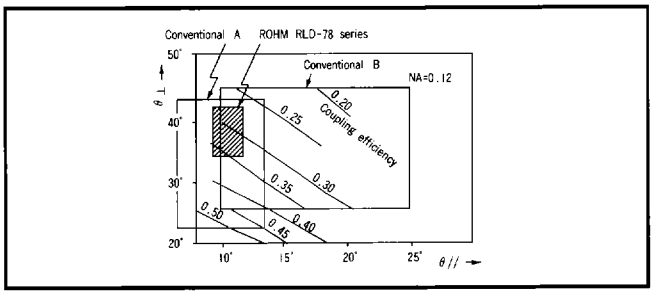
# Laser Diodes

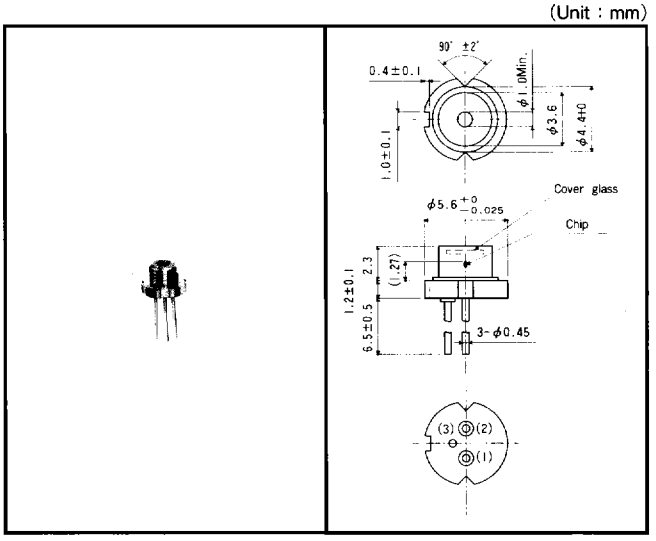
RLD-series laser diodes developed and manufactured by ROHM have a striking feature: a very small optical and electrical characteristic dispersion, which has been reduced to a third that of conventional equivalents, as illustrated on the right. This has made it possible for ROHM to constantly supply best lasers for various applications in large quantities. The RLD laser diodes are the products of ROHM's state-of-the-art laser technology, molecular beam epitaxial (MBE) method, which provides very precise controllability, and an ideally structured SAM laser developed by ROHM.




## ●Applications and Types of Lasers

| Applications | | RLD-78 Series | RLD-83 Series | RLD-85 Series |
|---|---|---|---|---|
| Compact Disc | General CD players | **RLD-78MA/PA** | – | – |
| | Battery-powered portable CD players | **RLD-78MA3/PA3** | – | – |
| | Battery-powered small portable CD players | **RLD-78MA4/PA4** | – | – |
| | Car CD players | **RLD-78MAT1/PAT1** | – | – |
| | | **RLD-78MAT2/PAT2** | – | – |
| Video Disk | VD and LD players | **RLD-78MV/PV** | – | – |
| General Applications | Sensors and bar code readers,etc. | **RLD-78MC/PC** | – | – |
| LBP | LBPs | **RLD-78MP/PP/NP** | – | – |
| | High-speed LBPs | **RLD-78MP10/PP10/NP10** | – | – |
| Optical Disc | Opitacal Disc memory and high-speed LBPs | **RLD-78M20/P20/N20** | **RLD-83M30/P30/N30** | – |
| | Optical Disc, Sensors, etc. | **RLD-78M21/P21/N21** | **RLD-83M31/P31/N31** | – |
| | | **RLD-78M30/P30/N30** | **RLD-83M40/P40/N40** | – |
| | | **RLD-78M35/P35/N35** | – | – |
| Optical link | Optical link | **RLD-78MF/PF** | **RLD-83MF/PF** | **RLD-85MC/PC** |
| | | **RLD-78MIT/PIT** | – | – |

(Unit : mm)




All the ROHM lasers are available in the highly-precise small package depicted above.

