ROITHNER LASERTECHNIK GmbH
WIEDNER HAUPTSTRASSE 76 1040 VIENNA AUSTRIA
TEL. +43 1 586 52 43 -0, FAX. -44, OFFICE@ROITHNER-LASER.COM

Manual of 980nm Fiber Coupled Laser Diode Module

G098PU1600M

G098PU1750M

G098PU11300M

G098PU25W

G098PU209W

G098PU312W

G098PU322W

1 Introduction

Thank you for choosing this high power fiber coupled Laser Diode for your application. Please read that manual carefully before using this product. If there is any question about this manual, please contact us.

The 980nm series high power Fiber coupled Laser Diodes with optimized QW structure have a high reliability, high performance. The MOCVD technical is used for epitaxy to get a high quality epi-wafer. The 980nm series high power fiber coupled Laser Diode module can get up to 25W multimode fiber coupled output at CW and N.A. 0.12 & 0.22. It can be applied in a wide field such as laser pumps, medical, target designator, free-space communication.

2 Specifications

2.1 optical and electrical specification

Type	G098PU 1600M	G098PU 1750M	G098PU 11300M	G098PU 25W	G098PU 209W	G098PU 312W	G098PU32 2W
Optical specification							
Rated output optical power P_f* (W)	0.6	0.75	1.3	5	9	12	22
Central Wavelength λ_c* (nm)	980	980	980	980	980	980	980
Central Wavelength λ_c* (nm)	980±10	980±10	980±10	980±10	980±10	980±10	980±10
Central Wavelength tolerance (nm)	<4	<4	<4	<5	<5	<7	<7
Wavelength temperature coefficient (nm/°C)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Fiber specification							
Fiber Core Size (µm)	50	100	100	400	400	700	700
N.A.	0.22	0.22 (0.12)	0.22	0.22 (0.12)	0.22	0.12	0.22
Fiber length (m)	1	1	1	1	1	1	1
Connector	FC/ST/SMA-905						
Electrical specification							
Threshold current I_{th}* (mA)	250	250	500	250	500	250	500
Operating current I_o (mA)	1250	1250	2500	1250	2500	1250	2500
Operating voltage V_f* (V)	<2	<2	<2	<14	<14	<35	<35
Slope efficiency E_s* (W/A)	>0.6	>0.75	>0.65	>5	>4.5	>12	>11
Resistance R_d* (Ω)	<0.2	<0.2	<0.2	<1.4	<1.4	<3.5	<3.5
Package	P1- Package			P2- Package		P3- Package	
Absolute Maximum Ratings							
Reverse Voltage V_r (V)	2	2	2	14	14	35	35
operating temperature T_o (°C)	-10...45	-10...45	-10...45	-10...45	-10...45	-10...45	-10...45
Storage temperature T_{stg} (°C)	-40...70	-40...70	-40...70	-40...70	-40...70	-40...70	-40...70

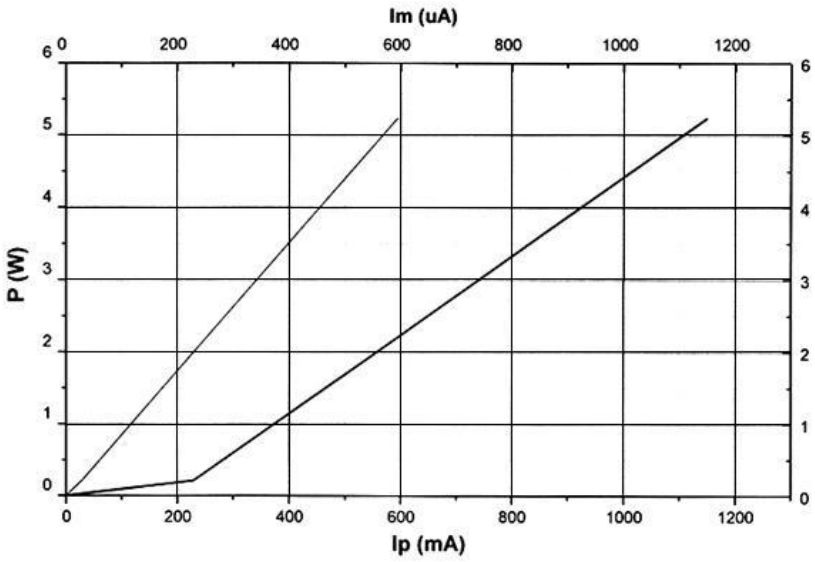
Parameter notes:

