | 0.5          | 1.8           | -0.1           | -0.1       | 749                              | 2.49           | 0.8          | 1.8           | 0.961        | 372               | 0.925      | C3         |
| 70  | -0.7                          | -16.7          | 0.1          | 0.0           | -1.2           | -0.1       | 752                              | 2.72           | 0.1          | 1.2           | 0.467        | 371               | 0.924      | C1         |
| 71  | 0.0                           | -7.7           | 0.3          | 0.6           | -0.1           | 0.1        | 754                              | 3.05           | 0.8          | 1.5           | 0.020        | 375               | 0.926      | C2         |

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|     | Drift Deltas post irradiation |                            |              |               |                            |                        | Absolute Values post irradiation |                            |              |               |              |                               |                        | Bias Cond. |
|-----|-------------------------------|----------------------------|--------------|---------------|----------------------------|------------------------|----------------------------------|----------------------------|--------------|---------------|--------------|-------------------------------|------------------------|------------|
| S/N | BV <sub>(DSS)</sub><br>[%]    | VGS <sub>(th)</sub><br>[%] | IGSS<br>[nA] | IGSS-<br>[nA] | RDS <sub>(ON)</sub><br>[%] | V <sub>SD</sub><br>[%] | BV <sub>(DSS)</sub><br>[V]       | VGS <sub>(th)</sub><br>[V] | IGSS<br>[nA] | IGSS-<br>[nA] | IDSS<br>[uA] | RDS <sub>(ON)</sub><br>[mOhm] | V <sub>SD</sub><br>[V] |            |
| 72  | -1.3                          | -23.7                      | 0.2          | -0.9          | 0.3                        | -0.0                   | 743                              | 2.51                       | 0.6          | 0.4           | 0.073        | 377                           | 0.924                  | C3         |
| 73  | -0.5                          | -17.8                      | 0.0          | -0.0          | -1.5                       | -0.0                   | 738                              | 2.67                       | 0.6          | 0.8           | 0.539        | 370                           | 0.926                  | C1         |
| 74  | -0.0                          | -8.5                       | 0.1          | 0.3           | -0.1                       | 0.1                    | 726                              | 2.96                       | 0.5          | 1.7           | 0.020        | 362                           | 0.925                  | C2         |
| 75  | -1.1                          | -23.1                      | 0.1          | -1.4          | -0.1                       | -0.1                   | 726                              | 2.53                       | 0.3          | 0.2           | 1.031        | 361                           | 0.924                  | C3         |
| 76  | -0.5                          | -16.7                      | 0.7          | -0.6          | -1.3                       | -0.0                   | 719                              | 2.71                       | 0.8          | 0.0           | 0.432        | 364                           | 0.923                  | C1         |
| 77  | -0.0                          | -7.7                       | 0.1          | 0.3           | -0.1                       | 0.1                    | 725                              | 3.03                       | 0.5          | 1.6           | 0.020        | 367                           | 0.925                  | C2         |
| 78  | -0.2                          | -24.0                      | 0.3          | -0.3          | -0.2                       | -0.2                   | 723                              | 2.48                       | 1.4          | 0.6           | 0.931        | 368                           | 0.923                  | C3         |
| R93 | 0.0                           | 0.1                        | 0.0          | -0.0          | 0.1                        | -0.0                   | 722                              | 3.18                       | 0.5          | 0.8           | 0.003        | 372                           | 0.928                  | Control    |
| R94 | -0.0                          | 0.1                        | -0.1         | 0.8           | -0.2                       | 0.0                    | 721                              | 3.17                       | 0.9          | 1.3           | 0.003        | 372                           | 0.930                  | Control    |
| R95 | 0.0                           | 0.0                        | 0.2          | -0.1          | 0.1                        | -0.0                   | 738                              | 3.22                       | 1.2          | 1.1           | 0.003        | 368                           | 0.930                  | Control    |
| R96 | 0.0                           | 0.0                        | 0.7          | 0.5           | 0.1                        | 0.0                    | 746                              | 3.22                       | 1.1          | 1.2           | 0.003        | 373                           | 0.929                  | Control    |
| R97 | 0.0                           | 0.0                        | -0.4         | 0.6           | 0.1                        | 0.0                    | 721                              | 3.23                       | 0.4          | 1.3           | 0.003        | 370                           | 0.929                  | Control    |

