

RELIABILITY REPORT
FOR
MAX17261METD+
MAX17261METD+T
MAX17261MEWL+
MAX17261MEWL+T
PLASTIC ENCAPSULATED AND
WAFER LEVEL DEVICES

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MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134



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Conclusion

The MAX17261 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 MAX17261 is an ultra-low power fuel gauge IC which implements the Maxim ModelGauge™ m5 algorithm. The IC monitors a multiple-series cell battery pack with an external resistor divider. The ModelGauge m5 EZ algorithm makes fuel gauge implementation easy by eliminating battery characterization requirements and simplifying host software interaction. The algorithm provides tolerance against battery diversity for most lithium batteries and applications. The algorithm combines the short-term accuracy and linearity of a coulomb counter with the long-term stability of a voltage-based fuel gauge, along with temperature compensation to provide industry-leading fuel gauge accuracy. The IC automatically compensates for cell-aging, temperature, discharge rate, and provides accurate state-of-charge (SOC) in percentage (%) and remaining capacity in milliampere-hours (mAh) over a wide range of operating conditions. As the battery approaches the critical region near empty, the algorithm invokes a special correction mechanism that eliminates any error. The IC provides accurate estimation of time-to-empty and time-to-full and provides three methods for reporting the age of the battery: reduction in capacity, increase in battery resistance, and cycle odometer.

II. Manufacturing Information

A. Description/Function:	5.1µA Multi-Cell Fuel Gauge with ModelGauge m5 EZ
B. Process:	S18
C. Device Count:	293193
D. Fabrication Location:	USA
E. Assembly Location:	Taiwan
F. Date of Initial Production:	May 9, 2018

III. Packaging Information

A. Package Type:	TDFN-Cu	WLP
B. Lead Frame:	Cu194	N/A
C. Lead Finish:	Matte Tin	N/A
D. Die Attach:	Hitachi EN4900G	N/A
E. Bondwire:	CuPd (0.80 mil dia.)	N/A
F. Mold Material:	G700LA	N/A
G. Assembly Diagram:	05-100776	05-100781
H. Flammability Rating:	UL-94 (V-0 Rating)	UL-94 (V-0 Rating)
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1	Level 1
J. Single Layer Theta Ja:	54 °C/W	N/A
K. Single Layer Theta Jc:	8 °C/W	N/A
L. Multi Layer Theta Ja:	41 °C/W	83.98 °C/W
M. Multi Layer Theta Jc:	8 °C/W	N/A

IV. Die Information

A. Dimensions:	58.2677 x 59.0551 mils
B. Passivation:	SiO ₂ /Si ₃ N ₄

V. Quality Assurance Information

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|-----------------------------------|--|
| 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)

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

$$\lambda = 24.31 \text{ FITs (60\% confidence level @25°C)}$$

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 Process FIT from Q2FY18

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

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

The MAX17261 has been found to have all pins able to withstand a transient pulse of:

ESD-HBM ± 2500 V per JEDEC / ESDA JS-001

ESD-CDM ± 750 V per JEDEC / ESDA JS-002

Latch-Up testing has shown that MAX17261 withstands ± 250 mA current injection and supply overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results
MAX17260SETD+ (MAX17261 QBS)

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.