

# ML1XX3 SERIES

FOR OPTICAL INFORMATION SYSTEMS

TYPE  
NAME

**ML1013R, ML1413R, ML120G3**

## DESCRIPTION

ML1XX3 is a high power AlGaInP semiconductor laser which provides a stable, single transverse mode oscillation with emission wavelength of 685-nm and standard CW light output of 50mW.

ML1XX3 has a window-mirror-facet which improves the maximum output power. That leads to highly reliable and high-power operation.

## FEATURES

- High Power: 50mW (CW), 60mW (pulse)
- Visible Light: 685nm (typ)

## APPLICATION

Optical disc drive (High Density / High Speed)

## ABSOLUTE MAXIMUM RATINGS (Note 1)

| Symbol | Parameter                     | Conditions    | Ratings   | Unit |
|--------|-------------------------------|---------------|-----------|------|
| Po     | Light output power            | CW            | 60        | mW   |
|        |                               | Pulse(Note 2) | 60        |      |
| VRL    | Reverse voltage (laser diode) | -             | 2         | V    |
| VRD    | Reverse voltage (Photodiode)  | -             | 30        | V    |
| IFD    | Forward current (Photodiode)  | -             | 10        | mA   |
| Tc     | Case temperature              | -             | -10~ +60  | °C   |
| Tstg   | Storage temperature           | -             | -40~ +100 | °C   |

Note1: The maximum rating means the limitation over which the laser should not be operated even instant time, and this does not mean the guarantee of its lifetime. As for the reliability, please refer to the reliability report from Mitsubishi Semiconductor Quality Assurance Department.

Note2: TARGET SPEC /Condition Duty less than 50%, pulse width less than 1μs

## ELECTRICAL/OPTICAL CHARACTERISTICS (Tc=25°C)

| Symbol | Parameter                              | Test conditions                      | Min. | Typ. | Max | Unit  |
|--------|----------------------------------------|--------------------------------------|------|------|-----|-------|
| Ith    | Threshold current                      | CW                                   | -    | 35   | 60  | mA    |
| Iop    | Operation current                      | CW, Po=50mW                          | -    | 80   | 120 | mA    |
| Vop    | Operating voltage                      | CW, Po=50mW                          | 2.0  | 2.4  | 3.0 | V     |
| η      | Slope efficiency                       | CW, Po=50mW                          | -    | 0.8  | -   | mW/mA |
| λp     | Peak wavelength                        | CW, Po=50mW                          | 670  | 685  | 700 | nm    |
| θ//    | Beam divergence angle (parallel)       | CW, Po=50mW                          | 7    | 10   | 12  | °     |
| θ⊥     | Beam divergence angle (perpendicular)  | CW, Po=50mW                          | 16   | 20   | 25  | °     |
| Im     | Monitoring output current (Photodiode) | CW, Po=50mW<br>VRD=1V RL=10Ω(Note 3) | 0.05 | 0.3  | 1.5 | mA    |
| ID     | Dark current (Photodiode)              | VRD=10V                              | 0    | -    | 0.5 | μA    |
| Ct     | Capacitance (Photodiode)               | VRD=5V                               | -    | 7    | -   | pF    |

Note3: RL=the load resistance of photodiode for ML1013R and ML1413R



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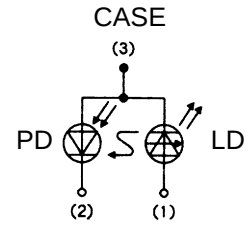
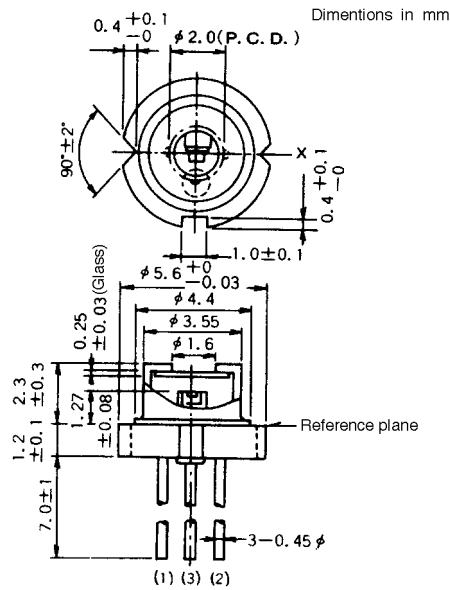
as of February '00

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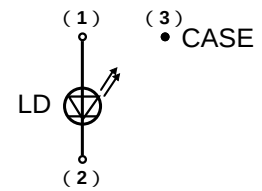
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## OUTLINE DRAWINGS

