

## Multibeam Laser Diodes Achieve High-Speed Printing

# SLD265RP SLD264EP

High-speed printing can be said to be one of the main strengths of laser printers.

With even higher speed printing being desired now that laser printers support color as well, Sony has now released multibeam laser diode products that can print multiple scanning lines at the same time.

The SLD265RP emits two laser beams from a single semiconductor device (dual-beam laser diode), and the SLD264EP is a laser diode that achieves quad-beam laser diode operation.

- **Multibeam laser diodes**  
(Dual- and quad-beam laser diodes)
- **Multiple inter-beam pitch specifications**  
(14 and 100  $\mu\text{m}$  pitches)
- **Matching laser characteristics and minimal inter-beam interference**

### ■ **Multibeam Laser Diodes**

Laser printers illuminate a laser beam on a photosensitive material in the scan direction, and develop toner on the printing paper. Until now, the printing speed has been determined by the rotational speed of a polygonal mirror that distributes the laser beam in the scan direction. However, there are limits to how fast the polygonal mirror can be rotated, and as more and more printers support color, the need for not only black, but RGB printing arises as well. Thus it has become necessary to develop other technologies to achieve even higher printing speeds.

To respond to this need, Sony has released multibeam laser diodes that print multiple scan lines at the same time. By switching

to dual-beam or quad-beam devices, the printing speed can be increased up to 2 times or 4 times previous speeds.

### ■ **Diversity in Inter-Beam Pitch Specifications**

Multibeam laser diodes emit multiple laser beams from a single semiconductor device. The inter-beam pitch will differ for each printer manufacturer's optical design. The SLD265RP achieves the ultra-narrow pitch of 14  $\mu\text{m}$ .

Sony's unique process technologies made it possible to create this 14  $\mu\text{m}$  beam pitch, and Sony's lineup provides multibeam laser diodes with beam pitches from 14 to 100  $\mu\text{m}$ .

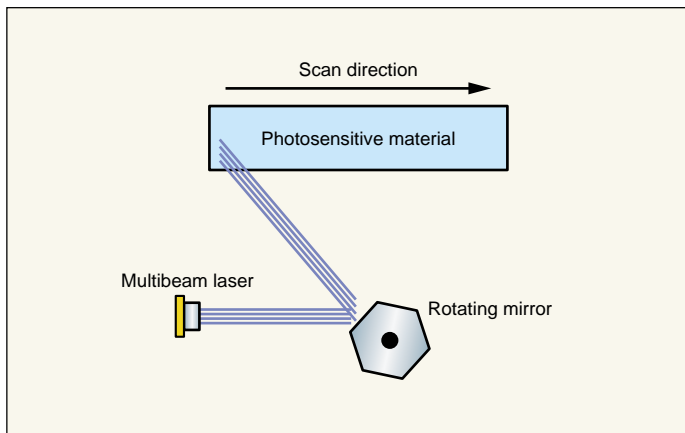
### ■ **Matching Laser Characteristics**

The largest difference between these devices and the two-wavelength laser diodes used in optical disc drives is that the dual or quad beams are driven at the same time. The multiple laser diodes must have the same characteristics and inter-beam interference must be held to a minimum to prevent nonuniformity in printing.

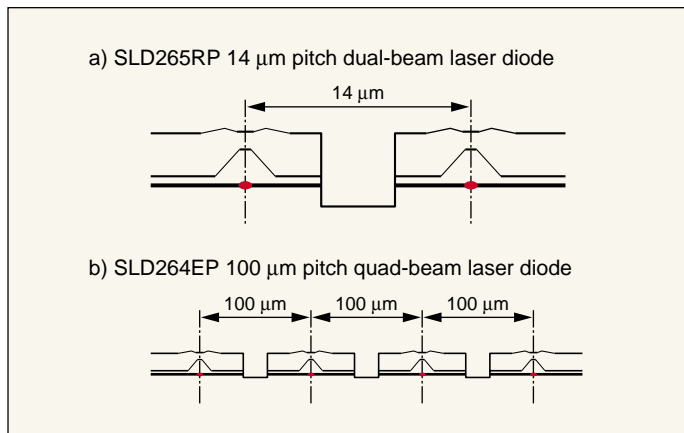
Sony is able to suppress relative differences between the beams with their stable wafer process technology, and products have been designed taking thermal and electrical interference into account to minimize inter-beam interference.

