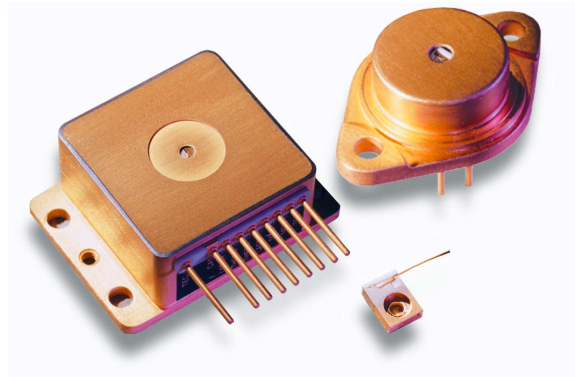


## Product Bulletin



### SDL-2300 Series 0.5 to 4.0 W, 798 to 800/808 to 812 nm Laser Diodes

The SDL-2300 series laser diodes offer high continuous wave (CW) optical power and high brightness with unsurpassed reliability. The small emitting aperture, combined with low beam divergence, makes the SDL-2300 series one of the highest-brightness CW laser diodes available in the industry today.

The SDL-2300 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 the complex pattern typical of broad area emitters. Emitting apertures for SDL-2300 variants range from 50 to 500  $\mu\text{m}$ , giving CW power output capability of up to 4 W with superlative reliability. For still higher-power 100 and 200  $\mu\text{m}$  aperture devices or fiber-coupled lasers, please see the SDL-2400 series products.

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 with internal TEC and MPD allow easy integration into user systems.

#### Key Features

- 0.5, 1.2, 2.0 and 4.0 W CW power
- 50, 100, 200 and 500  $\mu\text{m}$  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

Available Configurations

SDL-2350 Series	SDL-2360 Series
SDL-2350-C	SDL-2360-C
SDL-2352-H1	SDL-2362-P1
SDL-2352-P1	

Electro-optical Performance

Laser Characteristics	Symbol	SDL-2350 Series			SDL-2360 Series			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	
CW output power	$P_o$	-	-	0.5	-	-	1.2	W
Center wavelength	$\lambda_c$	808 ( $\pm 3$ )	-	810 ( $\pm 3$ )	798 ( $\pm 3$ )	-	800 ( $\pm 3$ )	nm
		-	-	-	808 ( $\pm 3$ )	-	812 ( $\pm 3$ )	nm
Spectral width	$\Delta\lambda$	-	2	-	-	2	-	nm
Slope efficiency	$\eta_D = P_o / (I_{op} - I_{th})$	0.7	0.9	-	0.7	0.9	-	W/A
Conversion efficiency	$\eta = P_o / (I_{op} V_{op})$	-	30	-	-	30	-	%
Emitting dimensions	W x H	-	50 x 1	-	-	100 x 1	-	$\mu\text{m}$
FWHM beam divergence								
Parallel to junction	$\theta_{//}$	-	12	-	-	12	-	degrees
Perpendicular to junction	$\theta_{\perp}$	-	32	-	-	32	-	degrees
Threshold current	$I_{th}$	-	0.2	0.25	-	0.4	0.6	A
Operating current	$I_{op}$	-	0.8	0.85	-	1.6	1.8	A
Operating voltage	$V_{op}$	-	(note <sup>5</sup> )	-	-	(note <sup>5</sup> )	-	
Series resistance	$R_s$	-	0.5	0.7	-	0.25	0.5	$\Omega$
Thermal resistance	$R_{th}$	-	12	-	-	10	-	$\Omega$
Recommended case temperature	$T_c$	-20	-	30	-20	-	30	$^{\circ}\text{C}$
<b>Absolute Maximum Ratings</b>								
Reverse voltage	$V_{rl}$	-	-	3	-	-	3	V
Case operating temperature	$T_{op}$	-20	-	50	-20	-	50	$^{\circ}\text{C}$
Storage temperature range	$T_{stg}$	-40	-	80	-40	-	80	$^{\circ}\text{C}$
Lead soldering temperature	$T_{ls}$	-	-	250 (5 sec.)	-	-	250 (5 sec.)	$^{\circ}\text{C}$
<b>Monitor Photodiode<sup>1</sup></b>								
Sensitivity	-	0.1	-	10.0	0.1	-	10.0	$\mu\text{A/mW}$
Capacitance	-	-	6	-	-	6	-	pF
Breakdown voltage	$V_{bd}$	-	25	-	-	25	-	V
Operating voltage	$V_{op}$	-	10	-	-	10	-	V
<b>Thermoelectric Cooler<sup>1</sup></b>								
Drive current								
P1 package	$I_{TE}$	-	3.5	-	-	3.5	-	A
H1 package	$I_{TE}$	-	1.4	-	-	NA	-	A
Drive voltage								
P1 package	$V_{TE}$	-	8.0	-	-	8.0	-	V
H1 package	$V_{TE}$	-	4.5	-	-	NA	-	V
Thermistor resistance	$R_{therm}$	-	10	-	-	10	-	k $\Omega$