### §7.2.3 ELECTRICAL MEASUREMENTS AFTER 24 HOURS ANNEAL AT ROOM TEMPERATURE

|     | Drift Deltas post 24h anneal at RT |                            |              |               |                            |                        | Absolute Values post 24h anneal at RT |                            |              |               |              |                               |                        | Bias Cond. |
|-----|------------------------------------|----------------------------|--------------|---------------|----------------------------|------------------------|---------------------------------------|----------------------------|--------------|---------------|--------------|-------------------------------|------------------------|------------|
| S/N | BV <sub>(DSS)</sub><br>[%]         | VGS <sub>(th)</sub><br>[%] | IGSS<br>[nA] | IGSS-<br>[nA] | RDS <sub>(ON)</sub><br>[%] | V <sub>SD</sub><br>[%] | BV <sub>(DSS)</sub><br>[V]            | VGS <sub>(th)</sub><br>[V] | IGSS<br>[nA] | IGSS-<br>[nA] | IDSS<br>[uA] | RDS <sub>(ON)</sub><br>[mOhm] | V <sub>SD</sub><br>[V] |            |
| min | -20%                               | -50%                       | -20nA        | -20nA         | -20%                       | -10%                   | 650                                   | 2                          |              |               |              |                               |                        |            |
| max | +20%                               | +10%                       | +20nA        | +20nA         | +20%                       | +10%                   |                                       | 4                          | 100          | 100           | 25           | 450                           | 1.2                    |            |
| 61  | -0.8                               | -13.4                      | -1.1         | -0.5          | -2.7                       | 0.2                    | 738                                   | 2.80                       | 0.3          | 0.8           | 0.070        | 364                           | 0.925                  | C1         |
| 62  | -0.3                               | -11.2                      | 0.0          | -1.2          | -1.2                       | 0.3                    | 728                                   | 2.86                       | 0.2          | 0.8           | 0.016        | 359                           | 0.928                  | C2         |
| 63  | -0.3                               | -20.2                      | -0.0         | -0.5          | -0.9                       | 0.2                    | 746                                   | 2.64                       | 0.5          | 1.0           | 0.038        | 365                           | 0.927                  | C3         |
| 64  | -0.9                               | -12.8                      | -0.8         | 0.7           | -2.6                       | 0.3                    | 738                                   | 2.88                       | 0.3          | 1.5           | 0.064        | 362                           | 0.926                  | C1         |
| 65  | -0.2                               | -10.7                      | 0.5          | -0.9          | -1.4                       | 0.3                    | 743                                   | 2.97                       | 0.9          | 0.0           | 0.015        | 367                           | 0.926                  | C2         |
| 66  | -0.4                               | -20.9                      | 0.1          | 0.5           | -1.1                       | 0.4                    | 739                                   | 2.63                       | 1.0          | 0.9           | 0.102        | 367                           | 0.926                  | C3         |
| 67  | -0.8                               | -13.0                      | -0.3         | -0.3          | -2.3                       | 0.2                    | 743                                   | 2.81                       | 0.3          | 0.6           | 0.064        | 376                           | 0.928                  | C1         |
| 68  | -0.2                               | -7.8                       | 1.1          | 0.0           | -1.5                       | 0.3                    | 745                                   | 2.96                       | 1.5          | 0.6           | 0.016        | 366                           | 0.928                  | C2         |
| 69  | -0.3                               | -20.3                      | 0.1          | 1.0           | -1.3                       | 0.1                    | 748                                   | 2.60                       | 0.5          | 1.0           | 0.121        | 367                           | 0.926                  | C3         |
| 70  | -0.9                               | -12.5                      | 0.6          | 0.1           | -2.4                       | 0.2                    | 750                                   | 2.85                       | 0.6          | 1.4           | 0.064        | 366                           | 0.927                  | C1         |
| 71  | -0.2                               | -6.7                       | 0.2          | -0.8          | -1.5                       | 0.2                    | 753                                   | 3.08                       | 0.8          | 0.1           | 0.016        | 369                           | 0.928                  | C2         |
| 72  | -1.3                               | -20.5                      | 0.9          | -0.6          | -1.2                       | 0.2                    | 744                                   | 2.62                       | 1.3          | 0.7           | 0.086        | 371                           | 0.926                  | C3         |
| 73  | -0.8                               | -13.6                      | 0.3          | -0.2          | -2.6                       | 0.2                    | 737                                   | 2.81                       | 1.0          | 0.6           | 0.067        | 366                           | 0.928                  | C1         |
| 74  | -0.2                               | -7.3                       | 0.7          | 0.0           | -1.4                       | 0.4                    | 724                                   | 3.00                       | 1.1          | 1.4           | 0.016        | 357                           | 0.926                  | C2         |
| 75  | -1.3                               | -19.9                      | 0.3          | -0.9          | -1.2                       | 0.1                    | 725                                   | 2.63                       | 0.5          | 0.7           | 0.121        | 357                           | 0.926                  | C3         |
| 76  | -0.7                               | -12.5                      | 0.0          | 0.4           | -2.5                       | 0.2                    | 717                                   | 2.85                       | 0.2          | 1.1           | 0.064        | 359                           | 0.925                  | C1         |
| 77  | -0.3                               | -6.6                       | -0.3         | -0.1          | -1.4                       | 0.3                    | 723                                   | 3.06                       | 0.1          | 1.2           | 0.016        | 363                           | 0.926                  | C2         |
| 78  | -0.3                               | -20.5                      | -0.7         | -0.1          | -0.8                       | -0.1                   | 723                                   | 2.60                       | 0.4          | 0.8           | 0.024        | 366                           | 0.925                  | C3         |
| R93 | -0.2                               | 0.4                        | 0.0          | -0.0          | -1.1                       | 0.2                    | 721                                   | 3.19                       | 0.5          | 0.8           | 0.002        | 368                           | 0.930                  | Control    |
| R94 | -0.2                               | 0.4                        | -0.3         | 0.1           | -1.1                       | 0.2                    | 720                                   | 3.18                       | 0.6          | 0.7           | 0.003        | 369                           | 0.931                  | Control    |
| R95 | -0.1                               | 0.3                        | -0.1         | -0.8          | -0.7                       | 0.1                    | 737                                   | 3.23                       | 0.8          | 0.4           | 0.002        | 365                           | 0.931                  | Control    |
| R96 | -0.2                               | 0.3                        | 0.9          | 0.7           | -1.0                       | 0.2                    | 745                                   | 3.23                       | 1.3          | 1.4           | 0.002        | 369                           | 0.931                  | Control    |
| R97 | -0.1                               | 0.3                        | 0.7          | 0.1           | -0.8                       | 0.1                    | 719                                   | 3.24                       | 1.4          | 0.9           | 0.002        | 366                           | 0.930                  | Control    |

