

100mW High Power Laser Diode

Description

The SLD301XT allows independent thermal and electric design.
 This laser diode has a built-in TE (Thermo Electric) cooler.

Features

- High power
 Recommended optical power output $P_o = 90\text{mW}$
- Low operating current
- Flat Package with built-in photodiode, TE cooler and thermistor

Applications

- Solid state laser excitation
- Medical use

Structure

AlGaAs double-hetero-type laser diode

Operating Lifetime

MTTF 10,000H (effective value) at $P_o = 90\text{mW}$, $T_{th} = 25^\circ\text{C}$

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

- | | | | |
|--------------------------------------|-----------|------------|------------------|
| • Optical power output | P_o | 100 | mW |
| • Reverse voltage | V_R LD | 2 | V |
| | PD | 15 | V |
| • Operating temperature (T_{th}) | T_{opr} | -10 to +50 | $^\circ\text{C}$ |
| • Storage temperature | T_{stg} | -40 to +85 | $^\circ\text{C}$ |

Warranty

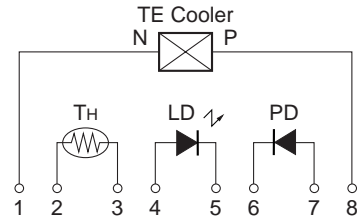
This warranty period shall be 90 days after receipt of the product or 1,000 hours operation time whichever is shorter.

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.

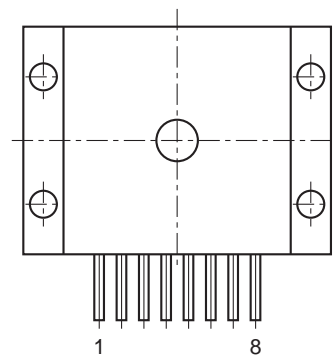
Special warranties are also available.

Equivalent Circuit



Pin Configuration (Top View)

| No. | Function |
|-----|-----------------------|
| 1 | TE cooler (negative) |
| 2 | Thermistor lead 1 |
| 3 | Thermistor lead 2 |
| 4 | Laser diode (anode) |
| 5 | Laser diode (cathode) |
| 6 | Photodiode (cathode) |
| 7 | Photodiode (anode) |
| 8 | 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 | | | 150 | 200 | mA |
| Operating current | Iop | P _O = 90mW | | 250 | 400 | mA |
| Operating voltage | Vop | P _O = 90mW | | 1.9 | 3.0 | V |
| Wavelength* | λp | P _O = 90mW | 770 | | 840 | nm |
| Monitor current | I _{mon} | P _O = 90mW V _R = 10V | | 0.15 | | mA |
| Radiation angle | Perpendicular | θ _⊥ | P _O = 90mW | 28 | 40 | degree |
| | Parallel | θ _{//} | | 12 | 17 | degree |
| Positional accuracy | Position | ΔX, ΔY | P _O = 90mW | | ±100 | μm |
| | Angle | Δφ _⊥ | | | ±3 | degree |
| Differential efficiency | η _D | P _O = 90mW | 0.65 | 0.9 | | mW/mA |
| Thermistor resistance | R _{th} | T _{th} = 25°C | | 10 | | kΩ |

*** Wavelength Selection Classification**

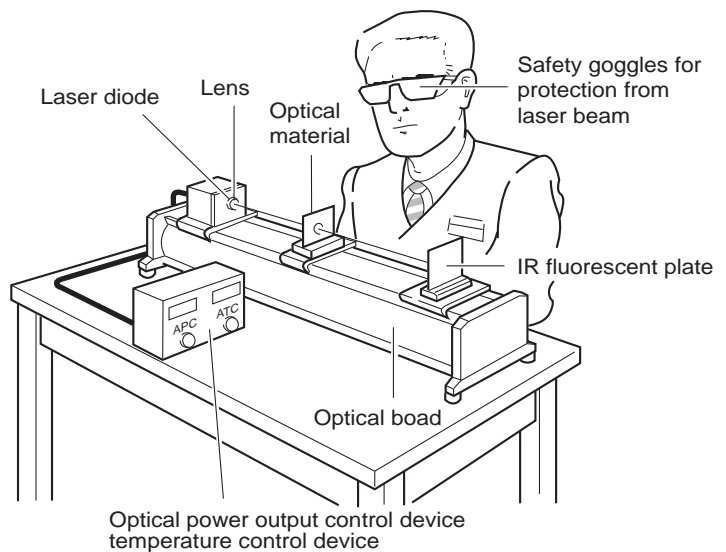
| Type | Wavelength (nm) |
|------------|-----------------|
| SLD301XT-1 | 785 ± 15 |
| SLD301XT-2 | 810 ± 10 |
| SLD301XT-3 | 830 ± 10 |

