

## 500mW High Power Laser Diode

### Description

SLD303XT is a gain-guided, high-power 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 power output  $P_o=450\text{mW}$
- Small operating current
- Newly developed flat package with built-in TE cooler, thermistor and photodiode.

### Structure

GaAlAs double-hetero laser diode

### Applications

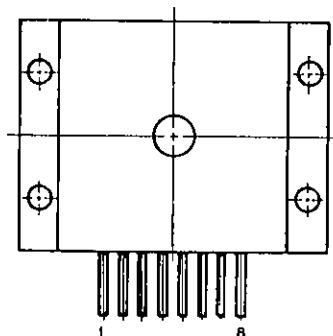
- Solid state laser excitation
- Medical use

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

|                                  |           |    |            |                    |
|----------------------------------|-----------|----|------------|--------------------|
| • Radiant power output           | $P_o$     |    | 500        | mW                 |
| • Reverse voltage                | $V_R$     | LD | 2          | V                  |
|                                  |           | PD | 15         | V                  |
| • Operating temperature          | $T_{opr}$ |    | -10 to +30 | $^{\circ}\text{C}$ |
| • Storage temperature            | $T_{stg}$ |    | -40 to +85 | $^{\circ}\text{C}$ |
| • Operating current of TE cooler | $I_T$     |    | 2.5        | A                  |

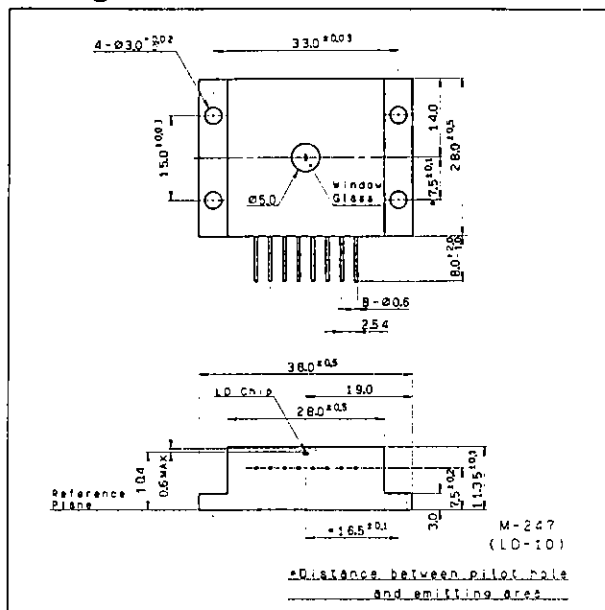
### Pin Configuration (Top View)

