**SONY**

# SLD322XT

## 0.5W High Power Laser Diode

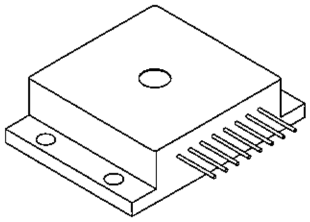
### Description

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 achived by QW-SCH structure*2.

Fine adjustment of the oscillation wavelength is possible by controllingthe temperature using the built-in TE cooler (Peltier element).

*1 MOCVD: Metal Organic Chemical Vapor Deposition
*2 QW-SCH: Quantum Well Separate Confinement Heterostructure

M-273



### Features

- High power
  Recommended optical power output: Po = 0.5W
- Low operating current: Iop = 0.75A (Po = 0.5W)
- Flat package with built-in photodiode, TE cooler, and thermistor

### Applications

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

### Structure

AlGaAs quantum well structure laser diode

### Operating Lifetime

MTTF 10,000H (effective value) at Po = 0.5W, Tth = 25°C

### Absolute Maximum Ratings (Tth = 25°C)

| | | | | |
|---|---|---|---|---|
| • Optical power output | Pomax | | 0.55 | W |
| • Reverse voltage | $V_R$ | LD | 2 | V |
| | | PD | 15 | V |
| • Operating temperature (Tth) | Topr | | −10 to +30 | °C |
| • Storage temperature | Tstg | | −40 to +85 | °C |

### Warranty

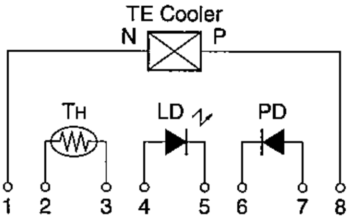
This warranty period shall be 90 days after receipt of the product or 1,000 hours operation time whichever is shorter.

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.

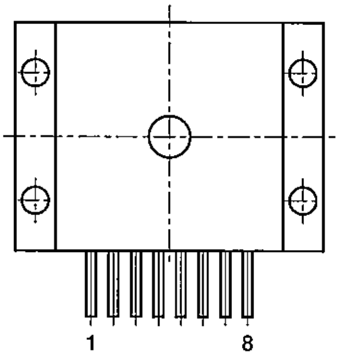
Special warranties are also available.

### 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) |



## 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 | Po = 0.5W | | 0.75 | 1.2 | A |
| Operating voltage | | Vop | Po = 0.5W | | 2.1 | 3.0 | V |
| Wavelength* | | λp | Po = 0.5W | 790 | | 840 | nm |
| Monitor current | | Imon | Po = 0.5W<br>$V_R$ = 10V | 0.15 | 0.8 | 3.0 | mA |
| Radiation angle | Perpendicular | θ⊥ | Po = 0.5W | 20 | 30 | 40 | degree |
| | Parallel | θ// | | 4 | 9 | 17 | degree |
| Positional accuracy | Position | ΔX, ΔY | Po = 0.5W | | | ±100 | µm |
| | Angle | Δφ⊥ | | | | ±3 | degree |
| Differential efficiency | | $\eta_D$ | Po = 0.5W | 0.5 | 0.9 | | W/A |
| Thermistor resistance | | Rth | Tth = 25°C | | 10 | | kΩ |

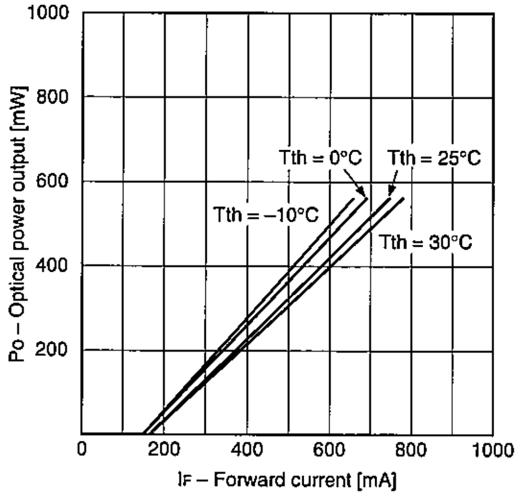
### * Wavelength Selection Classification

