RELIABILITY REPORT

FOR

MAX6695AUB+
(MAX6695/MAX6696)

PLASTIC ENCAPSULATED DEVICES

December 21, 2008

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX6695AUB+ 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 MAX6695/MAX6696 are precise, dual-remote, and local digital temperature sensors. They accurately measure the temperature of their own die and two remote diode-connected transistors, and report the temperature in digital form on a 2-wire serial interface. The remote diode is typically the emitter-base junction of a common-collector PNP on a CPU, FPGA, GPU, or ASIC. The 2-wire serial interface accepts standard system management bus (SMBus(tm)) commands such as Write Byte, Read Byte, Send Byte, and Receive Byte to read the temperature data and program the alarm thresholds and conversion rate. The MAX6695/MAX6696 can function autonomously with a programmable conversion rate, which allows control of supply current and temperature update rate to match system needs. For conversion rates of 2Hz or less, the temperature is represented as 10 bits + sign with a resolution of +0.125°C. When the conversion rate is 4Hz, output data is 7 bits + sign with a resolution of +1°C. The MAX6695/MAX6696 also include an SMBus timeout feature to enhance system reliability. Remote temperature sensing accuracy is ±1.5°C between +60°C and +100°C with no calibration needed. The MAX6695/MAX6696 measure temperatures from -40°C to +125°C. In addition to the SMBus active-low ALERT output, the MAX6695/MAX6696 feature two overtemperature limit indicators (active-low OT1 and active-low OT2), which are active only while the temperature is above the corresponding programmable temperature limits. The active-low OT1 and active-low OT2 outputs are typically used for fan control, clock throttling, or system shutdown. The MAX6695 has a fixed SMBus address. The MAX6696 has nine different pin-selectable SMBus addresses. The MAX6695 is available in a 10-pin µMAX® and the MAX6696 is available in a 16-pin QSOP package. Both operate throughout the -40°C to +125°C temperature range.

II. Manufacturing Information

A. Description/Function:	Dual Remote/Local Temperature Sensors with SMBus Serial Interface
B. Process:	B6
C. Number of Device Transistors:	
D. Fabrication Location:	California
E. Assembly Location:	UTL Thailand
F. Date of Initial Production:	January 24, 2004

III. Packaging Information

A. Package Type:	10 uMAX (Pb-Free)
B. Lead Frame:	Cu Alloy
C. Lead Finish:	Matte Sn Plate
D. Die Attach:	Non Conductive Epoxy
E. Bondwire:	Au (1.0 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1

IV. Die Information

A. Dimensions:	88 X 75 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide
C. Interconnect:	Aluminum/Si (Si = 1%)
D. Backside Metallization:	None
E. Minimum Metal Width:	0.6 microns (as drawn)
F. Minimum Metal Spacing:	0.6 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 B6 Process results in a FIT Rate of 0.8 @ 25C and 14.2 @ 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 TS50 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500 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

MAX6695AUB+

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