



Laser Diode Incorporated

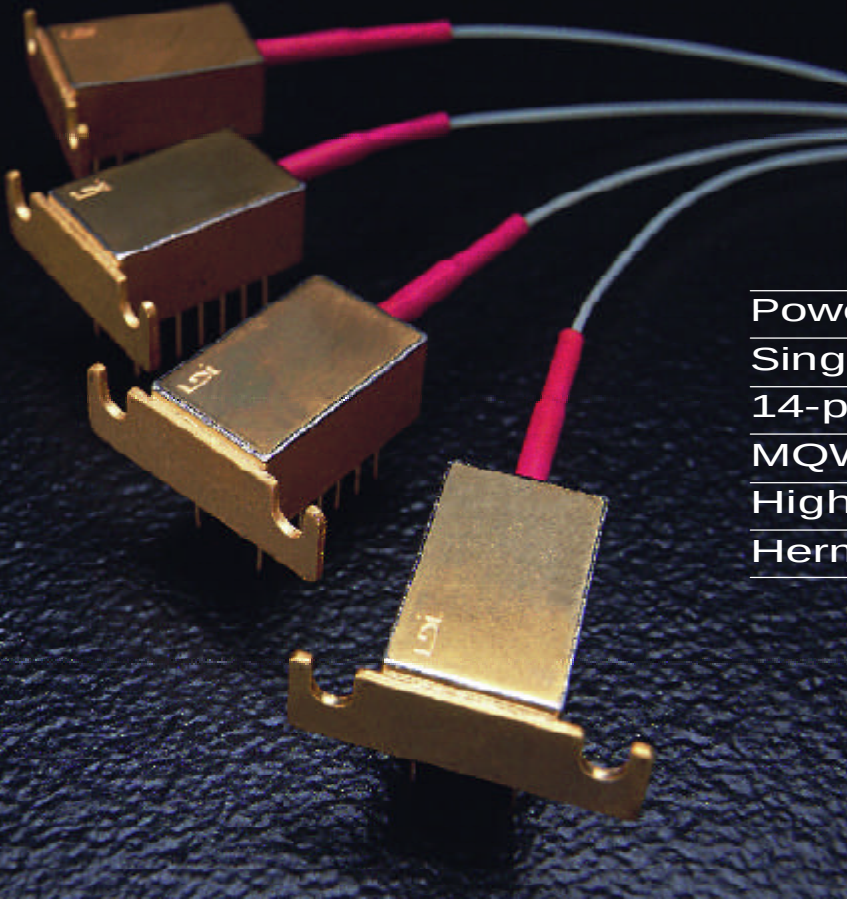
4 Olsen Avenue, Edison, New Jersey 08820 USA

Voice: 732-549-9001, Fax: 732-906-1559

Internet: www.laserdiode.com

e-mail: sales@laserdiode.com

1310 nm Laser Diode



Power to 2mW

Singlemode 9/125 fiber

14-pin DIP

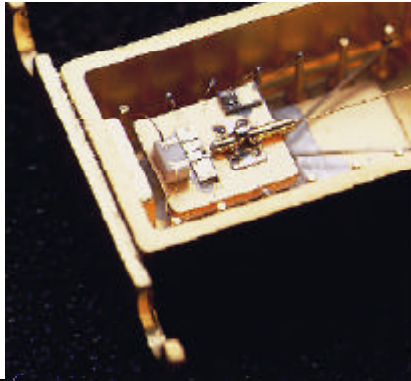
MQW laser structure

High stability fiber coupling

Hermetically sealed

Excellent output power stability and constant wavelength are features of our laser series that make these modules ideal for applications such as telecommunications and test instrumentation.

These devices comprise a Fabry-Perot laser chip and a singlemode optical fiber that are aligned in our high stability, temperature controlled, low reflection, 14-pin dual-in-line module. Our laser chips are based on a multiple quantum well structure fabricated by an MOCVD technology and processed into a ridge waveguide device structure.



Laser-welded fiber alignment assembly
for long-term power stability.

