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S2011 - Feb. 25, 2015

Item # S2011 was discontinued on Feb. 25, 2015. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.



Hide Overview

OVERVIEW

Features

- Collimated or Adjustable-Focus Laser Diode Modules
- Compact Ø8 mm or Ø11 mm Housing Makes these Modules Ideal as Alignment Lasers
- Lasing at Wavelengths from 405 nm to 980 nm (See Table to the Right)
 - Five 635 nm Wavelength Options Provide Alternatives to HeNe
 - 635 nm Kit Includes the Laser Module, Power Supply, and Mounting Mechanics
- · Single-Wavelength VCSEL Collimated Laser Module for 850 nm Available
- · Power Supplies are Not Included with Individual Laser Diode Modules (Sold Separately Below)

Thorlabs' Laser Diode Modules are available in either collimated or adjustable-focus varieties and provide output powers ranging from 0.85 mW to 4.5 mW (laser safety Class 2, 3R, or 3B depending on the model). Each module has an output beam shape that is either elliptical or round, as indicated in the tables below. These modules, which offer single spatial mode output and a compact cylindrical housing, are ideal for use as alignment lasers in optical systems.

For single-frequency applications, our collimated 850 nm VCSEL Module produces a single-wavelength output and a round. Gaussian beam shape



635 nm

780 nm

Accesories

Mounting Adapters

5 VDC Power Supply

SM1-Threaded Adapter and Mounted into a CP90F Quick-Release Cage Plate Within a 30 mm Cage System



Click to Enlarge CPS450 Laser Diode Module Held in a KAD11NT Unthreaded Kinematic Adapter and Mounted into an FMP1 Fixed Optic Mount



Click to Enlarge CPS850 Laser Diode Module Held in an AD11NT Unthreaded Adapter and Mounted into a KM100 Kinematic



Click to Enlarge CPS980S Laser Diode Module Held in an AD8F SM1-Threaded Adapter and Mounted into an LM1XY XY Translation Mount

without clipping the beam. This laser module features a 2 to 3 order of magnitude narrower linewidth than our other laser modules, but this comes at the expense of a lower total power output.

Each module requires a 5 VDC power supply (not included), such as the LDS5 offered below, to operate. Alternatively, a 2.5 mm phono plug is included for customers who wish to wire their own power supply to the laser module. These diode modules have either a 18" (457 mm) or 24" (610 mm) long cable, with a 2.5 mm phono socket for connection to a power supply.

Mounting Options

The Ø8 mm and Ø11 mm housings are compatible with our line of optomechanical components through the use of various mounting adapters, as shown in the images to the right. Depending on the adapter chosen, these laser modules can be directly mounted into either internally SM1-threaded (1.035"-40)

components or mechanics with a Ø1" bore. Further details on each adapter and its compatibility with our line of optomechanics can be found below.

Please note that the knurled knob used for focus adjustment on the CPS635F, CPS650F, and CPS670F laser modules is too large for the mounting adapter bore. This knob can be unthreaded to mount the diode module in the same manner as the collimated versions. Please make sure to loosen the setscrews locking the knob in place before unthreading; not doing so can damage the threading. Alternatively, the module can be mounted by threading the cord and phono plug through the adapter first.

LASER RADIATION

DO NOT STARE INTO BEAM CLASS 2 LASER PRODUCT

LASER RADIATION
AVOID DIRECT EYE EXPOSURE
CLASS 3R LASER PRODUCT

LASER RADIATION
AVOID EXPOSURE TO BEAM
CLASS 3B LASER PRODUCT

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.
- Laser Barriers and 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 laser sign lightboxes 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 Laser Barrier or 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.	CLASS 1 LASER PRODUCT
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.	LASER RADIATION DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS CLASS 1M LASER PRODUCT
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).	LASER RADIATION DO NOT STARE INTO BEAM CLASS 2 LASER PRODUCT

es	
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.	LASER RADIATION DO NOT STARE INTO BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS CLASS 2M LASER PRODUCT
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.	LASER RADIATION AVOID DIRECT EYE EXPOSURE CLASS 3R LASER PRODUCT
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.	LASER RADIATION AVOID EXPOSURE TO BEAM CLASS 3B LASER PRODUCT
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.	LASER RADIATION AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION CLASS 4 LASER PRODUCT
2 lasers (and higher) must display, in addition to the corresponding sign above, this triangular warning sign	
	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. 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. 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. 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