**ML1013R  
ML120G3**

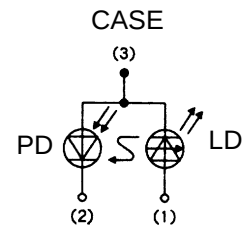
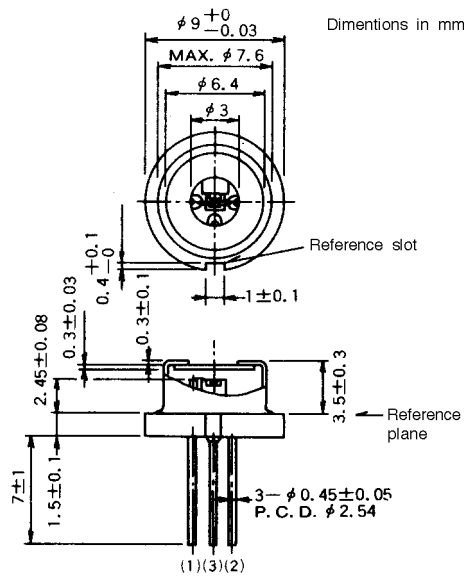
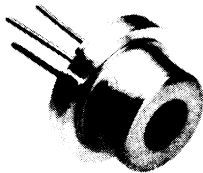


**ML1013R**



**ML120G3**

**ML1413R**

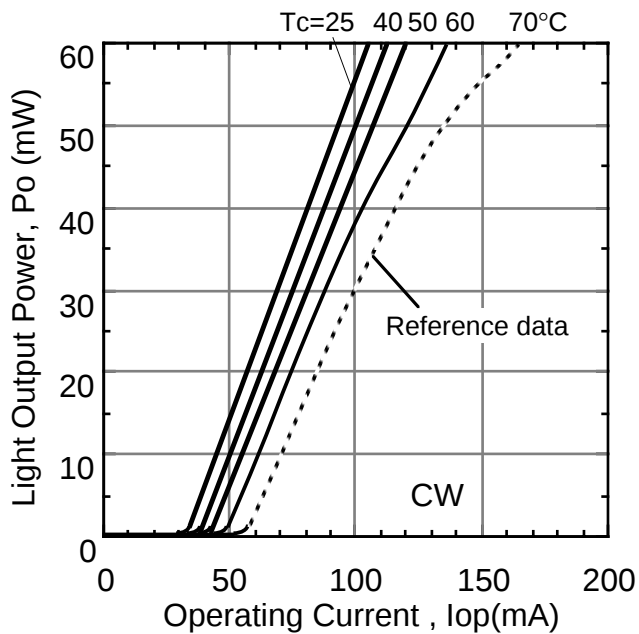


**ML1413R**

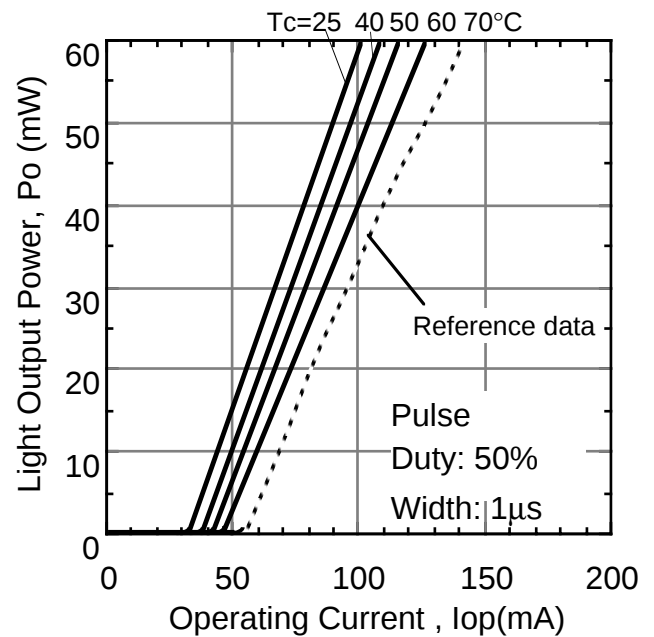
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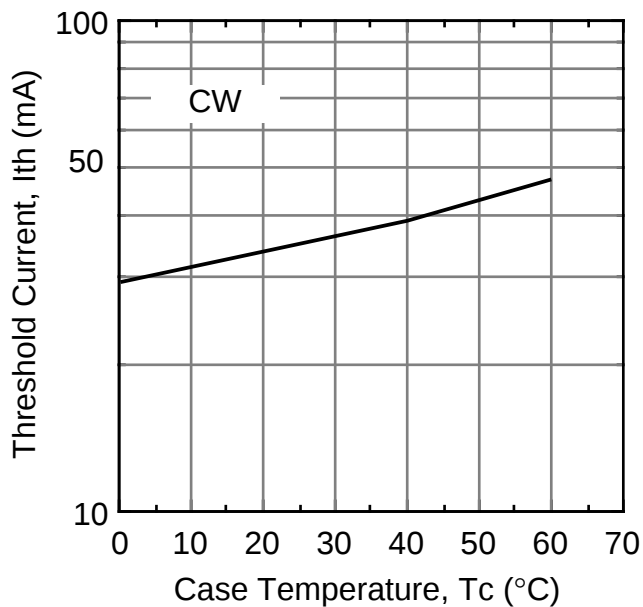
## Typical Characteristics



