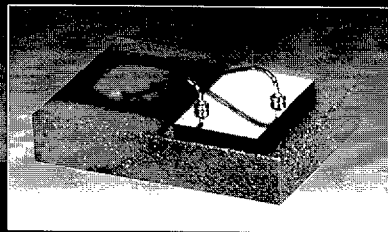
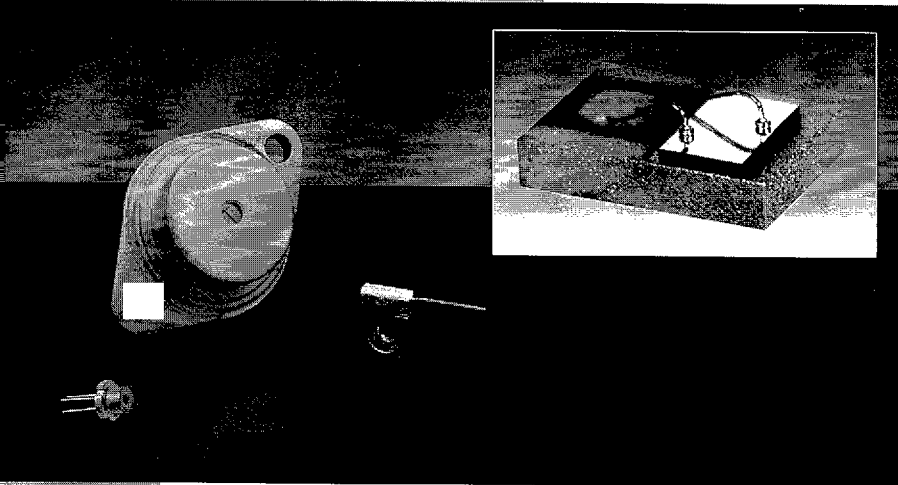


SDL 6500 SERIES



980 nm, 150 mW CW InGaAs LASER DIODES

Key Features

- 980 nm Output
- Single Transverse Mode
- 150 mW cw Power
- Proven High Reliability
- Demonstrated High Coupling Efficiency
- Erbium-Doped Fiber Amplifier Pumps
- Diffraction Limited Beam

Ideal for optical pumping Erbium doped fiber amplifiers, the SDL-6500 Series InGaAs laser diodes provide high power in a single transverse mode, diffraction limited beam for efficient coupling into single mode fibers. 150 mW cw chips, which operate kink-free to 180 mW, allow high launched power in single mode fibers and high amplifier gain.

Low threshold current and high slope efficiency contribute to low operating currents, enhancing reliability. The high electrical-to-optical efficiency of 980 nm lasers minimizes thermal loads. Lifetime compatible with communications systems and CATV network requirements has been demonstrated up to the 150 mW power level.

Coupling efficiencies in excess of 60% have consistently been achieved in production environments, allowing 90 mW or greater launched power. This high pump power permits very high amplifier saturated output at the low noise levels associated with 980 nm pumping. Laser diode wavelength tolerance options are compatible with absorption bandwidths of doped fiber.

The InGaAs quantum-well index guided laser diode is available in a variety of packages for OEM or scientific applications. The TO-3 package includes an internal thermoelectric cooler for wavelength control. 5.6 mm packaging permits miniaturized installations. The SDL-6520-D or SDL-6570-D package consists of a burned-in and characterized chip on ceramic submount, suitable for p-up or p-down installation in customer specified single mode fiber packages.



CW High Power/Brightness
Laser Diodes/Linear Arrays

CW Single Spatial/Longitudinal
Mode Laser Diodes

CW Single Spatial Mode
Laser Diodes
SDL-6500

Individually Addressable
Array Laser Diodes

High Power/Fiber-Coupled
Linear Arrays

CW Tunable
Laser Diodes

QCW Linear Arrays
and Stacked Arrays

Pulsed and QCW
Laser Diodes

Laser Diode Drivers,
Systems and Heatsinks

Specifications

(Typical values at 25 °C and 0.6 NA collection optics)

Laser Characteristics	Min.	Typical	Max.	Units
Rated Optical Power		150		mW
Kink-Free Power	180			mW
Peak Optical Power	220			mW
External Differential Quantum Eff.	52	63		%
Slope Efficiency	0.66	0.80		W/A
Total Conversion Efficiency	30	35		%
Threshold Current		15	25	mA
Operating Current		200	250	mA
Operating Voltage		2.0	2.5	V
Center Wavelength	975	980	985	nm
Emission Bandwidth for 90% Integrated Power		2	5	nm
Reverse Voltage Producing a Current of 20 µA	1.0	4.5		V
Beam Divergence				
Parallel	8	10	12	deg. FWHM
Perpendicular	26	29	31	deg. FWHM
Beam Steering - Parallel	-0.7		0.7	degrees
Wavelength Temp. Tuning		0.22	0.5	nm/K