| Type | Wavelength (nm) |
|-------------|-----------------|
| SLD301XT-21 | 798 ± 3 |
| SLD301XT-24 | 807 ± 3 |
| SLD301XT-25 | 810 ± 3 |

Handling Precautions

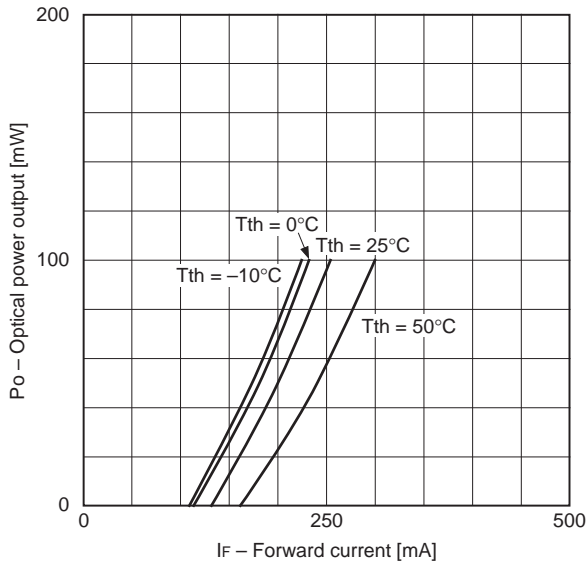
Eye protection against laser beams

The optical output of laser diodes ranges from several mW to 1W. 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.

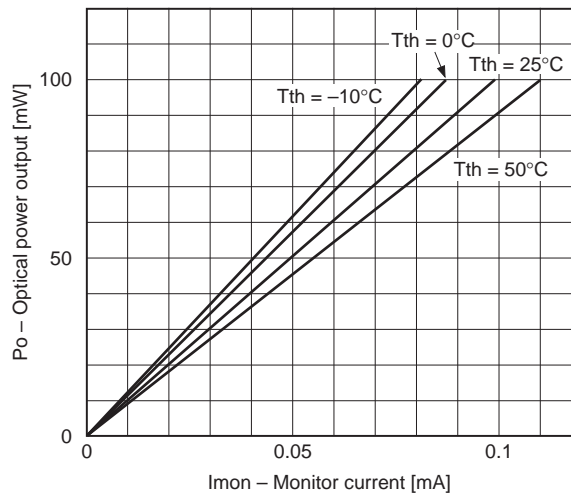


Example of Representative Characteristics

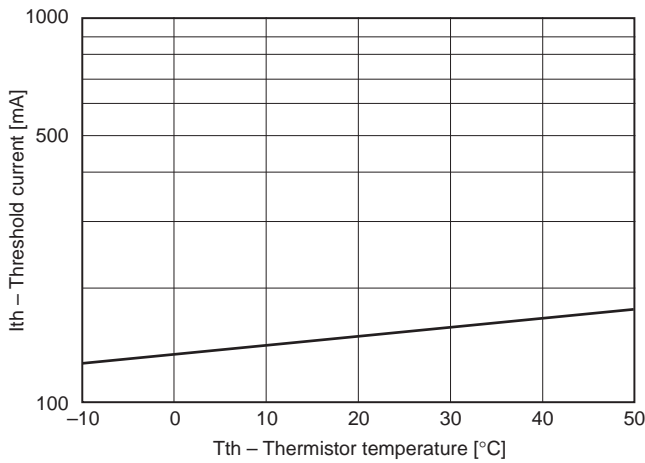
Optical power output vs. Forward current characteristics



