2.488 Gb/s DFB Laser Module with Integral Optical Isolator

Technical Data

LSC2500

Features

- **Center Wavelength Between 1535 nm and 1565 nm**
- **Modulation Capability up to 2.488 Gb/s**
- **30 dB Internal Optical Isolation**
- **25 Ω Impedance Matched**
- **Wide Operating Temperature Range: -20°C to +65°C**
- **Industry Standard Hermetic 14 PIN Butterfly Package**

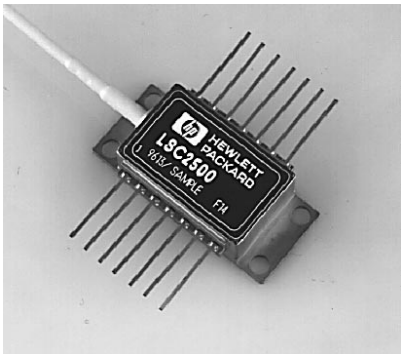
Applications

- **Telecommunications**
- **Fiber Optic Sensors**
- **Cable Television**
- **Military Communications and Control Systems**
- **Instrumentation**

Description

LSC2500 laser modules are highly reliable fiber optic light sources operating in the 1550 nanometer band. The internal DFB lasers are based upon InGaAs ridge waveguide Multi Quantum Well technology and fabricated by the Metal Organic Vapor Phase Epitaxy (MOVPE) process, resulting in long lifetimes and modest threshold currents.

The LSC2500 package includes a photodiode for monitoring the laser output, a thermistor for monitoring laser heatsink temperature, and a Peltier effect thermoelectric cooler (TEC). A heatsink mounting flange is incorporated into the industry standard 14 PIN package.



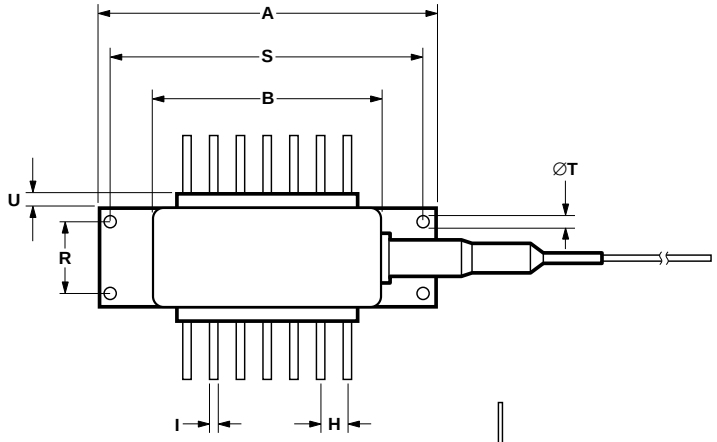
The LSC2500 also has 30 dB of optical isolation which is temperature controlled to maintain isolation over the full operating temperature range.

Laser Safety Warning

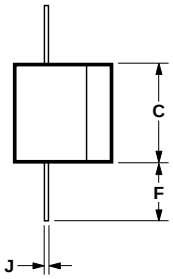
This device is a Class IIIb (3b) Laser Product. It may emit invisible laser radiation if operated with the fiber pigtail disconnected. To avoid possible eye damage do not look into an unconnected fiber pigtail during laser operation. Do not exceed specified operating limits.

LSC2500 Mechanical Outline

Top View



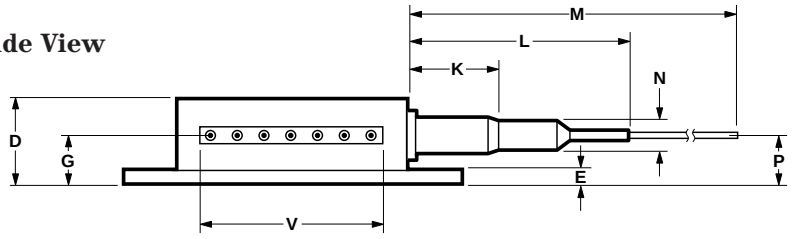
Back View



DIM.	MIN.	NOM.	MAX.
A	29.6	–	30.4
B	20.6	–	21.1
C	12.45	–	12.95
D	8.4	–	9.0
E	–	0.75	–
F	–	12.0	–
G	5.40	–	5.90
H	–	2.54	–
I	–	0.50	–
J	–	0.20	–
K	–	7.0	–
L	–	30.0	–
M	1500.00	–	–
N	–	2.0	–
P	4.5	–	6.5
R	8.8	–	9.0
S	25.9	–	26.1
T	2.50	–	2.70
U	–	0.75	–
V	–	17.8	–