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

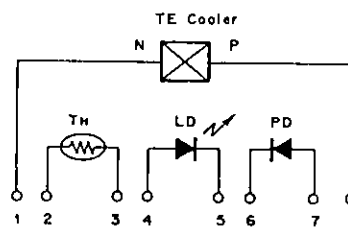


### Package Outline

Unit: mm



### Equivalent Circuit



Optical and Electrical Characteristics

T<sub>th</sub>=25°C

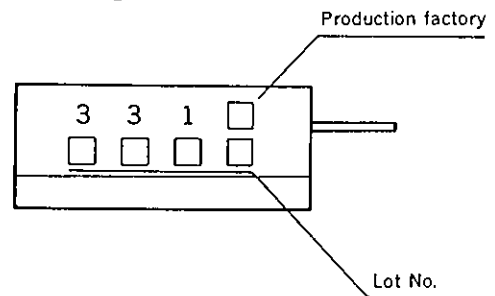
| Item                            | Symbol           | Condition                                    | Min.                  | Typ.            | Max. | Unit   |
|---------------------------------|------------------|--|-----------------------|-----------------|------|--------|
| Threshold current               | I <sub>th</sub>  |  |                       | 450             | 600  | mA     |
| Operating current               | I <sub>OP</sub>  | P <sub>o</sub> =450mW                        |                       | 950             | 1500 | mA     |
| Operating voltage               | V <sub>OP</sub>  | P <sub>o</sub> =450mW                        |                       | 1.9             | 3.0  | V      |
| Wavelength*                     | λ <sub>p</sub>   | P <sub>o</sub> =450mW                        | 770                   |                 | 840  | nm     |
| Monitor current                 | I <sub>mon</sub> | P <sub>o</sub> =450mW<br>V <sub>R</sub> =10V |                       | 0.8             |      | mA     |
| Radiation angle<br>(F. W. H. M) | Perpendicular    | θ <sub>⊥</sub>                               | P <sub>o</sub> =450mW | 28              | 40   | degree |
|                                 | Parallel         |  |                       | θ <sub>  </sub> | 12   | 17     |
| Positional accuracy             | Position         | ΔX, ΔY                                       | P <sub>o</sub> =450mW |                 | ±100 | μm     |
|                                 | Angle            |  |                       | Δφ <sub>⊥</sub> |      | ±3     |
| Slope efficiency                | η <sub>D</sub>   | P <sub>o</sub> =450mW                        | 0.65                  | 0.9             |      | mW/mA  |
| Thermistor resistance           | R <sub>th</sub>  | T <sub>th</sub> =25°C                        |                       | 10              |      | kΩ     |

Note) T<sub>th</sub>: Thermistor temperature

\*Wavelength Selection Classification

| Type        | Wavelength (nm) |
|-------------|-----------------|
| SLD303XT-1  | 785±15          |
| SLD303XT-2  | 810±10          |
| SLD303XT-3  | 830±10          |
| SLD303XT-21 | 798± 3          |
| -24         | 807± 3          |
| -25         | 810± 3          |

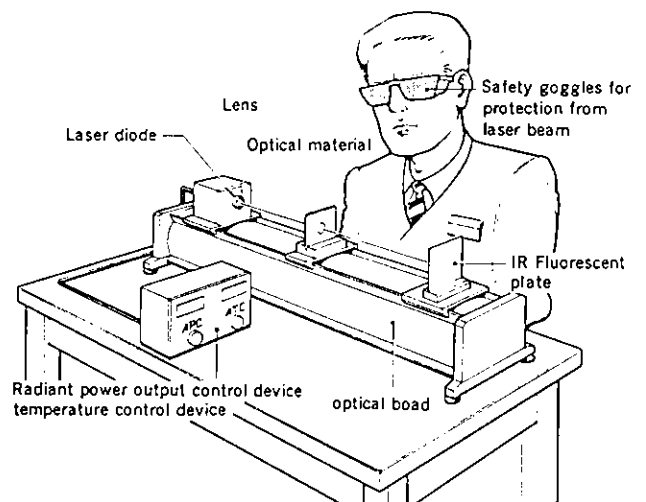
Marking



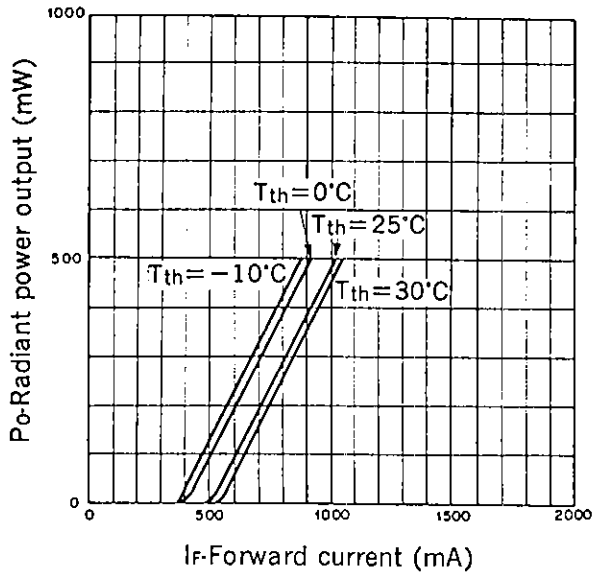
Categories are not specified by marking.

