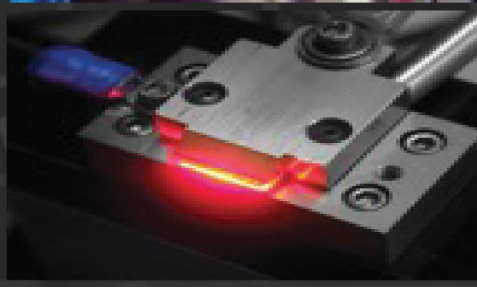
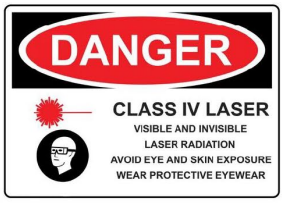
LDX Optronics Inc.

Specializing in quality high-power diode lasers



2025 CATALOG
MULTIMODE LASER DIODES



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Why LDX Optronics?

Choose LDX Optronics for Proven Performance & Unmatched Reliability

LDX Optronics is a trusted U.S.-based manufacturer of **high-power multimode laser diodes**, providing **precision-engineered solutions** for OEMs and researchers. Established in 1990, LDX has a **proven track record of success**, ensuring dependable performance, **consistent supply**, and **customized options** for industrial, medical, and defense markets.

Your Product Demands Superior Components

- **Rigorously tested for longevity**: Extensive wafer qualification & life testing
- **Pre-shipment burn-in process**: Minimizes failure rates and maximizes consistency
- **Thermal/electrical stability**: Flux-/void-free, hard (AuSn) or soft (In) soldering
- **Shock & vibration-resistant**: Engineered for demanding environments
- **Historically low failure rates**: Proven reliability across all product lines

The Industry's Broadest Range of High-Power Laser Diodes

- **Wavelengths spanning 445nm to 1850nm** with multiple output power options
- **Diverse configurations:** Multi-mode single emitter laser diodes & diode arrays (bars)
- **Flexible integration options**: C-/Q-/D-Mount, 9mm, HHL, fiber-coupled & more

Tailored Solutions Provide Superior Results for Your Unique Needs

- **Custom options:** epitaxy, emitter, submount, and package designs
- **Lensing integration options**: Superior collimation or defocused squared beam FAC
- **Reliability-enhancing features**: TECs, photodiodes, and ruggedized configurations
- **Sealed for protection**: Electrical isolation and hermetically sealed options available

Guaranteed Supply – Zero Disruptions to Your Operations

- **Continuous supply commitment**: No risk of changing or obsoleted parts
- **Strategic buffer stock**: Just-in-time deliveries ensure seamless availability
- **US-based manufacturing**: No tariffs/international shipping delays w/ **rapid delivery**

With a management team bringing over **five decades of semiconductor laser manufacturing experience**, LDX Optronics delivers **trusted expertise, precision engineering, and supply chain security**. Whether you need **off-the-shelf solutions or custom designs**, we provide **proven laser diode technology** tailored to your exact requirements.

When reliability, consistency, and performance matter—LDX Optronics is your partner.

LDX Optronics Inc.

