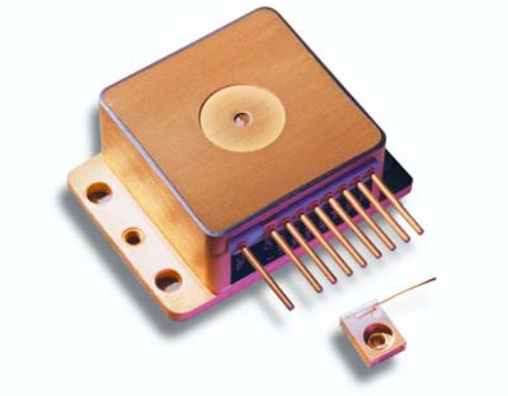
JDS Uniphase

Product Bulletin



2.0 & 3.0 W, 798 to 800/808 to 812 nm High-brightness Laser Diodes

SDL-2400 Series

The SDL-2400 series laser diodes represent a breakthrough in high continuous wave (CW) optical power and ultra-high brightness with unsurpassed reliability. The small emitting aperture, combined with low beam divergence, makes the SDL-2400 series the highest-brightness family of CW laser diodes available in the industry today.

The SDL-2400 series consists of partially coherent broad area emitters with relatively uniform emission over the emitting aperture. Operation is multi-longitudinal mode with a spectral envelope width of approximately 2 nm FWHM. The far field beam divergence in the plane perpendicular to the P/N junction is nearly Gaussian, while the lateral beam profile exhibits a multiple-transverse mode pattern typical of broad area emitters. SDL-2400 variants range from 2 W output from a 100 µm aperture to 3 W from a 200 µm aperture with superlative reliability.

The high efficiency of the quantum well structure, combined with low thermal resistance epi-down chip mounting, provides minimum junction temperature at high optical power. Low junction temperature and low thermal resistance packages extend lifetime and increase reliability.

Convenient package options such as open heatsink and window packages allow easy integration into user systems.

Key Features

- 2 and 3 W CW power
- 100 and 200 µm apertures
- High-efficiency MOCVD quantum well design
- TEC option for wavelength control
- Open heatsink and window packages
- High reliability

Applications

- Solid-state laser pumping
- Medical/ophthalmic
- Free-space communication
- Beacons/illumination

SDL-2460 Series

SDL-2460-A
SDL-2462-P1

Electro-optical Performance

Laser Characteristics	Symbol	Min.	Typ.	Max.	Unit
CW output power	P_o	–	–	2	W
Center wavelength	λ_c	798 (±3)	–	800 (±3)	nm
		808 (±3)	–	812 (±3)	nm
Spectral width	$\Delta\lambda$	–	2	–	nm
Slope efficiency	$\eta_D=P_o/(I_{op}-I_{th})$	0.75	0.95	–	
Conversion efficiency	$\eta=P_o/(I_{op}V_{op})$	–	35	–	%
Emitting dimensions	W x H	–	100 x 1	–	µm
FWHM beam divergence					
Parallel to junction	$\theta_{//}$	–	12	–	degrees
Perpendicular to junction	$\theta_{\perp}$	–	32	–	degrees
Threshold current	I_{th}	–	0.4	0.6	A
Operating current	I_{op}	–	2.5	3.0	A
Operating voltage	V_{op}	–	(note[5])	–	
Series resistance	R_s	–	0.25	0.50	Ω
Thermal resistance	R_{th}	–	12	–	°C/W
Recommended case temperature	T_c	-20	–	30	°C
Absolute Maximum Ratings					
Reverse voltage	V_{rl}	–	–	3	V
Case operating temperature	T_{op}	-20	–	50	°C
Storage temperature range	T_{stg}	-40	–	80	°C
Lead soldering temperature	T_{is}	–	–	250	°C (5 sec.)
Monitor Photodiode[1]					
Sensitivity	–	0.1	–	10.0	µA/mW
Capacitance	–	–	6	–	pF
Breakdown voltage	V_{bd}	–	25	–	V
Operating voltage	V_{op}	–	10	–	V
Thermoelectric Cooler[1]					
Drive current	I_{TE}	–	3.5	–	
Drive voltage	V_{TE}	–	8	–	V
Thermistor resistance	R_{therm}	–	10	–	kΩ

1. Not available on A package.
2. All values at 25 °C and 0.6 NA collection optics.
3. Features common to these products include:
   a. Duty factor of 100%.
   b. Rise and fall times of 500 ps (A package).
   c. Temperature coefficient of wavelength is approximately 0.27 to 0.3 nm/°C.
   d. 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 ~160 °K.
   e. Temperature coefficient of operating current is approximately 1% per °C.
4. Modulation bandwidth of CW laser diodes is approximately 1 GHz for A package diodes.
   P package diodes roll off at slightly lower frequencies due to inductance of pins and internal leads.
5. Forward voltage is typically: $V_f = 1.5\ V + I_{op} \times R_s$.

