RELIABILITY REPORT

FOR

MAX6382XR16D3+

PLASTIC ENCAPSULATED DEVICES

March 15, 2010

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Manager, Reliability Engineering

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Conclusion

The MAX6382XR16D3+ 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 MAX6381-MAX6390 microprocessor (µP) supervisory circuits monitor power-supply voltages from +1.8V to +5.0V while consuming only 3µA of supply current at +1.8V. Whenever VCC falls below the factory-set reset thresholds, the reset output asserts and remains asserted for a minimum reset timeout period after VCC rises above the reset threshold. Reset thresholds are available from +1.58V to +4.63V, in approximately 100mV increments. Seven minimum reset timeout delays ranging from 1ms to 1200ms are available. The MAX6381/MAX6384/MAX6387 have a push-pull active-low reset output. The MAX6382/MAX6385/MAX6388 have a push-pull active-high reset output, and the MAX6383/MAX6386/MAX6389/MAX6390 have an open-drain active-low reset output. The MAX6384/MAX6385/MAX6386 also feature a debounced manual reset input (with internal pullup resistor). The MAX6387/MAX6388/MAX6389 have an auxiliary input for monitoring a second voltage. The MAX6390 offers a manual reset input with a longer VCC reset timeout period (1120ms or 1200ms) and a shorter manual reset timeout (140ms or 150ms). The MAX6381/MAX6382/MAX6383 are available in 3-pin SC70 and 6-pin µDFN packages and the MAX6384-MAX6390 are available in 4-pin SC70 and 6-pin µDFN packages.

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II. Manufacturing Information

A. Description/Function:	SC70/µDFN, Single/Dual Low-Voltage, Low-Power µP Reset Circuits
B. Process:	B8
C. Number of Device Transistors:	647
D. Fabrication Location:	California or Texas
E. Assembly Location:	Malaysia
F. Date of Initial Production:	October 22, 2000

III. Packaging Information

A. Package Type:	3-pin SC70
B. Lead Frame:	Alloy42
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:	#05-1601-0127
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:	340°C/W
K. Single Layer Theta Jc:	115°C/W
L. Multi Layer Theta Ja:	n/a
M. Multi Layer Theta Jc:	n/a

IV. Die Information

A. Dimensions:	31 X 30 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

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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)

$\lambda = 13.7 \times 10^{-9}$

$\lambda = 13.7$ 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 MS58-1 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250mA.

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Table 1
Reliability Evaluation Test Results

MAX6382XR16D3+

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

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