

High-Power Density 2W Laser Diode

Description

The SLD324ZT is a gain-guided, high-power density laser diode with a built-in TE cooler. A new flat, square package with a low thermal resistance and an in-line pin configuration is employed. Fine tuning of the wavelength is possible by controlling the laser chip temperature.

Features

- High power
Recommended optical power output: $P_o = 2.0W$
- Low operating current: $I_{op} = 2.5A$ ($P_o = 2.0W$)
- Newly developed flat package with built-in photodiode, TE cooler and thermistor

Applications

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

Structure

GaAIAs quantum well structure laser diode

Operating Lifetime

MTTF 10,000H (effective value) at $P_o = 2.0W$, $T_{th} = 25^\circ C$

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

- | | | | | |
|--------------------------------------|-----------|----|------------|------------|
| • Optical power output | P_o | | 2.2 | 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 | | 4.0 | A |

Warranty

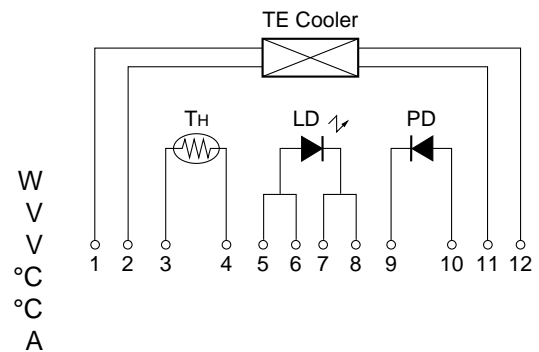
This warranty period shall be 90 days after receipt of the product or 1,000 hours operation time whichever is shorter.

Sony Quality Assurance Department shall analyze any product that fails during said warranty period, and if the analysis results show that the product failed due to material or manufacturing defects on the part of Sony, the product shall be replaced free of charge.

Laser diodes naturally have differing lifetimes which follow a Weibull distribution.

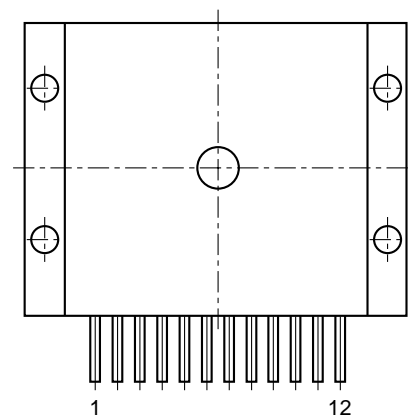
Special warranties are also available.

Equivalent Circuit



Pin Configuration (Top View)

| No. | Function | No. | Function |
|-----|----------------------|-----|----------------------|
| 1 | TE Cooler (negative) | 7 | LD (cathode) |
| 2 | TE Cooler (negative) | 8 | LD (cathode) |
| 3 | Thermistor | 9 | PD (cathode) |
| 4 | Thermistor | 10 | PD (anode) |
| 5 | LD (anode) | 11 | TE Cooler (positive) |
| 6 | LD (anode) | 12 | TE Cooler (positive) |



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Electrical and Optical Characteristics

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

| Item | Symbol | Conditions | Min. | Typ. | Max. | Unit | |
|-----------------------------------|------------------|---|-----------------------|-----------------|------|------|--------|
| Threshold current | Ith | | | 0.6 | 1.0 | A | |
| Operating current | Iop | P _O = 2.0W | | 2.5 | 3.5 | A | |
| Operating voltage | Vop | P _O = 2.0W | | 2.2 | 3.0 | V | |
| Wavelength*1 | λp | P _O = 2.0W | 790 | | 840 | nm | |
| Monitor current | I _{mon} | P _O = 2.0W V _R = 10V | 0.15 | 0.8 | 3.0 | mA | |
| Radiation angle (F. W. H. M.*) | Perpendicular | θ _⊥ | P _O = 2.0W | 20 | 30 | 40 | degree |
| | Parallel | | | θ _{//} | 4 | 9 | 17 |
| Positional accuracy | Position | ΔX, ΔY | P _O = 2.0W | | | ±100 | μm |
| | Angle | Δφ _⊥ | | | | ±3 | degree |
| Differential efficiency | η _D | P _O = 2.0W | 0.65 | 1.0 | | 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**

