

SONY®

SLD301WT

## 100mW High Power Laser Diode

### Description

SLD301WT is a gain-guided, high-powered laser diode with a built-in TE cooler. Fine tuning of the wavelength is possible by controlling the laser chip temperature.

### Features

- High power  
Recommended power output  $P_o = 90\text{mW}$
- Small operating current
- TO-3 package with built-in TE cooler, thermistor, and photodiode

### Structure

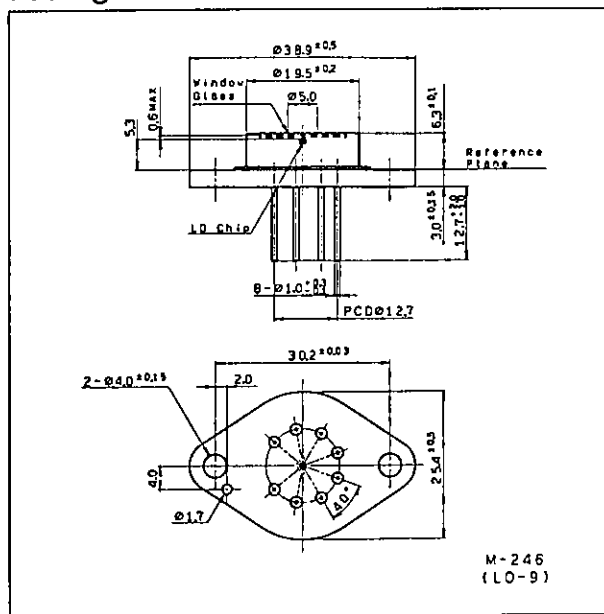
GaAlAs double-hetero laser diode

### Applications

- Solid state laser excitation
- Medical use

### Package Outline

Unit: mm

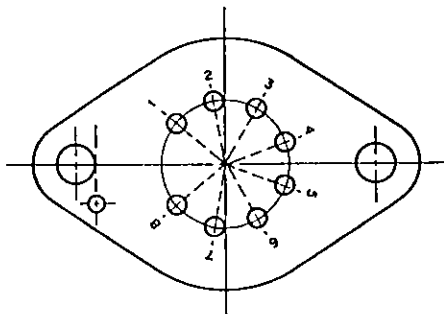


### Absolute Maximum Ratings ( $T_{th} = 25^\circ\text{C}$ )

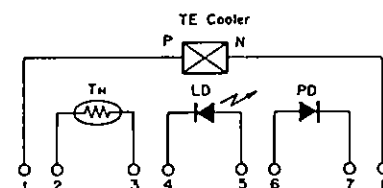
|                                  |           |    |            |                  |
|----------------------------------|-----------|----|------------|------------------|
| • Radiant power output           | $P_o$     | LD | 100        | mW               |
| • Reverse voltage                | $V_R$     | LD | 2          | V                |
|                                  |           | PD | 15         | V                |
| • Operating temperature          | $T_{opr}$ |    | -10 to +50 | $^\circ\text{C}$ |
| • Storage temperature            | $T_{stg}$ |    | -40 to +85 | $^\circ\text{C}$ |
| • Operating current of TE cooler | $I_T$     |    | 2.1        | A                |

