RELIABILITY REPORT

FOR

MAX882ESA+

PLASTIC ENCAPSULATED DEVICES

December 9, 2010

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX882ESA+ 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 MAX882/MAX883/MAX884 linear regulators maximize battery life by combining ultra-low supply currents and low dropout voltages. They feature 200mA output current capability at up to +125°C junction temperature and come in a 1.5W SOIC package. The 1.5W package (compared to 0.47W for standard SOIC packages) allows a wider operating range for the input voltage and output current. The MAX882/MAX883/MAX884 use a p-channel MOSFET pass transistor to maintain a low 11µA (15µA max) supply current from no-load to the full 200mA output. Unlike earlier bipolar regulators, there are no PNP base current losses that increase with output current. In dropout, the MOSFET does not suffer from excessive base currents that occur when PNP transistors go into saturation. Typical dropout voltages are 220mV at 5V and 200mA, or 320mV at 3.3V and 200mA. The MAX882 features a 7µA standby mode that disables the output but keeps the reference, low-battery comparator, and biasing circuitry alive. The MAX883/MAX884 feature a shutdown (OFF) mode that turns off all circuitry, reducing supply current to less than 1µA. All three devices include a low-battery-detection comparator, fold-back current limiting, reverse-current protection, and thermal-overload protection. The output is preset at 3.3V for the MAX882/MAX884 and 5V for the MAX883. In addition, all devices employ Dual Mode(tm) operation, allowing user-adjustable outputs from 1.25V to 11V using external resistors. The input voltage supply range is 2.7V to 11.5V. For low-dropout linear regulators with output currents up to 500mA, refer to the MAX603/MAX604 data sheet.

II. Manufacturing Information

A. Description/Function:	5V/3.3V or Adjustable, Low-Dropout, Low-I_Q, 200mA Linear Regulator with Standby Mode
B. Process:	S3
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Philippines
F. Date of Initial Production:	Pre 1997

III. Packaging Information

A. Package Type:	8-pin SOIC (N)
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Non-conductive
E. Bondwire:	Au (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-1701-0352
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:	N/A
K. Single Layer Theta Jc:	N/A
L. Multi Layer Theta Ja:	82°C/W
M. Multi Layer Theta Jc:	32°C/W

IV. Die Information

A. Dimensions:	80 X 85 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:	3.0 microns (as drawn)
F. Minimum Metal Spacing:	3.0 microns (as drawn)
G. Bondpad Dimensions:	5 mil. Sq.
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 135°C 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)

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

λ = 13.7 F.I.T. (60% confidence level @ 25°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 S3 Process results in a FIT Rate of 0.04 @ 25C and 0.69 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot NBNAJA410B D/C 0313)

The PW16 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500V 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

MAX882ESA+

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	IBNBHQ001A, D/C 9943

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