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

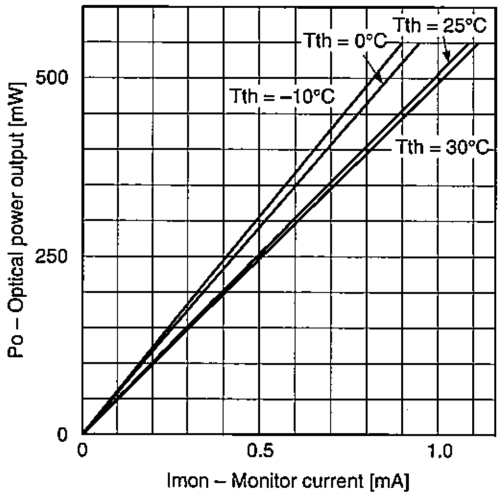
| Type | Wavelength (nm) |
|---|---|
| SLD322XT-21 | 798 ± 3 |
| SLD322XT-24 | 807 ± 3 |
| SLD322XT-25 | 810 ± 3 |

## Example of Representative Characteristics

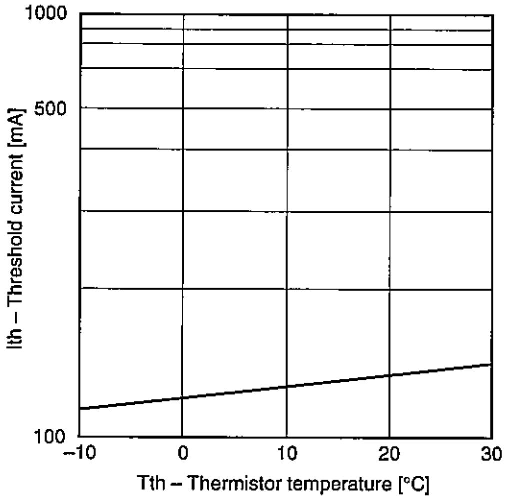
**Optical power output vs. Forward current characteristics**



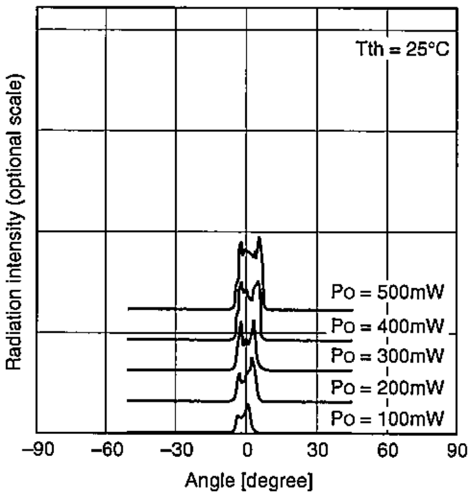
**Optical power output vs. Monitor current characteristics**



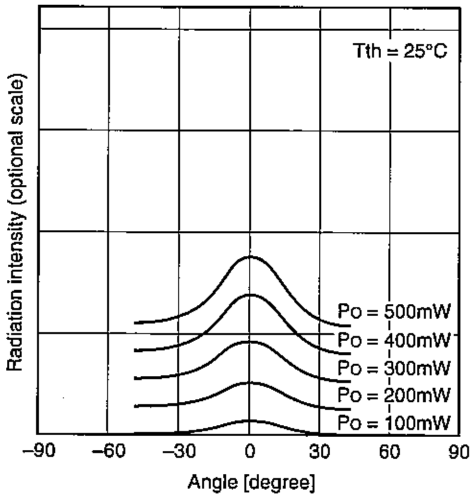
**Threshold current vs. Temperature characteristics**



