

SLD3131VF

SLD3131VFI

The market for Blu-ray Disc players has been growing due to the increasing popularity of flat panel digital high-definition television.

Sony has now developed the SLD3131VF and SLD3131VFI blue-violet laser diodes for Blu-ray Disc playback. By adopting an approach that satisfies both device characteristic and manufacturability criteria, Sony plans for these laser diodes to become the standard Blu-ray Disc playback laser diodes. Sony is releasing two products at the same time, one in a 5.6 mm diameter package for typical applications and one in a 3.8 mm diameter package for IT applications.

- The standard model Blu-ray Disc playback laser diodes
- High-temperature operation, low power, and low noise
- Available in two package options

■ Standard Model Blu-ray Disc Playback Laser Diodes

Sony has developed the SLD3131VF and SLD3131VFI blue-violet laser diodes as light sources for Blu-ray Disc playback. Sony took both characteristics and mass production issues into consideration during development so that the SLD3131VF and SLD3131VFI would become the long-term standard models for Blu-ray Disc playback laser diodes. These lasers have a maximum rating of 20 mW and support playback of 2-layer discs that have a ca-

capacity of 50 GB. By optimizing the chip size and laser structure, there were also merits from a production standpoint. Sony has achieved stable product supply through laser diode mass production technologies fostered in laser development for the Sony Computer Entertainment Inc. PS3*1.

*1 PS3 is a trademark of Sony Computer Entertainment Inc.

■ High-Temperature Operation, Low Power, and Low Noise

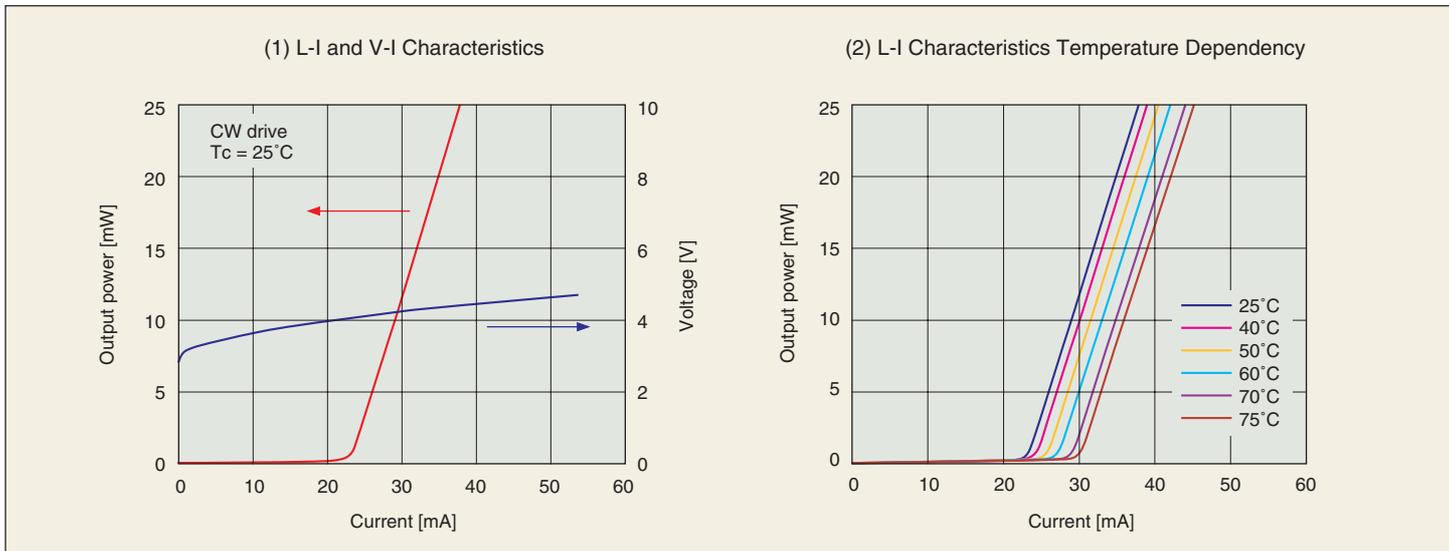
Since blue-violet laser diodes operate at short wavelengths that have higher energy than those of laser diodes used for DVD/CD playback, there is a tendency for them to generate larger amounts of heat internally. Thus it is expected that the environmental temperatures during Blu-ray Disc playback will also be higher. By optimizing the laser structures in these devices, Sony achieved a drive current of 45 mA (typical) and a drive voltage of 4.5 V (typical) during 20 mW operation under environments with temperatures as high as 75°C. Also, since these devices hold the threshold current value at room temperature to a low 25 mA (typical), the natural light emission components are suppressed and excellent noise characteristics are acquired.

