

# The Industry's Highest Power 670 nm Band Laser Diode Achieves 500 mW Optical Power Output

## SLD1332V

In addition to laser diodes for optical disc systems, Sony also produces an extensive line of ultrahigh power infrared laser diodes, from 100 mW devices to devices in the over 10 W class.

Sony has now applied its visible red laser diode technology developed for DVD disc applications to develop the SLD1332V, a new 500 mW ultrahigh power visible red laser diode.

- Emission wavelength: 670 nm
- Rated power output: 500 mW, CW operation
- Low operating current
- Easy-to-use 9 mm  $\phi$  can package

### ■ 670 nm Oscillation Wavelength Ultrahigh Power Laser Diode

Like the laser diodes used in optical discs, the development of watt class ultrahigh power laser diodes started with devices with emission wavelengths in the infrared band (770 to 840 nm). Sony has now developed an ultrahigh power laser diode with an emission wavelength in the 670 nm band, to create the possibilities of new ultrahigh power laser diode applications in bands other than the infrared band. The SLD1332V introduced here features a wavelength much shorter than conventional ultrahigh power infrared laser diodes. This device achieves the ultrahigh power of 500 mW, a level that could not be acquired from the laser diodes that have been used in optical disc applications until now. (See figure 1 and table 1.)

Applications for this new device will include entertainment and measurement applications.

### ■ Ultrahigh Power Laser with Index Guide Structure

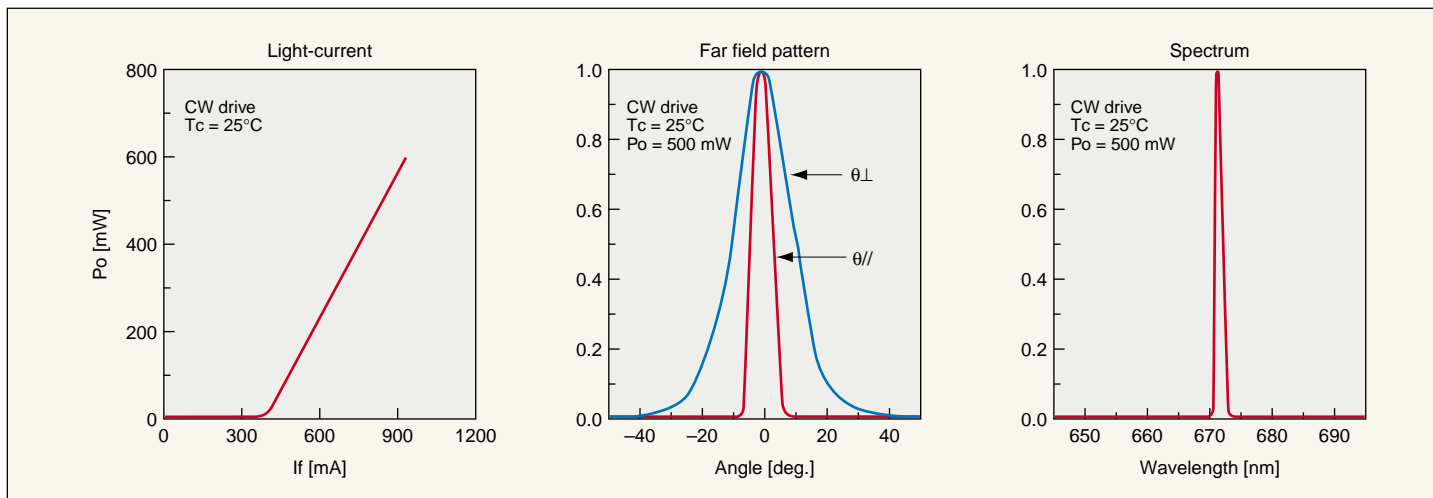
The SLD1332V has a stripe width of 100  $\mu\text{m}$ , and can provide an optical power output of 500 mW. The easy-to-use 9 mm  $\phi$  can package used in conventional infrared ultrahigh power laser diodes is also used in this product. The device structure of the laser chip has evolved from the conventional gain guide structure to the index guide structure. (See figure 2.) This index guide structure is used in laser diodes for DVD applications, and its adoption in this device allows it to achieve low current loss current injection control and precise control of the optical emission area. As compared to conventional structures, the operating current level is reduced and the near-field pattern characteristics in the parallel direction become closer to a trapezoid. (See figure 3.) Due to these and other advantages of this structure, the SLD1332V is extremely easy to use in a wide range of applications. In addition, certain other high-level technologies refined during the development of Sony's DVD laser diode products were used, resulting in a highly reliable device.