445nm - 690nm LASER DIODES

Part Number	Wavelength (nm)	Wavelength Tolerance	Emitter size (microns)	Output Power (mW)	Operating Temp (°C)	Polarization	Packages
LDX-3102-405	405	+/-5 nm	15	1000	25	TE	7, 11, 15,
LDX-3303-445	445	+/-10 nm	30	3500	25	TE	1, 4, 5, 6, 7, 8, 9, 11, 12, 14, 15,
LDX-3102-520	520	+/-10 nm	15	1000	20	TE	7, 11, 15,
LDX-2106-622	622	+/-3 nm	60	150	5	TE	1, 4, 5, 8, 9, 11, 12, 14, 15,
LDX-2205-627	627	+/-3 nm	50	250	5	TM	1, 4, 5, 8, 9, 10, 11, 12, 14, 15,
LDX-2310-627	627	+/-3 nm	100	350	5	TM	1, 4, 5, 8, 9, 10, 11, 12, 14, 15,
LDX-2205-630	630	+/-3 nm	50	250	15	TM	1, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-2410-630	630	+/-3 nm	100	400	15	TM	1, 4, 5, 8, 9, 10, 11, 12, 14, 15,
LDX-2305-635	635	+/-3 nm	50	300	20	TM	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-2410-635	635	+/-3 nm	100	400	20	TM	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-2615-635	635	+/-3 nm	150	600	20	TM	1, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-3130-635	635	+/-3 nm	300	1200	15	TM	1, 4, 5, 8, 9, 11, 12, 14, 15,
LDX-2305-645	645	+/-5 nm	50	300	20	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-2410-645	645	+/-5 nm	100	400	20	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-2305-650	650	+/-5 nm	50	350	20	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15,
LDX-2710-650	650	+/-5 nm	100	700	20	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15,
LDX-3115-650	650	+/-5 nm	150	1000	20	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15,
LDX-3230-650	650	+/-5 nm	300	2000	20	TE	1, 4, 5, 8, 9, 11, 12, 14, 15,
LDX-2305-660	660	+/-3 nm	50	350	25	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-2710-660	660	+/-3 nm	100	750	25	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-3115-660	660	+/-3 nm	150	1000	25	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15,
LDX-3230-660	660	+/-3 nm	300	2000	25	TE	1, 4, 5, 6, 7, 8, 9, 11, 12, 14, 15,
LDX-2305-665	665	+/-3 nm	50	350	25	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-2710-665	665	+/-3 nm	100	750	25	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-3115-665	665	+/-3 nm	150	1000	25	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15,
LDX-3230-665	665	+/-3 nm	300	2000	25	TE	1, 4, 5, 6, 7, 8, 9, 11, 12, 14, 15,
LDX-2405-680	680	+/-3 nm	50	400	25	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-2810-680	680	+/-3 nm	100	800	25	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-3115-680	680	+/-3 nm	150	1200	25	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-3230-680	680	+/-3 nm	300	2000	25	TE	1, 4, 5, 6, 7, 8, 9, 11, 12, 14, 15,
LDX-2405-685	685	+/-3 nm	50	400	25	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-2810-685	685	+/-3 nm	100	800	25	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-3115-685	685	+/-3 nm	150	1200	25	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-3230-685	685	+/-3 nm	300	2000	25	TE	1, 4, 5, 6, 7, 8, 9, 11, 12, 14, 15,
LDX-2405-690	690	+/-3 nm	50	400	25	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-2710-690	690	+/-3 nm	100	750	25	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-3115-690	690	+/-3 nm	150	1100	25	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-3230-690	690	+/-3 nm	300	2500	25	TE	1, 4, 5, 6, 7, 8, 9, 11, 12, 14, 15,

All values are typical for a device packaged on C-mount, performance may differ with other package options

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LDX Optronics Inc.

725nm-792nm LASER DIODES

Part Number	Wavelength (nm)	Wavelength Tolerance	Emitter size (microns)	Output Power (mW)	Operating Temp (°C)	Polarization	Packages
LDX-3105-725	725	+/-5 nm	50	1000	20	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-3110-725	725	+/-5 nm	100	1500	20	TM	1, 4, 5, 8, 9, 11, 12, 14, 15,
LDX-3215-725	725	+/-5 nm	150	2000	20	TM	1, 4, 5, 8, 9, 11, 12, 14, 15,
LDX-3105-730	730	+/-5 nm	50	1000	20	TM	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-3210-730	730	+/-5 nm	100	2000	20	TM	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-3315-730	730	+/-5 nm	150	2500	20	TM	1, 4, 5, 8, 9, 11, 12, 14, 15,
LDX-3330-730	730	+/-5 nm	300	3000	20	TM	1, 4, 5, 9, 11, 12, 14, 15,
LDX-3105-735	735	+/-5 nm	50	1000	25	TM	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-3110-735	735	+/-5 nm	100	1750	25	TM	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-3215-735	735	+/-5 nm	150	2000	25	TM	1, 4, 5, 8, 9, 11, 12, 14, 15,
LDX-3315-735	735	+/-5 nm	150	2500	25	TM	1, 4, 5, 8, 9, 11, 12, 14, 15,
LDX-3430-735	735	+/-5 nm	300	4000	25	TM	1, 4, 5, 8, 9, 11, 12, 14, 15,
LDX-3105-740	740	+/-5 nm	50	1500	25	TM	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-3210-740	740	+/-5 nm	100	2000	25	TM	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-3315-740	740	+/-5 nm	150	3000	25	TM	1, 4, 5, 6, 7, 8, 9, 11, 12, 14, 15,
LDX-3530-740	740	+/-5 nm	300	5000	25	TM	1, 4, 5, 8, 9, 11, 12, 14, 15,
LDX-3105-750	750	+/-5 nm	50	1000	25	TM	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-3110-750	750	+/-5 nm	100	1500	25	TM	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-3210-750	750	+/-5 nm	100	2000	25	TM	1, 4, 5, 6, 7, 8, 9, 11, 12, 14, 15,
LDX-3315-750	750	+/-5 nm	150	3000	25	TM	1, 4, 5, 6, 7, 8, 9, 11, 12, 14, 15,
LDX-3530-750	750	+/-5 nm	300	5000	20	TM	1, 4, 5, 8, 9, 11, 12, 14, 15,
LDX-3105-760	760	+/-5 nm	50	1200	25	TM	1, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15,
LDX-3210-760	760	+/-5 nm	100	2000	25	TE or TM	1, 4, 5, 6, 7, 9, 10, 11, 12, 14, 15,
LDX-3315-760	760	+/-5 nm	150	3000	25	TE or TM	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3420-760	760	+/-5 nm	200	4000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3630-760	760	+/-5 nm	300	6000	25	TM	1, 4, 5, 8, 9, 11, 12, 14, 15,
LDX-3315-775	775	+/-3 nm	150	3500	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3105-780	780	+/-3 nm	50	1200	25	TM	1, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15,
LDX-3310-780	780	+/-3 nm	100	2500	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3315-780	780	+/-3 nm	150	3500	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3520-780	780	+/-3 nm	200	5000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3315-785	785	+/-3 nm	150	3500	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3520-785	785	+/-3 nm	200	5000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3105-792	792	+/-3 nm	50	1200	25	TM	1, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15,
LDX-3310-792	792	+/-3 nm	100	3000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3415-792	792	+/-3 nm	150	4000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3820-792	792	+/-5 nm	200	8000	25	TM	3, 5, 9, 11, 12, 14, 15,

