MAX3261CCJ
Rev. A

RELIABILITY REPORT

FOR

MAX3261CCJ

PLASTIC ENCAPSULATED DEVICES

August 3, 2003

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

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Conclusion

The MAX3261 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

A. General

The MAX3261 is a complete, easy-to-program, single +5V-powered, 1.25Gbps laser diode driver with complementary enable inputs and automatic power control (APC). The MAX3261 accepts differential PECL inputs and provides complementary output currents. A temperature-stabilized reference voltage is provided to simplify laser current programming. This allows modulation current to be programmed up to 30mA and bias current to be programmed up to 60mA with two external resistors.

Complementary enable inputs allow the MAX3261 to interface with open-fiber-control architecture—a feature not found in other 1.25Gbps laser diode drivers.

An APC circuit is provided to maintain constant laser power in transmitters that use a monitor photodiode. Only two external components are required to implement the APC function.

The MAX3261's fully integrated feature set includes a TTL-compatible laser failure indicator and a programmable slow-start circuit to prevent laser damage. The slow-start is preset to 50ns and can be extended by adding an external capacitor.

B. Absolute Maximum Ratings

Item	Rating
Terminal Voltage (with respect to GND)	
Supply Voltages (VCCA, VCCB)	-0.3V to 6V
VIN+, VIN-, FAILOUT	0V to VCC_
OUT+, OUT-, IBIASOUT	1.5V to VCC_
ENB+, ENB-	VCC_ or 5.5V, whichever is smaller
Differential Input Voltage (|VIN+ - VIN-|)	3.8V
Input Current	
IBIASOUT	0mA to 75mA
OUT+, OUT-	0mA to 40mA
IBIASSET	0mA to 1.875mA
IMODSET	0mA to 2mA
IPIN, IPINSET, OSADJ	0mA to 2mA
FAILOUT	0mA to 10mA
IBIASFB	-2mA to 2mA
Output Current	
VREF1, VREF2	0mA to 20mA
SLWSTRT	0mA to 5mA
Operating Temperature Ranges	
MAX3261CCJ	0°C to +70°C
MAX3261ECJ	-40°C to +85°C
Junction Temperature	+150°C
Storage Temperature Range	-55°C to +175°C
Processing Temperature (die)	+400°C
Continuous Power Dissipation (TA = +70°C)	
32-Pin TQFP	816mW
Derate above +70°C	
32-Pin TQFP	10.2mW/°C

II. Manufacturing Information

A. Description/Function:	Single +5V, Fully Integrated, 1.2Gbps Laser Diode Driver
B. Process:	GST-1 (Double Poly-Silicon Bipolar Process)
C. Number of Device Transistors:	197
D. Fabrication Location:	Oregon, USA
E. Assembly Location:	Korea or Malaysia
F. Date of Initial Production:	September, 1995

III. Packaging Information

A. Package Type:	**32-Lead TQFP**
B. Lead Frame:	Copper
C. Lead Finish:	Solder Plate
D. Die Attach:	Silver-filled Epoxy
E. Bondwire:	Gold (1.3 mil dia.)
F. Mold Material:	Ceramic
G. Assembly Diagram:	# 05-7001-0175
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard JESD22-112:	Level 1

IV. Die Information

A. Dimensions:	80 x 80 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride)
C. Interconnect:	Aluminum/Si (Si = 1%)
D. Backside Metallization:	None
E. Minimum Metal Width:	2 microns (as drawn)
F. Minimum Metal Spacing:	2 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: Jim Pedicord (Reliability Lab Manager)
Bryan Preeshl (Executive Director**)**
Kenneth Huening (Vice President)

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 150°C biased (static) life test are shown in **Table 1**. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 9823 \times 135 \times 2}$$

(Chi square value for MTTF upper limit)

Temperature Acceleration factor assuming an activation energy of 0.8eV

$\lambda = 3.59 \times 10^{-9}$

$\lambda = 3.59$ F.I.T. (60% confidence level @ 25°C)

This low failure rate represents data collected from Maxim's reliability monitor program. In addition to routine production Burn-In, Maxim pulls a sample from every fabrication process three times per week and subjects it to an extended Burn-In prior to shipment to ensure its reliability. The reliability control level for each lot to be shipped as standard product is 59 F.I.T. at a 60% confidence level, which equates to 3 failures in an 80 piece sample. Maxim performs failure analysis on any lot that exceeds this reliability control level. Maxim also performs quarterly 1000 hour life test monitors. This data is published in the Product Reliability Report (**RR-B3A**).

