

High Power Density 0.5W Laser Diode

Description

The SLD322XT is a high power, gain-guided laser diode produced by MOCVD method*1. Compared to the SLD300 Series, this laser diode has a high brightness output with a doubled optical density which can be achieved by QW-SCH structure*2.

Temperature of laser diode is controlled by using built-in T.E. cooler and wavelength can be tuned exactly by this temperature control.

*1 MOCVD: Metal Organic Chemical Vapor Deposition

*2 QW-SCH: Quantum Well Separate Confinement Heterostructure

Features

- High power
Recommended optical power output: $P_o = 0.5W$
- Low operating current: $I_{op} = 0.75A$ ($P_o = 0.5W$)
- Flat package with built-in photodiode, TE cooler, and thermistor

Applications

- Solid state laser excitation
- Medical use
- Material processes
- Measurement

Structure

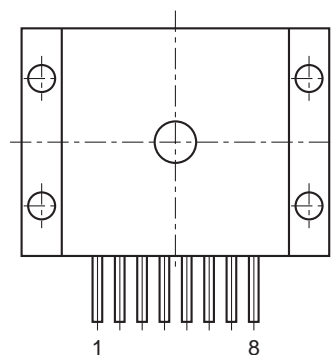
GaAlAs quantum well structure laser diode

Absolute Maximum Ratings ($T_{th} = 25^{\circ}C$)

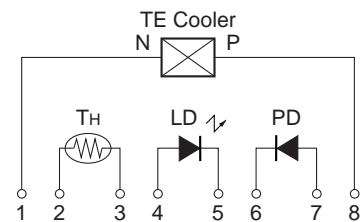
| | | | |
|--------------------------------------|-----------|------------|-------------|
| • Optical power output | P_o | 0.55 | W |
| • Reverse voltage | V_R LD | 2 | V |
| | PD | 15 | V |
| • Operating temperature (T_{th}) | T_{opr} | -10 to +30 | $^{\circ}C$ |
| • Storage temperature | T_{stg} | -40 to +85 | $^{\circ}C$ |
| • Operating current of TE cooler | I_T | 2.5 | A |

Pin Configuration (Top View)

| No. | Function |
|-----|---------------------|
| 1 | TE cooler, negative |
| 2 | Thermistor lead 1 |
| 3 | Thermistor lead 2 |
| 4 | Laser diode anode |
| 5 | Laser diode cathode |
| 6 | Photo diode cathode |
| 7 | Photo diode anode |
| 8 | TE cooler, positive |



Equivalent Circuit



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Electrical and Optical Characteristics

(Tth: Thermistor temperature, Tth = 25°C)

| Item | Symbol | Conditions | Min. | Typ. | Max. | Unit | |
|-----------------------------------|------------------|---|-----------------------|------|------|------|--------|
| Threshold current | Ith | | | 0.18 | 0.3 | A | |
| Operating current | Iop | P _O = 0.5W | | 0.75 | 1.2 | A | |
| Operating voltage | Vop | P _O = 0.5W | | 2.1 | 3.0 | V | |
| Wavelength*1 | λp | P _O = 0.5W | 790 | | 840 | nm | |
| Monitor current | I _{mon} | P _O = 0.5W V _R = 10V | 0.15 | 0.8 | 3.0 | mA | |
| Radiation angle (F. W. H. M.*) | Perpendicular | θ _⊥ | P _O = 0.5W | 20 | 30 | 40 | degree |
| | Parallel | θ _{//} | | 4 | 9 | 17 | degree |
| Positional accuracy | Position | ΔX, ΔY | P _O = 0.5W | | | ±100 | μm |
| | Angle | Δφ _⊥ | | | | ±3 | degree |
| Differential efficiency | η _D | P _O = 0.5W | 0.5 | 0.9 | | W/A | |
| Thermistor resistance | R _{th} | T _{th} = 25°C | | 10 | | kΩ | |