All values are typical for a device packaged on C-mount, performance may differ with other package options

LDX Optronics Inc.

797nm-980nm LASER DIODES

Part Number	Wavelength (nm)	Wavelength Tolerance	Emitter size (microns)	Output Power (mW)	Operating Temp (°C)	Polarization	Packages
LDX-3310-797	797	+/-3 nm	100	3000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3415-797	797	+/-3 nm	150	4000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3520-797	797	+/-3 nm	200	5000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3415-808	808	+/-3 nm	150	4000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 13, 14, 15,
LDX-3105-808	808	+/-3 nm	50	1200	25	TE	1, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15,
LDX-3210-808	808	+/-3 nm	100	2000	25	TE	1, 4, 5, 6, 7, 9, 10, 11, 12, 14, 15,
LDX-3310-808	808	+/-3 nm	100	3000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3410-808	808	+/-3 nm	100	4000	25	TM	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3610-808	808	+/-3 nm	100	6000	25	TM	3, 5, 9, 11, 12, 14, 15,
LDX-3620-808	808	+/-3 nm	200	6000	25	TE or TM	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3A20-808	808	+/-5 nm	200	10000	25	TM	3, 5, 9, 11, 12, 14, 15,
LDX-3415-825	825	+/-5 nm	150	4000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3210-835	835	+/-5 nm	100	2000	25	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
LDX-3610-835	835	+/-5 nm	100	6000	25	TM	3, 5, 9, 11, 12, 14, 15,
LDX-3103-860	860	+/-10 nm	30	1000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3105-860	860	+/-10 nm	50	1000	25	TE	1, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15,
LDX-3110-860	860	+/-10 nm	100	1500	25	TE	1, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15,
LDX-3210-860	860	+/-10 nm	100	2000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3310-860	860	+/-10 nm	100	3000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3415-860	860	+/-10 nm	150	4000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3520-860	860	+/-10 nm	200	5000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3415-870	870	+/-5 nm	150	4000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3210-885	885	+/-10 nm	100	2500	25	TE	1, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15,
LDX-3615-885	885	+/-10 nm	150	6000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3210-905	905	+/-5 nm	100	2000	25	TE	1, 4, 5, 6, 7, 8, 9, 11, 12, 14, 15,
LDX-3410-915	915	+/-10 nm	100	4000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3615-915	915	+/-10 nm	150	6000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3A10-915	915	+/-10 nm	100	10000	25	TE	3, 5, 9, 11, 12, 14, 15,
LDX-3410-940	940	+/-10 nm	100	4000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3615-940	940	+/-10 nm	150	6000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3810-940	940	+/-10 nm	100	8000	25	TE	3, 5, 9, 11, 12, 14, 15,
LDX-3F20-940	940	+/-10 nm	200	16000	25	TE	3, 5, 9, 12, 14, 15,
LDX-3A10-960	960	+/-10 nm	100	10000	25	TE	3, 5, 9, 11, 12, 14, 15,
LDX-3105-980	980	+/-10 nm	50	1500	25	TE	1, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15,
LDX-3410-980	980	+/-10 nm	100	4000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3615-980	980	+/-10 nm	150	6000	25	TE	1, 4, 5, 6, 7, 9, 11, 12, 14, 15,
LDX-3A10-980	980	+/-10 nm	100	10000	25	TE	3, 5, 9, 11, 12, 14, 15,

All values are typical for a device packaged on C-mount, performance may differ with other package options

