



## ABSTRACT

This report discusses the radiation characterization results of the INA951-SEP current-sense amplifier. The study was done to determine Total Ionizing Dose (TID) effects under high dose rate (HDR) up to 30krad(Si). The results show that all samples passed within the specified limits up to 30krad(Si). To specify the following results, the Radiation Lot Acceptance Testing (RLAT) was performed using five units at a dose level of 30krad(Si) that are required for future wafer lots. Furthermore, the INA951 is packaged in a space enhanced plastic for low outgassing characteristics and is Single Event Latch-Up (SEL) immune up to 47MeV-cm<sup>2</sup> /mg making the device designed for low Earth orbit space applications.

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## Trademarks

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## 1 Device Information

The INA951-SEP is a radiation-tolerant, ultra-precise current-sense amplifier that measures voltage drops across shunt resistors over a common-mode range of  $-4$  to  $80V$ . The INA951-SEP operates from a single  $2.7V$  to  $10V$  supply drawing  $1.5mA$  of a supply current.

### 1.1 Device Details

[Table 1-1](#) lists the device information used for TID HDR characterization and qualification.

**Table 1-1. Device and Exposure Details**

| TID HDR Details: Up to 30krad (Si) |   |
|------------------------------------|---|
| TI Device Number                   | INA951-SEP                                  |
| Package                            | 8-pin PW                                    |
| Technology                         | LBCSOI2                                     |
| Die Lot Number                     | 5217124                                     |
| A/T Lot Number / Lot Trace Code    | 5640552 / 5CA7KEW                           |
| Quantity Tested                    | 15 irradiated devices and 2 control devices |
| Lot Accept/Reject                  | Devices passed 30krad (Si)                  |
| HDR Radiation Facility             | Texas Instruments CLAB, Dallas, TX          |
| HDR Dose Level                     | 30krad (Si)                                 |
| HDR Dose Rate                      | 260rad(Si)                                  |
| HDR Radiation Source               | Gammacell (GR420) Co-60                     |
| Irradiation Temperature            | Ambient, room temperature                   |
| VID                                | V62/25635                                   |



**Figure 1-1. INA951-SEP Device**

## 2 Total Dose Test Setup

### 2.1 Test Overview

#### HDR Testing

The INA951-SEP samples were irradiated at a high dose rate of 50-300 rad(Si)/s up to 30krad(Si) and then put through full electrical parametric testing on the production Automated Test Equipment (ATE). The samples were functional and passed all electrical parametric tests with readings within datasheet electrical specification limits.

#### 2.2 Test Description and Facilities

The INA951-SEP HDR exposure was performed on biased devices in a Co60 gamma cell at TI CLAB facility in Dallas, Texas. The unattenuated dose rate of this cell is 50-300rad(Si)/s. After exposure, the devices completed a full post irradiation electrical evaluation using Texas Instruments ATE. The ATE guard band test limits are set within the electrical specifications in the datasheet to ensure a minimum Cpk and test error margin based on initial qualification and characterization data. Post-irradiation measurements were taken within 30 minutes of radiation.

#### 2.3 Test Setup Details

The devices were tested in biased conditions as shown in the following sections.

##### 2.3.1 Biased

Figure 2-1 shows the bias conditions for each pin during irradiation.

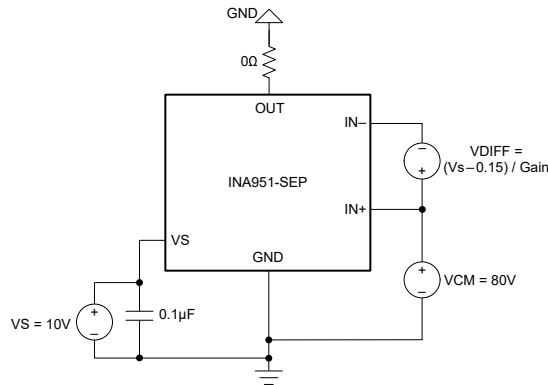


Figure 2-1. INA951-SEP Biased Diagram

#### 2.4 Test Configuration and Condition

Devices at HDR were stressed at 30krad(Si) for biased and unbiased conditions.

End point electrical test is performed on irradiated devices to verify they are within specified SMD electrical test limits. MIL-STD-883, Test Method 1019.9, Condition D is used in this case.

Table 2-1 shows the serialized samples used for HDR RHA characterization.

Table 2-1. HDR = 260rad(Si)/s Device Information

| HDR = 260rad(Si)/s |                |
|--------------------|----------------|
| Total Samples: 10  |                |
| Exposure Levels    |                |
| 30krad (Si)        | 30krad (Si)    |
| Biased             | Unbiased       |
| 1, 2, 3, 4, 5      | 6, 7, 8, 9, 10 |

### 3 Total Ionizing Dose (RHA) Characterization Test Results

#### 3.1 Total Ionizing Dose RHA Characterization Summary Results

The parametric data for the INA951-SEP is within datasheet limits up to 30krad(Si) for biased setup conditions.

#### 3.2 Specification Compliance Matrix

**Table 3-1. Electrical Parameters Table**

| Parameter                 |  | Test Conditions   | MIN | TYP          | MAX          | Unit                           | Test Name/Number    |
|---------------------------|--|---|-----|--------------|--------------|--------------------------------|---------------------|
| <b>INPUT</b>              |  |   |     |              |              |                                |                     |
| $V_{CM}$                  | Common-mode input range                      | $T_A = -55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$   | -4  |              | 80           | V                              |                     |
| CMRR                      | Common-mode rejection ratio, input referred  | $-4\text{V} \leq V_{CM} \leq 80\text{V}$ , $T_A = -55^{\circ}\text{C}$ to $125^{\circ}\text{C}$                 | -99 |              | -99          | nV/V                           | 80.10, 80.11        |
|                           |  | $F = 50\text{kHz}$  | -99 | 8            | 99           |                                |                     |
| $V_{OS}$                  | Offset voltage, input referred               |   |     | $\pm 30$     | $\pm 150$    | $\mu\text{V}$                  | 61.0                |
| $dV_{OS}/dT$              | Offset voltage drift                         | $T_A = -55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$   |     | $\pm 0.05$   |              | $\mu\text{V}/^{\circ}\text{C}$ |                     |
| PSRR                      | Power supply rejection ratio, input referred | $2.7\text{V} \leq V_S \leq 10\text{V}$ , $T_A = -55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$                  |     | $\pm 1$      | $\pm 8$      | $\mu\text{V}/\text{V}$         | 71.4                |
| $I_B$                     | Input bias current                           | $I_{B+}$ , $V_{SENSE} = 0\text{V}$  | 10  | 20           | 30           | $\mu\text{A}$                  | 20.1, 20.2          |
|                           |  | $I_{B-}$ , $V_{SENSE} = 0\text{V}$  | 10  | 20           | 30           |                                |                     |
| <b>OUTPUT</b>             |  |   |     |              |              |                                |                     |
| G                         | Gain   |   |     | 20           |              | V/V                            | 51.4                |
| $G_{ERR}$                 | Gain error                                   | $\text{GND} + 50\text{mV} \leq V_{OUT} \leq V_S - 200\text{mV}$   |     | $\pm 0.02$   | $\pm 0.15$   | %                              | 51.5                |
|                           |  | $T_A = -55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$   |     | $\pm 0.01$   |              | ppm/ $^{\circ}\text{C}$        |                     |
| $NL_{ERR}$                | Nonlinearity error                           |   |     | 0.01         |              | %                              |                     |
|                           | Maximum capacitive load                      | No sustained oscillations, no isolation resistor  |     | 500          |              | pF                             |                     |
| <b>VOLTAGE OUTPUT</b>     |  |   |     |              |              |                                |                     |
|                           | Swing to $V_S$ (Power supply rail)           | $R_{LOAD} = 10\text{k}\Omega$ , $T_A = -55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$                           |     | $V_S - 0.07$ | $V_S - 0.05$ | V                              | 110.0, 120.0, 130.0 |
|                           | Swing to ground                              | $R_{LOAD} = 10\text{k}\Omega$ , $V_{SENSE} = 0\text{V}$ , $T_A = -55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$ |     | 0.005        | 0.02         | V                              | 90.0                |
| <b>FREQUENCY RESPONSE</b> |  |   |     |              |              |                                |                     |
| BW                        | Bandwidth                                    | $C_{LOAD} = 5\text{pF}$ , $V_{SENSE} = 200\text{mV}$  |     | 1300         |              | kHz                            |                     |
| SR                        | Slew rate                                    | Rising edge   |     | 2.5          |              | V/ $\mu\text{S}$               |                     |
|                           | Settling time                                | $V_{OUT} = 4\text{V} \mp 0.1$ step, Output settles to 0.5%  |     | 10           |              | $\mu\text{S}$                  |                     |
|                           |  | $V_{OUT} = 4\text{V} \mp 0.1$ step, Output settles to 1%  |     | 5            |              |                                |                     |
|                           |  | $V_{OUT} = 4\text{V} \mp 0.1$ step, Output settles to 5%  |     | 1            |              |                                |                     |
| <b>NOISE</b>              |  |   |     |              |              |                                |                     |

**Table 3-1. Electrical Parameters Table (continued)**

| Parameter           |                       | Test Conditions                  | MIN | TYP | MAX  | Unit                   | Test Name/Number |
|---------------------|-----------------------|----------------------------------|-----|-----|------|------------------------|------------------|
| V <sub>EN</sub>     | Voltage noise density |                                  |     | 50  |      | nV/ $\sqrt{\text{Hz}}$ |                  |
| <b>POWER SUPPLY</b> |                       |                                  |     |     |      |                        |                  |
| V <sub>S</sub>      | Supply voltage        | T <sub>A</sub> = -55°C to +125°C | 2.7 |     | 10   | V                      |                  |
| I <sub>Q</sub>      | Quiescent current     |                                  |     | 1.5 | 2    | mA                     | 30.0, 30.1, 30.2 |
|                     |                       | T <sub>A</sub> = -55°C to +125°C |     |     | 2.25 |                        |                  |

## **A Total Ionizing Dose Report**

This appendix provides the INA951-SEP TID HDR report. The reports show the variation for each parameter up to 30krad(Si).

