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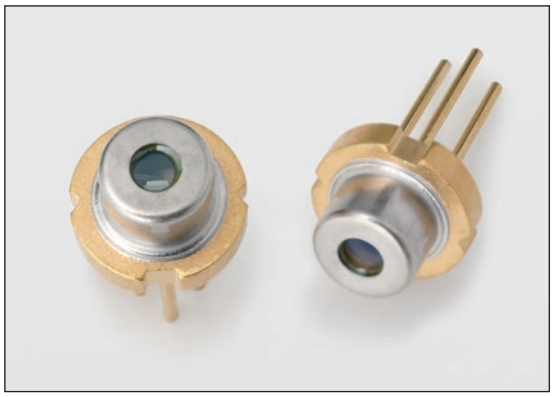
Pulsed Laser Diode
L11854-307-05/-55

■ Features

- 3 stack pulsed laser diode
- Wavelength: 905 nm
- Peak radiant power: ≥21 W
- Emiting area : 70 µm × 10 µm
- Sharp and stable Near filed pattern (NFP)



■ Applications

- LiDAR
- 3D sensing

■ Outline

This multi-mode laser provides high light output from the light emitting area of 70 µm × 10 µm. The standard PKG is ϕ5.6 metal can packages, and other cans package types are also available. It can be used for various applications such as laser range finder, security, and monitoring.

■ Absolute maximum rating

Parameter	Symbol	Value	Unit
Pulse forward current	I_{fp}	10	A
Reverse voltage (DC)	V_r	6	V
Pulse width	t_w	100	ns
Duty ratio	DR	0.1	%
Operating temperature	$T_{op(c)}$	-40 to +85	°C
Storage temperature	T_{stg}	-40 to +100	°C
Soldering conditions	T_{sol}	260 °C, up to 5 seconds	—

* $T_{op(c)}$=25 °C

■ Specification

Parameter		Symbol	Condition	Value			Unit
				Min.	Typ.	Max.	
Peak radiant power		Φ_{ep}	I_{fp} = 7 A	17	21	—	W
Operating voltage		V_{op}		—	11	14	V
Peak emission wavelength		λ_p		895	905	915	nm
Spectral width		$\Delta\lambda$		—	6	10	nm
Rise time		t_r		—	—	2	ns
Wavelength temperature coefficient		—		—	0.28	0.32	nm/°C
Beam spread angle	Horizontal	$\theta_{//}$	I_{fp} = 7 A FWHM	7	11	15	° (degrees)
	Vertical	$\theta_{\perp}$		18	23	28	
Threshold current		I_{th}	—	—	0.4	1	A
Emitting area		—	Designing value	—	70 × 10	—	µm × µm
Optical axis tilt *1	Horizontal	$\Delta\theta_{//}$	I_{fp} = 7 A	-2	—	2	° (degrees)
	Vertical	$\Delta\theta_{\perp}$					
Position accuracy of emission point *2		—	ΔX, ΔY, ΔZ	-0.2	—	0.2	mm

*1 Optical axis tlit is based on the bottom of the package base.
*2 The emitting point position accuracy is based on the package base center.
* Driving conditions: Pulse width t_w = 50 ns, repetition frequency f_r = 1 kHz
* $T_{op(c)}$=25 °C

Figure 1: Peak radiant power - pulse forward current and operating voltage vs. pulse forward current (example)

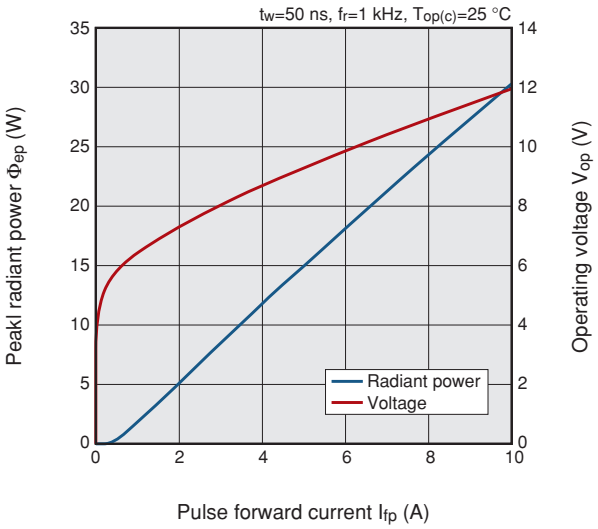


Figure 2: Emission spectrum (example)

