RELIABILITY REPORT

FOR

MAX6694TE9A+, MAX6694TE9A+T,

MAX6694UE9A+

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MAXIM INTEGRATED

160 RIO ROBLES

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Conclusion

The MAX6694 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 MAX6694 precision multichannel temperature sensor monitors its own temperature and the temperatures of up to four external diode-connected transistors. All temperature channels have programmable alert thresholds. Channels 1 and 4 also have programmable overtemperature thresholds. When the measured temperature of a channel exceeds the respective threshold, a status bit is set in one of the status registers. Two open-drain outputs, OVERT and ALERT, assert corresponding to these bits in the status register.

The 2-wire serial interface supports the standard system management bus (SMBus™) protocols: write byte, read byte, send byte, and receive byte for reading the temperature data and programming the alarm thresholds.

The MAX6694 is specified for a -40°C to +125°C operating temperature range and is available in 16-pin TSSOP and 5mm x 5mm thin QFN packages.

II. Manufacturing Information

A. Description/Function:	5-Channel Precision Temperature Monitor with Beta Compensation
B. Process:	B8
C. Device Count:	N/A
D. Fabrication Location:	USA
E. Assembly Location:	Taiwan, Thailand, China, Malaysia, Philippines
F. Date of Initial Production:	April 24, 2008

III. Packaging Information

A. Package Type:	TQFN	TSSOP
B. Lead Frame:	Cu194, EFTEC64T	Cu7025
C. Lead Finish:	Matte Tin	Matte Tin
D. Die Attach:	EN4900G, AB8200T	AB8200T, QMI-519, QMI-519
E. Bondwire:	1 mil Au	1 mil Au
F. Mold Material:	G770HJ, G770HCD, G700LA	G605L, G700K, CEL8240HF10-LXC
G. Assembly Diagram:	05-9000-3139	05-9000-3141
H. Flammability Rating:	UL-94 (V-0 Rating)	UL-94 (V-0 Rating)
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1	Level 1
J. Single Layer Theta Ja:	48 °C/W	106 °C/W
K. Single Layer Theta Jc:	2 °C/W	27 °C/W
L. Multi Layer Theta Ja:	30 °C/W	90 °C/W
M. Multi Layer Theta Jc:	2 °C/W	27 °C/W

IV. Die Information

A. Dimensions:	96X112 mils
B. Passivation:	SiN/ SiO2

V. Quality Assurance Information

A. Quality Assurance Contacts:	Ryan Wall (Manager, Reliability) Michael Cairnes (Executive Director, Reliability) Bryan Preeshl (SVP 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 125C biased (static) life test are shown in Table 1. Using these results, the Failure Rate λ is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192\ x\ 2454\ x\ 48\ x\ 2}$$ (Chi square value for MTTF upper limit)

(where 2454 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$$\lambda = 40.51\ x\ 10^{-9}$$

$$\lambda = 40.51\ FITs\ (60\%\ confidence\ level\ @25°C)$$

Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at https://www.maximintegrated.com/en/support/qa-reliability/reliability/reliability-monitor-program.html.

B8 cumulative process Fit

$$\lambda = 0.10\ FITs\ (60\%\ confidence\ level\ @25°C)$$

$$\lambda = 1.16\ FITs\ (60\%\ confidence\ level\ @55°C)$$

B. ESD and Latch-Up Testing

The MAX6694 has been found to have all pins able to withstand an HBM transient pulse of ±2500 V per JEDEC / ESDA JS-001. Latch-Up testing has shown that this device withstands ±250 mA current injection and supply overvoltage per JEDEC JESD78.

Table 1

Reliability Evaluation Test Results

MAX6693UP9A+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 125°C Biased Time = 192 hrs.	DC parameters & functionality	48	0	

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