

RELIABILITY REPORT

FOR

MAX77958EWW+, MAX77958EWW+T,
MAX77958AEWW+, MAX77958AEWW+T

October 26, 2020

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134



Sheena Karlyn Basinang
Engineer, Reliability



Ryan Wall
Manager, Reliability

Conclusion

The MAX77958 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.

Table of Contents

I.Device Description	IV.Die Information
II.Manufacturing Information	V.Quality Assurance Information
III.Packaging Information	VI.Reliability Evaluation
.....Attachments	

I. Device Description

A. General

The MAX77958 is a robust solution for USB Type-C CC detection and power delivery (PD) protocol implementation. It detects connected accessories or devices by using Type-C CC detection and USB PD messaging. The IC protects against overvoltage and overcurrent, and detects moisture and prevents corrosion on the USB TypeC connector. The IC also has a D+/D- USB switch and BC1.2 detection to support legacy USB standards. It contains VCONN switches for USB PD and an enable pin for an external VCONN boost or buck converter.

The IC is compliant with USB Type-C Specification Release 1.3 and PD 3.0. It can be customized easily without affecting the compliance.

The IC has an I2C master that can read and write to other devices in the system so that its firmware can configure related devices without the main processor's assistance. For example, it can configure an external charger based on BC1.2 detection, CC detection, and PD communication.

The IC has an interrupt output pin to report event detection and status changes. It also has an I2C interface that system can use to read/write and configure internal registers.

The IC has nine configurable GPIOs that can be used for detection, as interrupts, and as the enable/disable pin for external devices, or as ADC inputs.

The IC is available in a 3.10mm x 2.65mm, 0.5mm pitch, wafer-level package (WLP).

II. Manufacturing Information

A. Description/Function:	Standalone USB Type-C and USB Power Delivery Controller
B. Process:	P90
C. Device Count:	1881317
D. Fabrication Location:	Japan
E. Assembly Location:	Taiwan
F. Date of Initial Production:	December 16, 2019

III. Packaging Information

A. Package Type:	WLP
B. Lead Frame:	N/A
C. Lead Finish:	SAC125Ni
D. Die Attach:	N/A
E. Bondwire:	N/A
F. Mold Material:	N/A
G. Assembly Diagram:	05-101339
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:	N/A
M. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	122.0472X104.3307 mils
B. Passivation:	SiO ₂ /SiN

V. Quality Assurance Information

A. Quality Assurance Contacts:	Ryan Wall (Manager, Reliability) Michael Cairnes (Executive Director, 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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{1000 \times 2454 \times 77 \times 2} \text{ (Chi square value for MTTF upper limit)}$$

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

$$\lambda = 4.85 \times 10^{-9}$$

$$\lambda = 4.85 \text{ FITs (60\% confidence level @25°C)}$$

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>.

P90 cumulative process Fit

$$\lambda = 0.11 \text{ FITs (60\% confidence level @25°C)}$$

$$\lambda = 1.28 \text{ FITs (60\% confidence level @55°C)}$$

B. ESD and Latch-Up Testing

The MAX77958 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 ± 100 mA current injection and supply overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results
MAX77958EWV+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION		NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 125°C Biased Time = 1000 hrs.	DC parameters & functionality	77	0	

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