### Pin Configuration (Bottom View)

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



### Equivalent Circuit



## Optical and Electrical Characteristics

 $T_{th}=25^{\circ}\text{C}$ 

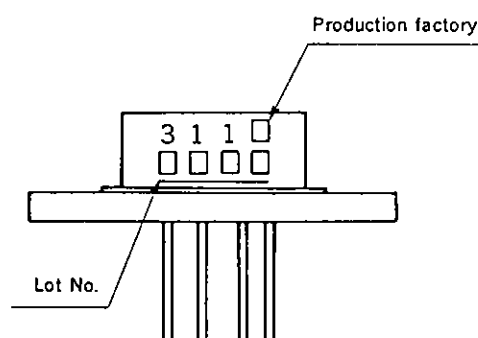
| Item                  | Symbol        | Condition                             | Min.              | Typ. | Max.      | Unit          |
|-----------------------|---------------|---------------------------------------|-------------------|------|-----------|---------------|
| Threshold current     | $I_{th}$      |                                       |                   | 150  | 200       | mA            |
| Operating current     | $I_{OP}$      | $P_o=90\text{mW}$                     |                   | 250  | 400       | mA            |
| Operating voltage     | $V_{OP}$      | $P_o=90\text{mW}$                     |                   | 1.9  | 3.0       | V             |
| Wavelength*           | $\lambda_p$   | $P_o=90\text{mW}$                     | 770               |      | 840       | nm            |
| Monitor current       | $I_{mon}$     | $P_o=90\text{mW}$<br>$V_R=10\text{V}$ |                   | 0.15 |           | mA            |
| F. W. H. M            | Perpendicular | $\theta_{\perp}$                      | $P_o=90\text{mW}$ | 28   | 40        | degree        |
|                       | Parallel      | $\theta_{\parallel}$                  |                   | 12   | 17        | degree        |
| Positional accuracy   | Position      | $\Delta X, \Delta Y$                  | $P_o=90\text{mW}$ |      | $\pm 100$ | $\mu\text{m}$ |
|                       | Angle         | $\Delta \phi$                         |                   |      | $\pm 3$   | degree        |
| Slope efficiency      | $\eta_o$      | $P_o=90\text{mW}$                     | 0.65              | 0.9  |           | mW/mA         |
| Thermistor resistance | $R_{th}$      | $T_{th}=25^{\circ}\text{C}$           |                   | 10   |           | k $\Omega$    |

Note)  $T_{th}$ : Thermistor temperature

## \*Wavelength Selection Classification

| Type        | Wavelength (nm) |
|-------------|-----------------|
| SLD301WT-1  | $785 \pm 15$    |
| SLD301WT-2  | $810 \pm 10$    |
| SLD301WT-3  | $830 \pm 10$    |
| SLD301WT-21 | $798 \pm 3$     |
| -24         | $807 \pm 3$     |
| -25         | $810 \pm 3$     |

