

RELIABILITY REPORT
FOR
MAX6314US29D2+T
PLASTIC ENCAPSULATED DEVICES

October 11, 2010

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
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Conclusion

The MAX6314US29D2+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 MAX6314 low-power CMOS microprocessor (μ P) supervisory circuit is designed to monitor power supplies in μ P and digital systems. The MAX6314's active-low RESET output is bidirectional, allowing it to be directly connected to μ Ps with bidirectional reset inputs, such as the 68HC11. It provides excellent circuit reliability and low cost by eliminating external components and adjustments. The MAX6314 also provides a debounced manual reset input. This device performs a single function: it asserts a reset signal whenever the VCC supply voltage falls below a preset threshold or whenever manual reset is asserted. Reset remains asserted for an internally programmed interval (reset timeout period) after VCC has risen above the reset threshold or manual reset is deasserted. The MAX6314 comes with factory-trimmed reset threshold voltages in 100mV increments from 2.5V to 5V. Preset timeout periods of 1ms, 20ms, 140ms, and 1120ms (minimum) are also available. The device comes in a SOT143 package. For a μ P supervisor with an open-drain reset pin, see the MAX6315 data sheet.

II. Manufacturing Information

A. Description/Function:	68HC11/Bidirectional-Compatible μ P Reset Circuit
B. Process:	B12
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon or Texas
E. Assembly Location:	Malaysia, Thailand
F. Date of Initial Production:	Pre 1997

III. Packaging Information

A. Package Type:	4-pin SOT
B. Lead Frame:	Alloy42
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:	#05-1601-0015
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Single Layer Theta Jb:	250°C/W
K. Single Layer Theta Jc:	130°C/W
L. Multi Layer Theta Ja:	N/A
M. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	40 X 31 mils
B. Passivation:	$\text{Si}_3\text{N}_4/\text{SiO}_2$ (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:	5 mil. Sq.
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

- A. Quality Assurance Contacts: 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:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 443 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 2.5 \times 10^{-9}$$

$\lambda = 2.5$ 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 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 (lot BNMAAA004GZ, D/C 9801)

The MS11 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 +/-250mA and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAX6314US29D2+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	49	0	SNMBGQ001D, DC 0345
			80	0	INMBEQ001CQ, DC 9914
			80	0	NNMBDX001F, DC 9741
			77	0	BNMBAB007K, DC 9704
			80	0	BNMBAQ001B, DC 9623
			77	0	BNMAAB006L, DC 9704

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