B. Moisture Resistance Tests

Maxim pulls pressure pot samples from every assembly process three times per week. Each lot sample must meet an LTPD = 20 or less before shipment as standard product. Additionally, the industry standard 85°C/85%RH testing is done per generic device/package family once a quarter.

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

The HF02 die type has been found to have all pins able to withstand a transient pulse of ±200V, per Mil-Std-883 Method 3015 (reference attached ESD Test Circuit). Latch-Up testing has shown that this device withstands a current of ±50mA.

Table 1
Reliability Evaluation Test Results

MAX3261CCJ

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	PACKAGE	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)					
	Ta = 150°C Biased Time = 192 hrs.	DC Parameters & functionality		135	0
Moisture Testing (Note 2)					
Pressure Pot	Ta = 121°C P = 15 psi. RH= 100% Time = 168hrs.	DC Parameters & functionality	TQFP	77	0
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

Attachment #1

TABLE II. Pin combination to be tested. 1/ 2/

	Terminal A (Each pin individually connected to terminal A with the other floating)	Terminal B (The common combination of all like-named pins connected to terminal B)
1.	All pins except V_{PS1} 3/	All V_{PS1} pins
2.	All input and output pins	All other input-output pins

1/ Table II is restated in narrative form in 3.4 below.
2/ No connects are not to be tested.
3/ Repeat pin combination I for each named Power supply and for ground

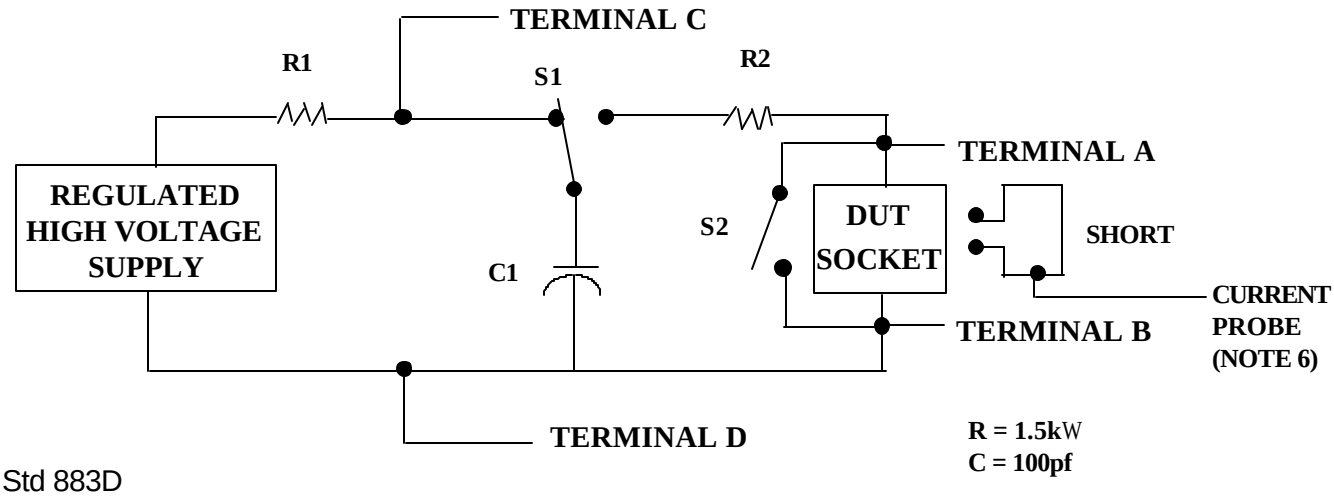
(e.g., where V_{PS1} is V_{DD}, V_{CC}, V_{SS}, V_{BB}, GND, $+V_S$, $-V_S$, V_{REF}, etc).