* F. W. H. M. : Full Width at Half Maximum

***1 Wavelength Selection Classification**

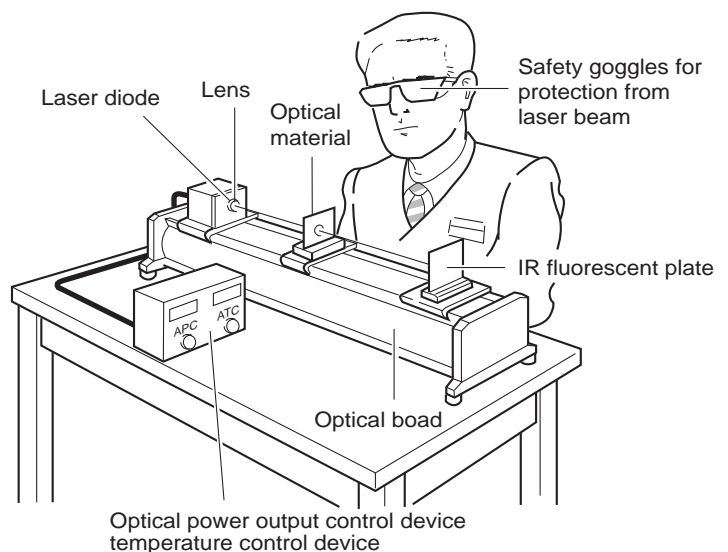
| Type | Wavelength (nm) |
|------------|-----------------|
| SLD322XT-1 | 795 ± 5 |
| SLD322XT-2 | 810 ± 10 |
| SLD322XT-3 | 830 ± 10 |

| Type | Wavelength (nm) |
|-------------|-----------------|
| SLD322XT-21 | 798 ± 3 |
| SLD322XT-24 | 807 ± 3 |
| SLD322XT-25 | 810 ± 3 |

Handling Precautions

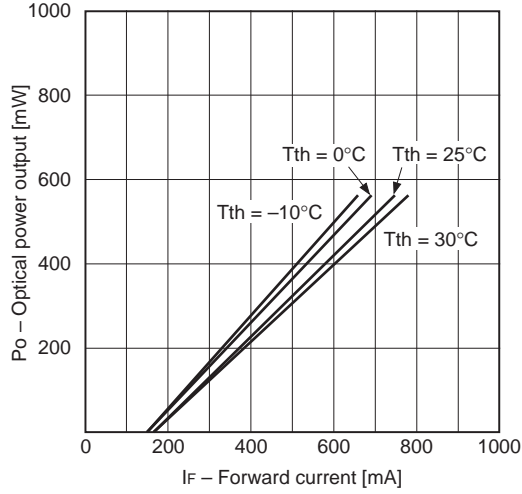
Eye protection against laser beams

The optical output of laser diodes ranges from several mW to 3W. However the optical power density of the laser beam at the diode chip reaches 1MW/cm². Unlike gas lasers, since laser diode beams are divergent, uncollimated laser diode beams are fairly safe at a laser diode. For observing laser beams, ALWAYS use safety goggles that block infrared rays. Usage of IR scopes, IR cameras and fluorescent plates is also recommended for monitoring laser beams safely.