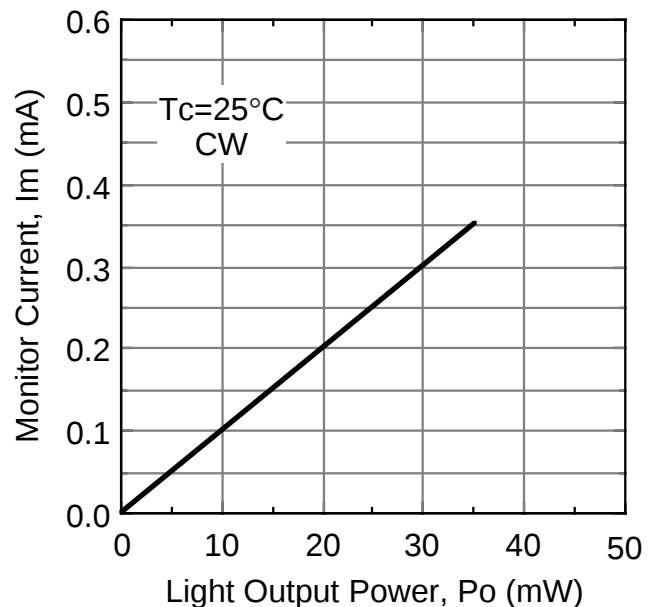
Light Output Power vs. Current (CW)



Light Output Power vs. Current (Pulse)



