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THORLABS

LP462-MF1W - November 28, 2018

Item # LP462-MF1W was discontinued on November 28, 2018. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

PIGTAILED LASER DIODES, MM FIBER

- 405 nm, 462 nm, 520 nm, 635 nm, or 658 nm Center Wavelength
- FC/PC or SMA905 Connector
- Custom Pigtails Available

LP520-MF100
520 nm, FC/PC Terminated

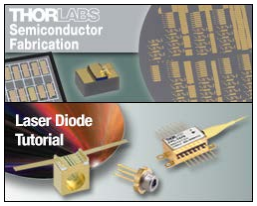
LPM-635-SMA
635 nm, SMA905 Terminated

Hide Overview

OVERVIEW

Features

- Multimode Pigtails at 405 nm, 462 nm, 520 nm, 635 nm, or 658 nm Center Wavelength
- Internal 8° Angle-Cleaved Fiber
- FC/PC (2.0 mm Narrow Key) or SMA905 Connector
- 1 m of MM Fiber
- Custom Pigtails Available Upon Request



This webpage contains Thorlabs' pigtailed laser diodes with multimode (MM) fiber. Diodes are arranged by wavelength and then power. The tables below list basic specifications to help you narrow down your search quickly. The blue button in the Info column within the tables opens a pop-up window that contains more detailed specifications for each item, as well as mechanical drawings.

Our high-quality MM pigtail alignment process for laser diodes includes multiple test and inspection points that ensure that the coupling efficiency is maximized. In addition, the input end of the fiber is cleaved at an 8° angle (as shown in the *Design* tab) in order to minimize back reflections that can cause the output intensity to fluctuate. We offer versions based on Ø5.6 mm and Ø9 mm TO-packaged diodes.

While the center wavelength is listed for each laser diode, this is only a typical number. The center wavelength of a particular unit varies from production run to production run, so the diode you receive may not operate at the typical center wavelength. After clicking "Choose Item" below, a list will appear that contains the dominant wavelength, output power, and operating current of each in-stock unit at 25° C. Clicking on the red Docs Icon next to the serial number provides access to a PDF with serial-number-specific L-I-V and spectral characteristics. Diodes can be temperature tuned, which will alter the lasing wavelength.

Laser Diode Selection Guide[a]
Shop by Package / Type
TO Can (Ø3.8, Ø5.6, Ø9, and Ø9.5 mm)
TO Can Pigtail (SM)
TO Can Pigtail (PM)
TO Can Pigtail (MM)
Fabry-Perot Butterfly Package
FBG-Stabilized Butterfly Package
Chip on Submount
MIR Fabry-Perot Two-Tab C-Mount
MIR Fabry-Perot D-Mount
One-Tab C-Mount
Single-Frequency Lasers
DFB TO Can Pigtail (SM)
VHG-Stabilized TO Can or Pigtail (SM)
VHG-Stabilized Butterfly Package (SM)
ECL Butterfly Package
DBR Butterfly Package
MIR DFB Two-Tab C-Mount
MIR DFB D-Mount
MIR DFB High Heat Load
Shop By Wavelength

- Our complete selection of laser diodes is available on the *LD Selection Guide* tab above.

The reliability of the laser diode/pigtail rapidly declines at higher temperatures. Therefore, for stable output power and wavelength, it is highly recommended that you use a temperature controller with these products.

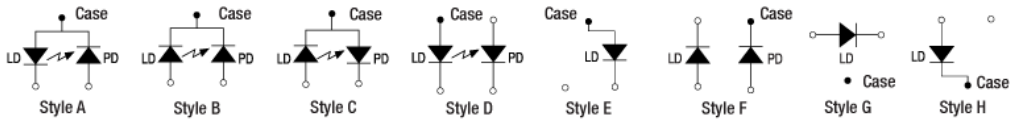
Laser diodes are sensitive to electrostatic shock. Please take the proper precautions when handling the device (see our electrostatic shock accessories). Fabry-Perot lasers are also sensitive to optical feedback, which can cause significant fluctuations in the output power of the laser diode depending on the application.

We recommend cleaning the fiber connector before each use if there is any chance that dust or other contaminants may have deposited on the surface. The laser intensity at the center of the fiber tip can be very high and may burn the tip of the fiber if contaminants are present. While the connectors on these pigtailed laser diodes are cleaned and capped before shipping, we cannot guarantee that they will remain free of contamination after they are removed from the package. For all of these pigtailed laser diodes, particularly those with power levels above 10 mW, the laser must be off when connecting or disconnecting the device.