Delta Threshold 10.00%

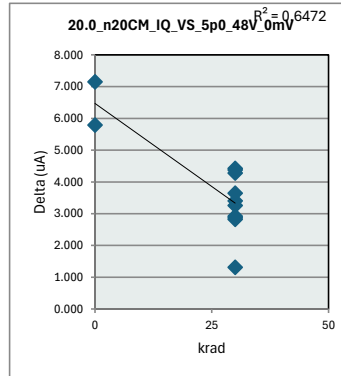
TID Report  
INA951-SEP

TID Report  
INA951-SEP

20.0\_n20CM\_IQ\_VS\_5p0\_48V\_0

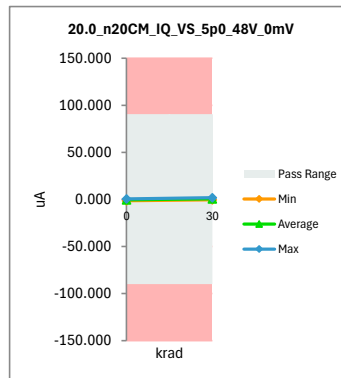
|             |           |           |
|-------------|-----------|-----------|
| Test Site   | J2S       | J2S       |
| Tester      | FETS36401 | FETS36417 |
| Test Number | EE213301  | EE213301  |
| Unit        | uA        | uA        |
| Max Limit   | 90        | 90        |
| Min Limit   | -90       | -90       |

| krad    | Serial # | pre   | Post.log | Delta |
|---------|----------|-------|----------|-------|
| 0       | 1        | 6.374 | 0.584    | 5.790 |
| 0       | 2        | 5.790 | -1.362   | 7.152 |
| 30      | 3        | 4.671 | 1.751    | 2.920 |
| 30      | 4        | 4.622 | 0.243    | 4.379 |
| 30      | 5        | 3.211 | 1.897    | 1.314 |
| 30      | 6        | 4.574 | 1.702    | 2.872 |
| 30      | 7        | 4.038 | -0.389   | 4.427 |
| 30      | 8        | 3.941 | -0.340   | 4.281 |
| 30      | 9        | 3.746 | 0.924    | 2.822 |
| 30      | 10       | 3.552 | -0.097   | 3.649 |
| 30      | 11       | 3.552 | 0.292    | 3.260 |
| 30      | 12       | 4.038 | 0.632    | 3.406 |
| Max     |          | 6.374 | 1.897    | 7.152 |
| Average |          | 4.342 | 0.486    | 3.856 |
| Min     |          | 3.211 | -1.362   | 1.314 |
| Std Dev |          | 0.939 | 0.981    | 1.518 |



20.0\_n20CM\_IQ\_VS\_5p0\_48V

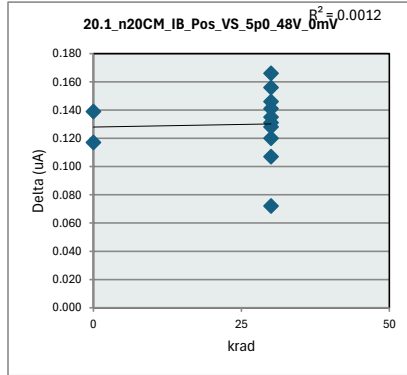
|             |                 |
|-------------|-----------------|
| Test Site   | J2S             |
| Tester      | FETS36401       |
| Test Number | EE213301        |
| Max Limit   | 90 uA           |
| Min Limit   | -90 uA          |
| krad        | 0 30            |
| LL          | -90.000 -90.000 |
| Min         | -1.362 -0.389   |
| Average     | -0.389 0.662    |
| Max         | 0.584 1.897     |
| UL          | 90.000 90.000   |



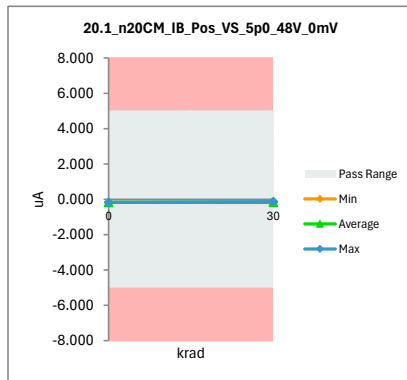
TID Report  
INA951-SEP

| 20.1_n20CM_IB_Pos_VS_5p0_48V_0mV |           |           |
|----------------------------------|-----------|-----------|
| Test Site                        | J2S       | J2S       |
| Tester                           | FETS36401 | FETS36417 |
| Test Number                      | EE213301  | EE213301  |
| Unit                             | uA        | uA        |
| Max Limit                        | 5         | 5         |
| Min Limit                        | -5        | -5        |

| krad    | Serial # | pre    | Post.log | Delta |
|---------|----------|--------|----------|-------|
| 0       | 1        | -0.033 | -0.172   | 0.139 |
| 0       | 2        | -0.054 | -0.171   | 0.117 |
| 30      | 3        | -0.042 | -0.162   | 0.120 |
| 30      | 4        | -0.025 | -0.171   | 0.146 |
| 30      | 5        | -0.044 | -0.172   | 0.128 |
| 30      | 6        | -0.058 | -0.130   | 0.072 |
| 30      | 7        | -0.036 | -0.171   | 0.135 |
| 30      | 8        | -0.014 | -0.180   | 0.166 |
| 30      | 9        | -0.028 | -0.159   | 0.131 |
| 30      | 10       | -0.052 | -0.159   | 0.107 |
| 30      | 11       | -0.021 | -0.162   | 0.141 |
| 30      | 12       | 0.001  | -0.155   | 0.156 |
| Max     |          | 0.001  | -0.130   | 0.166 |
| Average |          | -0.034 | -0.164   | 0.130 |
| Min     |          | -0.058 | -0.180   | 0.072 |
| Std Dev |          | 0.018  | 0.013    | 0.025 |



| 20.1_n20CM_IB_Pos_VS_5p0 |           |        |
|--------------------------|-----------|--------|
| Test Site                | J2S       |        |
| Tester                   | FETS36401 |        |
| Test Number              | EE213301  |        |
| Max Limit                | 5         | uA     |
| Min Limit                | -5        | uA     |
| krad                     | 0         | 30     |
| LL                       | -5.000    | -5.000 |
| Min                      | -0.172    | -0.180 |
| Average                  | -0.172    | -0.162 |
| Max                      | -0.171    | -0.130 |
| UL                       | 5.000     | 5.000  |

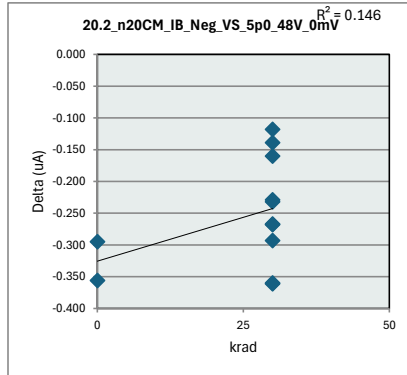


TID Report  
INA951-SEP

20.2\_n20CM\_IB\_Neg\_VS\_5p0\_4

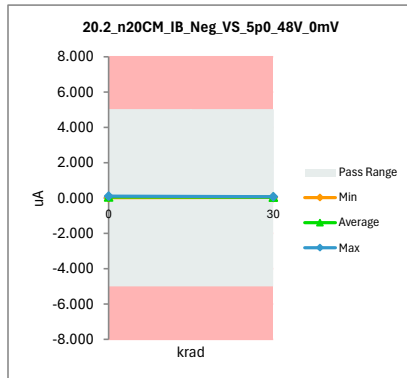
|             |           |           |
|-------------|-----------|-----------|
| Test Site   | J2S       | J2S       |
| Tester      | FETS36401 | FETS36417 |
| Test Number | EE213301  | EE213301  |
| Unit        | uA        | uA        |
| Max Limit   | 5         | 5         |
| Min Limit   | -5        | -5        |

| krad    | Serial # | pre    | Post.log | Delta  |
|---------|----------|--------|----------|--------|
| 0       | 1        | -0.247 | 0.109    | -0.356 |
| 0       | 2        | -0.272 | 0.023    | -0.295 |
| 30      | 3        | -0.113 | 0.047    | -0.160 |
| 30      | 4        | -0.187 | 0.045    | -0.232 |
| 30      | 5        | -0.218 | 0.075    | -0.293 |
| 30      | 6        | -0.077 | 0.041    | -0.118 |
| 30      | 7        | -0.101 | 0.038    | -0.139 |
| 30      | 8        | -0.290 | 0.071    | -0.361 |
| 30      | 9        | -0.190 | 0.077    | -0.267 |
| 30      | 10       | -0.177 | 0.052    | -0.229 |
| 30      | 11       | -0.222 | 0.046    | -0.268 |
| 30      | 12       | -0.304 | 0.056    | -0.360 |
| Max     |          | -0.077 | 0.109    | -0.118 |
| Average |          | -0.200 | 0.057    | -0.256 |
| Min     |          | -0.304 | 0.023    | -0.361 |
| Std Dev |          | 0.074  | 0.023    | 0.084  |