SDL-2470 Series

SDL-2470-A
SDL-2472-P1

Electro-optical Performance

Laser Characteristics	Symbol	Min.	Typ.	Max.	Unit
CW output power	P_o	–	–	3	W
Center wavelength	λ_c	798 (±3) 808 (±3)	– –	800 (±3) 812 (±3)	nm nm
Spectral width	$\Delta\lambda$	–	2	–	nm
Slope efficiency	$\eta_D=P_o/(I_{op}-I_{th})$	0.75	0.95	–	W/A
Conversion efficiency	$\eta=P_o/(I_{op}V_{op})$	–	35	–	%
Emitting dimensions	W x H	–	200 x 1	–	µm
FWHM beam divergence					
Parallel to junction	$\theta_{//}$	–	12	–	degrees
Perpendicular to junction	$\theta_{\perp}$	–	32	–	degrees
Threshold current	I_{th}	–	0.9	1.2	A
Operating current	I_{op}	–	4.0	4.8	A
Operating voltage	V_{op}	–	(note[5])	–	
Series resistance	R_s	–	0.12	0.25	Ω
Thermal resistance	R_{th}	–	10	–	°C/W
Recommended case temperature	T_c	-20	–	30	°C
Absolute Maximum Ratings					
Reverse voltage	V_{rl}	–	–	3	V
Case operating temperature	T_{op}	-20	–	50	°C
Storage temperature range	T_{stg}	-40	–	80	°C
Lead soldering temperature	T_{is}	–	–	250	°C (5 sec.)
Monitor Photodiode[1]					
Sensitivity	–	0.1	–	10.0	µA/mW
Capacitance	–	–	6	–	pF
Breakdown voltage	V_{bd}	–	25	–	V
Operating voltage	V_{op}	–	10	–	V
Thermoelectric Cooler[1]					
Drive current	I_{TE}	–	3.5	–	A
Drive voltage	V_{TE}	–	8	–	V
Thermistor resistance	R_{therm}	–	10	–	kΩ

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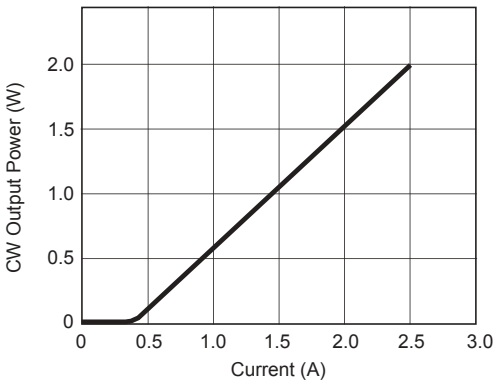
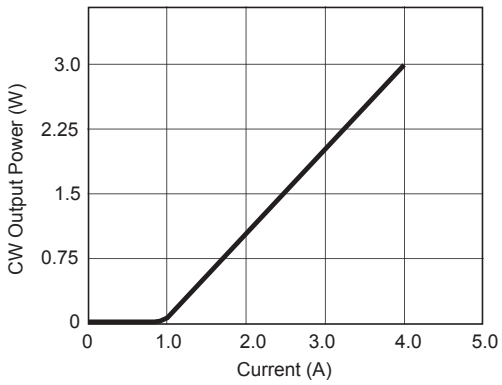
Typical Optical Characteristics

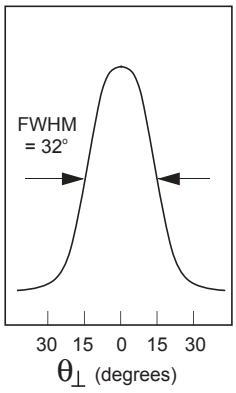
SDL-2460
Light vs. Current



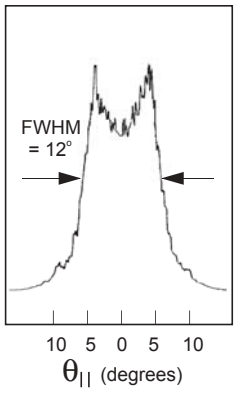
SDL-2470
Light vs. Current



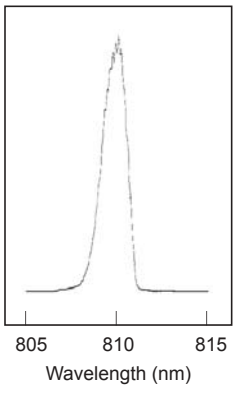
Far Field Energy
Distribution (A, P1)



Far Field Energy
Distribution (A, P1)



