RELIABILITY REPORT

FOR

MAX3711ETG+

PLASTIC ENCAPSULATED DEVICES

November 30, 2012

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

Approved by
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Quality Assurance
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Conclusion

The MAX3711ETG+ successfully meets the quality and reliability standards required of all Maxim Integrated products. In addition, Maxim Integrated's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim Integrated's quality and reliability standards.

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I. Device Description

A. General

The MAX3711 limiting amplifier and laser driver provides a highly integrated, low-cost, high-performance PMD solution. The low-jitter laser diode driver provides transmit average power control (APC) of laser bias current as well as an integrated modulation current control loop (extinction ratio control, or ERC). The ERC eliminates the need for temperature lookup tables (LUTs) controlling the modulation current. The low-noise limiting amplifier maximizes optical sensitivity and has adjustable SD/LOS threshold plus programmable output levels. The differential CML output stage features a slew-rate adjustment for 1.25Gbps operation. Integrated bias current monitor and Tx power monitor enable a low-cost implementation of modules with digital diagnostics. A novel auto-calibration mode enables low-cost fiber optic module production. An integrated 3-wire digital interface controls the laser driver and limiting amplifier functions, and enables communication with a low-cost controller. The MAX3711 is offered in a small, 4mm x 4mm, 24-pin TQFN package with exposed pad, and operates over the -40°C to +95°C temperature range.

II. Manufacturing Information

A. Description/Function:	125Mbps to 3.125Gbps Integrated Limiting Amplifier/Laser Driver with Dual-Loop Power Control
B. Process:	MB3
C. Number of Device Transistors:	49590
D. Fabrication Location:	California
E. Assembly Location:	Taiwan, China, Thailand
F. Date of Initial Production:	June 28, 2012

III. Packaging Information

A. Package Type:	24L TQFN
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:	#05-9000-4649
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	1
J. Single Layer Theta Ja:	48°C/W
K. Single Layer Theta Jc:	3°C/W
L. Multi Layer Theta Ja:	36°C/W
M. Multi Layer Theta Jc:	3°C/W

IV. Die Information

A. Dimensions:	82.28 X 62.99 mils
B. Passivation:	BCB
C. Interconnect:	Al with top layer 100% Cu
D. Backside Metallization:	None
E. Minimum Metal Width:	0.35µm
F. Minimum Metal Spacing:	0.35µm
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

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

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 160 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 6.9 \times 10^{-9}$

$\lambda = 6.9$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at http://www.maximintegrated.com/qa/reliability/monitor. Cumulative monitor data for the MB3 Process results in a FIT Rate of 0.08 @ 25C and 1.33 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (ST5ZDQ001C D/C 1132)

The HQ19-0 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 +/-100mA and overvoltage per JEDEC JESD78.

Table 1

Reliability Evaluation Test Results

MAX3711ETG+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C	DC Parameters	80	0	ST5ZDQ001C, D/C 1132
	Biased	& functionality	80	0	ST5ZCQ001C, D/C 1127
	Time = 192 hrs.				

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