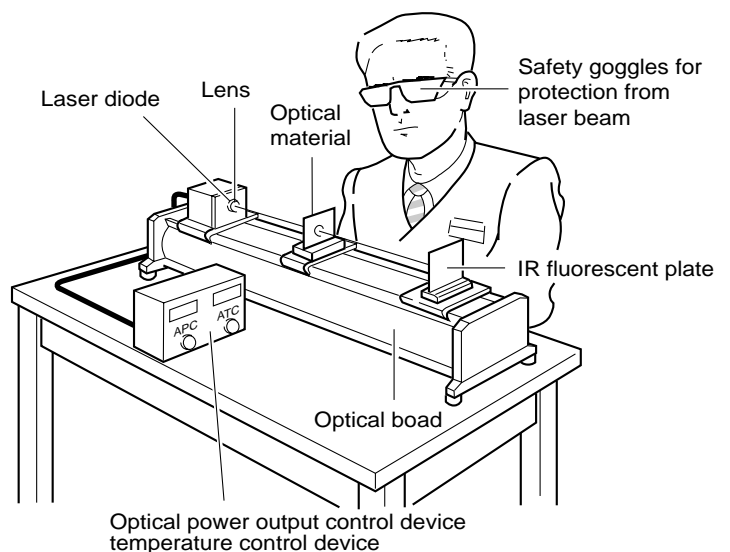
| Type | Wavelength (nm) |
|------------|-----------------|
| SLD324ZT-1 | 795 ± 5 |
| SLD324ZT-2 | 810 ± 10 |
| SLD324ZT-3 | 830 ± 10 |

| Type | Wavelength (nm) |
|-------------|-----------------|
| SLD324ZT-21 | 798 ± 3 |
| SLD324ZT-24 | 807 ± 3 |
| SLD324ZT-25 | 810 ± 3 |

Handling Precautions

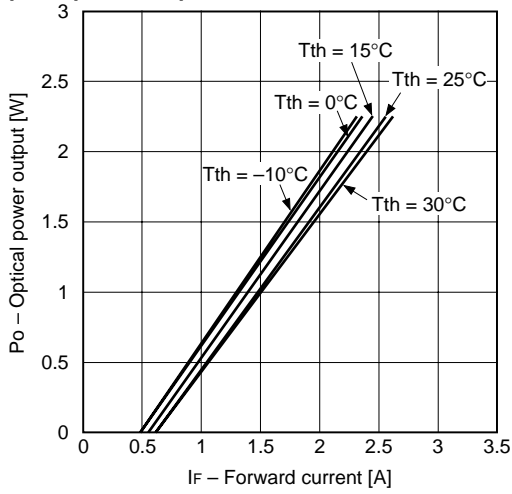
Eye protection against laser beams

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.

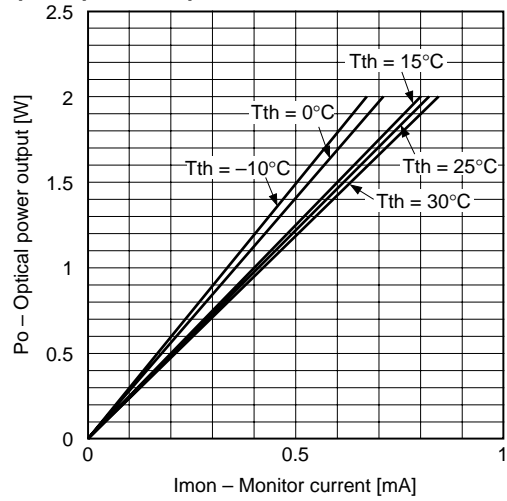


Example of Representative Characteristics

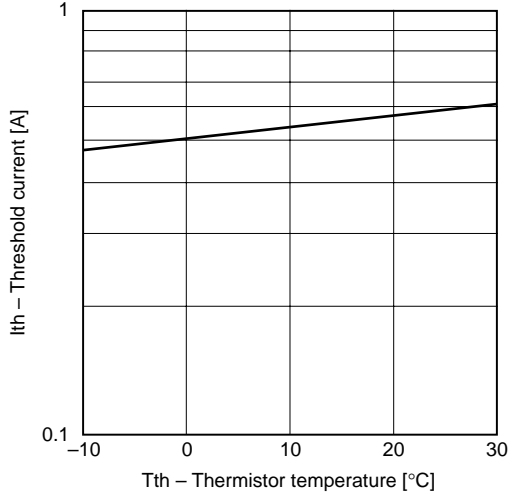
Optical power output vs. Forward current characteristics