## Marking

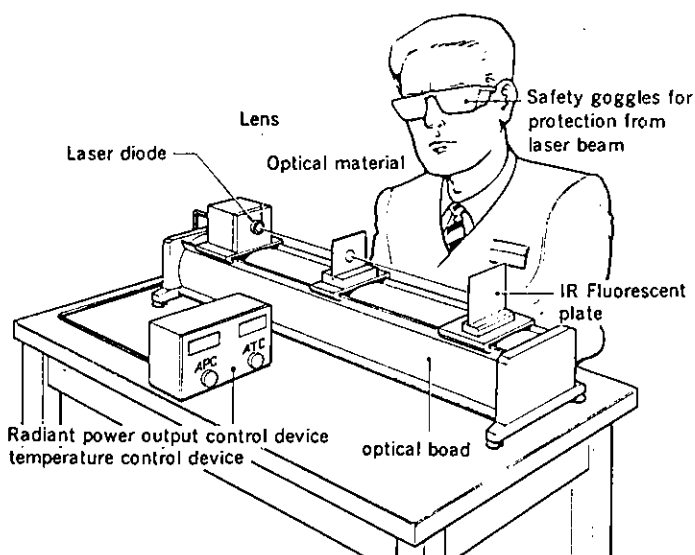


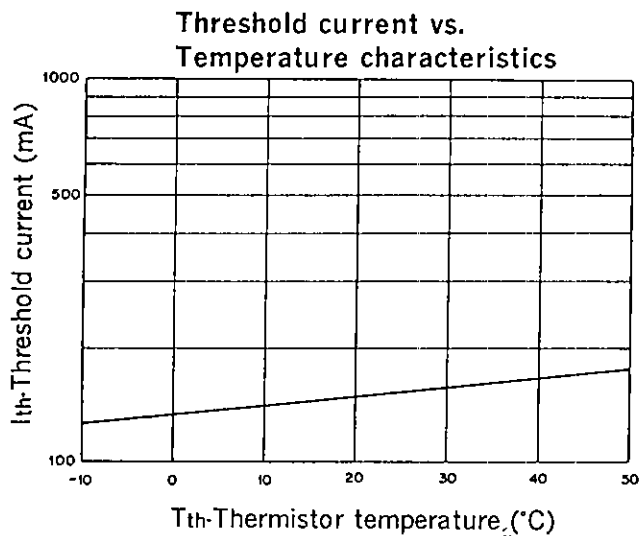
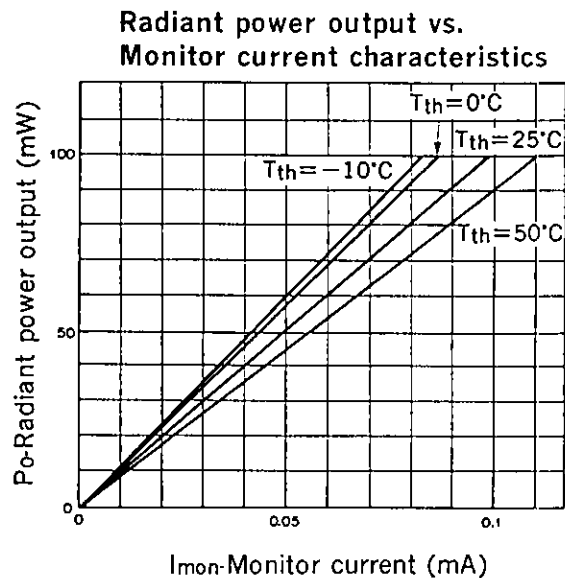
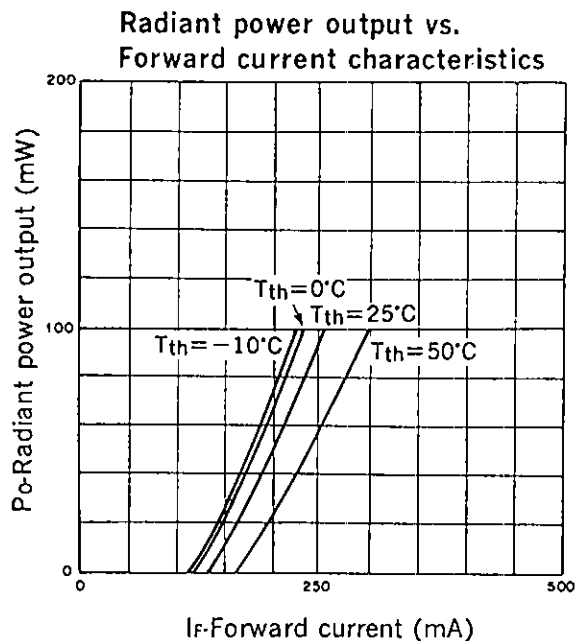
\* Categories are not specified by marking.

## Handling Precautions

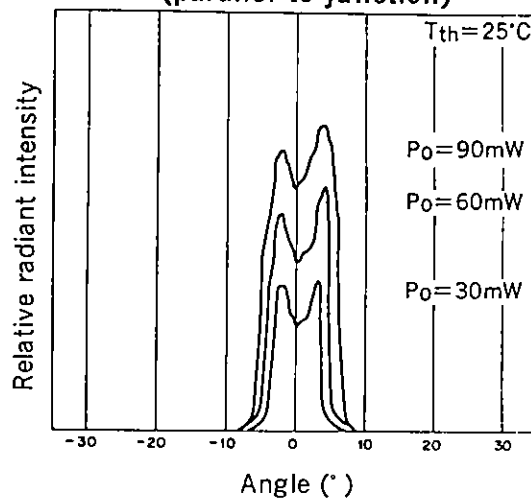
Eye protection against laser beams

The optical output of laser diodes ranges from several milliwatts to one watt. However the optical density of the laser beam at the tip end reaches 1 megawatt per square centimeter. Unlike gas lasers, as laser diode beams are rather divergent, beam of uncollimated laser diodes are fairly safe at a distance. Generally speaking, however, it is best NOT to LOOK into laser beams, under any circumstances. For laser beams observation purposes ALWAYS use safety goggles that block infrared rays. Usage of 1R scopes, 1R cameras and fluorescent plates is also recommended for the safe monitoring of laser beams.

