

RELIABILITY REPORT
FOR
MAX4466EXK+T
PLASTIC ENCAPSULATED DEVICES

January 22, 2016

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134

Approved by
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Conclusion

The MAX4466EXK+T 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.

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I. Device Description

A. General

The MAX4465-MAX4469 are micropower op amps optimized for use as microphone preamplifiers. They provide the ideal combination of an optimized gain bandwidth product vs. supply current, and low-voltage operation in an ultra-small package. The MAX4465/MAX4467/MAX4469 are unity-gain stable and deliver a 200kHz gain bandwidth from only 24 μ A of supply current. The MAX4466/MAX4468 are decompensated for a minimum stable gain of +5V/V and provide a 600kHz gain bandwidth product. In addition these amplifiers feature rail-to-rail outputs, high AVOL, plus excellent power-supply rejection and common-mode rejection ratios for operation in noisy environments. The MAX4467/MAX4468 include a complete shutdown mode. In shutdown, the amplifiers' supply current is reduced to 5nA and the bias current to the external microphone is cut off for ultimate power savings. The single MAX4465/MAX4466 are offered in the ultra-small 5-pin SC70 package, while the single with shutdown MAX4467/MAX4468 and dual MAX4469 are available in the space-saving 8-pin SOT23 package.

II. Manufacturing Information

A. Description/Function:	Low-Cost, Micropower, SC70/SOT23-8, Microphone Preamplifiers with Complete Shutdown
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	California or Texas
E. Assembly Location:	Malaysia, Thailand
F. Date of Initial Production:	January 27, 2001

III. Packaging Information

A. Package Type:	5-pin SC70
B. Lead Frame:	Alloy42
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:	#05-2501-0102
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:	324°C/W
K. Single Layer Theta Jc:	115°C/W
L. Multi Layer Theta Ja:	324°C/W
M. Multi Layer Theta Jc:	115°C/W

IV. Die Information

A. Dimensions:	31X30 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: 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:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 77 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 14.2 \times 10^{-9}$$

$$\lambda = 14.2 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 B8 Process results in a FIT Rate of 0.01 @ 25C and 0.26 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot I1X1AQ001D, D/C 0049)

The OX51-1 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2000V 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

MAX4466EXK+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	77	0	I1X0AQ001E, D/C 0047

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