Webpage Features	
	Clicking this icon opens a window that contains specifications and mechanical drawings.
	Clicking this icon allows you to download our standard support documentation.
Choose Item	Clicking the words "Choose Item" opens a drop-down list containing all of the in-stock lasers around the desired center wavelength. The red icon next to the serial number then allows you to download L-I-V and spectral measurements for that serial-numbered device.

Please contact Technical Support if you would like a quote on custom pigtailed laser diodes or for a volume order.

Pin Codes



For warranty information and the Thorlabs Life Support and Military Use Policy for laser diodes, please refer to the *LD Operation* tab.

Hide Design

DESIGN

The drawing to the right shows a laser diode's emitted light focused into an angle-polished fiber. By angling the ferrule 8°, light that is not coupled into the optical fiber is reflected away from the laser diode. Without this angle polish, reflected light would be coupled back into the diode.

Although we use a fiber coupling design that minimizes back reflections, other factors may also couple light into the fiber and send it back toward the diode. For example, many of our standard pigtailed laser diodes feature optical fiber with an FC/PC connector. When the FC/PC connector is not connected directly to another FC/PC connector, about 4% of light in the fiber is reflected back toward the laser diode due to the silica/air interface. Similarly, SMA905 connectors use a non-contact air gap design that always results in some back reflections from silica/air interfaces, even if two cables have been connected. For the multimode pigtailed laser diodes on this page, these back reflections are not significant and will not degrade performance. Customers who require pigtailed laser diodes with custom connectors are encouraged to contact Tech Support.

Hide LD Operation

LD OPERATION

Laser Diode and Laser Diode Pigtail Warranty

When operated within their specifications, laser diodes have extremely long lifetimes. Most failures occur from mishandling or operating the lasers beyond their maximum ratings. Laser Diodes are among the most static-sensitive devices currently made. Proper ESD Protection should be worn whenever handling a laser diode. Due to their extreme electrostatic sensitivity, laser diodes cannot be returned after their sealed package has been open. Laser diodes in their original sealed package can be returned for a full refund or credit.

Handling and Storage Precautions

Due to their extreme susceptibility to damage from electrostatic discharge (ESD), care should be taken whenever handling and operating laser diodes:

- Wrist Straps: Use grounded anti-static wrist straps whenever handling diodes.
- Anti-Static Mats: Always work on grounded anti-static mats.
- Laser Diode Storage: When not in use, short the leads of the laser together to protect against ESD damage.

Operating and Safety Precautions

Use an Appropriate Driver:

Laser diodes require precise control of operating current and voltage to avoid overdriving the laser diode. In addition, the laser driver should provide protection against power supply transients. Select a laser driver appropriate for your application. Do not use a voltage supply with a current limiting resistor since it does not provide sufficient regulation to protect the laser.

Power Meters:
When setting up and calibrating a laser diode with its driver, use a NIST-traceable power meter to precisely measure the laser output. It is usually safest to measure the laser output directly before placing the laser in an optical system. If this is not possible, be sure to take all optical losses (transmissive, aperture stopping, etc.) into consideration when determining the total output of the laser.

Reflections:
Flat surfaces in the optical system in front of a laser diode can cause some of the laser energy to reflect back onto the laser's monitor photodiode giving an erroneously high photodiode current. If optical components are moved within the system and energy is no longer reflected onto the monitor photodiode, a constant power feedback loop will sense the drop in photodiode current and try to compensate by increasing the laser drive current and possibly overdriving the laser. Back reflections can also cause other malfunctions or damage to laser diodes. To avoid this, be sure that all surfaces are angled 5-10°, and when necessary, use optical isolators to attenuate direct feedback into the laser.

Heat Sinks:
Laser diode lifetime is inversely proportional to operating temperature. Always mount the laser in a suitable heat sink to remove excess heat from the laser package.

Voltage and Current Overdrive:
Be careful not to exceed the maximum voltage and drive current listed on the specification sheet with each laser diode, even momentarily. Also, reverse voltages as little as 3 V can damage a laser diode.

ESD Sensitive Device:
Currently operating lasers are susceptible to ESD damage. This is particularly aggravated by using long interface cables between the laser diode and its driver due to the inductance that the cable presents. Avoid exposing the laser or its mounting apparatus to ESDs at all times.

ON/OFF and Power Supply Coupled Transients:
Due to their fast response times, laser diodes can be easily damaged by transients less than 1 µs. High current devices such as soldering irons, vacuum pumps, and fluorescent lamps can cause large momentary transients. Thus, always use surge-protected outlets.

If you have any questions regarding laser diodes, please call your local Thorlabs Technical Support office for assistance.

