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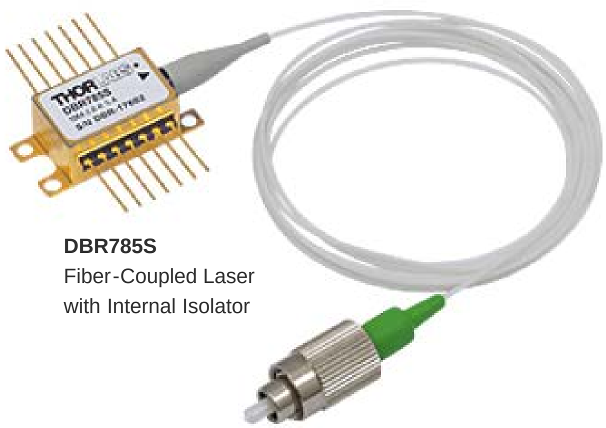
DBR852P - MAY 15, 2018

Item # DBR852P was discontinued on May 15, 2018. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

PIGTAILED DISTRIBUTED BRAGG REFLECTOR (DBR) SINGLE-FREQUENCY LASERS, BUTTERFLY PACKAGE

- 785 nm, 852 nm, 976 nm, or 1064 nm DBR Laser Diodes
- Narrowband, Tunable, Single-Frequency Operation
- Integrated TEC Element
- Versions with SM or PM Fiber Pigtail



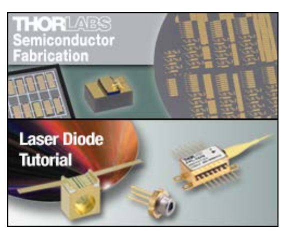
DBR785S
Fiber-Coupled Laser
with Internal Isolator

Application Idea
DBR Laser Diode Mounted in a CLD1015 Laser Diode Controller/Mount

OVERVIEW

Features

- Center Wavelengths: 785 nm, 852 nm, 976 nm, or 1064 nm
- 785 nm and 1064 nm Packages Have Internal Optical Isolator
- 14-Pin, Hermetically Sealed Butterfly Package
- Integrated Thermoelectric Cooler (TEC), Thermistor, and Monitor Photodiode
- Current Tuning of ±0.1 nm (Typical)
- Temperature Tuning of ±0.7 nm (Typical)
- Narrow 10 MHz Typical Linewidth
- SM or PM Fiber Output with 2.0 mm Narrow Key FC/APC Connector



Applications

- High-Resolution Spectroscopy
- Optical Metrology and Sensors
- Fiber Amplifier Seeding
- Nonlinear Frequency Conversion
- Laser Cooling and Trapping
- Free-Space Optical Communications

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)
FP Butterfly Package
FBG-Stabilized Butterfly Package
Chip on Submount
MIR Fabry-Perot Two-Tab C-Mount
MIR FP D-Mount
One-Tab C-Mount
Single-Frequency Lasers
DFB TO Can Pigtail (SM)
VHG-Stabilized TO Can or Pigtail (SM)
ECL Butterfly Package
DBR Butterfly Package
MIR DFB Two-Tab C-Mount
MIR DFB D-Mount
MIR DFB High Heat Load

Thorlabs' Distributed Bragg Reflector (DBR) lasers are narrow-linewidth, single-frequency (single-longitudinal-mode) laser diodes that have a monolithically integrated Bragg mirror outside of the active region. These lasers produce higher output powers than DFB lasers and achieve 10 MHz typical linewidths with excellent side mode suppression ratio (50 dB typical). The output wavelengths of these lasers are current- and temperature-tunable over approximately ±0.1 nm and ±0.7 nm, respectively. For a complete list of specifications for each DBR laser, click on the blue icons ( ) in the tables below.

Shop By Wavelength

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

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.

These DBR lasers are housed in a compact 14-pin type 1 butterfly package, enabling compatibility with any standard 14-pin laser diode mount (such as Item #'s LM14S2 or CLD1015). The butterfly package includes an integrated thermoelectric cooler (TEC), thermistor, monitor photodiode, and a single mode or polarization-maintaining output fiber with an FC/APC connector. DBR lasers are extremely sensitive to back reflections, which necessitates the use of the angled FC/APC connector. For additional protection from back reflections, we currently offer the 785 nm and 1064 nm DBR lasers with internal optical isolators.

While the center wavelengths are listed for the laser diodes below, they are only the typical values. 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 center wavelength, output power, and operating current of each in-stock unit. 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. For additional single frequency laser options, Thorlabs also offers external cavity, butterfly-packaged single frequency lasers. These lasers offer narrower linewidths compared to our DBR lasers.

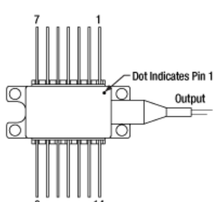
For an all-in-one current and temperature controller, we recommend the CLD1015 Compact Laser Diode Controller (pictured above in the Application Idea). This controller features a 14-pin butterfly mount, integrated current source, and digital PID TEC controller. Additionally, these DBR lasers are compatible with Thorlabs' line of laser diode drivers and temperature controllers. To achieve the narrowest possible linewidth, we recommend using a driver with low drive current noise, such as the LDC205C.