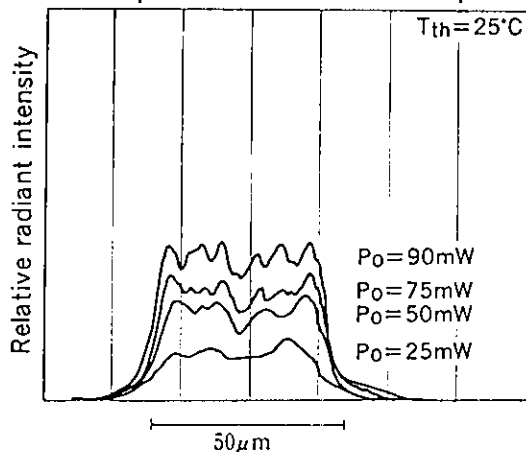




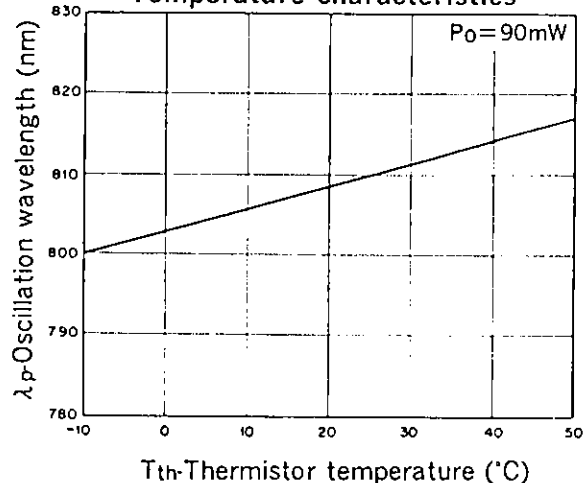
**Power dependence of far field pattern (parallel to junction)**



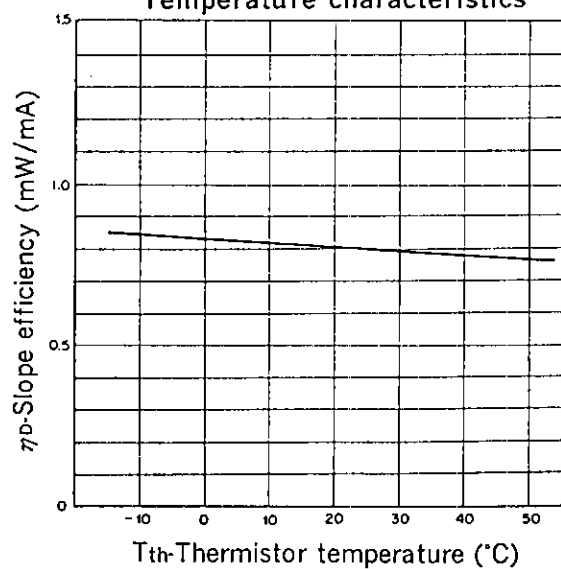
**Power dependence of near field pattern**



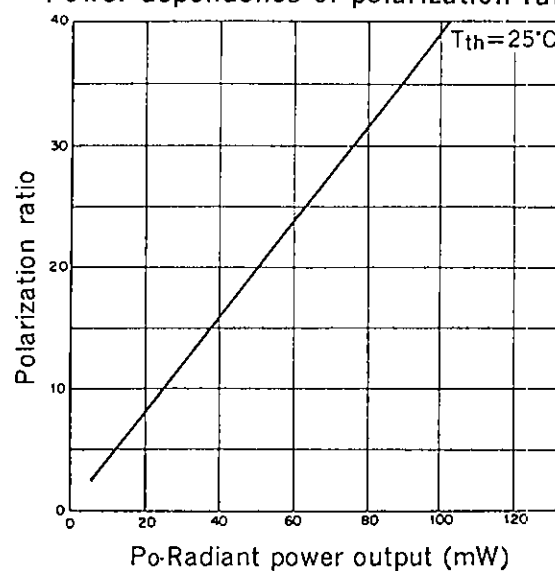
**Oscillation wavelength vs. Temperature characteristics**