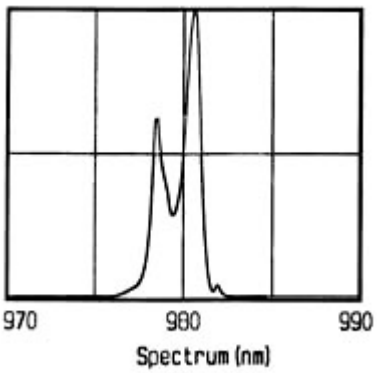
* ***Rated output optical power P_F:*** *Laser Diode output power rating.*
* ***Central Wavelength λ_c & Spectral width $\Delta\lambda$:*** *While the laser diode is at its rated output optical power, the wavelength at its emission spectrum curve with highest relative strengths is the central wavelength λ_c, the wavelength width between 1/2 highest strengths of both sides of the emission spectrum is $\Delta\lambda$.*
* ***Threshold current I_{th} :*** *Current when Laser Diode begins lasing.*
* ***Operating current I_o:*** *Current when Laser Diode at rated output power.*
* ***Operating voltage V_f:*** *Voltage of both ends of the Laser Diode when it at rated output power.*

* ***Slope efficiency E_s:*** *Characterization of the photo electronic conversion efficiency of Laser Diode after the lasing begins; $E_s=\Delta P/\Delta I$, where ΔP is the increment of output power corresponding to the increment of driving current ΔI.*
* ***Resistance R_d:*** *$R_d=\Delta V/\Delta I$, where ΔV is the increment of voltage of laser diode corresponding to the increment of driving current ΔI.*

2.2 Typical P-I/V-I curve

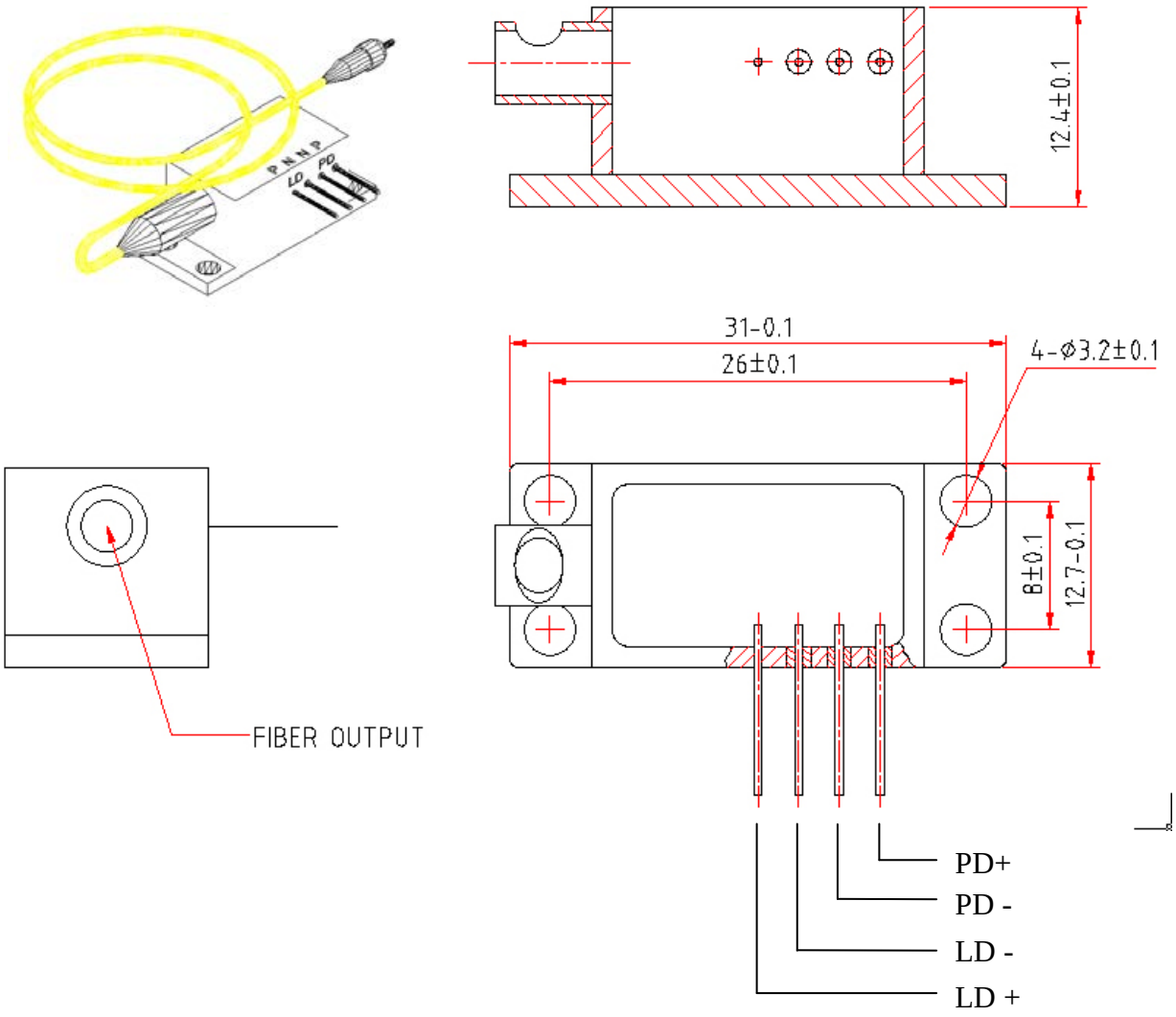
Note: The testing sample is part# G098PU25W.