Handling Precautions

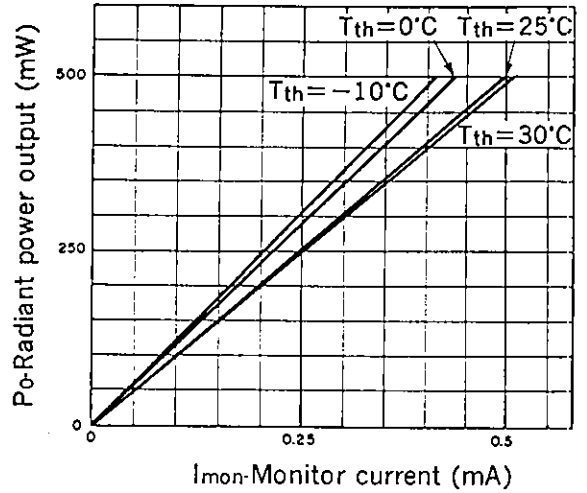
Eye protection against laser beams  
 The optical output of laser diodes ranges from several milliwatts to one watt. However the optical density of the laser beam at the diode chip reaches 1 megawatt per square centimeter. Unlike gas lasers, since laser diode beams are divergent, uncollimated laser diode 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.



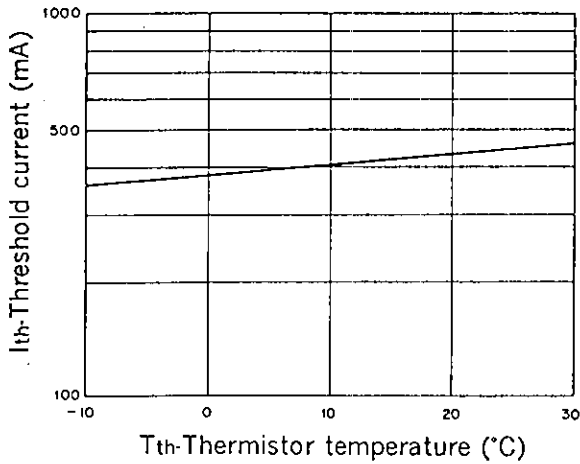
Radiant power output vs. Forward current characteristics



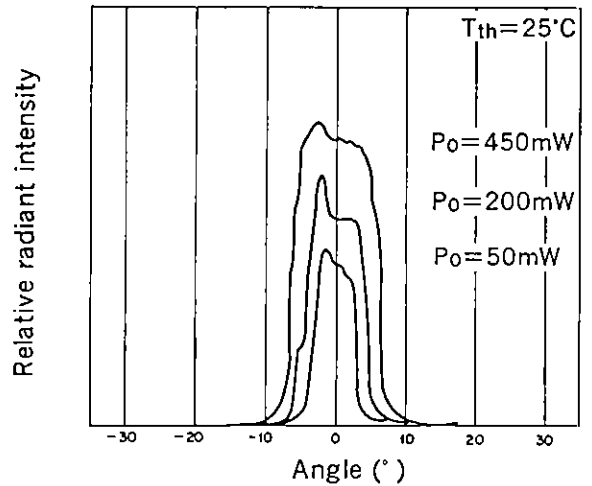
Radiant power output vs. Monitor current characteristics