20.2\_n20CM\_IB\_Neg\_VS\_5p0

|             |               |
|-------------|---------------|
| Test Site   | J2S           |
| Tester      | FETS36401     |
| Test Number | EE213301      |
| Max Limit   | 5 uA          |
| Min Limit   | -5 uA         |
| krad        | 0 30          |
| LL          | -5.000 -5.000 |
| Min         | 0.023 0.038   |
| Average     | 0.066 0.055   |
| Max         | 0.109 0.077   |
| UL          | 5.000 5.000   |

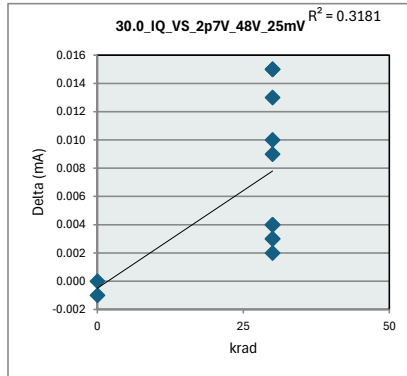


TID Report  
INA951-SEP

**30.0\_IQ\_VS\_2p7V\_48V\_25mV**

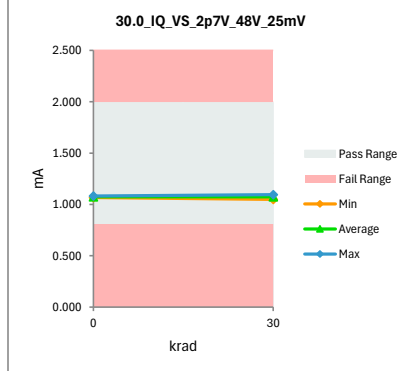
|             |           |           |
|-------------|-----------|-----------|
| Test Site   | J2S       | J2S       |
| Tester      | FETS36401 | FETS36417 |
| Test Number | EE213301  | EE213301  |
| Unit        | mA        | mA        |
| Max Limit   | 1.99      | 1.99      |
| Min Limit   | 0.81      | 0.81      |

| krad    | Serial # | pre   | Post.log | Delta  |
|---------|----------|-------|----------|--------|
| 0       | 1        | 1.067 | 1.067    | 0.000  |
| 0       | 2        | 1.081 | 1.082    | -0.001 |
| 30      | 3        | 1.077 | 1.073    | 0.004  |
| 30      | 4        | 1.099 | 1.089    | 0.010  |
| 30      | 5        | 1.089 | 1.074    | 0.015  |
| 30      | 6        | 1.062 | 1.049    | 0.013  |
| 30      | 7        | 1.097 | 1.095    | 0.002  |
| 30      | 8        | 1.078 | 1.075    | 0.003  |
| 30      | 9        | 1.097 | 1.094    | 0.003  |
| 30      | 10       | 1.085 | 1.070    | 0.015  |
| 30      | 11       | 1.070 | 1.061    | 0.009  |
| 30      | 12       | 1.061 | 1.057    | 0.004  |
| Max     |          | 1.099 | 1.095    | 0.015  |
| Average |          | 1.080 | 1.074    | 0.006  |
| Min     |          | 1.061 | 1.049    | -0.001 |
| Std Dev |          | 0.014 | 0.014    | 0.006  |



**30.0\_IQ\_VS\_2p7V\_48V\_25mV**

|             |             |
|-------------|-------------|
| Test Site   | J2S         |
| Tester      | FETS36401   |
| Test Number | EE213301    |
| Max Limit   | 1.99 mA     |
| Min Limit   | 0.81 mA     |
| krad        | 0 30        |
| LL          | 0.810 0.810 |
| Min         | 1.067 1.049 |
| Average     | 1.075 1.074 |
| Max         | 1.082 1.095 |
| UL          | 1.990 1.990 |

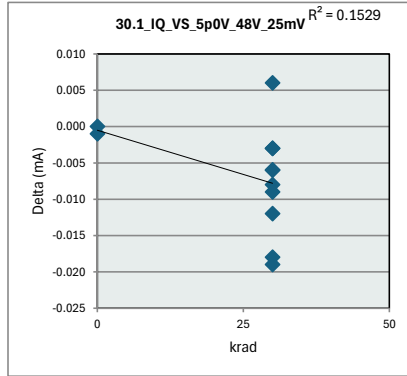


TID Report  
INA951-SEP

**30.1\_IQ\_VS\_5p0V\_48V\_25mV**

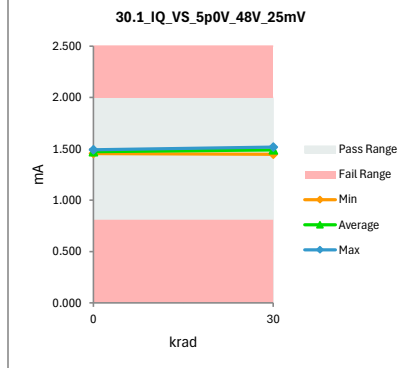
|             |           |           |
|-------------|-----------|-----------|
| Test Site   | J2S       | J2S       |
| Tester      | FETS36401 | FETS36417 |
| Test Number | EE213301  | EE213301  |
| Unit        | mA        | mA        |
| Max Limit   | 1.99      | 1.99      |
| Min Limit   | 0.81      | 0.81      |

| krad    | Serial # | pre   | Post.log | Delta  |
|---------|----------|-------|----------|--------|
| 0       | 1        | 1.453 | 1.454    | -0.001 |
| 0       | 2        | 1.491 | 1.491    | 0.000  |
| 30      | 3        | 1.484 | 1.496    | -0.012 |
| 30      | 4        | 1.499 | 1.517    | -0.018 |
| 30      | 5        | 1.507 | 1.516    | -0.009 |
| 30      | 6        | 1.452 | 1.460    | -0.008 |
| 30      | 7        | 1.469 | 1.488    | -0.019 |
| 30      | 8        | 1.497 | 1.503    | -0.006 |
| 30      | 9        | 1.508 | 1.511    | -0.003 |
| 30      | 10       | 1.453 | 1.447    | 0.006  |
| 30      | 11       | 1.502 | 1.505    | -0.003 |
| 30      | 12       | 1.446 | 1.452    | -0.006 |
| Max     |          | 1.508 | 1.517    | 0.006  |
| Average |          | 1.480 | 1.487    | -0.007 |
| Min     |          | 1.446 | 1.447    | -0.019 |
| Std Dev |          | 0.024 | 0.026    | 0.007  |



**30.1\_IQ\_VS\_5p0V\_48V\_25mV**

|             |             |
|-------------|-------------|
| Test Site   | J2S         |
| Tester      | FETS36401   |
| Test Number | EE213301    |
| Max Limit   | 1.99 mA     |
| Min Limit   | 0.81 mA     |
| krad        | 0 30        |
| LL          | 0.810 0.810 |
| Min         | 1.454 1.447 |
| Average     | 1.473 1.490 |
| Max         | 1.491 1.517 |
| UL          | 1.990 1.990 |

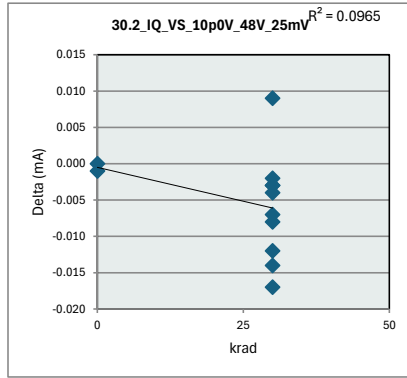


TID Report  
INA951-SEP

**30.2\_IQ\_VS\_10p0V\_48V\_25mV**

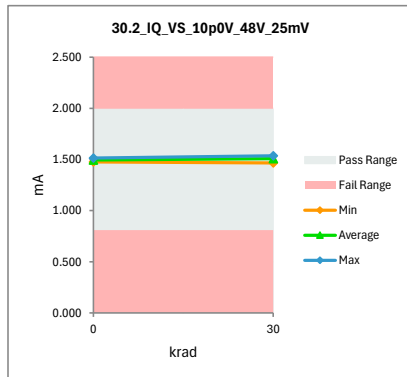
|             |           |           |
|-------------|-----------|-----------|
| Test Site   | J2S       | J2S       |
| Tester      | FETS36401 | FETS36417 |
| Test Number | EE213301  | EE213301  |
| Unit        | mA        | mA        |
| Max Limit   | 1.99      | 1.99      |
| Min Limit   | 0.81      | 0.81      |

| krad    | Serial # | pre   | Post.log | Delta  |
|---------|----------|-------|----------|--------|
| 0       | 1        | 1.475 | 1.476    | -0.001 |
| 0       | 2        | 1.514 | 1.514    | 0.000  |
| 30      | 3        | 1.500 | 1.512    | -0.012 |
| 30      | 4        | 1.522 | 1.536    | -0.014 |
| 30      | 5        | 1.527 | 1.534    | -0.007 |
| 30      | 6        | 1.474 | 1.478    | -0.004 |
| 30      | 7        | 1.491 | 1.508    | -0.017 |
| 30      | 8        | 1.516 | 1.524    | -0.008 |
| 30      | 9        | 1.529 | 1.532    | -0.003 |
| 30      | 10       | 1.475 | 1.466    | 0.009  |
| 30      | 11       | 1.520 | 1.522    | -0.002 |
| 30      | 12       | 1.466 | 1.469    | -0.003 |
| Max     |          | 1.529 | 1.536    | 0.009  |
| Average |          | 1.501 | 1.506    | -0.005 |
| Min     |          | 1.466 | 1.466    | -0.017 |
| Std Dev |          | 0.023 | 0.026    | 0.007  |