1. Not available on C package.
2. Typical values at 25  $^{\circ}\text{C}$  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 (C package).
  - c. Temperature coefficient of wavelength is approximately 0.27 to 0.3 nm/ $^{\circ}\text{C}$ .
  - 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 about 160 $^{\circ}\text{K}$ .
  - e. Temperature coefficient of operating current is approximately 1% per  $^{\circ}\text{C}$ .

4. Modulation bandwidth of CW laser diodes is approximately 1 GHz for C package diodes. P package diodes roll off at slightly lower frequencies due to inductance of pins and internal leads.
5. Forward voltage is typically:  
 $V_f = 1.5 \text{ V} + I_{op} \times R_s$
6. SDL-23XX X - (C, H1 or P1 packages)
  - 0 - No options
  - 2 - MPD, TE cooler
  - 5 - 0.5 W CW
  - 6 - 1.2 W CW

**SDL-2300 Series**  
**Laser Diodes | 3**

**Available Configurations**

<b>SDL-2370 Series</b>	<b>SDL-2380 Series</b>
SDL-2370-C	SDL-2380-C
SDL-2372-P1	SDL-2382-P1

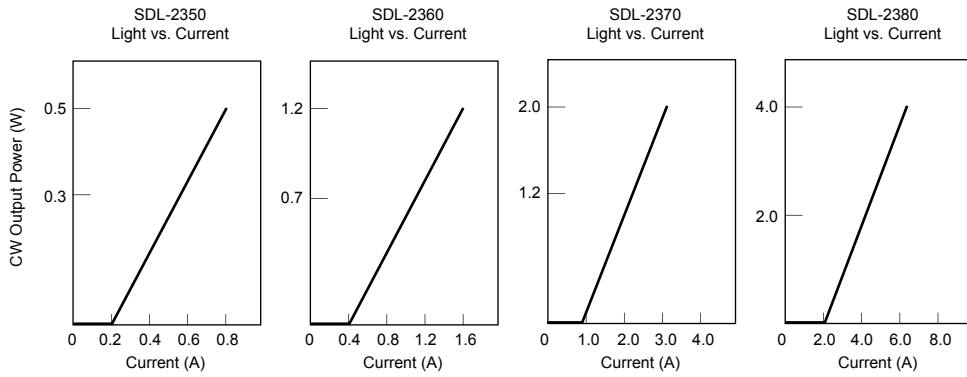
**Electro-optical Performance**

Laser Characteristics	Symbol	SDL-2370 Series			SDL-2380 Series			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	
CW output power	$P_o$	-	-	2	-	-	4	W
Center wavelength	$\lambda_c$	798 ( $\pm 3$ )	-	800 ( $\pm 3$ )	798 ( $\pm 3$ )	-	800 ( $\pm 3$ )	nm
		808 ( $\pm 3$ )	-	812 ( $\pm 3$ )	808 ( $\pm 3$ )	-	812 ( $\pm 3$ )	nm
Spectral width	$\Delta\lambda$	-	2	-	-	2	-	nm
Slope efficiency	$\eta_D = P_o / (I_{op} - I_{th})$	0.7	0.9	-	0.7	0.9	-	W/A
Conversion efficiency	$\eta = P_o / (I_{op} V_{op})$	-	30	-	-	30	-	%
Emitting dimensions <sup>7</sup>	W x H	-	200 x 1	-	-	500 x 1	-	$\mu\text{m}$
FWHM beam divergence								
Parallel to junction	$\theta_{//}$	-	12	-	-	12	-	degrees
Perpendicular to junction	$\theta_{\perp}$	-	32	-	-	32	-	degrees
Threshold current	$I_{th}$	-	0.9	1.2	-	2.0	2.5	A
Operating current	$I_{op}$	-	3.1	3.4	-	6.3	6.8	A
Operating voltage	$V_{op}$	-	(note <sup>5</sup> )	-	-	(note <sup>5</sup> )	-	
Series resistance	$R_s$	-	0.12	0.2	-	0.08	0.1	$\Omega$
Thermal resistance	$R_{th}$	-	8	-	-	4	-	$\Omega$
Recommended case temperature	$T_c$	-20	-	30	-20	-	30	$^{\circ}\text{C}$
<b>Absolute Maximum Ratings</b>								
Reverse voltage	$V_{rl}$	-	-	3	-	-	3	V
Case operating temperature	$T_{op}$	-20	-	50	-20	-	50	$^{\circ}\text{C}$
Storage temperature range	$T_{stg}$	-40	-	80	-40	-	80	$^{\circ}\text{C}$
Lead soldering temperature	$T_{is}$	-	-	250 (5 sec.)	-	-	250 (5 sec.)	$^{\circ}\text{C}$
<b>Monitor Photodiode<sup>1</sup></b>								
Sensitivity	-	0.1	-	10.0	0.1	-	10.0	$\mu\text{A/mW}$
Capacitance	-	-	6	-	-	6	-	pF
Breakdown voltage	$V_{bd}$	-	25	-	-	25	-	V
Operating voltage	$V_{op}$	-	10	-	-	10V	-	V
<b>Thermoelectric Cooler<sup>1</sup></b>								
Drive current	$I_{TE}$	-	3.5	-	-	3.5	-	A
Drive voltage	$V_{TE}$	-	8.0	-	-	8.0	-	V
Thermistor resistance	$R_{therm}$	-	10	-	-	10	-	k $\Omega$