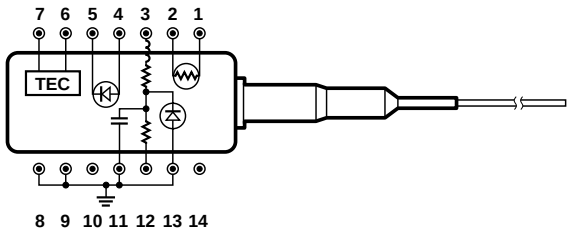
ALL DIMENSIONS IN MILLIMETERS

Side View



LSC2500 Pin Connections and Block Diagram

Top View



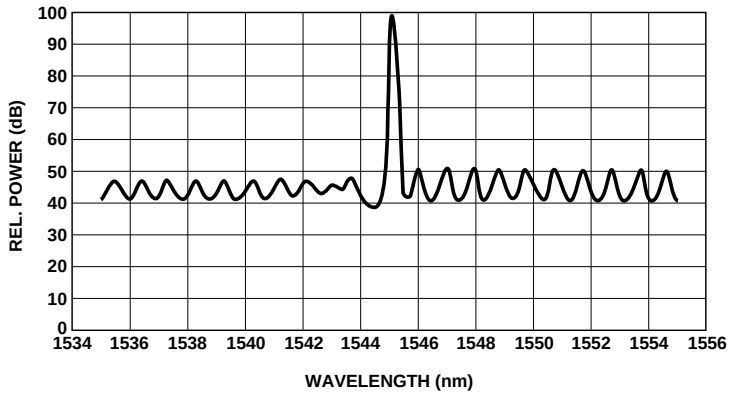
PIN CONNECTIONS

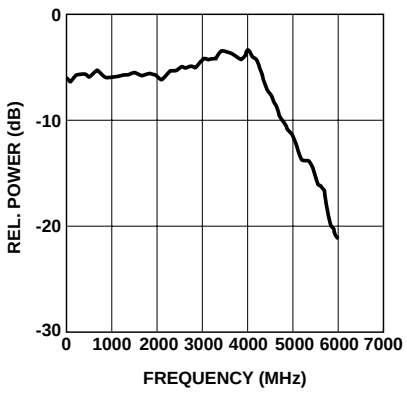
1	THERMISTOR
2	THERMISTOR
3	LASER DC BIAS
4	MONITOR ANODE
5	MONITOR CATHODE
6	TEC
7	TEC
8	GROUND
9	GROUND
10	NOT CONNECTED
11	GROUND
12	LASER MODULATION
13	GROUND
14	NOT CONNECTED

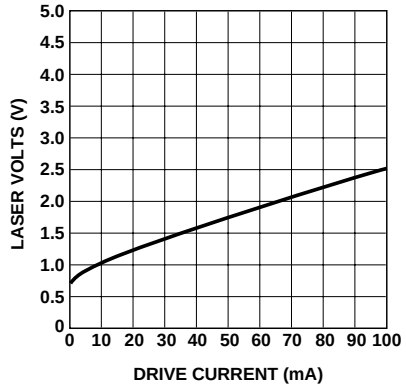
LSC2500 Typical Operating Characteristics

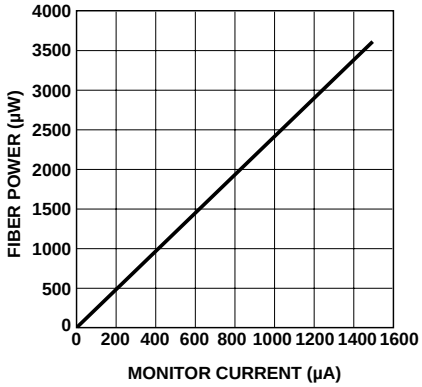
PRODUCT TYPE : LSC2500
MODULATION BIT RATE : 2.488 Gb/s
MODULATION DEPTH : 12% EXTINCTION RATIO

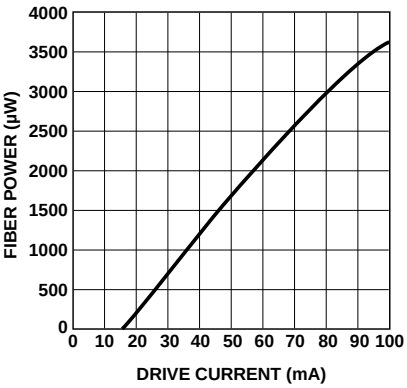
THRESHOLD CURRENT (Ith)	mA	16.00
FORWARD VOLTAGE AT 3000 µW	V	2.26
POWER AT Ith + 40 mA	µW	1956.00
MONITOR CURRENT AT 2000 µW	µA	629.39
PEAK WAVELENGTH (12% XR)	nm	1545.04
SIDEMODE SUPPRESSION	dB	45.99
SENSITIVITY (B-B) IE-10	dB	-29.69
SENSITIVITY (B-B) IE-4	dB	-33.27
SENSITIVITY (106 Km) IE-10	dB	-28.28
SENSITIVITY (106 Km) IE-4	dB	-32.34
Ssat		75.40
Svar		5.83











Absolute Maximum Ratings at +25°C

Absolute limiting (maximum) ratings mean that no catastrophic damage will occur if the product is subjected to these ratings for short periods, provided that each limiting parameter is in isolation and all other parameters have values within the performance specification. It should not be assumed that limiting values of more than one parameter can be applied to the product at the same time.

