RELIABILITY REPORT

FOR

MAX6346UR44+, MAX6346UR44+T,
MAX6346UR46+, MAX6346UR46+T

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MAXIM INTEGRATED

160 RIO ROBLES

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Conclusion

The MAX6346 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 MAX6326/MAX6327/MAX6328/MAX6346/MAX6347/MAX6348 microprocessor (µP) supervisory circuits monitor the power supplies in µP and digital systems. These devices provide excellent circuit reliability and low cost by eliminating external components and adjustments when used with 2.5V, 3V, 3.3V, and 5V powered circuits.

These circuits perform a single function: they assert a reset signal whenever the VCC supply voltage declines below a preset threshold, keeping it asserted for at least 100ms after VCC has risen above the reset threshold. The only difference between the devices is their output. The MAX6326/MAX6346 (push-pull) and MAX6328/ MAX6348 (open-drain) have an active-low reset output. The MAX6327/MAX6347 have an active-high push-pull reset output. All of these parts are guaranteed to be in the correct state for VCC down to 1V. The reset comparator is designed to ignore fast transients on VCC. Reset thresholds are factory-trimmable between 2.2V and 4.63V, in approximately 100mV increments. Twenty-one standard versions are available. Contact the factory for availability of nonstandard versions.

Ultra-low supply currents (1µA max for the MAX6326/ MAX6327/MAX6328) make these parts ideal for use in portable equipment. All six devices are available in space saving SOT23 and SC70 packages.

II. Manufacturing Information

A. Description/Function:	3-Pin, Ultra-Low-Power SC70/SOT µP Reset Circuits
B. Process:	S12
C. Device Count:	N/A
D. Fabrication Location:	USA
E. Assembly Location:	Thailand, Malaysia
F. Date of Initial Production:	May 1998

III. Packaging Information

A. Package Type:	SOT23
B. Lead Frame:	CU194
C. Lead Finish:	Matte Tin
D. Die Attach:	8006NS-2X
E. Bondwire:	1 mil Au
F. Mold Material:	G600 or CEL9220HF13
G. Assembly Diagram:	05-1601-0043
H. Flammability Rating:	UL-94 (V-0 Rating)
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Single Layer Theta Ja:	N/A
K. Single Layer Theta Jc:	N/A
L. Multi Layer Theta Ja:	336 °C/W
M. Multi Layer Theta Jc:	110.10 °C/W

IV. Die Information

A. Dimensions:	44X31 mils
B. Passivation:	N^{3-} and O^{2-}

V. Quality Assurance Information

A. Quality Assurance Contacts:	Ryan Wall (Manager, Reliability) Michael Cairnes (Executive Director, Reliability) Bryan Preeshl (SVP 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 125C biased (static) life test are shown in Table 1. Using these results, the Failure Rate λ is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192\ x\ 2454\ x\ 80\ x\ 2}$$ (Chi square value for MTTF upper limit)

(where 2454 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$$\lambda = 23.40\ x\ 10^{-9}$$

$$\lambda = 23.40\ FITs\ (60\%\ confidence\ level\ @25°C)$$

Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at https://www.maximintegrated.com/en/support/qa-reliability/reliability/reliability-monitor-program.html.

S12 cumulative process Fit

$$\lambda = 0.14\ FITs\ (60\%\ confidence\ level\ @25°C)$$

$$\lambda = 1.67\ FITs\ (60\%\ confidence\ level\ @55°C)$$

B. ESD and Latch-Up Testing

The MAX6346 has been found to have all pins able to withstand an HBM transient pulse of ±1000 V per JEDEC / ESDA JS-001. Latch-Up testing has shown that this device withstands ±250 mA current injection and supply overvoltage per JEDEC JESD78.

Table 1

Reliability Evaluation Test Results

MAX6346

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 125°C Biased Time = 192 hrs.	DC parameters & functionality	80	0	

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