



RELIABILITY REPORT
FOR
MAX9621AUB+T
PLASTIC ENCAPSULATED DEVICES

January 27, 2012

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
Sokhom Chum
Quality Assurance
Reliability Engineer

Conclusion

The MAX9621AUB+ 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 MAX9621 is a continuation of the Maxim family of Hall-effect sensor interfaces that already includes the MAX9921. The MAX9621 provides a single-chip solution to interface two 2-wire Hall-effect sensors to low voltage microprocessors (μ P) through either a digital output for Hall-effect switches or an analog output for linear information or both. The MAX9621 protects the Hall sensors from supply transients up to 60V at the BAT supply. Normal operating supply voltage ranges from 5.5V to 18V. If the BAT supply rises above 18V, the MAX9621 shuts off the current to the Hall sensors. When a short-to-ground fault condition is detected, the current to the Hall input is shut off and the condition is indicated at the analog output by a zero-current level and a high digital output. The MAX9621 provides a minimum of 50 μ s blanking time following Hall sensor power-up or restart. The open-drain digital outputs are compatible with logic levels up to 5.5V. The MAX9621 is available in a 3mm x 5mm, 10-pin μ MAX® package and is rated for operation in the -40°C to +125°C temperature range.

II. Manufacturing Information

A. Description/Function:	Dual, 2-Wire Hall-Effect Sensor Interface with Analog and Digital Outputs
B. Process:	BCD88
C. Number of Device Transistors:	1195
D. Fabrication Location:	Oregon
E. Assembly Location:	Thailand
F. Date of Initial Production:	October 25, 2009

III. Packaging Information

A. Package Type:	10L uMAX
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:	#05-9000-3711 / 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:	180°C/W
K. Single Layer Theta Jc:	42°C/W
L. Multi Layer Theta Ja:	113.1°C/W
M. Multi Layer Theta Jc:	42°C/W

IV. Die Information

A. Dimensions:	62 X 87 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:	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 biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 48 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 22.9 \times 10^{-9}$$

$$\lambda = 22.9 \text{ F.I.T. (60\% confidence level @ } 25^{\circ}\text{C)}$$

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 BCD8 Process results in a FIT Rate of 0.06 @ 25C and 1.08 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot JWLZBQ002C D/C 0952)

The OY43 die type has been found to have all pins able to withstand a transient pulse of:

ESD-HBM:	+/- 2500V per JEDEC JESD22-A114
ESD-CDM:	+/- 750V per JEDEC JESD22-C101

Latch-Up testing has shown that this device withstands a current of +/-100mA and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAX9621AUB+

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	48	0	JWLZBQ002B, D/C 0940

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