Threshold Current vs. Temperature



Monitor Photodiode Current



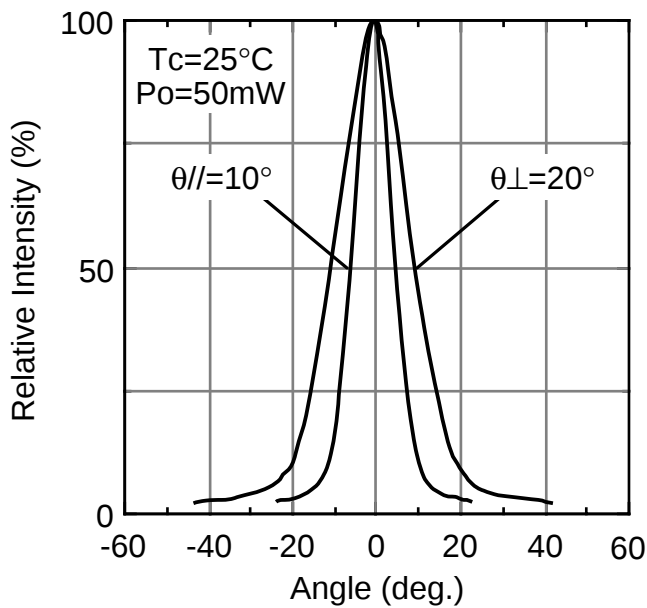
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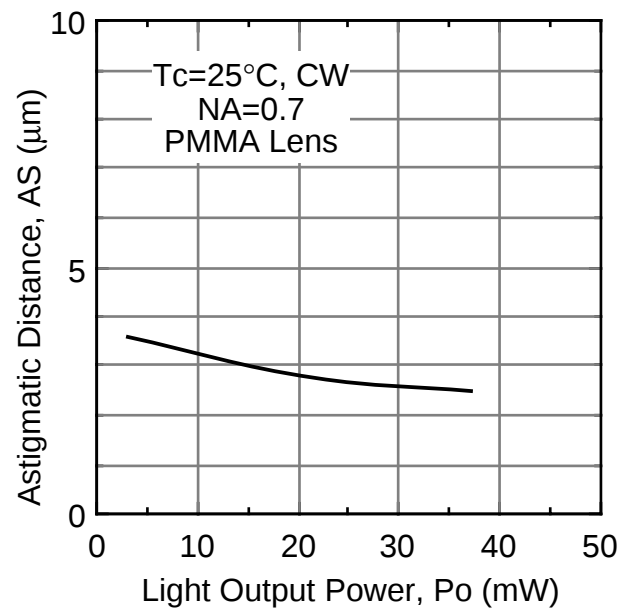
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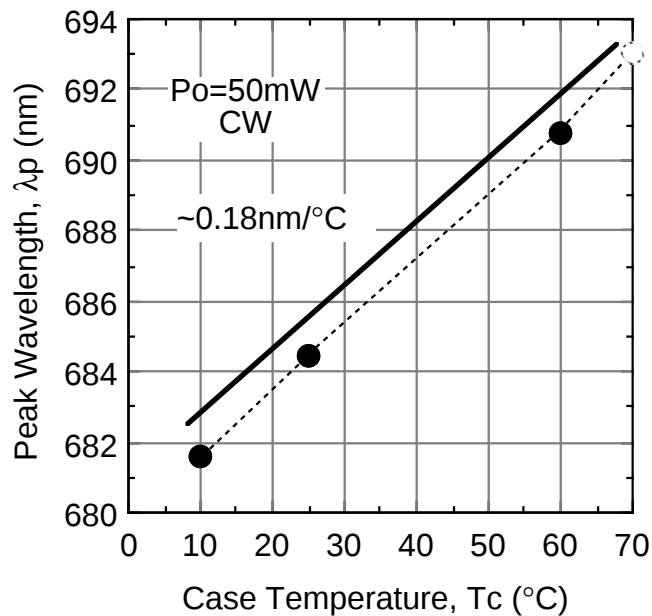
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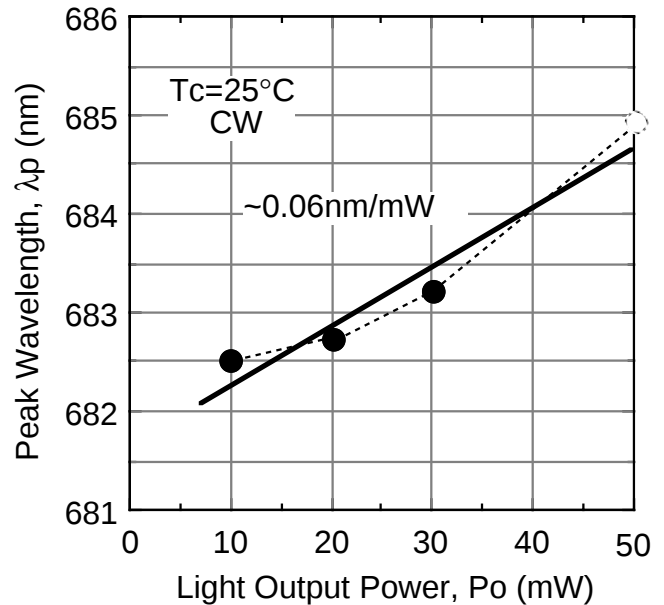
Far-Field-Patterns



Astigmatic Distance



Peak Wavelength vs. Temperature



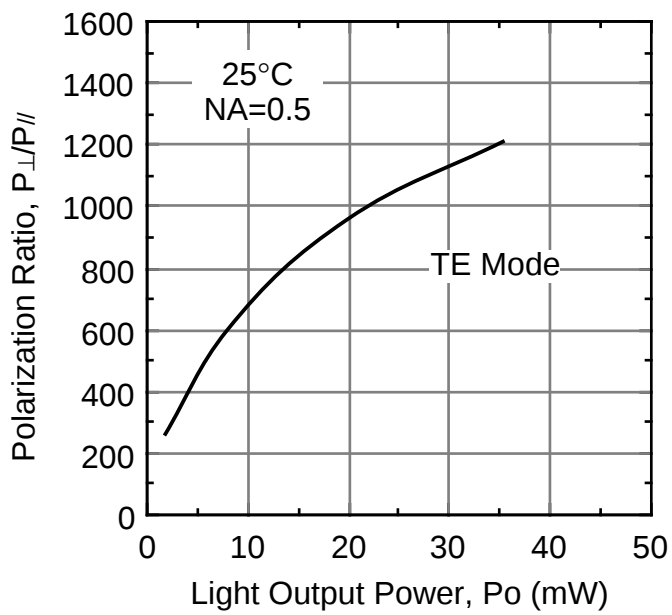
Peak Wavelength vs. Light Output Power



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## Typical Characteristics



Polarization Ratio