**30.2\_IQ\_VS\_10p0V\_48V\_25m**

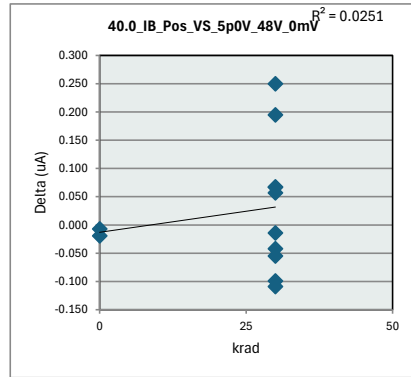
|             |             |
|-------------|-------------|
| Test Site   | J2S         |
| Tester      | FETS36401   |
| Test Number | EE213301    |
| Max Limit   | 1.99 mA     |
| Min Limit   | 0.81 mA     |
| krad        | 0 30        |
| LL          | 0.810 0.810 |
| Min         | 1.476 1.466 |
| Average     | 1.495 1.508 |
| Max         | 1.514 1.536 |
| UL          | 1.990 1.990 |



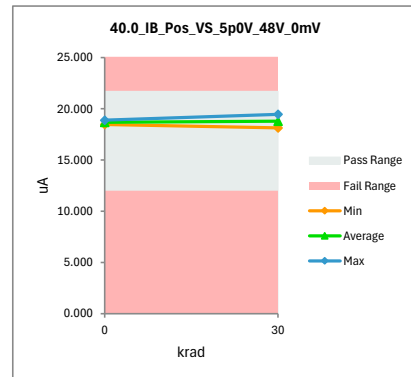
TID Report  
INA951-SEP

| 40.0_IB_Pos_VS_5p0V_48V_0m |           |           |
|----------------------------|-----------|-----------|
| Test Site                  | J2S       | J2S       |
| Tester                     | FETS36401 | FETS36417 |
| Test Number                | EE213301  | EE213301  |
| Unit                       | uA        | uA        |
| Max Limit                  | 21.7      | 21.7      |
| Min Limit                  | 12        | 12        |

| krad    | Serial # | pre    | Post.log | Delta  |
|---------|----------|--------|----------|--------|
| 0       | 1        | 18.449 | 18.468   | -0.019 |
| 0       | 2        | 18.887 | 18.894   | -0.007 |
| 30      | 3        | 18.694 | 18.803   | -0.109 |
| 30      | 4        | 19.526 | 19.459   | 0.067  |
| 30      | 5        | 18.863 | 18.668   | 0.195  |
| 30      | 6        | 18.816 | 18.566   | 0.250  |
| 30      | 7        | 19.218 | 19.317   | -0.099 |
| 30      | 8        | 18.814 | 18.828   | -0.014 |
| 30      | 9        | 19.146 | 19.201   | -0.055 |
| 30      | 10       | 18.633 | 18.566   | 0.067  |
| 30      | 11       | 18.429 | 18.372   | 0.057  |
| 30      | 12       | 18.097 | 18.139   | -0.042 |
| Max     |          | 19.526 | 19.459   | 0.250  |
| Average |          | 18.798 | 18.773   | 0.024  |
| Min     |          | 18.097 | 18.139   | -0.109 |
| Std Dev |          | 0.385  | 0.396    | 0.110  |



| 40.0_IB_Pos_VS_5p0V_48V_0 |           |        |
|---------------------------|-----------|--------|
| Test Site                 | J2S       |        |
| Tester                    | FETS36401 |        |
| Test Number               | EE213301  |        |
| Max Limit                 | 21.7      | uA     |
| Min Limit                 | 12        | uA     |
| krad                      | 0         | 30     |
| LL                        | 12.000    | 12.000 |
| Min                       | 18.468    | 18.139 |
| Average                   | 18.681    | 18.792 |
| Max                       | 18.894    | 19.459 |
| UL                        | 21.700    | 21.700 |

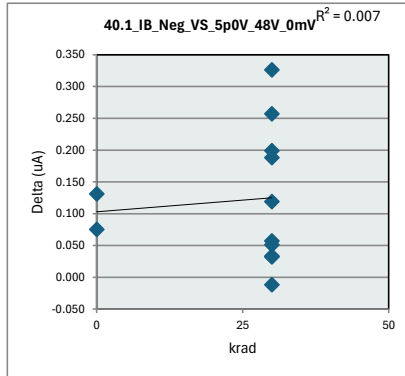


TID Report  
INA951-SEP

40.1\_IB\_Neg\_VS\_5p0V\_48V\_0mV

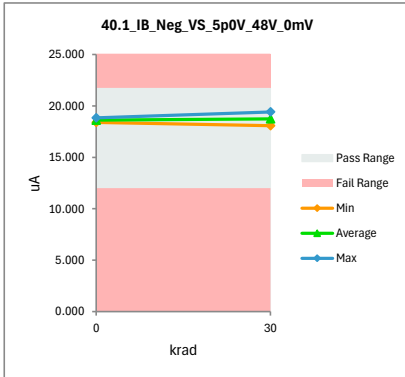
|             |           |           |
|-------------|-----------|-----------|
| Test Site   | J2S       | J2S       |
| Tester      | FETS36401 | FETS36417 |
| Test Number | EE213301  | EE213301  |
| Unit        | uA        | uA        |
| Max Limit   | 21.7      | 21.7      |
| Min Limit   | 12        | 12        |

| krad    | Serial # | pre    | Post.log | Delta  |
|---------|----------|--------|----------|--------|
| 0       | 1        | 18.527 | 18.396   | 0.131  |
| 0       | 2        | 18.915 | 18.840   | 0.075  |
| 30      | 3        | 18.784 | 18.796   | -0.012 |
| 30      | 4        | 19.598 | 19.410   | 0.188  |
| 30      | 5        | 18.858 | 18.601   | 0.257  |
| 30      | 6        | 18.838 | 18.512   | 0.326  |
| 30      | 7        | 19.296 | 19.245   | 0.051  |
| 30      | 8        | 18.821 | 18.789   | 0.032  |
| 30      | 9        | 19.196 | 19.163   | 0.033  |
| 30      | 10       | 18.632 | 18.513   | 0.119  |
| 30      | 11       | 18.478 | 18.279   | 0.199  |
| 30      | 12       | 18.134 | 18.077   | 0.057  |
| Max     |          | 19.598 | 19.410   | 0.326  |
| Average |          | 18.840 | 18.718   | 0.121  |
| Min     |          | 18.134 | 18.077   | -0.012 |
| Std Dev |          | 0.392  | 0.403    | 0.103  |



40.1\_IB\_Neg\_VS\_5p0V\_48V\_0mV

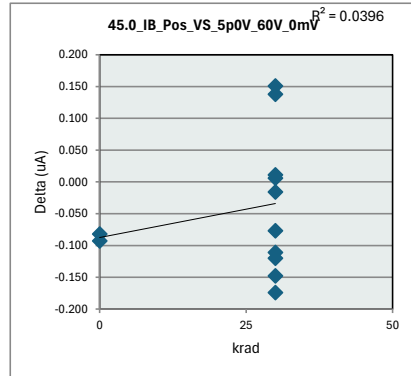
|             |               |
|-------------|---------------|
| Test Site   | J2S           |
| Tester      | FETS36401     |
| Test Number | EE213301      |
| Max Limit   | 21.7 uA       |
| Min Limit   | 12 uA         |
| krad        | 0 30          |
| LL          | 12.000 12.000 |
| Min         | 18.396 18.077 |
| Average     | 18.618 18.739 |
| Max         | 18.840 19.410 |
| UL          | 21.700 21.700 |



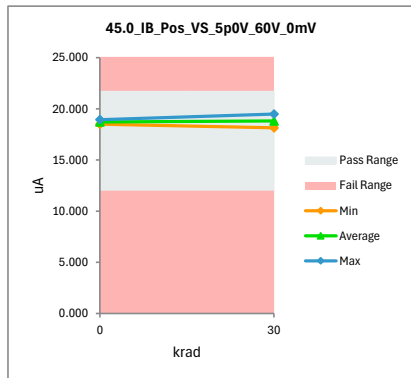
TID Report  
INA951-SEP

| 45.0_IB_Pos_VS_5p0V_60V_0m |           |           |
|----------------------------|-----------|-----------|
| Test Site                  | J2S       | J2S       |
| Tester                     | FETS36401 | FETS36417 |
| Test Number                | EE213301  | EE213301  |
| Unit                       | uA        | uA        |
| Max Limit                  | 21.7      | 21.7      |
| Min Limit                  | 12        | 12        |

| krad    | Serial # | pre    | Post.log | Delta  |
|---------|----------|--------|----------|--------|
| 0       | 1        | 18.408 | 18.501   | -0.093 |
| 0       | 2        | 18.855 | 18.937   | -0.082 |
| 30      | 3        | 18.654 | 18.828   | -0.174 |
| 30      | 4        | 19.500 | 19.489   | 0.011  |
| 30      | 5        | 18.828 | 18.690   | 0.138  |
| 30      | 6        | 18.758 | 18.607   | 0.151  |
| 30      | 7        | 19.185 | 19.333   | -0.148 |
| 30      | 8        | 18.757 | 18.868   | -0.111 |
| 30      | 9        | 19.113 | 19.233   | -0.120 |
| 30      | 10       | 18.590 | 18.584   | 0.006  |
| 30      | 11       | 18.378 | 18.394   | -0.016 |
| 30      | 12       | 18.067 | 18.144   | -0.077 |
| Max     |          | 19.500 | 19.489   | 0.151  |
| Average |          | 18.758 | 18.801   | -0.043 |
| Min     |          | 18.067 | 18.144   | -0.174 |
| Std Dev |          | 0.388  | 0.399    | 0.105  |



| 45.0_IB_Pos_VS_5p0V_60V_0 |           |        |
|---------------------------|-----------|--------|
| Test Site                 | J2S       |        |
| Tester                    | FETS36401 |        |
| Test Number               | EE213301  |        |
| Max Limit                 | 21.7      | uA     |
| Min Limit                 | 12        | uA     |
| krad                      | 0         | 30     |
| LL                        | 12.000    | 12.000 |
| Min                       | 18.501    | 18.144 |
| Average                   | 18.719    | 18.817 |
| Max                       | 18.937    | 19.489 |
| UL                        | 21.700    | 21.700 |

