



**ROITHNER LASERTECHNIK GmbH**

WIEDNER HAUPTSTRASSE 76

1040 VIENNA

AUSTRIA

TEL. +43 1 586 52 43 -0, FAX. -44, OFFICE@ROITHNER-LASER.COM



## **Manual of 808nm Fiber Coupled Laser Diode Module**

**G081PU1600M**  
**G081PU1750M**  
**G081PU11500M**  
**G081PU25W**  
**G081PU210W**  
**G081PU315W**  
**G081PU325W**



## 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 808nm 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 808nm 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

### optical and electrical specification

Type	G081PU 1600M	G081PU 1750M	G081PU 11500M	G081PU 25W	G081PU 210W	G081PU 315W	G081PU 325W
<b>Optical specification</b>							
Rated output optical power $P_F^*$ (W)	0.6	0.75	1.5	5	10	12	25
Central Wavelength $\lambda_c^*$ (nm)	808	808	808	808	808	808	808
Central Wavelength $\lambda_c^*$ (nm)	800-820	800-820	800-820	800-820	800-820	800-820	800-820
Central Wavelength tolerance (nm)	<4	<4	<4	<5	<5	<7(4)	<7(4)
Wavelength temperature coefficient (nm/°C)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
<b>Fiber specification</b>							
Fiber Core Size ( $\mu\text{m}$ )	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						
<b>Electrical specification</b>							
Threshold current $I_{th}^*$ (mA)	$\leq 250$	$\leq 250$	$\leq 500$	$\leq 250$	$\leq 500$	$\leq 250$	$\leq 500$
Operating current $I_o$ (mA)	$\leq 1250$	$\leq 1250$	$\leq 2500$	$\leq 1250$	$\leq 2500$	$\leq 1250$	$\leq 2500$
Operating voltage $V_f^*$ (V)	<2	<2	<2	<14	<14	<35	<35
Slope efficiency $E_s^*$ (W/A)	>0.6	>0.75	>0.75	>5	>5	>12	>12
Resistance $R_d^*$ ( $\Omega$ )	<0.2	<0.2	<0.2	<1.4	<1.4	<3.5	<3.5
Package	P1- Package		P2- Package		P3- Package		
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 $T_{sig}$ (°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  $\lambda_c$  & 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  $\lambda_c$ , 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  $\Delta P$  is the increment of output power corresponding to the increment of driving current  $\Delta I$ .
- \* **Resistance  $R_d$** :  $R_d = \Delta V / \Delta I$ , where  $\Delta V$  is the increment of voltage of laser diode corresponding to the increment of driving current  $\Delta I$ .

## Typical P-I/V-I curve

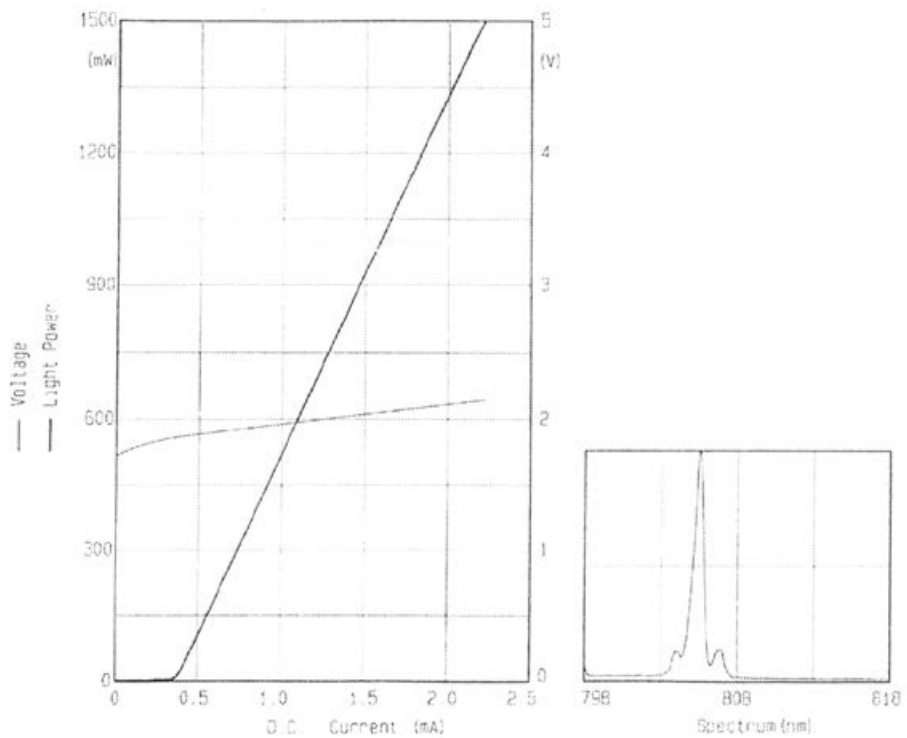
Note: The testing sample is part# G081PU11500M.