Hide Laser Diode Modules: 405 nm - 532 nm

Laser Diode Modules: 405 nm - 532 nm

Laser Diode	aser Diode Modules. 403 IIII - 332 IIIII					
Click Image for Full View (Not to Scale)						
Item #	CPS405	CPS450	CPS520	CPS532	CPS532-C2	
Collimation	Fixed	Fixed	Fixed	Fixed	Fixed	
Wavelength (Typical)	405 nm	450 nm	520 nm	532 nm	532 nm	
Power (Typical)	4.5 mW (Class 3R)	4.5 mW (Class 3R)	4.5 mW (Class 3R)	4.5 mW (Class 3R)	0.9 mW (Class 2)	
Beam Shape ^a (Click for Profile)	3.8 mm x 1.8 mm	3.2 mm x 1.0 mm	4.6 mm x 1.7 mm	Ø3.5 mm	Ø3.5 mm	
Housing Dimensions	Ø11.0 mm x 40 mm	Ø11.0 mm x 40 mm	Ø11.0 mm x 40 mm	Ø11.0 mm x 72.8 mm	Ø11.0 mm x 72.8 mm	
Specifications	0	0	0	0	0	

• The beam size was measured at a distance of 2" (50.8 mm) from the front of the housing.

Part Number	Description	Price	Availability
CPS405	Collimated Laser Diode Module, 405 nm, 4.5 mW, Elliptical Beam, Ø11 mm Housing	\$185.00	Today
CPS450	Collimated Laser Diode Module, 450 nm, 4.5 mW, Elliptical Beam, Ø11 mm Housing	\$212.00	Today
CPS520	Collimated Laser Diode Module, 520 nm, 4.5 mW, Elliptical Beam, Ø11 mm Housing	\$185.00	Today
CPS532	Collimated Laser Diode Module, 532 nm, 4.5 mW, Round Beam, Ø11 mm Housing	\$155.00	Today
CPS532-C2	Collimated Laser Diode Module, 532 nm, 0.9 mW, Round Beam, Ø11 mm Housing	\$155.00	Today

Hide Laser Diode Modules: 635 nm

Laser Diode Modules: 635 nm

The laser diode modules shown below have a center wavelength of 635 nm, providing alternatives to HeNe lasers. The power supplies are not included and are sold below. If a full kit is preferred, we also offer the S2011 Laser Diode Module Kit, shown below, that includes a CPS196 laser module, an LDS5 power supply, a KM100T kinematic mount, post assembly, and AD11F Mounting Adapter.

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- Focus can be adjusted by loosening the knurled locking nut at the front of the laser housing. A lens is located within a threaded body, which will translate the lens as it is rotated. Focus can be locked by reattaching the knurled locking nut.
- Focus can be adjusted by loosening the knurled knob at the front of the laser housing. As the knob is turned, the lens will translate without rotation. Please note that the rotation of the knob can be locked with two setscrews using the provided 0.9 mm hex wrench.
- The beam size was measured at a distance of 2" (50.8 mm) from the front of the housing.

Part Number	Description	Price	Availability	
CPS180	Collimated Laser Diode Module, 635 nm, 1 mW, Round Beam, Ø11 mm Housing	\$140.00	Today	
CPS182	Collimated Laser Diode Module, 635 nm, 4.5 mW, Elliptical Beam, Ø11 mm Housing			
CPS635S	Collimated Laser Diode Module, 635 nm, 4.5 mW, Elliptical Beam, Ø8 mm Housing			
CPS196	Adjustable Focus Laser Module, 635 nm, 4.5 mW, Elliptical Beam, Ø11 mm Housing	\$150.30	3-5 Days	
CPS635F	Adjustable Focus Laser Diode Module, 635 nm, 4.5 mW, Eliptical Beam, Ø11 mm Housing	\$99.80	Today	