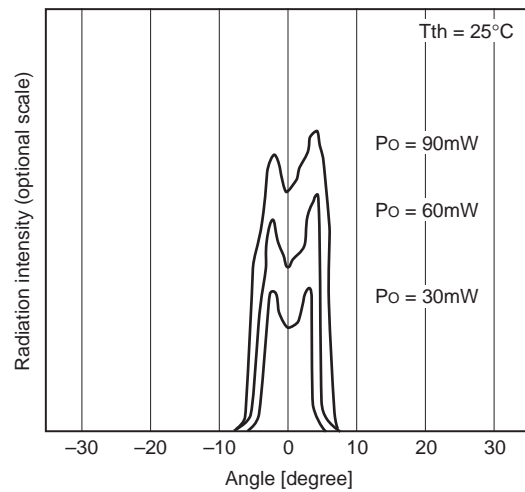
Optical power output vs. Monitor current characteristics



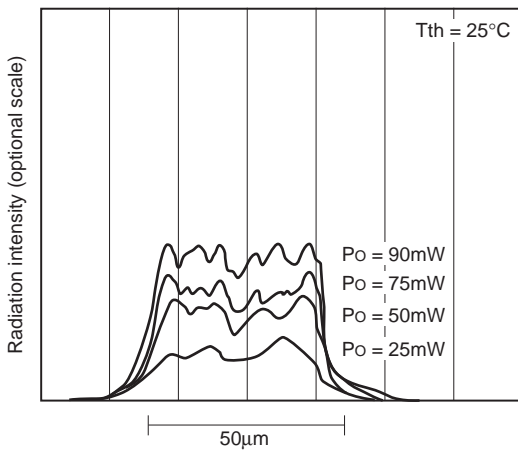
Threshold current vs. Temperature characteristics



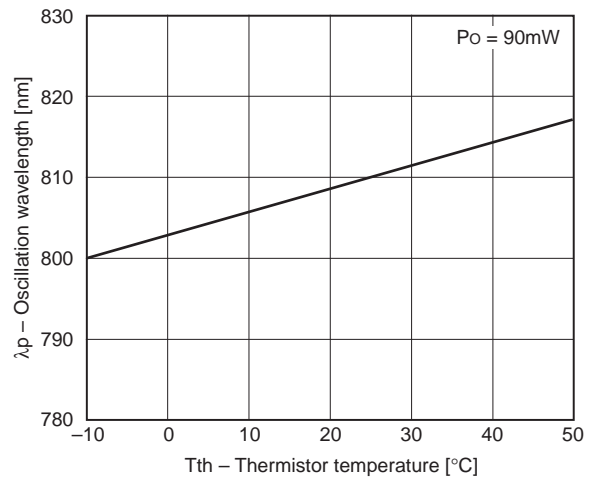
Power dependence of far field pattern (parallel to junction)