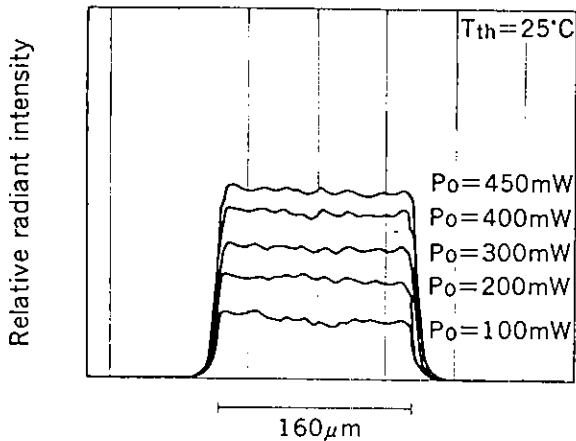
Threshold current vs. Temperature characteristics



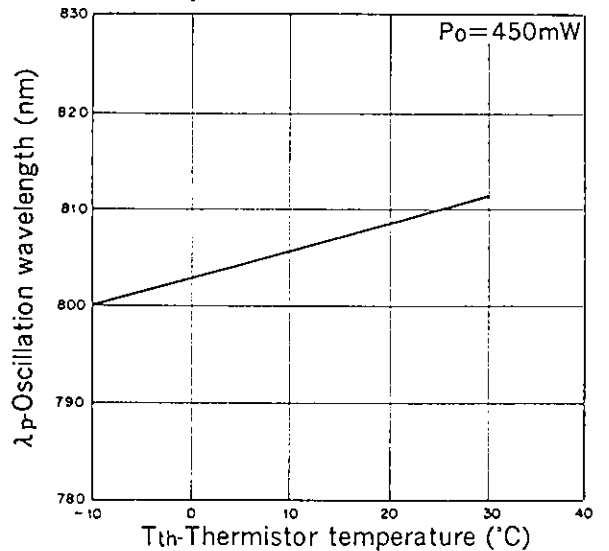
Power dependence of far field pattern (parallel to junction)



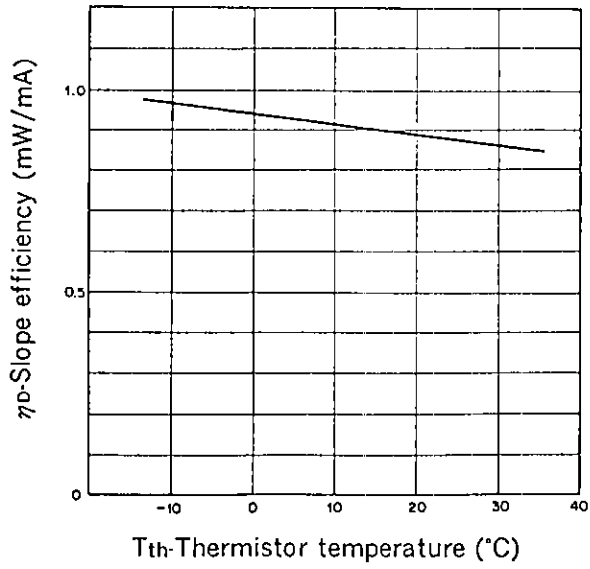
Power dependence of near field pattern



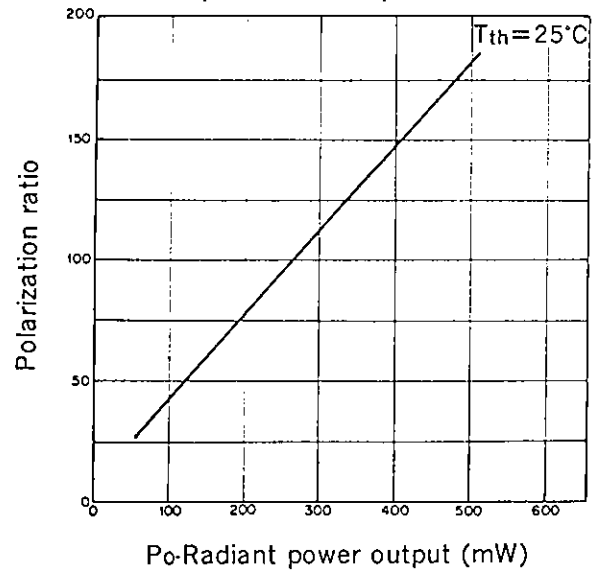
Oscillation wavelength vs. Temperature characteristics



