High-Power Semiconductor Laser Diode Achieves 12×-Speed CD-R Recording

SLD237VL

The CD-R/RW drive is extremely popular due to its compatibility with the CD standard and its ease-of-use for data backup, and demand grows every year. However, the desires for even higher recording speeds are also growing.
Sony, always a leader in the optical disc area, has now developed and released as a commercial product a 130 mW class infrared semiconductor laser diode, the SLD237VL, which is optimal for high-speed recording CD-R systems.

- **Supports 12×-speed CD-R writing**
- **High-power pulsed 130 mW class**
- **Low power consumption and high reliability**
- **High coupling efficiency due to a low aspect ratio**
- **Low-impedance design**
- **ϕ5.6 mm package**

CD-R/RW––An Easy-to-Use Recording System

The amount of data handled by individuals has increased greatly due to the recent rapid increase in the number of PC users. This has resulted in a strong need for a recording system that can store large amounts of data easily and cheaply. CD-R/RW can meet those needs. CD-R/RW discs can be read in CD-ROM drives, which are standard worldwide. Due to this high compatibility with existing equipment, CD-R/RW drives are now being included as standard equipment in new PCs, and their popularity is growing at an ever increasing rate. As is the case with CD-ROM, CD-R/RW drives are subject to severe competition to achieve even higher speeds. Since thermal recording is used (information is written by using the thermal energy of laser beam to physically change the recording media), semiconductor laser diodes with even higher power levels are an absolute necessity for achieving higher recording speeds. (See figure 1.)

High-Power Pulsed 130 mW Class

Sony's key technologies for high-power laser diodes are high-quality MOCVD technology, high-precision mounting technology, and a real refractive index guided structure for low loss. Based on these fundamental technologies, Sony has established high reliability due to a reduced optical density at the optical emitting surface as well as a longer cavity length, and thus has achieved both higher power and longer life in this device. Furthermore, in the SLD237VL, Sony was able to suppress the amplitude of high-frequency superposing by adopting a low-impedance design to reduce electromagnetic interference, which can be a source of noise in electronic devices. As a results, the SLD237VL supports 12×-speed recording.

High Power and High Reliability

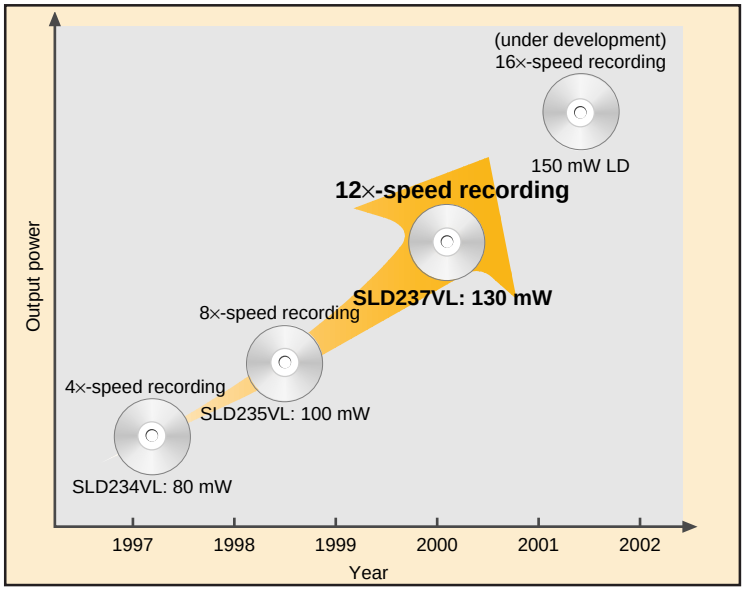
The following are the major points for achieving high power and high reliability.

- Reduced optical density at the facets
- A longer cavity (L = 800 µm)
- Beam spread angle characteristics that achieve an improved coupling ratio in the optical pickup optical system (See figure 2.)

The L-I characteristics are kink-free up to 150 mW (figure 3), and the device achieves superlative thermal characteristics (figure 4) and high reliability (figure 5). By providing the SLD237VL in a ϕ5.6 mm package that is widely applicable, Sony created a device that features both high performance and excellent ease of use. To continue to respond to our users' high-level requirements, Sony is committed not only to striving for higher power devices, but also to developing new technologies towards that end.

V O I C E

The SLD235VL has evolved into the SLD237VL, an advanced high-output, high-performance, and high-reliability device. The SLD237VL laser diode allows 12× speed recording in the CD-R/RW, a product with a rapidly growing market. In the future, we will develop even higher power laser diodes to expand the Sony lineup of laser diodes for high-speed recording. We hope that our high-power laser diodes will be widely used worldwide.

