HEWLETT® PACKARD

14 Pin DFB Laser Module With Cooler

Technical Data

LSC2210

Features

- **>1 Milliwatt Optical Output**
- **Center Wavelength Between 1520 nm and 1565 nm**
- **Modulation Capability Up To 1 Gbit/s**
- **Wide Operating Temperature Range: -20°C to +65°C**
- **Industry Standard Hermetic 14 PIN Dual-In-Line Package**

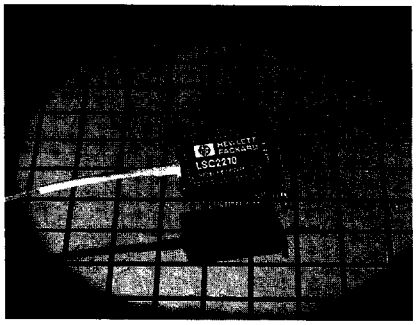
Applications

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

Description

LSC2210 laser modules are highly reliable fiber optic light sources operating in the 1550 nanometer band. The internal DFB lasers are based upon InGaAsP ridge waveguide technology and fabricated by the Metal Organic Vapor Phase Epitaxy (MOVPE) process, resulting in long lifetimes and modest threshold currents.

The LSC2210 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.

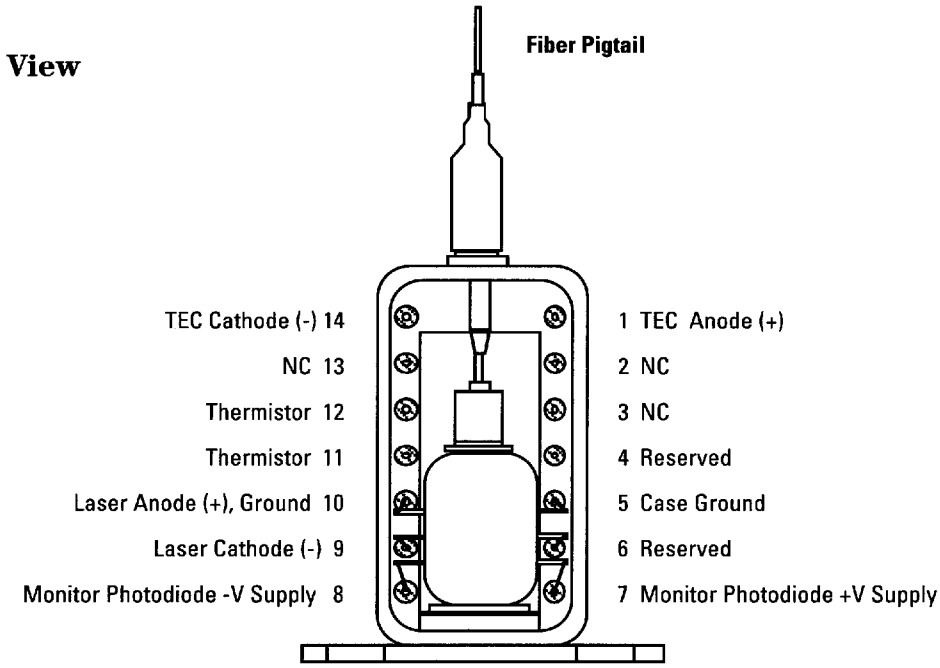


Laser Safety Warning

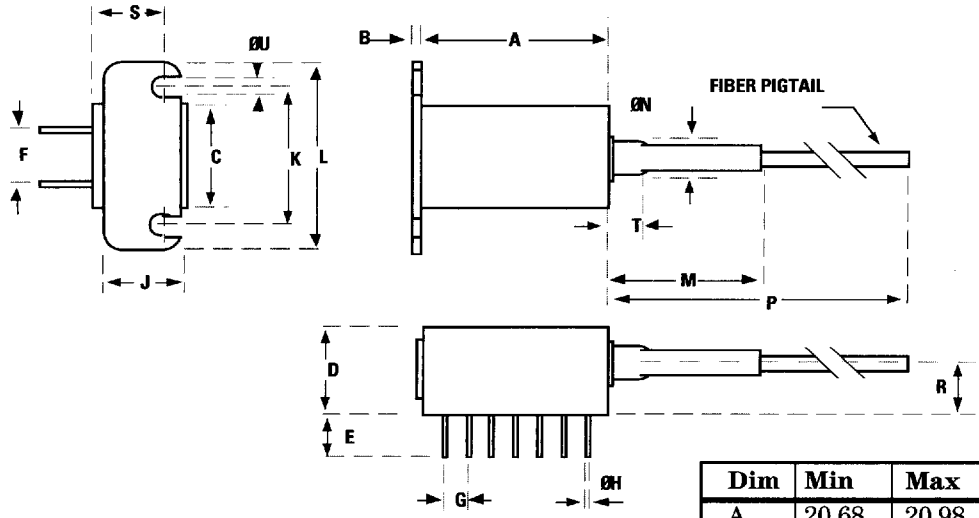
This device is a Class IIIb (3b) Laser Product. It may emit invisible laser radiation if operated with the fiber pigtail disconnected.
To avoid possible eye damage do not look into an unconnected fiber pigtail during laser operation. Do not exceed specified operating limits.

