RELIABILITY REPORT

FOR

MAX6683AUB+

PLASTIC ENCAPSULATED DEVICES

October 5, 2012

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

Approved by
Sokhom Chum
Quality Assurance
Reliability Engineer

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Conclusion

The MAX6683AUB+ 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 MAX6683 system supervisor monitors multiple power-supply voltages, including its own, and also features an on-board temperature sensor. The MAX6683 converts voltages to an 8-bit code and temperatures to an 11-bit (10-bit-plus-sign) code using an analog-to-digital converter (ADC). A multiplexer automatically sequences through the voltage and temperature measurements. The digitized signals are then stored in registers and compared to the over/underthreshold limits programmed over the SMBus™/I²C-compatible 2-wire serial interface. When a temperature measurement exceeds the programmed threshold, or when an input voltage falls outside the programmed voltage limits, the MAX6683 generates a latched interrupt output active-low ALERT. Three interrupt modes are available for temperature excursions. These are default mode, one-time interrupt mode, and comparator mode. The active-low ALERT output is cleared, except for temperature interrupts generated in comparator mode, by reading the Interrupt Status register (Table 5). The active-low ALERT output can also be masked by writing to the appropriate bits in the Interrupt Mask register (Table 6) or by setting bit 1 of the Configuration register (Table 4) to zero. The MAX6683 SMBus/I²C-compatible interface also responds to the SMB alert response address.

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II. Manufacturing Information

A. Description/Function:	Temperature Sensor and System Monitor in a 10-Pin µMAX
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	California or Texas
E. Assembly Location:	Texas, Philippines, Thailand, Malaysia
F. Date of Initial Production:	October 27, 2001

III. Packaging Information

A. Package Type:	10-pin uMAX
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:	#05-2901-0038
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:	180°C/W K.
Single Layer Theta Jc:	41.9°C/W
L. Multi Layer Theta Ja:	113.1°C/W
M. Multi Layer Theta Jc:	41.9°C/W

IV. Die Information

A. Dimensions:	87 X 61 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

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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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 134 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 8.2 \times 10^{-9}$

λ = 8.2 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 0.06 @ 25C and 0.99 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot J7E0E3001A D/C 0924)

The TS36 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2000V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250mA and overvoltage per JEDEC JESD78.

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Table 1

Reliability Evaluation Test Results

MAX6683AUB+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C	DC Parameters	54	0	D7E0DA004A, D/C 0752
	Biased	& functionality	80	0	I7E0BQ001H, D/C 0412
	Time = 192 hrs.				

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

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