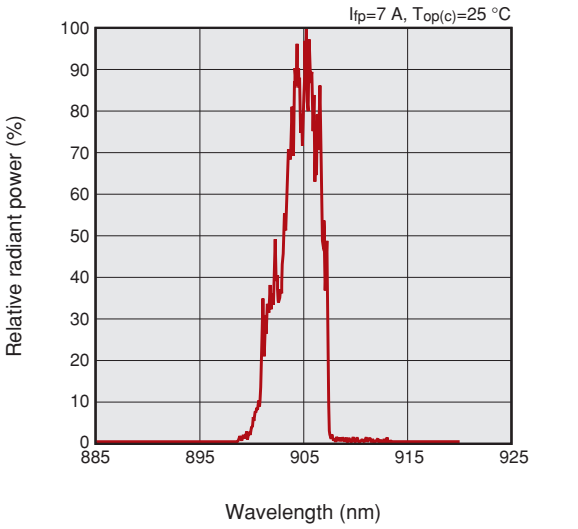


Figure 3: Relative light output temperature characteristics (example)

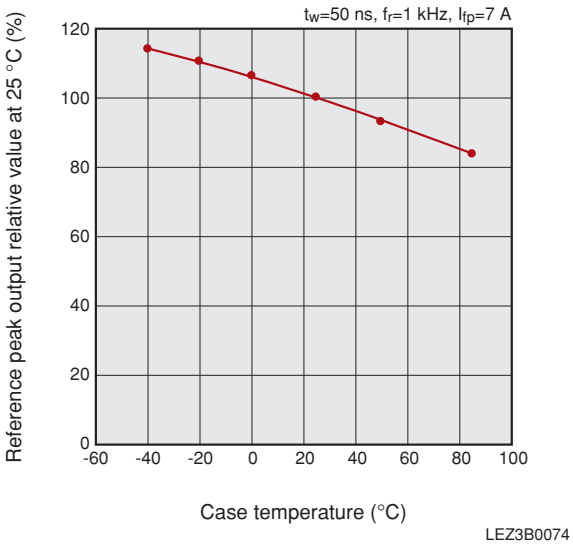


Figure 4: Center wavelength temperature characteristics (example)

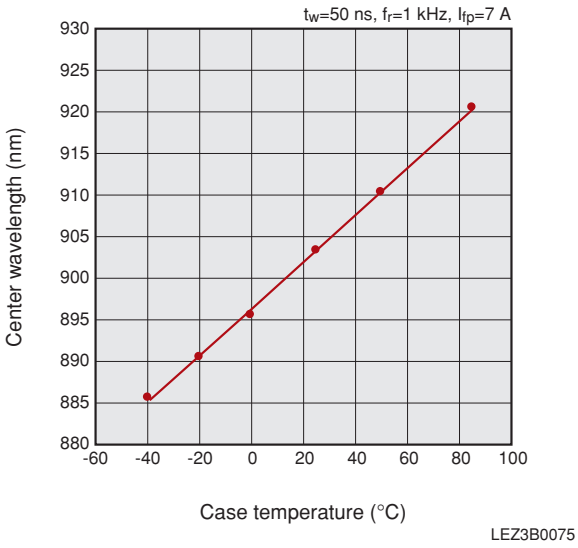


Figure 5: Directivity (example)

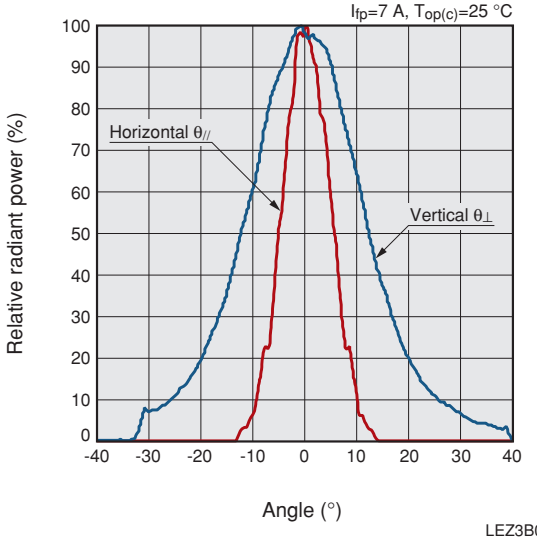


Figure 6: NFP near field pattern (example)

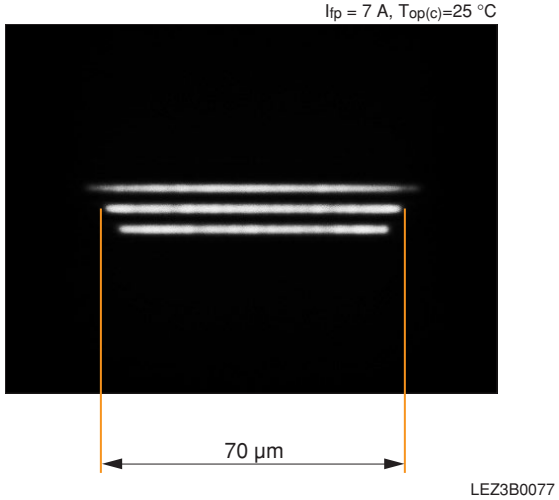


Figure 7: Short-pulse operation using laser driver board C14518 (example)

