

**UNISYS**

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PPM-95-126

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SUBJECT: Radiation Report on HST/PCP  
Part No. MFL2805S  
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A radiation evaluation was performed on MFL2805S (DC/DC Converter) to determine the total dose tolerance of these parts. A brief summary of the test results is provided below. For detailed information, refer to Tables I through IV and Figure 1.

The total dose testing was performed using a <sup>60</sup>Co gamma ray source. During the radiation testing, three parts were irradiated under bias (see Figure 1 for bias configuration), and one part was used as a control sample. The total dose radiation levels were 2.5, 5, 10, 15, 20, 30 and 50 krad\*. The dose rate was between 0.04 and 0.29 krad/hour, depending on the total dose level (see Table II for radiation schedule). After the 50 krad irradiation, parts were annealed at 25°C for 168 hours. After each radiation exposure and annealing treatment, parts were electrically tested according to the test conditions and the specification limits\*\* listed in Table III.

All parts passed initial electrical measurements. During the 2.5 krad irradiation, S/N 189 was accidentally damaged and was removed from further testing. Both remaining irradiated parts passed all electrical tests up to and including the 20 krad irradiation level. At the 30 krad irradiation level, S/N 219 marginally exceeded the maximum specification limit of 5.050V for Vout Full Load with a reading of 5.051V. The other part passed all electrical measurements. At the 50 krad irradiation level, both parts passed all electrical measurements.

After annealing for 168 hours at 25°C, both parts passed all electrical measurements.

Table IV provides a summary of the mean and standard deviation values for each parameter after different irradiation exposures and annealing steps.

Any further details about this evaluation can be obtained upon request. If you have any questions, please call me at (301) 731-8954.

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\*The term rads, as used in this document, means rads(silicon). All radiation levels cited are cumulative.

\*\*These are manufacturer's pre-irradiation data specification limits. No post-irradiation limits were provided by the manufacturer at the time these tests were performed.

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TABLE I. Part Information

|   |                     |
|---|---------------------|
| Generic Part Number:                    | MFL2805S*           |
| HST/PCP<br>Part Number:                 | 5962-9316301HXC     |
| HST/PCP<br>Control Number:              | 11009               |
| Charge Number:                          | EE44602             |
| Manufacturer:                           | Interpoint          |
| Lot Date Code:                          | 9442                |
| Quantity Tested:                        | 4                   |
| Serial Number of<br>Control Samples:    | 166                 |
| Serial Numbers of<br>Radiation Samples: | 175, 189**, 219     |
| Part Function:                          | DC/DC Converter     |
| Part Technology:                        | Hybrid              |
| Package Style:                          | 12 pin metal sealed |
| Test Equipment:                         | A540                |
| Test Engineer:                          | P. Srioudom         |

\* No radiation tolerance/hardness was guaranteed by the manufacturer for this part.

\*\* During the 2.5 krad irradiation, S/N 189 was accidentally damaged and was removed from further testing.

TABLE II. Radiation Schedule for MFL28058

| EVENTS  | DATE                 |
|---|----------------------|
| 1) INITIAL ELECTRICAL MEASUREMENTS  | 01/05/95             |
| 2) 2.5 KRAD IRRADIATION (0.15 KRADS/HOUR)<br>POST-2.5 KRAD ELECTRICAL MEASUREMENT | 01/05/95<br>01/06/95 |
| 3) 5 KRAD IRRADIATION (0.04 KRADS/HOUR)<br>POST-5 KRAD ELECTRICAL MEASUREMENT     | 01/06/95<br>01/09/95 |
| 4) 10 KRAD IRRADIATION (0.16 KRADS/HOUR)<br>POST-10 KRAD ELECTRICAL MEASUREMENT   | 01/09/95<br>01/10/95 |
| 5) 15 KRAD IRRADIATION ( 0.29 KRADS/HOUR)<br>POST-15 KRAD ELECTRICAL MEASUREMENT  | 01/10/95<br>01/11/95 |
| 6) 20 KRAD IRRADIATION (0.29 KRADS/HOUR)<br>POST-20 KRAD ELECTRICAL MEASUREMENT   | 01/11/95<br>01/12/95 |
| 7) 30 KRAD IRRADIATION (0.29 KRADS/HOUR)<br>POST-30 KRAD ELECTRICAL MEASUREMENT   | 01/12/95<br>01/13/95 |
| 8) 50 KRAD IRRADIATION (0.23 KRADS/HOUR)<br>POST-50 KRAD ELECTRICAL MEASUREMENT   | 01/17/95<br>01/18/95 |
| 9) 168-HOUR ANNEALING @25°C<br>POST-168 HOUR ANNEAL ELECTRICAL MEASUREMENT        | 01/18/95<br>01/25/95 |

PARTS WERE IRRADIATED AND ANNEALED UNDER BIAS; SEE FIGURE 1.