Monitor Photodiode Characteristics ¹ (J and H packages only)	Min.	Typical	Max.	Units
Capacitance		6		pF
Operating Voltage	0	10	25	V

Thermoelectric Cooler Characteristics (H package only)	Min.	Typical	Max.	Units
Drive Current			2	A
Drive Voltage			4	V
Thermal Resistance		15		K/W
Thermistor Resistance	8	10	12	kΩ

Miscellaneous Ratings	Package	Min.	Max.	Units
Chip Operating Temperature (Noncondensing Atmosphere)	All	10	30	°C
Case Operating Temperature	H	-20	50	°C
Lead Soldering Temperature	All		250	°C
Process Temperature for 1 min.	D		250	°C
Storage Temperature (Noncondensing Atmosphere)	All	-20	65	°C

Notes

- Features common to all SDL-6500 Series laser diodes include:
 - Duty factor of 100%.
 - Temperature coefficient of threshold current can be modeled as:

$$I_{TH2} = I_{TH1} \exp [(T_2 - T_1)/T_0]$$
 where T_0 is a device constant of about 100°K.
 - Temperature coefficient of operating current is approx. 0.5-0.7% per °C.
- Forward Voltage is typically:

$$V_f = 1.5 V + I_{op} \times R_s$$
- Wavelength range of the SDL-6500 Series is 980 ±5 nm. Spectral output is typically single longitudinal mode in the absence of optical feedback.
- The Silicon monitor photodiode is on the steep portion of the Si sensitivity vs. wavelength response. Use internal MPD as relative indicator only.
- Product Configurations Available:

SDL-6520-D
 SDL-6570-D
 SDL-6570-T
 SDL-6571-J1
 SDL-6572-H1

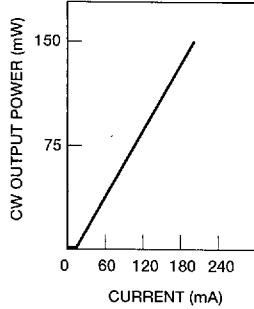
Definition of Part Numbers:

SDL-65X X - (D, H1, J1 or T package)

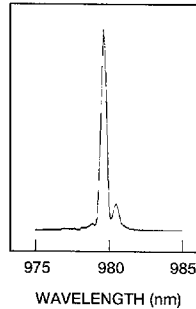
- 0 - No Options
- 1 - Monitor Photodiode
- 2 - Monitor Photodiode, TE Cooler
- 2 - p (epi) up polarity
- 7 - p (epi) down polarity

Optical Characteristics

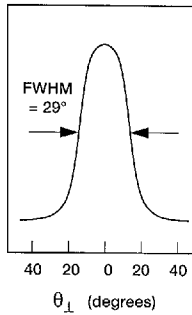
LIGHT vs. CURRENT CHARACTERISTICS



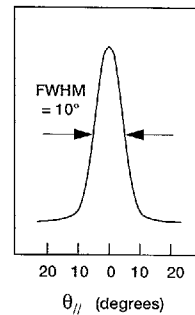
TYPICAL EMISSION SPECTRUM



FARFIELD ENERGY DISTRIBUTION



FARFIELD ENERGY DISTRIBUTION



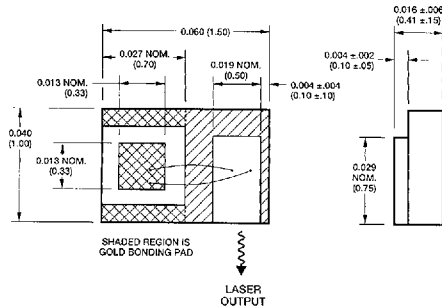
Package Specifications [Dimensions in inches (mm) except where indicated]

SDL Standard Tolerances:
(unless otherwise specified)

