

Uniform NFP Ultrahigh Power Laser Diode Features Even Higher Power

SLD335YT

Following the 1 W SLD333V and the 2 W SLD334YT developed in response to calls for lasers that provide both high power and uniform NFP characteristics, Sony has now developed the SLD335YT 4 W laser diode that responds to strong desires for even higher power in full top hat devices.

- Uniform NFP characteristics
- Low operating current
- Maximum power: 4 W
- High optical density (Optical power of 4 W from a 200 μm laser beam width)

■ Uniform NFP Characteristics

Ultrahigh power laser diodes are now being used in full-scale practical applications, and as a result, these individual applications are beginning to bring up their own requirements in addition to high optical output power. In addition to being used as the excitation light source for solid-state lasers, ultrahigh power laser diodes are also being used in a wide variety of manufacturing applications. The range of these manufacturing applications is increasing: in addition to welding, cutting, and soldering, these lasers are being used in application where a specific property of the material is modified. These appli-

cations include metal hardening, printing, erasing and initializing optical discs, joining plastics, and laser plating. The uniform NFP characteristic discussed here is required by almost all of these applications. Sony has already established and refined unique uniform NFP technologies in the SLD333V and SLD334YT*¹, and has now combined these technologies with their earlier high output technologies to develop a product that combines all three elements needed by these applications: high power, high optical density, and uniform NFP characteristics. Sony expects that development of this structure contributes to expansion of the further application. Following the SLD335YT of this release, Sony has already started the next development in this area, knowing that even more progress must be made on improving NFP characteristics. Keep your eye on Sony's ultrahigh power laser diodes.

■ Low Operating Current

The index guide structure used in the SLD333V and SLD334YT was also adopted in the SLD335YT so that control of current injection to the optical emission area and control of the optical emission area itself are performed efficiently. This reduces the reactive current and achieves a low operating current.

■ All-in-One Package that Makes Temperature Control Possible

The SLD335YT creates an optical output of 4 W in a beam width of 200 μm . A YT package that includes a built-in Peltier controller was adopted to allow even more precise control of temperature. Since a power monitor photodiode is also included, it provides functions for both power control and temperature control.

