RELIABILITY REPORT

FOR

MAX367EWN+

PLASTIC ENCAPSULATED DEVICES

June 14, 2012

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Sokhom Chum
Quality Assurance
Reliability Engineer

Conclusion

The MAX367EWN+ 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.

Table of Contents

I. Device Description

A. General

The MAX366 and MAX367 are multiple, two-terminal circuit protectors. Placed in series with signal lines, each two-terminal device guards sensitive circuit components against voltages near and beyond the normal supply voltages. These devices are used at interfaces where sensitive circuits are connected to the external world and could encounter damaging voltages (up to 35V beyond the supply rails) during power-up, power-down, or fault conditions. The MAX366 contains three independent protectors and the MAX367 contains eight. They can protect analog signals using either unipolar (4.5V to 36V) or bipolar (±2.25V to ±18V) power supplies. Each protector is symmetrical. Input and output terminals may be freely interchanged. These devices are voltage-sensitive MOSFET transistor arrays that are normally on when power is applied and normally open circuit when power is off. With ±10V supplies, on-resistance is 100 max and leakage is less than 1nA at +25°C. When signal voltages exceed or are within approximately 1.5V of either power-supply voltage (including when power is off), the two-terminal resistance increases dramatically, limiting fault current as well as output voltage to sensitive circuits. The protected side of the switch maintains the correct polarity and clamps approximately 1.5V below the supply rail. There are no "glitches" or polarity reversals going into or coming out of a fault condition.

II. Manufacturing Information

A. Description/Function:	Signal Line Circuit Protector with Three Independent Protectors
B. Process:	S5HV
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Philippines, Thailand
F. Date of Initial Production:	Pre 1997

III. Packaging Information

A. Package Type:	300 mil 18L SOIC
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-0301-0692 / 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:	105°C/W
K. Single Layer Theta Jc:	22°C/W
L. Multi Layer Theta Ja:	67°C/W
M. Multi Layer Theta Jc:	23°C/W

IV. Die Information

A. Dimensions:	150 X 174 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:	5.0 microns (as drawn)
F. Minimum Metal Spacing:	5.0 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:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 160 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 6.9 \times 10^{-9}$

λ = 6.9 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 S5HV Process results in a FIT Rate of 0.09 @ 25C and 1.55 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot NHTAB4001A D/C 9914)

The AG70 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1000V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250mA.

Table 1
Reliability Evaluation Test Results

MAX367EWN+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C	DC Parameters	80	0	NHTAB4001A, D/C 9914
	Biased	& functionality	80	0	XHTAAM001A, D/C 9505
	Time = 192 hrs.				

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