

RELIABILITY REPORT  
FOR  
MAX812MEUS+T  
PLASTIC ENCAPSULATED DEVICES

September 1, 2011

**MAXIM INTEGRATED PRODUCTS**

120 SAN GABRIEL DR.  
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<b>Approved by</b>
Sokhom Chum
Quality Assurance
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## Conclusion

The MAX812MEUS+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 MAX811/MAX812 are low-power microprocessor ( $\mu$ P) supervisory circuits used to monitor power supplies in  $\mu$ P and digital systems. They provide excellent circuit reliability and low cost by eliminating external components and adjustments when used with 5V-powered or 3V-powered circuits. The MAX811/MAX812 also provide a debounced manual reset input. These devices perform a single function: They assert a reset signal whenever the V<sub>CC</sub> supply voltage falls below a preset threshold, keeping it asserted for at least 140ms after V<sub>CC</sub> has risen above the reset threshold. The only difference between the two devices is that the MAX811 has an active-low RESET output (which is guaranteed to be in the correct state for V<sub>CC</sub> down to 1V), while the MAX812 has an active-high RESET output. The reset comparator is designed to ignore fast transients on V<sub>CC</sub>. Reset thresholds are available for operation with a variety of supply voltages. Low supply current makes the MAX811/MAX812 ideal for use in portable equipment. The devices come in a 4-pin SOT143 package.

**II. Manufacturing Information**

A. Description/Function:	4-Pin $\mu$ P Voltage Monitors with Manual Reset Input
B. Process:	B12
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Thailand
F. Date of Initial Production:	Pre 1997

**III. Packaging Information**

A. Package Type:	4L SOT
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:	#05-1601-0059 / A
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:	N/A
K. Single Layer Theta Jc:	N/A
L. Multi Layer Theta Ja:	290°C/W
M. Multi Layer Theta Jc:	100°C/W

**IV. Die Information**

A. Dimensions:	37 X 31 mils
B. Passivation:	$\text{Si}_3\text{N}_4/\text{SiO}_2$ (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al/0.5%Cu with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	1.2 microns (as drawn)
F. Minimum Metal Spacing:	1.2 microns (as drawn)
G. Bondpad Dimensions:	
H. Isolation Dielectric:	$\text{SiO}_2$
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 biased (static) life test are shown in Table 1. Using these results, the Failure Rate ( $\lambda$ ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 240 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 4.6 \times 10^{-9}$$

$$\lambda = 4.6 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 B12 Process results in a FIT Rate of 0.06 @ 25C and 1.06 @ 55C (0.8 eV, 60% UCL)

### B. E.S.D. and Latch-Up Testing (lot BGTGCO010A D/C N/A)

The MS28Z-6Z die type has been found to have all pins able to withstand a HBM transient pulse of +/-2000V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-100mA.

**Table 1**  
Reliability Evaluation Test Results

**MAX812MEUS-T**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
<b>Static Life Test</b> (Note 1)	Ta = 135°C	DC Parameters	80	0	BGTAFB027A, D/C 9740
	Biased	& functionality	80	0	NGTDEA004Q, D/C 9737
	Time = 192 hrs.		80	0	BGTACO001Q, D/C N/A

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