### ■ Visible Wavelength Ultrahigh Power Laser Diode

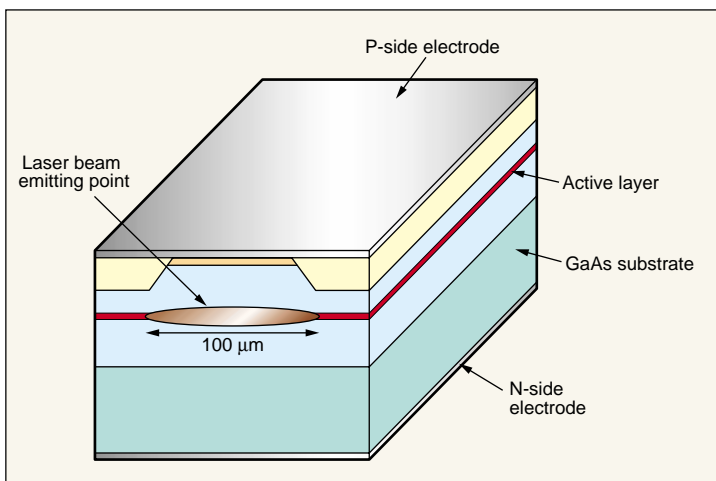
Starting with development of the SLD1332V, Sony has embarked on a plan to expand its selection of ultrahigh power laser diodes by achieving further progress in reducing the emission wavelength, increasing the power, and developing laser arrays.

## V O I C E

I've always wondered why there were no ultrahigh output laser diodes other than ones in the infrared wavelengths, and so I am pleased that we can finally announce a red ultrahigh output laser diode. Until this project, I had been working on red laser diodes for DVD drives, and I was able to apply all the technology from those efforts to this project. I hope to be able to continue to make progress in reducing the wavelength and increasing the power in ultrahigh output laser diodes.



■ Figure 1 SLD1332V Representative Characteristics

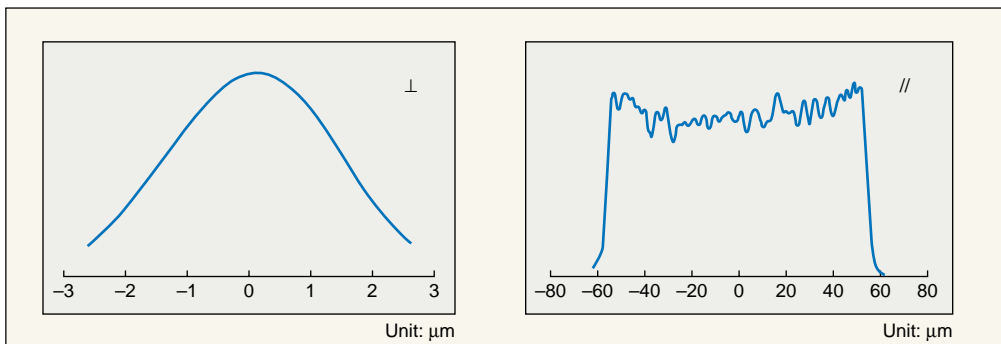


■ Figure 2 SLD1332V Chip Structure

■ Table 1 SLD1332V Main Characteristics

Item	Symbol	Typical value	Unit	
Threshold current	$I_{th}$	400	mA	
Operating current	$I_{op}$	900		
Operating voltage	$V_{op}$	2.4	V	
Oscillation wavelength	$\lambda_p$	670	nm	
Radiation angle	Parallel to junction	$\theta_{//}$	8	deg.
	Perpendicular to junction	$\theta_{\perp}$	24	
Differential efficiency	$\eta_D$	1.0	mW/mA	

Conditions:  $T_c = 25^\circ\text{C}$   
 $P_o = 500\text{ mW@CW}$



■ Figure 3 SLD1332V Near-Field Pattern