RELIABILITY REPORT

FOR

MAX13053ASA+

PLASTIC ENCAPSULATED DEVICES

June 29, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX13053ASA+ 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 MAX13050/MAX13052/MAX13053/MAX13054 are pin-for-pin compatible, industry-standard, high-speed, control area network (CAN) transceivers with extended ±80V fault protection. These products are ideal automotive and industrial network applications where overvoltage protection is required. These CAN transceivers provide a link between the CAN protocol controller and the physical wires of the bus lines in a CAN. These devices can be used for +12V/+42V battery, automotive, and DeviceNet® applications, requiring data rates up to 1Mbps. The CAN transceivers have an input common-mode range greater than ±12V, exceeding the ISO11898 specification of -2V to +7V, and feature ±8kV ESD protection, making these devices ideal for harsh automotive and industrial environments. The CAN transceivers provide a dominant timeout function that prevents erroneous CAN controllers from clamping the bus to a dominant level if the TXD input is held low for greater than 1ms. The MAX13050/MAX13052 provide a SPLIT pin used to stabilize the recessive commonmode voltage. The MAX13052 also has a slope-control mode that can be used to program the slew rate of the transmitter for data rates of up to 500kbps. The MAX13053 features a silent mode that disables the transmitter. The MAX13053 also has a reference output that can be used to bias the input of older CAN controllers that have a differential comparator. The MAX13054 has a separate dedicated logic input, VCC2, allowing interfacing with a +3.3V microcontroller. The MAX13050/MAX13052/MAX13053/MAX13054 are available in an 8-pin SO package and are specified to operate in the -40°C to +85°C and the -40°C to +125°C temperature ranges.

II. Manufacturing Information

A. Description/Function:	Industry-Standard High-Speed CAN Transceivers with ±80V Fault Protection
B. Process:	BCD80
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Carsem Malaysia
F. Date of Initial Production:	January 22, 2005

III. Packaging Information

A. Package Type:	8-pin SOIC (N)
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Non-conductive Epoxy
E. Bondwire:	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#31-4782
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:	40°C/W

IV. Die Information

A. Dimensions:	N/A mils (hybrid)
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide
C. Interconnect:	Al/0.5% Cu
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:	5 mil. Sq.
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

A. Quality Assurance Contacts:	Ken Wendel (Director, Reliability Engineering) 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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 48 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 22.4 \times 10^{-9}$

$\lambda = 22.4$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly 1000 hour life test monitors on its processes. This data is published in the Product Reliability Report found at http://www.maxim-ic.com/. Current monitor data for the BCD80 Process results in a FIT Rate of 2.3 @ 25C and 39.6 @ 55C (0.8 eV, 60% UCL)

B. Moisture Resistance Tests

The industry standard 85°C/85%RH or HAST testing is monitored per device process once a quarter.

C. E.S.D. and Latch-Up Testing

The RT73S-3 (RT88-3, 2xRT87) die type (hybrid) has been found to have all pins able to withstand a HBM transient pulse of +/-2500 V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

Table 1
Reliability Evaluation Test Results

MAX13053ASA+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)				
	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	48	0
Moisture Testing (Note 2)				
85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	DC Parameters & functionality	77	0
Mechanical Stress (Note 2)				
Temperature Cycle	-65°C/150°C 1000 Cycles Method 1010	DC Parameters & functionality	77	0

Note 1: Life Test Data may represent plastic DIP qualification lots.
Note 2: Generic Package/Process data