RELIABILITY REPORT

FOR

MAX6627MKA-T

PLASTIC ENCAPSULATED DEVICES

November 19, 2008

MAXIM INTEGRATED PRODUCTS

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Conclusion

The MAX6627MKA-T 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.

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I. Device Description

A. General

The MAX6627/MAX6628 precise digital temperature sensors report the temperature of a remote sensor. The remote sensor is a diode-connected transistor, typically a low-cost, easily mounted 2N3904 NPN type that replaces conventional thermistors or thermocouples. The MAX6627/MAX6628 can also measure the die temperature of other ICs, such as microprocessors (µPs) or microcontrollers (µCs) that contain an on-chip, diode-connected transistor. Remote accuracy is ±1°C when the temperature of the remote diode is between 0°C and +125°C and the temperature of the MAX6627/MAX6628 is +30°C. The temperature is converted to a 12-bit + sign word with 0.0625°C resolution. The architecture of the device is capable of interpreting data as high as +145°C from the remote sensor. The MAX6627/MAX6628 temperature should never exceed +125°C. These sensors are 3-wire serial interface SPI(tm) compatible, allowing the MAX6627/MAX6628 to be readily connected to a variety of µCs. The MAX6627/MAX6628 are read-only devices, simplifying their use in systems where only temperature data is required. Two conversion rates are available, one that continuously converts data every 0.5s (MAX6627), and one that converts data every 8s (MAX6628). The slower version provides minimal power consumption under all operating conditions (30µA, typ). Either device can be read at any time and provide the data from the last conversion. Both devices operate with supply voltages between +3.0V and +5.5V, are specified between -55°C and +125°C, and come in space-saving 8-pin SOT23 and lead-free TDFN packages.

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II. Manufacturing Information

A. Description/Function:	Remote ±1°C Accurate Digital Temperature Sensors with SPI-Compatible Serial Interface
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	Texas
E. Assembly Location:	UTL Thailand
F. Date of Initial Production:	April 28, 2001

III. Packaging Information

A. Package Type:	8-pin SOT23
B. Lead Frame:	Copper
C. Lead Finish:	85Sn/15Pb plate
D. Die Attach:	None Epoxy
E. Bondwire:	Au (1.0 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-2901-0009
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Single Layer Theta Jb:	103*°C/W
K. Single Layer Theta Jc:	75°C/W

IV. Die Information

A. Dimensions:	45 X 90 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:	0.8 microns (as drawn)
F. Minimum Metal Spacing:	0.8 microns (as drawn)
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

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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 pending. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 80 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 13.4 \times 10^{-9}$

λ = 13.4 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 B8 Process results in a FIT Rate of 2.71 @ 25C and 17.30 @ 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 TS05 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500V per JEDEC JESD22-A114-D. Latch-Up testing has shown that this device withstands a current of +/-100 mA.

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Table 1
Reliability Evaluation Test Results

MAX6627MKA-T

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	80	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

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