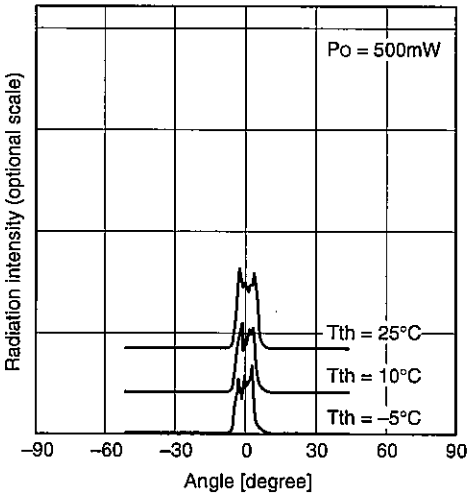
**Power dependence of far field pattern (Parallel to junction)**



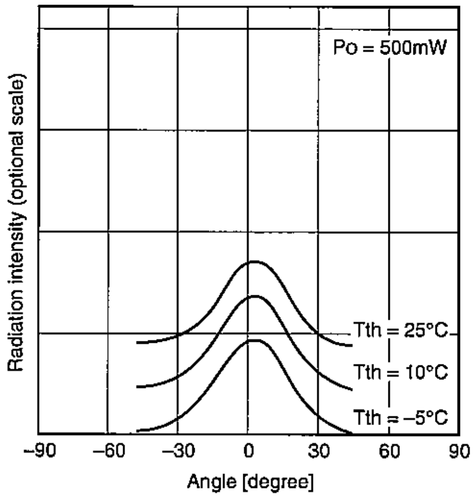
**Power dependence of far field pattern (Perpendicular to junction)**



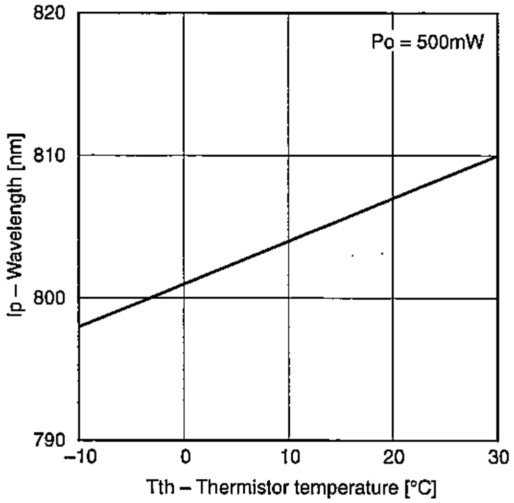
**Temperature dependence of far field pattern (Parallel to junction)**



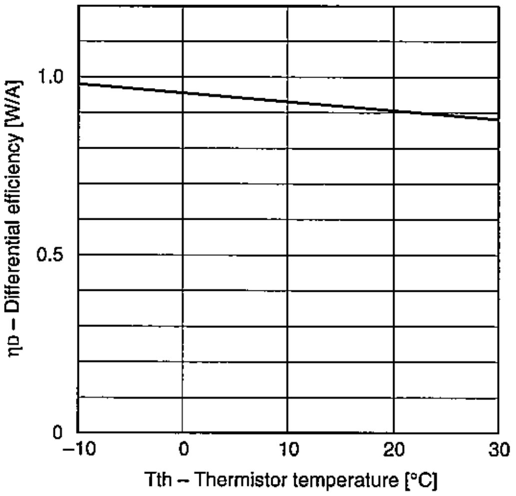
**Temperature dependence of far field pattern (Perpendicular to junction)**