### §7.2.4 ELECTRICAL MEASUREMENTS AFTER 168 HOURS ANNEAL AT 100°C

|     | Drift Deltas post 168h anneal at 100°C |                            |              |               |                            |                        | Absolute Values post 168h anneal at 100°C |                            |              |               |              |                               |                        | Bias Cond. |
|-----|--|----------------------------|--------------|---------------|----------------------------|------------------------|---|----------------------------|--------------|---------------|--------------|-------------------------------|------------------------|------------|
| S/N | BV <sub>(DSS)</sub><br>[%]             | VGS <sub>(th)</sub><br>[%] | IGSS<br>[nA] | IGSS-<br>[nA] | RDS <sub>(ON)</sub><br>[%] | V <sub>SD</sub><br>[%] | BV <sub>(DSS)</sub><br>[V]                | VGS <sub>(th)</sub><br>[V] | IGSS<br>[nA] | IGSS-<br>[nA] | IDSS<br>[uA] | RDS <sub>(ON)</sub><br>[mOhm] | V <sub>SD</sub><br>[V] |            |
| min | -20%                                   | -50%                       | -20nA        | -20nA         | -20%                       | -10%                   | 650                                       | 2                          |              |               |              |                               |                        |            |
| max | +20%                                   | +10%                       | +20nA        | +20nA         | +20%                       | +10%                   |   | 4                          | 100          | 100           | 25           | 450                           | 1.2                    |            |