LSC2210 Pin Connections and Block Diagram

Bottom View



LSC2210 Mechanical Outline

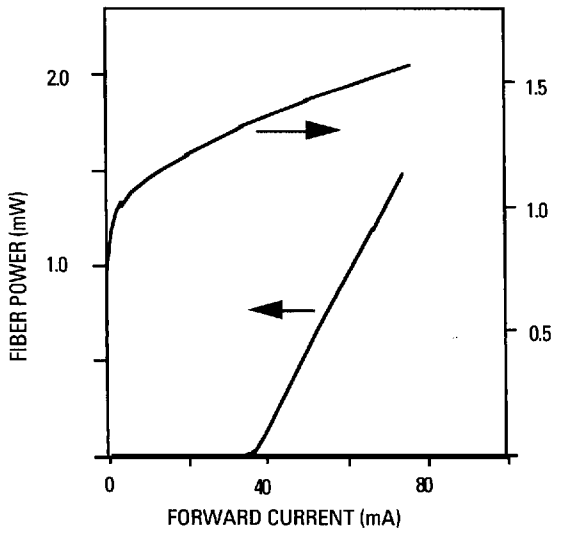


Dim	Min	Max	Dim	Min	Max
A	20.68	20.98	K	19.05 NOM	
B	0.90	1.10	L	25.10	25.70
C	12.55	13.00	M	-	30.00
D	8.51	9.60	ØN	-	4.20
E	6.10	6.60	P	1000	-
F	7.62 NOM		R	5.80	6.20
G	2.54 NOM		S	6.00 NOM	
ØH	0.457 NOM		T	-	6.00
J	7.01	7.21	ØU	3.17 NOM	