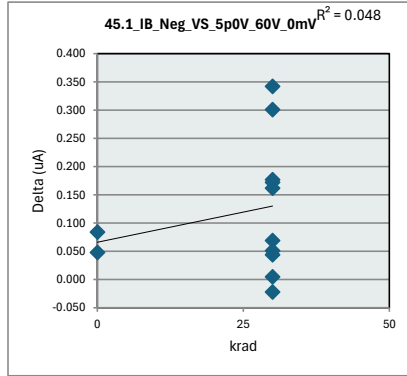


TID Report  
INA951-SEP

45.1\_IB\_Neg\_VS\_5p0V\_60V\_0mV

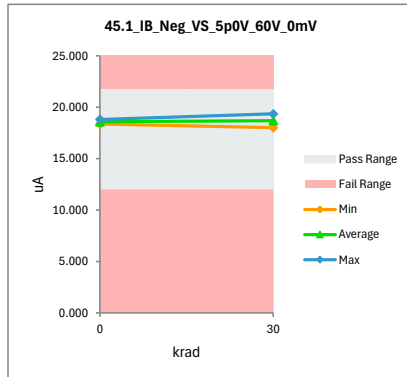
|             |           |           |
|-------------|-----------|-----------|
| Test Site   | J2S       | J2S       |
| Tester      | FETS36401 | FETS36417 |
| Test Number | EE213301  | EE213301  |
| Unit        | uA        | uA        |
| Max Limit   | 21.7      | 21.7      |
| Min Limit   | 12        | 12        |

| krad    | Serial # | pre    | Post.log | Delta  |
|---------|----------|--------|----------|--------|
| 0       | 1        | 18.455 | 18.371   | 0.084  |
| 0       | 2        | 18.857 | 18.809   | 0.048  |
| 30      | 3        | 18.689 | 18.711   | -0.022 |
| 30      | 4        | 19.541 | 19.364   | 0.177  |
| 30      | 5        | 18.876 | 18.575   | 0.301  |
| 30      | 6        | 18.836 | 18.494   | 0.342  |
| 30      | 7        | 19.229 | 19.224   | 0.005  |
| 30      | 8        | 18.817 | 18.748   | 0.069  |
| 30      | 9        | 19.143 | 19.099   | 0.044  |
| 30      | 10       | 18.636 | 18.464   | 0.172  |
| 30      | 11       | 18.431 | 18.269   | 0.162  |
| 30      | 12       | 18.070 | 18.019   | 0.051  |
| Max     |          | 19.541 | 19.364   | 0.342  |
| Average |          | 18.798 | 18.679   | 0.119  |
| Min     |          | 18.070 | 18.019   | -0.022 |
| Std Dev |          | 0.392  | 0.399    | 0.114  |



45.1\_IB\_Neg\_VS\_5p0V\_60V\_0mV

|             |                    |
|-------------|--------------------|
| Test Site   | J2S                |
| Tester      | FETS36401          |
| Test Number | EE213301           |
| Max Limit   | 21.7 uA            |
| Min Limit   | 12 uA              |
| krad        | 0      30          |
| LL          | 12.000      12.000 |
| Min         | 18.371      18.019 |
| Average     | 18.590      18.697 |
| Max         | 18.809      19.364 |
| UL          | 21.700      21.700 |

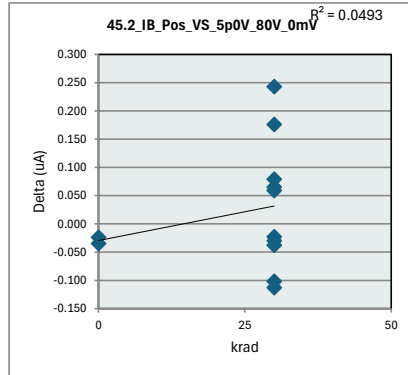


TID Report  
INA951-SEP

45.2\_IB\_Pos\_VS\_5p0V\_80V\_0m

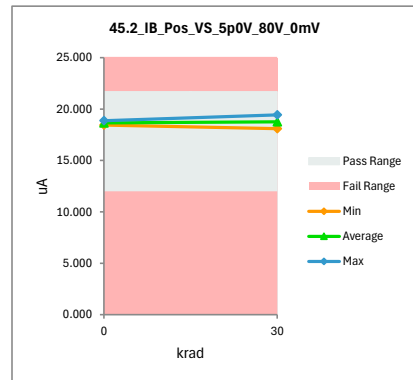
|             |           |           |
|-------------|-----------|-----------|
| Test Site   | J2S       | J2S       |
| Tester      | FETS36401 | FETS36417 |
| Test Number | EE213301  | EE213301  |
| Unit        | uA        | uA        |
| Max Limit   | 21.7      | 21.7      |
| Min Limit   | 12        | 12        |

| krad    | Serial # | pre    | Post.log | Delta  |
|---------|----------|--------|----------|--------|
| 0       | 1        | 18.409 | 18.444   | -0.035 |
| 0       | 2        | 18.841 | 18.865   | -0.024 |
| 30      | 3        | 18.658 | 18.771   | -0.113 |
| 30      | 4        | 19.500 | 19.435   | 0.065  |
| 30      | 5        | 18.818 | 18.642   | 0.176  |
| 30      | 6        | 18.783 | 18.540   | 0.243  |
| 30      | 7        | 19.192 | 19.294   | -0.102 |
| 30      | 8        | 18.781 | 18.804   | -0.023 |
| 30      | 9        | 19.128 | 19.158   | -0.030 |
| 30      | 10       | 18.602 | 18.523   | 0.079  |
| 30      | 11       | 18.391 | 18.332   | 0.059  |
| 30      | 12       | 18.054 | 18.092   | -0.038 |
| Max     |          | 19.500 | 19.435   | 0.243  |
| Average |          | 18.763 | 18.742   | 0.021  |
| Min     |          | 18.054 | 18.092   | -0.113 |
| Std Dev |          | 0.390  | 0.400    | 0.107  |



45.2\_IB\_Pos\_VS\_5p0V\_80V\_0

|             |                    |
|-------------|--------------------|
| Test Site   | J2S                |
| Tester      | FETS36401          |
| Test Number | EE213301           |
| Max Limit   | 21.7 uA            |
| Min Limit   | 12 uA              |
| krad        | 0      30          |
| LL          | 12.000      12.000 |
| Min         | 18.444      18.092 |
| Average     | 18.655      18.759 |
| Max         | 18.865      19.435 |
| UL          | 21.700      21.700 |

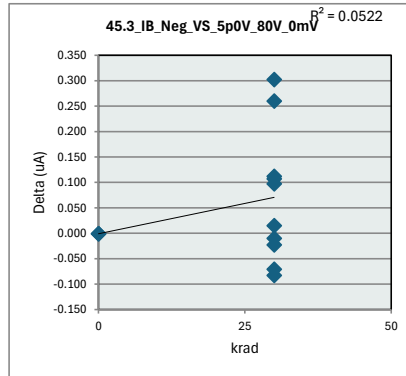


TID Report  
INA951-SEP

45.3\_IB\_Neg\_VS\_5p0V\_80V\_0mV

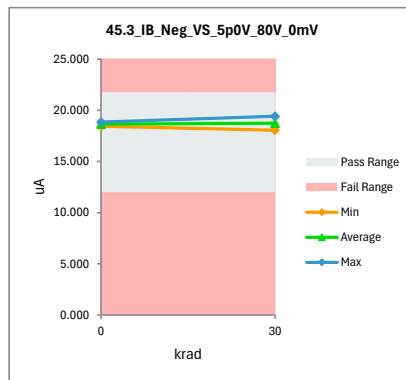
|             |           |           |
|-------------|-----------|-----------|
| Test Site   | J2S       | J2S       |
| Tester      | FETS36401 | FETS36417 |
| Test Number | EE213301  | EE213301  |
| Unit        | uA        | uA        |
| Max Limit   | 21.7      | 21.7      |
| Min Limit   | 12        | 12        |

| krad    | Serial # | pre    | Post.log | Delta  |
|---------|----------|--------|----------|--------|
| 0       | 1        | 18.445 | 18.446   | -0.001 |
| 0       | 2        | 18.849 | 18.850   | -0.001 |
| 30      | 3        | 18.684 | 18.755   | -0.071 |
| 30      | 4        | 19.529 | 19.422   | 0.107  |
| 30      | 5        | 18.867 | 18.607   | 0.260  |
| 30      | 6        | 18.826 | 18.524   | 0.302  |
| 30      | 7        | 19.199 | 19.282   | -0.083 |
| 30      | 8        | 18.805 | 18.790   | 0.015  |
| 30      | 9        | 19.122 | 19.145   | -0.023 |
| 30      | 10       | 18.622 | 18.525   | 0.097  |
| 30      | 11       | 18.420 | 18.308   | 0.112  |
| 30      | 12       | 18.047 | 18.057   | -0.010 |
| Max     |          | 19.529 | 19.422   | 0.302  |
| Average |          | 18.785 | 18.726   | 0.059  |
| Min     |          | 18.047 | 18.057   | -0.083 |
| Std Dev |          | 0.391  | 0.403    | 0.122  |



