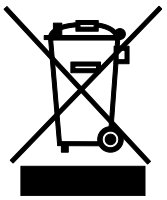
375 nm Laser Diode, 70 mW

L375P70MLD

Description

This 375 nm, 70 mW laser diode is a compact light source suited to many applications, including fluorescence measurements, microscopy, annealing, and photochemistry. It comes in a ∅5.6 mm, TO can package and is manufactured by Nichia as Item # NDU4116. To dissipate the high amount of generated heat and obtain a stable output spectrum, it is important to use a TEC-controlled mount. This diode is packaged with a Zener diode inside the TO can to help reduce the likelihood of ESD damage to the device. Normal laser diode handling practices, including grounding straps, should be observed.

Specifications

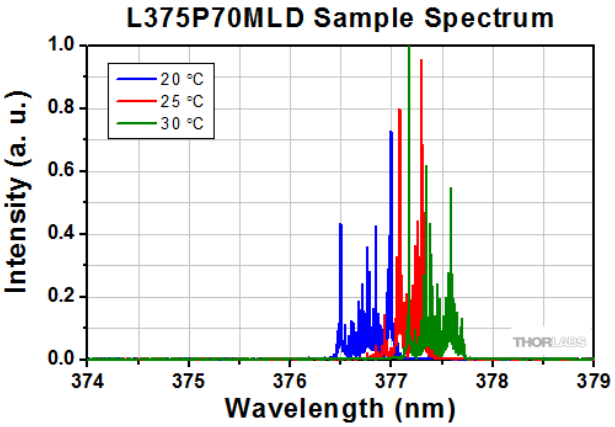


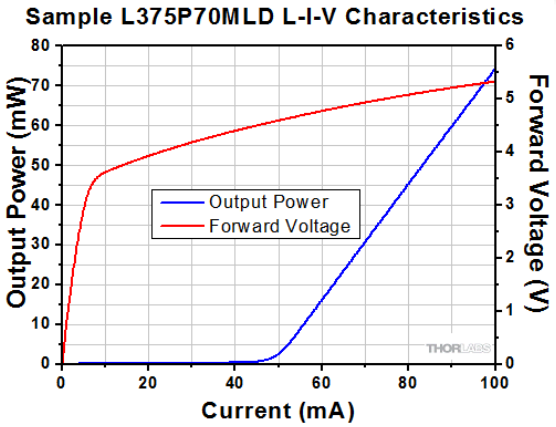
Absolute Max Ratings	
Specification	**Max**
Output Power	85 mW
LD Reverse Current	85 mA
PD Reverse Voltage	5 V
Operating Case Temperature	10 to 25 °C
Storage Temperature	-40 to 85 °C

L375P70MLD Specifications				
	Symbol	**Min**	**Typical**	**Max**
Center Wavelength	λ_o	370 nm	375 nm	380 nm
Output Power	P_o	-	70 mW	-
Operating Current CW @ P_o	I_{op}	80 mA	110 mA	140 mA
Threshold Current	I_{TH}	30 mA	50 mA	75 mA
Monitor Current @ P_o	I_s	0.05 mA	0.2 mA	2.0 mA
Operating Voltage @ P_o	V_{op}	4.6 V	5.4 V	6.0 V
Beam Divergence (FWHM) Parallel @ P_o	$\theta_{//}$	6°	9°	11°
Beam Divergence (FWHM) Perpendicular @ P_o	$\theta_{\perp}$	19°	22.5°	26°
Beam Pointing Accuracy Angle Parallel @ P_o	$\Delta\theta_{//}$	-3°	-	3°
Beam Pointing Accuracy Angle Perpendicular @ P_o	$\Delta\theta_{\perp}$	-3°	-	3°
Slope Efficiency	η	0.9 W/A	1.2 W/A	1.6 W/A