## V O I C E

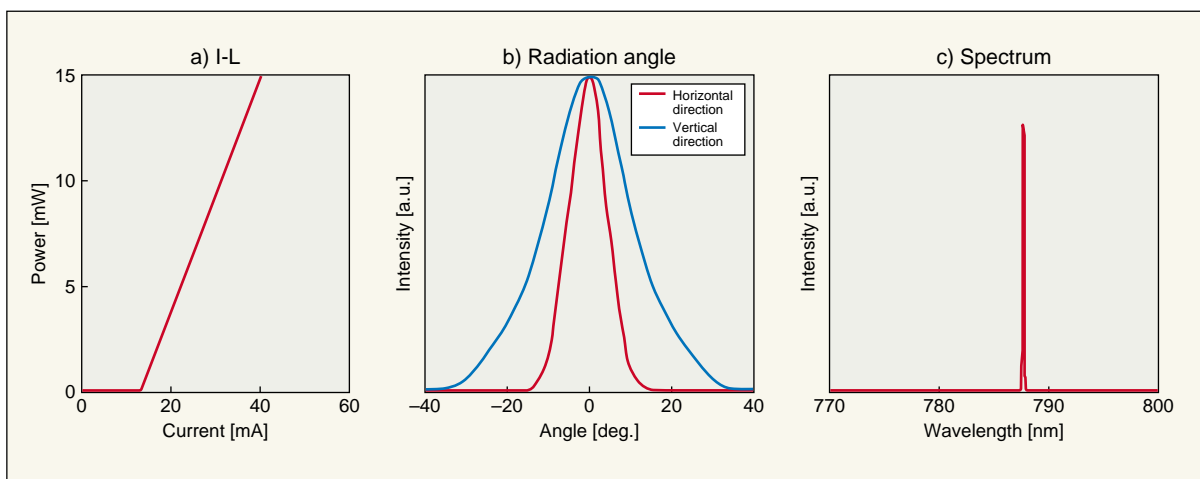
The number of multibeam laser products released has accelerated rapidly since 2000. Sony has led other companies in this area, and has cleared many technological hurdles along the way. As a result, Sony has captured a large share of this market based on its own technologies. I hope to continue to create products that respond to new market needs without becoming excessively proud of these technologies created by pioneers.



■ Figure 1 Multibeam Laser Application in Laser Printers



■ Figure 2 Number of Beams and Inter-Beam Pitch



■ Figure 3 SLD264EP Representative Characteristics

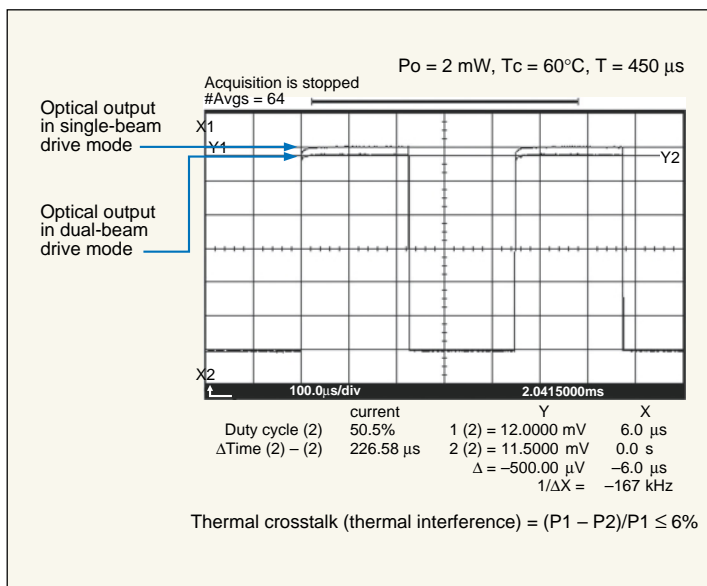
■ Table 1 Typical Values and Relative Difference

Item	Symbol	SLD265RP		Unit
		Typical value	Relative difference	
Recommended optical output	Pop	10	—	mW
Threshold current	I <sub>th</sub>	14	2	mA
Operating current	I <sub>op</sub>	25	—	mA
Operating voltage	V <sub>op</sub>	1.8	—	V
Differential efficiency	η	0.75	—	mW/mA
Radiation angle	Parallel	θ <sub>∥</sub>	9	deg.
	Perpendicular	θ <sub>⊥</sub>	31	
Wavelength	λ <sub>p</sub>	788	1.8	nm

Item	Symbol	SLD264EP		Unit
		Typical value	Relative difference	
Recommended optical output	Pop	10	—	mW
Threshold current	I <sub>th</sub>	14	—	mA
Operating current	I <sub>op</sub>	28	—	mA
Operating voltage	V <sub>op</sub>	1.8	—	V
Differential efficiency	η	0.6	—	mW/mA
Radiation angle	Parallel	θ <sub>∥</sub>	11	deg.
	Perpendicular	θ <sub>⊥</sub>	28	
Wavelength	λ <sub>p</sub>	786	2.5	nm

Relative difference: standard maximum value



■ Figure 4 SLD264EP Inter-Beam Thermal Interference