RELIABILITY REPORT

FOR

MAX3040EWE+

PLASTIC ENCAPSULATED DEVICES

January 20, 2016

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

Approved by
Sokhom Chum
Quality Assurance
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Conclusion

The MAX3040EWE+ successfully meets the quality and reliability standards required of all Maxim Integrated products. In addition, Maxim Integrated's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim Integrated's quality and reliability standards.

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I. Device Description

A. General

The MAX3040-MAX3045 is a family of 5V quad RS-485/RS-422 transmitters designed for digital data transmission over twisted-pair balanced lines. All transmitter outputs are protected to ±10kV using the Human Body Model. The MAX3040/MAX3043 (250kbps) and the MAX3041/MAX3044 (2.5Mbps) are slew-rate limited transmitters that minimize EMI and reduce reflections caused by improperly terminated cables, thus allowing error-free transmission. The MAX3040-MAX3045 feature a hot-swap capability that eliminates false transitions on the data cable during power-up or hot insertion. The MAX3042B/MAX3045B are optimized for data transfer rates up to 20Mbps, the MAX3041/MAX3044 for data rates up to 2.5Mbps, and the MAX3040/MAX3043 for data rates up to 250kbps. The MAX3040-MAX3045 offer optimum performance when used with the MAX3093E or MAX3095 5V quad differential line receivers or MAX3094E/MAX3096 3V quad differential line receivers. The MAX3040-MAX3045 are ESD-protected pin-compatible, low-power upgrades to the industry-standard 'SN75174 and 'DS26LS31C. They are available in space-saving TSSOP, narrow SO, and wide SO packages.

II. Manufacturing Information

A. Description/Function:	±10kV ESD-Protected, Quad 5V RS-485/RS-422 Transmitters
B. Process:	S3
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Philippines, Malaysia
F. Date of Initial Production:	July 28, 2001

III. Packaging Information

A. Package Type:	16-pin SOIC (W)
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-2601-0071
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Single Layer Theta Ja:	105°C/W
K. Single Layer Theta Jc:	22°C/W
L. Multi Layer Theta Ja:	69.1°C/W
M. Multi Layer Theta Jc:	22°C/W

IV. Die Information

A. Dimensions:	91X144 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al/0.5%Cu with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	3.0 microns (as drawn)
F. Minimum Metal Spacing:	3.0 microns (as drawn)
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

A. Quality Assurance Contacts:	Don Lipps (Manager, Reliability Engineering) Bryan Preeshl (Vice President of QA)
B. Outgoing Inspection Level:	0.1% for all electrical parameters guaranteed by the Datasheet. 0.1% for all Visual Defects.
C. Observed Outgoing Defect Rate:	< 50 ppm
D. Sampling Plan:	Mil-Std-105D

VI. Reliability Evaluation

A. Accelerated Life Test

The results of the 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 80 \times 2}$$ (Chi square value for MTTF upper limit)

(where 4340 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$\lambda = 13.7 \times 10^{-9}$

$\lambda = 13.7$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at http://www.maximintegrated.com/qa/reliability/monitor. Cumulative monitor data for the S3 Process results in a FIT Rate of 0.03 @ 25C and 0.5 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot N4C0BQ001B, D/C 0124)

The RT26 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250mA.

Table 1
Reliability Evaluation Test Results

MAX3040EWE+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	80	0	N4C0BQ001B, D/C 0124

Note 1: Life Test Data may represent plastic DIP qualification lots.