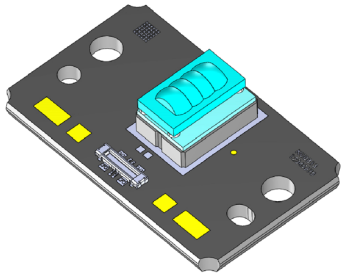
NICHIA

Laser Diode

NUBB13T With connector

■Features



- High Power Multiple Laser Diode (LD) die Package
- 4 Collimator Beams
- 4 series connection
- High Heat Dissipation

Standard Operating Conditions

- Forward Current: 3.0A(CW Operation)
- T_m=70°C, ACC (Auto Current Control) Operation

■Absolute Maximum Ratings

Item	Symbol	Absolute Maximum Ratings	Unit
Forward Current (T_m=25°C) *1	I_F	3.5	A
Allowable Reverse Current (T_m=25°C) *1	I_R	85	mA
Storage Temperature	T_{stg}	-40 ~ 85	°C
Operating Temperature	T_m	0 ~ 70	°C

*1: Individual LD die

■Initial Electrical/Optical Characteristics

(T_m=25°C)

Item		Condition	Symbol	Min	Typ.	Max	Unit
Optical Output Power		I_F=3.0A	P_o	17.5	(20)	-	W
Dominant Wavelength		I_F=3.0A	λ_d	449	(455)	461	nm
Threshold Current		CW	I_{th}	220	-	420	mA
Slope Efficiency		CW	η	-	(7.4)	-	W/A
Forward Voltage *2		I_F=3.0A	V_F	14.5	(16.5)	18.5	V
Beam Pointing Tilt Angle *3		I_F=3.0A	$\Delta\theta$	-	-	1.2	°
Beam Divergence *4	Parallel	I_F=3.0A	$\theta_{//}$	0	(0.8)	1.6	°
	Perpendicular		$\theta_{\perp}$	-1.5	(0)	1.5	

( ) are reference figures.

*2: When connected in series with the 4 LD die.

*3: The beam pointing tilt angle measurement is performed for the total emission area once the LD initiates laser oscillation. To calculate the beam pointing tilt angle, the following equation is used: $\Delta\theta = \sqrt{\Delta\theta_{//}^{\ 2} + \Delta\theta_{\perp}^{\ 2}}$

*4: Full angle at $1/e^2$ from peak intensity (Total Emission Area)

All figures in this specification are measured by Nichia's method and may contain measurement deviations.

This model is Test Sample for evaluation or design purpose only. Life time is not guaranteed.
The above specifications are for reference purpose only and subjected to change without prior notice.

