RELIABILITY REPORT

FOR

MAX8759ETI+

PLASTIC ENCAPSULATED DEVICES

April 5, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
Director, Reliability Engineering

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Conclusion

The MAX8759ETI+ 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 MAX8759 integrated cold-cathode fluorescent lamp (CCFL) inverter controller is designed to drive CCFLs using a full-bridge resonant inverter. The resonant operation ensures reliable striking and provides near-sinusoidal waveforms over the entire input range. The controller operates over a wide input-voltage range of 4.5V to 28V with high power to light efficiency. The device also includes safety features that effectively protect against single-point fault conditions such as lamp-out, secondary overvoltage, and secondary short-circuit faults. The MAX8759 provides accurate lamp-current regulation (±2.5%) for superior CCFL inverter performance. The lamp current is adjustable with an external resistor; 10:1 dimming range can be achieved by turning the CCFL on and off using a digital pulse-width modulation (DPWM) method, while maintaining the lamp-current constant. The MAX8759 provides three mechanisms for controlling brightness: 2-wire SMBus(tm)-compatible interface, external ambient-light sensor (ALS), or system PWM control. The MAX8759 supports Intel display power-saving technology (DPST) to maximize battery life. The device includes two lamp-current feedback input pins that support dual-lamp applications with a minimum number of external components. The MAX8759 controls a full-bridge inverter for maximum efficiency and directly drives four external n-channel power MOSFETs. An internal 5.35V linear regulator powers the MOSFET drivers and most of the internal circuitry. The MAX8759 is available in a space-saving, 28-pin, thin QFN package and operates over a -40°C to +85°C temperature range.

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II. Manufacturing Information

A. Description/Function:	Low-Cost, SMBus, CCFL Backlight Controller
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	Texas
E. Assembly Location:	UTL Thailand, Unisem Malaysia
F. Date of Initial Production:	October 22, 2005

III. Packaging Information

A. Package Type:	28-pin TQFN 5x5
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive Epoxy
E. Bondwire:	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-1888
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:	47°C/W
K. Single Layer Theta Jc:	2.1°C/W
L. Multi Layer Theta Ja:	29°C/W
M. Multi Layer Theta Jc:	2.1°C/W

IV. Die Information

A. Dimensions:	101 X 108 mils
B. Passivation:	Si_3N_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

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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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 96 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 23.3 \times 10^{-9}$

$\lambda = 23.3$ 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 B8 Process results in a FIT Rate of 2.71 @ 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 PD95-2 die type has been found to have all pins able to withstand a transient pulse of:

HBM: +/-1000 V per JESD22-A114
MM: +/-100 V per JESD22-A115

Latch-Up testing has shown that this device withstands a current of +/-250 mA.

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Table 1
Reliability Evaluation Test Results

MAX8759ETI+

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	46	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

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