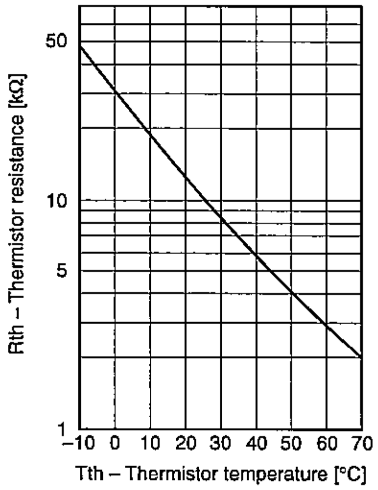
**Dependence of wavelength**



**Differential efficiency vs. Temperature characteristics**

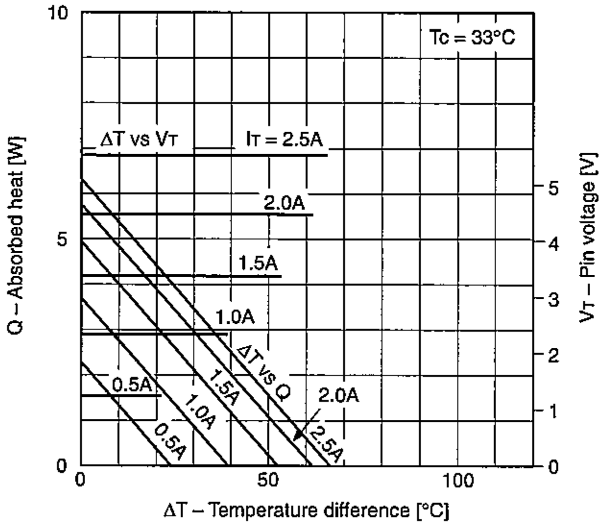


**Thermistor characteristics**



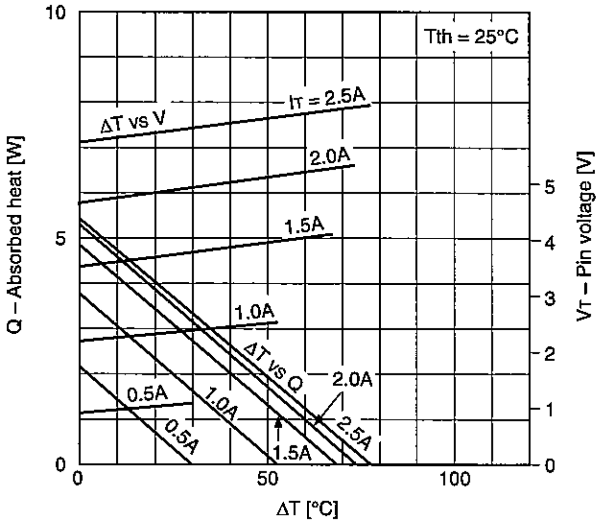
## TE cooler characteristics

**TE cooler characteristics 1**

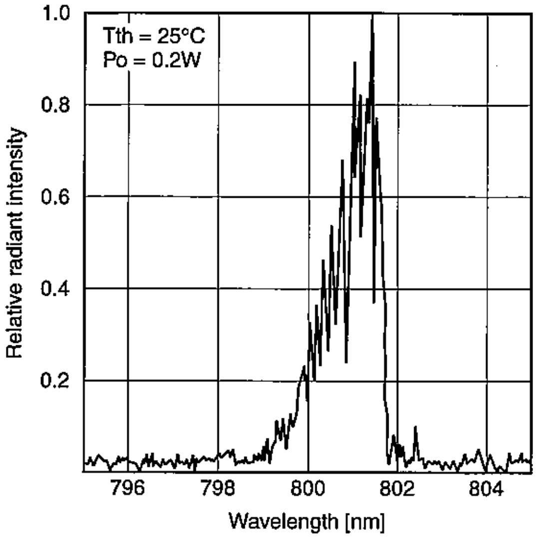


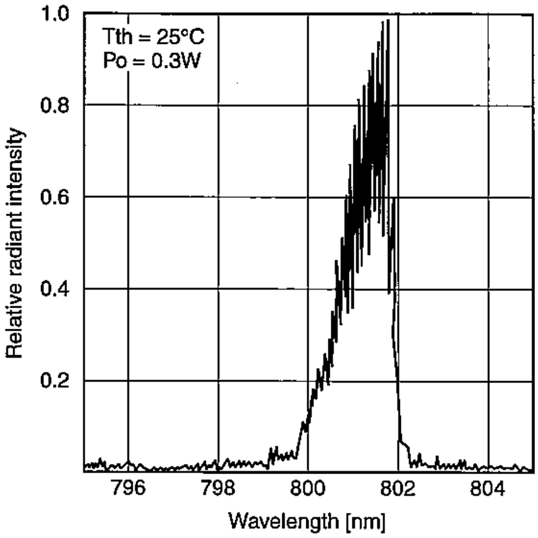
ΔT: Tc – Tth
Tth: Thermistor temperature
Tc: Case temperature