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09-10-2008
Model      : 2S00577
Serial No: 1

Po = 1.50 ( W )
Ith = 0.38 ( A )
Io = 2.22 ( A )
Vo = 2.14 ( V )
Es = 0.83 ( W/A )
Ep = 31.5 ( % )
Rd = 0.151 ( Ω )
λ = 805.5 ( nm )
Δλ = .7 ( nm )
θo = ( deg )
θi = ( deg )
Tc = 23 ( °C )

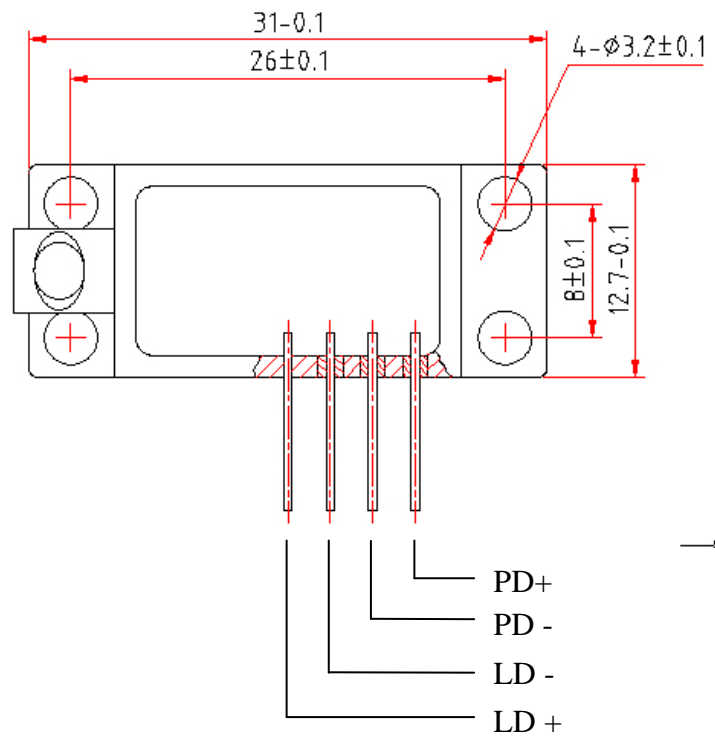
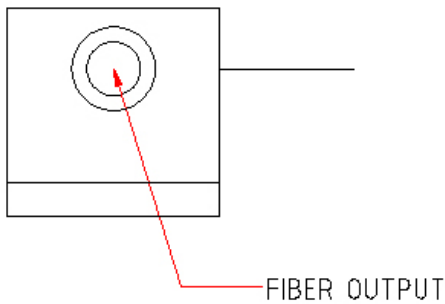
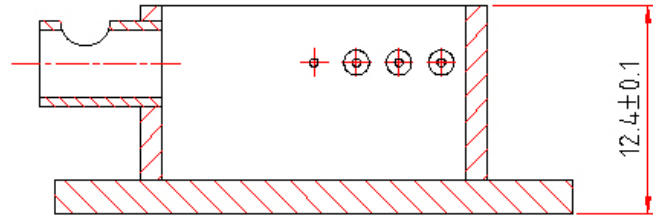
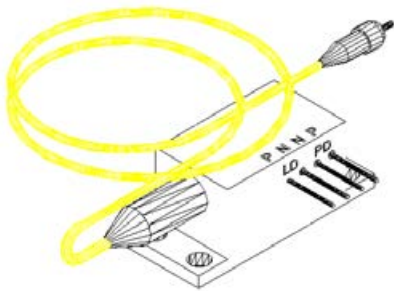