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 connector is cleaned and capped before shipping, we cannot guarantee that it will remain free of contamination after it is removed from the package. We also recommend that the laser is turned off when connecting or disconnecting the device from other fibers.

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

PIN DIAGRAM

Type 1 Butterfly Package Pin Diagram

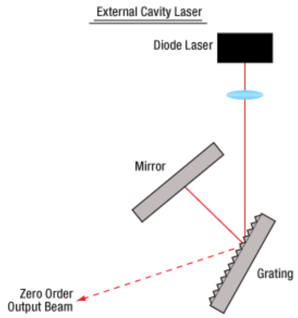


Pin Identification			
Pin	**Assignment**	**Pin**	**Assignment**
1	TEC +	14	TEC -
2	Thermistor	13	Case
3	PD Anode	12	-
4	PD Cathode	11	LD Cathode
5	Thermistor	10	LD Anode
6	-	9	-
7	-	8	-

SFL GUIDE

ECL, DFB, VHG-Stabilized, and DBR Single-Frequency Lasers

A wide variety of applications require tunable single-frequency operation of a laser system. In the world of



Click to Enlarge
Figure 1: ECL Lasers have a Grating Outside of the Gain Chip

diode lasers, there are currently four main configurations to obtain a single-frequency output: external cavity laser (ECL), distributed feedback (DFB), volume holographic grating (VHG), and distributed Bragg reflector (DBR). All four are capable of single-frequency output through the utilization of grating feedback. However, each type of laser uses a different grating feedback configuration, which influences performance characteristics such as output power, tuning range, and side mode suppression ratio (SMSR). We discuss below some of the main differences between these four types of single-frequency diode lasers.

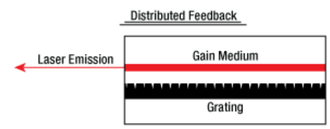
External Cavity Laser

The External Cavity Laser (ECL) is a versatile configuration that is compatible with most standard free space diode lasers. This means that the ECL can be used at a variety of wavelengths, dependent upon the internal laser diode gain element. A lens collimates the output of the diode, which is then incident upon a grating (see Figure 1). The grating provides optical feedback and is used to select the stabilized output wavelength. With proper optical design, the external cavity allows only a single longitudinal mode to lase, providing single-frequency laser output with high side mode suppression ratio (SMSR > 45 dB).

One of the main advantages of the ECL is that the relatively long cavity provides extremely narrow linewidths (<1 MHz). Additionally, since it can incorporate a variety of laser diodes, it remains one of the few configurations that can provide narrow linewidth emission at blue or red wavelengths. The ECL can have a large tuning range (>100 nm) but is often prone to mode hops, which are very dependent on the ECL's mechanical design as well as the quality of the antireflection (AR) coating on the laser diode.

Distributed Feedback Laser

The Distributed Feedback (DFB) Laser (available in NIR and MIR) incorporates the grating within the laser diode structure itself (see Figure 2). This corrugated periodic structure coupled closely to the active region acts as a Bragg reflector, selecting a single longitudinal mode as the lasing mode. If the active region has enough gain at frequencies near the Bragg frequency, an end reflector is unnecessary, relying instead upon the Bragg reflector for all optical feedback and mode selection. Due to this “built-in” selection, a DFB can achieve single-frequency operation over broad temperature and current ranges. To aid in mode selection and improve manufacturing yield, DFB lasers often utilize a phase shift section within the diode structure as well.



Click to Enlarge
Figure 2: DFB Lasers Have a Bragg Reflector Along the Length of the Active Gain Medium

The lasing wavelength for a DFB is approximately equal to the Bragg wavelength:

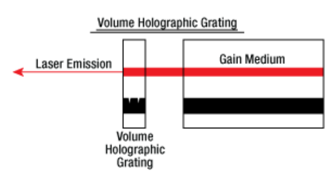
$$\lambda = 2n_{eff}\Lambda$$

where λ is the wavelength, n_{eff} is the effective refractive index, and Λ is the grating period. By changing the effective index, the lasing wavelength can be tuned. This is accomplished through temperature and current tuning of the DFB.

The DFB has a relatively narrow tuning range: about 2 nm at 850 nm, about 4 nm at 1550 nm, or at least 1 cm^{-1} in the mid-IR (4.00 - 11.00 µm). However, over this tuning range, the DFB can achieve single-frequency operation, which means that this is a continuous tuning range without mode hops. Because of this feature, DFBs have become a popular and majority choice for real-world applications such as telecom and sensors. Since the cavity length of a DFB is rather short, the linewidths are typically in the 1 MHz to 10 MHz range. Additionally, the close coupling between the grating structure and the active region results in lower maximum output power compared to ECL and DBR lasers.