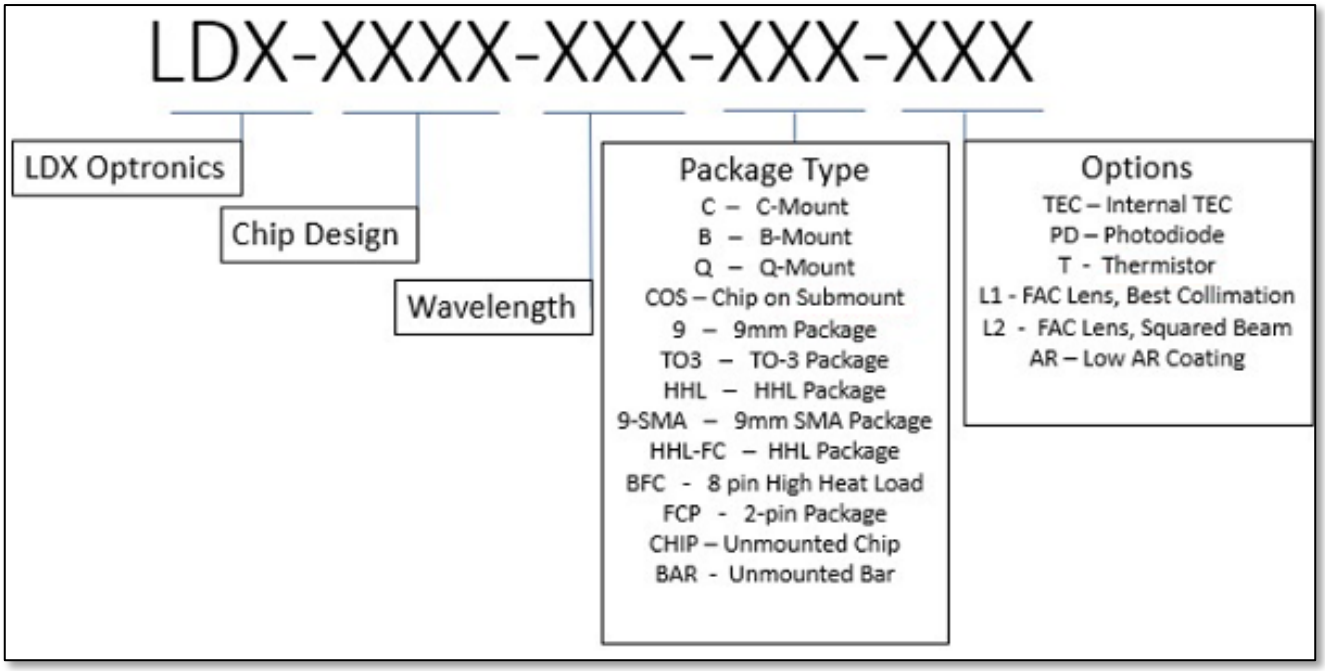
LDX Optronics Inc.

1015nm-1900nm LASER DIODES

Part Number	Wavelength (nm)	Wavelength Tolerance	Emitter size (microns)	Output Power (mW)	Operating Temp (°C)	Polarization	Packages
LDX-3C20-1015	1015	+/-5 nm	200	12000	25	TE	3, 5, 9, 11, 12, 14, 15,
LDX-3310-1030	1030	+/-10 nm	100	3000	25	TE	0
LDX-3520-1030	1030	+/-10 nm	200	5000	25	TE	1, 4, 5, 6, 7, 8, 9, 11, 12,
LDX-3C20-1030	1030	+/-5 nm	200	12000	25	TE	3, 5, 7, 8, 9, 11, 12,
LDX-3105-1064	1064	+/-10 nm	50	1500	25	TE	1, 4, 5, 6, 7, 8, 9, 10, 11, 12,
LDX-3410-1064	1064	+/-10 nm	100	4000	25	TE	1, 4, 5, 6, 7, 8, 9, 11, 12,
LDX-3515-1064	1064	+/-10 nm	150	5000	25	TE	1, 4, 5, 6, 7, 8, 9, 11, 12,
LDX-3A10-1064	1064	+/-10 nm	100	10000	25	TE	3, 5, 7, 8, 9, 11, 12,
LDX-3C20-1064	1064	+/-5 nm	200	12000	25	TE	3, 5, 7, 8, 9, 11, 12,
LDX-3205-1130	1130	+/-20 nm	50	2000	25	TE	1, 4, 5, 6, 7, 8, 9, 11, 12,
LDX-3310-1130	1130	+/-20 nm	100	3500	25	TE	1, 4, 5, 6, 7, 8, 9, 11, 12,
LDX-3515-1130	1130	+/-20 nm	150	5000	25	TE	1, 4, 5, 7, 8, 9, 11, 12,
LDX-3105-1210	1210	+/-20 nm	50	1500	20	TE	1, 4, 5, 7, 8, 9, 11, 12,
LDX-3210-1210	1210	+/-20 nm	100	2000	20	TE	1, 4, 5, 7, 8, 9, 11, 12,
LDX-3718-1280	1280	+/-20 nm	180	7000	20	TE	2, 4, 5, 7, 8, 9, 11, 12,
LDX-3310-1370	1370	+/-20 nm	100	3500	20	TE	1, 4, 5, 7, 8, 9, 11, 12,
LDX-3510-1370	1370	+/-20 nm	100	5000	20	TE	2, 4, 5, 7, 8, 9, 11, 12,
LDX-3310-1470	1470	+/-20 nm	100	3500	25	TE	1, 4, 5, 7, 8, 9, 11, 12,
LDX-3510-1470	1470	+/-20 nm	100	5000	25	TE	2, 4, 5, 7, 8, 9, 11, 12,
LDX-3718-1470	1470	+/-20 nm	180	7000	25	TE	2, 4, 5, 7, 9, 11, 12,
LDX-2803-1550	1550	+/-20 nm	35	800	25	TE	1, 4, 5, 6, 7, 8, 9, 11, 12,
LDX-3105-1550	1550	+/-20 nm	50	1000	25	TE	1, 4, 5, 6, 7, 8, 9, 11, 12,
LDX-3110-1550	1550	+/-20 nm	100	1500	25	TE	1, 4, 5, 7, 8, 9, 11, 12,
LDX-3205-1550	1550	+/-20 nm	50	1750	25	TE	1, 4, 5, 6, 7, 8, 9, 11, 12,
LDX-3210-1550	1550	+/-20 nm	100	2500	25	TE	1, 4, 5, 7, 8, 9, 11, 12,
LDX-3310-1550	1550	+/-20 nm	100	3500	25	TE	2, 4, 5, 7, 8, 9, 11, 12,
LDX-3518-1550	1550	+/-20 nm	180	5000	20	TE	2, 4, 5, 7, 9, 11, 12,
LDX-3115-1620	1620	+/-20 nm	150	1000	20	TE	1, 4, 5, 7, 8, 9, 11, 12,
LDX-3120-1640	1640	+/-20 nm	200	1200	20	TE	1, 4, 5, 7, 8, 9, 11, 12,
LDX-3210-1675	1675	+/-20 nm	100	2000	20	TE	2, 4, 5, 7, 8, 9, 11, 12,
LDX-3110-1850	1850	+/-30 nm	100	1000	20	TE	1, 4, 5, 7, 8, 9, 11, 12,
LDX-2606-1900	1900	+/-10 nm	60	600	20	TE	1, 4, 5, 7, 8, 9, 11, 12,