### Equivalent Integrated Circuits

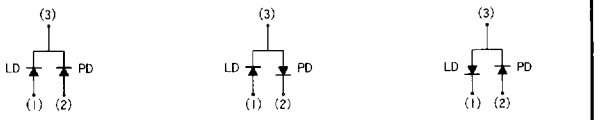
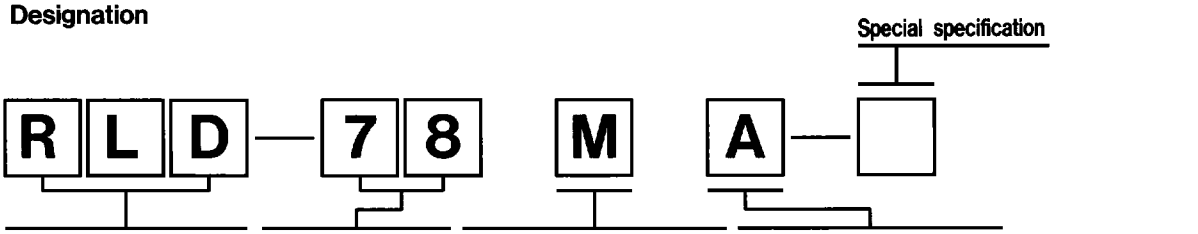



Fig.1 Type M  Fig.2 Type P  Fig.3 Type N

## ●Product Designation




| Wavelength | |
|---|---|
| 78 | 780nm |
| 83 | 830nm |
| 85 | 850nm |

| Drive source polarity | |
|---|---|
| M | Type M (Fig.1) |
| P | Type P (Fig.2) |
| N | Type N (Fig.3) |

| Applications (alphanumeric, high output type: max.optical output) | |
|---|---|
| A | For CD |
| V | For VD |
| C | For Sensors and General Measurement |
| P | For LBP |
| P10 | High-speed LBPs |

## ●For Compact Disc Players

Noise problem is eliminated by optimizing design characteristics. Noise from two of the three feedback beams is eliminated through our laser geometry. RLD 78MA4/PA4 series requires lower power compared to any other laser diodes on the market, and will support demanding system design. RLD78MAT1/PAT1/MAT2/PAT2 is suitable when high reliablilty is required.

| Part No. | Application | Wavelength λp (nm) | Absolute maximum ratings (Tc=25°C) Po (mW) | $V_R$ (V) | $Topr_{MAX.}$ (°C) | Optical/electrical characteristics (Tc=25°C) $V_F$ (V) | $I_{TH}$ (mA) | Iop (mA) | Im (mA) | θ⊥ (deg) | θ// (deg) | S/N Min. (dB) | Package/Equivalent Integrated Circuit | Basic order unit (pcs.) | Rank |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RLD-78MA | General CD players. | 785 | 5 | 2 | 60 | 1.9 | 35 | 45 | 0.2 | 37 | 11 | 60 | Fig.1 | 500 | ◎ |
| RLD-78PA | | 785 | 5 | 2 | 60 | 1.9 | 35 | 45 | 0.2 | 37 | 11 | 60 | Fig.2 | 500 | ◎ |
| RLD-78MA3 | Battery-powered portable CD players. | 785 | 4 | 2 | 60 | 1.9 | 30 | 40 | 0.2 | 37 | 11 | 60 | Fig.1 | 500 | ◎ |
| RLD-78PA3 | | 785 | 4 | 2 | 60 | 1.9 | 30 | 40 | 0.2 | 37 | 11 | 60 | Fig.2 | 500 | ◎ |
| RLD-78MA4 | Battery-powered smallportable CD players. | 785 | 4 | 2 | 60 | 1.9 | 25 | 35 | 0.2 | 37 | 11 | 60 | Fig.1 | 500 | ◎ |
| RLD-78PA4 | | 785 | 4 | 2 | 60 | 1.9 | 25 | 35 | 0.2 | 37 | 11 | 60 | Fig.2 | 500 | ◎ |
| RLD-78MAT1 | Car CD players. | 785 | 5 | 2 | 80 | 1.9 | 35 | 45 | 0.2 | 37 | 11 | 60 | Fig.1 | 500 | ◎ |
| RLD-78PAT1 | | 785 | 5 | 2 | 80 | 1.9 | 35 | 45 | 0.2 | 37 | 11 | 60 | Fig.2 | 500 | ◎ |
| RLD-78MAT2 | | 785 | 5 | 2 | 80 | 1.9 | 35 | 45 | 0.2 | 37 | 11 | 60 | Fig.1 | 500 | ◎ |
| RLD-78PAT2 | | 785 | 5 | 2 | 80 | 1.9 | 35 | 45 | 0.2 | 37 | 11 | 60 | Fig.2 | 500 | ○ |

