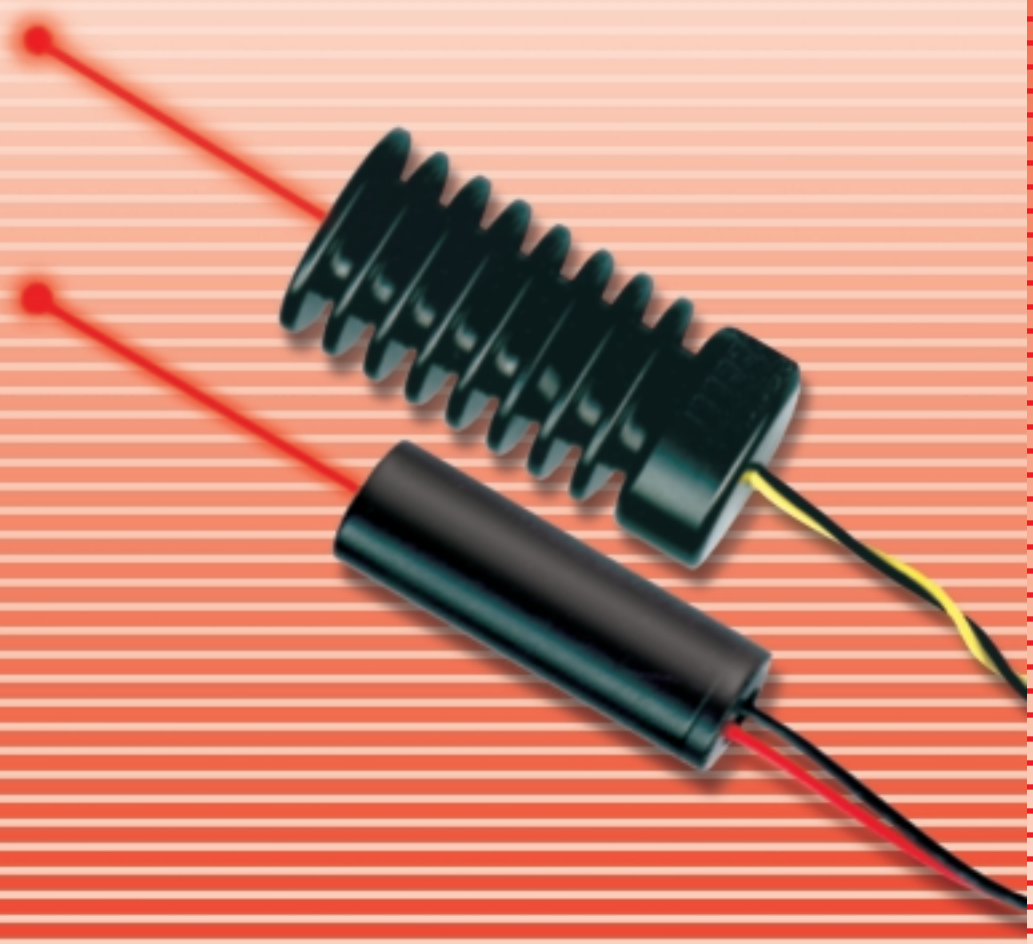
LASER DIODE MODULES

CUSTOMIZED OR STOCK

BEA LASERS



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WWW.BEALASERS.COM

Welcome to BEA Lasers

The highest quality laser diode modules at a reasonable cost – this is our commitment to you. Our team of applications engineers and sales associates, with many years of experience in the field of optics and photonics, will work closely with you to find a solution – customized or from stock – that meets your needs.

BEA Lasers are available nationwide. Our warehouse is in suburban Chicago and ships your components as ordered and on time.

Since 1980, BEA has been committed to offering solutions to industry and research. Many products conform to and surpass the standards of CE and FDA, so your products benefit from the quality that goes into our laser diode modules.

BEA Lasers Corporate Offices

About Laser Diode Modules

Our laser diode modules feature a rugged, compact design that is suitable for industrial or laboratory uses. Heat dissipation is handled by passive radiation through the case and mounting bracket. Integrated electronics protect the diode from reverse wiring and line noise that would otherwise destroy it.

About Lenses

Adjustable focus allows you to project the sharpest beam pattern possible: this is critical for projecting lines and crosshairs. Glass lenses will render a more uniformly focused beam pattern than plastic ones. Plastic lenses, however, are lower in cost and may be sufficient for some applications.