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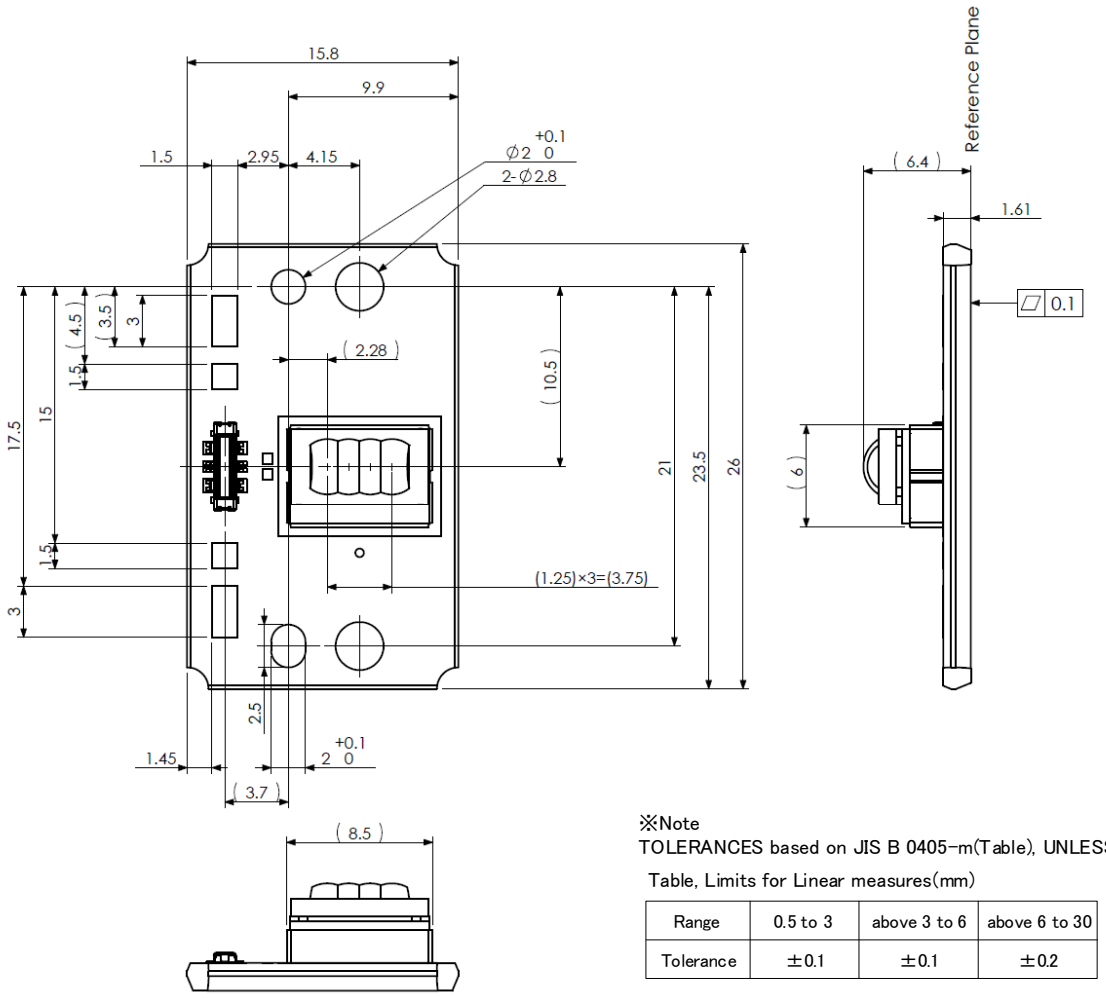
■Outline Dimensions



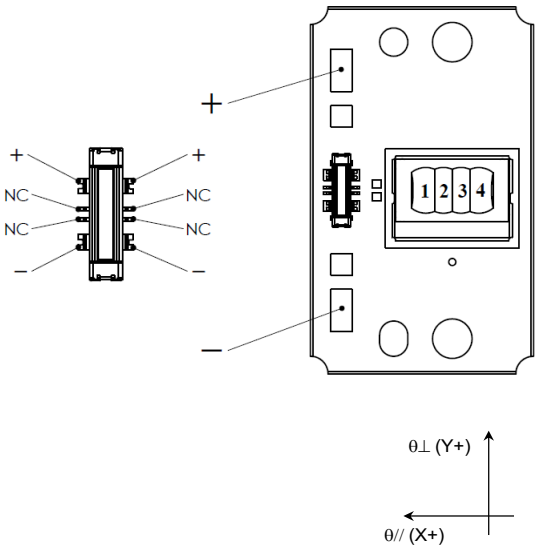
※Note
TOLERANCES based on JIS B 0405-m(Table), UNLESS NOTED

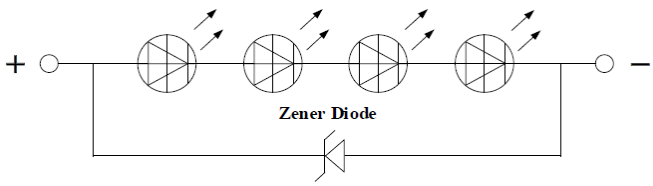
Table, Limits for Linear measures(mm)

Range	0.5 to 3	above 3 to 6	above 6 to 30
Tolerance	±0.1	±0.1	±0.2

Dimensions are in millimeters
( ) are reference figures

■LD die Position No. & Pad Connection





This model does not have a Photo Diode.
This model has a Zener Diode built in as a protection circuit against static electricity.

