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Memorandum



PPM-92-152

DATE: May 7, 1992
TO: S. Pszcolka/311
FROM: K. Sahu/7809 KS
SUBJECT: Radiation Report on SG1526B
(CDS/CS2 Project)

cc: C. Eveland/300.1
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A radiation evaluation was performed on SG1526B 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, 40 and 50 krads*. After 50 krads, parts were annealed at +25°C for 168 hours. The dose rate was 0.5 krads/hour (see Table II for radiation schedule). After each radiation exposure and annealing treatment, parts were electrically tested at +25°C according to the test conditions and the specification limits listed in Table III.

Parts passed all tests specified in Table III throughout all irradiation steps and annealing. No significant degradation was observed for any of the test parameters. Table IV gives 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.

*The term rad as used in this report means rads(Si).

TABLE I. Part Information

Generic Part Number:	SG1526B
CDS/CS2 Part Number:	M38510/12603BVA
Control Number:	5102
Charge Number:	C23737
Manufacturer:	Silicon General
Lot Date Code:	9203
Quantity Tested:	4
Serial Numbers of Radiation Samples:	35, 36, 37
Serial Number of Control Samples:	34
Part Function:	Pulse Width Modulator
Part Technology:	Bipolar
Package Style:	18-pin DIP
Test Engineer:	Cu Nguyen

TABLE II. Radiation Schedule for SG1526B

EVENTS	DATE
1) Initial (Pre-Irradiation) Electrical Measurements	04/13/92
2) 10-KRAD IRRADIATION (0.5 krads/hour)	04/14/92
POST-10-KRAD ELECTRICAL MEASUREMENT	04/15/92
3) 20-KRAD IRRADIATION (0.5 krads/hour)	04/15/92
POST-20-KRAD ELECTRICAL MEASUREMENT	04/16/92
4) 30-KRAD IRRADIATION (0.5 KRADS/HOUR) *	04/16/92
POST-30-KRAD ELECTRICAL MEASUREMENT	04/17/92
5) 40 KRAD IRRADIATION (0.5 KRADS/HOUR)	04/20/92
POST-40-KRAD ELECTRICAL MEASUREMENT	04/21/92
6) 50 KRAD IRRADIATION (0.5 KRADS/HOUR)	04/21/92
POST-50-KRAD ELECTRICAL MEASUREMENT	04/22/92
7) 168 HOURS ANNEALING AT +25°C	04/22/92
POST-168-HOUR ELECTRICAL MEASUREMENTS	04/29/92

*After the 30 krad irradiation, the ATE (LTS2020) developed hardware problems and the parts were placed under bias for 72 hours while repairs were made.

ALL ELECTRICAL MEASUREMENTS WERE PERFORMED AT +25°C.

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

Table III. Electrical Characteristics of SG1526B

TESTS PERFORMED @ 25°C
 Vin=15V unless otherwise specified

Tst#	Test name	Conditions	Min	Max	Unit
1	Standby Current		1	30	mA
2	Vref		4.95	5.05	V
3	Line Regulation	Vin=8V to 35V	-20	+20	mV
4	Load Regulation	Ii=0mA to 20mA	-30	+30	mV
5	IOS		-125	-25	mA
6	VR low			0.4	V
7	VR high		2.4		V
8	VS high		2.4		V
9	VSYN high		2.4		V
10	EA VOS		-5	+5	mV
11	EA IB+		-1	+1	uA
12	EA IB-		-1	+1	uA
13	EA IOS		-0.5	+0.5	uA
14	EA VOH		3.6		V
15	EA VOL			0.4	V
16	EA PSRR		66		dB
17	A OUT FUNCTIONAL		2	40	Vpp
18	A OUT SHUTDOWN AT 0.4V		0	0.5	Vpp
19	B OUT FUNCTIONAL		2	40	Vpp
20	B OUT SHUTDOWN AT 0.4V		0	0.5	Vpp
21	VCESAT A	I SINK =20MA		0.3	V
22	VCESAT B	I SINK =20MA		0.3	V

