RELIABILITY REPORT

FOR

MAX6369KA+
(MAX6370 – MAX6374)

PLASTIC ENCAPSULATED DEVICES

November 3, 2008

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX6369KA+ 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 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:	Texas
E. Assembly Location:	UTL Thailand
F. Date of Initial Production:	April 22, 2000

III. Packaging Information

A. Package Type:	8-pin SOT23
B. Lead Frame:	Copper Alloy
C. Lead Finish:	100% matte Tin
D. Die Attach:	Non Conductive Die Attach
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
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:	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

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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 160 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 14.8 \times 10^{-9}$

$\lambda = 14.8$ 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 MS37 die type has been found to have all pins able to withstand a HBM transient pulse of 1000 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

MAX6369KA+

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	160	1
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