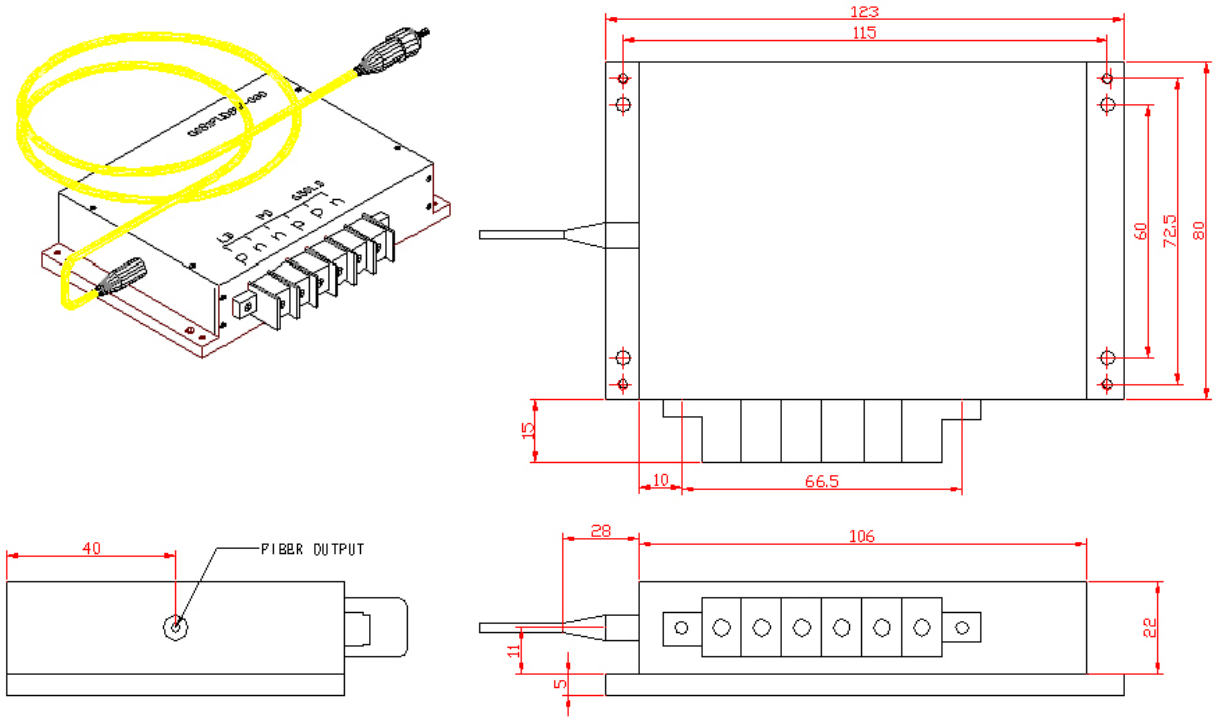


2.3 Dimension size

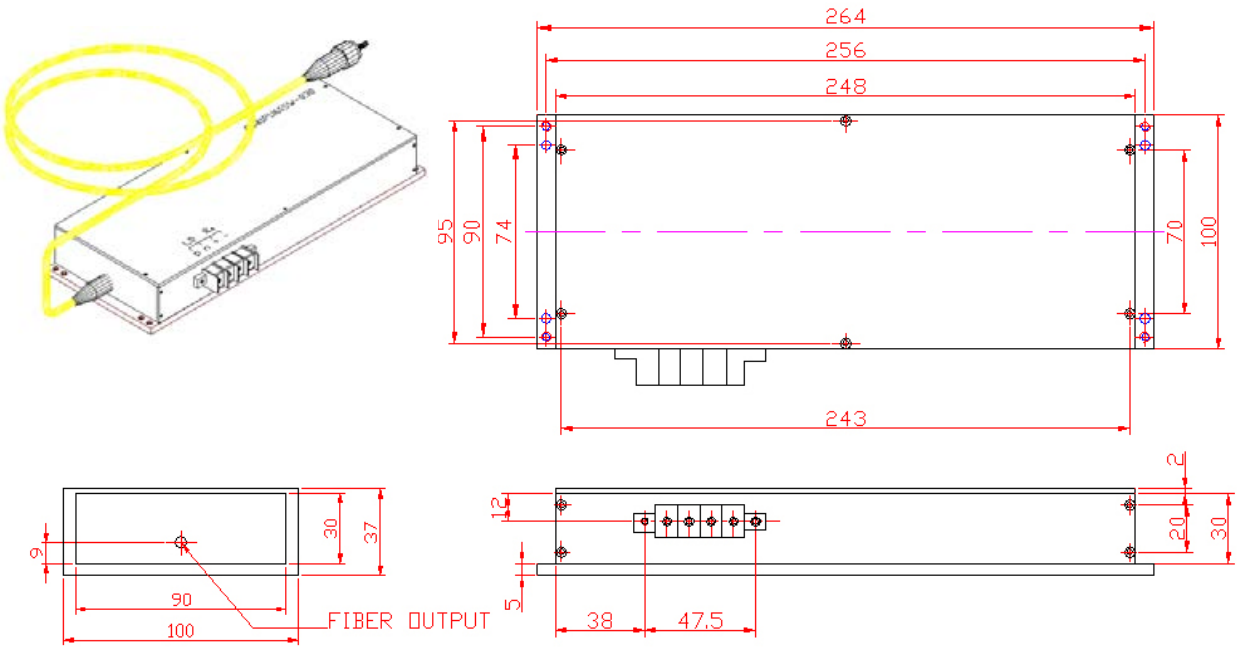
2.3.1 P1 Package Dimensions:



2.3.2 P2 Package Dimensions:



2.3.3 P3 Package Dimensions:



3 Laser safety operating instructions

3.1 Laser usage requirements in environment

- A ultra-clean environment should be provided for operating the LD. The operating temperature should be controlled at –10 °C … 45 °C.
- Laser safety warning signs should be posted in the working place.

