

RELIABILITY REPORT

FOR

MAX20801TPB+
MAX20801TPBA+
MAX20801TPBB+
MAX20801TPBC+
MAX20802TPBA+
MAX20802TPBB+
MAX20802TPBC+

PLASTIC ENCAPSULATED DEVICES

October 26, 2018

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134

Handwritten signature of Norbert Paul Gerena.

Norbert Paul Gerena
Engineer, Reliability

Handwritten signature of Brian Standley.

Brian Standley
Manager, Reliability

Conclusion

The MAX20801/MAX20802 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 MAX20801/MAX20802 family of Cell-String Optimizers enables cell-string Maximum Power Point Tracking (MPPT), providing superior photovoltaic (PV) module energy harvest and reliability as compared to both standard panels and those incorporating module level MPPT technologies. Photovoltaic cells can only deliver maximum power under specific electrical conditions that vary significantly with exposed irradiance and temperature. Series connections of PV cells creates a significant sensitivity to cell mismatch, resulting in less than optimal power and energy production under real-world conditions. The MAX20801/MAX20802 Cell-String Optimizer enables a string of PV cells to deliver their collective maximum power into a wide range of load conditions. This enhanced electrical flexibility eliminates power loss from mismatch in PV strings and arrays, ultimately improving energy production and system design flexibility.

II. Manufacturing Information

A. Description/Function:	MPP Tracking DC-DC Converter
B. Process:	TS18BCD
C. Device Count	112931
D. Fabrication Location:	Taiwan
E. Assembly Location:	China
F. Date of Initial Production:	April 9, 2018

III. Packaging Information

A. Package Type:	FCQFN
B. Lead Frame:	CDA194
C. Lead Finish:	Matte Tin
D. Die Attach:	N/A
E. Bondwire:	N/A
F. Mold Material:	G770HCD
G. Assembly Diagram:	05-100010
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:	1 °C/W

IV. Die Information

A. Dimensions:	90.5512X213.3858 mils
B. Passivation:	HPD/PEOX/SRO/PESN

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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 2454 \times 79 \times 2} \text{ (Chi square value for MTTF upper limit)}$$

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

$$\lambda = 24.61 \times 10^{-9}$$

$$\lambda = 24.61 \text{ FITs (60\% confidence level @25°C)}$$

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>.

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

The MAX20801/MAX20802 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

MAX20802TPBB+

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	79	0	

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