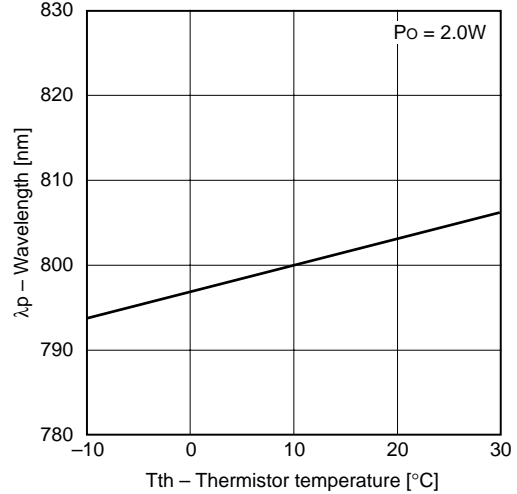
Optical power output vs. Monitor current characteristics



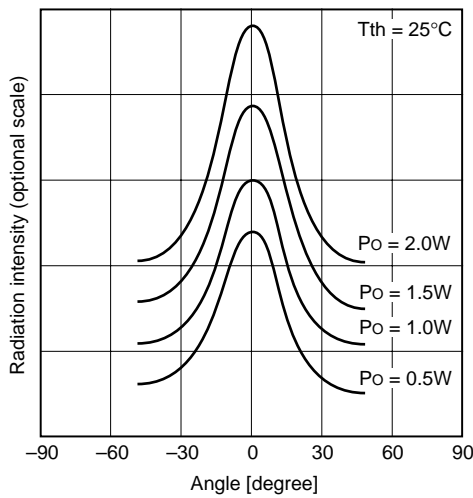
Threshold current vs. Temperature characteristics



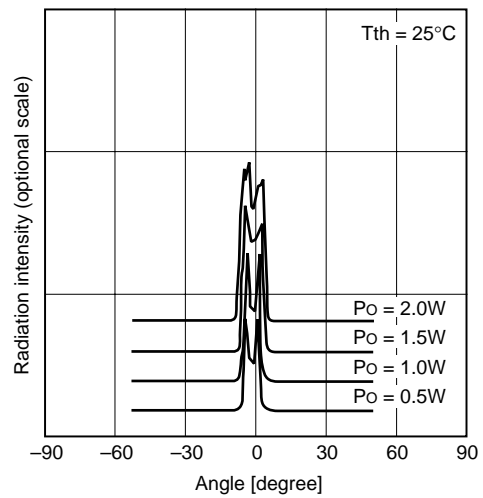
Dependence of wavelength



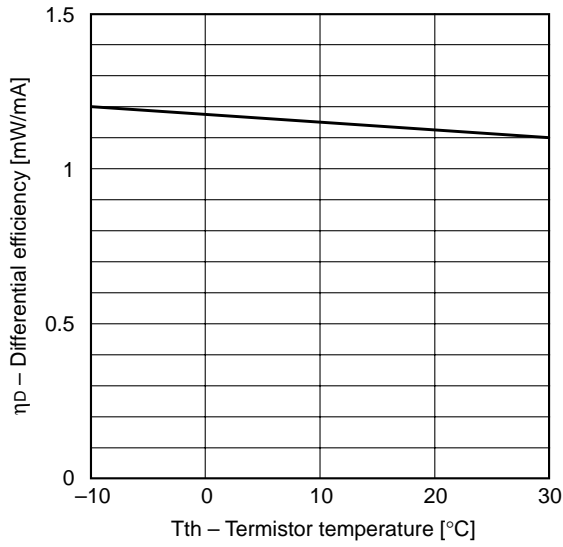
Power dependence of far field pattern (Perpendicular to junction)



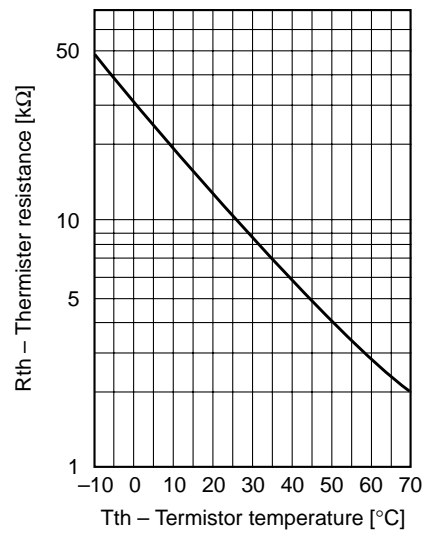
Power dependence of far field pattern (Parallel to junction)



