RELIABILITY REPORT

FOR

MAX4708EPE+

PLASTIC ENCAPSULATED DEVICES

December 1, 2011

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX4708EPE+ 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 MAX4708/MAX4709 8-to-1 and dual 4-to-1 fault-protected multiplexers are pin compatible with the industry-standard DG508/DG509. The MAX4708/MAX4709 are similar to the MAX4508/MAX4509, but these devices do not have clamp diodes to the supply rails on the switch outputs. These multiplexers feature fault-protected inputs, rail-to-rail signal-handling capability, and do not require power-supply sequencing. Both devices offer ±40V overvoltage protection with the supplies off, ±36V protection with the supplies on, and feature 400 (max) on-resistance with 15 (max) matching between channels. The MAX4708/MAX4709 operate with dual supplies of ±4.5V to ±20V or a single supply of +9V to +36V. All digital inputs have TTL logic-compatible thresholds, ensuring both TTL and CMOS logic compatibility when using a single +12V supply or dual ±15V supplies. For low-voltage applications requiring fault protection, refer to the MAX4711/MAX4712/MAX4713 data sheet.

II. Manufacturing Information

A. Description/Function:	Fault-Protected, Single 8-to-1/Dual 4-to-1 Multiplexers
B. Process:	S5
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Malaysia, Philippines
F. Date of Initial Production:	October 16, 2002

III. Packaging Information

A. Package Type:	16-pin PDIP
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:	#05-0301-0843
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:	95°C/W
K. Single Layer Theta Jc:	35°C/W
L. Multi Layer Theta Ja:	N/A
M. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	86 X 198 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:	5 mil. Sq.
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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 320 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 3.4 \times 10^{-9}$

$\lambda = 3.4$ 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 S5 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 (ESD lot NP6CBA026D D/C 0215, Latch-Up lot NP6CBA025D, D/C 0215)

The AG85-2 die type has been found to have all pins able to withstand a HBM transient pulse of +/-400V 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

MAX4708EPE+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C	DC Parameters	80	0	NP6CBA026D, D/C 0215
	Biased	& functionality	80	0	NP6BFA025C, D/C 0215
	Time = 192 hrs.		80	0	NP6ACN001C, D/C 9916
			80	0	XP6ABN002A, D/C 9839

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