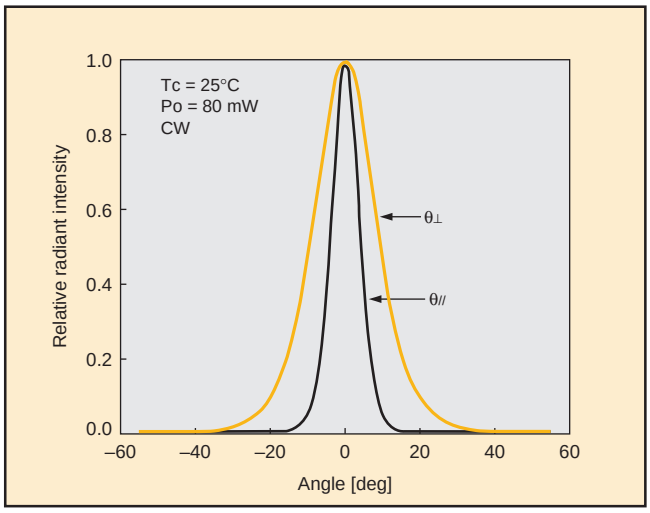


■ **Figure 1 Development Trends**

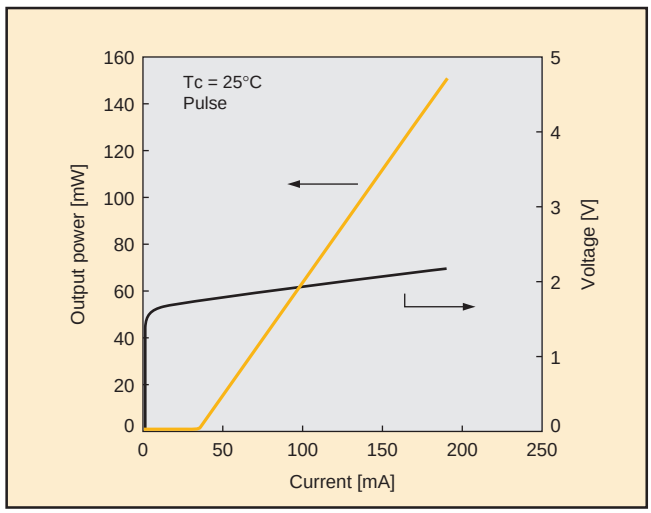
■ **Table 1 Main Characteristics**

Item		Symbol	Typical value	Unit
Threshold current		Ith	30	mA
Operating current		Iop	110	
Operating voltage		Vop	1.9	V
Oscillation wavelength		λp	784	nm
Radiation angle	Parallel	θ//	8.3	deg
	Perpendicular	θ⊥	18.0	
Differential efficiency		η	1.0	mW/mA

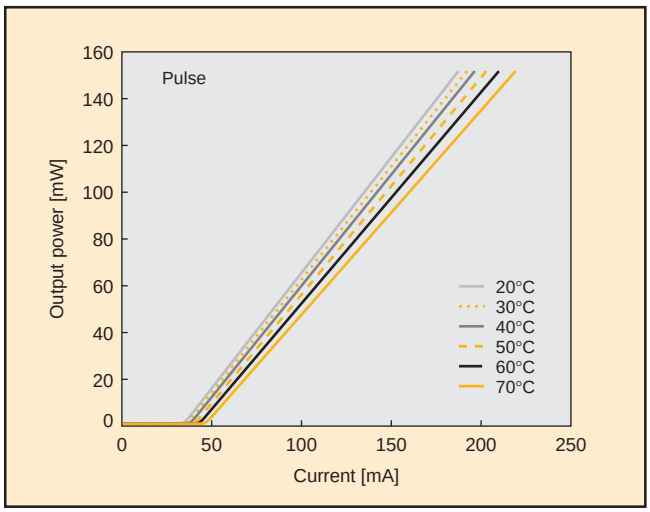
Condition: Tc = 25°C
Po = 80 mW @CW



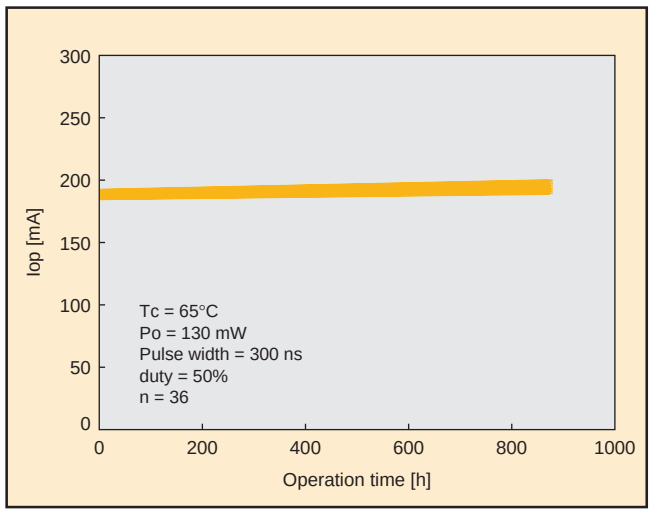
■ **Figure 2 SLD237VL Far Field Pattern**



■ **Figure 3 SLD237VL L-I and I-V Characteristics**



■ **Figure 4 SLD237VL Temperature Characteristics**



■ **Figure 5 SLD237VL Reliability Test Results**