Differential efficiency vs. Temperature characteristics

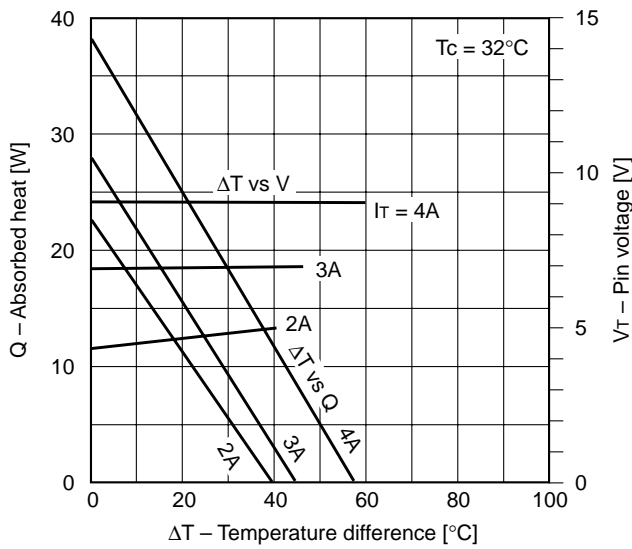


Termistor characteristics

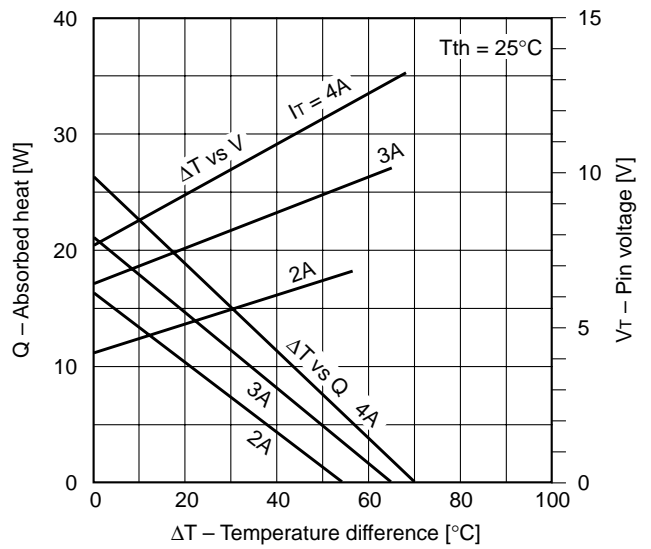


TE cooler characteristics

TE cooler characteristics 1

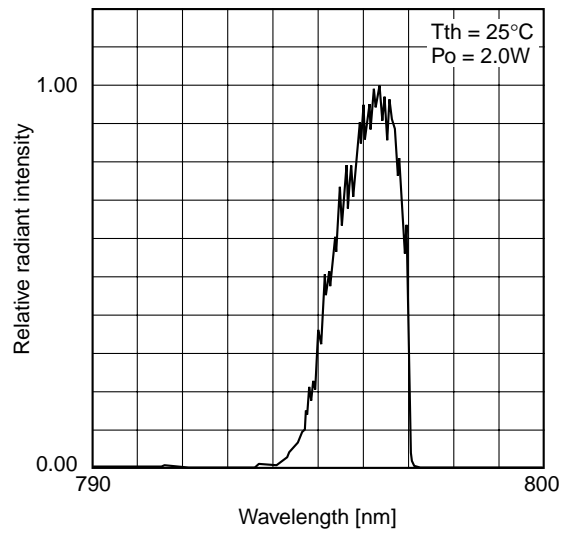
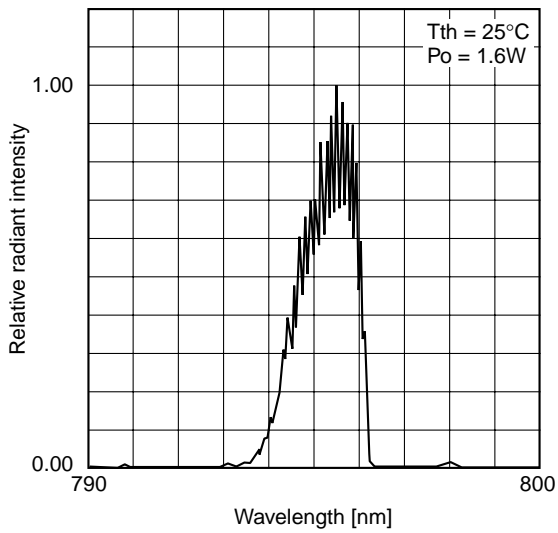