All values are typical for a device packaged on C-mount, performance may differ with other package options

Part Numbering System



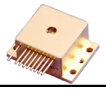
Examples:

LDX-3115-680-9	Semiconductor Laser Diode, 680±3 nm, 1200mW, 150um emitter, 9mm Package
LDX-2405-690-BFC-105	Semiconductor Laser Diode, 690±3 nm, 400mW, 50um emitter, Pigtailed Fiber Coupled 8-pin BFC Package w/ >80% Output Power from Fiber, Includes 105um, 0.22NA, 1m long fiber pigtail with SMA connector
LDX-2410-645-B-L1	Semiconductor Laser Diode, 645±5 nm, 400mW, 100um emitter, B-mount w/ FAC Lensing, Best Collimation
LDX-2710-660-HHL-L2	Semiconductor Laser Diode, 660±3 nm, 750mW, 100um emitter, HHL Package w/ TEC, PD, Thermistor, FAC Lens, Squared Beam

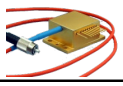
Package & Options

LDX Optronics Inc.

Free Space Package - Exposed Emitter					
#	Package Name		Features	Options	Drawing
1,2,3	C-Mount Package		Small footprint with screw mounting Material – Copper (OFHC) Fast-axis lensing	Fast-axis lensing	
4	B-Mount Package		Very small footprint Requires soldering to heatsink Material – Copper Tungsten (CuW)	Fast-axis lensing	
5	Chip-on-Submount		Very small footprint Requires soldering to heatsink Material – BeO	Fast-axis lensing	

Free Space Package - Hermetically Sealed Windowed Packages					
#	Package		Features	Options	Drawing
6, 7, 8	9mm Package		Industry-standard package Header material – Copper	Photodiode, Isolated package, Fast-axis lensing	
9, 10	TO-3 Package		Mounting to heatsink with screws Header material – Copper	TEC, Thermistor, Photodiode, Fast-axis lensing	
11	HHL Package		Internal peltier cooler (TEC), thermistor, and photodiode Header material – Copper	Fast-axis lensing	

FAC Lensing Options:		
Best Collimation	L1	Less than 1° divergence in the fast axis direction.
Squared Beam FAC	L2	Matches the fast-axis to the slow-axis divergence.

