Open Package 330 mW Laser Diode
for High-Speed CD-R/RW Optical Disc Recording

SLD255JL

Now that we are well into the high-speed network age, desires for even higher speed data recording CD-R/RW drives have been increasing recently, and higher output power is now strongly desired in the laser diodes used in these drives to meet the "optical power output proportional to the square root of the speed multiplier" rule of thumb. Also, in combo drives that use an optical pickup that shares a common optical system with the DVD system laser, even higher output specifications are required to make up for the output loss due to the optical system.
Sony has responded to these needs up to now with laser diode products through the SLD253 family. However, there are now strong demands from the market for devices that can support the high-speed write scribe function*1 and can be provided at even lower costs.
To respond to these demands, Sony has developed and is now releasing the SLD255JL that features 330 mW pulse/150 mW CW specifications and is provided in an open package.

- **Rated output: 330 mW (up to 50 ns, 50% duty, 75°C)/ 150 mW (CW, 75°C)**
- **Supports high-speed write scribe drives**
- **First open package laser diode in the 330 mW class**

*1: Write scribe: a drive function that draws text, graphics, and photographs on the label side of the CD-R disc by operating the laser in high-output CW mode.

Rated Output: 330 mW (up to 50 ns, 50% duty, 75°C)/150 mW (CW, 75°C)

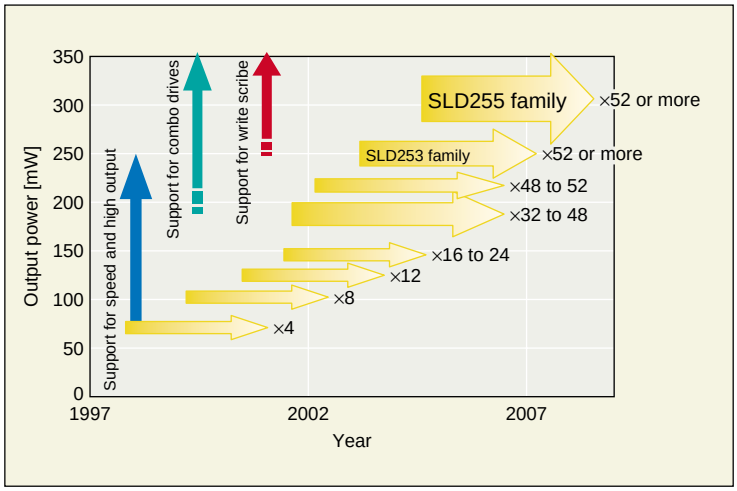
The following two improvements are required to provide even higher laser output power levels. First, the optical efficiency must be increased by reducing the loss within the waveguide. Second, catastrophic optical damage (COD), in which the optical emission surface is melted by its own optical energy must be avoided (that is, the lifetime of the device at the rated power level must be guaranteed).
In the SLD255JL, Sony optimized the design of the waveguide structure based on Sony's unique semiconductor crystal growth technologies, metal organic chemical vapor deposition (MOCVD) so that transmission loss of the laser beam is held to an absolute minimum. Furthermore, by adopting Sony's unique technologies in the protective film coating on the emission surface, Sony was able to both increase the COD level and extend the device lifetime.
As a result of these efforts, the SLD255JL guarantees both high output levels (330 mW pulse, 150 mW CW) that were previously unachievable as well as long-term reliability. This higher output means that the SLD255JL can also support a high-speed write scribe function.
Furthermore, the SLD255JL inherits from previous Sony products both the low-impedance design that can extract the maximum capability from the optical pickup high-speed pulse drive circuit as well as the interference distance nL of 3.57 mm. This means that customers currently using Sony products will see no changes in the ease of use if they switch over to the SLD255JL. Table 1 lists the main laser specifications when the SLD255JL is driven at 100 mW in CW operation at 25°C.
As can be seen from figures 2 and 3, the SLD255JL has a minimal temperature dependence in both pulse and CW drive modes, and has a power consumption design that allows it to provide low-current drive even at high temperatures.

