RELIABILITY REPORT
FOR MAX4766xETA+

PLASTIC ENCAPSULATED DEVICES

September 24, 2010

MAXIM INTEGRATED PRODUCTS
120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
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Conclusion

The MAX4766xETA+ 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 MAX4766 is a programmable current-limit switch that uses a proprietary control topology to provide a ±10% accurate current limit. It operates from 2.25V to 4.5V input voltage.

The current limit is resistor settable from 0.075A to 1.5A and features an adjustable soft-start function to control the output-voltage ramp rate, thereby limiting the inrush current. It also has an adjustable blanking time to accommodate various capacitive loads.

If the load current is greater than the current-limit threshold, the current limiter handles the overcurrent situation in one of three ways depending on the option selected. It enters an autoretry mode (MAX4766A), latches off the switch (MAX4766B), or places the device in a continuous current-limit mode (MAX4766C). Additional safety features include thermal shutdown to prevent overheating and reverse-current blocking to prevent current from being driven back into the source.

The MAX4766 is available in a tiny 8-pin 3mm x 3mm TDFN package and operates over the extended temperature range of -40°C to +85°C.

II. Manufacturing Information

A. Description/Function:	0.075A to 1.5A, Programmable Current-Limit Switch
B. Process:	E35
C. Number of Device Transistors:	
D. Fabrication Location:	Texas
E. Assembly Location:	China, Malaysia, Philippines, Taiwan and Thailand
F. Date of Initial Production:	October 19, 2004

III. Packaging Information

A. Package Type:	8-pin TDFN 3x3
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:	#05-9000-1084
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:	54°C/W
K. Single Layer Theta Jc:	8.3°C/W
L. Multi Layer Theta Ja:	41°C/W
M. Multi Layer Theta Jc:	8.3°C/W

IV. Die Information

A. Dimensions:	57 X 92 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:	0.35µm
F. Minimum Metal Spacing:	0.35µm
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:	Richard Aburano (Manager, Reliability Operations) Bryan Preeshl (Managing Director 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 125°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 45 \times 2} \quad \text{(Chi square value for MTTF upper limit)}$$

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

$\lambda = 24.4 \times 10^{-9}$

λ = 24.4 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 E35 Process results in a FIT Rate of 0.68 @ 25C and 11.68 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot CPK0AQ001E, D/C 0427)

The AS28 die type has been found to have all pins able to withstand a HBM transient pulse of +/- 1000V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of 250mA.

Table 1

Reliability Evaluation Test Results

MAX4766xETA+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 125°C Biased Time = 192 hrs.	DC Parameters & functionality	45	0	CPK0AQ001E, D/C 0427

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