3.4 Pin combinations to be tested.

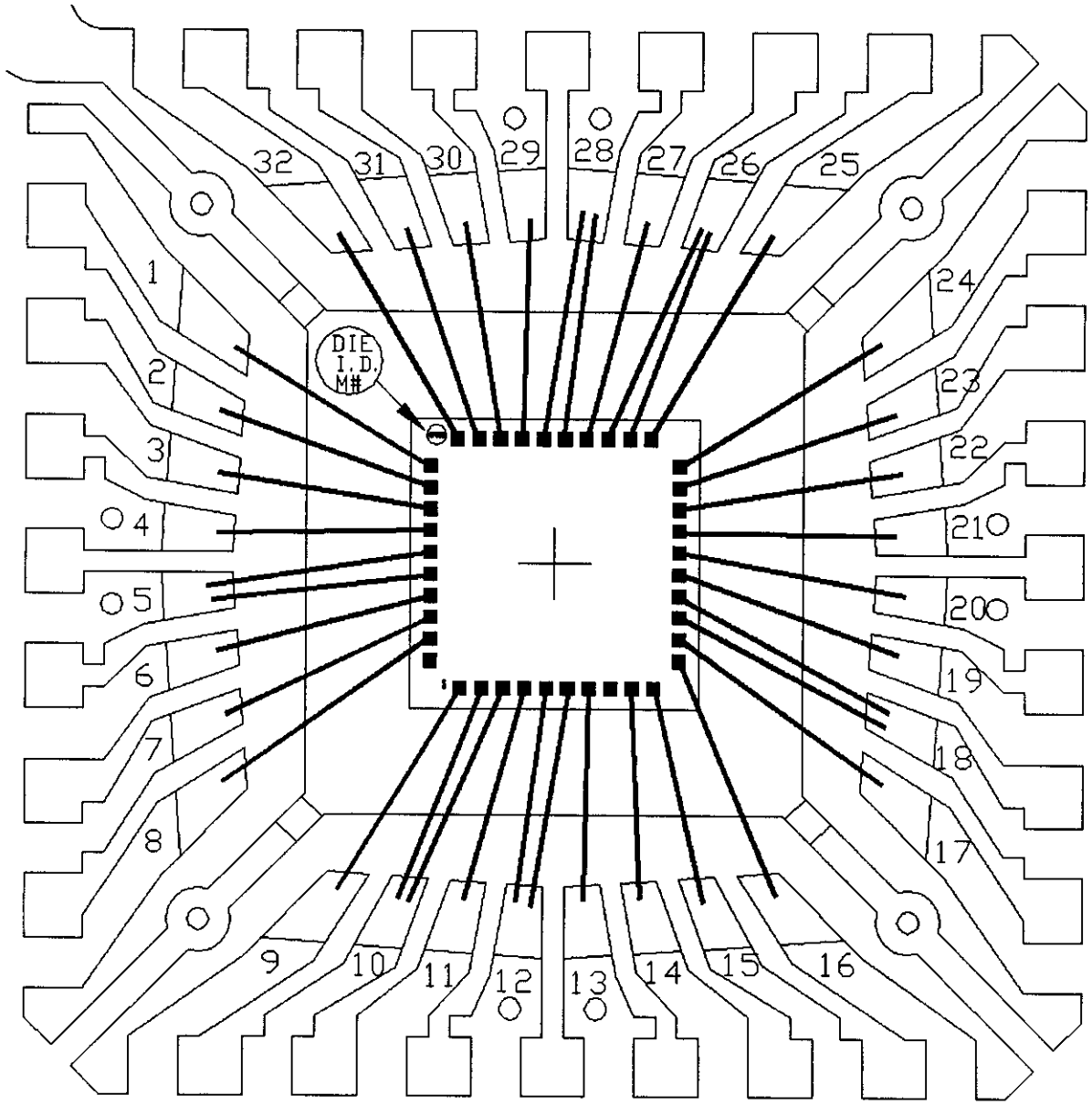
a. Each pin individually connected to terminal A with respect to the device ground pin(s) connected to terminal B. All pins except the one being tested and the ground pin(s) shall be open.

b. Each pin individually connected to terminal A with respect to each different set of a combination of all named power supply pins (e.g., V_{SS1}, or V_{SS2} or V_{SS3} or V_{CC1}, or V_{CC2}) connected to terminal B. All pins except the one being tested and the power supply pin or set of pins shall be open.

c. Each input and each output individually connected to terminal A with respect to a combination of all the other input and output pins connected to terminal B. All pins except the input or output pin being tested and the combination of all the other input and output pins shall be open.



Mil Std 883D
Method 3015.7
Notice 8



PKG. CODE: C32-1		APPROVALS	DATE	MAXIM
CAV./PAD SIZE: 138X138	PKG. DESIGN			BUILDSHEET NUMBER: 05-7001-0175 / REV.: B