

RELIABILITY REPORT  
FOR  
MAX1853EXT+  
MAX1853EXT+T

November 13, 2020

**MAXIM INTEGRATED**

160 RIO ROBLES  
SAN JOSE, CA 95134



Sheena Karlyn Basinang  
Engineer, Reliability



Ryan Wall  
Manager, Reliability

## Conclusion

The MAX1853 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

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

## I. Device Description

### A. General

The MAX1852/MAX1853 monolithic, CMOS chargepump voltage inverters in the ultra-small SC70 package feature a low 15Ω output resistance, permitting loads up to 30mA with maximum efficiency. The MAX1852/ MAX1853 are available with operating frequencies of 50kHz and 200kHz, respectively, allowing optimization of supply current or external component size. Small external components and micropower shutdown mode make these devices ideal for both battery-powered and board-level voltage conversion applications.

Oscillator control circuitry and four power-MOSFET switches are included on-chip. Applications include generating a negative supply from a +5V or +3.3V logic supply to power analog circuitry. Both versions come in a 6-pin SC70 package that is 40% smaller than a SOT23 .

## II. Manufacturing Information

A. Description/Function:	SC70 Inverting Charge Pumps with Shutdown
B. Process:	S8
C. Device Count:	N/A
D. Fabrication Location:	USA
E. Assembly Location:	Thailand, Malaysia
F. Date of Initial Production:	September 20, 2000

## III. Packaging Information

A. Package Type:	SC70
B. Lead Frame:	Cu194
C. Lead Finish:	NiPdAu
D. Die Attach:	8006NS-2X
E. Bondwire:	1 mil Au
F. Mold Material:	G600/ CEL9220HF13
G. Assembly Diagram:	05-2301-0065
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:	326 °C/W
K. Single Layer Theta Jc:	115 °C/W
L. Multi Layer Theta Ja:	326.50 °C/W
M. Multi Layer Theta Jc:	115 °C/W

## IV. Die Information

A. Dimensions:	32X31 mils
B. Passivation:	N/A

## 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  $\lambda$  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)

$$\lambda = 24.6 \times 10^{-9}$$

$$\lambda = 24.6 \text{ FITs (60\% confidence level @25°C)}$$

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. ESD and Latch-Up Testing

The MAX1853 has been found to have all pins able to withstand an HBM transient pulse of  $\pm 400$  V per JEDEC / ESDA JS-001. Latch-Up testing has shown that this device withstands  $\pm 250$  mA current injection and supply overvoltage per JEDEC JESD78.

**Table 1**  
Reliability Evaluation Test Results  
**MAX1853EXT+T**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 125°C Biased Time = 192 hrs.	DC parameters & functionality	79	0	

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