Volume-Holographic-Grating-Stabilized Laser

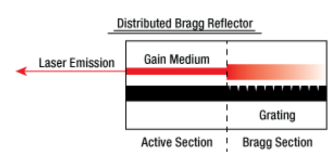
A Volume-Holographic-Grating-(VHG)-Stabilized Laser also uses a Bragg reflector, but in this case a transmission grating is placed in front of the laser diode output (see Figure 3). Since the grating is not part of the laser diode structure, it can be thermally decoupled from the laser diode, improving the wavelength stability of the device. The grating typically consists of a piece of photorefractive material (typically glass) which has a periodic variation in the index of refraction. Only the wavelength of light that satisfies the Bragg condition for the grating is reflected back into the laser cavity, which results in a laser with extremely wavelength-stable emission. A VHG-Stabilized laser can produce output with a similar linewidth to a DFB laser at higher powers that is wavelength-locked over a wide range of currents and temperatures.



Click to Enlarge
Figure 3: VHG Lasers have a Volume Holographic Grating Outside of the Active Gain Medium

Distributed Bragg Reflector Laser

Similar to DFBs, Distributed Bragg Reflector (DBR) lasers incorporate an internal grating structure. However, whereas DFB lasers incorporate the grating structure continuously along the active region (gain region), DBR lasers place the grating structure(s) outside this region (see Figure 4). In general a DBR can incorporate various regions not typically found in a DFB that yield greater control and tuning range. For instance, a multiple-electrode DBR laser can include a phase-controlled region that allows the user to independently tune the phase apart from the grating period and laser diode current. When utilized together, the DBR can provide single-frequency operation over a broad tuning range. For example, high end sample-grating DBR lasers can



Click to Enlarge
Figure 4: DBR Lasers have a Bragg Reflector Outside of the Active Gain Medium

have a tuning range as large as 30 - 40 nm. Unlike the DFB, the output is not mode hop free; hence, careful control of all inputs and temperature must be maintained.

In contrast to the complicated control structure for the multiple-electrode DBR, a simplified version of the DBR is engineered with just one electrode. This single-electrode DBR eliminates the complications of grating and phase control at the cost of tuning range. For this architecture type, the tuning range is similar to a DFB laser but will mode hop as a function of the applied current and temperature. Despite the disadvantage of mode hops, the single-electrode DBR does provide some advantages over its DFB cousin, namely higher output power because the grating is not continuous along the length of the device. Both DBR and DFB lasers have similar laser linewidths. Currently, Thorlabs offers only single-electrode DBR lasers.

Conclusion
ECL, DFB, VHG, and DBR laser diodes provide single-frequency operation over their designed tuning range. The ECL can be designed for a larger selection of wavelengths than either the DFB or DBR. While prone to mode hops, it also provides the narrowest linewidth (<1 MHz) of the three choices. In appropriately designed instruments, ECLs can also provide extremely broad tuning ranges (>100 nm).

The DFB laser is the most stable single-frequency, tunable laser of the four. It can provide mode-hop-free performance over its entire tuning range (<5 nm), making it one of the most popular forms of single-frequency laser for much of industry. It has the lowest output power due to inherent properties of the continuous grating feedback structure.

The VHG laser provides the most stable wavelength performance over a range of temperatures and currents and can provide higher powers than are typical in DFB lasers. This stability makes it excellent for use in OEM applications.

The single-electrode DBR laser provides similar linewidth and tuning range as the DFB (<5 nm). However, the single-electrode DBR will have periodic mode hops in its tuning curve.

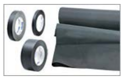
LASER SAFETY

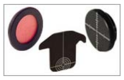
Laser Safety and Classification

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		

L D O P E R A T I O N

Laser Diode and Laser Diode Pigtail Warranty

When operated within their specifications, laser diodes have extremely long lifetimes. However most failures occur from mishandling or operating the lasers beyond their maximum ratings. Laser Diodes are among the most static sensitive devices currently made. Since Thorlabs does not receive any warranty credit from our laser manufacturers we cannot guarantee the lasers after their sealed package has been open. Thorlabs will be happy to extend a full refund or credit for any lasers returned in their original sealed package.

Handling and Storage Precautions

Because of 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.
- **Storing Lasers:** 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 lasers. 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 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 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 currents even momentarily. Also, reverse voltages as little as 3 V can damage a laser diode.
- **ESD Sensitive Device:** Even when a laser is operating it is susceptible to ESD damage. This is particularly aggravated by using long interface cables between the laser 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:** Because of 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, fluorescent lamps, etc., can cause large momentary transients; 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 APPLICATION WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF THORLABS, INC.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or 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. The Thorlabs products described in this document are not intended nor warranted for usage in Military Applications.

785 nm DBR Laser Diodes

Item #	Info	Wavelength (nm)	Power (mW)[a]	Typical Drive Current (mA)[a]	Package	Built-In Isolator	Pin Code	Monitor Photodiode[b]	Wavelength Tested	Spatial Mode
DBR785S	i	785	20	230	SM-Pigtailed Butterfly	Yes	14-Pin Type 1[c]	Yes	Yes	Single Mode
DBR785P	i				PM-Pigtailed Butterfly					

- Do not exceed the maximum optical power or maximum drive current, whichever occurs first.
- Laser diodes with a built-in monitor photodiode can operate at constant power.
- See the *Pin Diagram* Tab for Pin Configuration

