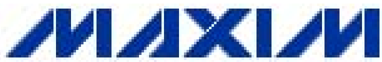

RELIABILITY REPORT

FOR

MAX15054AUT+T

PLASTIC ENCAPSULATED DEVICES

May 20, 2011

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
Manager, Reliability Engineering

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Conclusion

The MAX15054AUT+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 MAX15054 is a high-side, n-channel MOSFET driver for high-voltage applications capable of switching at high frequencies. This device is controlled by a CMOS logic-level signal referenced to ground and features a very short (12ns, typ) propagation delay from input to output. The high-voltage operation and high source/sink-current capability make the MAX15054 ideal for HB LED drivers and DC-DC converters. The MAX15054 is well suited to complement other Maxim LED driver products such as the MAX16814, MAX16838, MAX16833, MAX16834, and MAX16826. The MAX15054 adds a high-side driver to those products that include only a low-side driver; it then allows for buck-boost configurations for multistring drivers similar to the MAX16814, MAX16838, and MAX16826, and for buck-boost conversion with output referenced to ground for single-string drivers such as the MAX16834 and MAX16833. The MAX15054 is available in the industry-standard 6-pin SOT23 package and operates over the -40°C to +125°C automotive temperature range.

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II. Manufacturing Information

A. Description/Function:	High-Side MOSFET Driver for HB LED Drivers and DC-DC Applications
B. Process:	S45
C. Number of Device Transistors:	346
D. Fabrication Location:	California, Texas or Japan
E. Assembly Location:	Malaysia, Philippines and Thailand
F. Date of Initial Production:	August 4, 2009

III. Packaging Information

A. Package Type:	6-pin SOT23
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:	#05-9000-3802
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Single Layer Theta Jb:	°C/W
K. Single Layer Theta Jc:	80°C/W
L. Multi Layer Theta Ja:	230°C/W
M. Multi Layer Theta Jc:	76°C/W

IV. Die Information

A. Dimensions:	29 X 35 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:	Metal1 = 0.5 / Metal2 = 0.6 / Metal3 = 0.6 microns (as drawn)
F. Minimum Metal Spacing:	Metal1 = 0.45 / Metal2 = 0.5 / Metal3 = 0.6 microns (as drawn)
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

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V. Quality Assurance Information

A. Quality Assurance Contacts: Richard Aburano (Manager, Reliability Engineering)
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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 82 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 13.4 \times 10^{-9}$

λ = 13.4 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 S45 Process results in a FIT Rate of 0.49 @ 25C and 8.49 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot SYQZAQ001C, D/C 0924)

The SP25 die type has been found to have all pins able to withstand a HBM transient pulse of +/- 2500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/- 250mA and overvoltage per JEDEC JESD78.

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Table 1

Reliability Evaluation Test Results

MAX15054AUT+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C	DC Parameters	47	0	SYQZAQ001I, D/C 1017
	Biased	& functionality	35	0	SYQZAQ001G, D/C 1019
	Time = 192 hrs.				

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

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