

RELIABILITY REPORT
FOR
MAX8570EU/LT+
PLASTIC ENCAPSULATED DEVICES

April 6, 2009

MAXIM INTEGRATED PRODUCTS

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Conclusion

The MAX8570EU/LT+ 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.

Table of Contents

I.Device Description	V.Quality Assurance Information
II.Manufacturing Information	VI.Reliability Evaluation
III.Packaging Information	IV.Die Information
.....Attachments	

I. Device Description

A. General

The MAX8570 family of LCD step-up converters uses an internal n-channel switch and an internal p-channel output isolation switch. These converters operate from a 2.7V to 5.5V supply voltage and deliver up to 28V at the output. A unique control scheme provides the highest efficiency over a wide range of load conditions. The internal MOSFET switch reduces external component count and a high switching frequency (up to 800kHz) allows for tiny surface-mount components. Three current-limit options are available. The MAX8570 and MAX8572 use a 110mA current limit to reduce ripple and component size in low-current applications. For high-power requirements, the MAX8574 and MAX8575 use a 500mA current limit and supply up to 20mA at 20V. The MAX8571 and MAX8573 use a 250mA current limit for a compromise between ripple and power. Built-in safety features protect the internal switch and down-stream components from fault conditions. Additional features include a low quiescent current and a True Shutdown(tm) mode to save power. The MAX8570/MAX8571/MAX8574 allow the user to set the output voltage between 3V and 28V, and the MAX8572/MAX8573/MAX8575 have a preset 15V output. These step-up converters are ideal for small LCD panels with low current requirements, but can also be used in other applications. The MAX8571 evaluation kit is available to help reduce design time.

II. Manufacturing Information

A. Description/Function:	High-Efficiency LCD Boost with True Shutdown
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	Texas
E. Assembly Location:	UTL Thailand
F. Date of Initial Production:	October 23, 2004

III. Packaging Information

A. Package Type:	6-pin SOT23	6-pin uDFN
B. Lead Frame:	Copper Alloy	Copper Alloy
C. Lead Finish:	100% matte Tin	Gold
D. Die Attach:	Non Conductive Epoxy	Non Conductive Epoxy
E. Bondwire:	Au (1.3 mil dia.)	Au (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler	Epoxy with silica Filler
G. Assembly Diagram:	#	
H. Flammability Rating:	Class UL94-V0	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1	Level 1
J. Single Layer Theta Jb:	115°C/W	
K. Single Layer Theta Jc:	80°C/W	
L. Multi Layer Theta Ja:	74.6°C/W	223.1°C/W
M. Multi Layer Theta Jc:	6.1°C/W	121.1°C/W

IV. Die Information

A. Dimensions:	60 X 41 mils
B. Passivation:	Si ₃ N ₄ /SiO ₂ (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Aluminum/Si (Si = 1%)
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:	Ken Wendel (Director, Reliability Engineering) 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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 144 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 7.5 \times 10^{-9}$$

$$\lambda = 7.5 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly 1000 hour life test monitors on its processes. This data is published in the Product Reliability Report found at <http://www.maxim-ic.com/>. Current monitor data for the EB8 Process results in a FIT Rate of 0.28 @ 25C and 17.30 @ 55C (0.8 eV, 60% UCL)

B. Moisture Resistance Tests

The industry standard 85°C/85%RH or HAST testing is monitored per device process once a quarter.

C. E.S.D. and Latch-Up Testing

The PN50 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500 V per JEDEC JESD22-A114-D. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

Table 1
Reliability Evaluation Test Results

MAX8570EU/LT+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	144	0
Moisture Testing (Note 2) 85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	DC Parameters & functionality	77	0
Mechanical Stress (Note 2) Temperature Cycle	-65°C/150°C 1000 Cycles Method 1010	DC Parameters & functionality	77	0

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

Note 2: Generic Package/Process data