Red and Green Laser Considerations

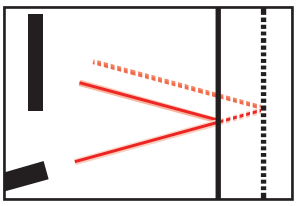
The human eye perceives the light emitted from a 1mW 670nm laser as bright. Laser light at 650nm is perceived as brighter, and 635nm is seen as the brightest red. Green laser light at 1mW 532nm is clearly perceived as the brightest laser diode module light.

Customization

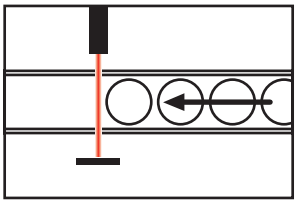
Other available wavelengths include Blue and Infrared. Caseless construction can save space inside enclosures. Driver electronics can support static protection, beam pulsing, or TTL modulation.

Typical Applications

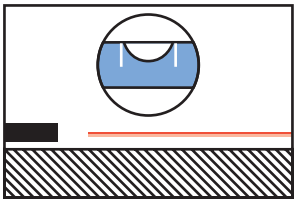
- Alignment
- Positioning
- Metrology
- Event Detection
- Edge Detection
- Security
- Bar Code Readers
- Vision Systems
- Education
- Leveling
- Robotic Control
- Lab Experimentation



Positioning



Event/Edge



Leveling

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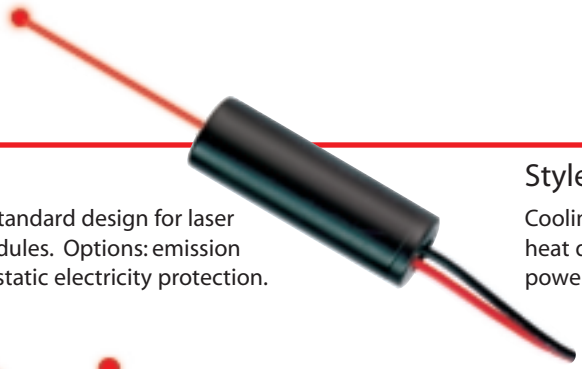
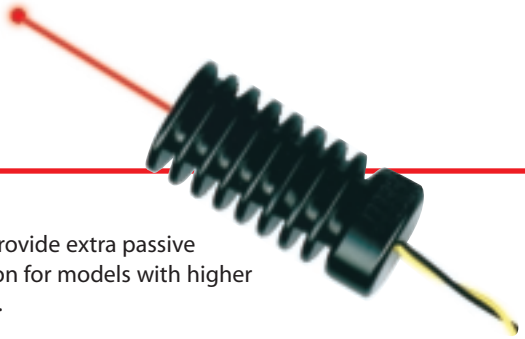
Product Guide



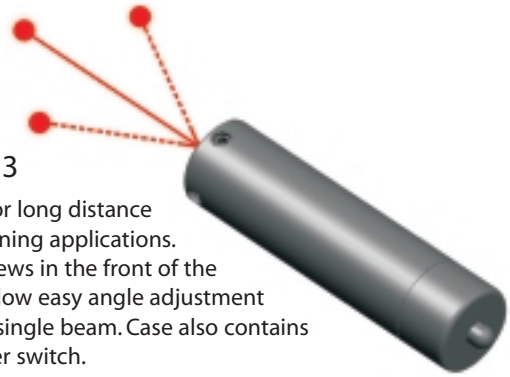
Style 1

Industry standard design for laser diode modules. Options: emission indicator, static electricity protection.



Style 2

Cooling fins provide extra passive heat dissipation for models with higher power output.



Style 3

Ideal for long distance positioning applications. Set screws in the front of the case allow easy angle adjustment to the single beam. Case also contains a power switch.

Style 4

Green lasers.
Features: superior electronic and mechanical ruggedness; excellent heat dissipation.

Style 5

Compatible with 1" mounts. Features: superior ruggedness, beam attenuation shutter, focusing lens, power switch with emission indicator, 2.5mm socket connector for power, and regulated AC adapter.