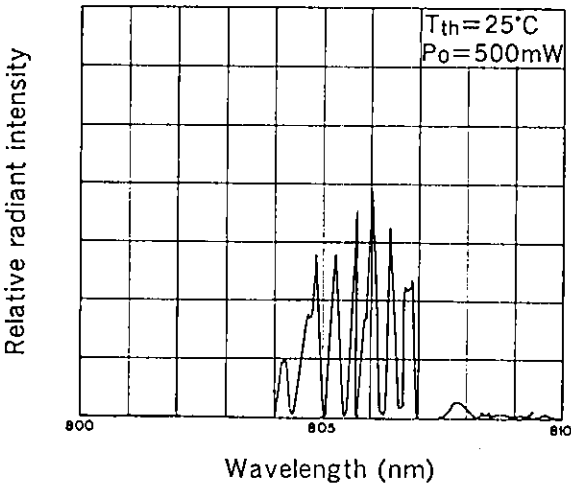
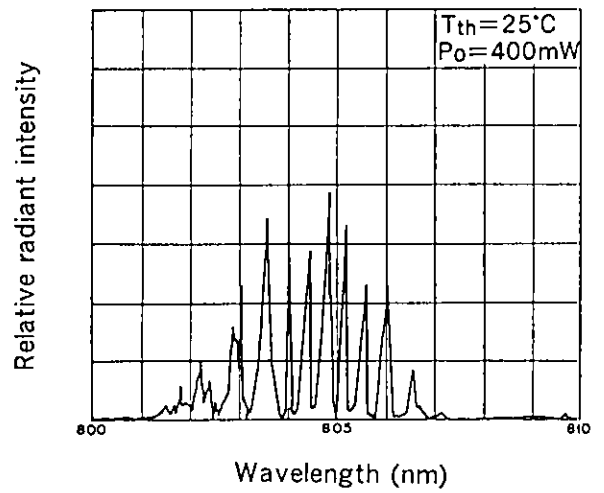
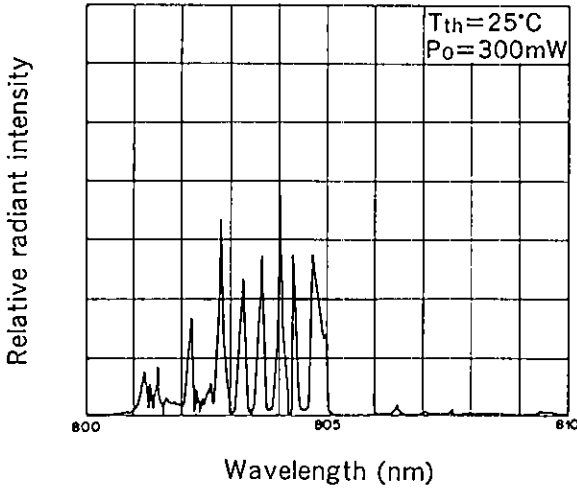
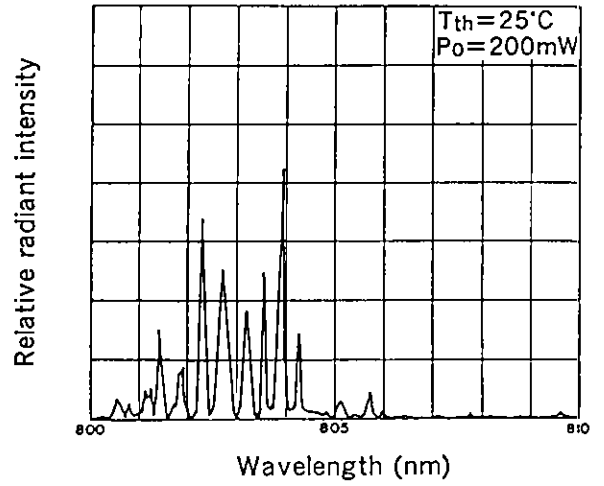
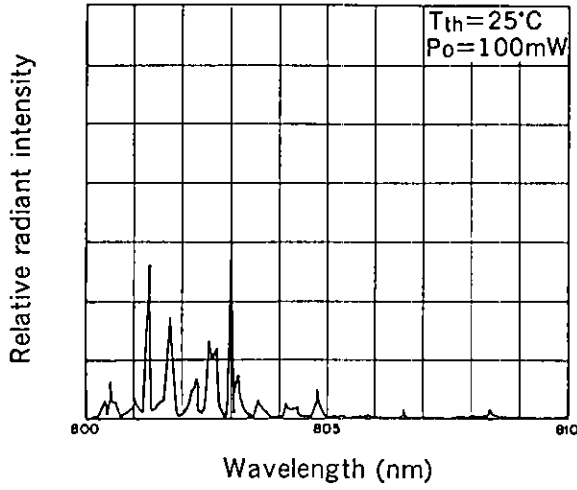
Slope efficiency vs. Temperature characteristics



