RELIABILITY REPORT

FOR

MAX6517UKP095+T

PLASTIC ENCAPSULATED DEVICES

June 7, 2011

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Sokhom Chum
Quality Assurance
Reliability Engineer

Conclusion

The MAX6517UKP095+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.

Table of Contents

I. Device Description

A. General

The MAX6516-MAX6519 low-cost, fully integrated temperature switches assert a logic signal when their die temperature crosses a factory-programmed threshold. Operating from a 2.7V to 5.5V supply, these devices feature a fixed voltage reference, an analog temperature sensor, and a comparator. They are available with factory-trimmed temperature trip thresholds from -45°C to +115°C in 10°C increments, and are accurate to ±0.5°C (typ). These devices require no external components and typically consume 22µA of supply current. Hysteresis is pin selectable at 2°C or 10°C. The MAX6516-MAX6519 are offered with hot-temperature thresholds (+35°C to +115°C), asserting when the temperature is above the threshold, or with cold-temperature thresholds (-45°C to +15°C), asserting when the temperature is below the threshold. These devices provide an analog output proportional to temperature and are stable with any capacitive load up to 1000pF. The MAX6516-MAX6519 can be used over a range of -55°C to +125°C with a supply voltage of 2.7V to 5.5V. For applications sensing temperature down to -45°C, a supply voltage above 4.5V is required. The MAX6516 and MAX6518 have an active-high, push-pull output. The MAX6517 and MAX6519 have an active-low, open-drain output. These devices are available in a space-saving 5-pin SOT23 package.

II. Manufacturing Information

A. Description/Function:	Low-Cost, 2.7V to 5.5V, Analog Temperature Sensor Switches in a SOT23
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	California or Texas
E. Assembly Location:	Malaysia, Philippines, Thailand
F. Date of Initial Production:	October 25, 2003

III. Packaging Information

A. Package Type:	5-pin SOT23
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-0173
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:	324.3°C/W
K. Single Layer Theta Jc:	82°C/W
L. Multi Layer Theta Ja:	255.9°C/W
M. Multi Layer Theta Jc:	81°C/W

IV. Die Information

A. Dimensions:	42 X 55 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:	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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 47 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 23.4 \times 10^{-9}$

$\lambda = 23.4$ 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. E.S.D. and Latch-Up Testing (lot SAH3AQ001B D/C 0343)

The TS48-3 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2000V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250mA.

Table 1
Reliability Evaluation Test Results

MAX6517UKP095+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	47	0	SAH4AQ001B, D/C 0350

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