RELIABILITY REPORT

FOR

MAX8556ETE+T

PLASTIC ENCAPSULATED DEVICES

May 14, 2012

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX8556ETE+T 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 MAX8556/MAX8557 low-dropout linear regulators operate from input voltages as low as 1.425V and are able to deliver up to 4A of continuous output current with a typical dropout voltage of only 100mV. The output voltage is adjustable from 0.5V to VIN - 0.2V. Designed with an internal p-channel MOSFET pass transistor, the MAX8556/MAX8557 maintain a low 800µA typical supply current, independent of the load current and dropout voltage. Using a p-channel MOSFET eliminates the need for an additional external supply or a noisy internal charge pump. Other features include a logic-controlled shutdown mode, built-in soft-start, short-circuit protection with foldback current limit, and thermal-overload protection. The MAX8556 features a POK output that transitions high when the regulator output is within ±10% of its nominal output voltage. The MAX8557 offers a power-on reset output that transitions high 140ms after the output has achieved 90% of its nominal output voltage. The MAX8556/MAX8557 are available in a 16-pin thin QFN 5mm x 5mm package with exposed paddle.

II. Manufacturing Information

A. Description/Function:	4A Ultra-Low-Input-Voltage LDO Regulators
B. Process:	S4
C. Number of Device Transistors:	3077
D. Fabrication Location:	USA
E. Assembly Location:	China and Thailand
F. Date of Initial Production:	April 23, 2004

III. Packaging Information

A. Package Type:	16-pin TQFN 5x5
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (2 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-0801
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:	48°C/W
K. Single Layer Theta Jc:	2°C/W
L. Multi Layer Theta Ja:	30°C/W
M. Multi Layer Theta Jc:	2°C/W

IV. Die Information

A. Dimensions:	110 X 90 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:	Metal1 = 0.5 / Metal2 = 0.6 / Metal3 = 0.6 microns (as drawn)
F. Minimum Metal Spacing:	Metal1 = 0.45 / Metal2 = 0.5 / Metal3 = 0.6 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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 373 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 2.95 \times 10^{-9}$

$\lambda = 2.95$ 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 S4 Process results in a FIT Rate of 0.06 @ 25C and 1.05 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot SNA0HA035G, D/C 0827)

The PN29 die type has been found to have all pins able to withstand a HBM transient pulse of +/- 2000V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of 250mA.

Table 1
Reliability Evaluation Test Results

MAX8556ETE+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135C	DC Parameters	154	0	SNA0DZ001E, D/C 0407
	Biased	& functionality	50	0	SNA0DZ001F, D/C 0407
	Time = 192 hrs.		74	0	SNA0EZ005F, D/C 0422
			45	0	SNA0EZ005H, D/C 0422
			50	0	SNA0HA009B, D/C 0534

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