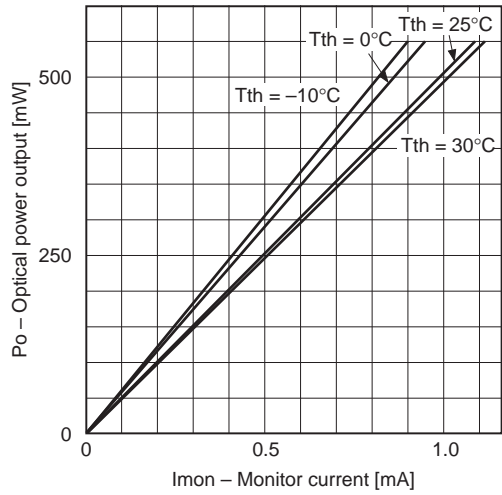


Example of Representative Characteristics

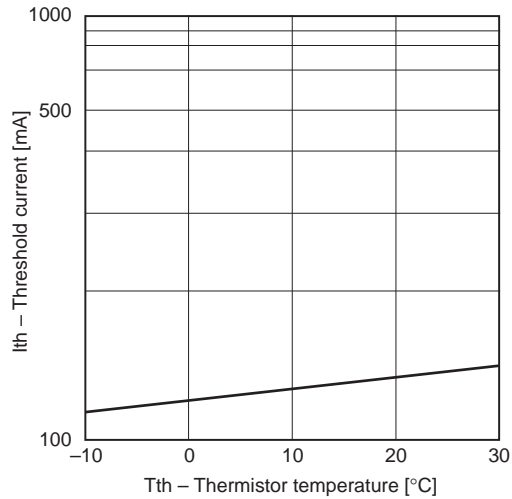
Optical power output vs. Forward current characteristics



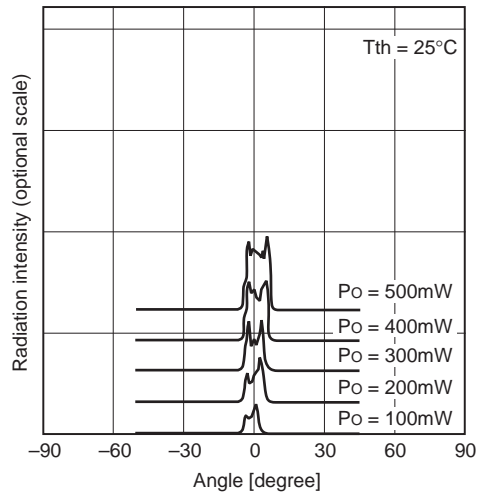
Optical power output vs. Monitor current characteristics



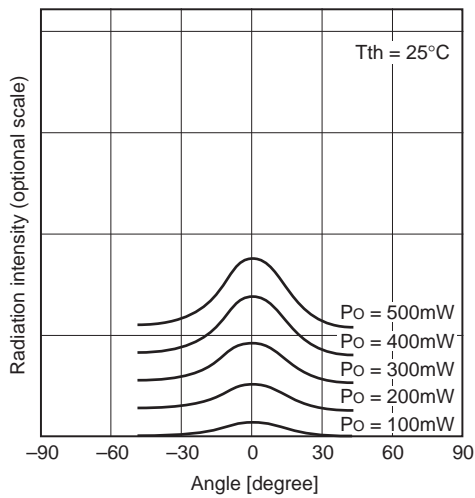
Threshold current vs. Temperature characteristics



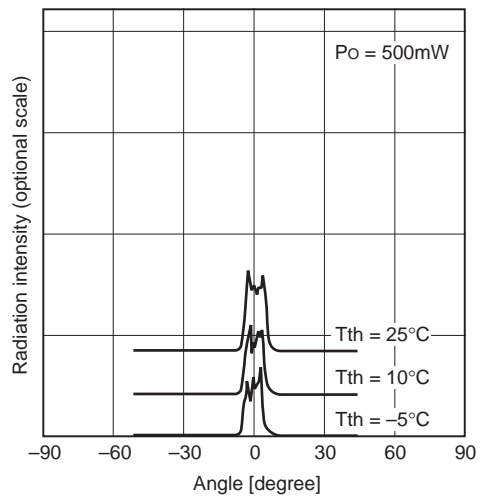
Power dependence of far field pattern (Parallel to junction)



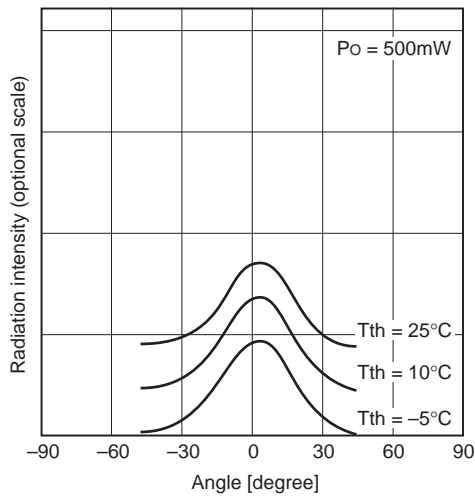
Power dependence of far field pattern (Perpendicular to junction)