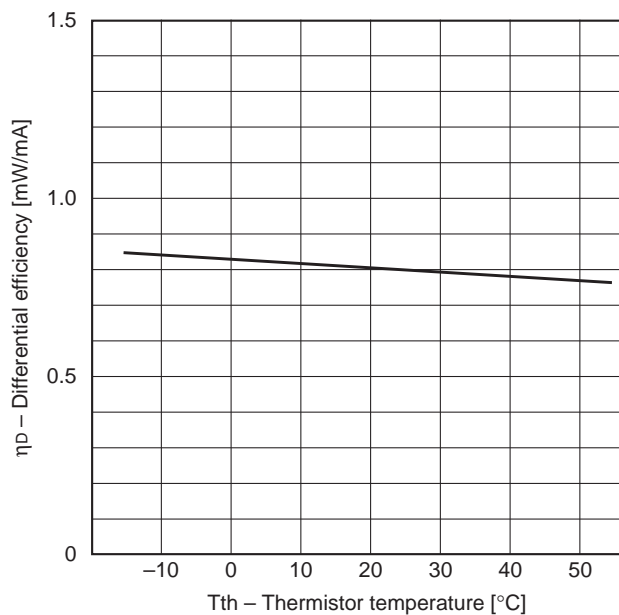
Power dependence of near field pattern



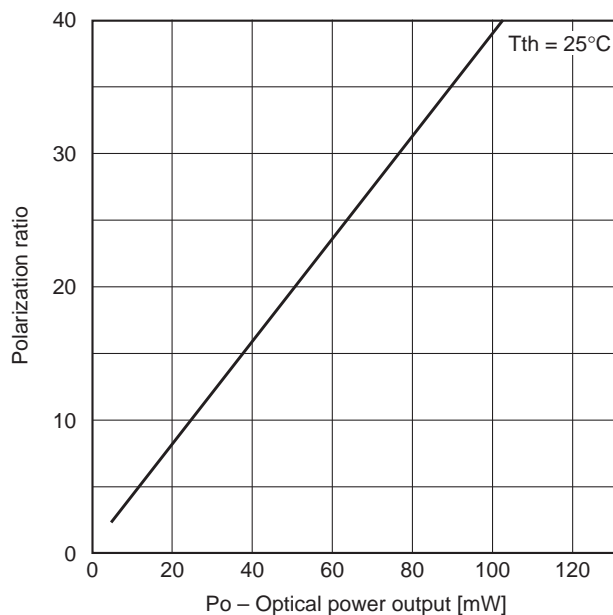
Oscillation wavelength vs. Temperature characteristics



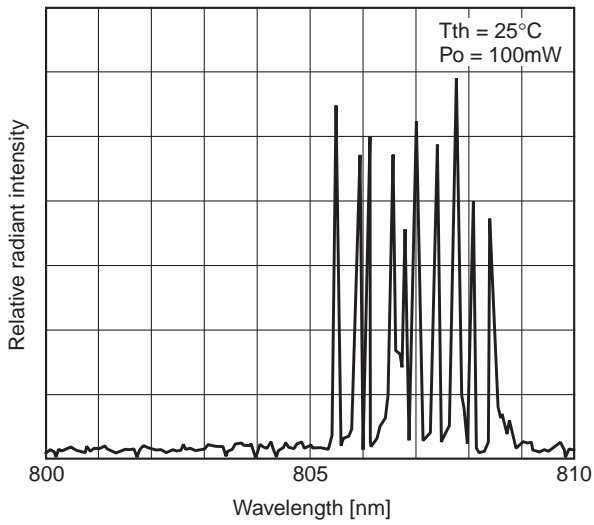
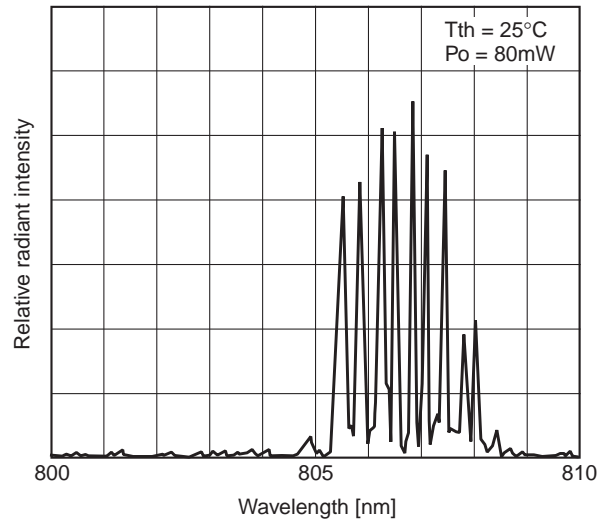
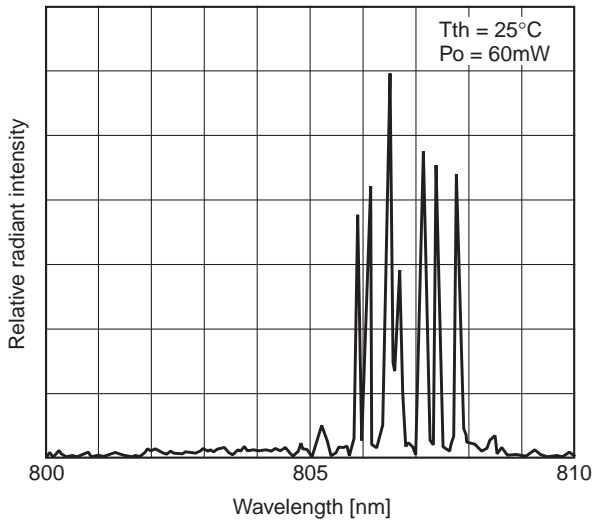
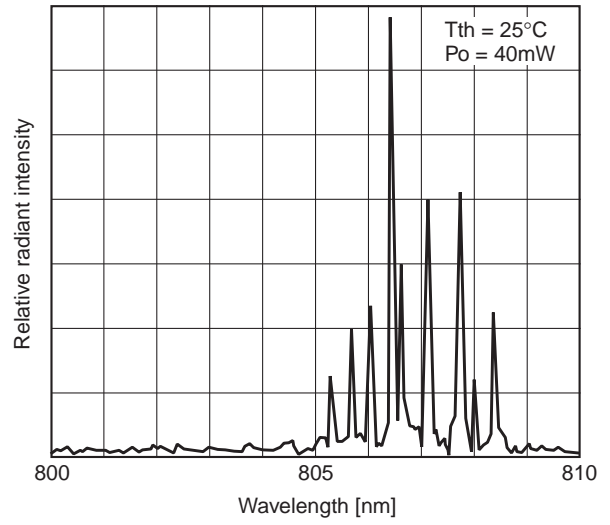
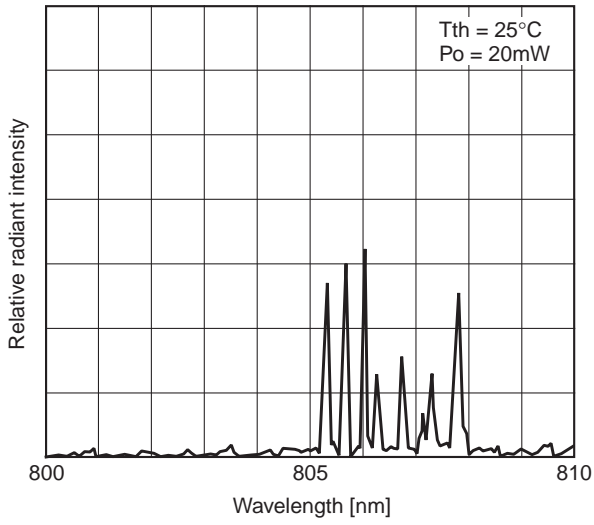
Differential efficiency vs. Temperature characteristics



