



RELIABILITY REPORT
FOR MAX8586ETA+T
PLASTIC ENCAPSULATED DEVICES

October 9, 2010

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
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Conclusion

The MAX8586ETA+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 MAX8586 single current-limited switch controls up to 1.2A to power USB applications and has multiple protection features including thermal shutdown, internal current limiting, and reverse current protection. The thermal shutdown limits junction temperature during a prolonged short or overload condition. The internal current-limiting circuitry protects the input supply against overload and is programmable using an external resistor. The MAX8586 meets all IEC specifications for USB ports. The IC latches off when the output experiences a short circuit for more than 20ms, saving system power. Auto-restart tests the shorted output with a 25mA current to determine if the short still exists. Once the short is removed, the MAX8586 automatically restarts the output. An open-drain fault signal notifies the system that the internal current limit has been reached. A 20ms fault-blanking feature allows the circuit to ignore momentary faults such as those caused when hot-swapping into a capacitive load. An ENRESET input is available to disable the auto-restart function. The MAX8586 features a SEL input that programs ON to be either active high or active low. The IC is supplied in a space-saving, 8-pin, 3mm x 3mm TDFN package.

II. Manufacturing Information

A. Description/Function:	Single 1.2A USB Switch in 3mm x 3mm TDFN
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	California or Texas
E. Assembly Location:	China, Malaysia, Taiwan and Thailand
F. Date of Initial Production:	October 22, 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 (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-3599
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:	65 X 61 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:	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 (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:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 47 \times 2} \text{ (Chi square value for MTTF upper limit)}$$

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

$$\lambda = 23.4 \times 10^{-9}$$
$$\lambda = 23.4 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 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 (lot JTQ0EA006C, D/C 1015)

The PN54 die type has been found to have all pins able to withstand a transient pulse of:

ESD-HBM:	+/- 2500V per JEDEC JESD22-A114
ESD-MM:	+/- 250V per JEDEC JESD22-A115
ESD-CDM:	+/- 750V per JEDEC JESD22-C101

Latch-Up testing has shown that this device withstands a current of +/- 100mA and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAX8586ETA+T

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	47	0	STQ0BQ001G, D/C 0430

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