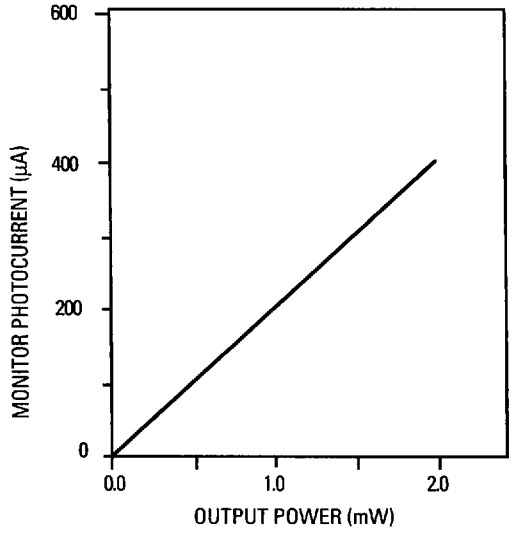
All dimensions in mm

LSC2210 Typical Operating Characteristics

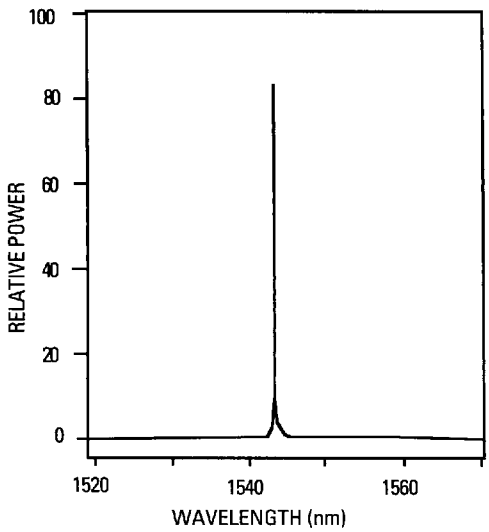
CONTINUOUS WAVE POWER AND FORWARD VOLTAGE VS. FORWARD CURRENT



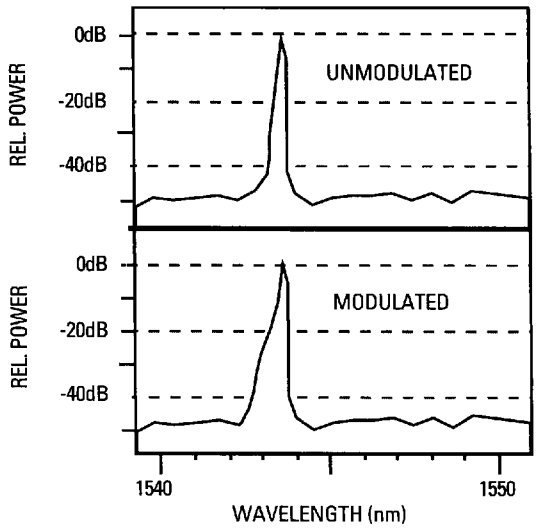
MONITOR PHOTOCURRENT VS. OUTPUT POWER



SPECTRAL CONTENT



EFFECT OF MODULATION ON SPECTRUM



Absolute Maximum Ratings at 25°C

Absolute maximum limits mean that no catastrophic damage will occur if the product is subjected to these ratings for short periods, provided 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 Current	-	10	µA
Laser Reverse Voltage	-	2.0	V
Photodiode Forward Current	-	1	mA
Photodiode Reverse Voltage (Vr)	-	-10	V
Fiber Pull Strength	-	10	N
Operating Temperature (Case)	-20	+65	°C
Storage Temperature	-40	+85	°C
Mechanical Shock	Mil Std 883, Method 2002, Test Condition B		
Vibration	Mil Std 883, Method 2007, Test Condition A		

Performance Specification - Laser [1]

Parameter	Minimum	Maximum	Units
Threshold Current (Ith)	-	60	mA
Fiber Output Power (Pf) at Ith +40 mA	1	-	mW
	0	-	dBm
Rise Time: 10% to 90%; Ith to Ith +25 mA	-	0.4	ns
Fall Time: 90% to 10%; Ith +25 mA to Ith	-	0.4	ns
Peak Wavelength	1520	1565	nm
Spectral Width (-20 dB, >20 dB ORL) [2], Modulated [3]	-	0.8	nm
Temperature Dependence of Peak Wavelength	-	0.10	nm/°C
Sidemodes (CW)	-	-30	dB
Sidemodes (Modulated) [3]	-	-30	dB

Notes:
1. At 25°C and Pf = 1 mW unless otherwise specified.
2. As measured using optical spectrum analysis.
3. Measured at 565 Mbit/s, Ith -2 mA = "0" level. Ith +40 mA = "1" level.

Performance Specification - Monitor Photodiode

Parameter	Minimum	Maximum	Units
Photocurrent (Im) at 1 mW	0.05	-	mA
Responsivity (ΔIm/ΔPf) at Vr = -5 V	0.05	-	μA/μW
Temperature Dependence of Responsivity [1] (from -20°C to 65°C, With Respect to 25°C)	-	±0.5	dB
Dark Current (Vr = -5 V) at 25°C	-	15	nA
at 65°C	-	1.0	μA

Thermistor

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

TEC

Parameter	Symbol	Test Conditions TC = 25°C, Pf = 1 mW unless otherwise specified	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 Cut-off 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.

Note:
1. Fiber output power change for constant monitor output current.

HEWLETT® PACKARD

Ordering Information

LSC2210 - XX

- XX — Connector Type:
  FP = FC/PC Polish
  ST = ST®
- LSC2210 — Model Name:
  LSC2210

Handling Precautions

1. The LSC2210 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

DANGER

Invisible LASER Radiation - Avoid direct exposure to beam

Peak power	10 mW
Wavelength	1550 nm

Class IIIb Laser product

For more Information:

United States: (800) 545-4306

Far East/Australasia: (65) 290-6305

Japan: (81) 3 3331 6111

Europe: (44) 473-742250

Canada: (416) 206-4725

Or contact your local HP sales office listed in your telephone directory and ask for a Components representative.

Data subject to change

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