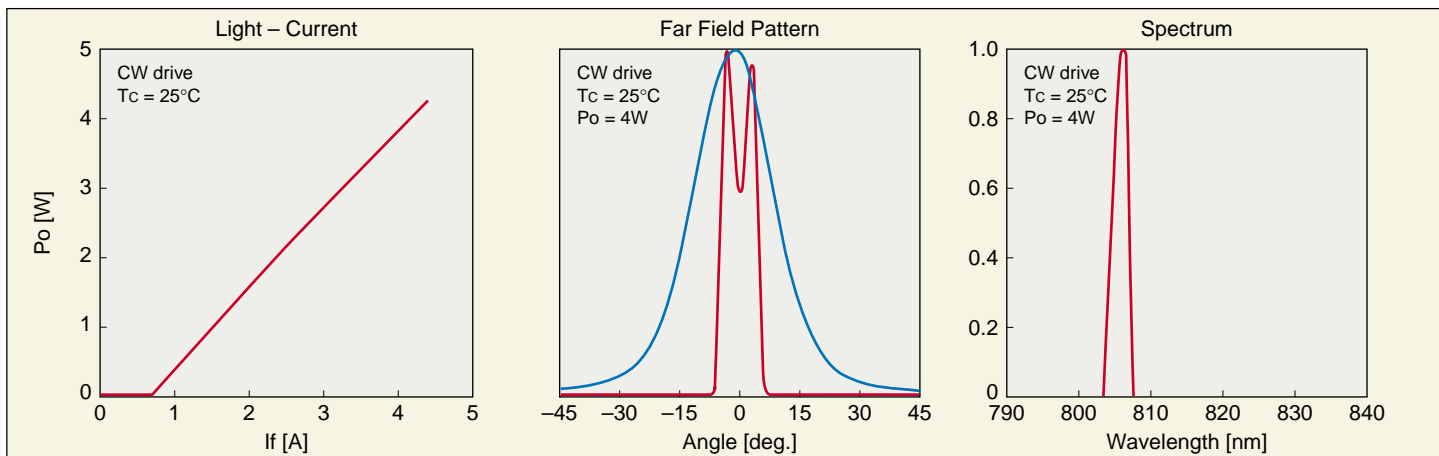
■ Uniform NFP and High Optical Density

The image created when a laser diode beam is focused by an optical system basically reflects the form of the NFP. The SLD335YT features the highest level of uniform NFP as a 4 W laser diode. Furthermore, it achieves a 4 W output power while providing its output in a 200 μm beam width, thus achieving the highest performance in a device of this class. Thus Sony has achieved an ultrahigh power laser diode that can irradiate the highest optical energy (optical output) most uniformly, when converged by the optical system due to the combination of these two characteristics.

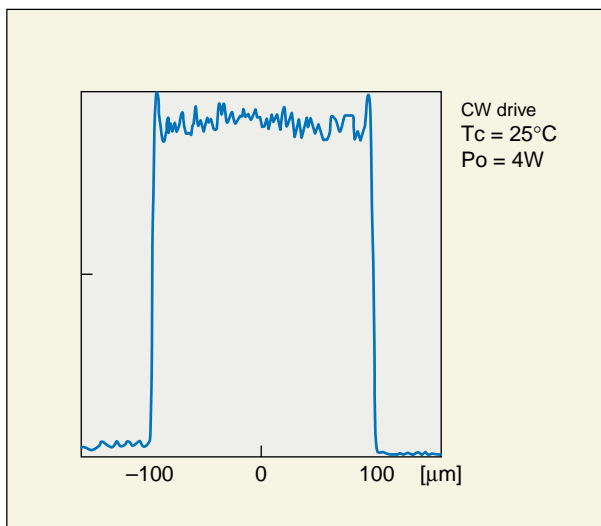
*1 See CX-News Volume 31.

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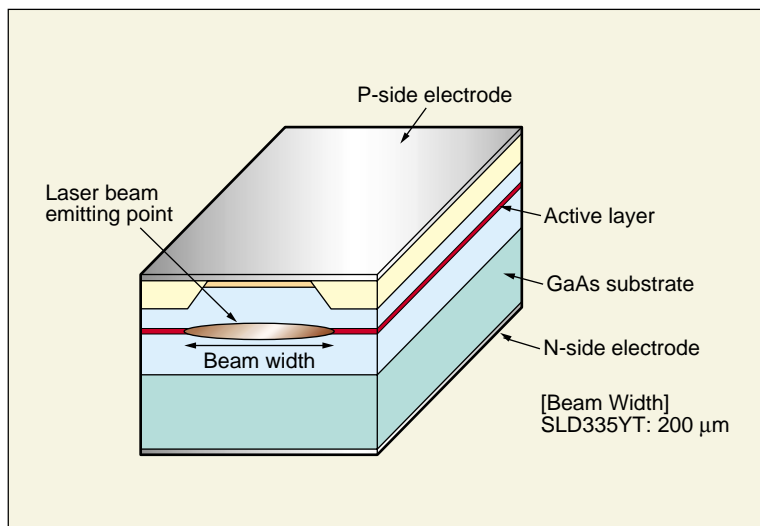
In the last year, we developed three uniform NFP ultrahigh power laser diode products: the 1 W SLD333V, the 2 W SLD334YT, and now the 4 W SLD335YT. And we have already started the next development. Although starting production was extremely difficult, since customer's evaluation of the characteristics of these products has been extremely positive, we are moving up the manufacturing schedule. We will continue to press forward with our product development efforts to respond to the ever stronger demands from our customers.



■ Figure 1 SLD335YT Representative Characteristics



■ Figure 2 SLD335YT NFP Characteristics



■ Figure 3 Chip Structure

■ Table 1 SLD335YT Main Specifications

Item	Symbol	Typ.	Unit	
Threshold current	I_{th}	0.7	mA	
Operating current	I_{op}	4.2		
Operating voltage	V_{op}	2.0	V	
Wavelength	λ_p	808	nm	
Radiation angle	Parallel	$\theta_{//}$	10	deg.
	Perpendicular	θ_{\perp}	24	
Differential efficiency	η_D	0.9	W/A	

Condition: $T_c = 25^\circ\text{C}$
 $P_o = 4\text{W @CW}$