

RELIABILITY REPORT
FOR
MAX4063EUD+T / MAX4063ETE+T
PLASTIC ENCAPSULATED DEVICES

January 18, 2011

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
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Approved by
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Quality Assurance
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Conclusion

The MAX4063EUD+T / MAX4063ETE+T 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	V.Quality Assurance Information
II.Manufacturing Information	VI.Reliability Evaluation
III.Packaging Information	IV.Die Information
.....Attachments	

I. Device Description

A. General

The MAX4063 is a differential-input microphone preamplifier optimized for high-performance, portable applications. The device features two selectable inputs, differential outputs, adjustable gain, an integrated low-noise bias source, and a low-power shutdown mode. Two input paths provide both differential and single-ended microphone sensing. The high-noise rejection of the differential input is ideally suited to an internal microphone where system noise and long-run PC board traces can degrade low-level signals. The single-ended input provides a simple connection to an external microphone. The differential and single-ended inputs have independent, adjustable gains that are set with a single external resistor. Differential outputs provide a full-scale signal of up to 6VP-P from a single 3V supply, optimizing the dynamic range of the amplified signal. A complete shutdown mode reduces the supply current to only 0.3 μ A and disables the microphone bias for the ultimate in power savings. The MAX4063 operates from 2.4V to 5.5V and is specified over the extended -40°C to +85°C operating temperature range. The MAX4063 is available in both 16-pin thin QFN (4mm x 4mm x 0.8mm) and 14-pin TSSOP packages.

II. Manufacturing Information

A. Description/Function:	Differential Microphone Preamplifier with Internal Bias and Complete Shutdown
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	California or Texas
E. Assembly Location:	Malaysia, Philippines and Thailand
F. Date of Initial Production:	January 25, 2003

III. Packaging Information

A. Package Type:	14-pin TSSOP	16-pin TQFN 4x4
B. Lead Frame:	Copper	Copper
C. Lead Finish:	100% matte Tin	100% matte Tin
D. Die Attach:	Conductive	Conductive
E. Bondwire:	Au (1 mil dia.)	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler	Epoxy with silica filler
G. Assembly Diagram:	#05-2501-0227	#05-9000-0425
H. Flammability Rating:	Class UL94-V0	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1	Level 1
J. Single Layer Theta Ja:	110°C/W	59.3°C/W
K. Single Layer Theta Jc:	30°C/W	5.7°C/W
L. Multi Layer Theta Ja:	100.4°C/W	40°C/W
M. Multi Layer Theta Jc:	30°C/W	5.7°C/W

IV. Die Information

A. Dimensions:	75 X 47 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:	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 Operations)
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:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 45 \times 2} \text{ (Chi square value for MTTF upper limit)}$$

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

$$\lambda = 24.4 \times 10^{-9}$$

$\lambda = 24.4$ 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 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 ID90BQ001B, D/C 0248)

The OX95 die type has been found to have all pins able to withstand a HBM transient pulse of 1000V 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

MAX4063EUD+T
MAX4063ETE+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	45	0	ID90BQ001B, D/C 0248

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