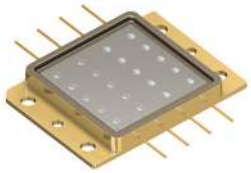
Blue Laser Diode in Multi-Die-Package
Version 1.1

PLPM4 450



Features

- Butterfly package with typical 60 W optical output power in continuous wave operation (cw) at T_{case} = 25 °C.
  (Please note that case temperature T_{case} is not equivalent to any heatsink temperature; details in corresponding application note)
- 20 multimode laser chips in one package
- One package contains 4 bars (channels). Per channel 5 multimode laser chips are bonded in series connection
- Wavelength 450 nm ±10 nm
- Typ. wall plug efficiency of 31% at T_{case} = 65 °C
- ESD protection diode for each laser chip

Applications

- Laser projection
- Laser shows
- Illumination

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

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Ordering Information

Type	Optical Output Power P_{opt} (T_{case} = 25 °C) 1) page 10	Ordering Code
PLPM4 450	60 W	Q65111A5713

Maximum Ratings

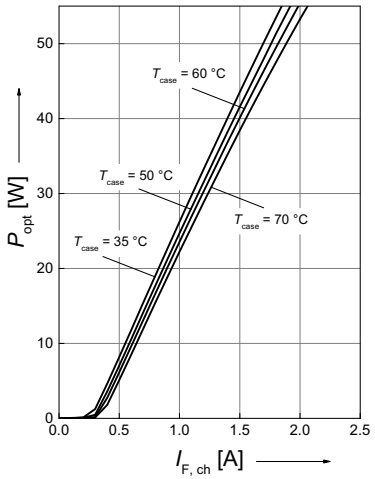
Operation outside these conditions may damage the device. Operation at the maximum ratings influences lifetime.

Parameter	Symbol	Values		Unit
		min.	max.	
Operating Temperature 2) page 10	T_{case}	0	+70	°C
Storage Temperature	T_{stg}	-20	+85	°C
Maximum optical output power	P_{opt}		65	W
Forward Current per channel	$I_{F, ch}$		2.3	A
Reverse Voltage per channel	$V_{R, ch}$		2	V
ESD withstand voltage (acc. to ANSI/ ESDA/ JEDEC JS-001 - HBM)	V_{ESD}		2	kV
Junction temperature per chip	$T_{j, chip}$		135	°C
Soldering Temperature at pins max. 10 sec.	T_{solder}		260	°C

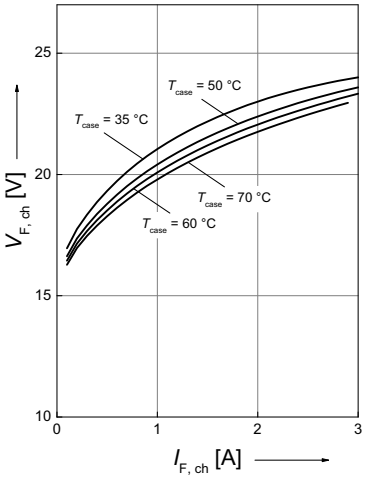
Laser Characteristics (T_{case} = 25 °C; pulsed operation) 2) page 10

Parameter	Symbol	Values			Unit
		min.	typ. 3) page 10	max.	
Emission Wavelength ($I_{F, ch}$ = 2.0 A) 4) page 10	$\lambda_{package}$	437	447	457	nm
Optical Output Power Package ($I_{F, ch}$ = 2.0 A, operation of 4 channels) 1) page 10	$P_{opt, package}$	50	–	–	W
Threshold Current per Channel	$I_{th, ch}$	–	0.28	–	A
Forward Current per Channel (P_{opt} = 50 W) 1) page 10	$I_{F, ch}$	–	1.7	2.0	A
Forward Voltage per Channel ($I_{F, ch}$ = 2.0 A) 5) page 10	$V_{F, ch}$	18	25	27	V
Beam Divergence per Chip ($I_{F, ch}$ = 2.0 A) FWHM	$\theta_{\parallel}$ x $\theta_{\perp}$	– –	7 x 26	15 x 31	deg
Polarization per Chip ($I_{F, ch}$= 2.0 A)	$P_{gr, chip}$	–	100:1	–	
Thermal Resistance per Chip (junction to case) 2) page 10	$R_{th, chip}$	–	9.5	–	K/W
Total Power Dissipation	P_{tot}	–	115	–	W