Part Number	Description	Price	Availability

DBR785S	**785 nm, 20 mW, Butterfly DBR Laser, SM Fiber, FC/APC, Internal Isolator**	**$4,042.26**	**Today**
DBR785S	**CWL = 785.0 nm, P = 32.6 mW (I = 250 mA),25 °C**	**$4,042.26**	**Today**
DBR785S	**CWL = 784.8 nm, P = 32.5 mW (I = 250 mA),25 °C**	**$4,042.26**	**Today**
DBR785P	**785 nm, 20 mW, Butterfly DBR Laser, PM Fiber, FC/APC, Internal Isolator**	**$4,119.78**	**Today**
DBR785P	**CWL = 785.6 nm, P = 24.3 mW (I = 230 mA),25 °C**	**$4,119.78**	**Today**
DBR785P	**CWL = 784.8 nm, P = 31.2 mW (I = 230 mA),25 °C**	**$4,119.78**	**Today**
DBR785P	**CWL = 784.8 nm, P = 31.6 mW (I = 230 mA),25 °C**	**$4,119.78**	**Today**

852 nm DBR Laser Diodes

Item #	Info	Wavelength (nm)	Power (mW)[a]	Typical Drive Current (mA)[a]	Package	Built-In Isolator	Pin Code	Monitor Photodiode[b]	Wavelength Tested	Spatial Mode
DBR852S		852	35	140	SM-Pigtailed Butterfly	No	14-Pin Type 1[c]	Yes	Yes	Single Mode
DBR852P					PM-Pigtailed Butterfly					

- Do not exceed the maximum optical power or maximum drive current, whichever occurs first.
- Laser diodes with a built-in monitor photodiode can operate at constant power.
- See the *Pin Diagram* Tab for Pin Configuration

These items 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
DBR852S	**852 nm, 35 mW, Butterfly DBR Laser, SM Fiber, FC/APC**	**$3,822.96**	**Lead Time**
DBR852P	**852 nm, 35 mW, Butterfly DBR Laser, PM Fiber, FC/APC**	**$3,901.50**	**Lead Time**

976 nm DBR Laser Diodes

Item #	Info	Wavelength (nm)	Power (mW)[a]	Typical Drive Current (mA)[a]	Package	Built-In Isolator	Pin Code	Monitor Photodiode[b]	Wavelength Tested	Spatial Mode
DBR976S		976	35	150	SM-Pigtailed Butterfly	No	14-Pin Type 1[c]	Yes	Yes	Single Mode
DBR976P					PM-Pigtailed Butterfly					

- Do not exceed the maximum optical power or maximum drive current, whichever occurs first.
- Laser diodes with a built-in monitor photodiode can operate at constant power.
- See the *Pin Diagram* Tab for Pin Configuration

Part Number	Description	Price	Availability
DBR976S	**976 nm, 35 mW, Butterfly DBR Laser, SM Fiber, FC/APC**	**$3,687.30**	**Lead Time**
DBR976P	**976 nm, 35 mW, Butterfly DBR Laser, PM Fiber, FC/APC**	**$3,770.94**	**Lead Time**

1064 nm DBR Laser Diodes

Item #	Info	Wavelength (nm)	Power (mW)[a]	Typical Drive Current (mA)[a]	Package	Built-In Isolator	Pin Code	Monitor Photodiode[b]	Wavelength Tested	Spatial Mode
DBR1064S		1064	20	150	SM-Pigtailed Butterfly	Yes	14-Pin Type 1[c]	Yes	Yes	Single Mode
DBR1064P					PM-Pigtailed Butterfly					

- Do not exceed the maximum optical power or maximum drive current, whichever occurs first.

- Laser diodes with a built-in monitor photodiode can operate at constant power.
- See the *Pin Diagram* Tab for Pin Configuration

Part Number	Description	Price	Availability
DBR1064S	1064 nm, 20 mW, Butterfly DBR Laser, SM Fiber, FC/APC, Internal Isolator	$3,911.70	Today
DBR1064S	CWL = 1064.6 nm, P = 35.9 mW (I = 150 mA),25 °C	$3,911.70	Today
DBR1064S	CWL = 1064.3 nm, P = 36.0 mW (I = 150 mA),25 °C	$3,911.70	Today
DBR1064S	CWL = 1064.3 nm, P = 35.3 mW (I = 150 mA),25 °C	$3,911.70	Today
DBR1064P	1064 nm, 20 mW, Butterfly DBR Laser, PM Fiber, FC/APC, Internal Isolator	$3,990.24	Today
DBR1064P	CWL = 1064.6 nm, P = 29.3 mW (I = 150 mA),25 °C	$3,990.24	Today
DBR1064P	CWL = 1064.8 nm, P = 28.1 mW (I = 150 mA),25 °C	$3,990.24	Today
DBR1064P	CWL = 1064.7 nm, P = 27.6 mW (I = 150 mA),25 °C	$3,990.24	Today