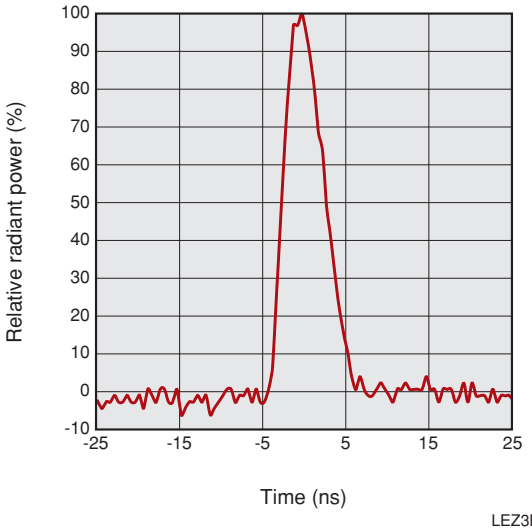


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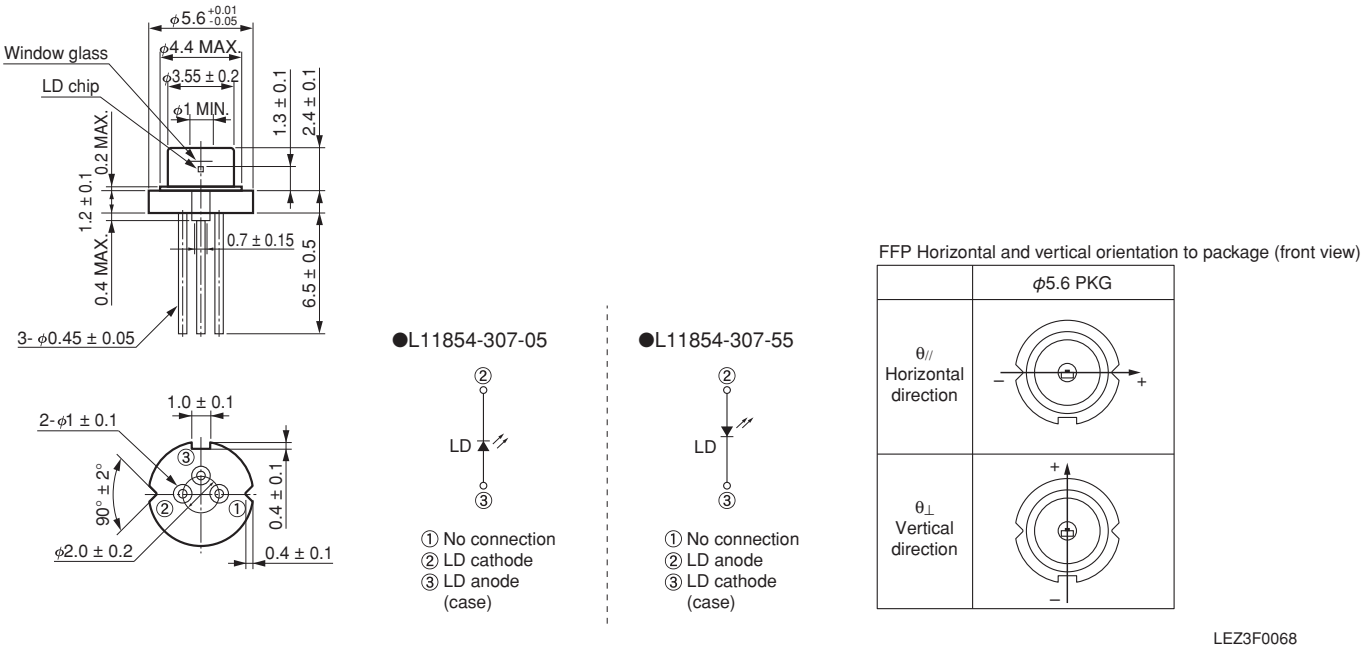
Figure 8: Dimensions (unit: mm)

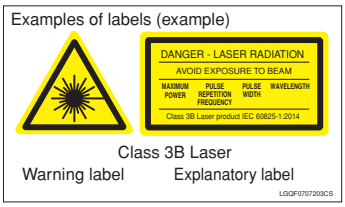


LEZ3F0068

⚠ DANGER (Class 3B Laser)
Invisible Laser Radiation – Avoid Exposure to Beam

●Exposure to the Laser Beam

The LD emits invisible laser radiation. The instrument which uses the LD, operated under ordinary conditions, is classified as Class 3B according to the laser product classification code IEC 60825-1. Direct laser beams or indirect laser beams viewed through lenses or reflected by mirrors may damage your eyes or skin. In particular exposing the eye to the laser beam may cause serious damage.
When using the Class 3B LD, for safe operation, ensure that the following countermeasures are taken:



Label for protective goggles

* See IEC 60825-1:2014 for more details concerning the above countermeasures.