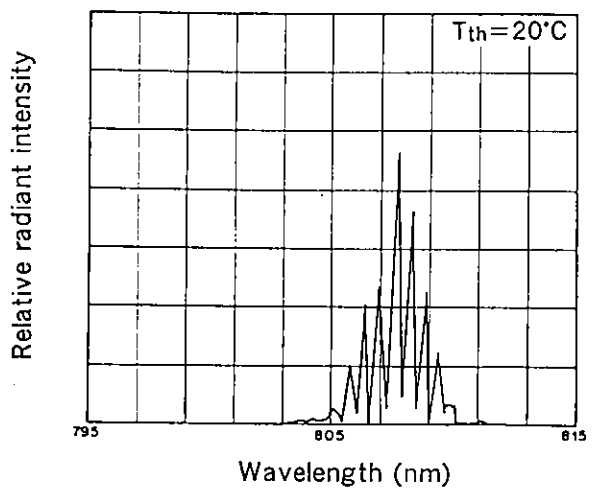
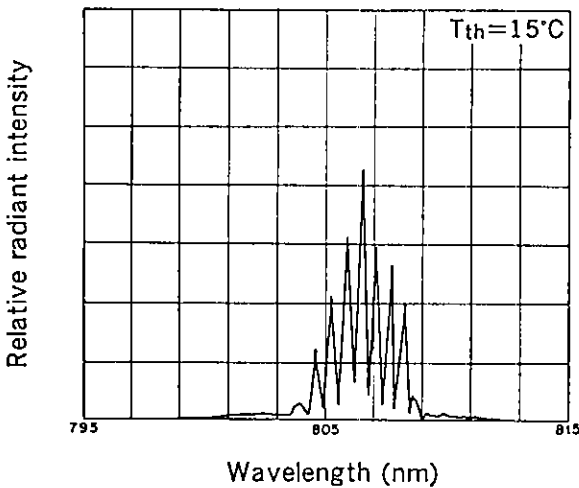
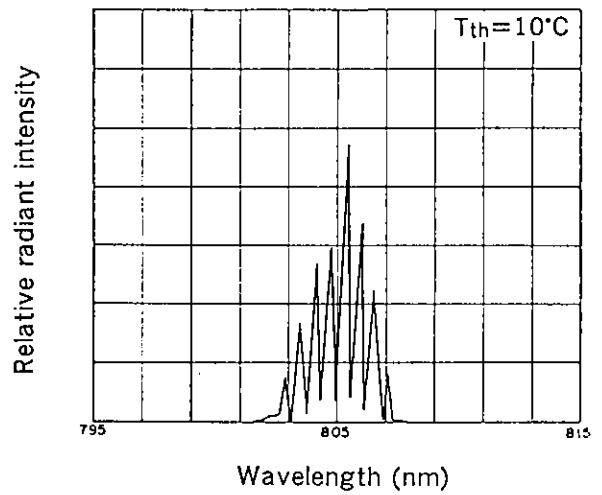
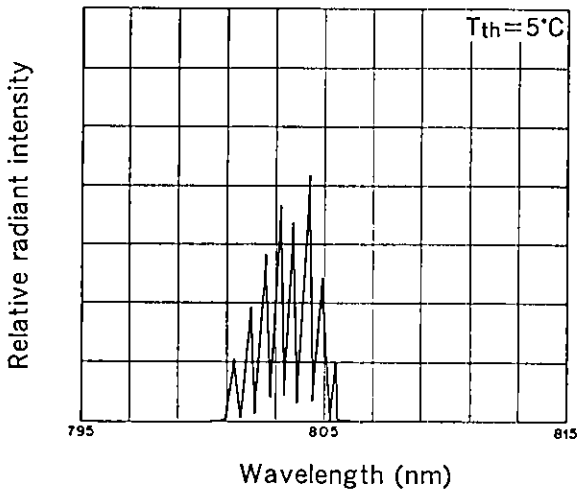
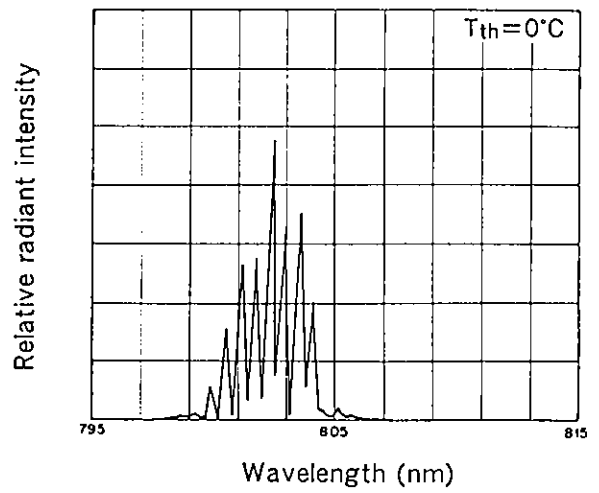
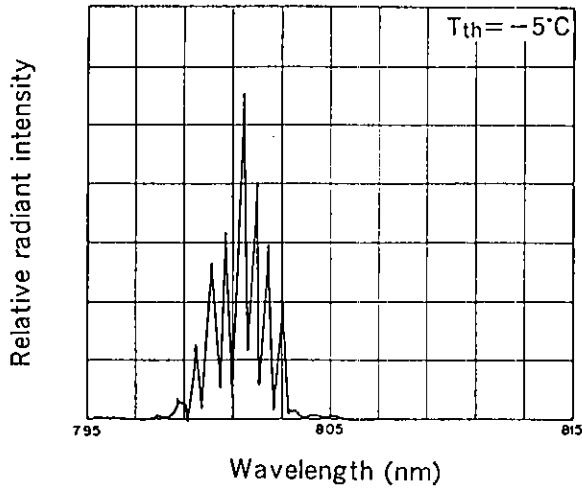
Power dependence of polarization ratio