Life Support and Military Use Application Policy

Thorlabs' products are not authorized for use as critical components in life support devices or systems or in any military applications without the express written approval of the president of Thorlabs:

1. Life support devices or systems are devices or systems intended for either surgical implantation into the body or to sustain life and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system or to affect its safety or effectiveness.
3. Thorlabs' laser diodes are not intended nor warranted for usage in Military Applications.

Hide Laser Safety

LASER SAFETY

Laser Safety and Classification

Safe practices and proper usage of safety equipment should be taken into consideration when operating lasers. The eye is susceptible to injury, even from very low levels of laser light. Thorlabs offers a range of laser safety accessories that can be used to reduce the risk of accidents or injuries. Laser emission in the visible and near infrared spectral ranges has the greatest potential for retinal injury, as the cornea and lens are transparent to those wavelengths, and the lens can focus the laser energy onto the retina.

Safe Practices and Light Safety Accessories

- Thorlabs recommends the use of safety eyewear whenever working with laser beams with non-negligible powers (i.e., > Class 1) since metallic tools such as screwdrivers can accidentally redirect a beam.
- Laser goggles designed for specific wavelengths should be clearly available near laser setups to protect the wearer from unintentional laser reflections.
- Goggles are marked with the wavelength range

over which protection is afforded and the minimum optical density within that range.
- Blackout Materials can prevent direct or reflected light from leaving the experimental setup area.
- Thorlabs' Enclosure Systems can be used to contain optical setups to isolate or minimize laser hazards.
- A fiber-pigtailed laser should always be turned off before connecting it to or disconnecting it from another fiber, especially when the laser is at power levels above 10 mW.

- All beams should be terminated at the edge of the table, and laboratory doors should be closed whenever a laser is in use.
- Do not place laser beams at eye level.
- Carry out experiments on an optical table such that all laser beams travel horizontally.
- Remove unnecessary reflective items such as reflective jewelry (e.g., rings, watches, etc.) while working near the beam path.
- Be aware that lenses and other optical devices may reflect a portion of the incident beam from the front or rear surface.
- Operate a laser at the minimum power necessary for any operation.
- If possible, reduce the output power of a laser during alignment procedures.
- Use beam shutters and filters to reduce the beam power.
- Post appropriate warning signs or labels near laser setups or rooms.
- Use a laser sign with a lightbox if operating Class 3R or 4 lasers (i.e., lasers requiring the use of a safety interlock).
- Do not use Laser Viewing Cards in place of a proper Beam Trap.

Laser Classification

Lasers are categorized into different classes according to their ability to cause eye and other damage. The International Electrotechnical Commission (IEC) is a global organization that prepares and publishes international standards for all electrical, electronic, and related technologies. The IEC document 60825-1 outlines the safety of laser products. A description of each class of laser is given below:

Class	Description	Warning Label
1	This class of laser is safe under all conditions of normal use, including use with optical instruments for intrabeam viewing. Lasers in this class do not emit radiation at levels that may cause injury during normal operation, and therefore the maximum permissible exposure (MPE) cannot be exceeded. Class 1 lasers can also include enclosed, high-power lasers where exposure to the radiation is not possible without opening or shutting down the laser.	
1M	Class 1M lasers are safe except when used in conjunction with optical components such as telescopes and microscopes. Lasers belonging to this class emit large-diameter or divergent beams, and the MPE cannot normally be exceeded unless focusing or imaging optics are used to narrow the beam. However, if the beam is refocused, the hazard may be increased and the class may be changed accordingly.	
2	Class 2 lasers, which are limited to 1 mW of visible continuous-wave radiation, are safe because the blink reflex will limit the exposure in the eye to 0.25 seconds. This category only applies to visible radiation (400 - 700 nm).	
2M	Because of the blink reflex, this class of laser is classified as safe as long as the beam is not viewed through optical instruments. This laser class also applies to larger-diameter or diverging laser beams.	
3R	Lasers in this class are considered safe as long as they are handled with restricted beam viewing. The MPE can be exceeded with this class of laser, however, this presents a low risk level to injury. Visible, continuous-wave lasers are limited to 5 mW of output power in this class.	
3B	Class 3B lasers are hazardous to the eye if exposed directly. However, diffuse reflections are not harmful. Safe handling of devices in this class includes wearing protective eyewear where direct viewing of the laser beam may occur. In addition, laser safety signs lightboxes should be used with lasers that require a safety interlock so that the laser cannot be used without the safety light turning on. Class-3B lasers must be equipped with a key switch and a safety interlock.	
4	This class of laser may cause damage to the skin, and also to the eye, even from the viewing of diffuse reflections. These hazards may also apply to indirect or non-specular reflections of the beam, even from apparently matte surfaces. Great care must be taken when handling these lasers. They also represent a fire risk, because they may ignite combustible material. Class 4 lasers must be equipped with a key switch and a safety interlock.	
All class 2 lasers (and higher) must display, in addition to the corresponding sign above, this triangular warning sign		