Part Numbering

(Example) **201 H-1-635**

Platform:
a unique set of module properties including: optical, mechanical, electrical and environmental

Features:
- **H** - Anti-Static Housing
- **P** - Power Adapter
- **S** - Shutter
- **C** - Cross Hair Generator
- **L** - Line Generator

Power: in milliwatts

Wavelength: in nanometers

Laser Diode Modules

Body Style 1 Body Style 2

Part Number	Class	Beam Diam (mm)	Power (mw)	Body Style	Body Material	Lens Material	Operating Current (mA)	Operating Voltage (DC)	Case Length (mm)	Case Diam (mm)
Cross Hair Beam Pattern (projected size: 15cm @ 1m), 1-6 milliwatts										
150C-1-635	II	<1	1	1	Aluminum	Glass	40	4.5-9	50.8	12.7
150C-3-635	IIIa	<1	3	1	Aluminum	Glass	40	4.5-9	50.8	12.7
150C-6-635	IIIb	<1	6	1	Aluminum	Glass	70	4.5-9	50.8	12.7
150C-3-650	IIIa	<1	3	1	Aluminum	Glass	30	4.5-9	50.8	12.7
150C-5-650	IIIa	<1	4.5	1	Aluminum	Glass	50	4.5-9	50.8	12.7
Line Beam Pattern (projected line: 117cm @ 1m 60 deg fan angle), 2-3 milliwatts										
151L-2-670	IIIa	<1	1.6	1	Aluminum	Glass	40	4.5-9	51	13.5
151L-3-670	IIIa	<1	3	1	Aluminum	Glass	40	4.5-9	51	13.5
Green Lasers, 532 nm, 1-3 milliwatts										
622-1-532	II	5	1	4	Aluminum	Glass	<500	3	70	20
622-3-532	II	5	3	4	Aluminum	Glass	<500	3	70	20
Red Lasers, 635 nm, 1 milliwatt										
201-1-635	II	4	1	1	Copper	Plastic	45-50	3	32.5	10.5
206-1-635	II	4	1	1	Copper	Glass	<80	3-4.5	45.1	12
206H-1-635	II	4	1	1	Brass, Anti-Static	Glass	<80	3-4.5	62.5	21.5
201H-1-635	II	4.2	1	1	Brass, Anti-Static	Plastic	45-50	3	53.5	21
203-1-635	II	4.8	1	1	Copper	Plastic	<45	3	37.1	14
203H-1-635	II	4.8	1	1	Brass, Anti-Static	Plastic	<45	3	53.5	22
202-1-635	II	5	1	1	Copper	Plastic	<45	3	42.7	12
202H-1-635	II	5	1	1	Brass, Anti-Static	Plastic	45	3	59	20.2
145-1-635	II	5	1	1	Aluminum	Glass	60	4-6	40	16
Red Lasers, 635 nm, 3 milliwatts										
201-3-635	IIIa	4	3	1	Copper	Plastic	45-50	3	32.5	10.5
206-3-635	IIIa	4	3	1	Copper	Glass	<80	3-4.5	45.1	12
206H-3-635	IIIa	4	3	1	Brass, Anti-Static	Glass	<80	3-4.5	62.5	21.5
201H-3-635	IIIa	4.2	3	1	Brass, Anti-Static	Plastic	45-50	3	53.5	21
203-3-635	IIIa	4.8	3	1	Copper	Plastic	<45	3	37.1	14
203H-3-635	IIIa	4.8	3	1	Brass, Anti-Static	Plastic	<45	3	53.5	22
202-3-635	IIIa	5	3	1	Copper	Plastic	<45	3	42.7	12
202H-3-635	IIIa	5	3	1	Brass, Anti-Static	Plastic	45	3	59	20.2
Red Lasers, 635 nm, 5-10 milliwatts										
201-5-635	IIIb	4	5	1	Copper	Plastic	45-50	3	32.5	10.5
206-5-635	IIIb	4	5	1	Copper	Glass	<80	3-4.5	45.1	12
206H-5-635	IIIb	4	5	1	Brass, Anti-Static	Glass	<80	3-4.5	62.5	21.5
201H-5-635	IIIb	4.2	5	1	Brass, Anti-Static	Plastic	45-50	3	53.5	21
203-5-635	IIIb	4.8	5	1	Copper	Plastic	<45	3	37.1	14
203H-5-635	IIIb	4.8	5	1	Brass, Anti-Static	Plastic	<45	3	53.5	22
202-5-635	IIIb	5	5	1	Copper	Plastic	<45	3	42.7	12
202H-5-635	IIIb	5	5	1	Brass, Anti-Static	Plastic	45	3	59	20.2
203H-10-635	IIIb	4.8	10	1	Brass, Anti-Static	Plastic	<45	3	53.5	22