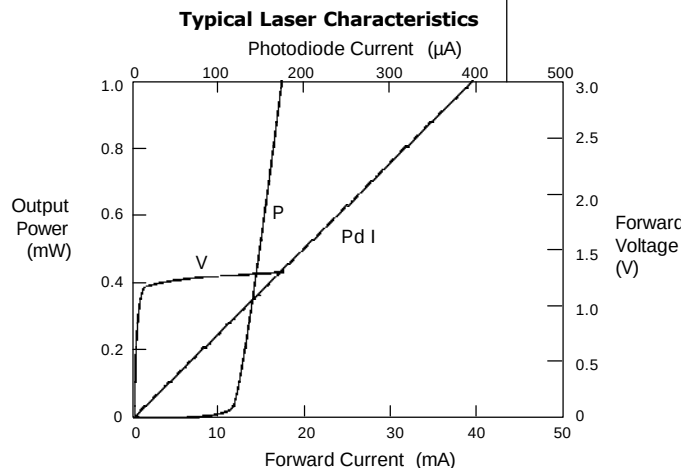
Specifications and limits

The resulting characteristics are high efficiency, excellent thermal stability, moderate threshold current, and bandwidth greater than 1 GHz. The module includes: a photodiode for monitoring the laser chip output power, a thermistor for monitoring the laser submount temperature, and a Peltier-effect thermoelectric cooler. The cooler can be used to maintain a constant laser temperature or to temperature tune the spectral frequency of the laser. Proven module design and a rigorous quality assurance program ensure the reliability and long operational life of these products.

The SCW 1300 Series lasers have a nominal wavelength of 1310 nm. Their light output is coupled into a singlemode optical fiber with a core diameter of 9 μm and a cladding diameter of 125 μm . The fiber has a protective upjacket of 900 μm diameter Hytel®.

These lasers are typically used in short- and intermediate-distance telecommunications systems including protocols such as SONET, SDH, and PDH. They are also used in long-distance, high-speed data communications network applications such as "fast" Ethernet or Fiberchannel. They are an excellent device for use in high-stability test equipment products.

Hytel is a trademark of Dupont.