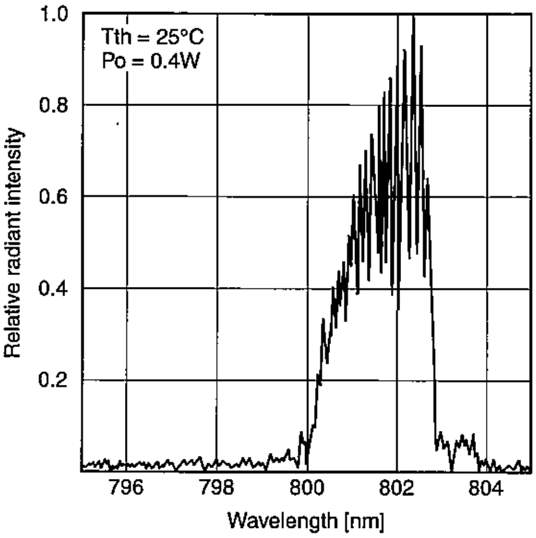
**TE cooler characteristics 2**

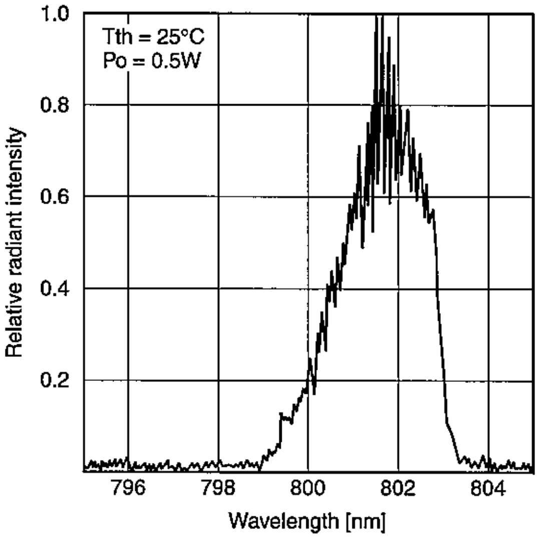


## Power dependence of spectrum

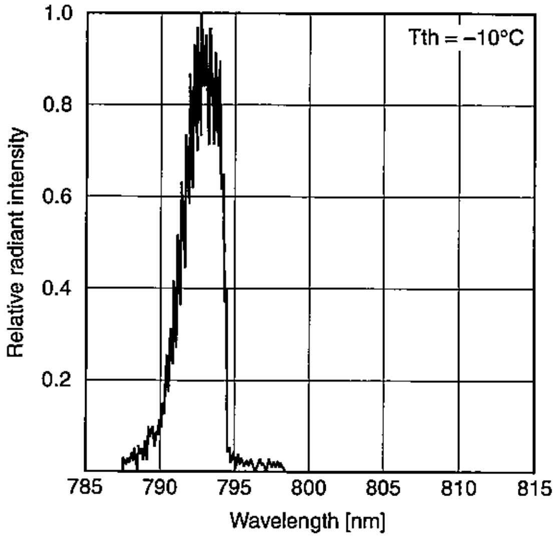


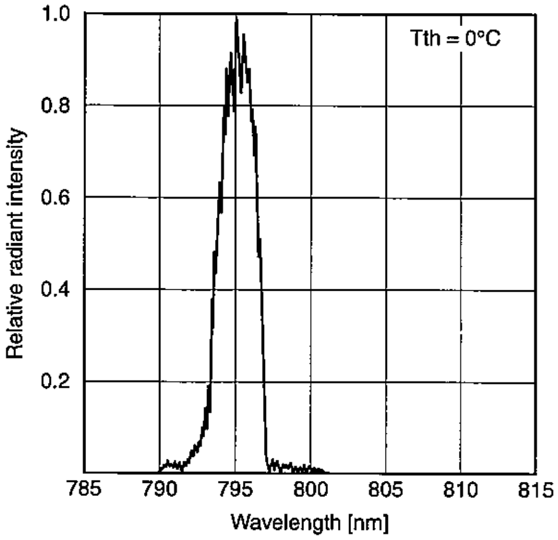


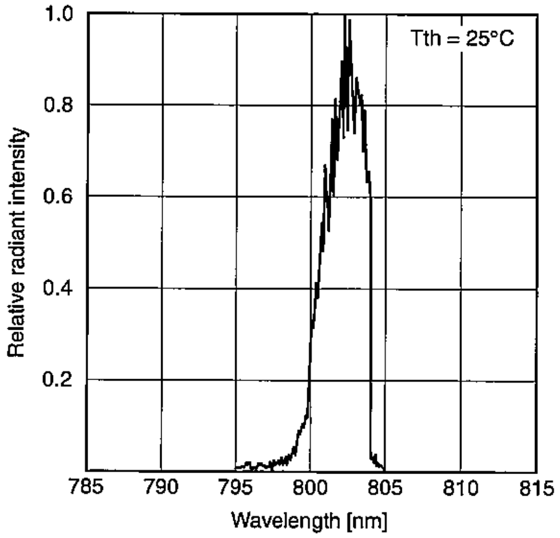


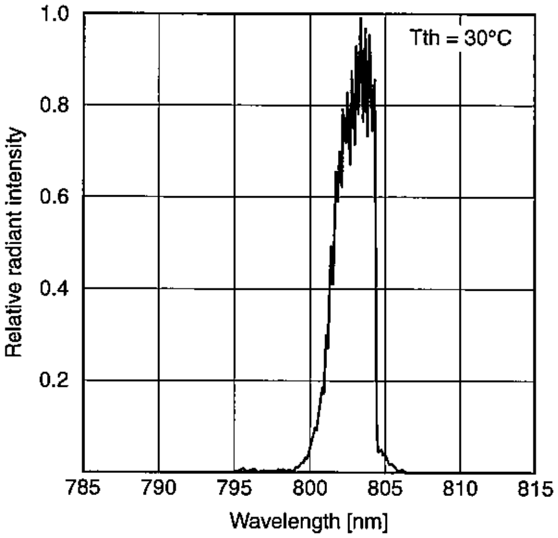


## **Temperature dependence of spectrum** (Po = 0.5W)









## Notes on Operation

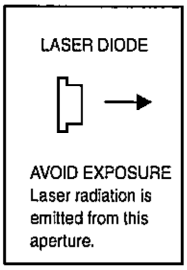
Care should be taken for the following points when using this product.

(1) This product corresponds to a Class 4 product under IEC60825-1 and JIS standard C6802 "Laser Product Emission Safety Standards".

DANGER

LASER RADIATION
AVOID EYE OR SKIN EXPOSURE TO
DIRECT OR SCATTERED RADIATION

MAXIMUM OUTPUT OVER 1 W
WAVELENGTH 600 - 950 nm
CLASS IV LASER PRODUCT



LASER DIODE

AVOID EXPOSURE
Laser radiation is
emitted from this
aperture.

SONY LASER DIODE

This product complies with 21
CFR Part 1040.10 and 1040.11
Sony Corporation
1-7-1 Konan,
Minato-ku,Tokyo
108-0075 Japan

(2) Eye protection against laser beams

Take care not to allow laser beams to enter your eyes under any circumstances.
For observing laser beams, ALWAYS use safety goggles that block laser beams. Usage of IR scopes, IR cameras and fluorescent plates is also recommended for monitoring laser beams safely.