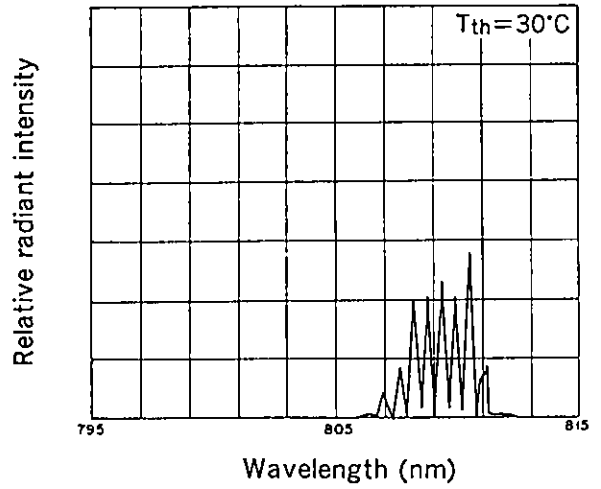
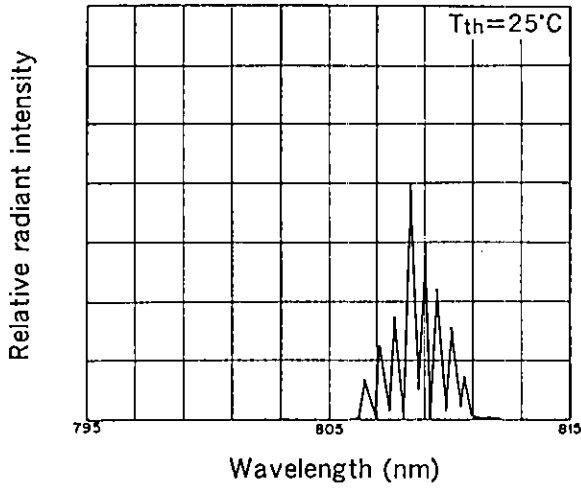