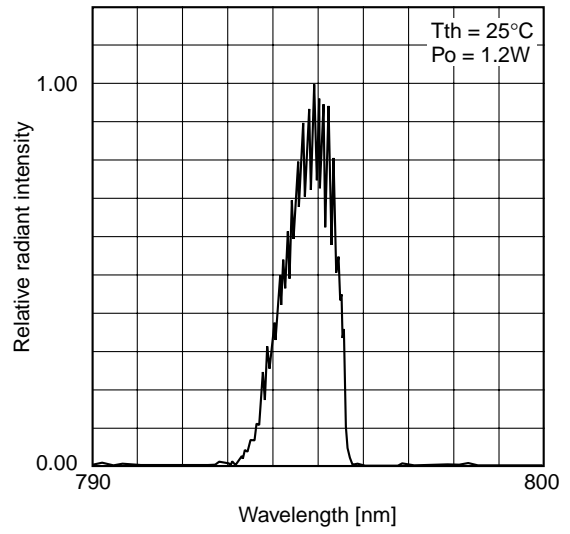
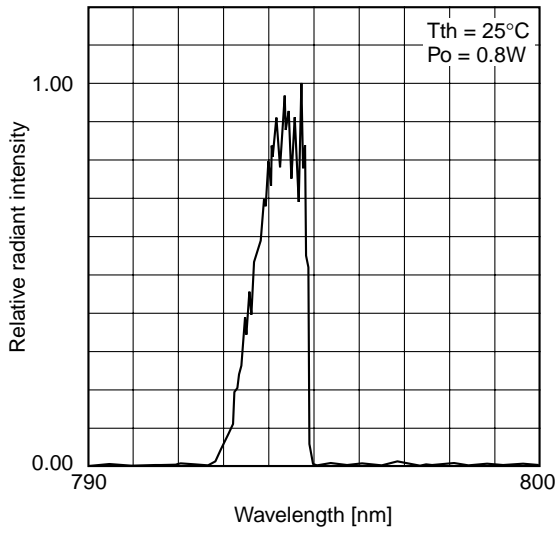


TE cooler characteristics 2

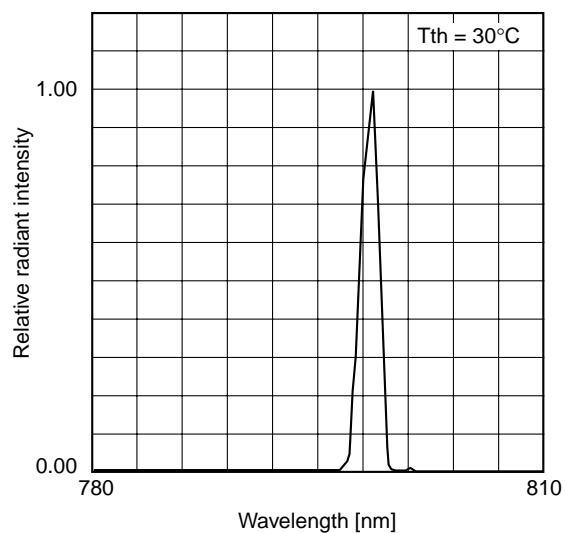
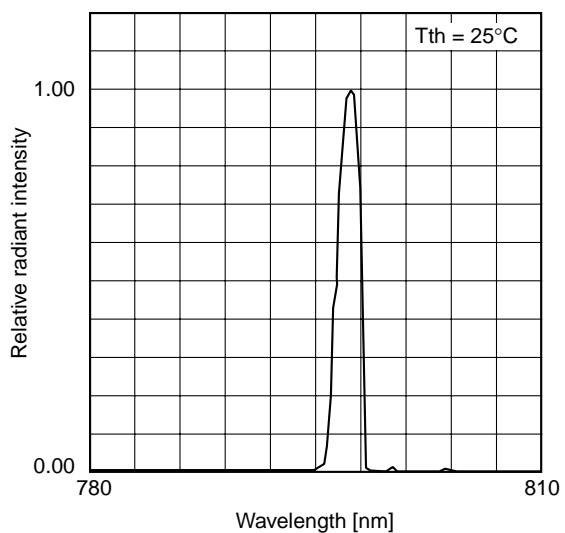
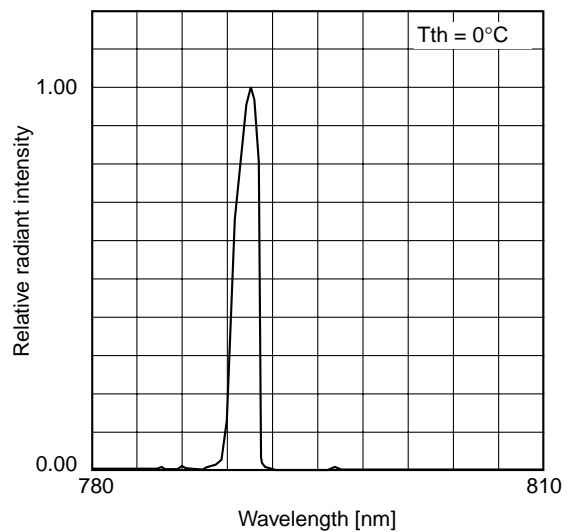
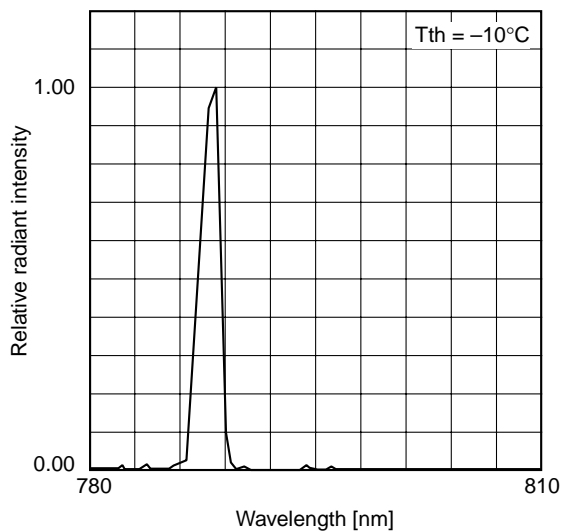


