

RELIABILITY REPORT
FOR
MAX4704EGC+
PLASTIC ENCAPSULATED DEVICES

August 12, 2011

MAXIM INTEGRATED PRODUCTS

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Conclusion

The MAX4704EGC+ 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 MAX4704 low-voltage, 4-channel analog multiplexer operates from a single +1.8V to +5.5V supply. The MAX4704 features break-before-make switching action with a $t_{ON} = 60\text{ns}$ and $t_{OFF} = 20\text{ns}$ at +3V. When powered from a +2.7V supply, the device has a 60 (max) on-resistance (RON), with 3 (max) RON matching and 5 max RON flatness. The digital logic inputs are 1.8V-logic compatible from a +2.7V to +3.3V supply. The MAX4704 is available in both a space-saving 12-pin QFN (3mm x 3mm) package and a 10-pin $\mu\text{MAX}^{\circledR}$ package.

II. Manufacturing Information

A. Description/Function:	Low-Voltage, 60 , 4:1 Analog Multiplexer in QFN
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Korea
F. Date of Initial Production:	October 27, 2001

III. Packaging Information

A. Package Type:	12-pin QFN 3x3
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:	#05-1201-0256
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:	68°C/W
K. Single Layer Theta Jc:	15°C/W
L. Multi Layer Theta Ja:	62°C/W
M. Multi Layer Theta Jc:	15°C/W

IV. Die Information

A. Dimensions:	41 X 41 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:	0.8 microns (as drawn)
F. Minimum Metal Spacing:	0.8 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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 125 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 8.8 \times 10^{-9}$$

$$\lambda = 8.8 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 B8 Process results in a FIT Rate of 0.06 @ 25C and 0.99 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot S8J0BQ001B D/C 0437)

The AH91 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500V 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

MAX4704EGC+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C	DC Parameters	45	0	S8J0BQ001B, D/C 0437
	Biased	& functionality	80	0	I8J0AQ001D, D/C 0138
	Time = 192 hrs.				

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