45.3\_IB\_Neg\_VS\_5p0V\_80V\_0mV

|             |               |
|-------------|---------------|
| Test Site   | J2S           |
| Tester      | FETS36401     |
| Test Number | EE213301      |
| Max Limit   | 21.7 uA       |
| Min Limit   | 12 uA         |
| krad        | 0 30          |
| LL          | 12.000 12.000 |
| Min         | 18.446 18.057 |
| Average     | 18.648 18.742 |
| Max         | 18.850 19.422 |
| UL          | 21.700 21.700 |



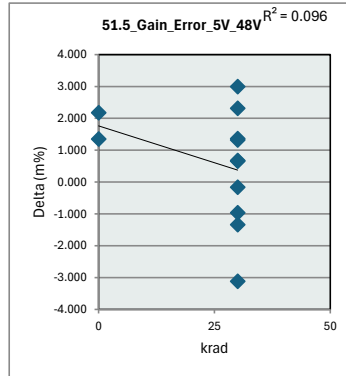


TID Report  
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**51.5\_Gain\_Error\_5V\_48V**

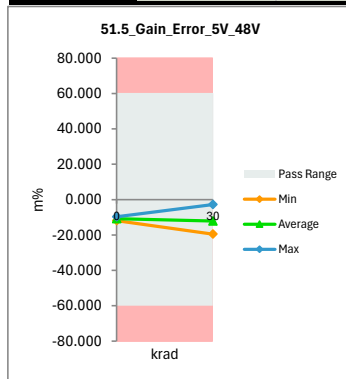
|             |           |           |
|-------------|-----------|-----------|
| Test Site   | J2S       | J2S       |
| Tester      | FETS36401 | FETS36417 |
| Test Number | EE213301  | EE213301  |
| Unit        | m%        | m%        |
| Max Limit   | 60        | 60        |
| Min Limit   | -60       | -60       |

| krad    | Serial # | pre     | Post.log | Delta  |
|---------|----------|---------|----------|--------|
| 0       | 1        | -7.492  | -9.670   | 2.177  |
| 0       | 2        | -10.544 | -11.894  | 1.349  |
| 30      | 3        | -10.905 | -12.228  | 1.323  |
| 30      | 4        | -8.782  | -8.618   | -0.164 |
| 30      | 5        | -5.894  | -2.781   | -3.113 |
| 30      | 6        | -8.764  | -9.421   | 0.657  |
| 30      | 7        | -13.332 | -12.367  | -0.965 |
| 30      | 8        | -16.509 | -19.507  | 2.998  |
| 30      | 9        | -14.269 | -16.585  | 2.316  |
| 30      | 10       | -11.525 | -12.888  | 1.363  |
| 30      | 11       | -9.999  | -8.660   | -1.339 |
| 30      | 12       | -17.111 | -17.787  | 0.677  |
| Max     |          | -5.894  | -2.781   | 2.998  |
| Average |          | -11.260 | -11.867  | 0.607  |
| Min     |          | -17.111 | -19.507  | -3.113 |
| Std Dev |          | 3.474   | 4.586    | 1.744  |



**51.5\_Gain\_Error\_5V\_48V**

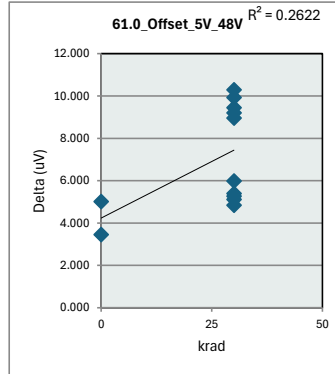
|             |                 |
|-------------|-----------------|
| Test Site   | J2S             |
| Tester      | FETS36401       |
| Test Number | EE213301        |
| Max Limit   | 60 m%           |
| Min Limit   | -60 m%          |
| krad        | 0 30            |
| LL          | -60.000 -60.000 |
| Min         | -11.894 -19.507 |
| Average     | -10.782 -12.084 |
| Max         | -9.670 -2.781   |
| UL          | 60.000 60.000   |



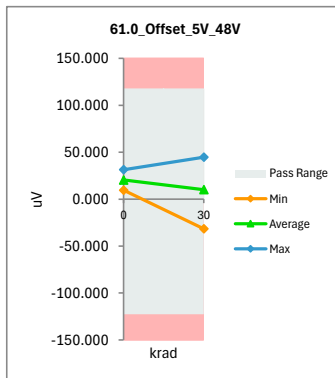
TID Report  
INA951-SEP

| 61.0_Offset_5V_48V |           |           |
|--------------------|-----------|-----------|
| Test Site          | J2S       | J2S       |
| Tester             | FETS36401 | FETS36417 |
| Test Number        | EE213301  | EE213301  |
| Unit               | uV        | uV        |
| Max Limit          | 117.27    | 117.27    |
| Min Limit          | -122.62   | -122.62   |

| krad    | Serial # | pre     | Post.log | Delta  |
|---------|----------|---------|----------|--------|
| 0       | 1        | 34.767  | 31.309   | 3.458  |
| 0       | 2        | 14.599  | 9.586    | 5.012  |
| 30      | 3        | 8.642   | -1.283   | 9.925  |
| 30      | 4        | 45.298  | 36.097   | 9.201  |
| 30      | 5        | 44.286  | 33.997   | 10.289 |
| 30      | 6        | 24.891  | 15.442   | 9.449  |
| 30      | 7        | 28.476  | 19.515   | 8.962  |
| 30      | 8        | -5.216  | -10.608  | 5.393  |
| 30      | 9        | -9.172  | -14.009  | 4.837  |
| 30      | 10       | 13.821  | 8.557    | 5.264  |
| 30      | 11       | 50.662  | 44.682   | 5.980  |
| 30      | 12       | -26.505 | -31.617  | 5.112  |
| Max     |          | 50.662  | 44.682   | 10.289 |
| Average |          | 18.712  | 11.806   | 6.907  |
| Min     |          | -26.505 | -31.617  | 3.458  |
| Std Dev |          | 23.950  | 23.076   | 2.437  |

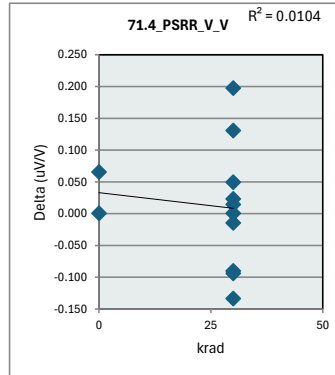


| 61.0_Offset_5V_48V |           |          |
|--------------------|-----------|----------|
| Test Site          | J2S       |          |
| Tester             | FETS36401 |          |
| Test Number        | EE213301  |          |
| Max Limit          | 117.27    | uV       |
| Min Limit          | -122.62   | uV       |
| krad               | 0         | 30       |
| LL                 | -122.620  | -122.620 |
| Min                | 9.586     | -31.617  |
| Average            | 20.448    | 10.077   |
| Max                | 31.309    | 44.682   |
| UL                 | 117.270   | 117.270  |

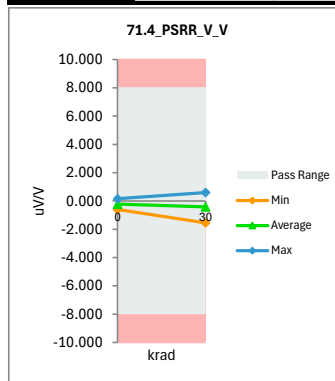


TID Report  
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| 71.4_PSRR_V_V |           |           |          |        |
|---------------|-----------|-----------|----------|--------|
| Test Site     | J2S       | J2S       |          |        |
| Tester        | FETS36401 | FETS36417 |          |        |
| Test Number   | EE213301  | EE213301  |          |        |
| Unit          | uV/V      | uV/V      |          |        |
| Max Limit     | 8         | 8         |          |        |
| Min Limit     | -8        | -8        |          |        |
| krad          | Serial #  | pre       | Post.log | Delta  |
| 0             | 1         | 0.227     | 0.161    | 0.066  |
| 0             | 2         | -0.600    | -0.600   | 0.001  |
| 30            | 3         | -0.607    | -0.631   | 0.023  |
| 30            | 4         | 0.327     | 0.278    | 0.050  |
| 30            | 5         | 0.491     | 0.506    | -0.015 |
| 30            | 6         | -0.158    | -0.064   | -0.094 |
| 30            | 7         | -0.071    | -0.202   | 0.131  |
| 30            | 8         | -1.076    | -1.274   | 0.198  |
| 30            | 9         | -1.467    | -1.377   | -0.090 |
| 30            | 10        | -0.446    | -0.460   | 0.015  |
| 30            | 11        | 0.598     | 0.597    | 0.001  |
| 30            | 12        | -1.682    | -1.548   | -0.133 |
| Max           |           | 0.598     | 0.597    | 0.198  |
| Average       |           | -0.372    | -0.385   | 0.013  |
| Min           |           | -1.682    | -1.548   | -0.133 |
| Std Dev       |           | 0.750     | 0.731    | 0.094  |