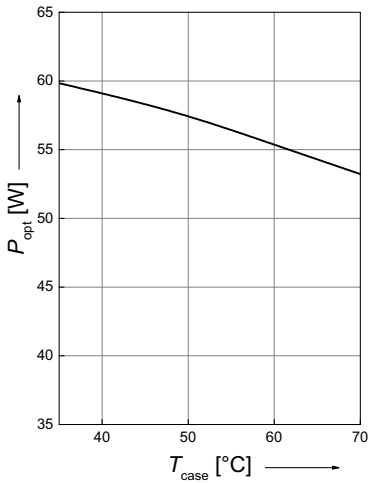
Typical optical output power, cw [2) 3) page 10]
$P_{opt, package} = f\ (I_{F, ch})$



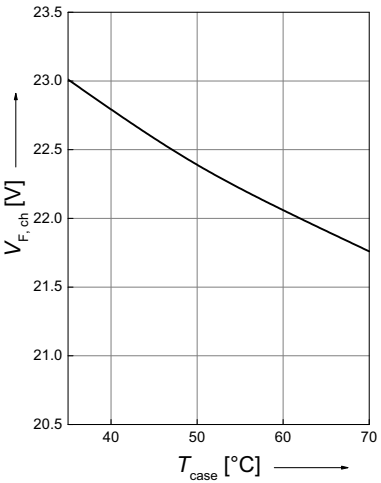
Forward voltage per channel, cw [2) 3) page 10]
$V_{F, ch} = f\ (I_{F, ch})$



Typical optical output power, cw [2) 3) page 10]
$P_{opt, package} = f\ (T_{case})$; $I_{F, ch}$ = 2 A



Forward voltage per channel, cw [2) 3) page 10]
$V_{F, ch} = f\ (T_{case})$; $I_{F, ch}$ = 2 A



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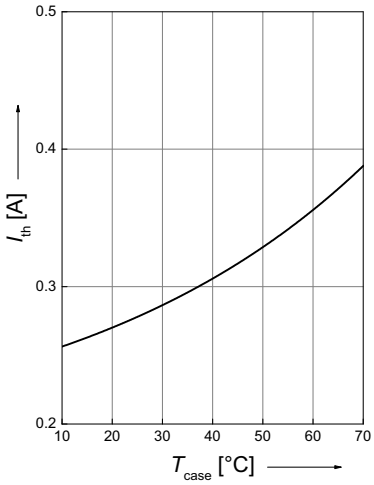
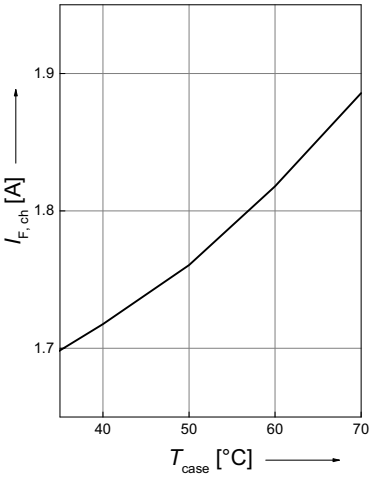
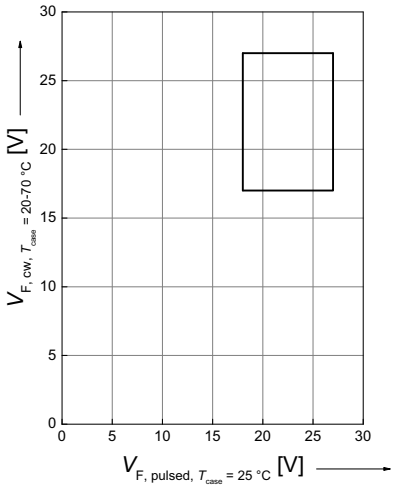
Typical threshold current, cw [2) 3) page 10]
$I_{th} = f\ (T_{case})$



