



RELIABILITY REPORT
FOR
MAX14627ETA+T
PLASTIC ENCAPSULATED DEVICES

September 18, 2012

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 MAX14627ETA+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.

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I. Device Description

A. General

The MAX14627/MAX14628 provide a simple solution for detecting the insertion and managing the operation of a 3.5mm stereo headset with a microphone. These devices integrate all circuitry needed to detect SEND/END button press events and generate required microphone bias voltages, and are fully compatible with Windows® Mobile 7. The devices need only three GPIOs from the host controller to select between call mode and standby mode, and monitor the SEND/END and jack insertion status. In call mode, the low-noise LDO is enabled to provide DC bias to the externally preamplified microphone. In standby mode, microphone low-power pulsing is enabled to reduce supply current while waiting for a SEND/END button press event. Two open-drain outputs signal the host controller when an insertion/removal or SEND/END button press event occurs. If a 3P headset without a microphone is inserted, the low-power pulsing can be disabled by setting the MODE input to high impedance. The MAX14627 operates from a 2.5V to 5.5V input voltage supply and features an internal 2.2V LDO output, while the MAX14628 operates from a 3.1V to 5.5V voltage supply and features an internal 2.8V LDO output voltage. Both devices control jack insertion detection by monitoring a 3.5mm socket with a normally open jack insertion switch. Additionally, the MAX14628 features open microphone detection. The MAX14627/MAX14628 are available in an 8-pin TDFN package, and are fully specified over the -40°C to +85°C extended temperature range.

II. Manufacturing Information

A. Description/Function:	Low-Power Headset Detectors with SEND/END Button Support
B. Process:	S18
C. Number of Device Transistors:	2734
D. Fabrication Location:	USA
E. Assembly Location:	China, Taiwan and Thailand
F. Date of Initial Production:	June 14, 2012

III. Packaging Information

A. Package Type:	8-pin TDFN 2x2
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:	#05-9000-4882
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:	110°C/W
K. Single Layer Theta Jc:	37°C/W
L. Multi Layer Theta Ja:	83.9°C/W
M. Multi Layer Theta Jc:	37°C/W

IV. Die Information

A. Dimensions:	25.1968X24.0157 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:	Metal1 = 0.23 / Metal2-3 = 0.28 / Metal 4 = 2.6 microns (as drawn)
F. Minimum Metal Spacing:	Metal1 = 0.23 / Metal2-3 = 0.28 / Metal 4 = 3.0 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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 160 \times 2} \text{ (Chi square value for MTTF upper limit)}$$

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

$$\lambda = 6.9 \times 10^{-9}$$

$$\lambda = 6.9 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 S18 Process results in a FIT Rate of 0.06 @ 25C and 1.05 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot SADI9Q001A, D/C 1201)

The AL47-0 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/- 250mA and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAX14627ETA+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135C	DC Parameters	80	0	SADI9Q001A, D/C 1201
	Biased	& functionality	80	0	SADJ0Q001B, D/C 1201
	Time = 192 hrs.				

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