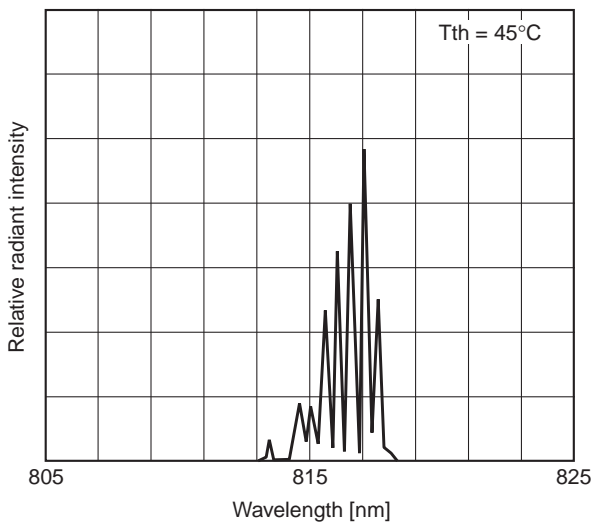
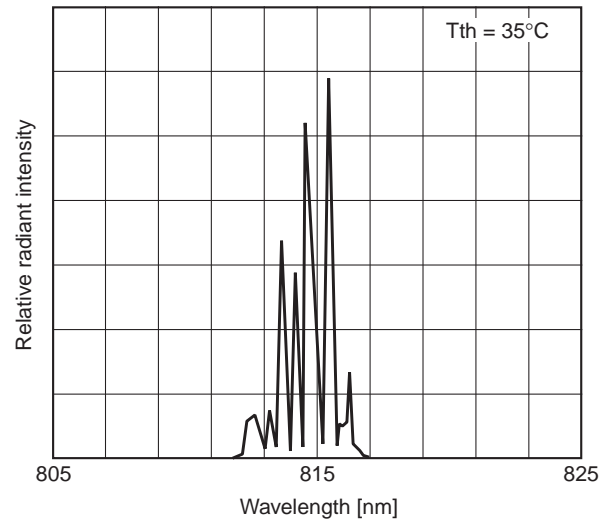
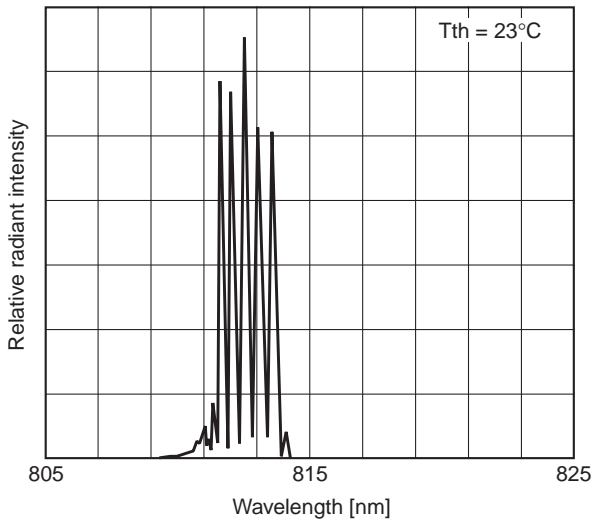
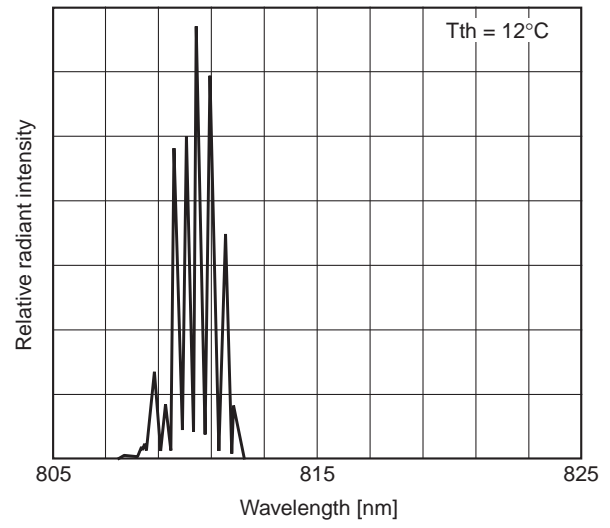
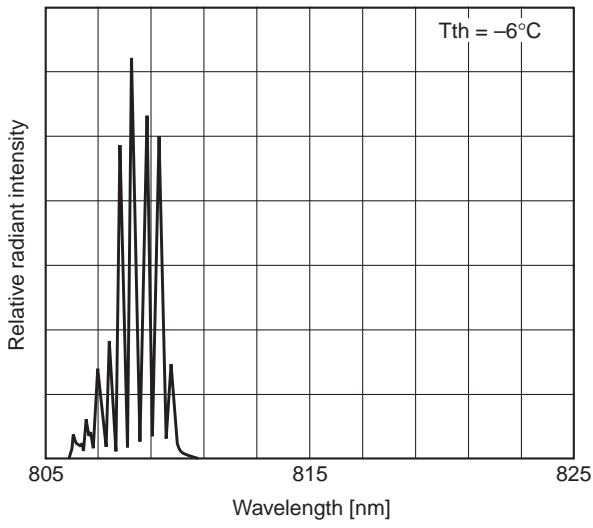
Power dependence of polarization ratio



