

Two-Wavelength DVD Player Laser Diode Improves Optical System Design Flexibility and Features Improved Resistance to ESD

SLD6164RL

Sony led the industry in developing multimode two-wavelength laser diodes that do not require a high-frequency superposed circuit.

Now, the SLD6164RL, which achieves a high resistance to damage from ESD in the DVD side and increases the optical output, increases ease of use even further.

The rated output levels have been increased by 25% over earlier products to 5 mW in both the DVD and CD side devices.

This device can handle limited optical systems and increases the design flexibility in end product optical systems even further.

The resistance to ESD in the DVD side has been increased to over 80 V, twice that of the earlier SLD6163RL, and thus this device can contribute to reducing the cost of antistatic measures in end product manufacture.

- Multimode two-wavelength laser diode that does not require a high-frequency superposed circuit
- DVD side resistance to ESD: 80 V or higher
- Rated output of 5 mW (CW, 70°C operation guaranteed) for both the DVD and CD sides

■ Multimode Two-Wavelength Laser Diode that does not Require a High-Frequency Superposed Circuit

In optical disc systems, light reflected from the disc with irregular amplitude, the so-called "returning light", can disrupt laser operation and generate noise. While this noise is usually excluded using a high-frequency superposed circuit, these high-frequency modules have a high current

consumption and undesired radiation countermeasures are required.

In the SLD6164RL, a self-pulsation type device is used on the DVD side and an amplifying waveguide type multimode laser is used on the CD side. Sony applied the industry-leading basic technologies used in the SLD6162RLI and SLD6163RL products in the SLD6164RL to achieve a low-noise laser that does not require a high-frequency superposed circuit. This allows both costs and power consumption to be reduced, and also obviates the need for undesired radiation countermeasures.

■ Rated Output of 5 mW (CW/70°C operation guaranteed) for both the DVD and CD Sides

Catastrophic optical damage (COD) is a problem that prevents achieving higher output in a laser diodes. If the laser is driven at a level above the output limit (the COD output), the optical emission surface (end surface) of the laser chip melts due to heat generation, leading to a cessation of light generation. Sony has applied their unique laser chip end surface strengthening technologies in the SLD6164RL resulting in an increase in the output limit to twice that of previous Sony products. (See figure 3.) The rated output is set at 5 mW, a 25% increase over earlier products, and continuous operation (CW operation) is guaranteed in operating environments up to 70°C.

This allows the SLD6164RL to provide greater flexibility in optical system design and to handle limited optical systems.

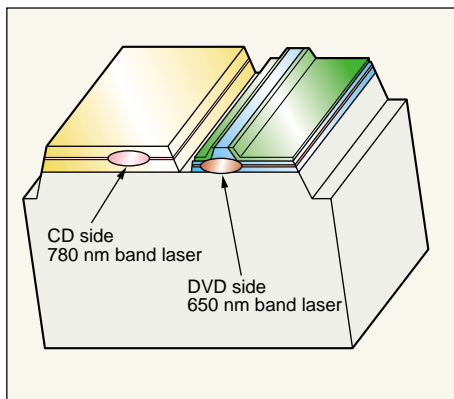
V O I C E

The self-pulsation laser diode is a product that depends on a delicate balance between current applied and the light enclosed, and as a result has the problem that introducing high output/high resistance to ESD technologies can disturb that balance and aggravate noise characteristics. It was extremely difficult, given the short development period, to find the precise balance for high output and low noise by adjusting various design parameters. I hope that we will continue to provide new products such as this that increase end product design flexibility for our customers. Keep your eye on Sony for further developments in this area!

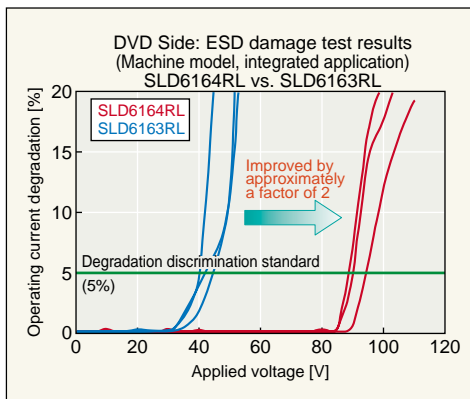
■ DVD Side Resistance to ESD: 80 V or Higher

Laser diodes are easily damaged by ESD and other instantaneous high currents, and thus antistatic and anti-surge measures are absolutely required in manufacturing lines that handle laser devices.

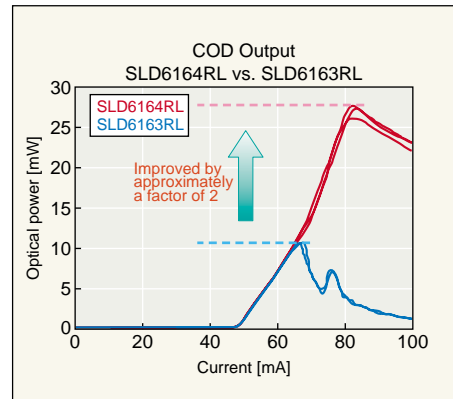
Conventional self-pulsation type lasers usually have a low resistance to ESD as compared to the lasers used for recording. The SLD6164RL, however, achieves a level of 80 V or higher for the DVD side forward direction ESD resistance (machine model test). Thus it has a resistance to damage from ESD twice that of conventional products and can enable reduced costs in antistatic measures. (See figure 2.)