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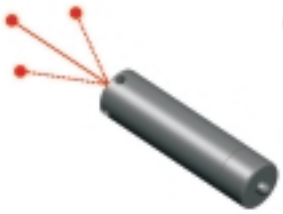
Laser Diode Modules


Body Style 3

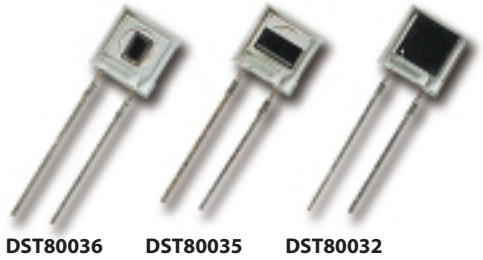

Body Style 4


Body Style 5

Part Number	Class	Beam Diam (mm)	Power (mw)	Body Style	Body Material	Lens Material	Operating Current (mA)	Operating Voltage (DC)	Case Length (mm)	Case Diam (mm)
Red Lasers, 650 nm, 1 milliwatt										
201-1-650	II	4	1	1	Copper	Plastic	45-50	3	32.5	10.5
206-1-650	II	4	1	1	Copper	Glass	<80	3-4.5	45.1	12
206H-1-650	II	4	1	1	Brass, Anti-Static	Glass	<80	3-4.5	62.5	21.5
201H-1-650	II	4.2	1	1	Brass, Anti-Static	Plastic	45-50	3	53.5	21
203-1-650	II	4.8	1	1	Copper	Plastic	<45	3	37.1	14
203H-1-650	II	4.8	1	1	Brass, Anti-Static	Plastic	<45	3	53.5	22
202-1-650	II	5	1	1	Copper	Plastic	<45	3	42.7	12
202H-1-650	II	5	1	1	Brass, Anti-Static	Plastic	45	3	59	20.2
145-1-650	II	5	1	1	Aluminum	Glass	36	4-6	40	16
Red Lasers, 650 nm, 3 milliwatts										
201-3-650	IIIa	4	3	1	Copper	Plastic	45-50	3	32.5	10.5
206-3-650	IIIa	4	3	1	Copper	Glass	<80	3-4.5	45.1	12
206H-3-650	IIIa	4	3	1	Brass, Anti-Static	Glass	<80	3-4.5	62.5	21.5
201H-3-650	IIIa	4.2	3	1	Brass, Anti-Static	Plastic	45-50	3	53.5	21
203-3-650	IIIa	4.8	3	1	Copper	Plastic	<45	3	37.1	14
203H-3-650	IIIa	4.8	3	1	Brass, Anti-Static	Plastic	<45	3	53.5	22
202-3-650	IIIa	5	3	1	Copper	Plastic	<45	3	42.7	12
202H-3-650	IIIa	5	3	1	Brass, Anti-Static	Plastic	45	3	59	20.2
218-3-650	IIIa	5	3	3	Copper	Plastic	<45	3	59	19
145-3-650	IIIa	5	3	1	Aluminum	Glass	50	4-6	40	16
Red Lasers, 650 nm, 5 milliwatts										
145-5-650	IIIa	5	4.5	1	Aluminum	Glass	120	4-6	40	16
201-5-650	IIIb	4	5	1	Copper	Plastic	45-50	3	32.5	10.5
206-5-650	IIIb	4	5	1	Copper	Glass	<80	3-4.5	45.1	12
206H-5-650	IIIb	4	5	1	Brass, Anti-Static	Glass	<80	3-4.5	62.5	21.5
201H-5-650	IIIb	4.2	5	1	Brass, Anti-Static	Plastic	45-50	3	53.5	21
203-5-650	IIIb	4.8	5	1	Copper	Plastic	<45	3	37.1	14
203H-5-650	IIIb	4.8	5	1	Brass, Anti-Static	Plastic	<45	3	53.5	22
202-5-650	IIIb	5	5	1	Copper	Plastic	<45	3	42.7	12
202H-5-650	IIIb	5	5	1	Brass, Anti-Static	Plastic	45	3	59	20.2
Red Lasers, 650nm, 10-35 milliwatts										
206-10-650	IIIb	4	10	1	Copper	Glass	<80	3-4.5	45.1	12
206H-10-650	IIIb	4	10	1	Brass, Anti-Static	Glass	<80	3-4.5	62.5	21.5
203-10-650	IIIb	4.8	10	1	Copper	Plastic	<45	3	37.1	14
208-10-650	IIIb	5	10	2	Aluminum	Glass	<180	4.5	51	25
208H-10-650	IIIb	5	10	1	Brass, Anti-Static	Glass	<180	4.5	67.5	33.2
208-20-650	IIIb	5	20	2	Aluminum	Glass	<180	4.5	51	25
208H-20-650	IIIb	5	20	1	Brass, Anti-Static	Glass	<180	4.5	67.5	33.2
208-30-650	IIIb	5	30	2	Aluminum	Glass	<180	4.5	51	25
208H-30-650	IIIb	5	30	1	Brass, Anti-Static	Glass	<180	4.5	67.5	33.2
208-35-650	IIIb	5	35	2	Aluminum	Glass	<180	4.5	51	25
208H-35-650	IIIb	5	35	1	Brass, Anti-Static	Glass	<180	4.5	67.5	33.2
Red Lasers, 670nm, 1-3 milliwatts (Oval Pattern)										
175SP-1-670	II	5 x 2	0.9	5	Aluminum	Glass	<150	5	51	25
175SP-3-670	IIIa	5 x 2	3	5	Aluminum	Glass	<150	5	51	25