Note : 1.Unless otherwise specified ,the electrical and optical characteristics are typical values. ◎ : Standard products ○ : Semi-standard products

## ●For Video Disc Players

Consistency of low noise, low astigmatism and stable production can be realized by selfpulsations. S/N is typically 100 dB. Astigmatism is typically 5 μm which enables to solve crosstalk problem.

| Part No. | Application | Wavelength λp (nm) | Absolute maximum ratings (Tc=25°C) Po (mW) | $V_R$ (V) | $Topr_{MAX.}$ (°C) | Optical/electrical characteristics (Tc=25°C,Po=3mW) $V_F$ (V) | $I_{TH}$ (mA) | Iop (mA) | Im (mA) | θ⊥ (deg) | θ// (deg) | S/N Min. (dB) | Package/Equivalent Integrated Circuit | Basic order unit (pcs.) | Rank |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RLD-78MV | VD and LD players. | 785 | 5 | 2 | 60 | 1.9 | 45 | 55 | 0.2 | 37 | 11 | 85 | Fig.1 | 500 | ◎ |
| RLD-78PV | | 785 | 5 | 2 | 60 | 1.9 | 45 | 55 | 0.2 | 37 | 11 | 85 | Fig.2 | 500 | ○ |

Note : 1.Unless otherwise specified ,the electrical and optical and characteristics are typical values. ◎ : Standard products ○ : Semi-standard products

## ●For Sensors and General Measurements

RLD-78MC/PC are the best choice when high coherency is required for sensing and measurement at 780 nm. ROHM's mass production technology established for CD is flexible enough to meet any volume.

| Part No. | Application | Wavelength λp (nm) | Absolute maximum ratings (Tc=25°C) Po (mW) | $V_R$ (V) | $Topr_{MAX.}$ (°C) | Optical/electrical characteristics (Tc=25°C,Po=3mW) $V_F$ (V) | $I_{TH}$ (mA) | Iop (mA) | Im (mA) | θ⊥ (deg) | θ// (deg) | S/N Min. (dB) | Package/Equivalent Integrated Circuit | Basic order unit (pcs.) | Rank |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RLD-78MC | Sensors, barcode readers,etc. | 785 | 5 | 2 | 60 | 1.9 | 35 | 45 | 0.2 | 37 | 11 | – | Fig.1 | 500 | ◎ |
| RLD-78PC | | 785 | 5 | 2 | 60 | 1.9 | 35 | 45 | 0.2 | 37 | 11 | – | Fig.2 | 500 | ◎ |

Note : 1.Unless otherwise specified ,the electrical and optical characteristics are typical values. ◎ : Standard products

## ●For Laser Beam Printers

Low droop can be achieved with small-package laser, φ5.6, thanks to design technology unique to ROHM. The laser can be used for LBP applications. Low droop characteristic, typ 5%, will improve printing quality. RLD-78, MP10/PP10/NP10 are specially designed to have high power (Po, max. 10 mW) for high speed printing.

| Part No. | Application | Wavelength λp (nm) | Absolute maximum ratings (Tc=25°C) Po (mW) | $V_R$ (V) | $Topr_{MAX.}$ (°C) | Optical/electrical characteristics (Tc=25°C,Po=3mW) $V_F$ (V) | $I_{TH}$ (mA) | Iop (mA) | Im (mA) | θ⊥ (deg) | θ// (deg) | Droop (%) | Condition Po (mW) | Package/Equivalent Integrated Circuit | Basic order unit (pcs.) | Rank |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RLD-78MP | LBP | 785 | 5 | 2 | 60 | 1.9 | 25 | 45 | 0.55 | 30 | 11 | 5 | 3 | Fig.1 | 500 | ◎ |
| RLD-78PP | | 785 | 5 | 2 | 60 | 1.9 | 25 | 45 | 0.55 | 30 | 11 | 5 | 3 | Fig.2 | 500 | ◎ |
| RLD-78NP | | 785 | 5 | 2 | 60 | 1.9 | 25 | 45 | 0.55 | 30 | 11 | 5 | 3 | Fig.3 | 500 | ○ |
| RLD-78MP10 | High-speed LBPs. | 785 | 10 | 2 | 60 | 1.9 | 25 | 45 | 0.4 | 30 | 11 | 5 | 6 | Fig.1 | 500 | ○ |
| RLD-78PP10 | | 785 | 10 | 2 | 60 | 1.9 | 25 | 45 | 0.4 | 30 | 11 | 5 | 6 | Fig.2 | 500 | ○ |
| RLD-78NP10 | | 785 | 10 | 2 | 60 | 1.9 | 25 | 45 | 0.4 | 30 | 11 | 5 | 6 | Fig.3 | 500 | ○ |

