RELIABILITY REPORT

FOR

MAX13041ASD+

PLASTIC ENCAPSULATED DEVICES

October 21, 2008

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Maxim's Quality Assurance Dept

Conclusion

The MAX13041ASD+ 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.

Table of Contents

I. Device Description

A. General

The MAX13041 ±80V fault-protected, high-speed controller area network (CAN) transceiver is ideal for high-speed automotive network applications where high reliability and advanced power management are required. The device links a CAN protocol controller to the physical bus wires of the controller area network and allows communication at speeds up to 1Mbps. The extended fault-protected voltage range of ±80V on CAN bus lines allows for use in +12V or +42V automotive, and higher voltage +24V and +36V mid-heavy truck applications. Advanced power management features make the MAX13041 ideal for automotive electronic control unit (ECU) modules that are permanently supplied by battery, regardless of the ignition switch position (clamp-30, Type-A modules). The device controls one or more external voltage regulators to provide a low power sleep mode for an entire clamp-30 node. Wake-on CAN capability allows the MAX13041 to restore power to the node upon detection of CAN bus activity. The MAX13041 is functionally compatible with the Philips TJA1041A and is a pin-to-pin replacement with improved performance. The MAX13041 is available in a 14-pin SO package, and operates over the -40°C to +125°C automotive temperature range.

II. Manufacturing Information

A. Description/Function:	±80V Fault-Protected High-Speed CAN Transceiver with Low-Power Management and Wake-On CAN
B. Process:	BCD80
C. Number of Device Transistors:	> 2k
D. Fabrication Location:	Beaverton, OR
E. Assembly Location:	Malaysia
F. Date of Initial Production:	January 18, 2007

III. Packaging Information

A. Package Type:	14-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:	#31-4791
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:	120°C/W
K. Single Layer Theta Jc:	37°C/W
L. Multi Layer Theta Ja:	81°C/W
M. Multi Layer Theta Jc:	32°C/W

IV. Die Information

A. Dimensions:	N/A
B. Passivation:	Si_3N_4/SiO_2
C. Interconnect:	Aluminum/Si (Si = 1%)
D. Backside Metallization:	None
E. Minimum Metal Width:	3 um
F. Minimum Metal Spacing:	3 um
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:	Jim Pedicord (Manager, Rel 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-105E

VI. Reliability Evaluation

A. Accelerated Life Test

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

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 0 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 22.91 \times 10^{-9}$

$\lambda = 22.91$ F.I.T. (60% confidence level @ 25°C)

This low failure rate represents data collected from Maxim"s reliability monitor program. In addition to routine production Burn-In, Maxim pulls a sample from every fabrication process three times per week and subjects it to an extended Burn-In prior to shipment to ensure its reliability. The reliability control level for each lot to be shipped as standard product is 59 F.I.T. at a 60% confidence level, which equates to 3 failures in an 80 piece sample. Maxim performs failure analysis on any lot that exceeds this reliability control level. Attached Burn-In Schematic (Spec. # 06-6512) shows the static Burn-In circuit. Maxim also performs quarterly 1000 hour life test monitors. This data is published in the Product Reliability Report (RR-1N). Current monitor data for the S4 Process results in a FIT Rate of @ 25C and @ 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 RT90 die type has been found to have all pins able to withstand a HBM transient pulse of 1kV per JEDEC JESD22-A114-D. Latch-Up testing has shown that this device withstands a current of 250mA.

Table 1
Reliability Evaluation Test Results

MAX13041ASD+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)				
	Ta = 135 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