Detectors

Designing your own emitter/detector system? These popular components benefit you through superior clean room manufacturing and economies of scale for a most competitive price. Surface-mount versions are available.



DST80036 DST80035 DST80032

Technical Specifications:

Parameter	*Symbol*	*Test Condition*	*Minimum*	*Maximum*	*Typical*
DST80032					
Active Area					8.1 mm^2
Spectral Response	λ		400 nm	1200 nm	
Spectral Responsivity	R	632 nm			0.36 A/W*
Spectral Responsivity	R	920 nm			0.62 A/W
Dark Current	I_D	V_r = 10V		30 nA	5 nA
Reverse Breakdown Voltage	V_{BR}	I_{bd} = 100 µA	33 V		170 V
Rise Time	T_r	V_r = 10 V, 100 ohm			50 nsec
Total Capacitance	C_t	1 MHz, 3 V			25 pF
DST80035					
Active Area					2.9 mm^2
Spectral Response	λ		400 nm	1100 nm	
Spectral Responsivity	R	632 nm			0.36 A/W
Spectral Responsivity	R	920 nm			0.62 A/W
Reverse Breakdown Voltage	V_{BR}	I_{bd} = 100 µA			80 V
Rise Time	T_r	V_r = 10 V, 100 ohm			30 nsec
DST80036					
Active Area					1.7 mm^2
Spectral Response	λ		400 nm	1100 nm	
Spectral Responsivity	R	632 nm			0.36 A/W
Spectral Responsivity	R	920 nm			0.62 A/W
Dark Current	I_D	V_r = 10 mV	200 pA	600 pA	
Reverse Breakdown Voltage	V_{BR}	I_{bd} = 10 µA			80 V
Rise Time	T_r	V_r = 5V, 50 ohm			100 nsec
Junction Capacitance	C_J	10 kHz, 0 V			30 pF
Junction Capacitance	C_J	10 kHz, 10 V			6 pF

** A/W = Amps per Watt (Electrical current out per optical power in)*

Power Supplies

BEA-220: A convenient 3VDC power supply for use in testing laser diode modules. Powered by 2 x 1.5 Volt Batteries.

BEA-230: Regulated power supply for laser diode modules. Provides extra power conditioning to protect the laser diode. Converts 120VAC to 5VDC, 300mA. UL Listed, Class 2 Transformer.

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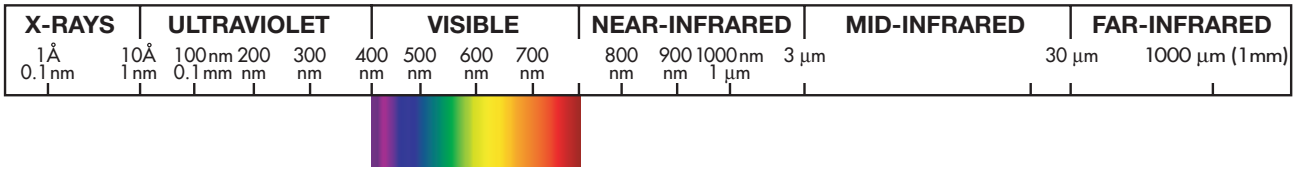
Figure 1: The optical spectrum. Laser light is nonionizing and ranges from the ultra-violet (100 - 400nm), visible (400 - 700nm), and infrared (700nm - 1mm).