DBR852P - 852 nm, 35 mW, Butterfly DBR Laser, PM Fiber, FC/APC

Specs | Fiber Specs | Drawing | Spectrum | SMSR | Tuning | LIV

Optical Electrical Characteristics (T_{CHIP} = 15 - 35 °C, T_{CASE} = 25 °C, I_{op} = 140 mA)				
Characteristic	**MIN**	**TYP**	**MAX**	**UNIT**
Center Wavelength[a]	850	852	854	nm
Side-Mode Suppression Ratio (SMSR) in Mode Hop Free Range	30	50	-	dB
Laser Linewidth	-	10	-	MHz
Optical Output Power (CW)[a]	35	50	-	mW
Forward Voltage[a]	-	2.0	2.5	V
Operating Current	-	140	160	mA
Mode Hop Free Range[b]	20	40	-	mA
Threshold Current	-	40	-	mA
Slope Efficiency	-	0.36	-	W/A
Current Tuning Coefficient	-	0.0025	-	nm/mA
Temperature Tuning Coefficient	-	0.06	-	nm/°C
Monitor Diode Responsivity	-	10	-	µA/mW
Extinction Ratio[c]	-	19	-	dB

a. T_{Chip} = 25 °C
b. Continuous tuning range between mode hops.
c. Ratio of transmitted light polarized along the fiber's slow axis to transmitted light polarized along the fast axis.

Absolute Maximum Ratings[a] (T_{CHIP} = 15 - 35 °C, T_{CASE} = 25 °C)		
Characteristic		
Fiber Output Power	100	mW
Operating Current	160	mA
LD Reverse Voltage	2.5	V
PD Reverse Voltage	2	V
Operation Case Temperature	0 to 50	°C
Storage Temperature	-10 to 65	°C

a. Absolute Maximum Rating specifications should never be exceeded. Operating beyond these conditions can seriously damage the laser. For more information, please see the Laser Diode Tutorial.

TEC Operation (Typ./Max @ T_{CASE} = 25 °C/50 °C)				
Characteristic	**MIN**	**TYP**	**MAX**	**UNIT**
TEC Current	-	0.1	1.5	A
TEC Voltage	-	2.8	4.0	V
Thermistor Resistance	-	10	-	kOhms

General Specifications	
Characteristic	**Value**
Monitor Photodiode	Yes[a]
Package	PM-Pigtailed Butterfly
Pin Code	14-Pin Type 1[b]
Built-In Isolator	No
Spatial Mode	Single Frequency[c]
Wavelength Tested	Yes

a. Laser diodes with a built-in monitor photodiode can operate at constant power.
b. See the *Pin Diagram* Tab for Pin Configuration
c. Single-Frequency Laser (Single Longitudinal Mode)

DBR852P - 852 nm, 35 mW, Butterfly DBR Laser, PM Fiber, FC/APC

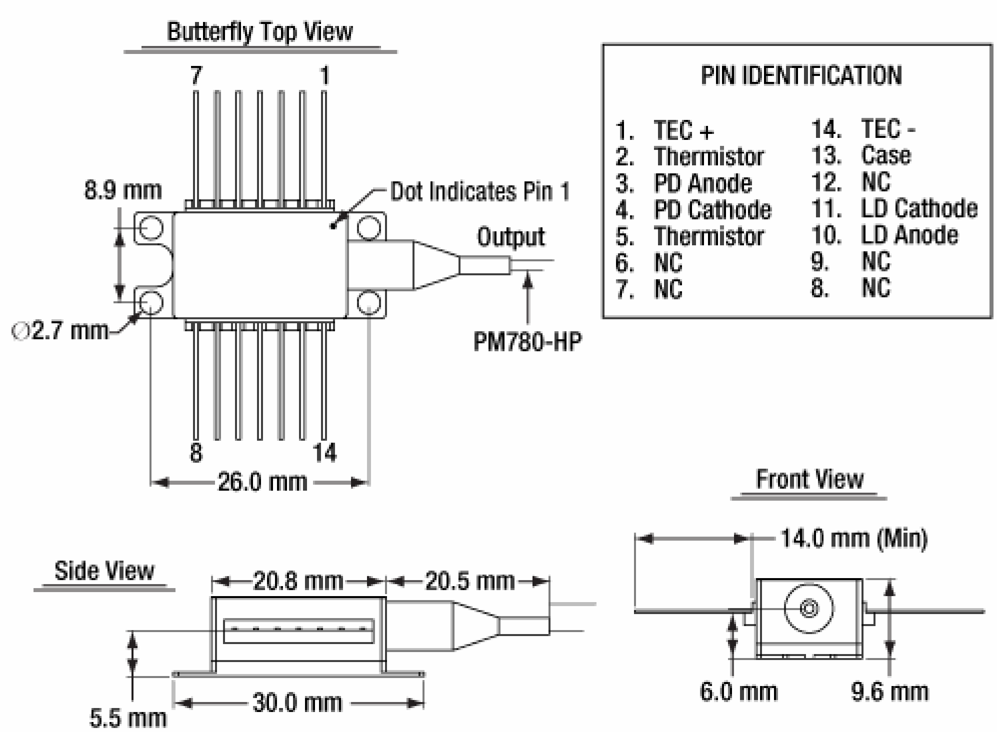
Specs | Fiber Specs | Drawing | Spectrum | SMSR | Tuning | LIV

Fiber Specifications	
Characteristic	
Fiber Type	PM780-HP
Mode Field Diameter[a]	5.3 ± 1.0 µm @ 850 nm
Numerical Aperture	0.12
Fiber Length	1.5 m
Connector	FC/APC (2.0 mm Narrow Key)
Jacket	Ø900 µm

a. Mode Field Diameter (MFD) is specified as a nominal value.