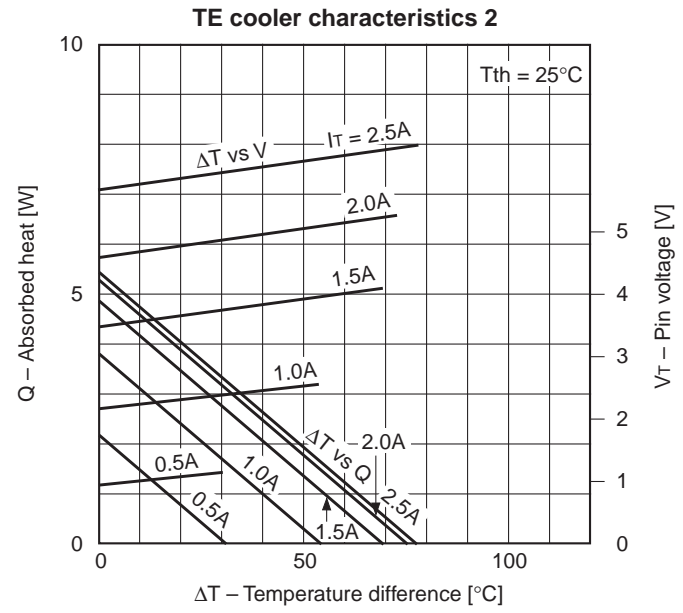
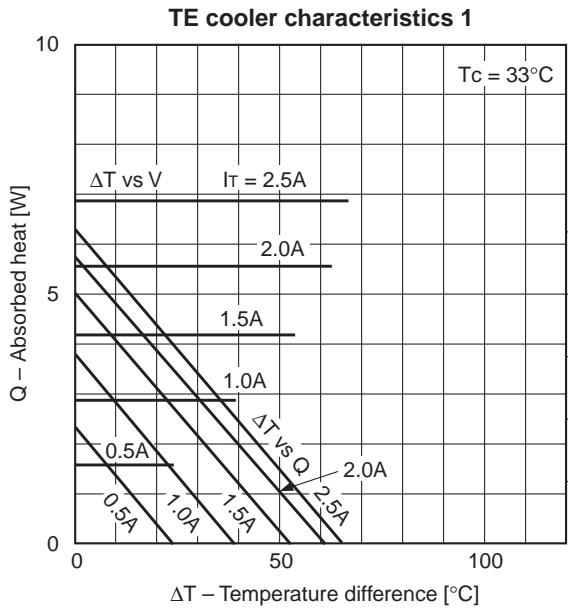
Power dependence of wavelength



