

RELIABILITY REPORT
FOR
MAX6307UK31D3+T
PLASTIC ENCAPSULATED DEVICES

March 30, 2012

MAXIM INTEGRATED PRODUCTS

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Conclusion

The MAX6307UK31D3+T 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 MAX6305-MAX6313 CMOS microprocessor (μ P) supervisory circuits are designed to monitor more than one power supply. Ideal for monitoring both 5V and 3.3V in personal computer systems, these devices assert a system reset if any of the monitored supplies falls outside the programmed threshold. Low supply current (15 μ A) and a small package suit them for portable applications. The MAX6305-MAX6313 are specifically designed to ignore fast transients on any monitored supply. These devices are available in a SOT23-5 package, have factory-programmed reset thresholds from 2.5V to 5.0V (in 100mV increments), and feature four power-on reset timeout periods. Ten standard versions are available. Contact the factory for availability of non standard versions.

II. Manufacturing Information

A. Description/Function:	5-Pin, Multiple-Input, Programmable Reset ICs
B. Process:	B12
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Malaysia
F. Date of Initial Production:	Pre 1997

III. Packaging Information

A. Package Type:	5L SOT23
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:	#05-1601-0027 / A
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	1
J. Single Layer Theta Ja:	324.3°C/W
K. Single Layer Theta Jc:	82°C/W
L. Multi Layer Theta Ja:	255.9°C/W
M. Multi Layer Theta Jc:	81°C/W

IV. Die Information

A. Dimensions:	57 X 38 mils
B. Passivation:	Si ₃ N 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:	1.2 microns (as drawn)
F. Minimum Metal Spacing:	1.2 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 biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 79 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 13.9 \times 10^{-9}$$

$$\lambda = 13.9 \text{ F.I.T. (60\% confidence level @ 25}^\circ\text{C)}$$

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 B12 Process results in a FIT Rate of 0.06 @ 25C and 1.06 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (ESD lot BPHAAO002C, Latch-up lot IPHACQ002H D/C 9928)

The MS10 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 +/-200mA.

Table 1
Reliability Evaluation Test Results

MAX6307UK31D3+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	79	0	IPHACQ001I, D/C 9929

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