■ Available in Two Package Options

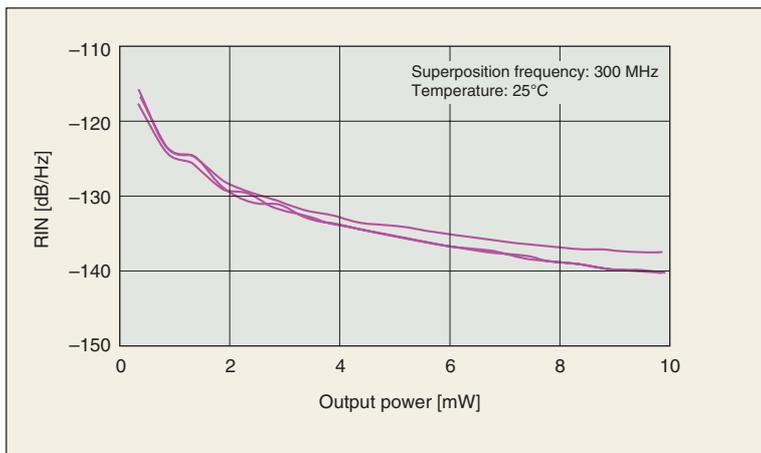
Two products, the SLD3131VF and SLD3131VFI, with differing packages were developed at the same time. The SLD3131VF adopts the 5.6 mm diameter package that is used as the standard for CD/DVD laser diodes and is expected to be used in AV players and H/H drives. In contrast, the SLD3131VFI adopts a 3.8 mm diameter package, and is proposed for use in slim drives that require thin form factor designs. Although increases in laser diode temperature due to this miniaturization are of concern with the 3.8 mm diameter package, by optimizing the package design and package materials, Sony assured that this package provides equivalent performance, including temperature characteristics, to the 5.6 mm diameter package.

V O I C E

Although this was the first time I have been in charge of design of a Blu-ray Disc laser diode, I was supported by my extensive experience in GaN laser diode research and development and by Sony's mass production technologies and was able to create this product. This product should become the standard model blue-violet laser diode, which is the key device in the high-definition television age, and I hope to continue with design and development efforts that incorporate our customers' desires.



■ Figure 1 Representative Characteristics

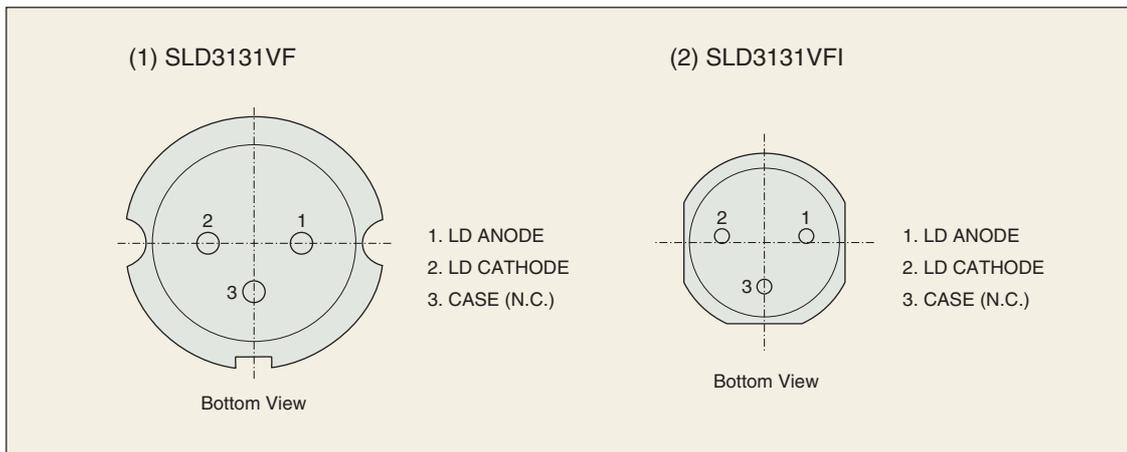


■ Figure 2 Noise Characteristics

■ Table 1 Main Specifications

Item	Symbol	Typ.	Unit	
Threshold current	I_{th}	25	mA	
Operating current	I_{op}	35		
Operating voltage	V_{op}	4.5	V	
Wavelength	λ_p	405	nm	
Radiation angle	Parallel	$\theta_{//}$	10	deg.
	Perpendicular	θ_{\perp}	24	
Differential efficiency	η_D	1.3	mW/mA	

Condition: $T_c = 25^{\circ}\text{C}$
 $P_o = 15\text{mW@CW}$



■ Figure 3 Package Forms