

RELIABILITY REPORT
FOR
MAX20332EWE+T
MAX20332EWE+
PLASTIC ENCAPSULATED DEVICES

June 18, 2018

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134



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Conclusion

The MAX20332 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 MAX20332 is a USB charger detector compliant with USB Battery Charging Specification Revision 1.2. The USB charger detection circuitry detects USB standard downstream ports (SDPs), USB charging downstream ports (CDPs), or dedicated charger ports (DCPs), and controls an external lithium-ion (Li+) battery charger. The device implements USB Battery Charging Specification Revision 1.2-compliant detection logic. The device also includes Apple® charger detection that allows identification of resistor-divider networks on D+/D-.

II. Manufacturing Information

A. Description/Function:	USB Charger Detection with Integrated Overvoltage Protector
B. Process:	S18
C. Device Count:	49708
D. Fabrication Location:	USA
E. Assembly Location:	China
F. Date of Initial Production:	April 13, 2018

III. Packaging Information

A. Package Type:	WLP
B. Lead Frame:	NA
C. Lead Finish:	NA
D. Die Attach:	NA
E. Bondwire:	NA
F. Mold Material:	NA
G. Assembly Diagram:	05-100933
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:	NA
K. Single Layer Theta Jc:	NA
L. Multi Layer Theta Ja:	58 °C/W
M. Multi Layer Theta Jc:	NA

IV. Die Information

A. Dimensions:	75.98x72.05 mils
B. Passivation:	SiO/SiN

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 λ 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)

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

$$\lambda = 24.3 \text{ FITs (60\% confidence level @25°C)}$$

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>.

S18 Quarterly Process FIT from Q1FY18

$$\lambda = 0.1 \text{ FITs (60\% confidence level @25°C)}$$

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

The MAX202332 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

MAX20332EWE+T

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

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