

UNISYS

DATE: February 8, 1995

TO: S. Hull/311

FROM: K. Sahu/300.1 | \ S

SUBJECT: Radiation Report on IIST/PCP
Part No. MFL2815S
Control No. 11011

PPM-95-127

cc: B. Fafaul/311
A. Nguyen/300.1
A. Sharma/311.0
R. Williams/300.1
OFA Library/300.1

A radiation evaluation was performed on MFL2815S (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 ⁶⁰Co 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*s*. The dose rate was between 0.04 and 1.18 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. All parts passed all electrical tests up to and including the 50 krad irradiation level.

After annealing for 168 hours at 25°C, all 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 step.

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

*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.

ADVISORY ON THE USE OF THIS DOCUMENT

The information contained in this document has been developed solely for the purpose of providing general guidance to employees of the Goddard Space Flight Center (GSFC). This document may be distributed outside GSFC only as a courtesy to other government agencies and contractors. Any distribution of this document, or application or use of the information contained herein, is expressly conditional upon, and is subject to, the following understandings and limitations:

- (a) The information was developed for general guidance only and is subject to change at any time;
- (b) The information was developed under unique GSFC laboratory conditions which may differ substantially from outside conditions;
- (c) GSFC does not warrant the accuracy of the information when applied or used under other than unique GSFC laboratory conditions;
- (d) The information should not be construed as a representation of product performance by either GSFC or the manufacturer;
- (e) Neither the United States government nor any person acting on behalf of the United States government assumes any liability resulting from the application or use of the information.

TABLE I. Part Information

Generic Part Number:	MFL2815S*
HST/PCP Part Number:	5962-9316101HXC
HST/PCP Control Number:	11011
Charge Number:	EE44604
Manufacturer:	Interpoint
Lot Date Code:	9442
Quantity Tested:	4
Serial Number of Control Samples:	34
Serial Numbers of Radiation Samples:	46, 55, 62
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.

TABLE II. Radiation Schedule for MLS2815S

EVENTS	DATE
1) INITIAL ELECTRICAL MEASUREMENTS	01/06/95
2) 2.5 KRAD IRRADIATION (0.04 KRADS/HOUR) POST-2.5 KRAD ELECTRICAL MEASUREMENT	01/06/95 01/09/95
3) 5 KRAD IRRADIATION (0.16 KRADS/HOUR) POST-5 KRAD ELECTRICAL MEASUREMENT	01/09/95 01/10/95
4) 10 KRAD IRRADIATION (0.29 KRADS/HOUR) POST-10 KRAD ELECTRICAL MEASUREMENT	01/10/95 01/11/95
5) 15 KRAD IRRADIATION (0.29 KRADS/HOUR) POST-15 KRAD ELECTRICAL MEASUREMENT	01/11/95 01/12/95
6) 20 KRAD IRRADIATION (0.29 KRADS/HOUR) POST-20 KRAD ELECTRICAL MEASUREMENT	01/12/95 01/13/95
7) 30 KRAD IRRADIATION (0.11 KRADS/HOUR) POST-30 KRAD ELECTRICAL MEASUREMENT	01/17/95 01/18/95
8) 50 KRAD IRRADIATION (1.18 KRADS/HOUR) POST-50 KRAD ELECTRICAL MEASUREMENT	01/18/95 01/19/95
9) 168-HOUR ANNEALING @25°C POST-168 HOUR ANNEAL ELECTRICAL MEASUREMENT	01/19/95 01/27/95

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

Table III. Electrical Characteristics of MFL2815S

Test #	Parameters	Units	Conditions	Min	Max
1	Vout Full Load	V	Full Load	14.850	15.077
2	Efficiency	%	Full Load	84	-
3	Iin No Load	A	No Load	-	80
4	Load Reg	V	No Load to Full	-	20
5	Ln Reg	V	Full Load	-	20
6	Output Ripple	Vp-p	Full Load	-	85

TABLE IV: Summary of Electrical Measurements after Total Dose Exposures and Annealing for MLS2815S /1

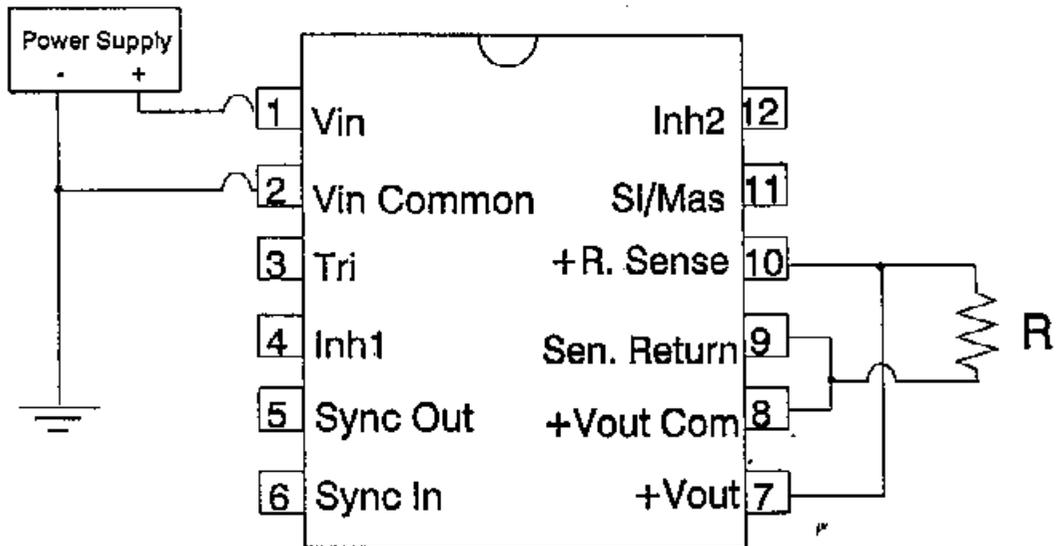
Test #	Parameters	Unit	Spec. Lim./2		Total Dose Exposure (krads)																Annealing	
					Initial		2.5		5		10		15		20		30		50		168 hrs @25°C	
					mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd
1	Vout Full Load	V	14.85	15.15	14.9	0.05	14.9	0.05	14.9	0.05	15.0	0.01	14.9	0.05	15.0	0.05	15.1	0.01	15.1	0.05	15.1	0.03
2	Efficiency	%	84	-	86.2	0.23	86.1	0.19	86.2	0.16	85.8	0.20	85.9	0.20	85.9	0.17	86.0	0.12	85.9	0.09	85.9	0.17
3	Iin No Load	mA	-	80	70.2	2.45	69.2	2.94	69.3	3.62	71.0	1.75	70.6	0.92	69.4	0.66	67.9	2.73	69.8	2.96	68.6	1.37
4	Load Reg	mV	-	20	0.82	.24	0.77	.19	0.75	.22	0.86	.28	0.76	.28	0.70	.31	0.57	.21	0.16	.18	0.66	.22
5	Ln Reg	mV	-	20	1.07	.27	1.05	.36	1.03	.27	1.43	.26	1.54	.32	1.71	.34	1.63	.34	2.10	.45	0.92	.34
6	Output Ripple	Vp-p	-	85	27.5	3.94	28.5	3.98	28.1	3.77	35.8	4.39	34.3	4.12	32.6	3.98	48.3	6.32	43.0	5.02	44.6	4.45

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 are not included in this table.
- 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 MFL2815S



$V_{in} = 28V$

MFL2815S $R = 25 \text{ ohms}$