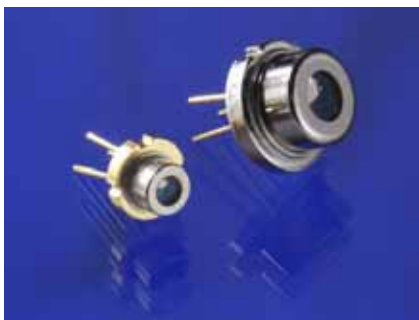


Diode Lasers, Single-mode 200 mW 850 nm 5450 -J1 Series



Key Features

- 200 mW kink-free power
- Narrow spectral width
- High efficiency
- Low astigmatism
- High reliability

Applications

- Illumination
- Printing
- Sensing
- Medical applications
- Imaging

High-resolution applications including optical data storage, image recording, spectral analysis, printing, point-to-point free-space communications and frequency doubling all require diffraction-limited sources. Faster writing, wider dynamic range and better signal-to-noise ratio may be achieved with JDSU's high-reliability 5450-J1 series single-mode diode lasers.

Available in power levels up to 200 mW kink-free, this advanced diode laser combines a quantum well structure and a real-refractive index-guided single-mode waveguide to provide high power, low astigmatism, narrow spectral width and a single spatial mode Gaussian far field. Our 5450-J1 series diode lasers are among the most reliable high-power diode lasers available in the industry today.

The 5450-J1 series diode lasers operate in single longitudinal mode under some conditions. Like in all Fabry-Perot index-guided diode lasers, spectral broadening, mode hopping and longitudinal mode instability may occur due to small changes in drive current, diode-junction temperature or optical feedback.

The unique diode structure features high reliability with long operating life and very low early failure rate. The highest brightness (20 MW/cm² steradian) is provided by our 5450-J1.

Available Configurations

5450 Series
5450-J1

Electro-optical Specifications

Parameter	Symbol	5450-J1 Series			Unit	
		Min.	Typ.	Max.		
Laser Characteristics						
CW output power, kink-free ²	P _O	–	–	200	mW	
Center wavelength	λ _c	–	(note ⁵)	–		
Spectral width ¹	Δλ	–	3	5	nm	
Slope efficiency	η _D = P _O /(I _{op} –I _{th})	0.75	0.85	–	mW/mA	
Conversion efficiency	η = P _O /(I _{op} V _{op})	–	30	–	%	
Emitting dimensions	W x H	–	3 x 1	–	μm	
FWHM beam divergence						
Parallel to junction	θ _{//}	–	9	–	degrees	
Perpendicular to junction	θ _⊥	–	30	–	degrees	
Threshold current	I _{th}	–	35	45	mA	
Operating current	I _{op}	–	250	300	mA	
Operating voltage	V _{op}	–	(note ⁴)	–		⁴
Series resistance	R _s	–	4.0	6.0	Ω	
Thermal resistance	R _{th}	–	60	–	°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						
Sensitivity	–	0.1	–	20	μA/mW	
Capacitance	–	–	6	–	pF	
Breakdown voltage	V _{bd}	–	25	–	V	
Operating voltage	V _{op}	–	10	–	V	

1. Emission bandwidth for 90% integrated power.

2. Typical values at 25 $^{\circ}\text{C}$ and 0.6 NA collection optics.

3. Features common to all 5430 series diode lasers include:

a. Duty factor of 100%.

b. Temperature coefficient of wavelength is approximately 0.3 nm/ $^{\circ}\text{C}$.

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 110 $^{\circ}\text{K}$.

d. Temperature coefficient of operating current is approximately 0.5 to 0.7% per $^{\circ}\text{C}$.

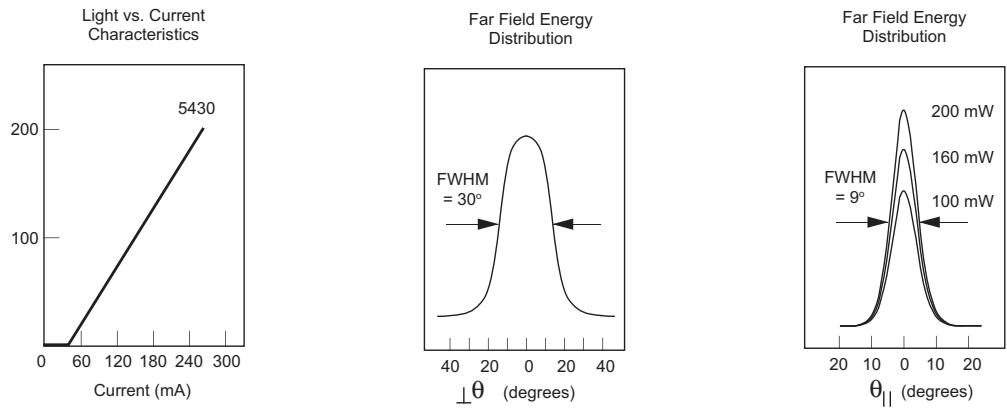
4. Forward voltage is typically: $V_f = 1.5 \text{ V} + I_{OP} \times R_S$.

5. Wavelength ranges for the 5400 and 5410 series:
830 nm

A variety of part numbers are available that each designate a particular subset within these wavelength ranges. Consult tables on page 5.

6. Astigmatism is less than 5 μm .

Typical Optical Characteristics



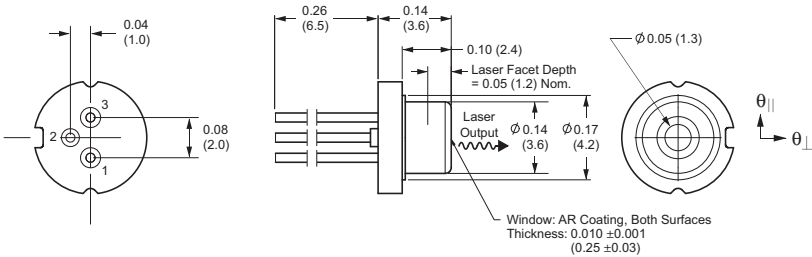
Dimensions Diagrams

(Specifications in inches [mm] unless otherwise noted.)
Standard Tolerances
inches: x.xx = ± 0.02
 x.xxx = ± 0.010
mm: x.x = ± 0.5
 x.xx = ± 0.25

Package Style: TO-56 Window (J1)

Pinout

Pin	Description
1	Laser cathode (-)
2	Laser anode, MPD cathode and case ground
3	Monitor photodiode anode (+)



User Safety

Safety and Operating Considerations

The laser light emitted from this diode laser is invisible and may be harmful to the human eye. Avoid looking directly into the diode laser or 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 diode laser 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 diode lasers may be damaged by excessive drive current or switching transients. When using power supplies, the diode laser should be connected with the main power on and the output voltage at zero. The current should be increased slowly while monitoring the diode laser 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 heatsink for the diode laser on a thermal radiator will greatly enhance laser life. Firmly mount the laser on a radiator with a thermal impedance of less than 2 °C/W for increased reliability.

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

Labeling

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.

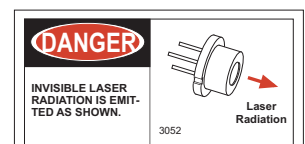
Serial Number Identification Label

JDS Uniphase Corporation	
MODEL:	S/N:
MANUFACTURED:	
WAVELENGTH:	Top:
This laser product complies with 21 CFR 1040 as applicable	

Output Power Danger Label



Package Aperture Labels



G1,J1 Package Diodes