UTMC APPLICATION NOTE

UT63M14X 5 Volt Only Transceiver Total Dose Test Report

Summary

Twelve parts were tested during December 1995. Eight of the parts were nominally processed; four of the parts had process parameters pushed toward their process extremes. All twelve parts passed at 25°C after exposure to total dose of 10E6 rads(Si). Four of the twelve parts were tested at +125°C and -55°C and passed. Four separate parts were annealed for 168 hours and passed 25°C testing (not tested at 125°C or -55°C).

Test Method

Parts were irradiated at approximately 250 rads(Si)/sec in UTMC's Co60 chamber. The first four parts received a split between biased and unbiased conditions, and were irradiated to the following cumulative dose levels: Pre-Rad, 200K, 500K, 1M, 2.5M, 4M, 9M. Based on these test results, UTMC confirmed that the biased irradiation was worst case.

The second and third sets of four parts were irradiated under bias. These parts received the following cumulative total dose levels: Pre-rad, 1M, 10M. Bias conditions were as follows: zero volts for RXEN, RXIN, $\overline{\text{RXIN}}$, TXIN. Five volts for $\overline{\text{TXIN}}$, TXINB. RXOUT, $\overline{\text{RXOUT}}$, TXOUT, $\overline{\text{TXOUT}}$ were left floating.

Test Results

Selected test parameters of interest for two nominally processed parts tested at 25°C (many intermediate read points):

Table 1: Device #1

	Pre-Rad	2E5 Rads(Si)	5E5 Rads(Si)	1E6 Rad(si)	2.5E5 Rads(Si)	4E6 Rads(Si)	9E6 Rads(Si)
I_{CC} (mA)	15.851	15.857	15.863	15.864	15.85	15.847	15.828
V_{PP}, L-L	7.551	7.558	7.557	7.557	7.544	7.541	7.545
RXOUT V_{OL} @4.5V	0.392	0.391	0.394	0.395	0.398	0.407	0.415
RXOUT V_{OH} @4.5V	3.792	3.797	3.793	3.793	3.796	3.788	3.79

Table 2: Device #1

	Pre-Rad	2E5 Rads(Si)	5E5 Rads(Si)	1E6 Rad(si)	2.5E5 Rads(Si)	4E6 Rads(Si)	9E6 Rads(Si)
I_{CC} (mA)	16.103	16.095	16.097	16.093	16.094	16.09	16.075
V_{PP}, L-L	7.868	7.872	7.871	7.867	7.835	7.782	7.782
RXOUT V_{OL} @4.5V	0.395	0.396	0.396	0.397	0.399	0.403	0.404
RXOUT V_{OH} @4.5V	3.794	3.794	3.794	3.794	3.794	3.788	3.795

Selected test parameters of interest for four extreme processed parts tested at 25°C:

Table 3: Device #1

	Pre-Rad	1E6 Rads(Si)	10E6 Rads(Si)
I_{CC} (mA)	16.91	16.863	16.863
V_{PP}, L-L	7.96	7.926	7.862
RXOUT V_{OL} @4.5V	0.396	0.403	0.411
RXOUT V_{OH} @4.5V	3.799	3.788	3.788

Table 4: Device #2

	Pre-Rad	1E6 Rads(Si)	10E6 Rads(Si)
I_{CC} (mA)	16.258	16.214	16.198
V_{PP}, L-L	7.906	7.873	7.807
RXOUT V_{OL} @4.5V	0.39	0.397	0.405
RXOUT V_{OH} @4.5V	3.801	3.79	3.791

Table 5: Device #3

	Pre-Rad	1E6 Rads(Si)	10E6 Rads(Si)
I_{CC} (mA)	16.182	16.144	16.124
V_{PP}, L-L	7.941	7.911	7.824
RXOUT V_{OL} @4.5V	0.392	0.399	0.407
RXOUT V_{OH} @4.5V	3.796	3.787	3.788

Table 6: Device #4

	Pre-Rad	1E6 Rads(Si)	10E6 Rads(Si)
I_{CC} (mA)	15.678	15.639	15.635
V_{PP}, L-L	7.893	7.864	7.788
RXOUT V_{OL} @4.5V	0.391	0.398	0.405
RXOUT V_{OH} @4.5V	3.798	3.788	3.789