

RELIABILITY REPORT

FOR

MAX14637EVB+

MAX14637EVB+T

MAX14637CVB+

MAX14637CVB+T

PLASTIC ENCAPSULATED DEVICES

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**MAXIM INTEGRATED**

160 RIO ROBLES

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## Conclusion

The MAX14637 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 MAX14576/MAX14636/**MAX14637** are USB charger detectors. The MAX14576/MAX14636/**MAX14637** will pass USB Battery Charger Specification Revision 1.2 (USB BC 1.2) compliance tests. The MAX14636/**MAX14637** can also detect Apple chargers, and other nonstandard types. These devices are capable of detecting multiple USB battery charging methods including standard downstream ports (SDP), charging downstream ports (CDP), and dedicated charger ports (DCP). The devices also feature USB BC 1.2 defined dead-battery option support.

## II. Manufacturing Information

A. Description/Function:	USB Charger Detector
B. Process:	S18
C. Device Count	34331
D. Fabrication Location:	USA
E. Assembly Location:	Taiwan
F. Date of Initial Production:	March 28, 2013

## III. Packaging Information

A. Package Type:	Ultra-Thin QFN
B. Lead Frame:	Cu194
C. Lead Finish:	NiPdAu Preplate
D. Die Attach:	ATB-125
E. Bondwire:	1.00 mil Au
F. Mold Material:	G700LA
G. Assembly Diagram:	05-9000-4911
H. Flammability Rating:	UL-94 (V-0 Rating)
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Single Layer Theta Ja:	N/A
K. Single Layer Theta Jc:	N/A
L. Multi Layer Theta Ja:	110.80 °C/W
M. Multi Layer Theta Jc:	62.10 °C/W

## IV. Die Information

A. Dimensions:	38.9764X57.48 mils
B. Passivation:	SiO <sub>2</sub> /Si <sub>3</sub> N <sub>4</sub>

## V. Quality Assurance Information

A. Quality Assurance Contacts:	Norbert Gerena (Engineer, Reliability) Brian Standley (Manager, Reliability) Bryan Preeshl (SVP 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 125C biased (static) life test are shown in Table 1. Using these results, the Failure Rate  $\lambda$  is calculated as follows:

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

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

$$\lambda = 24.31 \times 10^{-9}$$

$$\lambda = 24.21 \text{ FITs (60\% confidence level @25°C)}$$

Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at <https://www.maximintegrated.com/en/support/qa-reliability/reliability/reliability-monitor-program.html>.

SA S18 Quarterly Process FIT from Q2FY18

$$\lambda = 0.4 \text{ FITs (60\% confidence level @25°C)}$$

### B. E.S.D. and Latch-Up Testing

The MAX14637 has been found to have all pins able to withstand an HBM transient pulse of +/- 2500 V per JEDEC / ESDA JS-001. Latch-Up testing has shown that this device withstands +/- 250 mA current injection and supply overvoltage per JEDEC JESD78.

**Table 1**  
Reliability Evaluation Test Results  
**MAX14576EVB+ (MAX14637 QBS)**

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

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