ΔT : $T_c - T_{th}$
 T_{th} : Thermistor temperature
 T_c : Case temperature

Power dependence of spectrum



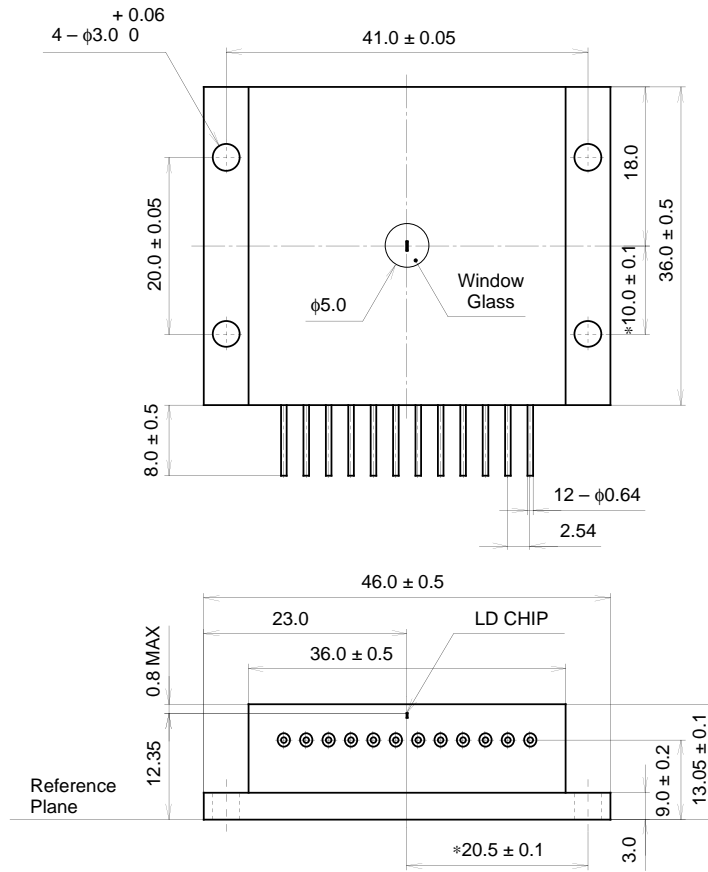
Temperature dependence of spectrum ($P_o = 2W$)



Package Outline

Unit: mm

M-272



| | |
|------------|-------|
| SONY CODE | M-272 |
| EIAJ CODE | _____ |
| JEDEC CODE | _____ |

*Distance between pilot hole and emitting area.

| | |
|--------------|-------|
| PACKAGE MASS | 118 g |
|--------------|-------|