Temperature dependence of wavelength ($P_o = 90\text{mW}$)

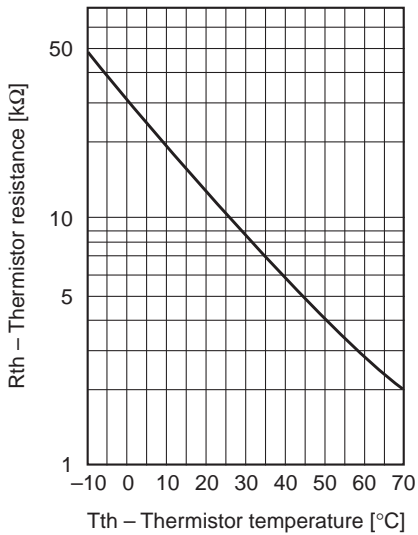


TE cooler characteristics



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

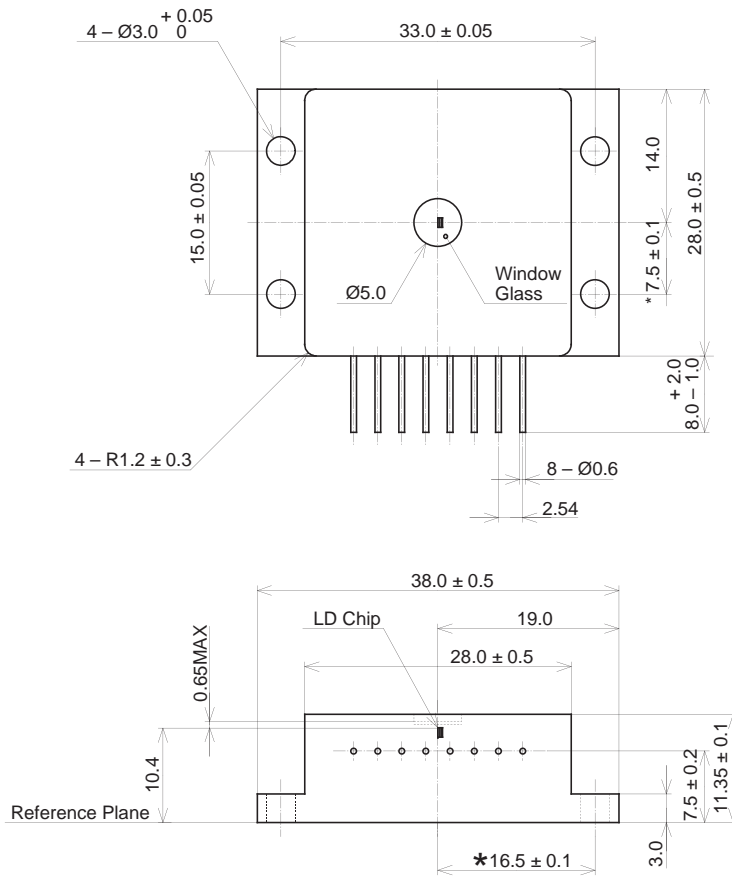
Thermistor characteristics



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 |
|----------------|-----|