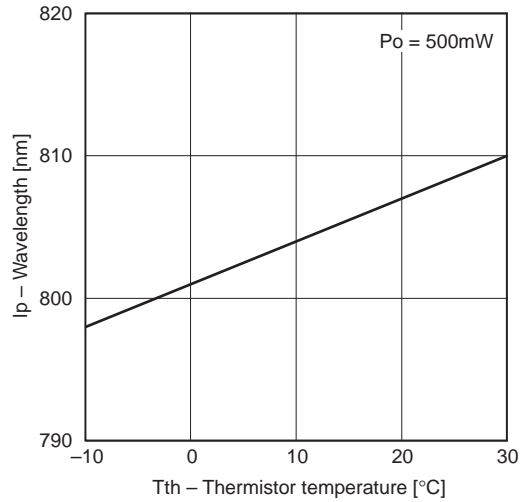
Temperature dependence of far field pattern (Parallel to junction)



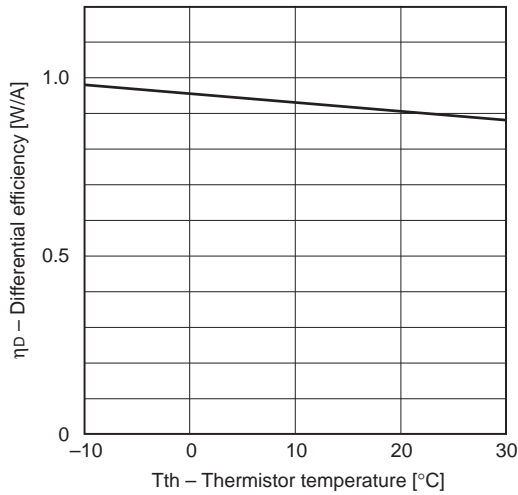
Temperature dependence of far field pattern
(Perpendicular to junction)



