

# Blue Laser Diode in TO90 Package

## Version a.2

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PLPT9 450D\_E A01



### Features

- Typ. emission wavelength 447 nm
- Efficient radiation source for cw and pulsed operation
- TO90 package
- ESD protection diode
- Laser diode isolated against package

### Applications

- Laser projection
- Laser shows
- Illumination
- Metrology

### Safety Advice

Depending on the mode of operation, these devices emit highly concentrated visible light which can be hazardous to the human eye. Products which incorporate these devices have to follow the safety precautions found in IEC 60825-1 "Safety of laser products".



**ATTENTION – Observe Precautions For Handling – Electrostatic Sensitive Device**

**Ordering Information**

Type:	Optical Output Power $P_{\text{opt}}$ ( $T_{\text{case}} = 25\text{ °C}$ )	Ordering Code
PLPT9 450D_E A01	3.5 W	–

**Maximum Ratings**

Operation outside these conditions may damage the device. Operation at the maximum ratings may influence lifetime.

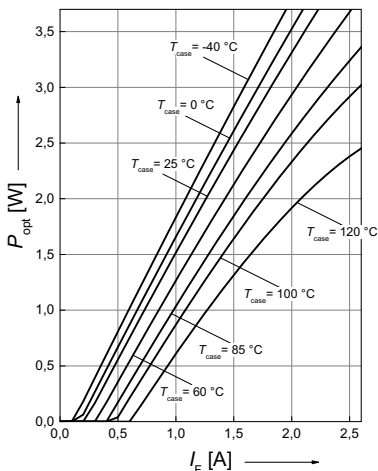
Parameter	Symbol	Values		Unit
		min.	max.	
Optical Output Power	$P_{\text{opt max}}$		3.7	W
Operating Current <sup>1) page 6</sup>	$I_F$		2.6	A
Operating Temperature <sup>1) page 6</sup>	$T_{\text{case}}$	-40	+120	°C
Storage Temperature	$T_{\text{stg}}$	-40	+135	°C
Reverse Current	$I_R$		20	mA
Soldering Temperature max. 10 sec.	$T_{\text{solder}}$		260	°C
Junction Temperature	$T_j$		160	°C

**Laser Characteristics** ( $T_{\text{case}} = 25\text{ °C}$ )

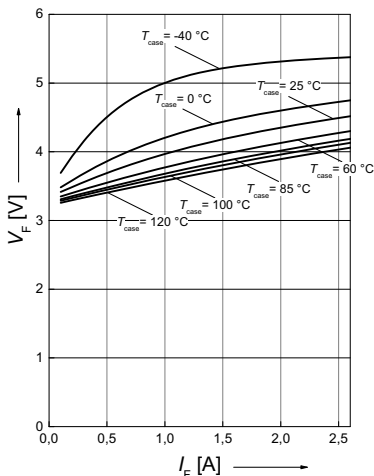
Parameter	Symbol	Values <sup>2) page 6</sup>			Unit	
		min.	typ.	max.		
Emission Wavelength ( $P_{\text{opt}} = 3.5\text{ W}$ ) <sup>3) page 6</sup>	B1 B2 B3 B4 B5 B6 B7	$\lambda_{\text{peak}}$	440 442 444 446 448 450 452	– – – – – – –	442 444 446 448 450 452 455	nm nm nm nm nm nm nm
Threshold Current	$I_{\text{th}}$	–	0.25	0.40	A	
Optical Output Power ( $I_F = 2.1\text{ A}$ ) <sup>3) page 6</sup>	$P_{\text{opt}}$	–	3.5	–	W	
Operating Current ( $P_{\text{opt}} = 3.5\text{ W}$ ) <sup>3) page 6</sup>	$I_F$	–	2.1	2.5	A	
Forward Voltage ( $P_{\text{opt}} = 3.5\text{ W}$ ) <sup>3) page 6</sup>	$V_F$	–	–	5.5	V	
Beam Divergence ( $P_{\text{opt}} = 3.5\text{ W}$ ) Full angle at $1/e^2$ from peak intensity	$\theta_{\parallel}$ x $\theta_{\perp}$	–	7 x 49	–	deg	
Polarization ( $P_{\text{opt}} = 3.5\text{ W}$ )	$PR$	–	100:1	–	TE:TM	
Thermal Resistance (junction to case)	$R_{\text{th}}$	–	10	–	K/W	
Total Power Dissipation	$P_{\text{tot}}$	–	6.75	–	W	

