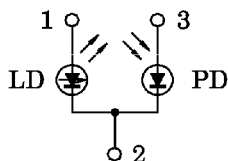


TOSHIBA LASER DAIODE InGaAlP

# TOLD9441MD

Unit in mm

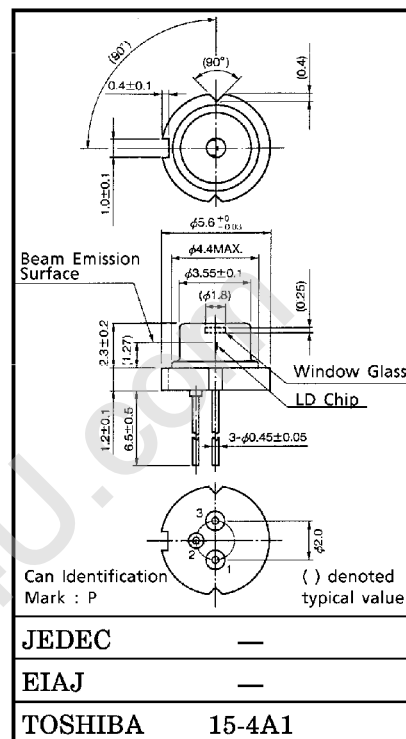
- Lasing Wavelength :  $\lambda_p = 650\text{nm}$  (Typ.)
- Optical Output Power :  $P_o = 5\text{mW}$
- Operation Case Temperature :  $T_c = -10 \sim 70^\circ\text{C}$
- Pin Connection



1. LASER DIODE ANODE
2. LASER DIODE CATHODE
3. PHOTODIODE ANODE

MAXIMUM RATINGS ( $T_c = 25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	RATING	UNIT
Optical Output Power (CW)	$P_o$	7	mW
LD Reverse Voltage	$V_R(\text{LD})$	2	V
PD Reverse Voltage	$V_R(\text{PD})$	30	V
Operation Case Temperature	$T_c$	-10~70	$^\circ\text{C}$
Storage Temperature	$T_{\text{stg}}$	-40~85	$^\circ\text{C}$



OPTICAL-ELECTRICAL CHARACTERISTICS ( $T_c = 25^\circ\text{C}$ )

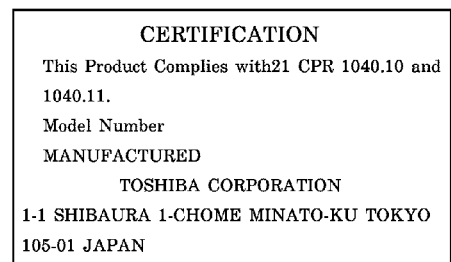
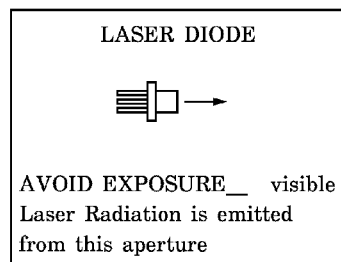
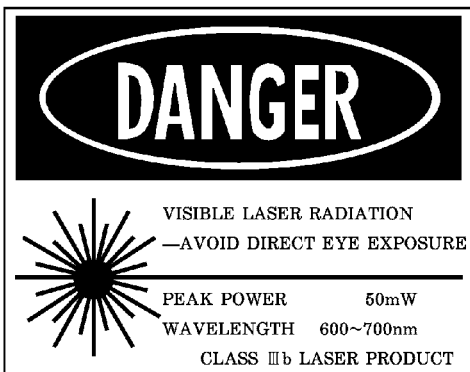
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Threshold Current	$I_{\text{th}}$	CW Operation	—	40	70	mA
Operation Current	$I_{\text{op}}$	$P_o = 5\text{mW}$	—	50	80	mA
Operation Voltage	$V_{\text{op}}$	$P_o = 5\text{mW}$	—	2.2	3.0	V
Lasing Wavelength	$\lambda_p$	$P_o = 5\text{mW}$	640	650	660	nm
Beam Divergence	$\theta_{\parallel}$	$P_o = 5\text{mW}$	5	8	12	$^\circ$
	$\theta_{\perp}$	$P_o = 5\text{mW}$	24	28	35	$^\circ$
Monitor Current	$I_m$	$P_o = 5\text{mW}$	0.07	0.25	0.5	mA
PD Dark Current	$I_D(\text{PD})$	$V_R = 5\text{V}$	—	—	100	nA
PD Total Capacitance	$C_T(\text{PD})$	$V_R = 5\text{V}, f = 1\text{MHz}$	—	—	20	pF

961001EAC1

- TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.
- Gallium arsenide (GaAs) is a substance used in the products described in this document. GaAs dust and fumes are toxic. Do not break, cut or pulverize the product, or use chemicals to dissolve them. When disposing of the products, follow the appropriate regulations. Do not dispose of the products with other industrial waste or with domestic garbage.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