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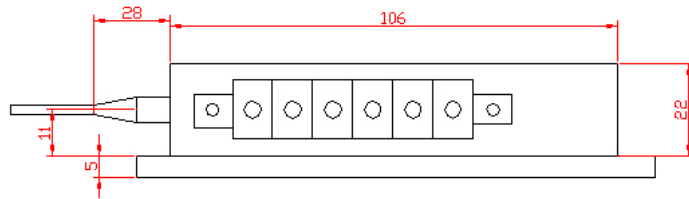
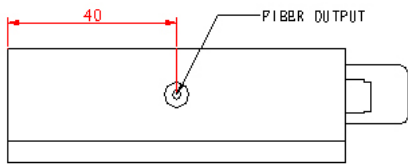
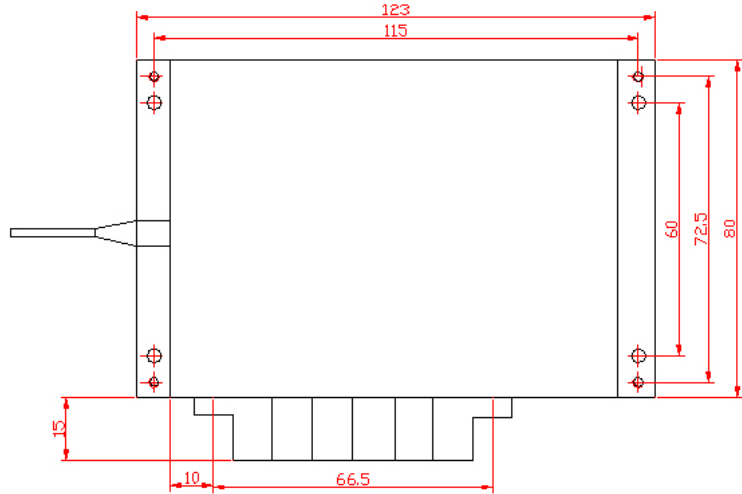
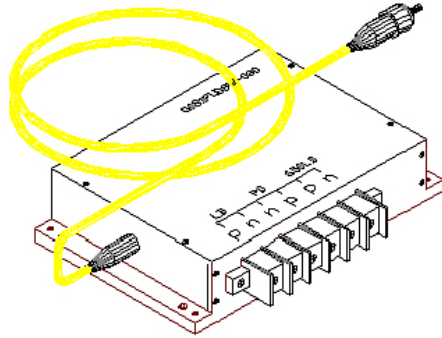
## Dimension size

### P1 Package Dimensions:

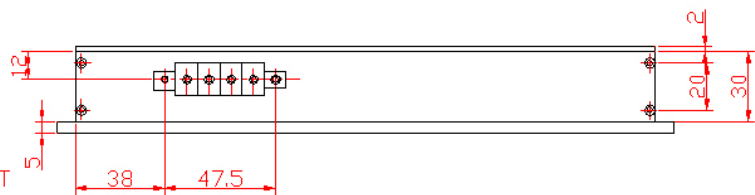
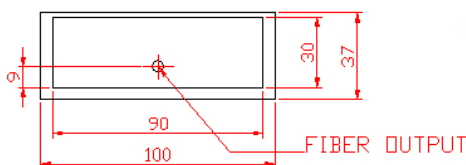
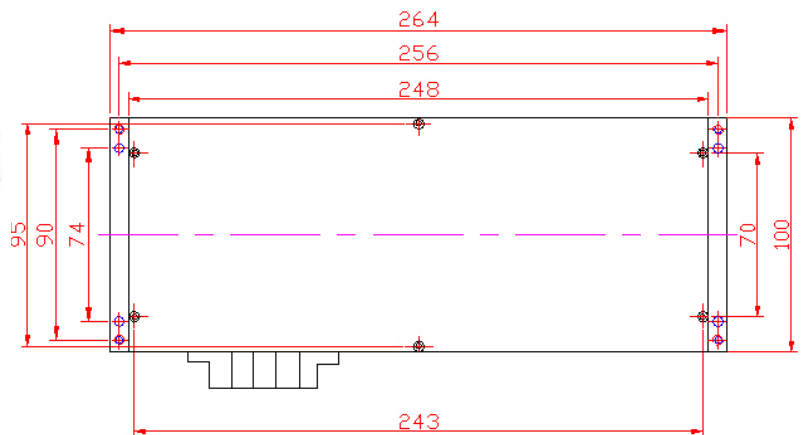
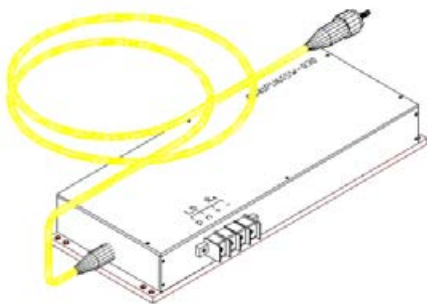