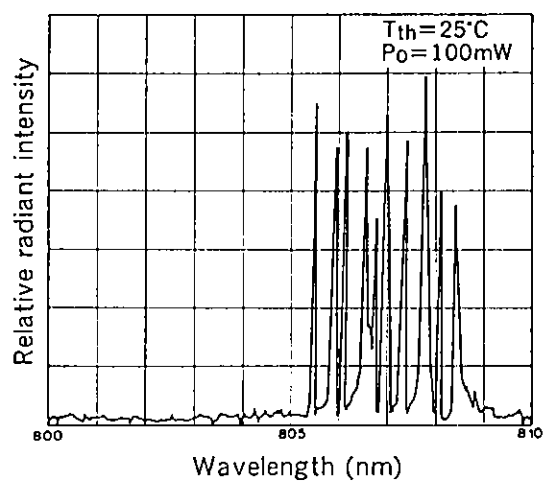
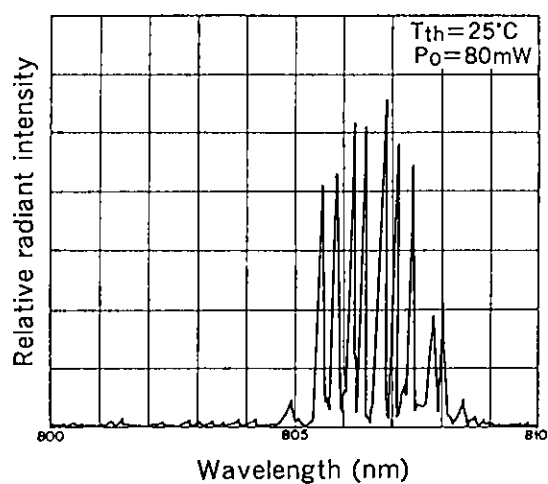
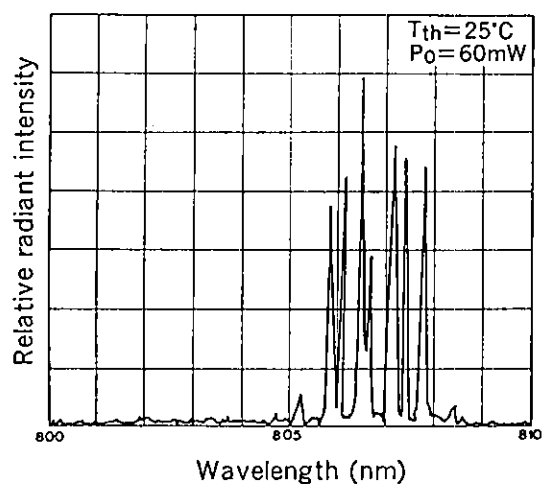
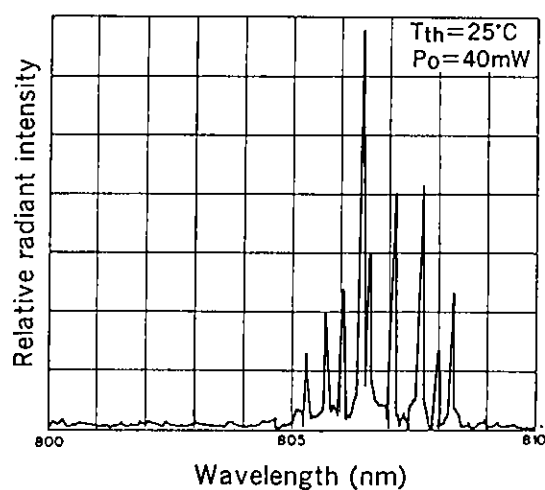
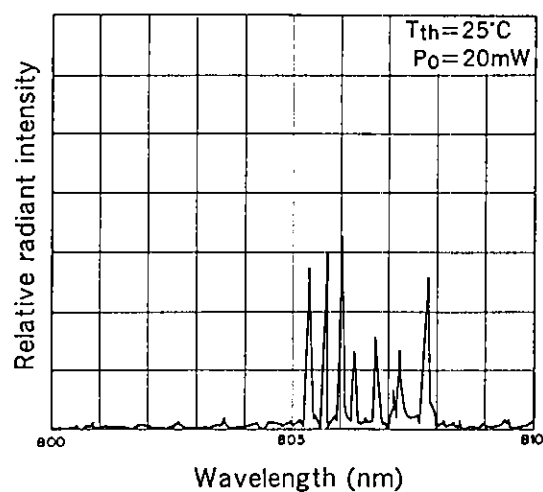
Slope efficiency vs.  
Temperature characteristics