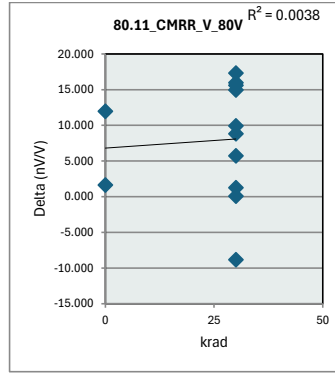


| 71.4_PSRR_V_V |           |        |
|---------------|-----------|--------|
| Test Site     | J2S       |        |
| Tester        | FETS36401 |        |
| Test Number   | EE213301  |        |
| Max Limit     | 8         | uV/V   |
| Min Limit     | -8        | uV/V   |
| krad          | 0         | 30     |
| LL            | -8.000    | -8.000 |
| Min           | -0.601    | -1.548 |
| Average       | -0.220    | -0.418 |
| Max           | 0.161     | 0.597  |
| UL            | 8.000     | 8.000  |

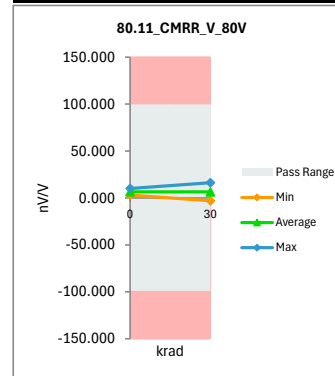


TID Report  
INA951-SEP

| 80.11_CMRR_V_80V |           |        |           |        |
|------------------|-----------|--------|-----------|--------|
| Test Site        | J2S       |        | J2S       |        |
| Tester           | FETS36401 |        | FETS36417 |        |
| Test Number      | EE213301  |        | EE213301  |        |
| Unit             | nV/V      |        | nV/V      |        |
| Max Limit        | 99        |        | 99        |        |
| Min Limit        | -99       |        | -99       |        |
| krad             | Serial #  | pre    | Post.log  | Delta  |
| 0                | 1         | 11.735 | 10.087    | 1.649  |
| 0                | 2         | 14.965 | 2.995     | 11.971 |
| 30               | 3         | 7.404  | 16.233    | -8.830 |
| 30               | 4         | 5.907  | -2.916    | 8.823  |
| 30               | 5         | 7.325  | 7.249     | 0.075  |
| 30               | 6         | 18.430 | 8.511     | 9.920  |
| 30               | 7         | 11.342 | 10.087    | 1.255  |
| 30               | 8         | 21.819 | 16.077    | 5.742  |
| 30               | 9         | 17.407 | 1.419     | 15.989 |
| 30               | 10        | 18.510 | 3.546     | 14.964 |
| 30               | 11        | 18.982 | 1.655     | 17.327 |
| 30               | 12        | 18.589 | 2.995     | 15.595 |
| Max              |           | 21.819 | 16.233    | 17.327 |
| Average          |           | 14.368 | 6.495     | 7.873  |
| Min              |           | 5.907  | -2.916    | -8.830 |
| Std Dev          |           | 5.424  | 5.939     | 8.056  |



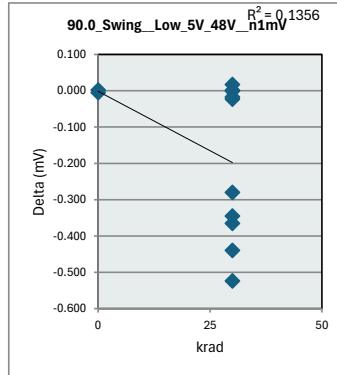
| 80.11_CMRR_V_80V |           |         |
|------------------|-----------|---------|
| Test Site        | J2S       |         |
| Tester           | FETS36401 |         |
| Test Number      | EE213301  |         |
| Max Limit        | 99        | nV/V    |
| Min Limit        | -99       | nV/V    |
| krad             | 0         | 30      |
| LL               | -99.000   | -99.000 |
| Min              | 2.995     | -2.916  |
| Average          | 6.541     | 6.486   |
| Max              | 10.087    | 16.233  |
| UL               | 99.000    | 99.000  |



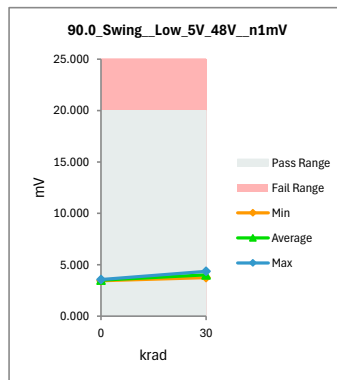
TID Report  
INA951-SEP

| 90.0_Swing_Low_5V_48V_n1 |           |           |
|--------------------------|-----------|-----------|
| Test Site                | J2S       | J2S       |
| Tester                   | FETS36401 | FETS36417 |
| Test Number              | EE213301  | EE213301  |
| Unit                     | mV        | mV        |
| Max Limit                | 20        | 20        |
| Min Limit                | 0         | 0         |

| krad    | Serial # | pre   | Post.log | Delta  |
|---------|----------|-------|----------|--------|
| 0       | 1        | 3.556 | 3.561    | -0.005 |
| 0       | 2        | 3.446 | 3.444    | 0.002  |
| 30      | 3        | 3.782 | 4.127    | -0.345 |
| 30      | 4        | 3.804 | 4.084    | -0.280 |
| 30      | 5        | 3.772 | 4.137    | -0.365 |
| 30      | 6        | 3.637 | 4.161    | -0.524 |
| 30      | 7        | 3.918 | 4.358    | -0.440 |
| 30      | 8        | 3.867 | 3.868    | -0.001 |
| 30      | 9        | 3.848 | 3.871    | -0.023 |
| 30      | 10       | 4.073 | 4.056    | 0.017  |
| 30      | 11       | 3.742 | 3.759    | -0.017 |
| 30      | 12       | 3.748 | 3.747    | 0.001  |
| Max     |          | 4.073 | 4.358    | 0.017  |
| Average |          | 3.766 | 3.931    | -0.165 |
| Min     |          | 3.446 | 3.444    | -0.524 |
| Std Dev |          | 0.165 | 0.270    | 0.207  |



| 90.0_Swing_Low_5V_48V_n1 |           |        |
|--------------------------|-----------|--------|
| Test Site                | J2S       |        |
| Tester                   | FETS36401 |        |
| Test Number              | EE213301  |        |
| Max Limit                | 20        | mV     |
| Min Limit                | 0         | mV     |
| krad                     | 0         | 30     |
| LL                       | 0.000     | 0.000  |
| Min                      | 3.444     | 3.747  |
| Average                  | 3.503     | 4.017  |
| Max                      | 3.561     | 4.358  |
| UL                       | 20.000    | 20.000 |

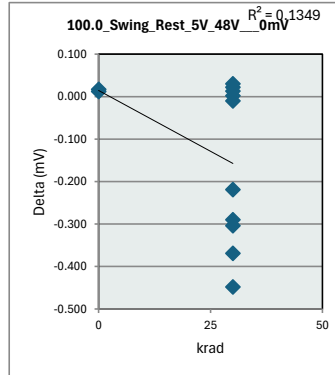


TID Report  
INA951-SEP

100.0\_Swing\_Rest\_5V\_48V\_0

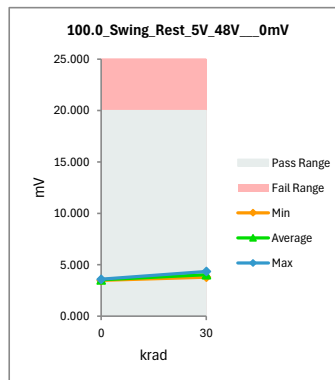
|             |           |           |
|-------------|-----------|-----------|
| Test Site   | J2S       | J2S       |
| Tester      | FETS36401 | FETS36417 |
| Test Number | EE213301  | EE213301  |
| Unit        | mV        | mV        |
| Max Limit   | 20        | 20        |
| Min Limit   | 0         | 0         |

| krad    | Serial # | pre   | Post.log | Delta  |
|---------|----------|-------|----------|--------|
| 0       | 1        | 3.608 | 3.596    | 0.012  |
| 0       | 2        | 3.498 | 3.481    | 0.017  |
| 30      | 3        | 3.835 | 4.125    | -0.290 |
| 30      | 4        | 3.854 | 4.073    | -0.219 |
| 30      | 5        | 3.831 | 4.135    | -0.304 |
| 30      | 6        | 3.688 | 4.136    | -0.448 |
| 30      | 7        | 3.975 | 4.344    | -0.369 |
| 30      | 8        | 3.922 | 3.909    | 0.013  |
| 30      | 9        | 3.897 | 3.907    | -0.010 |
| 30      | 10       | 4.126 | 4.096    | 0.030  |
| 30      | 11       | 3.801 | 3.799    | 0.002  |
| 30      | 12       | 3.810 | 3.788    | 0.022  |
| Max     |          | 4.126 | 4.344    | 0.030  |
| Average |          | 3.820 | 3.949    | -0.129 |
| Min     |          | 3.498 | 3.481    | -0.448 |
| Std Dev |          | 0.166 | 0.250    | 0.182  |



