RELIABILITY REPORT

FOR

MAX6604AAHA+, MAX6604AATA+

PLASTIC ENCAPSULATED DEVICES

September 22, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX6604AAHA+ 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 MAX6604 high-precision temperature sensor is designed for thermal monitoring functions in DDR memory modules. The device is readable and programmable through the 2-wire SMBus(tm)/I²C-compatible interface. Three address inputs set the bus address for the temperature sensor to provide up to eight devices on one bus. The internal thermal sensor continuously monitors the temperature and updates the temperature data eight times per second. The master can read the temperature data at any time. Since the thermal sensor is located on the memory module, temperature data recorded accurately represents the temperature of the components on the module. Consequently, the MAX6604 provides a much more accurate measurement of module temperature than techniques involving temperature sensors on the motherboard. In addition, the device responds more quickly to temperature changes on the module than a motherboard sensor. The MAX6604 also features an interrupt-output indicator for temperature-threshold monitoring. The threshold levels are programmable through the digital interface. The MAX6604 operates from -20°C to +125°C, and is available in JEDEC-standard 8-pin TSSOP and TDFN (MO-229-WCED-2) packages.

II. Manufacturing Information

A. Description/Function:	Precision Temperature Monitor for DDR Memory Modules
B. Process:	B8
C. Number of Device Transistors:	12679
D. Fabrication Location:	California or Texas
E. Assembly Location:	Philippines, Thailand
F. Date of Initial Production:	October 13, 2006

III. Packaging Information

A. Package Type:	8-pin TSSOP	8-pin TDFN 2x3
B. Lead Frame:	Copper	Copper
C. Lead Finish:	100% Matte Sn	100% Matte Sn
D. Die Attach:	Conductive Epoxy	Conductive Epoxy
E. Bondwire:	Gold (1 mil dia.)	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-2019	#05-9000-2074
H. Flammability Rating:	Class UL94-V0	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1	Level 1
L. Multi Layer Theta Ja:	123.7°C/W	60°C/W
M. Multi Layer Theta Jc:	36.6°C/W	10.8°C/W

IV. Die Information

A. Dimensions:	57 X 71 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:	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 life test monitors on its processes. This data is published in the Reliability Report found at http://www.maxim-ic.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. 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 TS84 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500 V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

Table 1

Reliability Evaluation Test Results

MAX6604AAHA+
MAX6604AATA+

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)				
HAST	Ta = 130°C RH = 85% Biased Time = 96hrs.	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