Hide 405 nm Pigtail

405 nm Pigtail

Item #	Info	Wavelength	Power (Typ.)[a]	Typical/Max Drive Current[a]	Pin Code[b]	Package	Compatible Socket	Recommended Mount	Recommended Driver
LP405-MF300		405 nm	300 mW	350 mA / 410 mA	G	Ï 5.6 mm MM Pigtail	S7060R[c]	LDM9LP or CLD1010LP	ITC4001[d]

a. Do not exceed the maximum optical power or maximum drive current, whichever occurs first.
b. Laser diodes with A, B, C, or D pin codes have a built-in monitor photodiode and therefore support constant power operation.
c. This socket is included with the purchase of the corresponding laser diode.
d. The ITC4001 driver is only necessary if the LDM9LP mount or a custom mount is used, as the CLD1010LP is a combined mount and driver.

Part Number	Description	Price	Availability
LP405-MF300	405 nm, 300 mW, G Pin Code, Ø50 µm MM Fiber-Pigtailed Laser Diode, FC/PC	$809.88	Today
LP405-MF300	CWL = 403.3 nm, P = 300.0 mW (I = 350 mA), 25 °C	$809.88	3-5 Days
LP405-MF300	CWL = 402.9 nm, P = 300.0 mW (I = 359 mA), 25 °C	$809.88	3-5 Days
LP405-MF300	CWL = 404.6 nm, P = 300.0 mW (I = 340 mA), 25 °C	$809.88	Today
LP405-MF300	CWL = 404.8 nm, P = 300.0 mW (I = 349 mA), 25 °C	$809.88	Today
LP405-MF300	CWL = 402.7 nm, P = 300.0 mW (I = 357 mA), 25 °C	$809.88	Today
LP405-MF300	CWL = 403.5 nm, P = 300.0 mW (I = 344 mA), 25 °C	$809.88	Today
LP405-MF300	CWL = 405.3 nm, P = 300.0 mW (I = 345 mA), 25 °C	$809.88	Today
LP405-MF300	CWL = 404.5 nm, P = 300.0 mW (I = 343 mA), 25 °C	$809.88	Today
LP405-MF300	CWL = 405.9 nm, P = 300.0 mW (I = 397 mA), 25 °C	$809.88	Today
LP405-MF300	CWL = 405.6 nm, P = 300.0 mW (I = 358 mA), 25 °C	$809.88	Today
LP405-MF300	CWL = 405.7 nm, P = 300.0 mW (I = 342 mA), 25 °C	$809.88	Today
LP405-MF300	CWL = 404.7 nm, P = 300.0 mW (I = 349 mA), 25 °C	$809.88	Today
LP405-MF300	CWL = 404.6 nm, P = 300.0 mW (I = 342 mA), 25 °C	$809.88	Today
LP405-MF300	CWL = 404.4 nm, P = 300.0 mW (I = 350 mA), 25 °C	$809.88	Today
LP405-MF300	CWL = 404.2 nm, P = 300.0 mW (I = 352 mA), 25 °C	$809.88	Today
LP405-MF300	CWL = 404.1 nm, P = 300.0 mW (I = 344 mA), 25 °C	$809.88	Today
LP405-MF300	CWL = 403.6 nm, P = 300.0 mW (I = 360 mA), 25 °C	$809.88	Today
LP405-MF300	CWL = 403.8 nm, P = 300.0 mW (I = 351 mA), 25 °C	$809.88	Today
LP405-MF300	CWL = 405.7 nm, P = 300.0 mW (I = 357 mA), 25 °C	$809.88	Today
LP405-MF300	CWL = 405.8 nm, P = 300.0 mW (I = 358 mA), 25 °C	$809.88	Today
LP405-MF300	CWL = 403.6 nm, P = 300.0 mW (I = 345 mA), 25 °C	$809.88	Today
LP405-MF300	CWL = 405.5 nm, P = 300.0 mW (I = 356 mA), 25 °C	$809.88	3-5 Days
LP405-MF300	CWL = 404.7 nm, P = 300.0 mW (I = 364 mA), 25 °C	$809.88	Today

Hide 462 nm Pigtail

462 nm Pigtail

Item #	Info	Wavelength	Power (Typ.)[a]	Typical/Max Drive Current[a]	Pin Code[b]	Package	Compatible Socket	Recommended Mount[c]	Recommended Driver
LP462-MF1W		462 nm	1000 mW	1100 mA / 1450 mA	G	Ï 9 mm MM Pigtail	S8060	-	ITC4002QCL

a. Do not exceed the maximum optical power or maximum drive current, whichever occurs first.
b. Laser diodes with A, B, C, or D pin codes have a built-in monitor photodiode and therefore support constant power operation.
c. The LDM9LP, which has a maximum current output of 1 A, can be used to mount the LP462-MF1W, but the diode will not operate at the specified power using this mount.

