

RELIABILITY REPORT
FOR
MAX1833EUT#G16
PLASTIC ENCAPSULATED DEVICES

June 21, 2012

MAXIM INTEGRATED PRODUCTS

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Approved by
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Conclusion

The MAX1833EUT#G16 successfully meets the quality and reliability standards required of all Maxim products. In addition, Maxim's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim's quality and reliability standards.

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I. Device Description

A. General

The MAX1832-MAX1835 are high-efficiency step-up converters with complete reverse battery protection that protects the device and the load when the battery is reversed. They feature a built-in synchronous rectifier, which allows for over 90% efficiency and reduces size and cost by eliminating the need for an external Schottky diode. These step-up converters operate from a +1.5V to +5.5V input voltage range and deliver up to 150mA of load current. The MAX1833EUT/MAX1835EUT (SOT devices) have a fixed 3.3V output voltage. The MAX1833ETT30 (TDFN device) has a fixed 3.0V output voltage. The MAX1832/MAX1834 have adjustable outputs from +2V to +5.5V. In shutdown, the MAX1832/MAX1833 connect the battery input to the voltage output, allowing the input battery to be used as a backup or real-time clock supply when the converter is off (see Selector Guide). MAX183_EUT devices are available in a miniature 6-pin SOT23 package. The MAX1833ETT30 is available in a 3mm x 3mm thin DFN package. The MAX1832EVKIT is available to speed designs.

II. Manufacturing Information

A. Description/Function:	High-Efficiency Step-Up Converters with Reverse Battery Protection
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Taiwan, Thailand
F. Date of Initial Production:	January 2, 2001

III. Packaging Information

A. Package Type:	6L SOT Flip Chip
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	None
E. Bondwire:	(0.006HL mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-2458 / A
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	1
J. Single Layer Theta Ja:	185.5°C/W
K. Single Layer Theta Jc:	75°C/W
L. Multi Layer Theta Ja:	134.4°C/W
M. Multi Layer Theta Jc:	39°C/W

IV. Die Information

A. Dimensions:	45 X 85 mils
B. Passivation:	Si ₃ N ₄ /SiO ₂ (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al/0.5%Cu with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	0.8 microns (as drawn)
F. Minimum Metal Spacing:	0.8 microns (as drawn)
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO ₂
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

- A. Quality Assurance Contacts: Richard Aburano (Manager, Reliability Engineering)
Don Lipps (Manager, Reliability Engineering)
Bryan Preeshl (Vice President 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 biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 75 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 14.6 \times 10^{-9}$$

$$\lambda = 14.6 \text{ F.I.T. (60\% confidence level @ 25}^\circ\text{C)}$$

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at <http://www.maxim-ic.com/qa/reliability/monitor>. Cumulative monitor data for the B8 Process results in a FIT Rate of 0.06 @ 25C and 0.99 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (ESD lot I0LBAQ001C D/C 0032, Latch-Up lot D0LDBA014B D/C 0522)

The PY51-1 die type has been found to have all pins able to withstand a HBM transient pulse of +/-400V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250mA.

Table 1
Reliability Evaluation Test Results

MAX1833EUT#G16

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	75	0	I0LAAQ001DQ, D/C 0033

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