RELIABILITY REPORT

FOR

MAX6371KA+

PLASTIC ENCAPSULATED DEVICES

November 30, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX6371KA+ 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 MAX6369-MAX6374 are pin-selectable watchdog timers that supervise microprocessor (µP) activity and signal when a system is operating improperly. During normal operation, the microprocessor should repeatedly toggle the watchdog input (WDI) before the selected watchdog timeout period elapses to demonstrate that the system is processing code properly. If the µP does not provide a valid watchdog input transition before the timeout period expires, the supervisor asserts a watchdog (active-low WDO) output to signal that the system is not executing the desired instructions within the expected time frame. The watchdog output pulse can be used to reset the µP or interrupt the system to warn of processing errors. The MAX6369-MAX6374 are flexible watchdog timer supervisors that can increase system reliability through notification of code execution errors. The family offers several pin-selectable watchdog timing options to match a wide range of system timing applications: - Watchdog startup delay: provides an initial delay before the watchdog timer is started. - Watchdog timeout period: normal operating watchdog timeout period after the initial startup delay. - Watchdog output/timing options: open drain (100ms) or push-pull (1ms). The MAX6369-MAX6374 operate over a +2.5V to +5.5V supply range and are available in miniature 8-pin SOT23 packages.

II. Manufacturing Information

A. Description/Function:	Pin-Selectable Watchdog Timers
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	California or Texas
E. Assembly Location:	Thailand
F. Date of Initial Production:	April 22, 2000

III. Packaging Information

A. Package Type:	8-pin SOT23
B. Lead Frame:	
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:	#05-9000-2980
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:	112°C/W
K. Single Layer Theta Jc:	80°C/W

IV. Die Information

A. Dimensions:	55 X 31 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:

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

(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 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 MS37-2 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

MAX6371KA+

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)				
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