

RELIABILITY REPORT

FOR

MAX40203AUK+  
MAX40203AUK+T

PLASTIC ENCAPSULATED DEVICES

March 12, 2019

**MAXIM INTEGRATED**

160 RIO ROBLES  
SAN JOSE, CA 95134



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## Conclusion

The MAX40203 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 MAX40203 is an ideal diode current-switch with forward voltage drop that is approximately an order of magnitude smaller than that of Schottky diodes. When forward biased and enabled, the MAX40203 conducts with 230mV of voltage drop while carrying currents as high as 1A. During a short-circuit or a fast power-up, the device limits its output current to 2A. The MAX40203 thermally protects itself and any downstream circuitry from overcurrent conditions. This ideal diode operates from a supply voltage of 1.2V to 5.5V. The supply current is relatively constant with load current, and is typically 300nA. When disabled (EN = low), the ideal diode blocks voltages up to 6V in either direction, makes it suitable for use in most low-voltage, portable electronic devices.

## II. Manufacturing Information

A. Description/Function:	Ultra-Tiny Nanopower, 1A Ideal Diodes with Ultra-Low-Voltage Drop
B. Process:	S18
C. Device Count	381
D. Fabrication Location:	USA
E. Assembly Location:	Thailand
F. Date of Initial Production:	July 2018

## III. Packaging Information

A. Package Type:	SOT23
B. Lead Frame:	Cu194
C. Lead Finish:	Matte Tin
D. Die Attach:	Ablebond 84-1LMISR4
E. Bondwire:	Au (1.00 mil dia.)
F. Mold Material:	Sumitomo G600
G. Assembly Diagram:	05-101011
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:	324.30 °C/W
K. Single Layer Theta Jc:	82 °C/W
L. Multi Layer Theta Ja:	255.90 °C/W
M. Multi Layer Theta Jc:	81 °C/W

## IV. Die Information

A. Dimensions:	31.4961X31.4961 mils
B. Passivation:	SiO <sub>2</sub> /Si <sub>3</sub> N <sub>4</sub>

## V. Quality Assurance Information

- |                                   |  |
|-----------------------------------|--|
| A. Quality Assurance Contacts:    | Norbert Gerena (Engineer, Reliability)<br>Michael Cairnes (Executive Director, Reliability)<br>Bryan Preeshl (SVP of QA) |
| B. Outgoing Inspection Level:     | 0.1% for all electrical parameters guaranteed by the Datasheet.<br>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  $\lambda$  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>.

MFN S18 Quarterly Process FIT from Q3CY18

$$\lambda = 0.2 \text{ FITs (60\% confidence level @25°C)}$$

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

The MAX40203AUK+ 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

**MAX40203AUK+**

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

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