## P2 Package Dimensions:



## P3 Package Dimensions:





### **3 Laser safety operating instructions**

#### **Laser usage requirements in environment**

- A ultra-clean environment should be provided for operating the LD. The operating temperature should be controlled at  $-10\text{ °C} \dots 45\text{ °C}$ .
- Laser safety warning signs should be posted in the working place.

#### **The requirements on the power supply driving the LD**

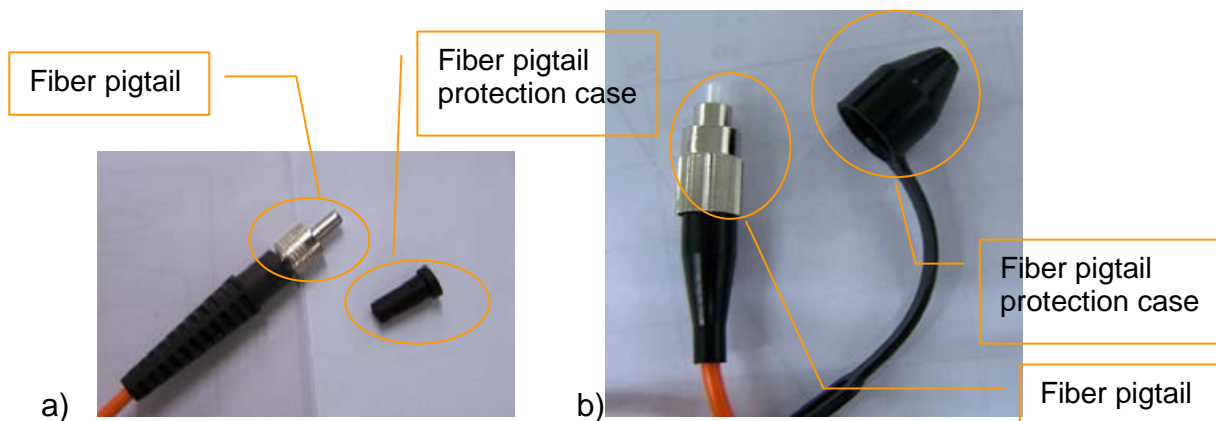
- Constant-current should be available for power supply. The power supply should have the ability to avoid current or voltage surge at any condition (during start-up, intermittence or open circuit). The surge would result in instant increase of optical power, which can cause COMD (catastrophic optical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