V O I C E

We put a lot of effort into this rapid product development project that aimed at both high-output operation as well as guaranteed long-term reliability. This was a development effort that was also premised on maintaining resonator length (interference distance) and providing ease-of-use for customers who were already using Sony laser diode products. I am looking forward to future product development efforts that can also satisfy our customers' needs.

First Open Package Laser Diode in the 330 mW Class

To respond to the strong market needs for lower prices in this area, given that the required long-term reliability had been assured, Sony has led the industry by adopting, for the first time in a 300 mW class laser diode, an "open package", which eliminates the glass cap.
Sony also provides, as a product line of similar high-output/low-cost laser diodes, both the even lower priced SLD253JL and the nL = 3.41 mm interference distance SLD251JL to support a wide range of customer needs.
Sony is committed to continuing to develop products that lead the industry in meeting customer needs, and will respond to these needs with even higher output power and even lower prices.

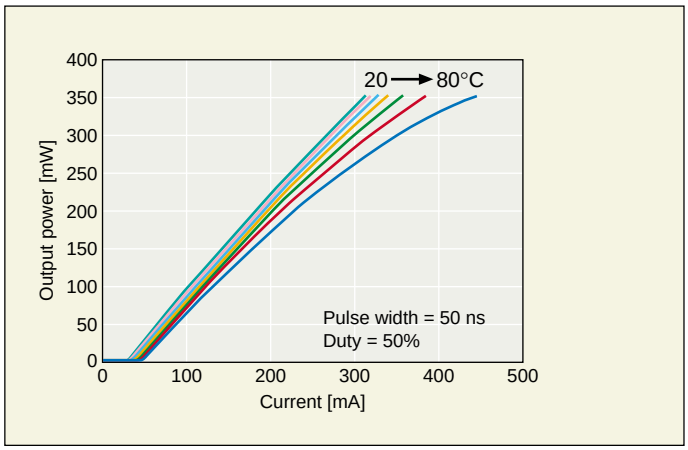


■ **Figure 1 CD-R/RW Record Speeds and Power Trends**

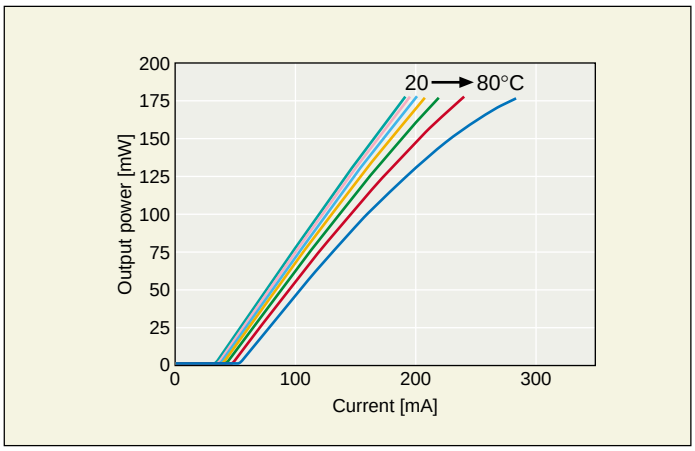
■ **Table 1 Main Room Temperature Specifications**

Item		Symbol	Typ.	Unit
Threshold current		Ith	30.0	mA
Operating current		Iop	130.0	
Operating voltage		Vop	2.0	V
Wavelength		λp	784.0	nm
Radiation angle	Parallel	θ//	8.4	deg.
	Perpendicular	θ⊥	16.0	
Differential efficiency		ηD	1.0	mW/mA

Condition: Tc = 25°C
Po = 100 mW @CW



■ **Figure 2 Light - Current Characteristics Temperature Dependence (Pulse Mode)**



■ **Figure 3 Light - Current Characteristics Temperature Dependence (CW Mode)**