■Cautions

(1) Safety of Collimated beam LD

- **Laser Light can damage the human eyes and skin.** Do not expose the eye or skin to laser light directly. This Laser product has an optical lens and emits a collimated laser beam. The light from this product, both direct and reflected, is very harmful as it can propagate a long distance while maintaining high optical density. When handling the product, wear appropriate safety glasses to protect eyes from laser light including reflected and stray light. The reflected and stray light spilling into an unintended area should be attenuated and/or absorbed.
- The LD is classified in **Class 4 of IEC60825-1 and 21 CFR Part 1040.10 Safety Standards**. It is absolutely necessary to take overall safety measures against User's modules, equipment and systems into which Nichia LD is incorporated and/or integrated.

(2) Operating method

- The LD will change its V_F requirement and optical output power according to the temperature change. Also, the LD will require a higher operation current to maintain the same output power as it degrades. In order to maintain the output power, use of APC (Automatic Power Control) is recommended, which uses feedback of the optical output power to adjust the operation current.
- Confirm that the electrical spike current generated by switching on and off does not exceed the maximum operating current as specified within this document as the absolute max rating. Additionally, ensure that there are appropriate countermeasures to reduce chattering and/or overshooting in the circuit.
- ACC (Auto Current Control) mode is recommended for the operation of this product. Additionally, be careful for the overshooting in order to avoid excessive optical output power as the laser operation is started.

(3) Design Consideration

- LDs may fail as either a short circuit or an open circuit. If an LD shorts during operation, the forward voltage of the LD may fluctuate greatly. When designing a circuit, ensure that both short and open circuits are considered and that there will be no issues if a short or open circuit occurs.
- Since this LD uses a resin to secure the lens, if the lens becomes removed during operation, it may cause unintentional laser exposure to occur (e.g. random radiation) leading to accidents/injuries (e.g. causing an object to smoke, fire, and the laser light to escape). Ensure that the chosen system includes a safeguard (e.g. containing the laser light, emergency shutdown, etc.).

(4) Static Electricity

- Static electricity or electrical surges will reduce and degrade the reliability of the LD. It is recommended to use a wrist strap or anti-electrostatic glove when handling the Product.

(5) Absolute Maximum Rating

- The active layer of the mounted LD die has a high current density and generates a high electric field during its operation. In order to prevent excessive damage, the LD must be operated strictly below the Absolute Max Rating.
- During operation, if the forward current and/or optical output power are increased the lifetime of the LDs will decrease. Ensure that the LDs are operated within the recommended conditions.

(6) Others

- The LD described in this brochure is intended to be used for ordinary electronic equipment (such as office equipment, communications equipment, measurement instruments and household appliances). Consult Nichia's sales staff in advance for information on the applications in which exceptional quality and reliability are required, particularly when the failure or malfunction of the LD may directly jeopardize life or health (such as for airplanes, aerospace, submersible repeaters, nuclear reactor control systems, automobiles, traffic control equipment, life support systems and safety devices).
- The Customer must acknowledge that any LD can statistically fail and must design its equipments in a fail safe design. Prior to use of the LD, please confirm that the LD, as described in Nichia's specifications, meets the life expectancy needs of, and provides the features required by the Circuit and any related modules, equipment and/or systems.
- Due to its short wavelength and high optical output power, optical depositions on optical path may occur depending on the surrounding conditions. Appropriate design or countermeasures should be used to avoid optical depositions.
- Nichia prohibits Customer from reverse engineering, disassembling, or taking any other steps to derive the structure or design of the LD.
- The appearance and specifications of the product may be modified for improvement without notice. The formal specifications must be exchanged and signed by both parties before large volume purchase begins.
- No unauthorized transmission or reproduction of this document, either in whole or in part, is permitted.