DBR852P - 852 nm, 35 mW, Butterfly DBR Laser, PM Fiber, FC/APC

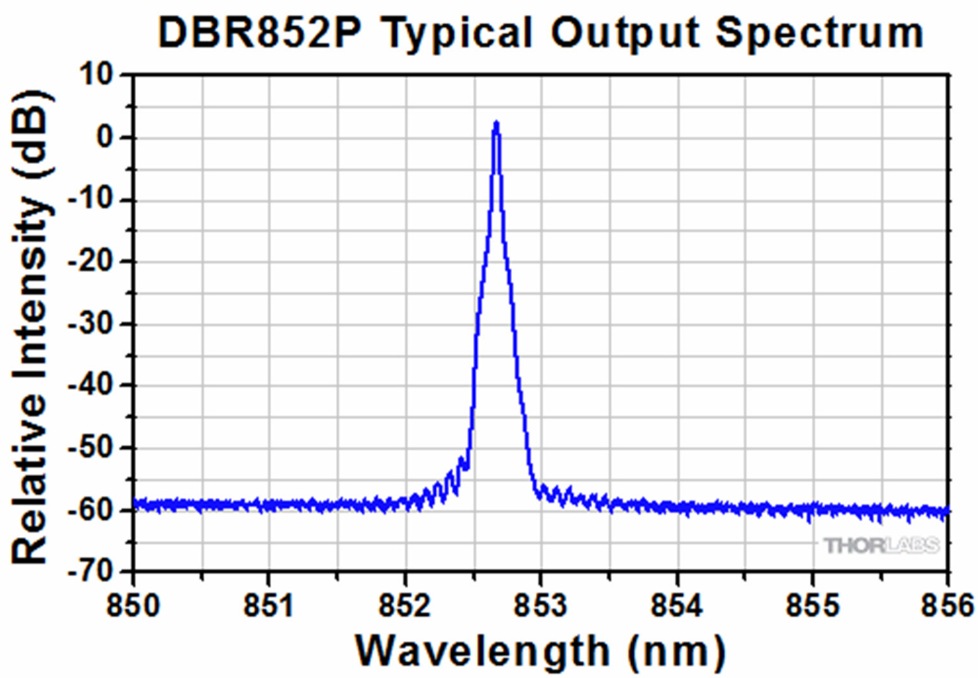
Specs | Fiber Specs | Drawing | Spectrum | SMSR | Tuning | LIV



DBR852P - 852 nm, 35 mW, Butterfly DBR Laser, PM Fiber, FC/APC

DBR852P - 852 nm, 35 mW, Butterfly DBR Laser, PM Fiber, FC/APC

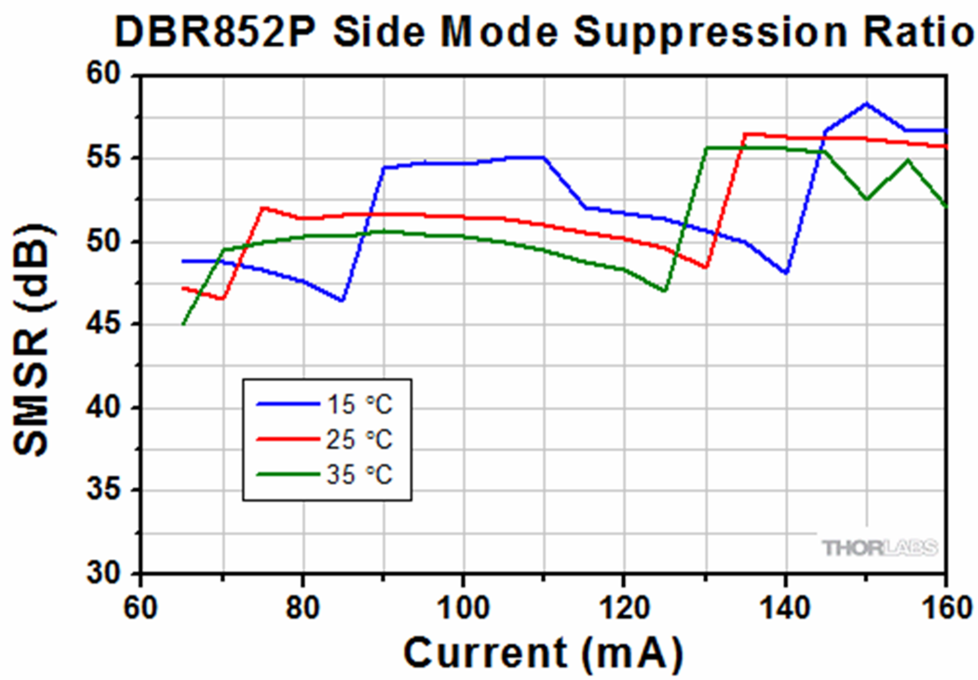
Specs | Fiber Specs | Drawing | **Spectrum** | SMSR | Tuning | LIV



Note: the plot above is typical, and performance will vary between individual lasers. Serial-number-specific documentation is available by clicking "Choose Item" on the left side of the price box.