(3) Gallium Arsenide

This product uses gallium arsenide (GaAs). This is not a problem for normal use, but GaAs vapors may be potentially hazardous to the human body. Therefore, never crush, heat to the maximum storage temperature or higher, or place the product in your mouth.
In addition, the following disposal methods are recommended when disposing of this product.

1. Engaging the services of a contractor certified in the collection, transport and intermediate treatment of items containing arsenic.
2. Managing the product through to final disposal as specially managed industrial waste which is handled separately from general industrial waste and household waste.

(4) Prevention of surge current and electrostatic discharge

Laser diodes are most sensitive to electrostatic discharge among semiconductors. When a large current is passed through the laser diode for even an extremely short time, the strong light emitted from the laser diode promotes deterioration and then destruction of the laser diode. Therefore, note that surge current should not flow to the laser diode driving circuit from switches and others. Also, if the laser diode is handled carelessly, it may be destroyed instantly because electrostatic discharge is easily applied by a human body. Therefore, be extremely careful about overcurrent and electrostatic discharge.
Also, use the power supply that was designed not to exceed the optical power output specified at the absolute maximum ratings.

(5) Use for special applications

This product is not designed or manufactured for use in equipment used under circumstances where failure may pose a risk to life and limb, or result in significant material damage, etc.
Consult your Sony sales representative when investigating use for medical, vehicle, nuclear power control or other special applications.

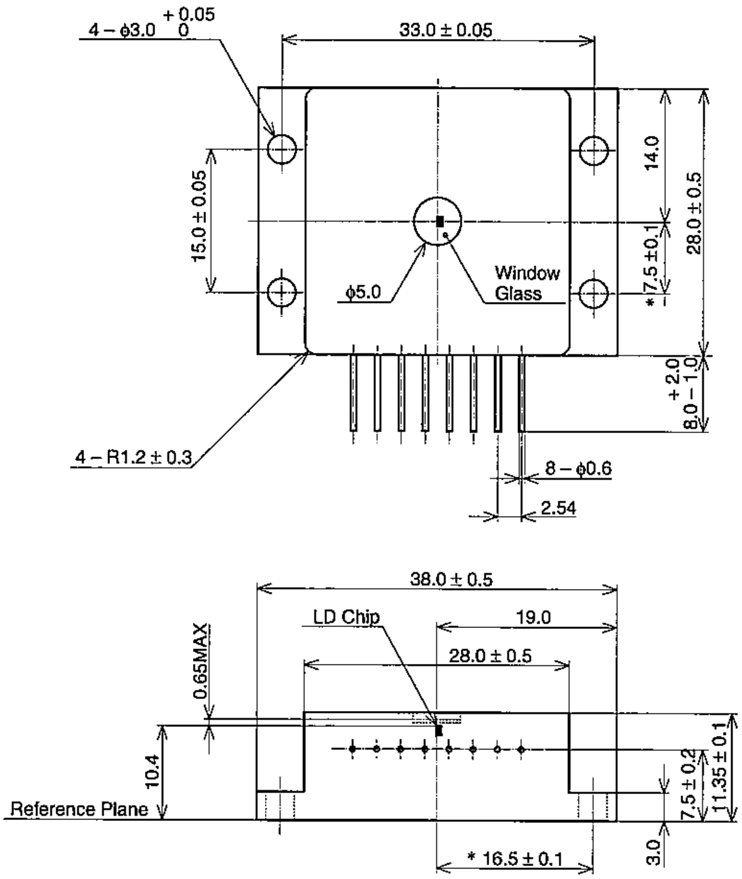
(6) Environment-related Substances to be Controlled

No substances classified at level 1 (immediate ban) of Sony Technical Standard, SS-00259, "Management regulations for the Environment-related Substances to be Controlled". The excerpt from SS-00259 is introduced on following URL.

http://www.sony.net/SonyInfo/procurementinfo/ss00259/

## Package Outline    Unit: mm

M-273 (LO-10)



*Distance between pilot hole and emittng area

PACKAGE STRUCTURE

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

| | |
|---|---|
| PACKAGE MASS | 43g |