3.2 The requirements on the power supply driving the LD

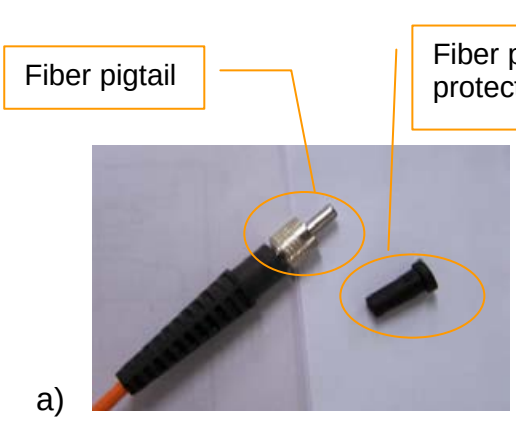
- Constant-current should be available for power supply. The power supply should have the ability to avoid current or voltage surge at any condition (during start-up, intermittence or open circuit). The surge would result in instant increase of optical power, which can cause COMD (catastrophic optical mirror damage).
- High power Laser Diodes could operate in forward voltage. The reverse current and voltage should not be higher than 25 µA and 3 V, respectively.

3.3 Laser operating requirements

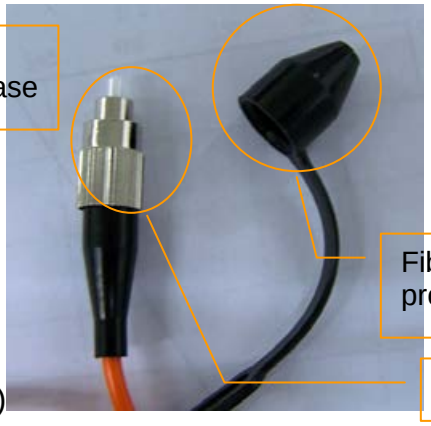
- Please check the laser safeguard before used the LD. More information about the laser safe is mentioned in “laser safe” section of this manual.
- The semiconductor Laser Diode is a sensitive electronic device. Do not ship or store near strong electrostatic, electromagnetic, magnetic or radioactive fields. Please observe precaution for handling electrostatic sensitive devices, such as wearing anti-static wrist straps, use anti-static packaging material and tools when operation.
- Shut off the power supplier before connecting the LD with the power supplier. To shut off the LD please decrease the current to zero gradually then shut off the power supply.

- The operating current of laser must not be higher than the given rate current. The excessive current would accelerate aging and shorten lifetime, even damage the LD.
- Keep the fiber pigtail clean. In non-working environment, you must use the protection case to avoid fiber pigtail from being polluted. If you need to clean the fiber pigtail, use ethanol or water-free alcohol cotton balls and wipe fiber pigtail gently.

a)

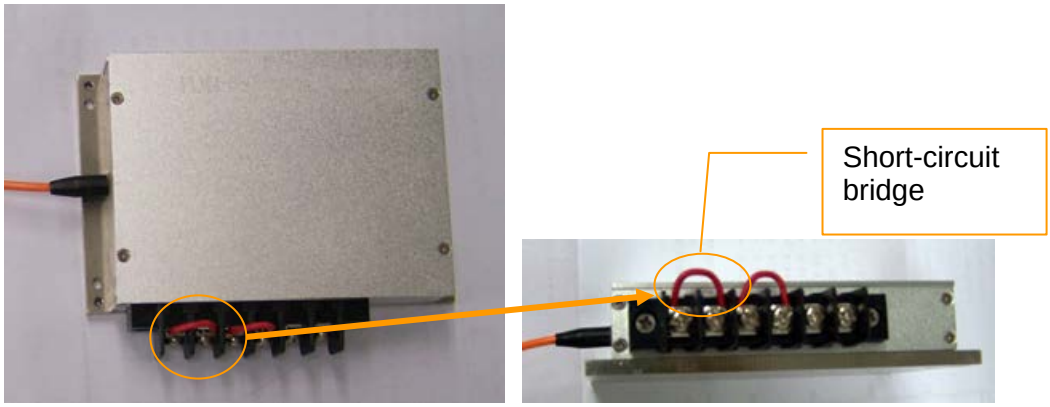


b)