Hide 635 nm Laser Diode Module Kit

635 nm Laser Diode Module Kit



- Complete Kit Includes 635 nm Laser, Power Supply, and Mounting Mechanics
- CPS196 Laser Provides Adjustable Focus/Collimation
- Kinematic Mount for Tip/Tilt Adjustment

The S2011(-EC) kit contains all of the components needed to mount and power our CPS196 635 nm Laser Diode Module. It includes a CPS196 laser module, a power supply, a KM100T kinematic mount, a TR3 (TR75/M) post, a PH3 (PH3/M) post holder, an AD11F adapter, and a BA2 (BA2/M) base. For more information on the individual kit components, including links to the available drawings and documents, please see our supporting documents available by clicking the red "Docs" icon or by clicking on the item numbers below.

The kit includes a power supply with a selectable line voltage of 115 or 230 V and a location-specific power cable.

Part Number	Part Number Description		Availability
S2011	Adjustable Focus Laser Diode Kit, 635 nm, 4.5 mW	\$338.00	Lead Time
S2011-EC	Adjustable Focus Laser Diode Kit, 635 nm, 4.5 mW, Metric	\$338.00	Today
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Hide Laser Diode Modules: 650 nm - 780 nm

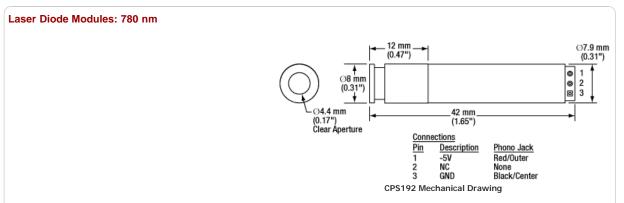
| Click Image for Full View (Not to Scale) | Item # | CPS184 | CPS650Fa | CPS186 | CPS198b | CPS670Fa | CPS670

Туре	Fixed	Adjustable	Fixed	Adjustable	Adjustable	
Wavelength (Typical)	650 nm	650 nm 670 nm		670 nm	670 nm	
Power (Typical)	4.5 mW (Class 3R)	4.5 mW (Class 3R) 4.5 mW (Class 3R)		4.5 mW (Class 3R)	4.5 mW (Class 3R)	
Beam Shape ^c (Click for Profile)	4.4 mm x 1.2 mm	Collimated 5.0 mm x 2.4 mm	4.4 mm x 1.2 mm	Collimated 2.54 mm x 0.54 mm	Collimated 5.0 mm x 2.4 mm	
Housing Dimensions	Ø8.0 mm x 42 mm	Ø11.0 mm x 54 mm	Ø8.0 mm x 42 mm	Ø11.0 mm x 46 mm	Ø11.0 mm x 54 mm	
Specifications	0	0	•	0	0	

- Focus can be adjusted by loosening the knurled knob at the front of the laser housing. As the knob is turned, the lens will translate without rotation. Please note that the rotation of the knob can be locked with two setscrews using the provided 0.9 mm hex wrench.
- Focus can be adjusted by loosening the knurled locking nut at the front of the laser housing. A lens is located within a threaded body, which will translate the lens as it is rotated. Focus can be locked by reattaching the knurled locking nut.
- The beam size was measured at a distance of 2" (50.8 mm) from the front of the housing.

Part Number	Description	Price	Availability	
CPS184	Collimated Laser Diode Module, 650 nm, 4.5 mW, Elliptical Beam, Ø8 mm Housing	\$108.00	Today	
CPS650F	Focus Adjustable Laser Diode Module, 650 nm, 4.5 mW, Elliptical Beam, Ø11 mm Housing			
CPS186	Collimated Laser Diode Module, 670 nm, 4.5 mW, Elliptical Beam, Ø8 mm Housing	\$117.00	Today	
CPS198	Adjustable Focus Laser Module, 670 nm, 4.5 mW, Elliptical Beam, Ø11 mm Housing	\$138.00	Today	
CPS670F	Adjustable Focus Laser Diode Module, 670 nm, 4.5 mW, Elliptical Beam, Ø11 mm Housing	\$113.20	Today	