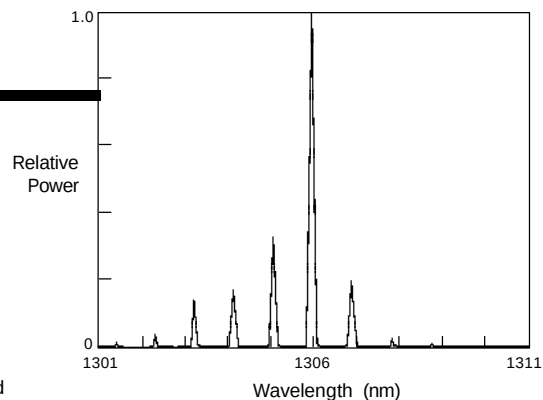


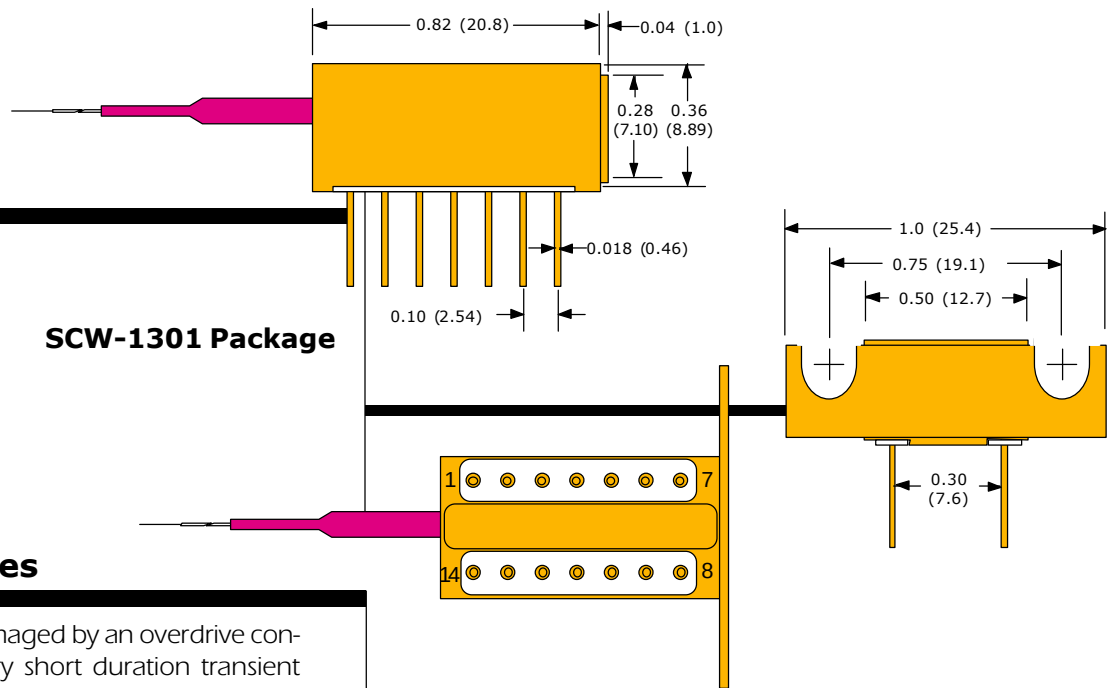
		Power Options (μW)			
		500	1000	1500	2000
Spectral Characteristics					
Wavelength range	nm	1280-1330	1280-1330	1280-1330	1280-1330
Spectral width, RMS	nm	1.7	1.7	1.7	1.7
Spectral width, FWHM	nm	2	2	2	2
Drive Characteristics					
Threshold current (typ;max)	mA	15;30	15;30	15;30	25;30
Modulation current (typ;max)	mA	10;20	10;20	10;20	25;30
Forward voltage maximum	V	1.7	1.7	1.7	1.7
Maximum optical rise/fall time	ns	0.5	0.5	0.5	0.5
Monitor Diode					
Photocurrent at P_{MAX} (min;max)	μA	50;1200	50;1200	50;1200	50;1200
Maximum dark current	nA	10	10	10	10
Maximum capacitance	pF	6	6	6	6
Maximum rise/fall time	ns	2.0	2.0	2.0	2.0
Maximum reverse voltage	V	10	10	10	10
Tracking error ²	dB	± 0.5	± 0.5	± 0.5	± 0.5
Temperature Range					
Module operating temperature	$^{\circ}\text{C}$	-20 to +70	-20 to +70	-20 to +70	-20 to +70
Storage temperature	$^{\circ}\text{C}$	-40 to +85	-40 to +85	-40 to +85	-40 to +85
Thermoelectric Cooler					
Maximum cooler capacity	$^{\circ}\text{C}$	45	45	45	45
Current for maximum capacity	A	0.6	0.6	0.6	0.6
Maximum current	A	1.0	1.0	1.0	1.0
Voltage for maximum capacity	V	1.2	1.2	1.2	1.2
Thermistor					
Resistance at $T = 25^{\circ}\text{C}$	Kohms	9.8-10.2	9.8-10.2	9.8-10.2	9.8-10.2
Temperature coefficient	$\%/^{\circ}\text{C}$	-4.4	-4.4	-4.4	-4.4

Notes:

- Performance is specified at 25°C .
- Tracking error is the variation of the linear relationship between fiber-coupled power and monitor diode current over the specified operating temperature range.

Typical Device Spectrum





Application notes

A laser diode can be damaged by an overdrive condition or by even a very short duration transient spike. It is advisable to protect the laser diode by providing a slow-start circuit to ramp the driver current to the appropriate DC level. Commercial drivers are available in integrated circuit form from companies such as Maxim Inc. (Max 3261, for example) or in an OEM module form from Wavelength Electronics Inc. and others. Complete laboratory driver and characterization systems can be purchased from ILX Inc. or Profile GmbH.

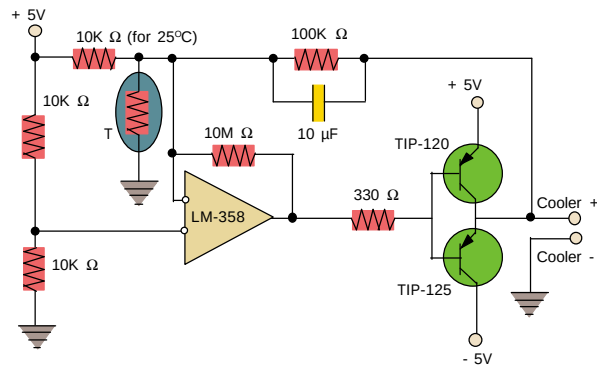
The monitor photodiode in this device reads the optical power from the rear facet of the laser diode. This technique provides a very good indication of the level and stability of the optical power that is coupled from the front facet of the laser into the optical fiber. The current from the monitor diode should be used in a dynamic feedback loop to control the laser drive current and thus maintain a constant optical output level.