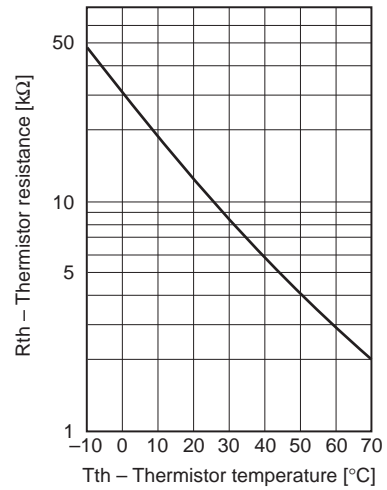
Dependence of wavelength



Differential efficiency vs. Temperature characteristics

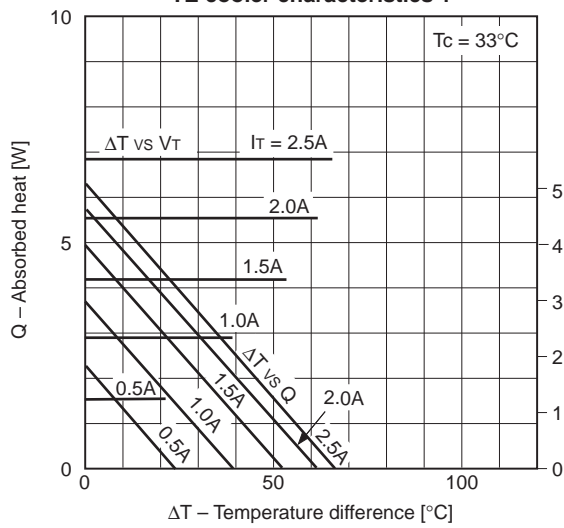


Thermistor characteristics

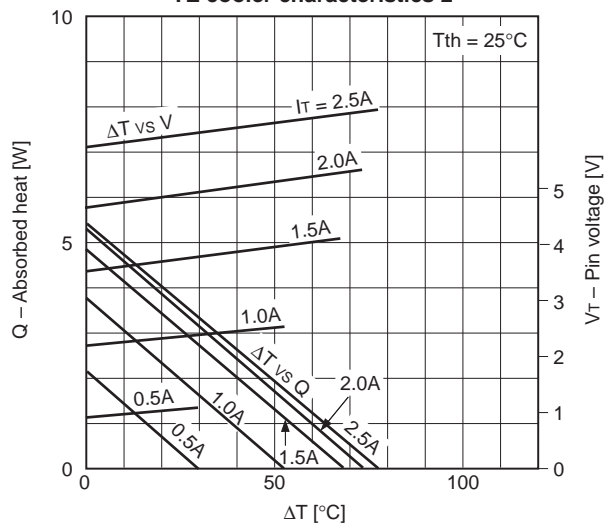


TE cooler characteristics

TE cooler characteristics 1

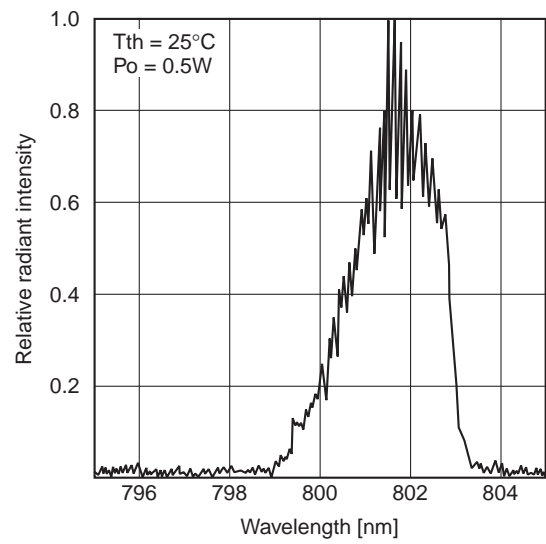
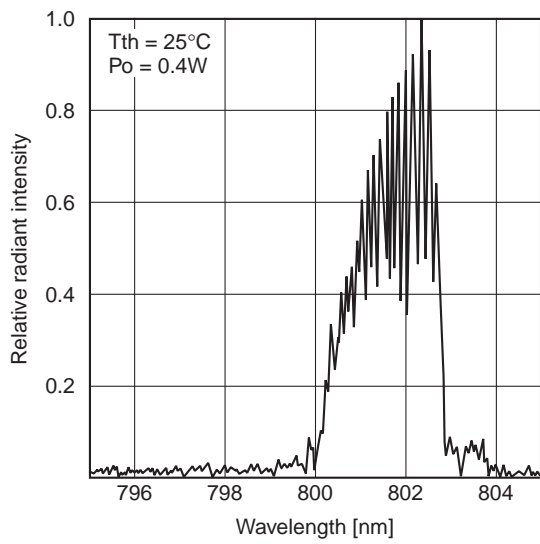
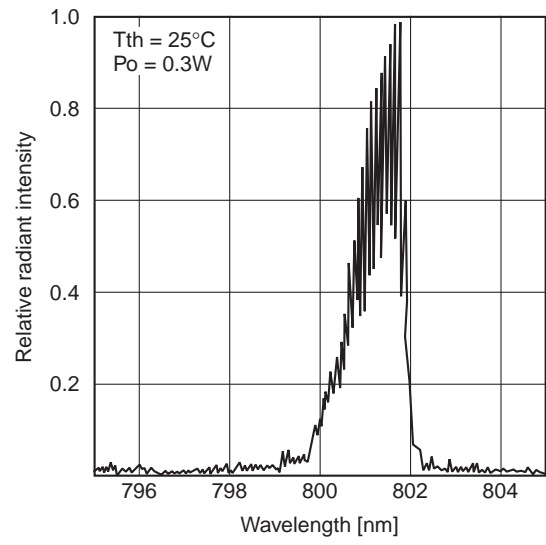
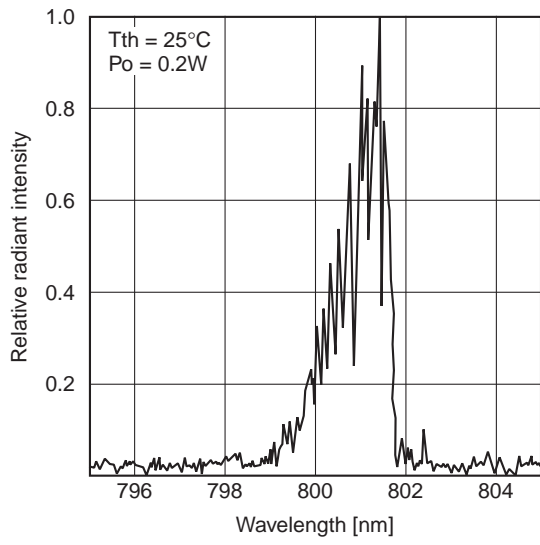


