

RELIABILITY REPORT
FOR
MAX326CEE+
PLASTIC ENCAPSULATED DEVICES

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MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134

Approved by
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Quality Assurance
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Conclusion

The MAX326CEE+ successfully meets the quality and reliability standards required of all Maxim Integrated products. In addition, Maxim Integrated's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim Integrated's quality and reliability standards.

Table of Contents

I.Device Description	IV.Die Information
II.Manufacturing Information	V.Quality Assurance Information
III.Packaging Information	VI.Reliability Evaluation
.....Attachments	

I. Device Description

A. General

The MAX326/MAX327 quad, single-po/e-single-throw (SPST1, CMOS analog switches upgrade the OG201A/OG202 and OG211/OG212 with at least 100 times less leakage-the MAX3261MAX327 have 10pA maximum leakage, while the OG201 AIDG202 have 1000pA and the OG211/OG212 have 5000pA. Low leakage currents support high system accuracy and make the devices useful for switching into high impedances, such as large-value feedback resistors in closedloop gain configurations. And the MAX326/MAX327 logic inputs are CMOS and TTL compatible. The MAX3261MAX327's low charge injection (2pC typ) minimizes signal error. Operation from single supplies (+10V to +30V), dual supplies (\pm SV to \pm 18V), and unbalanced combinations (i.e. +12V and -SV, or +SV and -15V) maximizes design flexibility. 80th parts also feature interchangeable inputs/outputs and Maxim's standard latchup-proof construction. Extremely low power consumption (525mW max) makes the MAX326/MAX327 Ideal for portable applications. Other programmable . applications include integrators with long RC time constants, current-to-voltage converters, high-gain amplifiers, and voltage dividers.

II. Manufacturing Information

A. Description/Function:	Quad, SPST, Ultra-Low-Leakage, CMOS Analog Switches
B. Process:	M6H
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Malaysia, Philippines, Thailand
F. Date of Initial Production:	Pre 1997

III. Packaging Information

A. Package Type:	16-pin QSOP
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:	#05-0301-0788
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:	120°C/W
K. Single Layer Theta Jc:	37°C/W
L. Multi Layer Theta Ja:	103.7°C/W
M. Multi Layer Theta Jc:	37°C/W

IV. Die Information

A. Dimensions:	90X59 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 microns (as drawn)
F. Minimum Metal Spacing:	Metal1 = 0.45 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: 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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 240 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 4.58 \times 10^{-9}$$

$$\lambda = 4.58 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at <http://www.maximintegrated.com/qa/reliability/monitor>. Cumulative monitor data for the M6H Process results in a FIT Rate of 0.1 @ 25C and 1.74 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (ESD lot NRMAC3030H D/C, Latch-Up lot NRMACQ001I D/C 9949)

The AG39 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

MAX326CEE+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C	DC Parameters & functionality	80	0	NRMACQ0011, D/C 9949
	Biased		80	0	XRMAAQ003A, D/C 9112
	Time = 192 hrs.		80	0	XRMBAQ002A, D/C 9104

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