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| <b>Infineon</b><br>technologies<br><br><b>HiRel Discrete &amp; MW Semiconductors</b> | ESCC Comp. No.: 520503301R   | Page: 9  |
|  | Wafer Lot: VE810011  | Rep.No.: VE810011TID<br>Issue: Iss. 1, Aug. 2021 |
|  | <b>Total Dose Steady-State Irradiation Test Report</b><br><b>BUY65CS08J-01(ES)</b> |  |

|     | Drift Deltas post 168h anneal at 100°C |                            |              |               |                            |                        | Absolute Values post 168h anneal at 100°C |                            |              |               |              |                               |                        | Bias Cond. |
|-----|--|----------------------------|--------------|---------------|----------------------------|------------------------|---|----------------------------|--------------|---------------|--------------|-------------------------------|------------------------|------------|
| S/N | BV <sub>(DSS)</sub><br>[%]             | VGS <sub>(th)</sub><br>[%] | IGSS<br>[nA] | IGSS-<br>[nA] | RDS <sub>(ON)</sub><br>[%] | V <sub>SD</sub><br>[%] | BV <sub>(DSS)</sub><br>[V]                | VGS <sub>(th)</sub><br>[V] | IGSS<br>[nA] | IGSS-<br>[nA] | IDSS<br>[uA] | RDS <sub>(ON)</sub><br>[mOhm] | V <sub>SD</sub><br>[V] |            |
| 61  | -0.4                                   | -10.9                      | -1.1         | -0.8          | -2.1                       | -0.1                   | 741                                       | 2.88                       | 0.2          | 0.5           | 0.064        | 366                           | 0.922                  | C1         |
| 62  | -0.1                                   | -9.7                       | 0.5          | -1.2          | -1.8                       | 0.1                    | 729                                       | 2.91                       | 0.7          | 0.8           | 0.008        | 357                           | 0.926                  | C2         |
| 63  | -0.1                                   | -17.3                      | -0.3         | -0.8          | -1.8                       | -0.2                   | 748                                       | 2.73                       | 0.2          | 0.6           | 0.008        | 361                           | 0.923                  | C3         |
| 64  | -0.5                                   | -10.4                      | -0.7         | 1.0           | -2.6                       | -0.0                   | 740                                       | 2.97                       | 0.4          | 1.7           | 0.064        | 362                           | 0.923                  | C1         |
| 65  | -0.1                                   | -9.0                       | 0.0          | 0.1           | -2.0                       | -0.0                   | 744                                       | 3.03                       | 0.5          | 1.0           | 0.008        | 364                           | 0.924                  | C2         |
| 66  | -0.1                                   | -17.7                      | -0.1         | 0.2           | -1.9                       | -0.2                   | 741                                       | 2.73                       | 0.8          | 0.6           | 0.008        | 364                           | 0.921                  | C3         |
| 67  | -0.5                                   | -10.4                      | -0.2         | 0.1           | -2.7                       | 0.1                    | 745                                       | 2.90                       | 0.5          | 0.9           | 0.064        | 374                           | 0.927                  | C1         |
| 68  | -0.1                                   | -6.7                       | -0.0         | 0.5           | -2.0                       | 0.1                    | 747                                       | 3.00                       | 0.4          | 1.1           | 0.009        | 364                           | 0.926                  | C2         |
| 69  | -0.1                                   | -17.2                      | -0.0         | 0.7           | -1.7                       | -0.2                   | 749                                       | 2.70                       | 0.4          | 0.7           | 0.009        | 366                           | 0.923                  | C3         |
| 70  | -0.6                                   | -10.2                      | 0.8          | 0.6           | -2.8                       | -0.1                   | 753                                       | 2.93                       | 0.8          | 1.9           | 0.062        | 365                           | 0.924                  | C1         |
| 71  | -0.1                                   | -6.0                       | -0.1         | -0.2          | -1.8                       | -0.1                   | 754                                       | 3.10                       | 0.4          | 0.7           | 0.009        | 368                           | 0.925                  | C2         |
| 72  | -0.2                                   | -17.4                      | -0.2         | 0.1           | -1.7                       | -0.1                   | 752                                       | 2.72                       | 0.2          | 1.3           | 0.009        | 369                           | 0.923                  | C3         |
| 73  | -0.4                                   | -10.8                      | -0.4         | -0.2          | -2.5                       | 0.1                    | 740                                       | 2.90                       | 0.2          | 0.7           | 0.070        | 366                           | 0.927                  | C1         |
| 74  | -0.0                                   | -6.5                       | -0.2         | -0.9          | -1.8                       | 0.0                    | 726                                       | 3.02                       | 0.2          | 0.4           | 0.009        | 356                           | 0.923                  | C2         |
| 75  | -0.1                                   | -16.9                      | 0.5          | -0.7          | -1.8                       | -0.1                   | 734                                       | 2.73                       | 0.6          | 1.0           | 0.009        | 355                           | 0.924                  | C3         |
| 76  | -0.4                                   | -10.0                      | 0.1          | 0.8           | -2.7                       | -0.0                   | 719                                       | 2.93                       | 0.2          | 1.4           | 0.061        | 359                           | 0.923                  | C1         |
| 77  | -0.0                                   | -6.0                       | -0.3         | -1.1          | -1.7                       | -0.0                   | 725                                       | 3.08                       | 0.1          | 0.2           | 0.009        | 361                           | 0.924                  | C2         |
| 78  | -0.1                                   | -17.5                      | -1.0         | -0.2          | -1.8                       | -0.3                   | 724                                       | 2.70                       | 0.1          | 0.7           | 0.008        | 362                           | 0.923                  | C3         |
| R93 | -0.2                                   | -0.1                       | 0.0          | -0.0          | -1.2                       | 0.2                    | 721                                       | 3.18                       | 0.5          | 0.8           | 0.002        | 368                           | 0.930                  | Control    |
| R94 | -0.3                                   | -0.3                       | -0.6         | -0.1          | -1.2                       | 0.2                    | 720                                       | 3.16                       | 0.3          | 0.5           | 0.003        | 369                           | 0.932                  | Control    |
| R95 | -0.1                                   | -0.3                       | -0.5         | 0.4           | -0.7                       | 0.1                    | 737                                       | 3.22                       | 0.5          | 1.6           | 0.002        | 365                           | 0.931                  | Control    |
| R96 | -0.1                                   | -0.0                       | 0.2          | 0.2           | -0.8                       | 0.2                    | 745                                       | 3.22                       | 0.6          | 0.9           | 0.002        | 370                           | 0.931                  | Control    |
| R97 | -0.1                                   | -0.1                       | -0.3         | -0.4          | -0.8                       | 0.1                    | 719                                       | 3.23                       | 0.5          | 0.4           | 0.002        | 366                           | 0.930                  | Control    |

