

RELIABILITY REPORT FOR MAX6613MXK+T

PLASTIC ENCAPSULATED DEVICES

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MAXIM INTEGRATED

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Conclusion

The MAX6613MXK+T 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

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The MAX6613 is a low-power precision analog output temperature sensor in a tiny 5-pin SC70 package. The MAX6613 operates over a 1.8V to 5.5V supply voltage range, with a typical current consumption of only 7.5 μ A. It is particularly well suited for portable applications where minimizing battery cost and maximizing useful battery life are crucial. The MAX6613 provides an analog voltage output proportional to temperature. Accuracy is ±4.0°C (max) over a range of TA = 0°C to +50°C and ±4.4°C (max) from TA = -20°C to +80°C. Self-heating effects are negligible due to the low current consumption of the part. Unlike many analog temperature sensors, the MAX6613 is stable with any capacitive load from 0pF to 1000pF, providing broad flexibility in board-level design. The operating temperature range varies with the voltage supply. The MAX6613 can be used over a +25°C to +130°C range with a 2.5V to 5.5V supply voltage. For applications with a supply voltage of 1.8V, the MAX6613 can be used over a +25°C to +130°C temperature range.



II. Manufacturing Information

A. Description/Function:	Low-Voltage Analog Temperature Sensor in an SC70 Package		
B. Process:	B8		
C. Number of Device Transistors:			

D. Fabrication Location:USAE. Assembly Location:Malaysia and ThailandF. Date of Initial Production:April 27, 2002

III. Packaging Information

A. Package Type:	5-pin SC70
B. Lead Frame:	Copper
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:	#05-2901-0049
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:	324°C/W
K. Single Layer Theta Jc:	115°C/W
L. Multi Layer Theta Ja:	324°C/W
M. Multi Layer Theta Jc:	115°C/W

IV. Die Information

A. Dimensions:	31 X 30 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:	0.9 microns (as drawn)
F. Minimum Metal Spacing:	0.9 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:	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:

 $\lambda = \frac{1}{\text{MTFF}} = \frac{1.83}{192 \times 4340 \times 180 \times 2}$ (Chi square value for MTTF upper limit) (where 4340 = Temperature Acceleration factor assuming an activation energy of 0.8eV) $\lambda = 6.1 \times 10^{-9}$

 $\mathfrak{X} = 6.1 \text{ F.I.T.}$ (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 0.04 @ 25C and 0.61 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot DH10CA006S, D/C 1026)

The TS37 die type has been found to have all pins able to withstand a transient pulse of:

ESD-HBM:	+/- 2500V per JEDEC JESD22-A114
ESD-CDM:	+/- 750V per JEDEC JESD22-C101

Latch-Up testing has shown that this device withstands a current of +/- 100mA and overvoltage per JEDEC JESD78.



Table 1 Reliability Evaluation Test Results

MAX6613MXK+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Not	e 1)				
·	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	80 100	0 0	SH10BU005K, D/C 0629 DH10CQ001Q, D/C 0732

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