RELIABILITY REPORT

FOR

MAX707ESA+

PLASTIC ENCAPSULATED DEVICES

May 17, 2013

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

Approved by
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Quality Assurance
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Conclusion

The MAX707ESA+ successfully meets the quality and reliability standards required of all Maxim Integrated products. In addition, Maxim Integrated's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim Integrated's quality and reliability standards.

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I. Device Description

A. General

The MAX705-MAX708/MAX813L microprocessor (µP) supervisory circuits reduce the complexity and number of components required to monitor power-supply and battery functions in µP systems. These devices significantly improve system reliability and accuracy compared to separate ICs or discrete components. The MAX705/MAX706/MAX813L provide four functions:

- A reset output during power-up, power-down, and brownout conditions.
- An independent watchdog output that goes low if the watchdog input has not been toggled within 1.6 seconds.
- A 1.25V threshold detector for power-fail warning, low-battery detection, or for monitoring a power supply other than +5V.
- An active-low manual-reset input. The MAX707/MAX708 are the same as the MAX705/MAX706, except an active-high reset is substituted for the watchdog timer. The MAX813L is the same as the MAX705, except RESET is provided instead of active-low RESET. Two supply-voltage monitor levels are available: The MAX705/MAX707/MAX813L generate a reset pulse when the supply voltage drops below 4.65V, while the MAX706/MAX708 generate a reset pulse below 4.40V. All four parts are available in 8-pin DIP, SO and µMAX® packages.

II. Manufacturing Information

A. Description/Function:	Low-Cost, µP Supervisory Circuits
B. Process:	B3
C. Number of Device Transistors:	648
D. Fabrication Location:	Oregon
E. Assembly Location:	Malaysia, Philippines, or Thailand
F. Date of Initial Production:	Pre 1997

III. Packaging Information

A. Package Type:	8-pin SOIC (N)
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-1701-0104
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:	170°C/W
K. Single Layer Theta Jc:	40°C/W
L. Multi Layer Theta Ja:	136°C/W
M. Multi Layer Theta Jc:	38°C/W

IV. Die Information

A. Dimensions:	70X51 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:	3.0 microns (as drawn)
F. Minimum Metal Spacing:	3.0 microns (as drawn)
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

A. Quality Assurance Contacts:	Richard Aburano (Manager, Reliability Engineering) Don Lipps (Manager, Reliability Engineering) Bryan Preeshl (Vice President 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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{1000 \times 4340 \times 159 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 1.3 \times 10^{-9}$

λ = 1.3 F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at http://www.maximintegrated.com/qa/reliability/monitor. Cumulative monitor data for the B3 Process results in a FIT Rate of 0.03 @ 25C and 0.5 @ 55C (0.8 eV, 60% UCL).

B. E.S.D. and Latch-Up Testing (lot NTOCFO004C, D/C 9532)

The PW27-2 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2000V per Mil-Std 883 Method 3015.7 Latch-Up testing has shown that this device withstands a current of +/-100mA.

Table 1
Reliability Evaluation Test Results

MAX707ESA+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C	DC Parameters	79	0	NTOAH20A9F, D/C 1015
	Biased	& functionality	80	0	NTOBI2079B, D/C 0943
	Time = 1000 hrs.				

Note 1: Life Test Data may represent plastic DIP qualification lots.