Fiber Coupled Packages - Hermetically Sealed					
#	Package		Features	Options	Drawing
12	9mm SMA FC Package		Industry-standard package SMA connector for detachable fiber Header material – Copper	Photodiode, Isolated package	
13	8-Pin BFC Package		Built-in internal TEC and Photodiode Fiber pigtail with SMA connector Header material – Copper	Thermistor	
14	2-Pin FCP Package		Fiber pigtail with SMA connector Header material – Copper	none	
15	HHL-FC Package		Fiber pigtail with SMA connector Internal TEC, thermistor, and PD Header material – Copper	none	

Emitter Size	Standard Fiber size
≤ 80um Emitter	105um Fiber
100um Emitter	105um or 200um Fiber
150um Emitter	200um Fiber
200um Emitter	200um or 365um Fiber
300um Emitter	365um Fiber

General Precautions

1. Special wavelength diodes (especially red diodes) are much, much more susceptible to damage than standard infrared diodes.
2. Think about how you are employing the diodes to make sure you are doing everything possible to get a long lifetime. We want you to be successful using these products.
3. Keep the diodes *clean*. They should not be operated in an environment where dust particles in the air can reach the active region (output facet) of the diode.
4. Keep the output facet (which emits light) *dry*. If you store the unit in a high humidity, the optical coatings can be damaged and render the diode useless.
5. Operating the laser diode at a *temperature lower* than recommended will usually slightly increase the output power (higher efficiency) and improve lifetime.
6. Operating the laser diode at a *temperature higher* than recommended will increase the threshold current and decrease the slope efficiency.
7. Laser diodes need to be operated with an *approved power supply/driver* or they may be damaged and/or destroyed quickly. Off-the-shelf drivers can deliver a high spike of current at turn-on, and they can deliver a very short duration reverse biasing when the unit is turned off. Either of these will damage and/or destroy the diode laser.
8. The power supply/driver should be current-regulated and specifically designed for laser diodes. The power supply should create no surges or spikes, no reverse voltages and should not have any ringing. Many poorly designed power supplies have voltage transients during turn-on, turn-off, or in the case of power failure.
9. Never make the connection to the laser diode with the power supply voltage on. Most laser diode power supplies have provision to disable the supply and short the output to allow for connection of the diode.
10. Laser diodes are very sensitive to damage by electrostatic discharge (ESD), or other voltage transients. The laser should be handled using static-safe procedures when it is taken out of its static-protective shipping container. When the laser is not connected to a power supply, the user should short the anode and cathode together to prevent static damage.
11. Some laser diodes are susceptible to damage from *back reflections* into the device. This is more the case with shorter wavelength material than with longer wavelengths. Thus, if attempting to collimate the output, care must be taken to avoid back reflections.
12. The emission wavelength changes with temperature: the wavelength changes about +1 nm for every 6° C increase in temperature. This value varies by wavelength.

Thermal Management

1. *Heat*: This is the biggest cause of field failures.
2. Some laser diodes are more sensitive than others to the operating temperature. Red laser diodes tend to be more temperature sensitive than the infrared laser diodes.
3. Many customers do not appreciate the importance and/or the complexity of removing waste heat.
4. Because operating temperature has a strong influence on laser lifetime, the heatsinking of the laser package is of tremendous importance and doing it well is not as simple as many assume it is.
5. Waste heat must be removed efficiently and instantaneously, or the laser will heat up and burn out, or, at a minimum, experience an abbreviated lifetime.
6. The laser can be operated at higher temperatures than recommended, but the lifetime of the laser is reduced exponentially as the operating temperature is increased.
7. The diode package should be attached to a heatsink plate at least several millimeters thick.
8. The heatsink must be capable of dissipating the waste heat generated by the laser diode. High power laser diodes are typically 10 – 50% efficient at converting electricity into light. The remainder of the electrical input power is dissipated as heat. Therefore, there may be several watts of waste heat generated by the laser. Because so much heat is generated within the small area, it is critical that the laser is securely connected to an adequate heatsink
9. The best heatsink material is copper, but aluminum is also a fair heat conductor. If aluminum is used, the surface should not be anodized in the region where the laser package makes contact with the heatsink. The aluminum oxide anodized coating makes an effective thermal insulator.
10. The surface of the heatsink should be machined flat and smooth where it will contact the back of the laser package to allow for efficient heat transfer.
11. Thermal compound, or an indium foil washer can be used to reduce the thermal impedance of this interface. Our experience is that indium foil offers negligible improvement over a good copper-to-copper interface. In permanent installations, some improvement of the heatsinking can be achieved using a silver-filled epoxy at this interface. If silver-filled epoxy is used, it should be a “space qualified” low outgassing formulation to avoid contamination of the laser facets (Epoxy Technology H21D, for example)
12. The heatsink may be cooled by air, water, or thermoelectric coolers. Depending on the type of laser, an air-cooled heatsink may provide sufficient cooling, as long as the application does not require stability of the laser wavelength and output power. Most often, active cooling of the heatsink must be used. Active cooling usually is either water-cooling, or thermoelectric coolers (TEC’s).
13. Finally, when testing out a heatsink configuration, it is wise to test the temperature drop between the laser package and the heatsink using a very small thermocouple touched against the base of the package. The temperature drop during laser operation should be only 1-2 ° C.