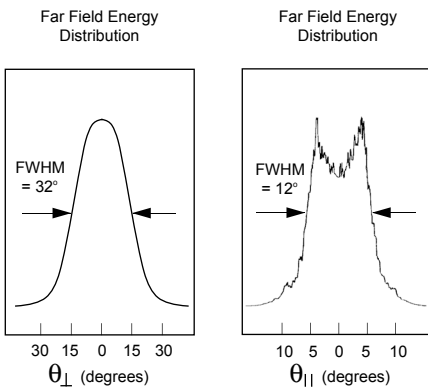
- Not available on C package.
- Typical values at 25  $^{\circ}\text{C}$  and 0.6 NA collection optics.
- Features common to these products include:
  - Duty factor of 100%.
  - Rise and fall times of 500 ps (C package).
  - Temperature coefficient of wavelength is approximately 0.27 to 0.3 nm/ $^{\circ}\text{C}$ .
  - 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 160  $^{\circ}\text{K}$ .
  - Temperature coefficient of operating current is approximately 1% per  $^{\circ}\text{C}$ .
- Modulation bandwidth of CW laser diodes is approximately 1 GHz for C package diodes. P package diodes roll off at slightly lower frequencies due to inductance of pins and internal leads.

- Forward voltage is typically:  
 $V_f = 1.5 \text{ V} + I_{op} \times R_s$
- SDL-23XX - (C, H1 or P1 packages)
  - 0 - No options
  - 2 - MPD, TE cooler
  - 7 - 2 W CW
  - 8 - 4 W CW
- The SDL-2380 near field consists of two active segments separated by an isolation space to produce specified aperture.

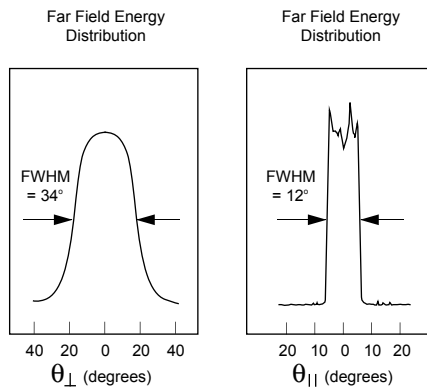
**Typical Optical Characteristics**



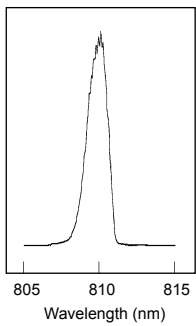
**SDL-2350, 2360 and 2370 Laser Emission**



**SDL-2380 Laser Emission**



**Typical Emission Spectrum**



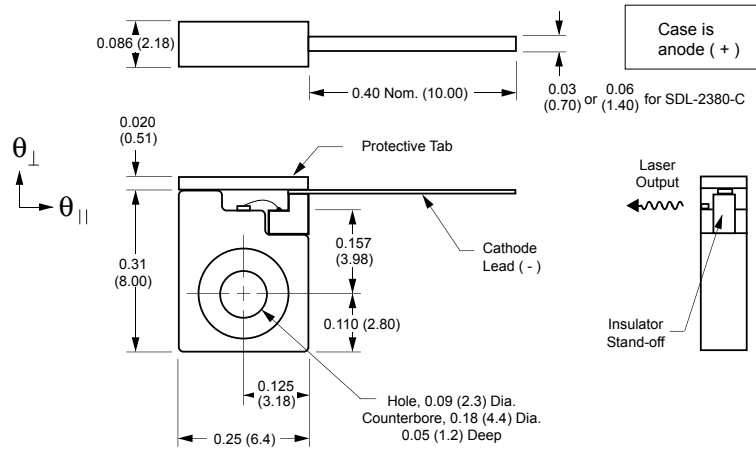
**SDL-2300 Series**  
**Laser Diodes | 5**

