RELIABILITY REPORT

FOR

MAX1857EUA47+

PLASTIC ENCAPSULATED DEVICES

October 28, 2014

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

Approved by
Sokhom Chum
Quality Assurance
Reliability Engineer

Conclusion

The MAX1857EUA47+ 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 MAX1857 low-dropout linear regulator operates from a +2.5V to +5.5V supply and delivers a guaranteed 500mA load current with low 120mV dropout. The high-accuracy (±1%) output voltage is preset at an internally trimmed 4.75V or can be adjusted from 1.25V to 5.0V with an external resistive divider. An internal PMOS pass transistor allows the low 135µA supply current to remain independent of load, making this device ideal for portable battery-operated equipment such as personal digital assistants (PDAs), cellular phones, cordless phones, base stations, and notebook computers. Other features include an active-low open-drain reset output with a 4.5ms timeout period that indicates when the output is out of regulation, a 0.1µA shutdown mode, short-circuit protection, and thermal shutdown protection. The device is available in a miniature 8-pin µMAX package. For higher power applications, refer to the MAX1792 and MAX1793 data sheets.

II. Manufacturing Information

A. Description/Function:	500mA, Low-Dropout, Ripple-Rejecting LDO in µMAX
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	California or Texas
E. Assembly Location:	Philippines, Thailand, Malaysia
F. Date of Initial Production:	October 18, 2000

III. Packaging Information

A. Package Type:	8-pin uMAX
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-3501-0001
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Single Layer Theta Ja:	221°C/W
K. Single Layer Theta Jc:	41.9°C/W
L. Multi Layer Theta Ja:	206.3°C/W
M. Multi Layer Theta Jc:	41.9°C/W

IV. Die Information

A. Dimensions:	60X60 mils
B. Passivation:	Si_3N_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:	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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

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

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

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

$\lambda = 13.7$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at http://www.maximintegrated.com/qa/reliability/monitor. Cumulative monitor data for the B8 Process results in a FIT Rate of 0.01 @ 25C and 0.26 @ 55C (0.8 eV, 60% UCL).

B. E.S.D. and Latch-Up Testing (ESD lot IOKDAQ003B D/C 0037, Latch-Up lot S3Y3BQ001A D/C 0442)

The PM15-3 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500V 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

MAX1857EUA47+

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	I3Y3AQ001L, D/C 0103

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