PPM - 91- 703

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UNISYS

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Interoffice Memorandum

PPM-91-703

To
C. Kellenbenz
Department
Code 711
From
K. Sahu KS
Department
7809
Subject
Radiation Report on ISTP - 711
Part Number OP232TX

Date
November 22, 1991
Location
GSFC
Telephone
731-8954
Location
Lanham
cc
S. Jung
A. Sharma/311

A radiation evaluation was performed on OP232TX 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 cobalt-60 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 steps were 10, 20, 30, 50, 75 and 100 krads. After 100 krads, parts were annealed at 25°C for 24 and 168 hours, and then the irradiation was continued to 200 and 300 krads (cumulative). The dose rate was between 0.6 - 5.3 krads/hour, depending on the total dose level (see Table II for radiation schedule). 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 three parts passed all tests on irradiation up to 300 krads without any significant degradation in any of the electrical parameters.

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

TABLE I. Part Information

Generic Part Number:	OP232TX
ISTP - 711 Part Number:	OP232TX
ISTP - 711 Control Number:	5117
Charge Number:	C90425
Manufacturer:	OPTEK TECHNOLOGY INC
Lot Date Code:	9042
Quantity Tested:	4
Serial Numbers of Radiation Samples:	56, 57, 58
Serial Number of Control Sample:	55
Part Function:	Infrared emitting diode
Part Technology:	GaAlAs
Package Style:	TO-46
Test Engineer:	Anh Phung

TABLE II. Radiation Schedule

EVENTS	DATE
1) Initial Electrical Measurements	10/22/91
2) 10 krads irradiation @ 590 rads/hr	10/22/91
Post 10 krads Electrical Measurements	10/23/91
3) 20 krads irradiation @ 500 rads/hr	10/23/91
Post 20 krads Electrical Measurements	10/24/91
4) 30 krads irradiation @ 500 rads/hr	10/24/91
Post 30 krads Electrical Measurements	10/25/91
5) 50 krads irradiation @ 300 rads/hr	10/25/91
Post 50 krads Electrical Measurements	10/28/91
6) 75 krads irradiation @ 1300 rads/hr	10/28/91
Post 75 krads Electrical Measurements	10/29/91
7) 100 krads irradiation @ 1300 rads/hr	10/29/91
Post 100 krads Electrical Measurements	10/30/91
8) 24 hour annealing @25°C	10/30/91
Post 24 hr Electrical Measurements	10/31/91
9) 168 hour annealing @25°C	10/30/91
Post 168 hr Electrical Measurements	11/06/91
10) 200 krads irradiation @ 5260 rads/hr	11/06/91
Post 200 krads Electrical Measurements	11/07/91
11) 300 krads irradiation @ 5260 rads/hr	11/07/91
Post 300 krads Electrical Measurements	11/08/91

Notes:

- All parts were radiated under bias at the cobalt-60 gamma ray facility at GSFC.
- All electrical measurements were performed off-site at 25°C.
- Annealing performed at 25°C under bias.

Table III. Electrical Characteristics of OP232TX

PARAMETER	TEST CONDITIONS	MIN	MAX	UNIT
E_e	I_F=100mA (3) (4)	3.5	7	mW/cm²
V_F	I_F=100mA (4)		2	V
I_R	V_R=2V		100	μA

TABLE IV: Summary of Electrical Measurements after Total Dose Exposures and Annealing for OP232TX 1/, 2/

Parameters	Spec. Limits min	Spec. Limits max	Pre-Irradiation mean	Pre-Irradiation sd	Total Dose Exposure (krads) 10 mean	10 sd	20 mean	20 sd	50 mean	50 sd	100 mean	100 sd	Anneal 168 hrs mean	168 hrs sd	Total Dose (krads) 200 mean	200 sd	300 mean	300 sd
Ee mW/cm^2	3.5	7	5.3	0.2	5.1	0.1	5.0	.05	5.0	0.1	4.9	0.1	5.1	0.1	4.6	0.1	4.5	0.1
IR uA	-	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VF V	-	2	1.58	.02	1.57	.02	1.57	.02	1.58	.03	1.58	.03	1.58	.03	1.59	.02	1.60	.02

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.

2/ Table IV does not include measurement data taken after the following test steps: 30 krads, 75 krads and 24 hours annealing. This data is available and can be obtained upon request.

Figure 1. Radiation Bias Circuit for OP232TX