Free Space Packages

1. Free space packages can be either a simple open heatsink with an exposed laser chip or a sealed TO-can type package. With open heatsinks, there is no protection for the delicate laser chip. The laser chip is very fragile and must be protected from any mechanical contact. The exposed laser facets (mirror coatings) must not be contaminated with any foreign material. Facet contamination can cause immediate and permanent damage to the laser. You should not blow on the laser, or expose the laser to smoke, dust, oils, or adhesive fumes.
2. The laser facets are sensitive to accumulation of dust. When the laser is operating, dust particles tend to be attracted to the laser facet. As the dust particles enter the intense optical field at the laser facet, they burn, and the residues accumulate in the laser facet. Unless the laser is operated in a true “class 100” clean-room environment, this dust accumulation will occur, even in a seemingly clean “lab environment. This kind of contamination does not occur very rapidly, but over several hundred hours of operation in a normal room environment, an open heatsink laser will show tiny “specks” on the lasers facet under microscopic examination. These will gradually degrade the laser prematurely. If an open heatsink laser is to be operated outside of a clean-room for more than short periods, it should be packaged within a sealed container to prevent this dust accumulation. This does not require a true hermetic sealing of the laser. An epoxy seal or O-ring seal around the laser assembly is perfectly sufficient.

C-Mount Package:

1. To operate, the C-mount must be screwed down securely to a heatsink using a #2-56 (English) or M-2 (metric) screw. The C-mount has a shallow counterbore around the mounting hole, for applications which require close mounting of a component in front of the laser. A shallow binding head screw, or a button head cap screw can be used in this situation.
2. Thermal grease should not be used with a C-mount. Most thermal greases tend to “creep” and the material will eventually contaminate the diode facets.
3. The copper C-mount is the laser diode anode (+) terminal, so the power supply anode connection is best made to the heatsink. Do not attempt to solder directly to the copper C-mount. The laser diode cathode (-) terminal is the wire lead attached to the C-mount. Connection to this lead can be made either by soldering, or by using a small, high quality, spring contact socket. The best sockets of this type have four contact fingers, and the fingers are gold-plated (see for example parts made by Mill-Max).
4. Great care must be used if soldering to the cathode wire lead. The soldering is best done with the C-mount already attached to the heatsink. This will prevent the body of the laser from heating up excessively. The cathode lead itself can withstand high temperature, but the main part of the laser block must remain <120°C. During soldering, the laser can also be damaged by contamination of the laser facets with solder flux fumes. Typical rosin-core electronics solder generates a cloud of smoke when it is melted. This smoke will coat the laser facets, and if the laser is then operated, permanent facet damage can occur. If it is necessary to solder near the laser diode, the diode should be covered to prevent this contamination. One method is to use a piece of aluminum foil to loosely cover or block-off the area around the laser chip. The chip and the wire bonds are very fragile, so the foil must be applied carefully, without actually contacting the laser chip.

Free Space Packages

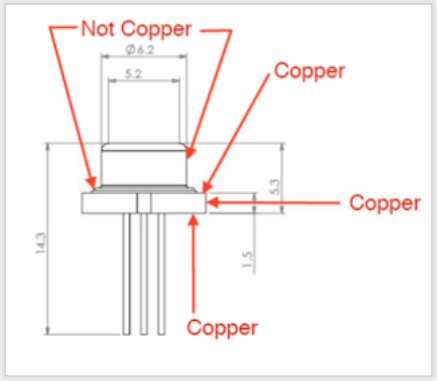
B-mount, Chip on Submount (COS) and other exposed emitter packages:

