RELIABILITY REPORT

FOR

MAX6375XR26+

PLASTIC ENCAPSULATED DEVICES

August 22, 2014

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

Approved by
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Quality Assurance
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Conclusion

The MAX6375XR26+ 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.

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I. Device Description

A. General

The MAX6375-MAX6380 are ultra-low-power circuits used for monitoring battery, power-supply, and regulated system voltages. Each detector contains a precision bandgap reference, comparator, and internally trimmed resistors that set specified trip threshold voltages. These devices provide excellent circuit reliability and low cost by eliminating external components and adjustments when monitoring nominal system voltages from 2.5V to 5V. These circuits perform a single function: they assert an output signal whenever the VCC supply voltage falls below a preset threshold. The devices are differentiated by their output logic configurations and preset threshold voltages. The MAX6375/MAX6378 (push-pull) and MAX6377/MAX6380 (open-drain) have an active-low output (active-low OUT is logic low when VCC is below VTH). The MAX6376/MAX6379 have an active-high push-pull output (OUT is logic high when VCC is below VTH). All parts are guaranteed to be in the correct output logic state for VCC down to 1V. The detector is designed to ignore fast transients on VCC. The MAX6375/MAX6376/ MAX6377 have voltage thresholds between 2.20V and 3.08V in approximately 100mV increments. The MAX6378/MAX6379/MAX6380 have voltage thresholds between 3.30V and 4.63V in approximately 100mV increments. Ultra-low supply current of 500nA (MAX6375/MAX6376/MAX6377) makes these parts ideal for use in portable equipment. All six devices are available in a space-saving SC70 package or in a tiny SOT23 package.

II. Manufacturing Information

A. Description/Function:	3-Pin, Ultra-Low-Power SC70/SOT23 Voltage Detectors
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	California or Texas
E. Assembly Location:	Malaysia
F. Date of Initial Production:	April 22, 2000

III. Packaging Information

A. Package Type:	3-pin SC70
B. Lead Frame:	Alloy42
C. Lead Finish:	100% matte Tin
D. Die Attach:	Non-conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-1601-0078
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:	340°C/W
K. Single Layer Theta Jc:	115°C/W
L. Multi Layer Theta Ja:	340.4°C/W
M. Multi Layer Theta Jc:	120°C/W

IV. Die Information

A. Dimensions:	30X31 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:	
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

A. Quality Assurance Contacts:	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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{1000 \times 4340 \times 80 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 2.64 \times 10^{-9}$

$\lambda = 2.64$ 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 B8 Process results in a FIT Rate of 0.01 @ 25C and 0.26 @ 55C (0.8 eV, 60% UCL).

B. E.S.D. and Latch-Up Testing (lot I3GGAA004B, D/C 0011)

The MS45-6 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250mA.

Table 1

Reliability Evaluation Test Results

MAX6375XR26+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C Biased Time = 1000 hrs.	DC Parameters & functionality	80	0	S3GAC1002G, D/C 0214

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