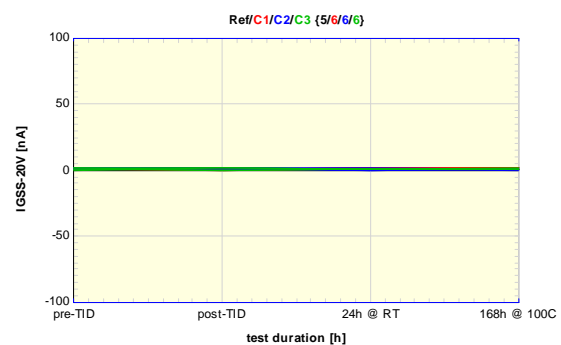
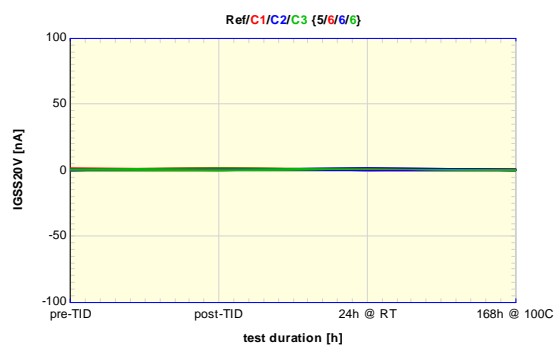
## §7.3 GRAPHICAL REPRESENTATION OF ELECTRICAL MEASUREMENTS

In the following, the electrical parameters listed in §7.2 are plotted for four points of the testing sequence, i.e.