TE cooler characteristics 2

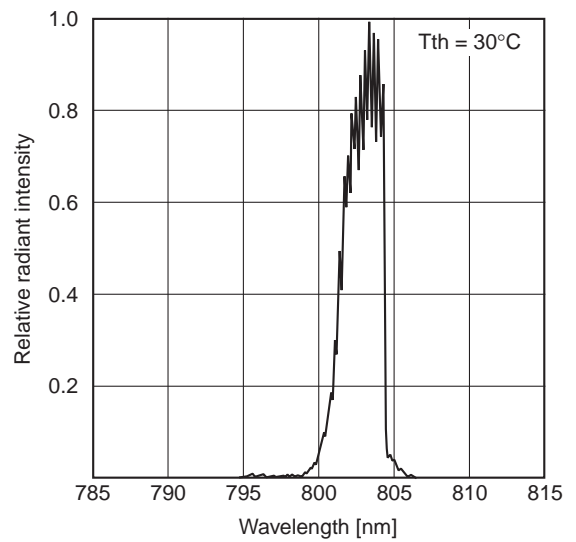
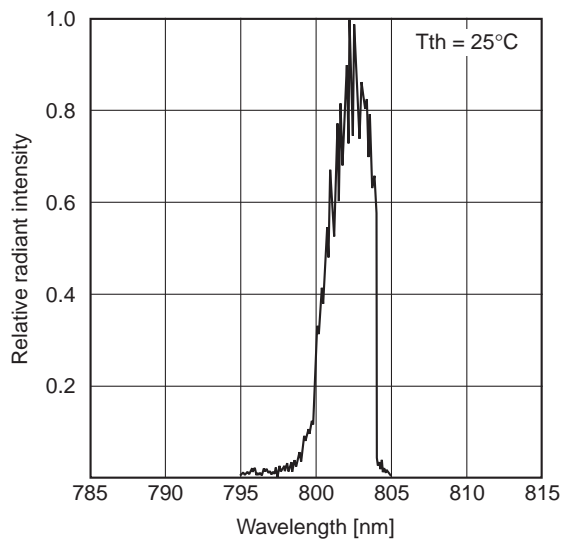
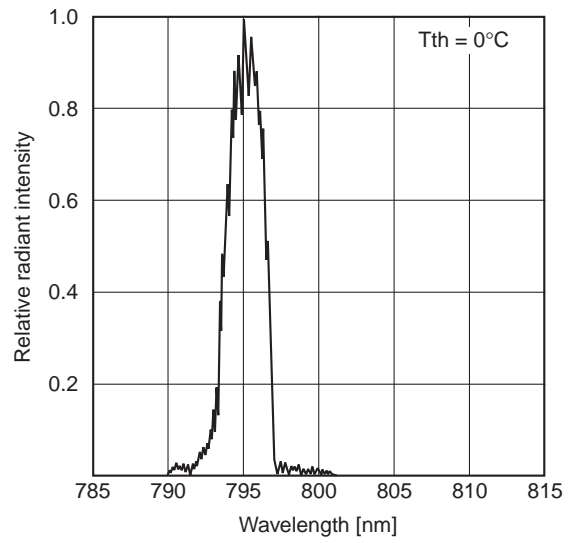
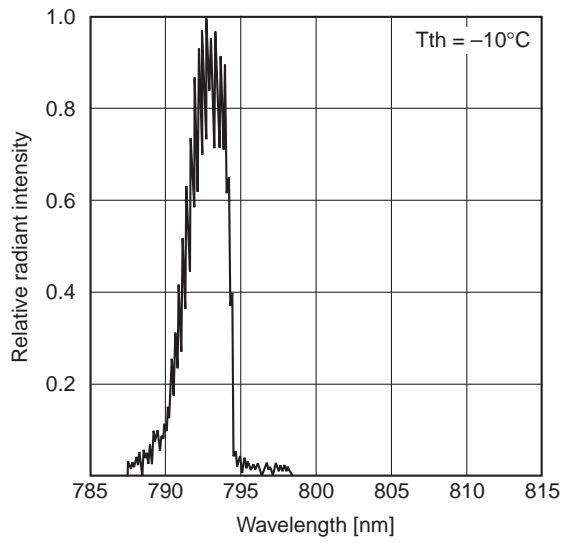