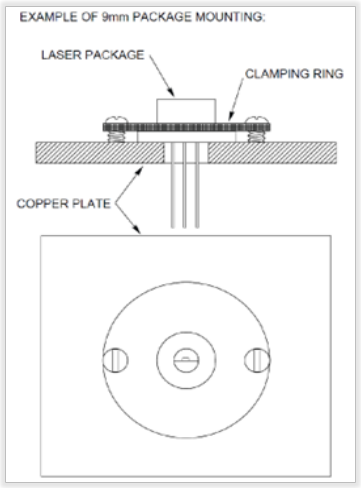
1. The copper mount is the laser diode anode (+) terminal, so the power supply anode connection is best made to the heatsink. Do not attempt to solder directly to the copper mount. The laser diode cathode (-) terminal is the wire lead attached to the mount. Connection to this lead can be made either by soldering, or by using a small, high quality, spring contact socket. The best sockets of this type have four contact fingers, and the fingers are gold-plated (see for example parts made by Mill-Max).
2. Great care must be used if soldering to the cathode wire lead. The soldering is best done with the mount already attached to the heatsink. This will prevent the body of the laser from heating up excessively. The cathode lead itself can withstand high temperature, but the main part of the laser.
3. To operate, these exposed emitter packages must be securely attached to a heatsink.
4. Thermal grease should not be used with open heatsinks. Most thermal greases tend to “creep” and the material will eventually contaminate the diode facets.
5. Attaching these exposed emitter packages to a heatsink is critical. This can be accomplished by either using a low temperature solder or a silver-filled epoxy at this interface. If silver-filled epoxy is used, it should be a “space qualified” low outgassing formulation to avoid contamination of the laser facets (Epoxy Technology H21D, for example). Great care must be used if soldering the package to the heatsink. The laser must remain <120°C to prevent the solder from reflowing and/or damaging the laser. During soldering, the laser can also be damaged by contamination of the laser facets with solder flux fumes. Typical rosin-core electronics solder generates a cloud of smoke when it is melted. This smoke will coat the laser facets, and if the laser is then operated, permanent facet damage can occur. The laser diode should be covered to prevent this contamination. One method is to use a piece of aluminum foil to loosely cover or block-off the area around the laser chip. The chip and the wire bonds are very fragile, so the foil must be applied carefully, without actually contacting the laser chip.

Free Space Packages

9mm Package

1. For good heat extraction from the 9mm laser package, it is critical that the Copper portion of the base be in good contact with the heatsink.
2. Not all parts of the 9mm package are made of Copper. See drawing 1 below, which indicates the Copper portion of the base. The window cap, and the portion of the base to which it is attached, are made of Steel, which is a poor thermal conductor.





TO-3 Package, HHL Package and other sealed packages

1. The package must be screwed down to a heatsink that can dissipate the heat generated by the laser and the TE cooler, if installed.
2. The heatsink should be cooled well enough that the temperature rises to no more than 40-45°C during operation.
3. The surface of the heatsink should be machined flat and smooth so that the base of the package is not bent when the screws are tightened. Screwing the package to a heatsink that is not flat could potentially fracture the TEC cooler inside of the package.
4. A layer of thermal grease between the package and the heatsink is suggested to improve the heat dissipation. When using thermal grease, tighten the mounting screws gently at first to allow excess grease to squeeze out the edges.
5. The laser chip is oriented so that the wide dimension (i.e. 150um) is along the x-axis, and the narrow dimension (I.e. 1um) is along the Y-axis.

Fiber Coupled Packages

BFC, FCP, HHL-FC Packages

1. The package must be screwed down to a heatsink that can dissipate the heat generated by the laser and the TEC cooler, if installed.
2. The heatsink should be cooled well enough that the temperature rises to no more than 40-45°C during operation.
3. The surface of the heatsink should be machined flat and smooth so that the base of the package is not bent when the screws are tightened. Screwing the package to a heatsink that is not flat could potentially fracture the TEC cooler inside of the package.
4. A layer of thermal grease between the package and the heatsink is suggested to improve the heat dissipation. When using thermal grease, tighten the mounting screws gently at first to allow excess grease to squeeze out the edges.
5. Special care is required with fiber pigtailed laser diodes. The fiber should not exceed the minimum bend radius of the fiber. The minimum bend radius is defined by the fiber type and core diameter.
6. Typically, the fiber is terminated with a SMA connector. The fiber end-cap should be replaced if the laser is not in use. The end of the fiber is very susceptible to damage if it is not handled correctly. The fiber end should be inspected prior to starting the laser. Ensure there are no particles on the end of the fiber. All particles on the end of the fiber will become damage spots once the laser is turned on.

9mm SMA fiber--coupled package

1. The 9mm SMA package will couple a chip with good efficiency to a fiber that is at least 150um larger than the laser emitter. If this rule is observed, coupling efficiency is typically about 85--90% and the minimum fiber diameters would be:
    - 50um emitter 200um fiber
    - 100um emitter 250um fiber
    - 150um emitter 300um fiber
    - 200um emitter 350um fiber
    - 300um emitter 450um fiber
2. Not all of these are standard fiber diameters. We recommend using Silica core/Silica clad fibers with NA=0.22, low-OH.
3. In many cases, decent coupling can be achieved to fibers that are only 100um larger than the emitter. Efficiency in this case would typically be only 70--80% depending on the divergence of the laser chip. Also, the coupling is not typically as stable as with a larger fiber, and the coupling efficiency can sometimes change depending on the centering of fiber in the connector, and how the connector happens to be screwed down into the SMA fitting.
4. If using a fiber near the minimum diameter, a high power SMA connector should be used.

LDX follows a policy of continuous product improvement. Specifications are subject to change without notice.

These components do not comply with the Federal Regulations (21 CFR Subchapter 1) as administered by the Center for Devices and Radiological health. Purchaser acknowledges that his/her products must comply with these regulations before they can be sold to a customer.

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