



RELIABILITY REPORT
FOR
MAX16807AUI+
PLASTIC ENCAPSULATED DEVICES

October 22, 2010

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX16807AUI+ 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 MAX16807 is an integrated, high-efficiency white or RGB LED driver. It is designed for LCD backlighting and other LED lighting applications with multiple strings of LEDs. The MAX16807 current-mode PWM controller regulates the necessary voltage to the LED array. Depending on the input voltage and LED voltage range, it can be used with boost or buck-boost (SEPIC) topologies. The MAX16807 features an 8V to 26.5V input voltage range. A wide range of adjustable frequency (20kHz to 1MHz) allows design optimization for efficiency and minimum board space. The MAX16807 LED driver includes eight open-drain, constant-current-sinking LED driver outputs rated for 36V continuous operation. The LED current-control circuitry achieves $\pm 3\%$ current matching among strings and enables paralleling of outputs for LED string currents higher than 55mA. The output-enable pin is used for simultaneous PWM dimming of all output channels. Dimming frequency range is 50Hz to 30kHz and dimming ratio is up to 5000:1. The constant-current outputs are single resistor programmable and the LED current can be adjusted up to 55mA per output channel. The MAX16807 operates either in stand-alone mode or with a microcontroller (μC) using an industry-standard, 4-wire serial interface. The MAX16807 includes overtemperature protection, operates over the full -40°C to $+125^{\circ}\text{C}$ temperature range, and is available in a thermally enhanced, 28-pin TSSOP exposed paddle package.

MAX16807MAX16808EEPW AnalogMixed-Signal IC Market Application
Award Winner 2006

II. Manufacturing Information

A. Description/Function:	Integrated 8-Channel LED Driver with Switch-Mode Boost and SEPIC Controller
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Thailand
F. Date of Initial Production:	October 21, 2006

III. Packaging Information

A. Package Type:	28-pin TSSOP
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#31-4811
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:	N/A
K. Single Layer Theta Jc:	N/A
L. Multi Layer Theta Ja:	N/A
M. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	62 X 85 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: 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 biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{700 \times 4340 \times 77 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 3.9 \times 10^{-9}$$

$\lambda = 3.9$ 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 (ESD lot NBTUAAG D/C 0831, Latchup lot NBTUAAB, D/C 0637)

The SP10 die type has been found to have all pins able to withstand a HBM transient pulse of +/-500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250mA.

Table 1
Reliability Evaluation Test Results

MAX16807AUI+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C Biased Time = 700 hrs.	DC Parameters & functionality	77	0	NBTUAAG, DC 0831

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