RELIABILITY REPORT

FOR

MAX809RExR

PLASTIC ENCAPSULATED DEVICES

May 13, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 9408

Approved by
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Quality Assurance
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Conclusion

The MAX809L 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 MAX803/MAX809/MAX810 are microprocessor (µP) supervisory circuits used to monitor the power supplies in µP and digital systems. They provide excellent circuit reliability and low cost by eliminating external components and adjustments when used with +5V, +3.3V, +3.0V, or +2.5V powered circuits.

These circuits perform a single function: they assert a reset signal whenever the V_{CC} supply voltage declines below a preset threshold, keeping it asserted for at least 140ms after V_{CC} has risen above the reset threshold. Reset thresholds suitable for operation with a variety of supply voltages are available.

The MAX803 has an open-drain output stage, while the MAX809/MAX810 have push-pull outputs. The MAX803's open-drain active-low RESET output requires a pull-up resistor that can be connected to a voltage higher than V_{CC}. The MAX803/MAX809 have an active-low RESET output, while the MAX810 has an active-high RESET output. The reset comparator is designed to ignore fast transients on V_{CC}, and the outputs are guaranteed to be in the correct logic state for V_{CC} down to 1V.

Low supply current makes the MAX803/MAX809/MAX810 ideal for use in portable equipment. The MAX803 is available in a 3-pin SC70 package, and the MAX809/MAX810 are available in 3-pin SC70 or SOT23 packages.

B. Absolute Maximum Ratings

Item	Rating
Terminal Voltage (with respect to GND)	
V_{CC}	-0.3V to +6.0V
/RESET (push-pull)	-0.3V to (V_{CC} + 0.3V)
Input Current, V_{CC}	20mA
Output Current, /RESET	20mA
Rate of Rise, V_{CC}	100V/µs
Storage Temp.	-65°C to +150°C
Lead Temp. (10 sec.)	+300°C
Continuous Power Dissipation (TA = +70°C)	
3 Lead SC70	174mW
3 Lead SOT23	320mW
Derates above +70°C	
3 Lead SC70	2.17mW/°C
3 Lead SOT23	4.00mW/°C

II. Manufacturing Information

A. Description/Function:	3-Pin Microprocessor Reset Circuit
B. Process:	S3 (SG3) - Standard 3 micron silicon gate CMOS
C. Number of Device Transistors:	275
D. Fabrication Location:	Oregon, USA
E. Assembly Location:	Malaysia or Thailand
F. Date of Initial Production:	December, 1994

III. Packaging Information

	3 Lead SOT-23	**3-Lead SC70**
A. Package Type:		
B. Lead Frame:	Alloy 42	Alloy 42
C. Lead Finish:	Solder Plate	Solder Plate
D. Die Attach:	Silver-filled Epoxy	Non-Conductive Epoxy
E. Bondwire:	Gold (1 mil dia.)	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler	Epoxy with silica filler
G. Assembly Diagram:	# 05-1701-0199	# 05-1601-0080
H. Flammability Rating:	Class UL94-V0	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard JESD22-A112:	Level 1	Level 1

IV. Die Information

A. Dimensions:	44 x 31 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Aluminum/0.5% Cu
D. Backside Metallization:	None
E. Minimum Metal Width:	3 microns (as drawn)
F. Minimum Metal Spacing:	3 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:

$$\lambda = \frac{1}{MTTF} = \frac{4.04}{192 \times 4389 \times 544 \times 2}$$

(Chi square value for MTTF upper limit)

Temperature Acceleration factor assuming an activation energy of 0.8eV

$\lambda = 4.41 \times 10^{-9}$

$\lambda = 4.41$ 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 S3 Process results in a FIT Rate of 0.04 @ 25C and 0.69 @ 55C (0.8 eV, 60% UCL)

B. Moisture Resistance Tests

Maxim evaluates pressure pot stress from every assembly process during qualification of each new design. Pressure Pot testing must pass a 20% LTPD for acceptance. Additionally, industry standard 85°C/85%RH or HAST tests are performed quarterly per device/package family.

C. E.S.D. and Latch-Up Testing

The PW54 die types has been found to have all pins able to withstand a transient pulse of

ESD HBM: +/-3000V per Mil- Std-883 Method 3015
ESD CDM: +/-750V Per JESD22-C101

Latch-Up testing has shown that this device withstands a current of +/-250mA, 1.5x VCCMax Overvoltage per JESD78.

Table 1
Reliability Evaluation Test Results

MAX809RExR

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	544	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	DC Parameters (generic test vehicle) Method 1010	77	0

Note 1: Life Test Data may represent plastic D.I.P. qualification lots. Note 2: Generic Process/Package Dat