TABLE IV: Summary of Electrical Measurements After Total Dose Exposures and Annealing Steps for SG1526B 1/

Parameters	Spec. Limits min max	Total Dose Exposure (TDE) (krads)																Anneal	
		0		10		20		30		40		50		168 hrs @+25°C		mean	sd		
		mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd				
Istdby	mA	1	30	20.53	0.4	20.04	0.4	19.72	0.4	19.52	0.3	19.63	0.3	19.56	0.4	19.50	0.3		
Vref	V	4.95	5.05	5.01	.01	5.02	.02	5.03	.01	5.03	.01	5.03	.01	5.02	.02	5.02	0		
Line Reg	mV	-20	20	6.29	0.3	6.09	0.2	8.20	3.7	8.41	3.7	8.33	3.4	8.20	3.4	8.05	3.6		
Load Reg	mV	-30	30	-4.82	4.3	-9.90	12	-2.25	1.5	15.51	18	7.67	7.3	-2.53	1.4	-9.95	6.1		
IOS	mA	25	125	68.28	1.2	68.37	1.5	68.13	1.5	68.04	1.4	68.04	1.4	68.28	1.2	67.90	1.2		
VR low	V	0	0.4	.25	.01	.25	.01	.27	.01	.31	.03	.27	.01	.26	.02	.26	.01		
VR high	V	2.4	6	4.72	.01	4.74	.01	4.74	.01	4.75	.01	4.74	.01	4.74	.01	4.75	.01		
VS high	V	2.4	6	4.73	.01	4.75	.02	4.76	.01	4.75	.02	4.75	.01	4.75	.02	4.75	0		
VSYN high	V	2.4	6	4.73	.01	4.75	.01	4.75	.01	4.76	.01	4.75	.01	4.75	.01	4.75	.01		
EA VOS	mV	-5	5	1.61	0.4	1.59	0.4	1.61	0.4	1.61	0.4	1.62	0.4	1.61	0.4	1.66	0.4		
EA IB+	nA	-1000	1000	-258	62	-278	52	-301	44	-324	34	-348	25	-371	16	-359	22		
EA IB-	nA	-1000	1000	232	36	255	25	0	1	1.3	1.2	325	7.6	350	13	339	7		
EA IOS	nA	-500	500	25.9	28	23.6	27	300.4	44	323.0	34	23.3	29	20.8	28	20.3	26		
EA VOH	V	3.6	6	4.01	.01	4.03	.01	4.04	.02	4.05	.01	4.05	.01	4.04	.01	4.05	0		
EA VOL	V	0	0.4	.02	0	.04	.01	.03	.01	.03	.01	.03	.01	.03	.01	.03	.01		
EA PSRR	dB	66	1000	155.5	12	135.8	0.7	152.7	2.8	139.4	9.8	147.1	22	150.2	5.5	142.0	1.1		
A OUT FUNC	Vpp	2	40	10.81	.04	10.83	.09	9.37	2.5	10.79	.09	10.67	.05	7.84	3.3	10.71	.06		
A OUT SHUTDOWN @0.4V	Vpp	0	0.5	.02	.03	.03	.03	.02	.03	0	0	.03	.03	.05	0	.03	.03		
B OUT FUNC	Vpp	2	40	7.27	.05	7.26	.08	7.25	.05	7.21	.03	7.13	0.1	7.19	.08	7.14	.08		
B OUT SHUTDOWN @0.4V	Vpp	0	0.5	.02	.03	0	0	.02	.03	.02	.03	.02	.03	.02	.03	.02	.03		
VCESAT A	V	-0.1	0.3	.13	.01	.20	.13	.25	0.1	.19	.09	.20	.06	.18	.06	.18	.04		
VCESAT B	V	-0.1	0.3	.08	0	.10	.02	.11	.03	.16	.02	.18	0.1	.15	.03	.13	.02		

Note:

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.

Figure 1. Radiation Bias Circuit for SG1526B

