

RELIABILITY REPORT

FOR

MAX6817EUT+, MAX6817EUT+T,
MAX6817MUT+, MAX6817MUT+T

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MAXIM INTEGRATED

160 RIO ROBLES
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Conclusion

The MAX6817 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 MAX6817 are single, dual, and octal switch debouncers that provide clean interfacing of mechanical switches to digital systems. They accept one or more bouncing inputs from a mechanical switch and produce a clean digital output after a short, preset qualification delay. Both the switch opening bounce and the switch closing bounce are removed. Robust switch inputs handle $\pm 25V$ levels and are $\pm 15kV$ ESD-protected for use in harsh industrial environments. They feature single-supply operation from +2.7V to +5.5V. Undervoltage-lockout circuitry ensures the output is in the correct state upon power-up.

II. Manufacturing Information

A. Description/Function:	±15kV ESD-Protected, Single/Dual/Octal, CMOS Switch Debouncers
B. Process:	S3
C. Device Count:	
D. Fabrication Location:	USA
E. Assembly Location:	Thailand, Malaysia
F. Date of Initial Production:	January 23, 1999

III. Packaging Information

A. Package Type:	6L SOT23
B. Lead Frame:	CU194
C. Lead Finish:	Matte Tin
D. Die Attach:	84-1LMISR4
E. Bondwire:	1 mil Au
F. Mold Material:	G600, CEL9220HF13
G. Flammability Rating:	UL-94 (V-0 Rating)
H. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
I. Single Layer Theta Ja:	N/A
J. Single Layer Theta Jc:	N/A
K. Multi Layer Theta Ja:	230 °C/W
L. Multi Layer Theta Jc:	76 °C/W

IV. Die Information

A. Dimensions:	57 x 33 mils
B. Passivation:	Si ₃ N ₄ /SiO ₂

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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 80 \times 2} \text{ (Chi square value for MTTF upper limit)}$$

(where 4340 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$$\lambda = 13.7 \times 10^{-9}$$

$$\lambda = 13.7 \text{ FITs (60\% confidence level @25°C)}$$

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>.

S3 Quarterly Process FIT from USA fab location for Q2FY19

$$\lambda = 1.2 \text{ FITs (60\% confidence level @25°C)}$$

B. ESD and Latch-Up Testing

The MAX6817 has been found to have all pins able to withstand an HBM transient pulse of ± 15 kV per JESD22-A114. 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
MAX6817EUT+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C Biased Time = 192 hrs.	DC parameters & functionality	80	0	

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