

RELIABILITY REPORT
FOR
MAX3057ASA+T
PLASTIC ENCAPSULATED DEVICES

January 22, 2013

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134

Approved by
Richard Aburano
Quality Assurance
Manager, Reliability Engineering

Conclusion

The MAX3057ASA+T 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.

Table of Contents

I.Device Description	IV.Die Information
II.Manufacturing Information	V.Quality Assurance Information
III.Packaging Information	VI.Reliability Evaluation
.....Attachments	

I. Device Description

A. General

The MAX3050/MAX3057 interface between the CAN protocol controller and the physical wires of the bus lines in a controller area network (CAN). They are primarily intended for automotive systems requiring data rates up to 2Mbps and feature $\pm 80V$ fault protection against short circuits in high-voltage power buses. They provide differential transmit capability to the bus and differential receive capability to the CAN controller. The MAX3050/MAX3057 have four modes of operation: high speed, slope control, standby, and shutdown. High-speed mode allows data rates up to 2Mbps. In slope-control mode, data rates are 40kbps to 500kbps, so the effects of EMI are reduced, and unshielded twisted or parallel cable can be used. In standby mode, the transmitters are shut off and the receivers are put into low-current mode. In shutdown mode, the transmitter and receiver are switched off. The MAX3050 has an AutoShutdown™; function that puts the device into a 15 μ A shutdown mode when the bus or CAN controller is inactive for 4ms or longer. The MAX3050/MAX3057 are available in an 8-pin SO package and are specified for operation from -40°C to +125°C.

II. Manufacturing Information

A. Description/Function:	±80V Fault-Protected, 2Mbps, Low Supply Current CAN Transceivers
B. Process:	BCD8
C. Number of Device Transistors:	1214
D. Fabrication Location:	USA
E. Assembly Location:	Malaysia, Philippines and Thailand
F. Date of Initial Production:	October 26, 2002

III. Packaging Information

A. Package Type:	8-pin SOIC (N)
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:	#05-2601-0086
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:	170°C/W
K. Single Layer Theta Jc:	40°C/W
L. Multi Layer Theta Ja:	128.4°C/W
M. Multi Layer Theta Jc:	36°C/W

IV. Die Information

A. Dimensions:	83 X 136 mils
B. Passivation:	Si ₃ N 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:	Metal1 = 1.0 / Metal2 = 3.0 microns (as drawn)
F. Minimum Metal Spacing:	Metal1 = 2.0 / Metal2 = 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: Richard Aburano (Manager, Reliability Engineering)
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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 144 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 7.6 \times 10^{-9}$$

$$\lambda = 7.6 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 BCD8 Process results in a FIT Rate of 0.36 @ 25C and 6.17 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot N6Q1C4007A, D/C 0403)

The RT09-1 die type has been found to have all pins able to withstand a HBM transient pulse of +/- 1000V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/- 250mA.

Table 1
Reliability Evaluation Test Results

MAX3057ASA+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C	DC Parameters	48	0	N6Q0FA005B
	Biased	& functionality	48	0	I6Q0EQ002B
	Time = 192 hrs.		48	0	I6Q0CQ001A

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