Power dependence of wavelength

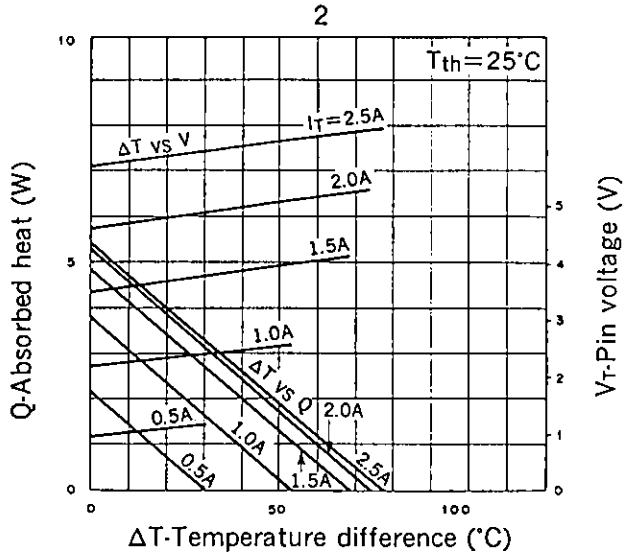
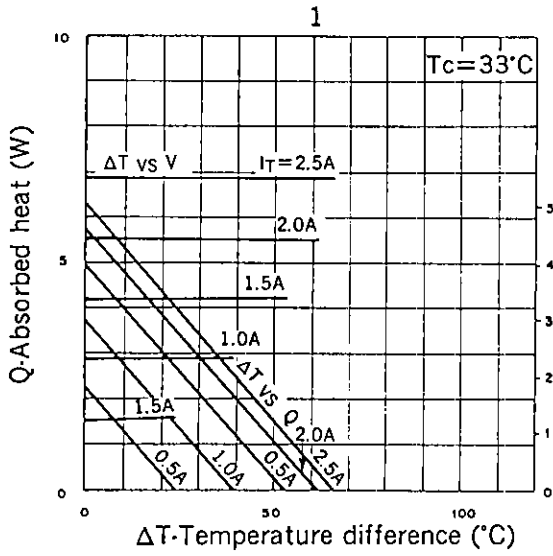


Temperature dependence of wavelength ( $P_o=450mW$ )





TE cooler characteristics



$\Delta T$  :  $T_c - T_{th}$   
 $T_{th}$  : Thermistor temperature  
 $T_c$  : Case temperature

Thermistor characteristics