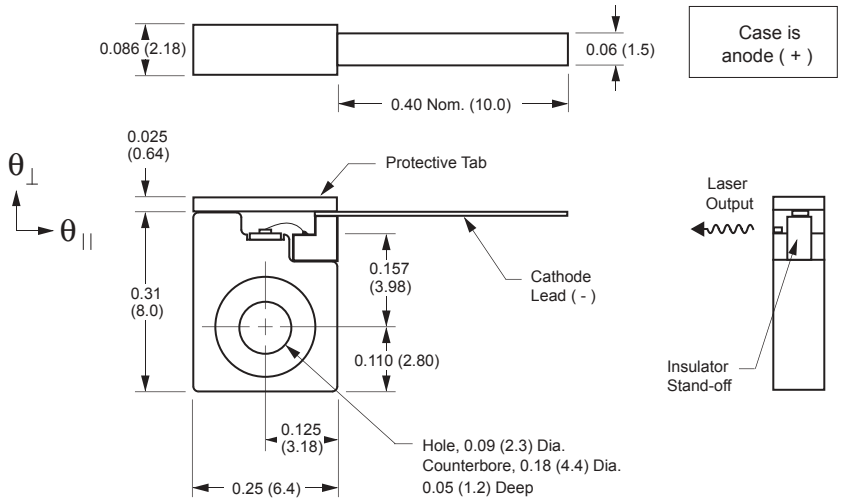
Typical Emission
Spectrum



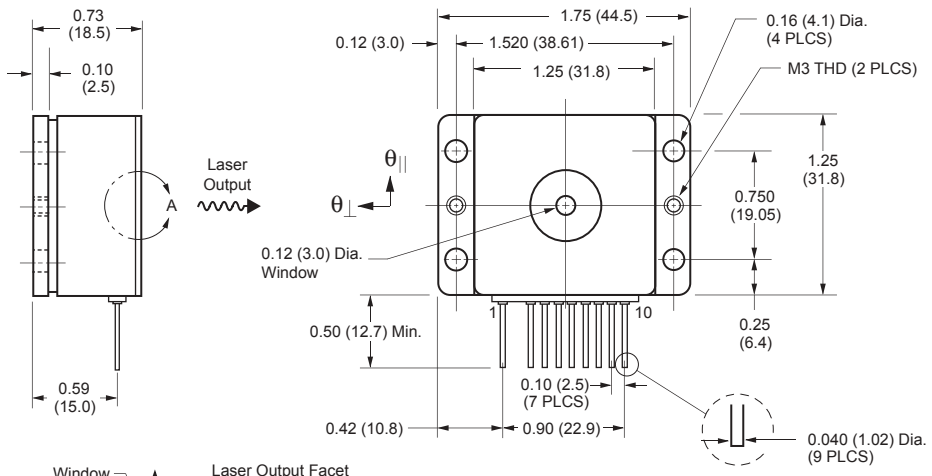
Package Dimensions (inches [mm])

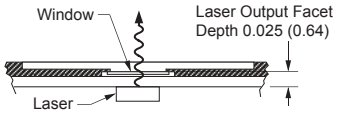
Standard Tolerances
inches: x.xx = ±0.02 mm: x.x = ±0.5
x.xxx = ±0.010 x.xx = ±0.25

A
Open Heatsink
Package



P1
High Heat Load
Window Package





Detail 'A'

Pin
1. TEC (–)
2. –
3. Case
4. Laser anode (+)
5. Thermistor (2)
6. Thermistor (1)
7. Laser cathode (–)
8. Monitor photodiode anode
9. Monitor photodiode cathode
10. TEC (+)

User Safety

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, or directly into the fiber 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 power supplies are used, the laser diode should be connected with the main power on and the output voltage at zero. The current should be increased slowly while the laser diode output power and the drive current are monitored.

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.

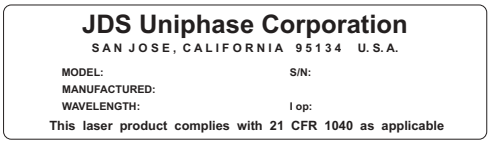
A proper heatsink for the laser diode on a thermal radiator will greatly enhance laser life. Firmly mount the laser on a radiator with a thermal impedance of less than 0.5 °C/W for increased reliability.

ESD PROTECTION – Electrostatic discharge is the primary cause of unexpected laser diode failure. Take extreme precaution to prevent ESD. Use wrist straps, grounded work surfaces and rigorous antistatic techniques when handling laser diodes.

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 Radiation Control for Health and Safety Act of 1968.

Serial Number Identification Label

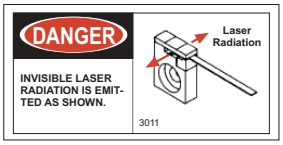


Output Power Danger Labels

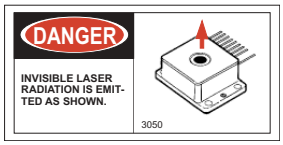
SDL-2460

SDL-2470

Package Aperture Labels



A Package Diodes



P1 Package Diodes

Ordering Information

For more information on this or other products and their availability, please contact your local JDS Uniphase account manager or JDS Uniphase directly at 1-800-498-JDSU (5378) in North America and +800-5378-JDSU worldwide or via e-mail at jdsu.sales@jdsu.com.

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