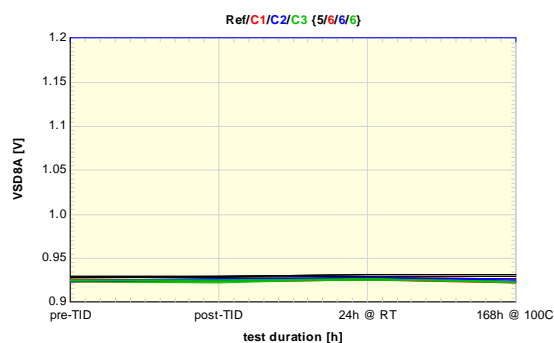
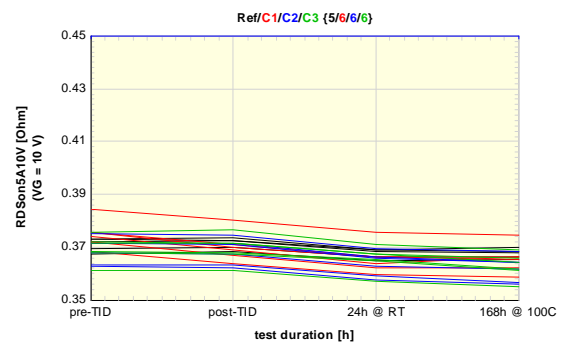
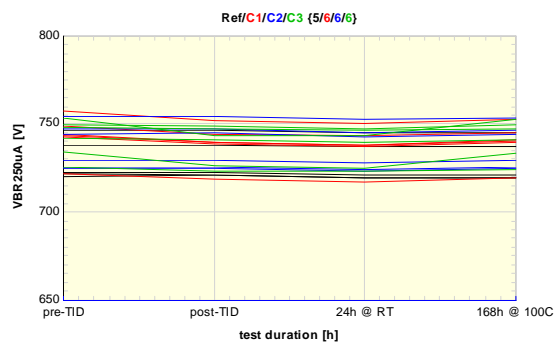
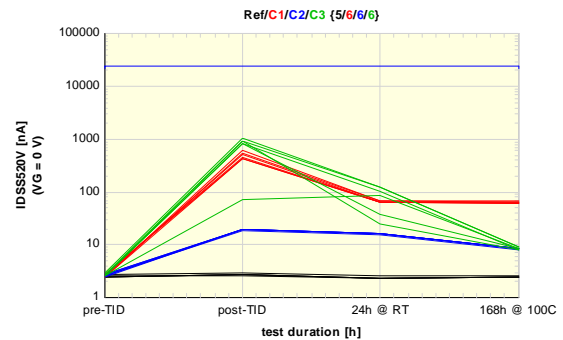
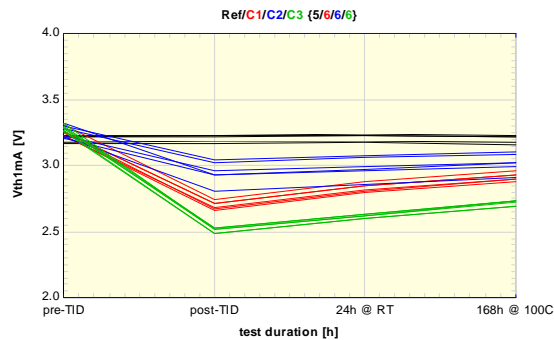
1. Prior to irradiation (pre-TID),
2. Post-irradiation (post-TID),
3. Posterior to room-temperature anneal of 24 hours (24h@RT),
4. Posterior to 168 hours of anneal at 100°C (168h@100°C) .

Four groups of samples are given coded by line-color:

1. Unirradiated control (reference) devices (legend: Ref in BLACK)
2. Irradiated devices Bias Condition C1 (legend: C1 in RED)
3. Irradiated devices Bias Condition C2 (legend: C2 in BLUE)
4. Irradiated devices Bias Condition C3 (legend: C3 in GREEN)



|  |                            |  |
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| <b>Infineon</b><br>technologies<br><b>HiRel Discrete &amp; MW Semiconductors</b>   | ESCC Comp. No.: 520503301R | Page: 10   |
|  | Wafer Lot: VE810011        | Rep.No.: VE810011TID<br>Issue: Iss. 1, Aug. 2021 |
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## §8 TOTAL IONIZING DOSE TESTING RESULT SUMMARY / CHECK FOR LOT FAILURE

| TID Bias Condition | Minimum Required | Total to Condition | Failures Allowed | Failures Occurred | Condition Passed |
|--------------------|------------------|--------------------|------------------|-------------------|------------------|
| C1                 | 5                | 6                  | 0                | 0                 | yes              |
| C2                 | 5                | 6                  | 0                | 0                 | yes              |
| C3                 | 5                | 6                  | 0                | 0                 | yes              |
| Complete TID Tests |                  |                    |                  |                   | passed           |

**The Wafer Lot passed the Total Dose Steady-State Irradiation Test.**