**Optical Output Power** <sup>2)</sup> page 6

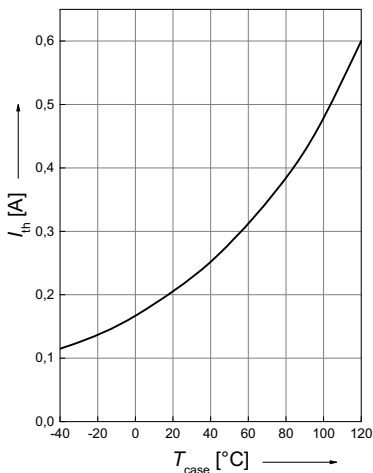
$$P_{\text{opt}} = f(I_F)$$

**Forward Voltage** <sup>2)</sup> page 6

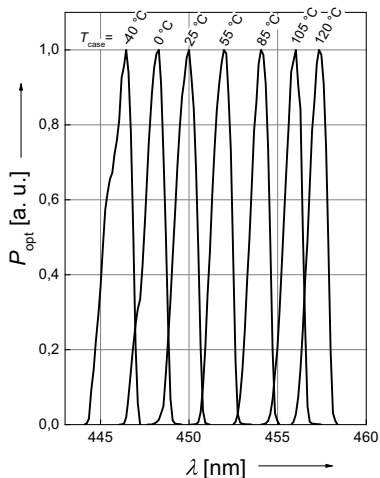
$$V_F = f(I_F)$$

**Threshold Current** <sup>2)</sup> page 6

$$I_{\text{th}} = f(T_{\text{case}})$$

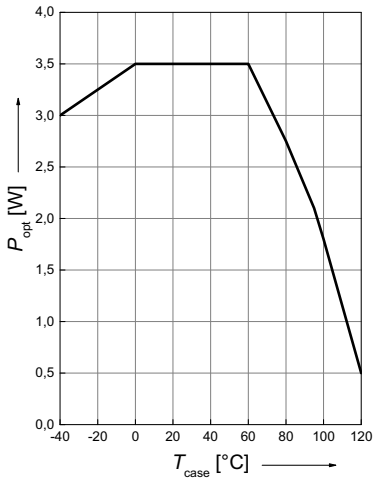
**Relative Spectral Emission** <sup>2)</sup> page 6

$$P_{\text{opt}} = f(\lambda)$$

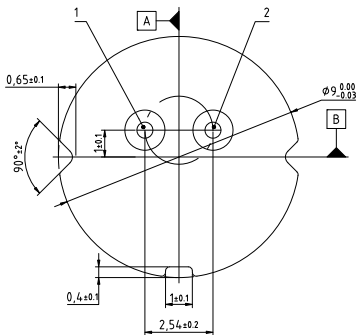


**Max. Permissible Opt. Output Power** <sup>1) 2)</sup> page 6

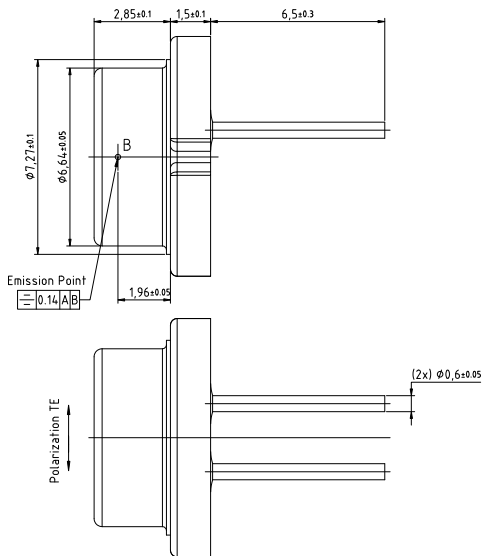
$$P_{\text{opt}} = f(T_{\text{case}})$$



## Package Outline



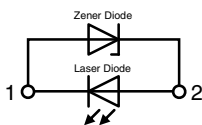
1: Cathode  
2: Anode



E062.5902.06-01

Dimensions in mm

## Pin Connection



Pin 1: LD Cathode  
Pin 2: LD Anode

## Disclaimer

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### Attention please!

The information describes the type of component and shall not be considered as assured characteristics.

Terms of delivery and rights to change design reserved. Due to technical requirements components may contain dangerous substances.

For information on the types in question please contact our Sales Organization.

If printed or downloaded, please find the latest version in the Internet.

### Packing

Please use the recycling operators known to you. We can also help you – get in touch with your nearest sales office.

By agreement we will take packing material back, if it is sorted. You must bear the costs of transport. For packing material that is returned to us unsorted or which we are not obliged to accept, we shall have to invoice you for any costs incurred.

### Components used in life-support devices or systems must be expressly authorized for such purpose!

Critical components\* may only be used in life-support devices\*\* or systems with the express written approval of OSRAM OS.

\*) A critical component is a component used in a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or the effectiveness of that device or system.

\*\*) Life support devices or systems are intended (a) to be implanted in the human body, or (b) to support and/or maintain and sustain human life. If they fail, it is reasonable to assume that the health and the life of the user may be endangered.

## Important notes of operation for laser diode

### a) Electrical operation

OSRAMs laser diodes are designed for maximum performance and reliability. Operating the laser diode above the maximum rating even for very short periods of time can damage the laser diode or reduce its lifetime. The laser diode must be operated with a suitable power supply with minimized electrical noise.

The laser diode is very sensitive to electrostatic discharge (ESD). Proper precautions must be taken.

### b) Mounting instructions

In order to maintain the lifetime of the laser diode proper heat management is essential. Due to the design of the laser diode heat is dissipated only through the base plate of the diode's body. A proper heat conducting interconnection between the diodes base plate and the heat sink must be maintained.

## Glossary

- 1) **Case temperatures:** At case temperature higher than 60°C we recommend a derating of the maximum operation current in order to not exceed the maximum junction temperature  $T_j$ .
- 2) **Typical values:** Due to the special conditions of the manufacturing processes of laser diodes, the typical data or calculated correlations of technical parameters can only reflect statistical figures. These do not necessarily correspond to the actual parameters of each single product, which could differ from the typical data and calculated correlations or the typical characteristic line. If requested, e.g. because of technical improvements, these typ. data will be changed without any further notice.
- 3) **Reproducibility:**  $P_{opt}$ ,  $\lambda_{peak}$ , and  $V_F$  is measured with an internal reproducibility of  $\pm 7\%$ ,  $\pm 0.3$  nm, and  $\pm 0.05$  V, respectively (acc. to GUM with a coverage factor of  $k = 3$ ).

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