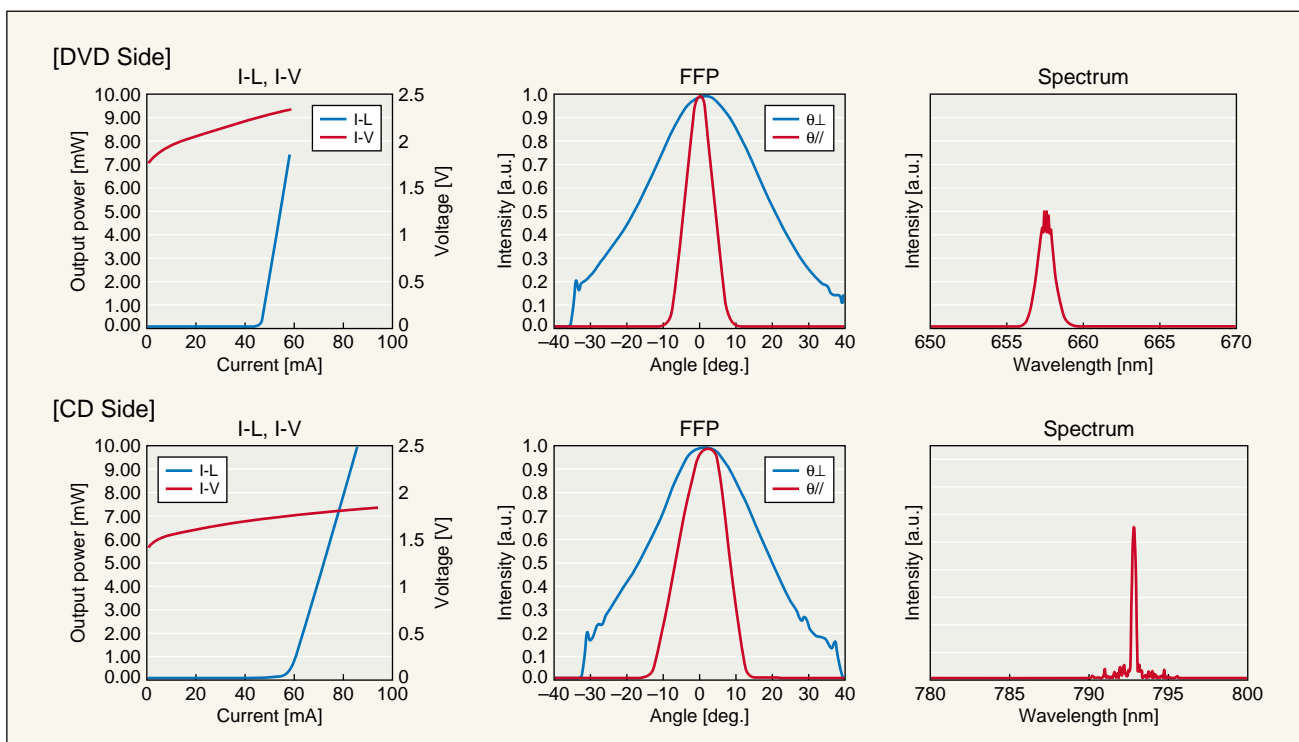
■ Figure 1 Laser Structure



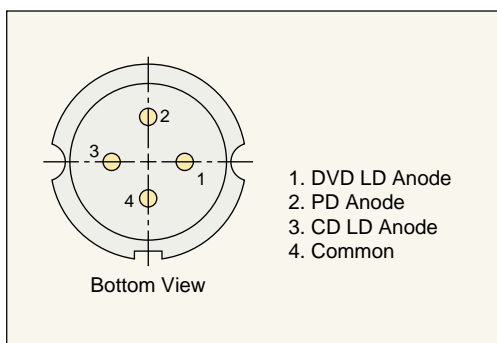
■ Figure 2 Resistance to ESD Strength Comparison



■ Figure 3 COD Output Comparison



■ Figure 4 Representative Characteristics



■ Figure 5 Pin Configuration

■ Table 1 Main Specifications

Item	Symbol	DVD side	CD side	Unit
Threshold current	I_{th}	45	55	mA
Operating current	I_{op}	52	68	
Operating voltage	V_{op}	2.2	1.9	V
Wavelength	λ_p	655	790	nm
Radiation angle	Parallel	$\theta_{//}$	8.5	deg.
	Perpendicular	θ_{\perp}	35	
Differential efficiency	η_D	0.6	0.4	mW/mA

Condition: $T_c = 25^{\circ}\text{C}$
 $P_o = 5 \text{ mW @ CW}$