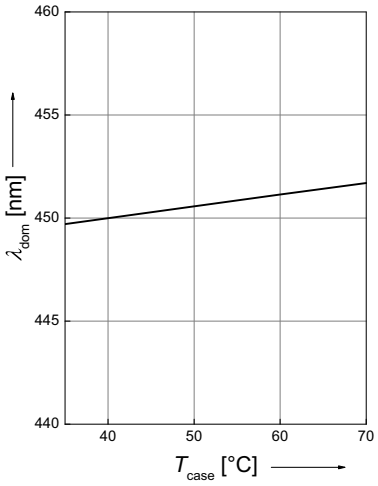
Typ. operation current per channel [2) 3) page 10]
$I_{F, ch} = f\ (T_{case})$



Corr. of voltage, pulsed vs. cw operation
$I_F = 2$ A [2) 3) page 10]



Typical dominant wavelength [2) 3) page 10]
$\lambda_{dom} = f\ (T_{case})$



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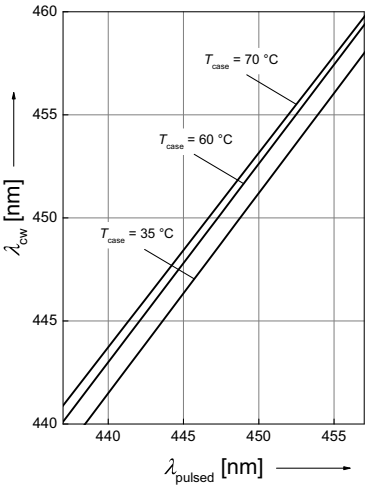
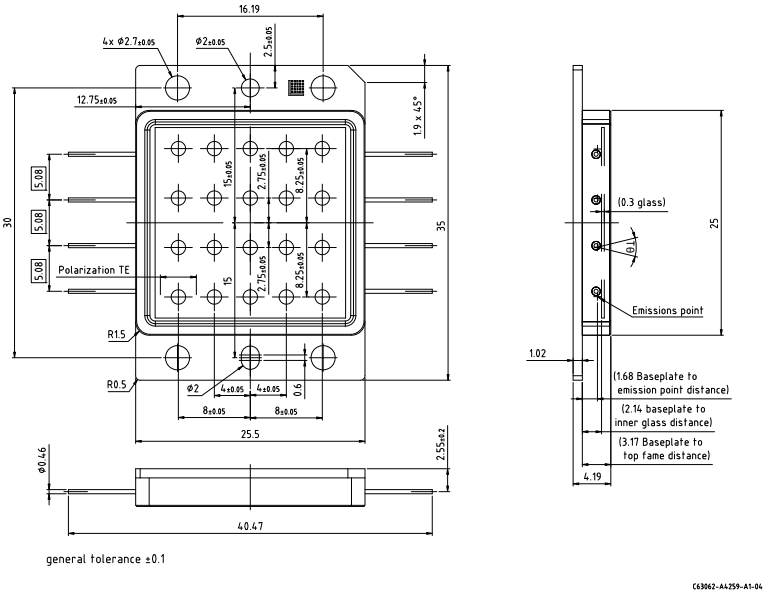
Corr. of wavelength, pulsed vs. cw operation
I_F = 2 A [2) 3) 4) page 10]



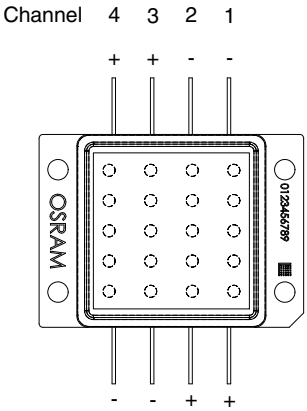
Package Outline



Dimensions in mm

Pin connection

Channel 4	Channel 3	Channel 2	Channel 1
+	+	-	-
-	-	+	+



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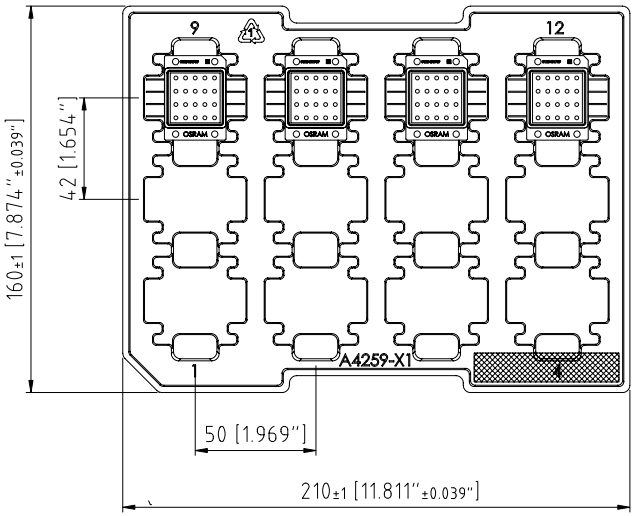
Tray