What is a Laser?

LASER is an acronym which stands for Light Amplification by Stimulated Emission of Radiation. The energy generated by the laser is in or near the optical portion of the electromagnetic spectrum (see Figure 1). Energy is amplified to extremely high intensity by an atomic process called stimulated emission. The color of laser light is normally expressed in terms of the laser's wavelength. Nanometer (nm) is the most common unit used in expressing a laser's wavelength.

Laser Hazards & Beam Hazards

The laser produces an intense, highly directional beam of light. If directed, reflected, or focused upon an object, laser light will be partially absorbed, raising the temperature of the surface and/or the interior of the object, potentially causing an alteration or deformation of the material. Lasers can also cause tissue damage. Today, most high-power lasers are designed to minimize access to laser radiation during normal operation. Lower-power lasers may emit levels of laser light that are not a hazard.

Laser Hazards Classification

The Center for Devices and Radiological Health, a division of the Food and Drug Administration regulates the manufacturing and classification of laser products. The laser classes help group lasers by their hazard potential, and identifies these classes based on their optical emission (wavelength, exposure time, output power).

General Guidelines for CW Laser Classification

Class I Lasers or laser systems that do not, under normal operating conditions, pose a hazard.

Class IIa Low power visible lasers or laser systems that are not intended for prolonged viewing, and under normal operating conditions will not produce a hazard if the beam is viewed directly for periods not exceeding 1000 seconds.

Class II Low power visible lasers or laser systems which, because of the normal human aversion response, do not normally present a hazard, but may present some potential for hazard if viewed directly for extended periods of time (like many conventional light sources).

Class IIIa Lasers or laser systems having a CAUTION label that normally would not injure the eye if viewed for only momentary periods (within the aversion response period) with the unaided eye, but may present a greater hazard if viewed using collecting optics. Another group of Class 3a lasers have DANGER labels and are capable of exceeding permissible exposure levels for the eye in 0.25 seconds and still pose a low risk of injury.

Class IIIb Lasers or laser systems that can produce a hazard if viewed directly. This includes intrabeam viewing of specular reflections. Class 3B lasers will not normally produce a hazardous diffuse reflection.

Class IV Lasers or laser systems that produce a hazard not only from direct or specular reflections, but may also produce hazardous diffuse reflections. Such lasers may produce significant skin hazards as well as fire hazards.

The information mentioned here is intended to be an introduction to lasers and laser safety, and should not be considered to be an authoritarian guide. A better informed user has the knowledge to make safer decisions: learn about safety procedures for your class of laser, and the next class higher.

An excellent source for laser safety is the Laser Institute of America. A very useful resource is their web-based *Safety Bulletin* and printed *Laser Safety Guide*.

Laser Diode Module Glossary

Term	*Definition*
Angstrom	Metric unit equal to 10^{-10} meter.
Beam Diameter	Calculated distance between two exactly opposed points on a beam at a chosen fraction of peak power.
Beam Divergence	Increase in the diameter of an initially collimated beam as measured in milliradians (mrad) at specified points.
CDRH	Center for Devices and Radiological Health.
CW	Continuous Wave.
LASER	Light Amplification by Stimulated Emission of Radiation.
Laser Diode Module	Small semiconductor laser packaged in a durable housing.
Micron	One-millionth of a meter ($1\mu m = 10^{-6}m$).
Milli	Prefix for one-thousandth (10^{-3}).
Millimeter	0.001 meter.
MRad	Milli-Radian; 1/1000 of a radian used to specify laser beam divergence.
Nanometer	One-billionth of a meter ($1nm = 10^{-9}m$).
Watt	Unit of power that produces energy at the rate of 1 joule per second.
Wavelength	Electromagnetic energy transmitted in the form of a sinusoidal wave; the physical distance covered by one cycle of this wave. Wavelength is inversely proportional to frequency.

Laser Institute of America

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