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⚠ Handling Precautions • • • Negligence following the instructions may lead to the degradation of the LD

●ABSOLUTE MAXIMUM RATINGS

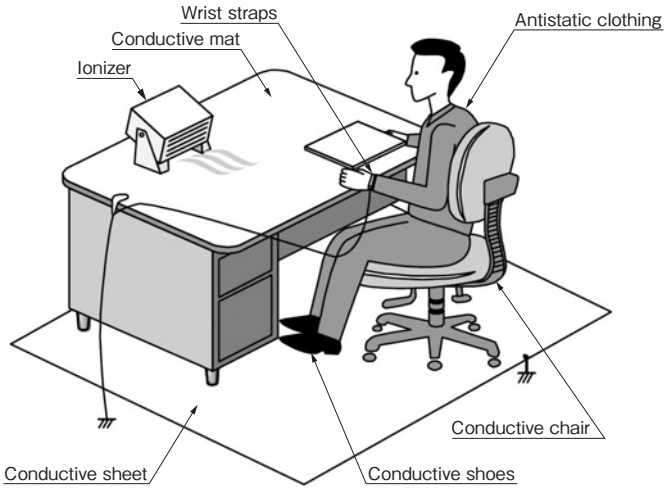
When using this product, observe the maximum ratings stated in the specifications and test results.

●Protection against Electrostatic Discharges

The LD is an Electrostatic-Discharge Sensitive (ESDS) device that may be damaged or deteriorated by electrostatic discharges. When handling the LD, ensure the following measures are taken. (ESDS : Electrostatic discharge sensitive devices)

- The conductive sheet which is electrically grounded through 1 MΩ resistor should be laid on all worktables and floors of the work area.
- Operators should wear wrist straps and conductive fingerstalls grounded through 1 MΩ resistor.
- The humidity should be around 50 % (about 40 % for bear products). A low humidity tends to generate static electricity, while a high humidity tends to absorb moisture.
- When handling the product, it is recommended to neutralize it using an ionizer, etc.
- Wear antistatic clothing and conductive shoes (100 kΩ to 100 MΩ).
- Use a soldering iron with an insulation resistance of 10 MΩ or more and a soldering iron tip grounded.

[Example of anti-static measures]



Notes on connecting electrodes

●Lead terminal products

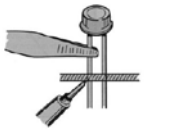
Soldered joint is required for the lead type LD. Strong stress or heat will cause for the damage or deterioration of the product. Please pay attention to the following.

◆Lead forming (Can package)

- Hold firmly and set in the base of the lead terminal with tweezers before the soldering.
- Lead forming: pull less than 5 Newton within 5 seconds; bend less than 90° within twice; and twist less than 180° within twice, at 6 mm farther from the base of the package. (Forming is not possible for items other than canned packages.)

◆Soldering

- Use a soldering iron which is grounded or more than 10 MΩ (DC 100 V) insulating resistance 5 minutes after turning on power.
- The soldering temperature should be less than 260 °C, and work operation should be less than 5 seconds (when lead length is less than 2 mm, within 1 second)
- Hold the lead base with a heat dissipation clip or tweezers.
- Do not give the strong pressure on the soldering parts.
- Rosin type flux is recommended if necessary.


Hold the base of the lead with a tweezers

◆Cutting

- Do not cut the lead soon after soldering; cut the lead at room temperature.

●Overvoltage, Overcurrent, and Reverse voltage

Overvoltage, overcurrent and reverse voltage in the LD will cause for the immediate breakdown. Please pay attention to the following;

- Do not exceed the absolute maximum ratings. Especially be cautious about the excess forward current, reverse voltage and surge voltage etc. When turning on/off power, the surge voltage is liable to be impressed. Please take some countermeasures against the impressed voltage.
- Install a protection circuit such as resistors, diodes or capacitors in the driver (power supply) to protect the LD from the excess voltage, current and reverse voltage.
- Connection of LD with driver should be done while the power of the driver is turned off.

●Cleaning

Stain on the output window will be a cause of lower output power from the LD. When the window needs to be cleaned, use a clean gauze or cotton swab dipped into ethyl alcohol and wipe off the stain gently. Do not clean any other parts of the LD.


Lightly wipe dirt off the window using ethyl alcohol.

●About reflected light

If the LD is irradiated by own laser beam, the LD will be damaged. When using the LD, please pay attention not to irradiate the reflection laser beam on the LD.

●Information described in this material current as of October 2023. Specifications are subject to change without notice.

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