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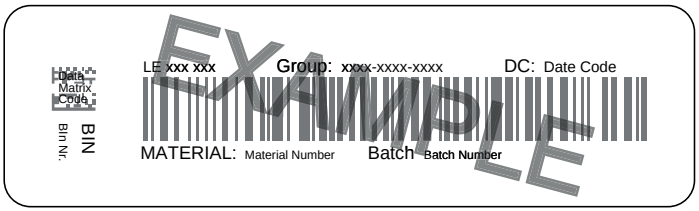
Dimensions in mm

Barcode-Tray-Label (BTL)



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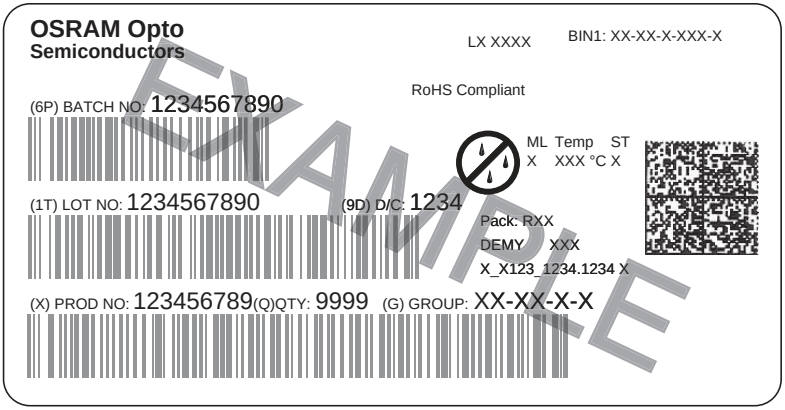
Barcode-Product-Label (BPL)



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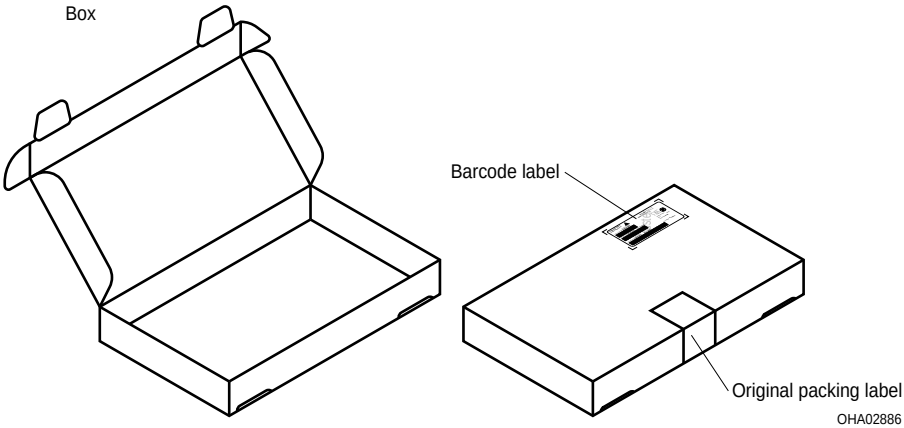
Transportation Packing and Materials



OHA02886

Dimensions of transportation box in mm

Width	Length	Height
170 ± 5	223 ± 5	44 ± 5

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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) **Optical Output Power:** Optical output power is measured during a current pulse of typically 3 ms and 27% duty cycle.

2) **Case temperatures:** Case temperature is defined as maximum temperature at bottom side of base plate. At case temperature higher than 65 °C we recommend a derating of the maximum operation current in order to not exceed the maximum junction temperature per chip $T_{j, chip}$.

3) **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 typical data will be changed without any further notice.

4) **Wavelength:** Wavelength is measured during a current pulse of typically 3 ms.

5) **Forward Voltage:** Forward voltages are tested during a current pulse duration of 3 ms and 27% duty cycle.

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