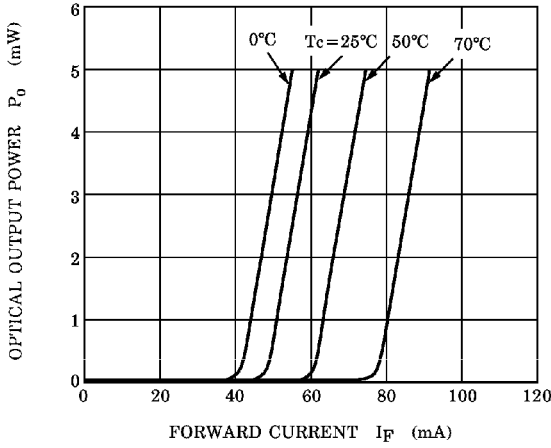
**PRECAUTIONS :**

1. Be careful never to exceed, even momentarily, the maximum ratings. The laser diode is damaged by spike current which can be generated when switching the power ON or OFF. Before activating laser diodes, check the transient state of the power supply to ensure that it will not cause the laser diode to exceed the maximum ratings.
2. Effective heat sinking should be performed, because temperature rise causes decrease of optical output power. Use a thermal radiator to reduce the temperature rise.
3. Prevent electrostatic discharge and electric spike which may damage the laser diode. The following precautions should be taken when using a laser diode.
  1. Set the electrical potential of the work bench to be the same as that of the power supply ground line.
  2. Soldering irons and the operator's body should be grounded.
  3. Do not operate equipment which may generate high frequency surge energy near the laser diode.
4. Do not apply excessive stress between the package and the leads, because it deteriorates hermeticity. If the leads are formed, soldering should be performed after lead forming.  
Soldering temperature : 260°C MAX Soldering time : 5s MAX  
(soldering portion of leads : up to 2mm from the body of the device)
5. Take care not to touch the window glass. Contamination and scratches on the window glass surface will result in decreased optical output power and distorted far-field patterns.
6. Do not look at the laser beam directly or through lenses when the laser diode is activated. The laser beam emitted by laser diode is harmful if aimed directly into human eye.

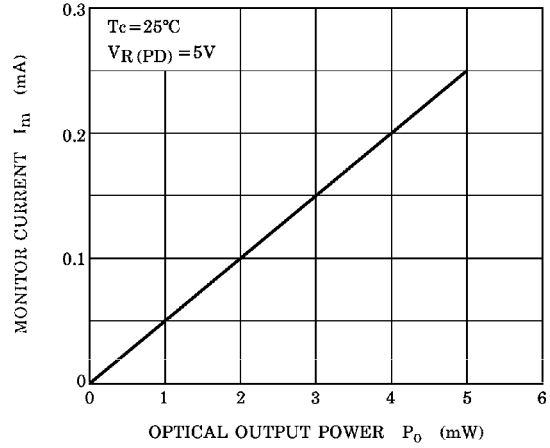


7. Toshiba Visible Laser Diodes are available in two types of carton to which the following warning labels are attached : -
  1. Envelope Package (1 piece) : warning labels are included on the reverse side of the individual envelope
  2. Tray Package (200 pieces) warning labels are attached to the top of the external carton that contains the tray.
 (\*) due to the small size of the laser diodes, the warning labels are placed on the laser diode packaging and not on the individual laser diodes.

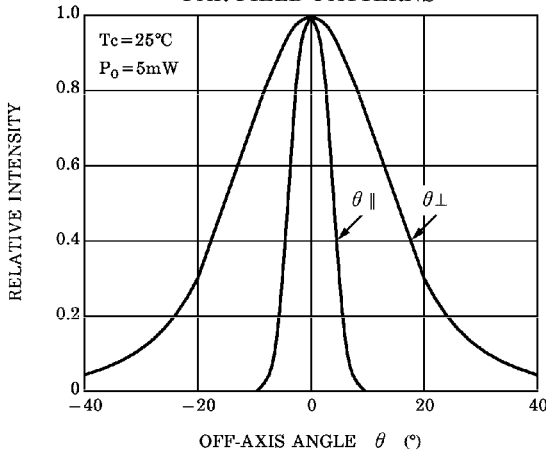
OPTICAL OUTPUT POWER – FORWARD CURRENT



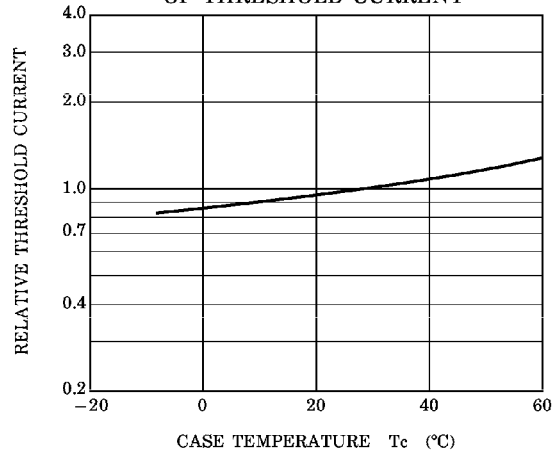
MONITOR CURRENT – OPTICAL OUTPUT POWER



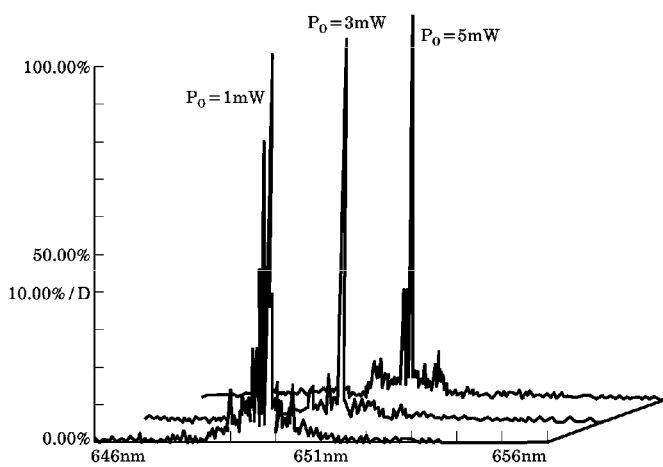
FAR-FIELD PATTERNS



CASE TEMPERATURE DEPENDENCE OF THRESHOLD CURRENT



LASING SPECTRUM



LASING SPECTRUM AND VISIBILITY UNDER HIGH FREQUENCY MODULATION