inches: x.xx = ±0.02
x.xxx = ±0.010

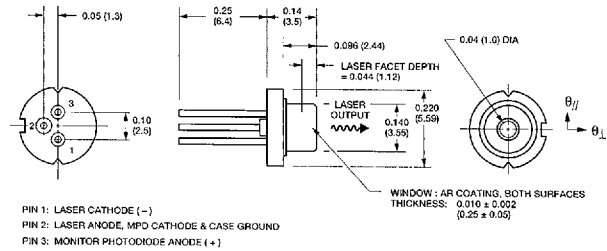
mm: x.x = ±0.5
x.xx = ±0.25

D CERAMIC SUBMOUNT PACKAGE

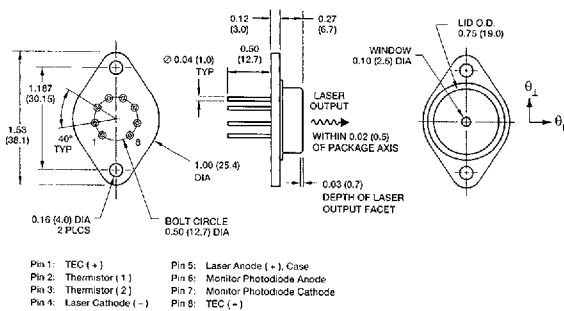


NOTE: SDL-6520-D IS P (EP) UP CHIP POLARITY
SDL-6570-D IS P (EP) DOWN CHIP POLARITY

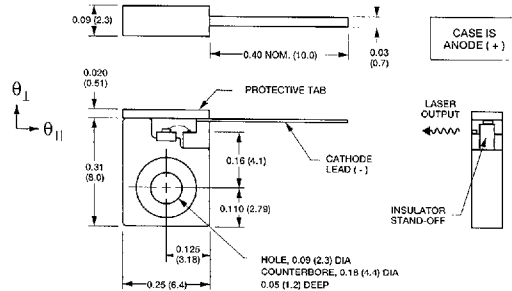
J1 5.6 mm WINDOW PACKAGE



H1 TO-3 WINDOW PACKAGE



T OPEN HEATSINK PACKAGE



CW High Power/Brightness Laser Diodes/Linear Arrays
 CW Single Spatial/Longitudinal Mode Laser Diodes
 CW Single Spatial Mode Laser Diodes
 SDL-6500
 Individually Addressable Array Laser Diodes
 High Power Fiber-Coated Linear Arrays
 CW Tunable Laser Diodes
 QCW Linear Arrays and Stacked Arrays
 Pulsed and QCW Laser Diodes
 Laser Diode Drivers, Systems and Heatsinks

SDL-6500 SERIES

Safety And Operating Considerations

The laser light emitted from this laser diode is invisible and may be harmful to the human eye. Avoid looking directly into the laser diode, into the collimated beam along its optical axis when the device is in operation.

CAUTION: THE USE OF OPTICAL INSTRUMENTS WITH THIS PRODUCT WILL INCREASE EYE HAZARD.

Operating the laser diode outside of its maximum ratings may cause device failure or a safety hazard. Power supplies used with the component must be employed such that the maximum peak optical power cannot be exceeded. CW laser diodes may be damaged by excessive drive current or switching transients. When using power supplies, the laser diode should be connected with the main power on and the output voltage at zero. The current should be increased slowly while monitoring the laser diode output power and the drive current.

Device degradation accelerates with increased temperature and therefore careful attention to minimize the case temperature is advised. For example, life expectancy will decrease by a factor of four if the case is operated at 50 °C rather than 30 °C.

A proper heat sink for the laser diode on a thermal radiator will greatly enhance laser life. Firmly mount the laser on a radiator having a thermal impedance of less than 2.0 °C/W for increased reliability.

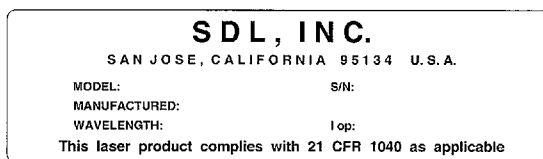
ESD PROTECTION — Electro-static discharge is the primary cause of unexpected laser diode failure. Take extreme precaution to prevent ESD. Use wrist straps, grounded work surfaces, and rigorous anti-static techniques when handling laser diodes.

This product is export controlled under CO-COM. The ECCN is 6A05A; Harmonized Commodity is 8541.40.6050.

21 CFR 1040.10 Compliance

Because of the small size of these devices, each of the labels shown is attached to the individual shipping container. They are illustrated here to comply with 21 CFR 1040.10 as applicable under the radiations control for health and safety act of 1968.

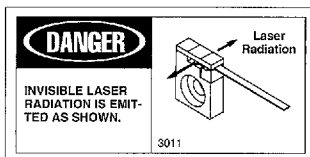
SERIAL NUMBER IDENTIFICATION LABEL



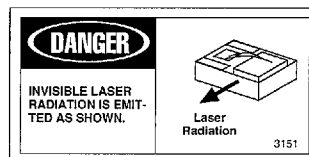
OUTPUT POWER DANGER LABEL



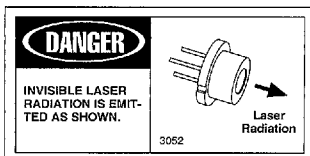
PACKAGE APERTURE LABELS



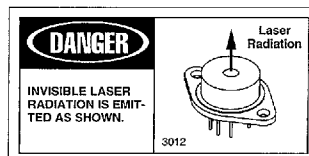
"T" PACKAGE DIODES



"D" PACKAGE DIODES



"J1" PACKAGE DIODES



"H1" PACKAGE DIODES