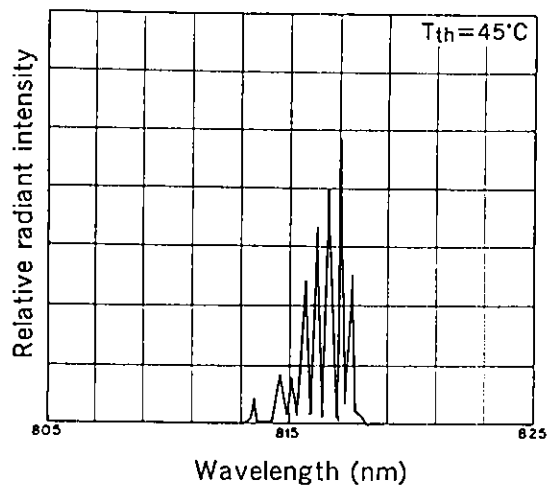
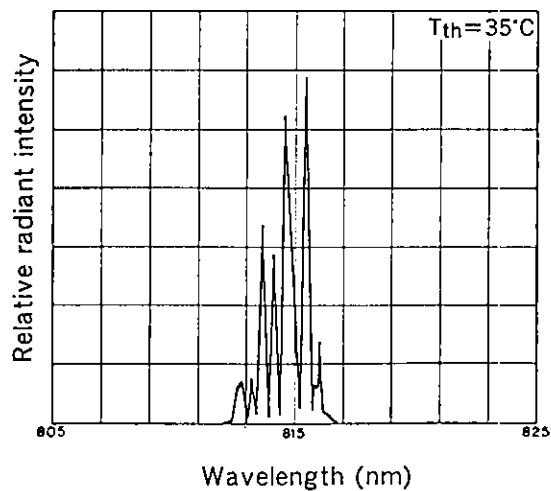
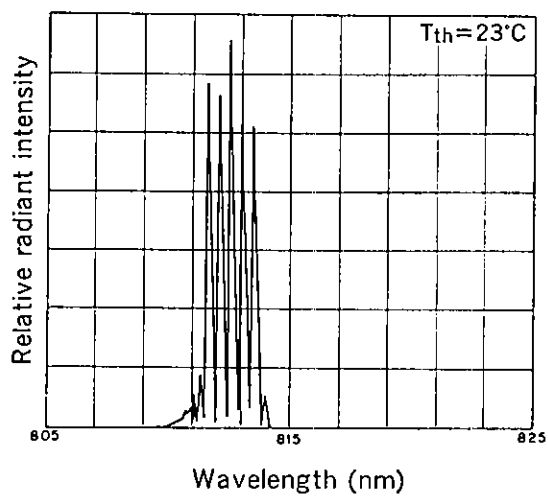
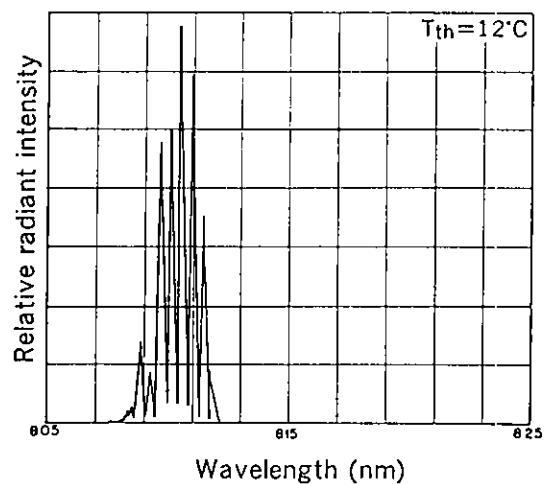
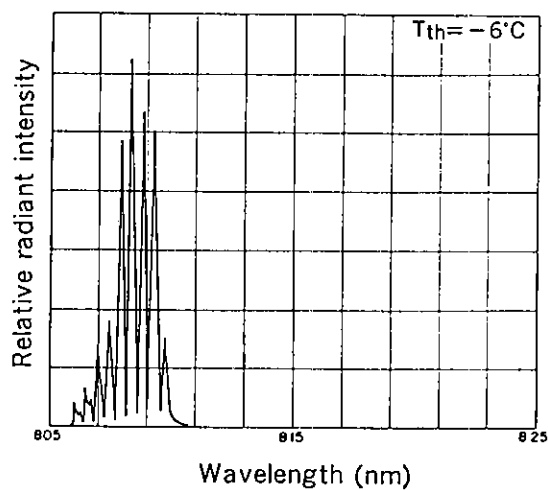
Power dependence of polarization ratio