100.0\_Swing\_Rest\_5V\_48V

|             |               |
|-------------|---------------|
| Test Site   | J2S           |
| Tester      | FETS36401     |
| Test Number | EE213301      |
| Max Limit   | 20 mV         |
| Min Limit   | 0 mV          |
| krad        | 0 30          |
| LL          | 0.000 0.000   |
| Min         | 3.481 3.788   |
| Average     | 3.539 4.031   |
| Max         | 3.596 4.344   |
| UL          | 20.000 20.000 |

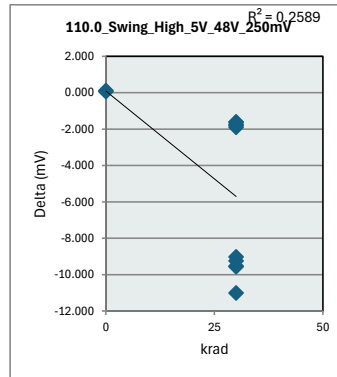


TID Report  
INA951-SEP

110.0\_Swing\_High\_5V\_48V\_250

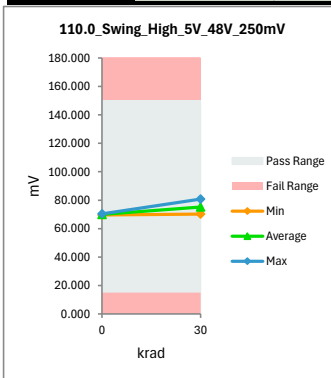
|             |           |           |
|-------------|-----------|-----------|
| Test Site   | J2S       | J2S       |
| Tester      | FETS36401 | FETS36417 |
| Test Number | EE213301  | EE213301  |
| Unit        | mV        | mV        |
| Max Limit   | 150       | 150       |
| Min Limit   | 15        | 15        |

| krad    | Serial # | pre    | Post.log | Delta   |
|---------|----------|--------|----------|---------|
| 0       | 1        | 70.491 | 70.376   | 0.115   |
| 0       | 2        | 69.658 | 69.597   | 0.061   |
| 30      | 3        | 69.945 | 79.191   | -9.246  |
| 30      | 4        | 69.471 | 79.031   | -9.560  |
| 30      | 5        | 69.517 | 78.539   | -9.022  |
| 30      | 6        | 69.763 | 80.772   | -11.009 |
| 30      | 7        | 69.454 | 78.979   | -9.525  |
| 30      | 8        | 68.593 | 70.224   | -1.631  |
| 30      | 9        | 69.071 | 70.859   | -1.788  |
| 30      | 10       | 69.726 | 71.332   | -1.606  |
| 30      | 11       | 69.199 | 70.950   | -1.751  |
| 30      | 12       | 70.154 | 72.053   | -1.899  |
| Max     |          | 70.491 | 80.772   | 0.115   |
| Average |          | 69.587 | 74.325   | -4.738  |
| Min     |          | 68.593 | 69.597   | -11.009 |
| Std Dev |          | 0.501  | 4.463    | 4.430   |



110.0\_Swing\_High\_5V\_48V\_2

|             |           |           |
|-------------|-----------|-----------|
| Test Site   | J2S       | J2S       |
| Tester      | FETS36401 | FETS36417 |
| Test Number | EE213301  | EE213301  |
| Max Limit   | 150       | mV        |
| Min Limit   | 15        | mV        |
| krad        | 0         | 30        |
| LL          | 15.000    | 15.000    |
| Min         | 69.597    | 70.224    |
| Average     | 69.987    | 75.193    |
| Max         | 70.376    | 80.772    |
| UL          | 150.000   | 150.000   |

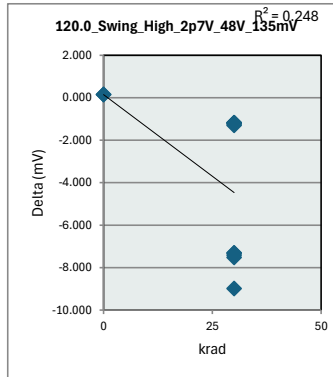


TID Report  
INA951-SEP

120.0\_Swing\_High\_2p7V\_48V\_1

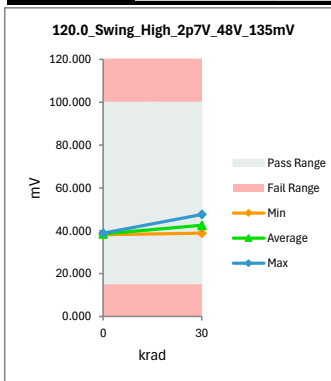
|             |           |           |
|-------------|-----------|-----------|
| Test Site   | J2S       | J2S       |
| Tester      | FETS36401 | FETS36417 |
| Test Number | EE213301  | EE213301  |
| Unit        | mV        | mV        |
| Max Limit   | 100       | 100       |
| Min Limit   | 15        | 15        |

| krad    | Serial # | pre    | Post.log | Delta  |
|---------|----------|--------|----------|--------|
| 0       | 1        | 39.017 | 38.874   | 0.143  |
| 0       | 2        | 38.290 | 38.138   | 0.152  |
| 30      | 3        | 38.289 | 45.592   | -7.303 |
| 30      | 4        | 37.819 | 45.143   | -7.324 |
| 30      | 5        | 37.864 | 45.280   | -7.416 |
| 30      | 6        | 38.591 | 47.576   | -8.985 |
| 30      | 7        | 37.776 | 45.300   | -7.524 |
| 30      | 8        | 37.686 | 38.868   | -1.182 |
| 30      | 9        | 37.872 | 39.066   | -1.194 |
| 30      | 10       | 38.241 | 39.419   | -1.178 |
| 30      | 11       | 38.163 | 39.464   | -1.301 |
| 30      | 12       | 38.549 | 39.783   | -1.234 |
| Max     |          | 39.017 | 47.576   | 0.152  |
| Average |          | 38.180 | 41.875   | -3.696 |
| Min     |          | 37.686 | 38.138   | -8.985 |
| Std Dev |          | 0.401  | 3.522    | 3.604  |



120.0\_Swing\_High\_2p7V\_48V

|             |                 |
|-------------|-----------------|
| Test Site   | J2S             |
| Tester      | FETS36401       |
| Test Number | EE213301        |
| Max Limit   | 100 mV          |
| Min Limit   | 15 mV           |
| krad        | 0 30            |
| LL          | 15.000 15.000   |
| Min         | 38.138 38.868   |
| Average     | 38.506 42.549   |
| Max         | 38.874 47.576   |
| UL          | 100.000 100.000 |

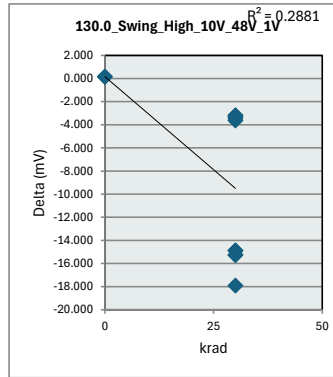


TID Report  
INA951-SEP

130.0\_Swing\_High\_10V\_48V\_1V

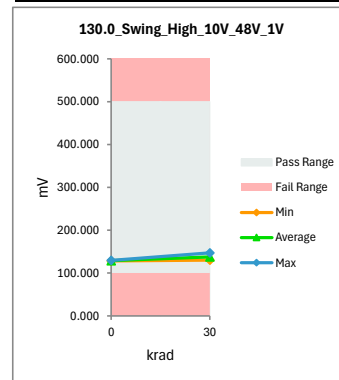
|             |           |           |
|-------------|-----------|-----------|
| Test Site   | J2S       | J2S       |
| Tester      | FETS36401 | FETS36417 |
| Test Number | EE213301  | EE213301  |
| Unit        | mV        | mV        |
| Max Limit   | 500       | 500       |
| Min Limit   | 100       | 100       |

| krad    | Serial # | pre     | Post.log | Delta   |
|---------|----------|---------|----------|---------|
| 0       | 1        | 129.756 | 129.585  | 0.171   |
| 0       | 2        | 128.510 | 128.347  | 0.163   |
| 30      | 3        | 128.321 | 143.192  | -14.871 |
| 30      | 4        | 128.098 | 143.353  | -15.255 |
| 30      | 5        | 127.674 | 142.565  | -14.891 |
| 30      | 6        | 129.287 | 147.200  | -17.913 |
| 30      | 7        | 127.674 | 142.944  | -15.270 |
| 30      | 8        | 127.055 | 130.229  | -3.174  |
| 30      | 9        | 127.924 | 131.245  | -3.321  |
| 30      | 10       | 128.612 | 131.822  | -3.210  |
| 30      | 11       | 127.691 | 131.116  | -3.425  |
| 30      | 12       | 129.414 | 133.028  | -3.614  |
| Max     |          | 129.756 | 147.200  | 0.171   |
| Average |          | 128.335 | 136.219  | -7.884  |
| Min     |          | 127.055 | 128.347  | -17.913 |
| Std Dev |          | 0.817   | 6.927    | 7.006   |



130.0\_Swing\_High\_10V\_48V

|             |                 |
|-------------|-----------------|
| Test Site   | J2S             |
| Tester      | FETS36401       |
| Test Number | EE213301        |
| Max Limit   | 500 mV          |
| Min Limit   | 100 mV          |
| krad        | 0 30            |
| LL          | 100.000 100.000 |
| Min         | 128.347 130.229 |
| Average     | 128.966 137.669 |
| Max         | 129.585 147.200 |
| UL          | 500.000 500.000 |



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