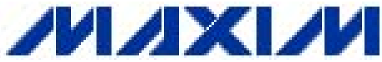

RELIABILITY REPORT

FOR

MAX13430EETB+T/MAX13430EEUB+T

PLASTIC ENCAPSULATED DEVICES

August 18, 2010

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
Manager, Reliability Operations

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Conclusion

The MAX13430EETB+T/MAX13430EEUB+T successfully meets the quality and reliability standards required of all Maxim products. In addition, Maxim's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim's quality and reliability standards.

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I. Device Description

A. General

The MAX13430E-MAX13433E are full- and half-duplex RS-485 transceivers that feature an adjustable low-voltage logic interface for operation in multivoltage systems. This allows direct interfacing to low-voltage ASIC/FPGAs without extra components. The MAX13430E-MAX13433E RS-485 transceivers operate with a VCC voltage supply from +3V to +5V. The low-voltage logic interface operates with a voltage supply from +1.62V to VCC. The MAX13430E/MAX13432E feature reduced slew-rate drivers that minimize EMI and reduce reflections caused by improperly terminated cables, allowing error-free data transmission up to 500kbps. The MAX13431E/MAX13433E driver slew rates are not limited, enabling data transmission up to 16Mbps. The MAX13430E/MAX13431E are intended for half-duplex communications, and the MAX13432E/MAX13433E are intended for full-duplex communications. The MAX13430E/MAX13431E are available in 10-pin µMAX® and 10-pin TDFN packages. The MAX13432E/MAX13433E are available in 14-pin TDFN and 14-pin SO packages.

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II. Manufacturing Information

A. Description/Function:	RS-485 Transceivers with Low-Voltage Logic Interface
B. Process:	B8
C. Number of Device Transistors:	952
D. Fabrication Location:	California or Texas
E. Assembly Location:	China, Malaysia, Philippines and Thailand
F. Date of Initial Production:	October 25, 2008

III. Packaging Information

A. Package Type:	10-pin TDFN 3x3	10-pin uMAX
B. Lead Frame:	Copper	Copper
C. Lead Finish:	100% matte Tin	100% matte Tin
D. Die Attach:	Conductive	Conductive
E. Bondwire:	Au (1 mil dia.)	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-3227	05-9000-3229
H. Flammability Rating:	Class UL94-V0	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1	Level 1
J. Single Layer Theta Ja:	54°C/W	180°C/W
K. Single Layer Theta Jc:	8.5°C/W	41.9°C/W
L. Multi Layer Theta Ja:	41°C/W	113.1°C/W
M. Multi Layer Theta Jc:	8.5°C/W	41.9°C/W

IV. Die Information

A. Dimensions:	54 X 87 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:	0.8 microns (as drawn)
F. Minimum Metal Spacing:	0.8 microns (as drawn)
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

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V. Quality Assurance Information

A. Quality Assurance Contacts: Richard Aburano (Manager, Reliability Operations)
Bryan Preeshl (Managing Director 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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 96 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 11.5 \times 10^{-9}$

λ = 11.5 F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at http://www.maxim-ic.com/qa/reliability/monitor. Cumulative monitor data for the B8 Process results in a FIT Rate of 0.06 @ 25C and 0.99 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot TNUZBQ001C, D/C 0835)

The RU35 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 and overvoltage per JEDEC JESD78.

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Table 1
Reliability Evaluation Test Results

MAX13430EETB+T/MAX13430EETB+T

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	96	0	TNUWBQ001C, D/C 0835

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

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