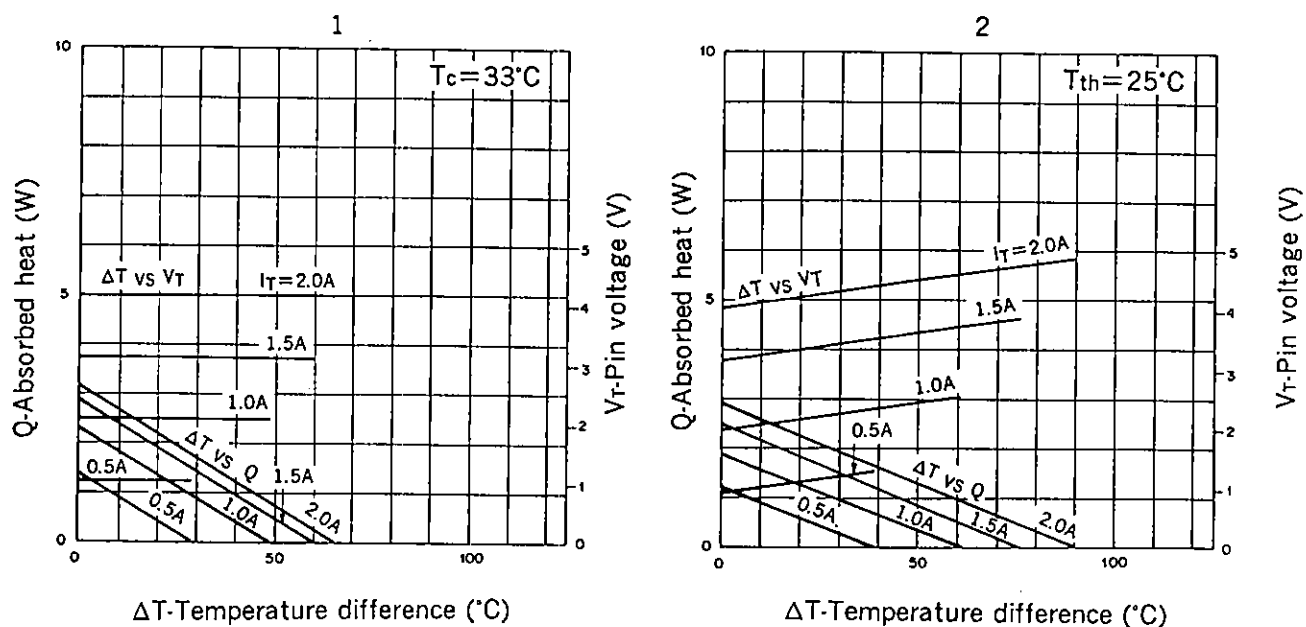
## Power dependence of wavelength (spectrum)



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



## TE cooler characteristics



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

## Thermistor characteristics