Hide Laser Diode Modules: 780 nm



Click Image for Full View (Not to Scale)	0.00	
Item #	CPS192	CPS780S
Туре	Fixed	Fixed
Wavelength (Typical)	780 nm	780 nm
Power (Typical)	4.5 mW (Class 3R)	4.5 mW (Class 3R)
Beam Shape ^a (Click for Profile)	4.4 mm x 1.7 mm	3.8 mm x 1.6 mm
Housing Dimensions	Ø8.0 mm x 42 mm	Ø8.0 mm x 30 mm
Specifications	0	0

 The beam size was measured at a distance of 2" (50.8 mm) from the front of the housing.

000400			
CPS192 Collimated Laser	r Diode Module, 780 nm, 4.5 mW, Elliptical Beam, Ø8 mm Housing	\$106.00	Today
CPS780S Collimated Laser	r Diode Module, 780 nm, 4.5 mW, Elliptical Beam, Ø8 mm Housing	\$98.00	Today

Hide Laser Diode Modules: 808 nm - 980 nm

Laser Diode	Modules: 808 nm - 980	nm		

er Diode Modules				
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Item #	CPS808A	CPS808S	CPS830	CPS830S
Collimation	Fixed	Fixed	Fixed	Fixed
Wavelength (Typical)	808 nm	808 nm	830 nm	830 nm
Power (Typical)	4.5 mW (Class 3R)	4.5 mW (Class 3R)	4.5 mW (Class 3R)	4.5 mW (Class 3R)
Beam Shape a (Click for Profile)	2.6 mm x 1.3 mm	2.8 mm x 1.6 mm	4.4 mm x 1.1 mm	4.0 mm x 1.3 mm
Housing Dimensions	Ø11.0 mm x 40 mm	Ø8.0 mm x 30 mm	Ø11.0 mm x 40 mm	Ø8.0 mm x 30 mm
Specifications	0	0	0	0
Click Image for Full View (Not to Scale)				
Click Image for Full View	CPS850	CPS850S	CPS980	CPS980S
Click Image for Full View (Not to Scale)			3	
Click Image for Full View (Not to Scale)	CPS850	CPS850S	CPS980	CPS980S
Click Image for Full View (Not to Scale) Item # Collimation Wavelength	CPS850 Fixed	CPS850S Fixed	CPS980 Fixed	CPS980S Fixed
Click Image for Full View (Not to Scale) Item # Collimation Wavelength (Typical) Power	CPS850 Fixed 850 nm	CPS850S Fixed 850 nm	CPS980 Fixed 980 nm	CPS980S Fixed 980 nm

• The beam size was measured at a distance of 2" (50.8 mm) from the front of the housing.

Ø8.0 mm x 30 mm

Ø11.0 mm x 40 mm

Part Number	Description	Price	Availability
CPS808A	Collimated Laser Diode Module, 808 nm, 4.5 mW, Elliptical Beam, Ø11 mm Housing	\$168.00	Today
CPS808S	Collimated Laser Diode Module, 808 nm, 4.5 mW, Elliptical Beam, Ø8 mm Housing	\$168.00	Today
CPS830	Collimated Laser Diode Module, 830 nm, 4.5mW, Elliptical Beam, Ø11 mm Housing	\$102.00	Today
CPS830S	Collimated Laser Diode Module, 830 nm, 4.5 mW, Elliptical Beam, Ø8 mm Housing	\$102.00	Today
CPS850	Collimated Laser Diode Module, 850 nm, 4.5 mW, Elliptical Beam, Ø11 mm Housing	\$102.00	Today
CPS850S	Collimated Laser Diode Module, 850 nm, 4.5 mW, Elliptical Beam, Ø8 mm Housing	\$102.00	Today
CPS980	Collimated Laser Diode Module, 980 nm, 4.5mW, Elliptical Beam, Ø11 mm Housing	\$99.00	Today
CPS980S	Collimated Slim Laser Module, 980 nm, 4.5mW, Elliptical Beam, Ø8 mm Housing	\$99.00	Today