DBR852P - 852 nm, 35 mW, Butterfly DBR Laser, PM Fiber, FC/APC

Specs | Fiber Specs | Drawing | Spectrum | **SMSR** | Tuning | LIV



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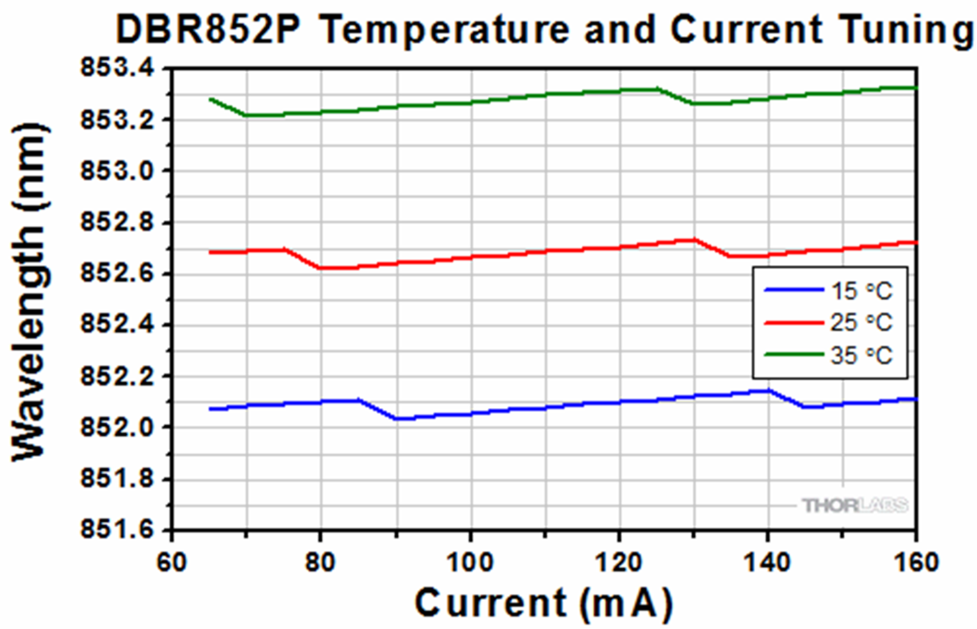
DBR852P - 852 nm, 35 mW, Butterfly DBR Laser, PM Fiber, FC/APC

Specs | Fiber Specs | Drawing | Spectrum | SMSR | **Tuning** | LIV



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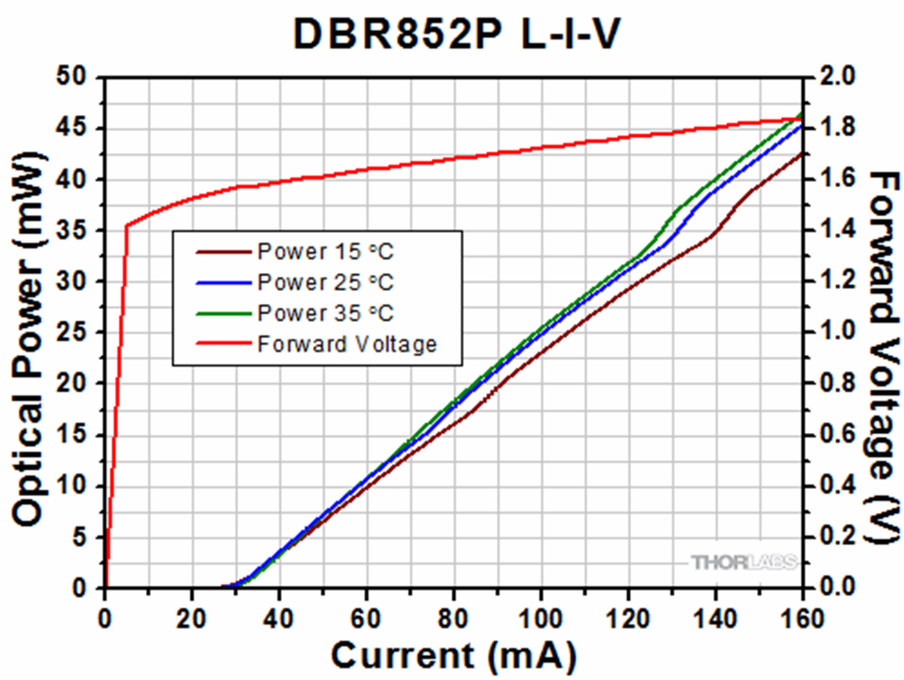
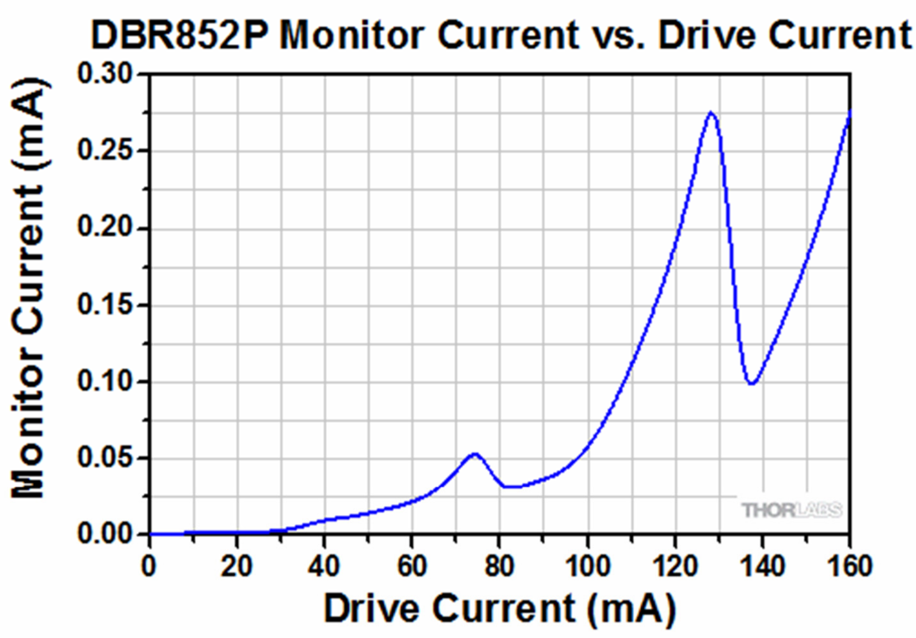
DBR852P - 852 nm, 35 mW, Butterfly DBR Laser, PM Fiber, FC/APC