Limited STOCK

The LP462-MF1W will be retired without replacement when stock is depleted. If you require this part for line production, please contact our OEM Team.

Part Number	Description	Price	Availability
LP462-MF1W	462 nm, 1000 mW, G Pin Code, Ø50 µm MM Fiber-Pigtailed Laser Diode, FC/PC	$876.18	3-5 Days
LP462-MF1W	CWL = 460.9 nm, P = 1000.0 mW (I = 1126 mA), 25 °C	$876.18	3-5 Days

Hide 520 nm Pigtail

520 nm Pigtail

Item #	Info	Wavelength	Power (Typ.)[a]	Typical/Max Drive Current[a]	Pin Code[b]	Package	Compatible Socket	Recommended Mount	Recommended Driver
LP520-MF100		520 nm	100 mW	320 mA / 390 mA	G	Ø5.6 mm MM Pigtail	S7060R[c]	LDM9LP or CLD1010LP	ITC4001[d]

a. Do not exceed the maximum optical power or maximum drive current, whichever occurs first.
b. Laser diodes with A, B, C, or D pin codes have a built-in monitor photodiode and therefore support constant power operation.
c. This socket is included with the purchase of the corresponding laser diode.
d. The ITC4001 driver is only necessary if the LDM9LP mount or a custom mount is used, as the CLD1010LP is a combined mount and driver.

Part Number	Description	Price	Availability
LP520-MF100	520 nm, 100 mW, G Pin Code, Ø105 µm MM Fiber-Pigtailed Laser Diode, FC/PC	$640.56	Today
LP520-MF100	CWL = 519.8 nm, P = 100.0 mW (I = 284 mA), 25 °C	$640.56	3-5 Days
LP520-MF100	CWL = 513.3 nm, P = 100.0 mW (I = 273 mA), 25 °C	$640.56	3-5 Days
LP520-MF100	CWL = 518.4 nm, P = 100.0 mW (I = 289 mA), 25 °C	$640.56	3-5 Days
LP520-MF100	CWL = 516.0 nm, P = 100.0 mW (I = 299 mA), 25 °C	$640.56	3-5 Days
LP520-MF100	CWL = 513.8 nm, P = 100.0 mW (I = 253 mA), 25 °C	$640.56	Today

Hide 635 and 658 nm Pigtails

635 and 658 nm Pigtails

Item #	Info	Wavelength	Power (Typ.)[a]	Typical/Max Drive Current[a]	Pin Code[b]	Package	Compatible Socket	Recommended Mount	Recommended Driver
LPM-635-SMA		635 nm	7.5 mW	70 mA / 95 mA	A	Ø9 mm MM Pigtail	S8060 or S8060-4	LDM9LP or CLD1010LP	ITC4001[c]
LPM-660-SMA		658 nm	22.5 mW	65 mA / 95 mA	C	Ø5.6 mm MM Pigtail	S7060R[d]	LDM9LP or CLD1011LP	ITC4001[c]

a. Do not exceed the maximum optical power or maximum drive current, whichever occurs first.
b. Laser diodes with A, B, C, or D pin codes have a built-in monitor photodiode and therefore support constant power operation.
c. The ITC4001 driver is only necessary if the LDM9LP mount or a custom mount is used, as the CLD1010LP and CLD1011LP are each a combined mount and driver.
d. This socket is included with the purchase of the corresponding laser diode.

Part Number	Description	Price	Availability
LPM-635-SMA	635 nm, 7.5 mW, A Pin Code, Ø62.5 µm MM Fiber-Pigtailed Laser Diode, SMA905	$410.04	Today
LPM-635-SMA	CWL = 637.4 nm, P = 8.0 mW (I = 59 mA), 25 °C	$410.04	Today
LPM-635-SMA	CWL = 637.4 nm, P = 8.0 mW (I = 60 mA), 25 °C	$410.04	Today
LPM-660-SMA	658 nm, 22.5 mW, C Pin Code, Ø62.5 µm MM Fiber-Pigtailed Laser Diode, SMA905	$374.34	Lead Time


LP462-MF1W