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Radiation Report on ISTE  
Non-Common Buy Part No. MP5010NTG. Krishnan/311  
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A radiation evaluation was performed on MP5010NT 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, eight parts were irradiated under bias (see Figure 1 for bias configuration), and two parts were used as control samples. The total dose radiation steps were 10, 20, 50, and 100 krads. After 100 krads, parts were annealed at 25°C for 24 and 168 hours. The dose rate was between 0.5 - 2.5 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 (8) parts passed the initial electrical measurements. Parts continued to stay within the specification limits without any significant degradation throughout all radiation steps up to 100 krads and subsequent annealing up to 168 hours. Table IV provides the mean and standard deviation values for each parameter after different radiation exposures and annealing treatments. It also provides a summary of functional test results after each radiation/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.

TABLE I. Part Information

Generic Part Number:	MP5010
ISTP Non-Common Buy Part Number:	MP5010NT
ISTP Non-Common Buy Control Number:	3383
Manufacturer:	Micro Power Systems
Quantity Procured:	40
Lot Date Codes:	9049
Quantity Tested:	10
Serial Numbers of Radiation Samples:	153, 154, 155, 156 157, 158, 159, 160
Serial Numbers of Control Samples:	151, 152
Part Function:	Voltage Reference
Part Technology:	Bipolar
Package Style:	TO-52 (Radial Leads)

TABLE II. Radiation Schedule

EVENTS	DATE
1) Initial Electrical Measurements	04/30/91
2) 10 krads irradiation @ 540 rads/hr	04/30/91
Post 10 krads Electrical Measurements	05/01/91
3) 20 krads irradiation @ 500 rads/hr	05/01/91
Post 20 krads Electrical Measurements	05/02/91
4) 50 krads irradiation @ 1.6667 krads/hr	05/02/91
Post 50 krads Electrical Measurements	05/03/91
5) 100 krads irradiation @ 757.6 rads/hr	05/03/91
Post 100 krads Electrical Measurements	05/06/91
6) 24 hour annealing	05/06/91
Post 24 hr Electrical Measurements	05/07/91
7) 168 hour annealing	05/07/91
Post 168 hr Electrical Measurements	05/13/91

Notes:

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

Table III. Electrical Characteristics of MP5010NT

Conditions

$T_A = +25^\circ\text{C}$

<u>TEST</u>	<u>CONDITIONS</u>	<u>MIN</u>	<u>MAX</u>
Ref. Volt. 1 (Ref.V1)	$I_R = 50 \mu\text{A}$	1.20 V	1.25 V
Ref. Volt. 2 (Ref.V2)	$I_R = 1.0 \text{ mA}$	1.20 V	1.25 V
Ref. Volt. 3 (Ref.V3)	$I_R = 100 \mu\text{A}$	1.20 V	1.25 V

TABLE IV: Summary of Electrical Measurements after  
Total Dose Exposures and Annealing for MP5010NT

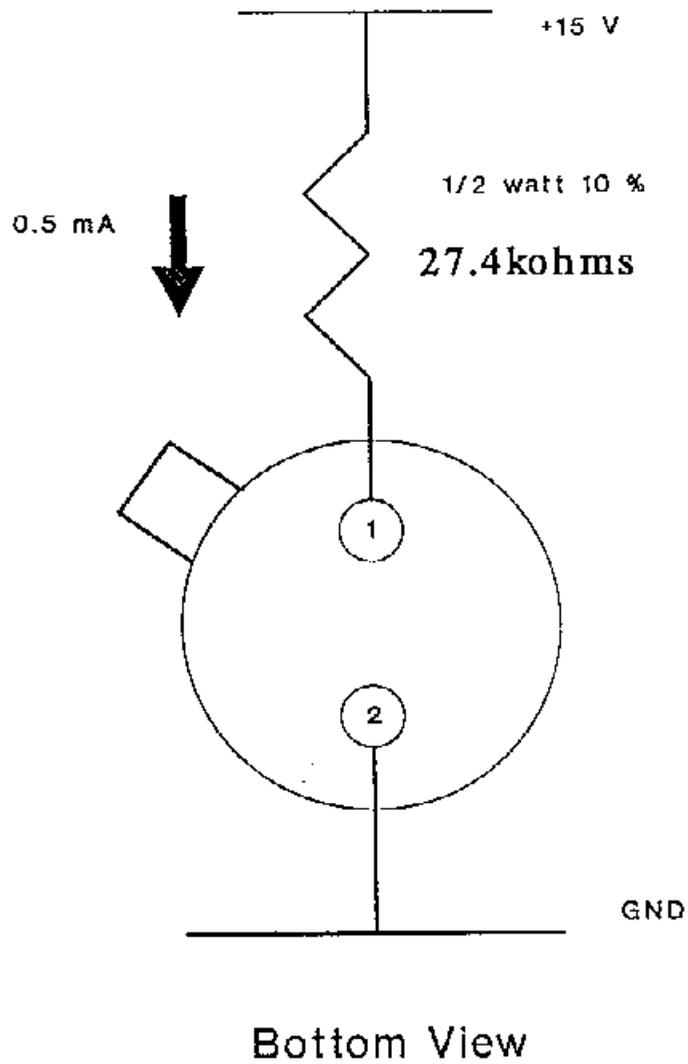
1/

Parameters	V	Spec. Limits		Initials		Total Dose Exposure (krads)								Annealing			
		min	max	mean	sd	10		20		50		100		24 hrs		168 hrs	
						mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd
Ref.V1	V	1.2	1.25	1.24	.002	1.24	.002	1.24	.002	1.24	.002	1.24	.001	1.24	.002	1.24	.001
Ref.V2	V	1.2	1.25	1.24	.002	1.24	.002	1.24	.003	1.24	.002	1.24	.001	1.24	.002	1.24	.001
Ref.V3	V	1.2	1.25	1.24	.002	1.24	.002	1.24	.002	1.24	.002	1.24	.002	1.24	.001	1.24	.001

Notes:

1/ The mean and standard deviation values were calculated over the eight parts irradiated in this testing. The control samples remained constant throughout the testing and are not included in this table.

Figure 1. Radiation Bias Circuit for MP5010NT



$$T_A = 25^{\circ}\text{C}$$