T_{CASE} = 25°C

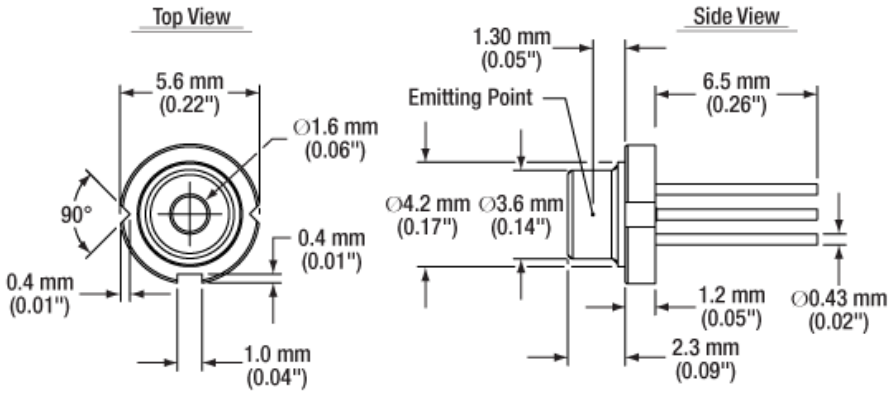
Performance Plots

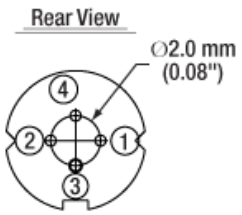


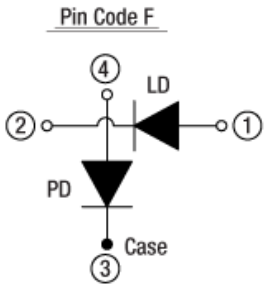


This data will vary for each diode. The sample spectrum of the L375P70MLD laser diode was taken at 20 °C, 25 °C, and 30 °C. The measurements were taken using a Thorlabs OSA201 Spectrum Analyzer. The L-I-V data was taken at 25 °C.

Drawings







Pin	Description
1	Laser Anode
2	Laser Cathode
3	Monitor PD Cathode (Case)
4	Monitor PD Anode

Operation Notes and Warnings

1. The Absolute Maximum values specified above should not ever be exceeded, even instantaneously. Operating at or near one or more of these values can significantly reduce the lifetime of or destroy the device.

2. Take all necessary Electrostatic Discharge (ESD) precautions. The user should be appropriately grounded, such as through the use of an ESD wrist strap with 1 MΩ resistance, as should all surfaces that come in contact with the leads. Neither the laser diode nor its mount should be disconnected while in operation. Handling in a low humidity environment tends to increase the chance of ESD damage. Other causes of electrical transients from the environment should be avoided.

3. Applying a reverse electric potential or current exceeding the specified value across the laser diode/LED can cause damage to the device.

4. It is necessary to determine a suitable drive (injection) current for each device by empirically measuring its LI relationship ("LI curve"). To do so, it is recommend to gradually increase the current from zero while monitoring the optical power until the specified power is reached. This should be performed at the same operating temperature that will be used in the application. From this measurement, a current limit appropriate to the specific device should be set on the controller. Merely operating at the specified Typical or Maximum Operating Current can damage the laser diode since the corresponding power may exceed its operating specification.

    a. Note that the Maximum Current value given above is the maximum current required for the diode to lase at the specified typical optical power. In practice, operating at the Maximum Current spec will likely result in an output power that approaches or exceeds the Absolute Maximum value.

5. The laser diode's specifications are valid at the specified operating case temperature. Operating at other temperatures will accelerate aging and results in a reduced lifetime. The TO header needs to be in good thermal contact with a suitable heat sink. For high heat load and/or narrow operating temperature range diodes, using a low thermal impedance temperature controlled mount is absolutely necessary; and the base of the TO header should be in good thermal contact with the heat sink.

6. If it is desirable to operate the laser diode in "constant power" mode, an appropriate value for the monitor current I_{Mon} should be determined by measuring at P_{op} in "constant current" mode. An appropriate drive current limit should also be set when operating in the constant power mode.

7. The laser diode should be operated with an appropriate current source. The current source should be free of transients. In particular, it should not spike or overshoot when powered on or off. Many standard laboratory benchtop or board level power supplies will not be free of transient. The current reading should be accurate.

8. It is necessary to avoid direct reflections to the laser diode. This can cause sudden failure, in addition to destabilizing the performance. It is recommended to use an optical isolator if reflections may be present.

9. This device emits coherent light and is classified as Class 3B when electrically powered. To ensure safe operation, use only with a suitable power source that complies with the requirements for laser systems, as specified in IEC-60825-1 "Safety of Laser Products."