

RELIABILITY REPORT FOR MAX620EWN+ PLASTIC ENCAPSULATED DEVICES

July 30, 2010

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by	
Don Lipps	
Quality Assurance	
Manager, Reliability Engineering	



Conclusion

The MAX620EWN+ 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 MAX620/MAX621 incorporate four MOSFET drivers and a charge-pump high-side power supply to power high-side switching and control circuits. The charge pump delivers a regulated output voltage 11V greater than Vcc to the drivers, which then translate a TTL/CMOS input signal to the noninverted output that swings from ground to the high-side voltage. The outputs drive N-channel FETs in high-side or low-side switching applications, including a wide range of line and batter-powered applications. The MAX620/MAX621 are microprocessor compatible and feature undervoltage lockout capability. This lockout feature inhibits the FET driver outputs until the high-side voltage reaches the proper level, as indicated by a Power-Ready output. The MAX620 requires three inexpensive charge-pump capacitors. The MAX621 has internal capacitors, no external components are needed.



II. Manufacturing Information

A. Description/Function:	Quad, High-Side MOSFET Driver
B. Process:	M6
C. Number of Device Transistors:	

Oregon

Pre 1997

Malaysia, Philippines

- D. Fabrication Location:
- E. Assembly Location:
- F. Date of Initial Production:

III. Packaging Information

A. Package Type:	18-pin SOIC (W)
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:	#05-0701-0398
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Single Layer Theta Ja:	105°C/W
K. Single Layer Theta Jc:	22°C/W
L. Multi Layer Theta Ja:	n/a
M. Multi Layer Theta Jc:	n/a

IV. Die Information

A. Dimensions:	113 X 84 mils
B. Passivation:	Si ₃ N ₄ /SiO ₂ (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al/1.0%Si
D. Backside Metallization:	None
E. Minimum Metal Width:	Metal1 = 0.5 / Metal2 = 0.6 / Metal3 = 0.6 microns (as drawn)
F. Minimum Metal Spacing:	Metal1 = 0.45 / Metal2 = 0.5 / Metal3 = 0.6 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 (Managing Director of QA)
В.	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:

 $\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 320 \times 2}$ (Chi square value for MTTF upper limit) $\lambda = 3.4 \times 10^{-9}$ $\lambda = 3.4 \text{ F.I.T.}$ (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 M6 Process results in a FIT Rate of 0.22 @ 25C and 3.73 @ 55C (0.8 eV, 60% UCL)

B. Moisture Resistance Tests

The industry standard 85°C/85%RH or HAST testing is monitored per device process once a quarter.

C. E.S.D. and Latch-Up Testing

The PS52 die type has been found to have all pins able to withstand a HBM transient pulse of +/-800V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-50mA.



Table 1 Reliability Evaluation Test Results

MAX620EWN+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	
Static Life Test (Note 1)					
	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	320	0	
Moisture Testing (Note 2)					
HAST	Ta = 130°C RH = 85% Biased Time = 96hrs.	DC Parameters & functionality	77	0	
Mechanical Stress (Note 2)					
Temperature Cycle	-65°C/150°C 1000 Cycles Method 1010	DC Parameters & functionality	77	0	

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

Note 2: Generic Package/Process data