

RELIABILITY REPORT
FOR
MAX20328BEWA+
MAX20328BEWA+T

April 13, 2020

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134



Ryan Wall
Manager, Reliability

Conclusion

The MAX20328B 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 MAX20328/MAX20328A/MAX20328B are USB Type-C audio interface ICs for use in portable devices. As USB Type-C and USB power delivery (PD) make a high-voltage charging solution readily available, the data and SBU lines are at risk of shorting to a high bus voltage, risking permanent damage to the portable device. USB 2.0 data lines also need protection when multiplexed with analog audio signals that vary from positive to negative voltages. The devices can detect a CC pin connection event to disable the microphone bias and eliminate pop up noise when an audio accessory is attached.

II. Manufacturing Information

A. Description/Function:	MUX Switch for USB Type-C Audio Adapter Accessories
B. Process:	S18
C. Device Count:	65698
D. Fabrication Location:	USA, Taiwan
E. Assembly Location:	China, Taiwan
F. Date of Initial Production:	April 10, 2018

III. Packaging Information

A. Package Type:	WLP
B. Lead Frame:	N/A
C. Lead Finish:	N/A
D. Die Attach:	N/A
E. Bondwire:	N/A
F. Mold Material:	N/A
G. Assembly Diagram:	05-100769
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:	52.43 °C/W
M. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	92.126 x 92.126 mils
B. Passivation:	Si ₃ N ₄ /SiO ₂

V. Quality Assurance Information

- A. Quality Assurance Contacts: Ryan Wall (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 cumulative process data:

$$\lambda = 0.02 \text{ FITs (60\% confidence level @25°C)}$$

$$\lambda = 0.25 \text{ FITs (60\% confidence level @55°C)}$$

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

The MAX20328B 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

MAX20328AEWA+T (Note 1)

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 2)	Ta = 125C Biased Time = 192 hrs.	DC Parameters & functionality	80	0	

Note 1: MAX20328AEWA+ and MAX20328BEWA+ are the same silicon.

Note 2: Life Test Data may represent plastic DIP qualification lots.