RELIABILITY REPORT

FOR

MAX6365xKAxx+

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 MAX6365xKAxx+ 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 MAX6365 - MAX6368 supervisory circuits simplify power-supply monitoring, battery-backup control functions, and memory write protection in microprocessor (µP) systems. The circuits significantly improve the size, accuracy, and reliability of modern systems with an ultra-small integrated solution. These devices perform four basic system functions:

- Provide a µP reset output during VCC supply power-up, power-down, and brownout conditions.
- Internally control VCC to backup-battery switching to maintain data or low-power operation for CMOS RAM, CMOS µPs, real-time clocks, and other digital logic when the main supply fails.
- Provide memory write protection through internal chip-enable gating during supply or processor faults.
- Include one of the following options: a manual reset input (MAX6365), a watchdog timer function (MAX6366), a battery-on output (MAX6367), or an auxiliary user-adjustable reset input (MAX6368).

The MAX6365 - MAX6368 operate from VCC supply voltages as low as 1.2V. The factory preset reset threshold voltages range from 2.32V to 4.63V (see *Ordering Information*). In addition, each part is offered in three reset output versions: push-pull active low, open-drain active low, or open-drain active high (see *Selector Guide*). The MAX636 - MAX6368 are available in miniature 8-pin SOT23 packages.

II. Manufacturing Information

A. Description/Function:	SOT23, Low-Power µP Supervisory Circuits with Battery Backup and Chip-Enable Gating
B. Process:	B8
C. Number of Device Transistors:	0
D. Fabrication Location:	California or Texas
E. Assembly Location:	Malaysia
F. Date of Initial Production:	April 22, 2000

III. Packaging Information

A. Package Type:	8-pin SOT23
B. Lead Frame:	Cu Alloy
C. Lead Finish:	100% matte Tin
D. Die Attach:	Non-conductive Epoxy
E. Bondwire:	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-1601-0095
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:	64 X 32 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:

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

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

$\lambda = 13.4 \times 10^{-9}$

$\lambda = 13.4$ 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 MS36 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

MAX6365xKAxx+

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