#### **Laser operating requirements**

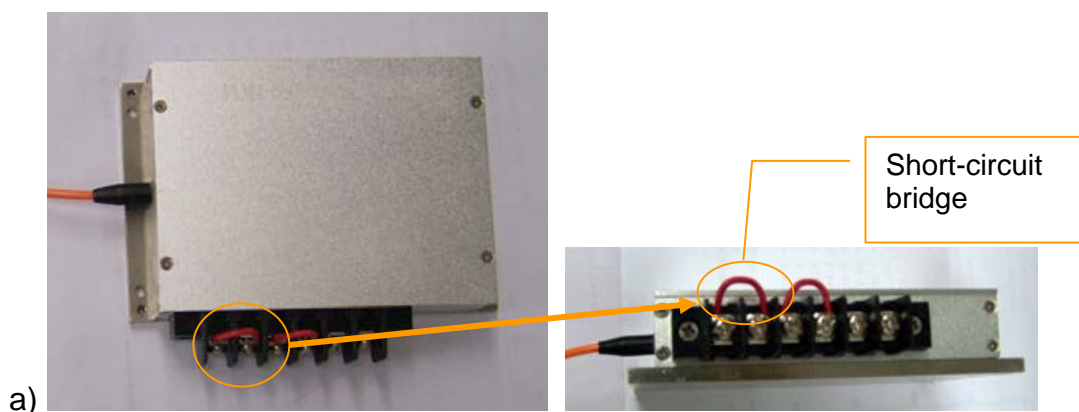
- Please check the laser safeguard before used the LD. More information about the laser safe is mentioned in “laser safe” section of this manual.
- The semiconductor Laser Diode is a sensitive electronic device. Do not ship or store near strong electrostatic, electromagnetic, magnetic or radioactive 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.



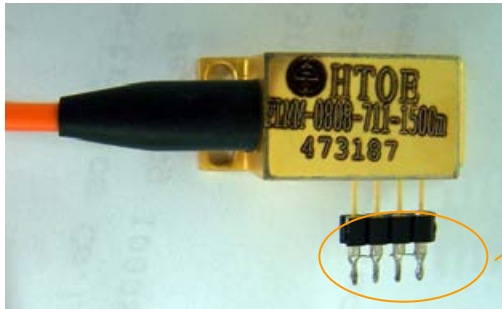
- The operating current of laser must not be higher than the given rate current. The excessive current would accelerate aging and shorten lifetime, even damage the LD.
- Keep the fiber pigtail clean. In non-working environment, you must use the protection case to avoid fiber pigtail from being polluted.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



- 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.



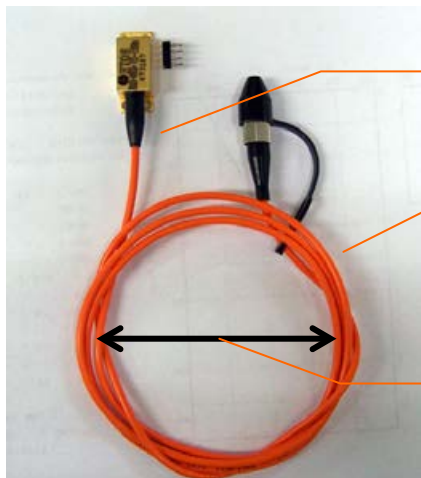




Short-circuit bridge

b)

- 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.

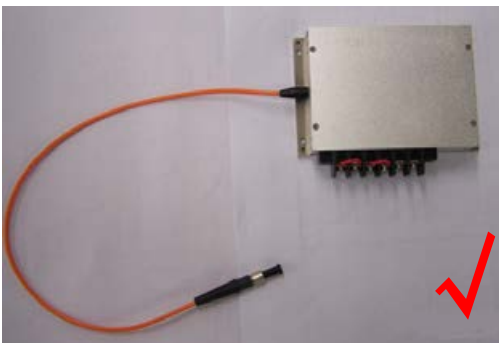


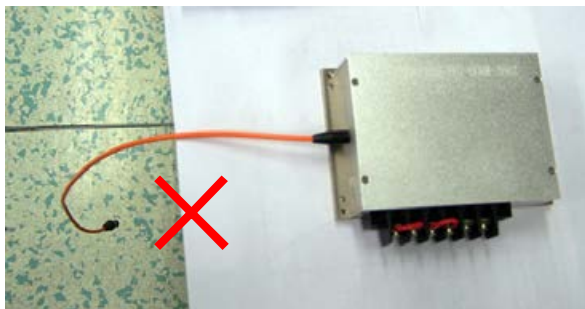
Fiber root

Fiber protection case

Bending diameter D:  
 $D \geq 4\text{cm}$

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





## 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.