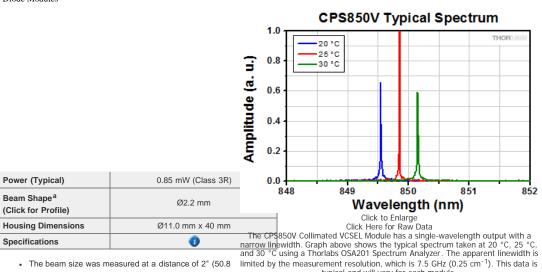
Ø11.0 mm x 40 mm

Ø8.0 mm x 30 mm

Hide VCSEL Laser Diode Module: 850 nm

Dimensions
Specifications

Click Image for Full View (Not to Scale) Item # CPS850V Collimation Fixed Wavelength (Typical) 850 nm



typical and will vary for each module. mm) from the front of the housing.

Part Number	Description	Price	Availability
CPS850V	NEW! Customer Inspired!Collimated VCSEL Diode Module, 850 nm, 0.85 mW, Circular Beam, Ø11 mm Housing	\$211.00	Today

Hide Laser Diode Module Mounting Adapters

Laser Diode Module Mounting Adapters

These adapters provide mechanical compatibility between the laser diode housing and SM1 (1.035"-40) lens tubes, 30 mm cage systems, Ø1/2" posts, or Ø1/2" or Ø1" Mounts. Please see the application photos in the Overview tab for more details.

The KAD11F and KAD11NT Adapters both provide ±6° of pitch and yaw adjustment. Two 80 TPI fine adjustment screws on the front plate of the adapter control the pitch and yaw position and can be turned using a 5/64" (2.0 mm) hex key.

Please note that the knurled knob used for focus adjustment on the CPS635F, CPS650F, and CPS670F laser modules is too large for the mounting adapter bore. This knob can be unthreaded to mount the diode module in the same manner as the collimated versions, as shown in the animation to the right. Please make sure to loosen the setscrews locking the knob in place before unthreading; not doing so can damage the threading. Alternatively, the module can be mounted by threading the cord and phono plug through the adapter first.



Part Number	Description	Price	Availability
AD8F	SM1-Threaded Adapter for Ø8 mm Cylindrical Components	\$27.50	Today
AD11BA	NEW! Ø1/2" Unthreaded Adapter for Ø11 mm Cylindrical Components	\$19.00	Today
AD11F	SM1-Threaded Adapter for Ø11 mm Cylindrical Components	\$27.80	Today
AD11NT	Customer Inspired!Ø1" Unthreaded Adapter for Ø11 mm Cylindrical Components	\$22.00	Today
KAD11F	SM1-Threaded Kinematic Pitch/Yaw Adapter for Ø11 mm Cylindrical Components	\$63.00	Today
KAD11NT	Ø1" Kinematic Pitch/Yaw Adapter for Ø11 mm Cylindrical Components	\$60.00	Today

Hide 5 VDC Regulated Power Supply

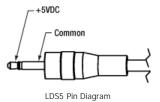
5 VDC Regulated Power Supply



- Compatible with CPS Series Laser Modules
- 5 VDC Power Output
- 6 ft (183 cm) Cable with 2.5 mm Phono Plug

The LDS5 is a 5 VDC power supply that is ideal for use with our CPS laser diode modules. A 6 ft (183 cm) cable with a 2.5 mm phono plug extends from the body of the power supply for connection to a CPS module.

The power supply has a selectable line voltage of 115 or 230 V. A 120 VAC power cable is included with the LDS5, while the LDS5-EC comes with a 230 VAC power cable. To order this item with a different power cable, please contact tech support.



Part Number	Description	Price	Availability
LDS5	5 VDC Regulated Power Supply, 2.5 mm Phono Plug, 120 VAC	\$83.35	Today
LDS5-EC	5 VDC Regulated Power Supply, 2.5 mm Phono Plug, 230 VAC	\$83.35	Today

Visit the Laser Diode Modules page for pricing and availability information: http://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=1487