Table III. Electrical Characteristics of MFL2805S

| Test # | Parameters     | Units | Conditions      | Min  | Max  |
|--------|----------------|-------|-----------------|------|------|
| 1      | Vout Full Load | V     | Full Load       | 4.95 | 5.05 |
| 2      | Efficiency     | %     | Full Load       | 77   | -    |
| 3      | Iin No Load    | A     | No Load         | -    | 120  |
| 4      | Load Reg       | V     | No Load to Full | -    | 20   |
| 5      | Ln Reg         | V     | Full Load       | -    | 20   |
| 6      | Output Ripple  | Vp-p  | Full Load       | -    | 35   |

**TABLE IV: Summary of Electrical Measurements after Total Dose Exposures and Annealing for MLS2805S /1**

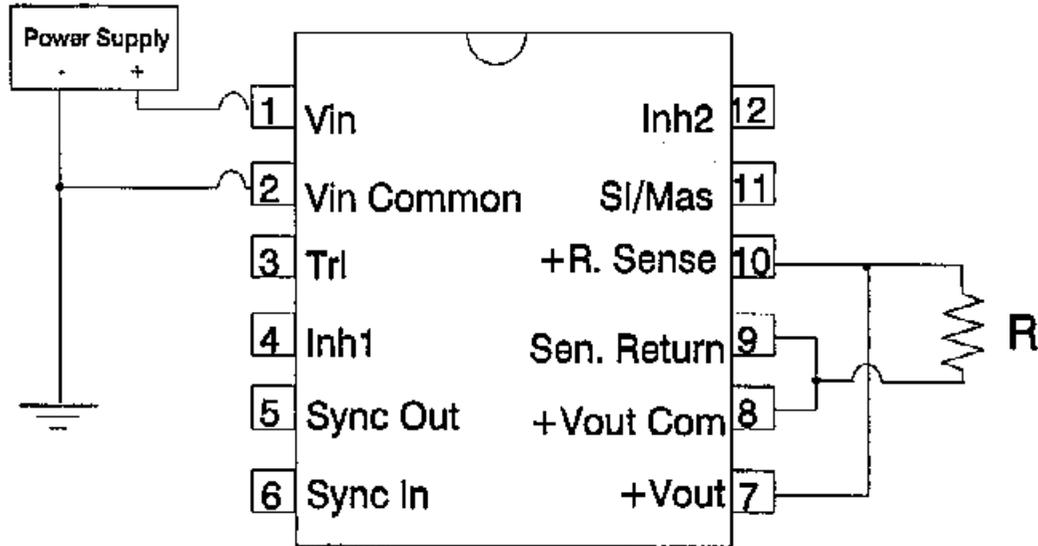
| Test # | Parameters     | Unit | Spec. Lim./2 |      | Total Dose Exposure (krads) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Annealing     |      |
|--------|----------------|------|--------------|------|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------|------|
|        |                |      |              |      | Initial                     |      | 2.5  |      | 5    |      | 10   |      | 15   |      | 20   |      | 30   |      | 50   |      | 168 hrs @25°C |      |
|        |                |      |              |      | mean                        | sd   | mean | sd   | mean | sd   | mean | sd   | mean | sd   | mean | sd   | mean | sd   | mean | sd   | mean          | sd   |
| 1      | Vout Full Load | V    | 4.95         | 5.05 | 5003                        | 10.1 | 5000 | 14.5 | 5007 | 11   | 5012 | 11.5 | 5011 | 12   | 5021 | 12   | 5043 | 8    | 5035 | 10.5 | 5029          | 12.5 |
| 2      | Efficiency     | %    | 77           | -    | 78.5                        | 0.14 | 78.5 | 0.5  | 78.5 | 0.15 | 78.5 | 0.2  | 78.4 | 0.05 | 78.1 | 0.05 | 78.2 | 0.05 | 78.1 | 0.05 | 78.1          | 0.05 |
| 3      | Iin            | mA   | -            | 120  | 79.3                        | 12.6 | 71   | 1    | 68.5 | 1.5  | 69.6 | 2.2  | 68.5 | 1.5  | 68.8 | 1.5  | 68.5 | 1.5  | 67.8 | 3.3  | 67.1          | 3.1  |
| 4      | Load Reg       | mV   | -            | 20   | 0.05                        | .03  | 0.06 | .01  | 0.03 | 0    | 0.01 | .02  | 0.04 | .01  | 0.05 | .01  | 0.13 | .03  | 0.29 | .03  | 0.16          | .02  |
| 5      | Ln Reg         | mV   | -            | 20   | 0.31                        | .07  | 0.44 | 0    | 0.40 | .03  | 0.38 | .01  | 0.46 | .05  | 0.48 | .03  | 0.71 | .07  | 0.63 | .03  | 0.49          | .06  |
| 6      | Output Ripple  | Vp-p | -            | 35   | 3.7                         | 0.12 | 3.7  | 0.05 | 3.7  | 0.05 | 3.7  | 0.05 | 3.9  | 0.0  | 3.9  | 0.0  | 3.9  | 0.0  | 4.7  | 0.2  | 4.5           | 0.2  |

**Notes:**

- 1/ The mean and standard deviation values were calculated over the three parts irradiated in this testing. The control sample remained constant throughout the testing and is not included in this table. During the 2.5 krad irradiation, S/N 189 was accidentally damaged and was removed from further testing.
- 2/ These are manufacturer's pre-irradiation data sheet specification limits. No post-irradiation limits were provided by the manufacturer at the time the tests were performed.

**Radiation-sensitive parameter: None.**

Figure 1. Radiation Bias Circuit for MFL2805S



$V_{in} = 28V$

MFL2805S  $R = 10 \text{ ohms}$