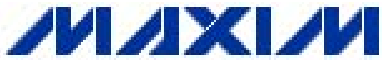

RELIABILITY REPORT

FOR

MAX14579EETA+T

PLASTIC ENCAPSULATED DEVICES

August 16, 2011

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
Manager, Reliability Engineering

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Conclusion

The MAX14579EETA+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 MAX14579E/MAX14579AE/MAX14579BE 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 required to detect SEND/END button press events and generate required microphone bias voltages. All the devices are automatically configured without the use of an I^2C interface; the host controller only needs to provide one MODE input to select between call mode and standby mode. 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. The MAX14579E manages jack insertion detection by monitoring a 3.5mm socket with a normally closed jack insertion switch, while the MAX14579AE monitors a normally open jack insertion switch. The MAX14579BE monitors the presence of a microphone when a socket with no jack insertion switch is used. All the devices 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 Detector with SEND/END Button Support
B. Process:	S18
C. Number of Device Transistors:	1990
D. Fabrication Location:	California
E. Assembly Location:	Malaysia, Taiwan and Thailand
F. Date of Initial Production:	June 24, 2011

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:	#05-9000-4274
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:	24.01 X 24.01 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	0.18µm
F. Minimum Metal Spacing:	0.18µm
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

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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 125°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 2454 \times 80 \times 2}$$ (Chi square value for MTTF upper limit)

(where 2454 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$\lambda = 24.3 \times 10^{-9}$

λ = 24.3 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 0.40 @ 25C and 6.96 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot ST1ZCQ003D, D/C 1118)

The AL22 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 +/- 100mA and overvoltage per JEDEC JESD78.

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Table 1
Reliability Evaluation Test Results

MAX14579EETA+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 125°C Biased Time = 192 hrs.	DC Parameters & functionality	80	0	ST1ZCQ003D, D/C 1118

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

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