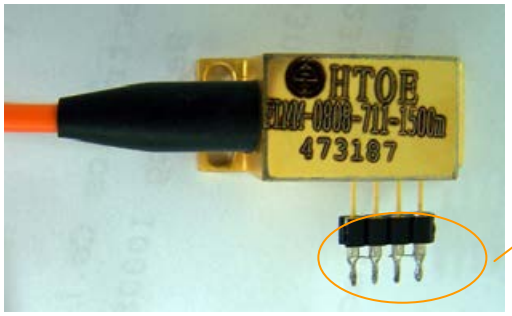


- LD must be taken out of the fiber protection case before it starts to work.
- Please remove the short-circuit bridge when you want the laser to work. In non-working environment, the short-circuit bridge must be used between electrodes to protect laser. It is especially important to use the short-circuit bridge when you weld the electrodes.

a)

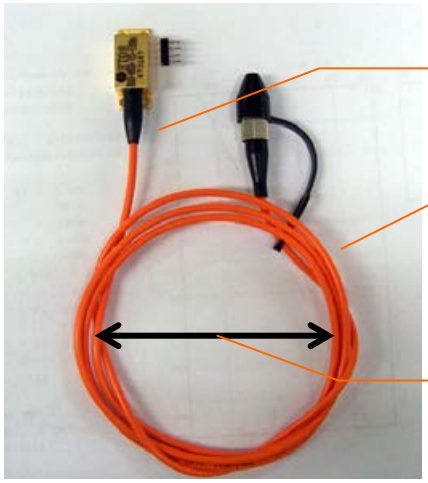


b)



Short-circuit bridge

- When laser is working, please don't point it straight to the fiber as shown below the yellow part, in order to prevent the fiber protection case from being damaged by high-power laser generated heat.
- Bending diameter of the fiber cannot be allowed to be less than 4cm. When bending the fiber, please make sure the starting point is away larger than 4cm from the fiber root. When moving the laser, please don`t directly use fiber (yellow part). Not obeying these rules may cause fracture of the laser fiber from the root.

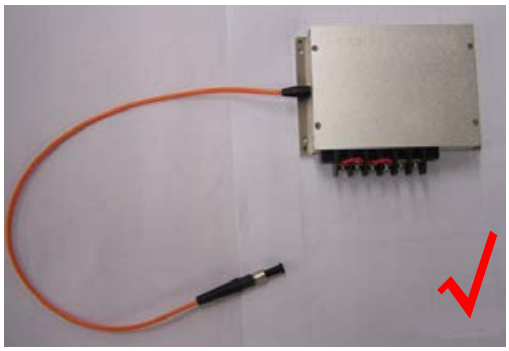


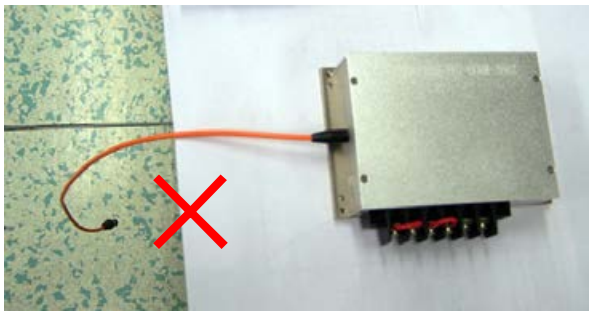
Fiber root

Fiber protection case

Bending diameter D:
D≥4cm

- Make sure that the module and the fiber are in the same plane.





3.4 Cooling system

High-power semiconductor Laser Diodes are temperature-sensitive devices. High temperature will affect its performance. Its lifetime may also be shortened by working at high temperature. So the generated heat must be removed in time when the LD is working. Water cooling system or TEC system is recommended for keeping the LD working at appropriate temperature.

4 Laser safety instructions

High power laser diodes are high energy laser devices. It is harmful to human body and health. Any personnel working with or around open lasers must be aware of the following:

- Exposure to the laser beam may cause physical burns and can cause severe eye damage. Proper eye protection should be used at all times. All eye protection should be appropriate for the radiation wavelength generated by the laser in use.
- Exposure to the laser beam may cause ignition of volatile or combustible materials.
- Never look directly into the laser output port.
- Interlock all rooms in which open beams may be present and post appropriate warnings on or near the doors. Access to these rooms should be limited to properly trained technicians when lasers are in use.
- Use appropriate protective coverings over all beam paths whenever possible.
- Lasers and optical elements should be positioned to keep the beam and reflections below eye level.