Parameter	Minimum	Maximum	Units
Laser Forward Current	-	150	mA
Laser Reverse Voltage	-	3.0	V
Photodiode Forward Current	-	1	mA
Photodiode Reverse Voltage (Vr)	-	–10	V
Fiber Pull Strength	-	10	N
Operating Temperature (Case)	–20	+65	℃
Storage Temperature	–40	+85	℃
Mechanical Shock	MIL-STD-883, Method 2002, Test Condition B		
Vibration	MIL-STD-883, Method 2007, Test Condition A		
TEC Current	-	1.1	A
TEC Voltage	-	3.0	V

Performance Specifications – Laser[1]

Parameter	Minimum	Typical	Maximum	Units
Threshold Current (Ith)	10	-	30	mA
Slope Efficiency[3]	0.02	0.05	0.12	mW/mA
Rise Time: 10% to 90%	-	-	0.12	ns
Fall Time: 90% to 10%	-	-	0.12	ns
Peak Wavelength	1535	-	1565	nm
Spectral Width (–30 dB) Modulated	-	-	0.6	nm
Temperature Dependence of Peak Wavelength	-	0.10	-	nm/℃
Sidemodes (Modulated)[2]	-	-	–34	dB
Dispersion Penalty (1800 ps/nm)[2]	-	-	1.5	dB
Tracking Error +65℃ Case, +25℃ Chip[4]	-	-	0.5	dB
Tracking Error –20℃ Case, +25℃ Chip	-	-	0.5	dB
Flatness of Frequency Response to 3 GHz	-	-	± 1.5	dB
Cut Off Frequency	3.5	4.3	-	GHz

Notes:
1. At +25℃ and Pf = 2 mW unless otherwise specified.
2. Measured at PRBS 2^{23-1}, 2.488 Gb/s, 12% extinction.
3. Other slope efficiencies available on request.
4. Fiber output power change for constant monitor output current.

Performance Specifications – Monitor Photodiode

Parameter	Minimum	Maximum	Units
Photocurrent (Im) at 2 mW	0.2	2.0	mA
Dark Current (Vr = –5 V) at +25°C	-	100	nA

Thermistor

Parameter	Symbol	Test Conditions TC = +25°C, Pf = 0 mW unless otherwise stated	Test Limits		Units
			Min.	Max.	
Resistance	Rt		9.5	10.5	kΩ
Temperature Coefficient of Rt	ΔRt/ΔT		Typ. 4.4		%dR/K
β Constant	β	0°C to +50°C	Typ. 3900		°K

TEC

Parameter	Symbol	Test Conditions TC = +25°C, Pf = 0 mW unless otherwise stated	Test Limits		Units
			Min.	Max.	
TEC Cooling Current	Ic	ΔT = –40°C, Tc = +65°C	-	1.0	A
TEC Heating Current	Ih	ΔT = –45°C, Tc = –20°C	-	1.0	A
Voltage	Vc	ΔT = –20°C, to +65°C	-	2.0	V

Fiber Pigtail: Tight jacketed, self-mode stripping, single mode fiber

Parameter	Minimum	Maximum	Units
Length	1.0	-	m
Spot Size (Mode Radius)	4.5	5.5	µm
Cladding Diameter	122	128	µm
Core/Cladding Concentricity	-	1.0	µm
Secondary Jacket Diameter	0.8	1.0	mm
Effective Cutoff Wavelength	1150	1240	nm

Hewlett-Packard can offer a ruggedized fiber pigtail for this product range if extreme mechanical strength is required. The pigtail length can be customized to your specific length, with a connector, to a tolerance of ± 25 mm.

Ordering Information

LSC2500 - XX

- XX: Connector Type: FP = FC/PC Polish
- LSC2500: Model Name: LSC2500

Handling Precautions

1. The LSC2500 can be damaged by current surges or overvoltage.
2. Power supply transient precautions should be taken.
3. Normal handling precautions for electrostatic sensitive devices should be taken.

CDRH Certification

Hewlett-Packard Ltd.
Whitehouse Road
Ipswich, Suffolk IP1 5PB
England

Manufactured:_____ Serial No:_____

Model No: _____

This product conforms to the applicable requirements of 21 CFR 1040 at the date of manufacture.

Laser Warning