Note : 1.Unless otherwise specified, the electrical and optical characteristics are typical values. ◎ : Standard products ○ : Semi-standard products

# Laser Diodes

## ●For Optical Link

RLD-85MC/PC oscillate at a wave length which matches the sensitivity of silicone photo diode: the most suitable laser for FDDI. RLD-83MF/PF in relaxation oscillation mode and RLD-78MF/PF in self-pulsation mode reduce modal noise in multi-mode optical fibers. Their characteristics are very suitable to digital/ analog optical link applications. RLD78MIT/PIT features high response, long life, and high reliability, which are favorable for data communications such as Fiber Channel standard.

| Part No. | Application | Wavelength | Absolute maximum ratings (Tc=25°C) | | | Optical/electrical characteristics (Tc=25°C) | | | | | | Condition | Package/ Integrated Circuit | Basic order unit (pcs.) | Rank |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | λp (nm) | Po (mW) | $V_R$ (V) | $Topr_{MAX.}$ (°C) | $V_F$ (V) | $I_{TH}$ (mA) | Iop (mA) | Im (mA) | θ⊥ (deg) | θ// (deg) | Po (mW) | | | |
| RLD-78MF | Optical link | 785 | 5 | 2 | 60 | 1.9 | 35 | 45 | 0.2 | 37 | 11 | 3 | Fig.1 | 500 | ○ |
| RLD-78PF | | 785 | 5 | 2 | 60 | 1.9 | 35 | 45 | 0.2 | 37 | 11 | 3 | Fig.2 | 500 | ○ |
| RLD-83MF | | 830 | 5 | 2 | 60 | 1.9 | 35 | 45 | 0.2 | 30 | 11 | 3 | Fig.1 | 500 | ○ |
| RLD-83PF | | 830 | 5 | 2 | 60 | 1.9 | 35 | 45 | 0.2 | 30 | 11 | 3 | Fig.2 | 500 | ○ |
| RLD-85MC | | 850 | 5 | 2 | 60 | 1.9 | 30 | 40 | 0.2 | 30 | 11 | 3 | Fig.1 | 500 | ○ |
| RLD-85PC | | 850 | 5 | 2 | 60 | 1.9 | 30 | 40 | 0.2 | 30 | 11 | 3 | Fig.2 | 500 | ○ |
| New RLD-78MIT | | 785 | 5 | 2 | 80 | 1.9 | 35 | 45 | 0.2 | 37 | 11 | 3 | Fig.1 | 500 | ○ |
| New RLD-78PIT | | 785 | 5 | 2 | 80 | 1.9 | 35 | 45 | 0.2 | 37 | 11 | 3 | Fig.2 | 500 | ○ |

Note : 1.Unless otherwise specified, the electrical and optical characteristics are typical values.

○ : Semi-standard products

## ●For Optical Disc Drives

High-power lasers oscillate with stability up to high optical output and exhibit longitudinal multi-mode at low optical output (in the reading mode) featuring low noise characteristics compared with conventional high-power lasers. Lasers having these characteristics have been thought difficult to make, but ROHM overcame various problems and was first in the world to manufacture this type of laser. This series is most suitable for optical disc, optical cards and optical measurement equipment.