This laser package contains a temperature control called a Peltier-effect thermoelectric cooler (TEC). It is imperative that the TEC is running when the laser chip is operating to prevent thermal damage to the laser. A thermistor that measures 10 Kohms at 25°C is mounted close to the laser chip to provide feedback to the temperature controller. A simple drive circuit for the TEC is included in this document. Modular drivers are available from Wavelength Electronics Inc. and others. Laboratory controllers can be purchased from ILX Inc. or Profile GmbH.

Pin Assignments

Pin	Function
1	cooler anode (+)
2,3,4,6,13	no connection
5	laser anode (+)
7	monitor (+)
8	monitor (-)
9	laser cathode (-)
10	ground
11,12	thermistor
14	cooler cathode (-)

Thermoelectric Cooler Control



Fibers are prepared for metalization, critical to the pigtailed process.



1310 nm Laser Diode

Product changes

In seeking to provide greater value to our customers, Laser Diode, Inc. may make changes to its products that deviate from the information in this document.

Personal hazard

Normal aversion reactions will protect from radiation hazards to the eye associated with devices of this kind. Direct and prolonged exposure to a laser beam may cause eye damage. Observe precautions accompanying the product and precautions appropriate to a Class IIb laser.

Handling precautions

Handle optical fiber with normal care, avoiding stretch, tension, twist, kink, or bend abuse. Products are subject to the risks normally associated with sensitive electronic devices including static discharge, transients, and overload.

Special orders

Some products can be supplied with performance characteristics that will meet special customer requirements and that are different from those indicated herein. Contact the Laser Diode Sales Department or your local Laser Diode representative to discuss your requirements.

Ordering

Products can be ordered directly from Laser Diode, Inc. or from its representatives. Refer to the following order numbers:

Order numbers

Part number	Description
SCW 1301F-025XX	laser, 1310 nm, 250 μ W, 14-pin DIP, TEC, 9/125 pigtail
SCW 1301F-050XX	laser, 1310 nm, 500 μ W, 14-pin DIP, TEC, 9/125 pigtail
SCW 1301F-100XX	laser, 1310 nm, 1000 μ W, 14-pin DIP, TEC, 9/125 pigtail
SCW 1301F-200XX	laser, 1310 nm, 2000 μ W, 14-pin DIP, TEC, 9/125 pigtail

Note:

To indicate the pigtail connector termination you require, substitute one of the following designations for XX in the above table:

Use **OO** to indicate no connector.

Use **FC** to indicate an FC/PC type connector.

Use **SC** to indicate an SC/PC type connector.

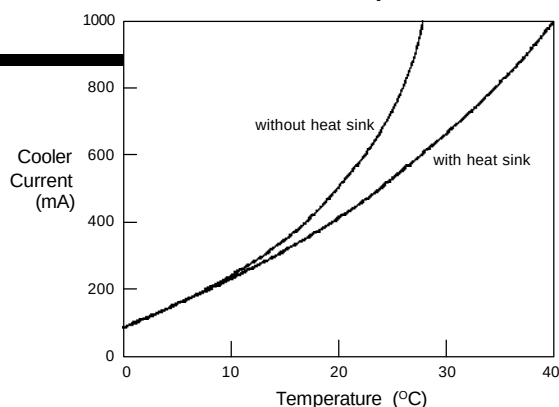
Use **ST** to indicate an ST® type connector.

ST is a trademark of AT&T.

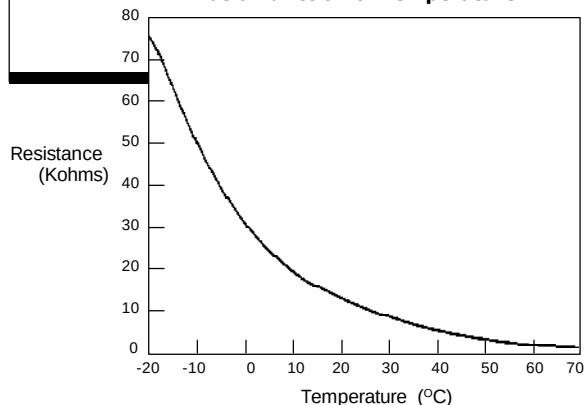


INVISIBLE LASER RADIATION
AVOID DIRECT EXPOSURE TO BEAM
CLASS IIb LASER PRODUCT

Thermoelectric Cooler Current as a Function of Temperature



Typical Values of Thermistor Resistance as a Function of Temperature



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