**Package Dimensions (inches [mm])**

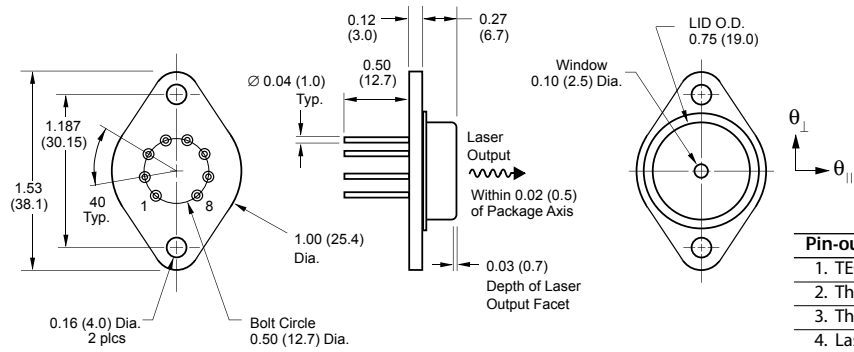
Standard Tolerances

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

**C**  
**Open Heatsink**  
**Package**

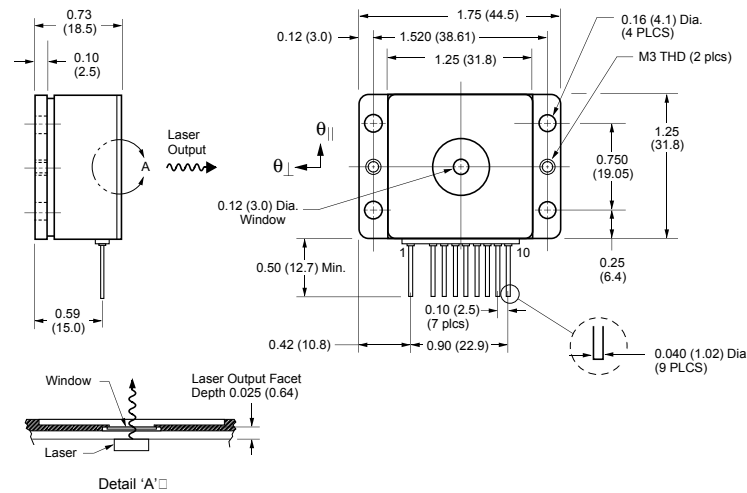


**H1**  
**TO-3 Window**  
**Package**



Pin-out	
1.	TEC (+)
2.	Thermistor (1)
3.	Thermistor (2)
4.	Laser cathode (-)
5.	Laser anode (+), case
6.	Monitor photodiode anode
7.	Monitor photodiode cathode
8.	TEC (-)

**P1**  
**High Heat Load**  
**Window Package**



Pin-out	
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 (+)

Detail 'A'

## 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 using power supplies, connect the laser diode 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.

## Ordering Information

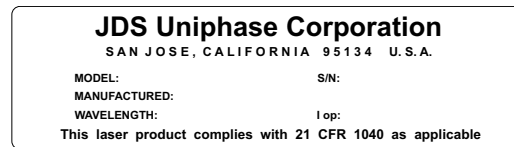
For more information on this or other products and their availability, please contact your local JDS Uniphase account manager or JDS Uniphase directly at 800-871-8537 in North America and 1-800-8735-5378 worldwide or via e-mail at [jdsu.sales@jdsu.com](mailto:jdsu.sales@jdsu.com).

**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.

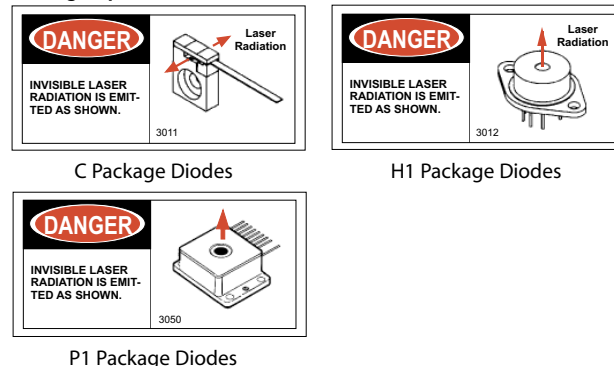
### Serial Number Identification Label



### Output Power Danger Labels



### Package Aperture Labels



North America toll-free: 800-871-8537  
Worldwide toll-free: 1-800-8735-5378  
[www.jdsu.com](http://www.jdsu.com)

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