ΔT: Tc - Tth
Tth: Thermistor temperature
Tc: Case temperature

Power dependence of spectrum



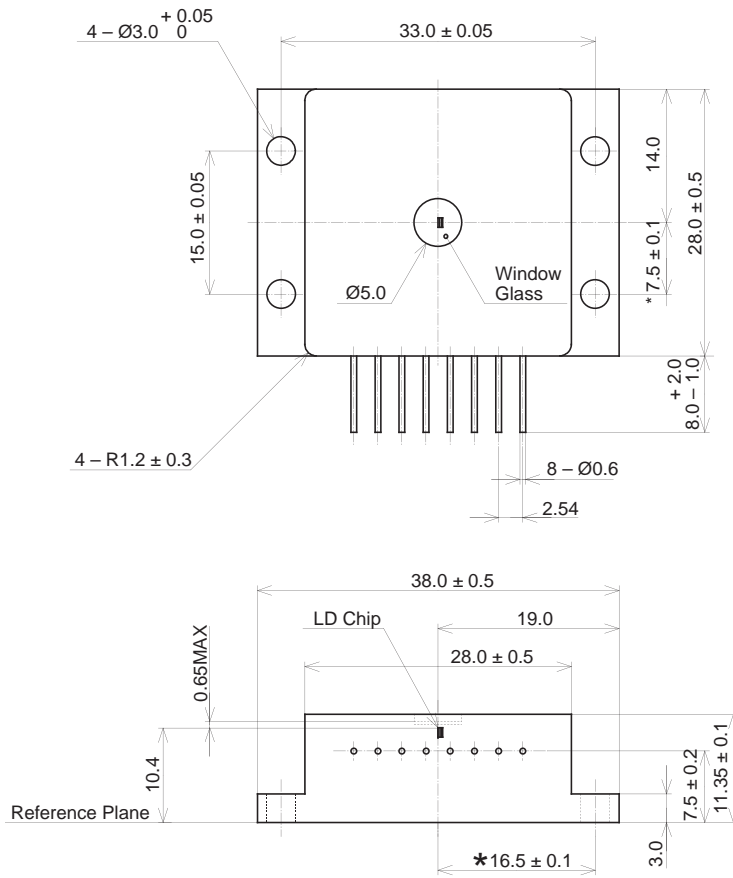
Temperature dependence of spectrum ($P_o = 0.5W$)



Package Outline

Unit: mm

M-273(LO-10)



*Distance between pilot hole and emitting area

PACKAGE STRUCTURE

| | |
|------------|--------------|
| SONY CODE | M-273(LO-10) |
| EIAJ CODE | _____ |
| JEDEC CODE | _____ |

| | |
|----------------|-----|
| PACKAGE WEIGHT | 43g |
|----------------|-----|