Specs | Fiber Specs | Drawing | Spectrum | SMSR | Tuning | LIV





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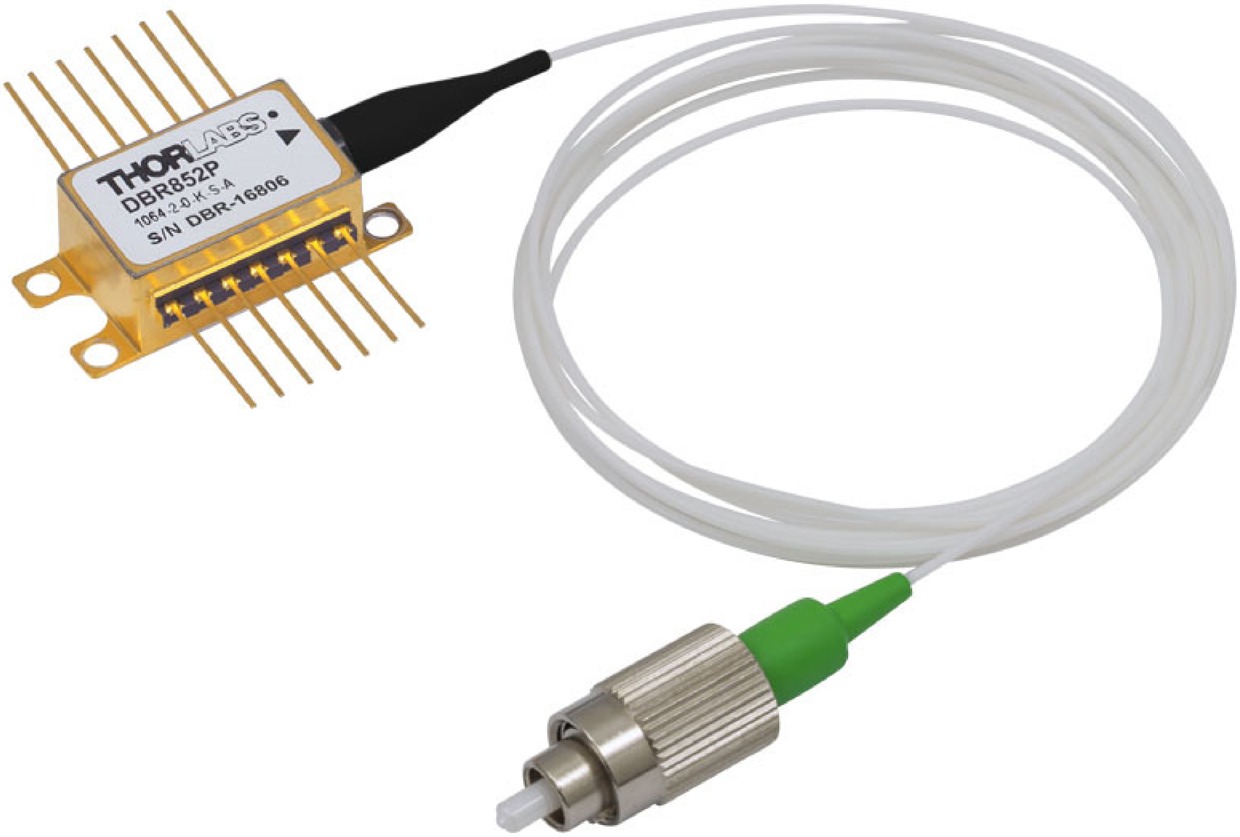
THORLABS
DBR852P
1064-2-0-K-S-A
S/N DBR-16806