

RELIABILITY REPORT

FOR

MAX6668AUA50+ (MAX6670)

PLASTIC ENCAPSULATED DEVICES

December 1, 2008

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR. SUNNYVALE, CA 94086

Approved by	
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Quality Assurance	
Director, Reliability Engineering	



Conclusion

The MAX6668AUA50+ 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 MAX6668/MAX6670 remote-junction thermal switches with an internal power transistor drive a cooling fan rated for supply voltages up to +12V and 250mA. These devices measure the temperature of an external P-N junction (typically a diode-connected transistor) and turn on the fan power switch when the remote temperature rises above a factory-programmed threshold. Self-contained and requiring no software development, the MAX6668/MAX6670 are simple âcedrop-ina for a variety of systems. The MAX6670 features an open-drain active-low WARN output that goes active when the remote temperature exceeds the factory-programmed fan activation threshold by +15°C. The MAX6670 features an open-drain OT output that goes active when the remote temperature exceeds the factory-programmed threshold by +30°C. The MAX6668/MAX6670 provide a fan-control input, active-low FORCEON, that allows the fan to be driven externally, regardless of temperature. Available temperature thresholds range from +40°C to +75°C in 5°C increments. Hysteresis is preset to 8°C on the MAX6668 or pin selectable to 4°C, 8°C, or 12°C using a three-level logic input on the MAX6670. Temperature threshold accuracy is ±1°C (typ) and ±2.2°C (max) for remote-junction temperatures from +40°C to +75°C. The MAX6668/MAX6670 operate from a +3V to +3.6V power supply, and are specified over the automotive temperature range (-40°C to +125°C). The MAX6668 is offered in an 8-pin µMAX package and the MAX6670 is available in a space-saving 10-pin µMAX package.



II. Manufacturing Information

Remote Temperature Switches with Integrated Fan Controller/Driver

- A. Description/Function:
- B. Process:
- C. Number of Device Transistors:
- D. Fabrication Location:
- E. Assembly Location:
- F. Date of Initial Production:

III. Packaging Information

A. Package Type:	10 Pin uMAX
B. Lead Frame:	Copper Alloy
C. Lead Finish:	Matte Sn
D. Die Attach:	Non Conductive Epoxy
E. Bondwire:	Au (1.0 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1

IV. Die Information

Α.	Dimensions:	70 X 88 mils
В.	Passivation:	$Si_3N_4\!/SiO_2~$ (Silicon nitride/ Silicon dioxide
C.	Interconnect:	Aluminum/Si (Si = 1%)
D.	Backside Metallization:	None
Ε.	Minimum Metal Width:	0.8 microns (as drawn)
F.	Minimum Metal Spacing:	0.8 microns (as drawn)
G.	Bondpad Dimensions:	5 mil. Sq.
н.	Isolation Dielectric:	SiO ₂
I.	Die Separation Method:	Wafer Saw

B8

Texas

UTL Thailand

July 28, 2001



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:

 $\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 75 \times 2}$ (Chi square value for MTTF upper limit) (where 4340 = Temperature Acceleration factor assuming an activation energy of 0.8eV) $\lambda = 14.3 \times 10^{-9}$ $\lambda = 14.3 \text{ F.I.T.}$ (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 TS20-2 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500 V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250 mA.



Table 1 Reliability Evaluation Test Results

MAX6668AUA50+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES			
Static Life Test (Note 1)							
	Ta = 135°C	DC Parameters	75	0			
	Biased	& functionality					
	Time = 192 hrs.						
Moisture Testing (Note 2)							
85/85	Ta = 85°C	DC Parameters	77	0			
	RH = 85%	& functionality					
	Biased						
	Time = 1000hrs.						
Mechanical Stress (Note 2)							
Temperature	-65°C/150°C	DC Parameters	77	0			
Cycle	1000 Cycles	& functionality					
	Method 1010						

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

Note 2: Generic Package/Process data