| Part No. | Application | Wavelength | Absolute maximum ratings (Tc=25°C) | | | Optical/electrical characteristics (Tc=25°C) | | | | | | Condition | Package/ Integrated Circuit | Basic order unit (pcs.) | Rank |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | λp (nm) | Po (mW) | $V_R$ (V) | $Topr_{MAX.}$ (°C) | $V_F$ (V) | $I_{TH}$ (mA) | Iop (mA) | Im (mA) | θ⊥ (deg) | θ// (deg) | Po (mW) | | | |
| RLD-78M20 | Optical disc memory and high-speed LBPs | 785 | 20 | 2 | 60 | 1.9 | 35 | 55 | 0.2 | 30 | 9 | 10 | Fig.1 | 50 | ○ |
| RLD-78P20 | | 785 | 20 | 2 | 60 | 1.9 | 35 | 55 | 0.2 | 30 | 9 | 10 | Fig.2 | 50 | ○ |
| RLD-78N20 | | 785 | 20 | 2 | 60 | 1.9 | 35 | 55 | 0.2 | 30 | 9 | 10 | Fig.3 | 50 | ○ |
| RLD-78M21 | Optical disc, Optical card, sensors, etc. | 785 | 30 ※ | 2 | 60 | 1.9 | 35 | 55 | 0.2 | 30 | 9 | 10 | Fig.1 | 50 | ○ |
| RLD-78P21 | | 785 | 30 ※ | 2 | 60 | 1.9 | 35 | 55 | 0.2 | 30 | 9 | 10 | Fig.2 | 50 | ○ |
| RLD-78N21 | | 785 | 30 ※ | 2 | 60 | 1.9 | 35 | 55 | 0.2 | 30 | 9 | 10 | Fig.3 | 50 | ○ |
| RLD-78M30 | | 785 | 30 | 2 | 60 | 1.9 | 45 | 85 | 0.4 | 25 | 9 | 20 | Fig.1 | 50 | ○ |
| RLD-78P30 | | 785 | 30 | 2 | 60 | 1.9 | 45 | 85 | 0.4 | 25 | 9 | 20 | Fig.2 | 50 | ○ |
| RLD-78N30 | | 785 | 30 | 2 | 60 | 1.9 | 45 | 85 | 0.4 | 25 | 9 | 20 | Fig.3 | 50 | ○ |
| New RLD-78M35 | | 785 | 35 | 2 | 60 | 1.9 | 50 | 110 | 0.6 | 25 | 9 | 30 | Fig.1 | 50 | ○ |
| New RLD-78P35 | | 785 | 35 | 2 | 60 | 1.9 | 50 | 110 | 0.6 | 25 | 9 | 30 | Fig.2 | 50 | ○ |
| New RLD-78N35 | | 785 | 35 | 2 | 60 | 1.9 | 50 | 110 | 0.6 | 25 | 9 | 30 | Fig.3 | 50 | ○ |
| RLD-83M30 | Optical disc, Optical card, sensors, etc. | 830 | 30 | 2 | 60 | 1.9 | 45 | 85 | 0.2 | 25 | 10 | 20 | Fig.1 | 50 | ○ |
| RLD-83P30 | | 830 | 30 | 2 | 60 | 1.9 | 45 | 85 | 0.2 | 25 | 10 | 20 | Fig.2 | 50 | ○ |
| RLD-83N30 | | 830 | 30 | 2 | 60 | 1.9 | 45 | 85 | 0.2 | 25 | 10 | 20 | Fig.3 | 50 | ○ |
| RLD-83M31 | | 830 | 40 ※ | 2 | 60 | 1.9 | 45 | 85 | 0.2 | 25 | 10 | 20 | Fig.1 | 50 | ○ |
| RLD-83P31 | | 830 | 40 ※ | 2 | 60 | 1.9 | 45 | 85 | 0.2 | 25 | 10 | 20 | Fig.2 | 50 | ○ |
| RLD-83N31 | | 830 | 40 ※ | 2 | 60 | 1.9 | 45 | 85 | 0.2 | 25 | 10 | 20 | Fig.3 | 50 | ○ |
| RLD-83M40 | | 830 | 40 | 2 | 60 | 1.9 | 45 | 100 | 0.3 | 25 | 9 | 30 | Fig.1 | 50 | ○ |
| RLD-83P40 | | 830 | 40 | 2 | 60 | 1.9 | 45 | 100 | 0.3 | 25 | 9 | 30 | Fig.2 | 50 | ○ |
| RLD-83N40 | | 830 | 40 | 2 | 60 | 1.9 | 45 | 100 | 0.3 | 25 | 9 | 30 | Fig.3 | 50 | ○ |

Notes : 1.Unless otherwise specifies, the electrical, optical characteristics are typical values.
2.Ratings marked with an asterisk (※) are measured with pulses (1μsec, duty1/2).

○ : Semi-standard products

## Safety Considerations

The light emitted from laser diodes, while almost invisible to the human eye, can cause retinal damage if viewed directly. Never look directly into the laser beam or through any lenses or fibers when the system is operating.
For optical axis alignment or other operations, we recommend use of an infrared-sensitive camera (ITV) or to wear protection goggles.