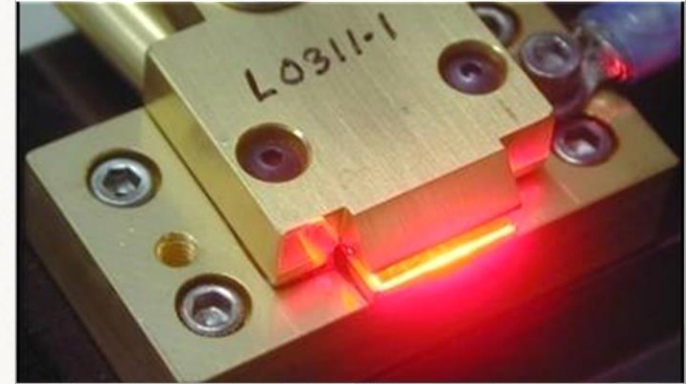




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# Multimode Laser Diodes



LDX Optronics Inc.  
2021 Catalog

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## 445nm-665nm Laser Diodes

Part Number	Wavelength (nm)	Emitter Size (um)	Output Power (mW)	Output from Fiber (mW)	Min Fiber Size HHL & BTF (um)	Min Fiber Size 9mm SMA (um)	Operating Temp (°C)	Threshold Current (mA) Typ.	Operating Current (mA) Typ.	Operating Voltage (V) Typ.	Beam Divergence (FWHM) $\theta$ / (°)	Beam Divergence (FWHM) $\theta_{\perp}$ (°)	Spectral Width (nm) FWHM	Polarization	Acceptable Packages
LDX-3303-445	445 ±10 nm	30	3,500	2800	100	200	25	250	2200	4.5	14	40	2.0	TE	7,11
LDX-3102-520	520 ±10 nm	15	1,000	800	100	200	25	300	1600	4.5	11	40			7,11
LDX-2106-622	622 ±3 nm	60	150	120	100	200	5	560	950	2.3	7	50	0.8	TE	1,4-16
LDX-2205-627	627 ±3 nm	50	250	200	100	200	10	500	900	2.3	7	40	0.3	TM	1,4-16
LDX-2310-627	627 ±3 nm	100	350	280	100	250	10	1080	1900	2.3	7	40	0.5	TM	1,4-6,9,10,14,15
LDX-2205-630	630 ±3 nm	50	250	200	100	200	15	400	775	2.3	7	40	0.7	TM	1,4-16
LDX-2410-630	630 ±3 nm	100	400	320	100	250	15	900	1675	2.3	7	40	0.7	TM	1,4-6,9,10,14,15
LDX-2305-635	635 ±3 nm	50	300	240	100	200	20	300	625	2.1	7	40	0.6	TM	1,4-16
LDX-2410-635	635 ±3 nm	100	400	320	100	250	20	450	850	2.1	7	40	0.6	TM	1,4-16
LDX-2615-635	635 ±3 nm	150	600	480	200	300	20	600	1200	2.1	7	40	0.6	TM	1,4-16
LDX-3130-635	635 ±3 nm	300	1,200	960	300	600	15	1500	2900	2.2	7	40	0.6	TM	1,4,9,10
LDX-2305-645	645 ±5 nm	50	250	200	100	200	20	325	600	2.1	7	40	0.6	TE	1,4-16
LDX-2410-645	645 ±5 nm	100	400	320	100	250	20	650	1050	2.1	7	40	0.4	TE	1,4-16
LDX-3115-650	650 ±5 nm	150	1,000	800	200	300	20	630	1860	2.1	7	40	0.8	TE	1,4-7,9-12,14,15
LDX-2305-660	660 ±3 nm	50	300	240	100	200	20	340	675	2.1	7	40	0.8	TE	1,4-16
LDX-2710-660	660 ±3 nm	100	750	600	100	250	20	550	1200	2.1	7	40	0.7	TE	1,4-16
LDX-3115-660	660 ±3 nm	150	1,000	800	200	300	20	800	1550	2.2	7	40	0.7	TE	1,4-16
LDX-3230-660	660 ±3 nm	300	2,000	1600	300	600	20	1450	3500	2.2	7	40	0.7	TE	1,4,9,10
LDX-2305-665	665 ±3 nm	50	350	280	100	200	20	300	900	2.1	7	40	1.0	TE	1,4-16
LDX-2710-665	665 ±3 nm	100	750	600	100	250	20	400	1100	2.1	7	40	0.7	TE	1,4-16
LDX-3115-665	665 ±3 nm	150	1,000	800	200	300	20	625	1600	2.1	7	40	0.8	TE	1,4-16
LDX-3230-665	665 ±3 nm	300	2,000	1600	300	600	20	1350	3250	2.1	7	40	0.8	TE	1,4-6,9,10,14,15



## 680nm-760nm Laser Diodes

Part Number	Wavelength (nm)	Emitter Size (um)	Output Power (mW)	Output from Fiber (mW)	Min Fiber Size HHL & BTF (um)	Min Fiber Size 9mm SMA (um)	Operating Temp (°C)	Threshold Current (mA) Typ.	Operating Current (mA) Typ.	Operating Voltage (V) Typ.	Beam Divergence (FWHM) $\theta//$ (°)	Beam Divergence (FWHM) $\theta\perp$ (°)	Spectral Width (nm) FWHM	Polarization	Acceptable Packages
LDX-2405-680	680 ±3 nm	50	400	320	100	200	20	200	550	2.1	7	38	0.9	TE	1,4-16
LDX-2810-680	680 ±3 nm	100	800	640	100	250	20	400	1100	2.1	7	38	0.9	TE	1,4-16
LDX-3115-680	680 ±3 nm	150	1,200	960	200	300	20	600	1700	2.1	7	38	0.8	TE	1,4-16
LDX-3230-680	680 ±3 nm	300	2,000	1600	300	600	20	1000	2700	2.1	7	38	0.7	TE	1,4-6,9,10,14,15
LDX-2405-685	685 ±3 nm	50	400	320	100	200	20	200	550	2.1	7	38	1.0	TE	1,4-16
LDX-2810-685	685 ±3 nm	100	800	640	100	250	20	400	1100	2.1	7	38	1.0	TE	1,4-16
LDX-3115-685	685 ±3 nm	150	1,200	960	200	300	20	460	1300	2.1	7	40	0.9	TE	1,4-16
LDX-3230-685	685 ±3 nm	300	2,000	1600	300	600	20	1000	2800	2.1	7	40	0.7	TE	1,4-6,9,10,14,15
LDX-2405-690	690 ±3 nm	50	400	320	100	200	20	300	700	2.2	7	40	0.7	TE	1,4-16
LDX-2710-690	690 ±3 nm	100	750	600	100	250	20	450	1250	2.2	7	40	0.9	TE	1,4-16
LDX-3105-735	735 ±5 nm	50	1,000	800	100	200	25	300	1150	1.9	6	26	1.0	TM	1,4-16
LDX-3110-735	735 ±5 nm	100	1,750	1400	100	250	25	630	2100	1.9	6	26	1.1	TM	1,4-16
LDX-3215-735	735 ±5 nm	150	2,000	1600	200	300	25	800	2600	1.9	6	26	1.1	TM	1,4-16
LDX-3315-735	735 ±5 nm	150	2,500	2000	200	300	25	930	3080	1.9	6	26	1.0	TM	1,4-6,9,10,14,15
LDX-3430-735	735 ±5 nm	300	4,000	3200	300	600	25	1900	5600	1.9	6	26	0.9	TM	1,4,9,10
LDX-3105-750	750 ±5 nm	50	1,000	800	100	200	25	270	1120	1.9	6	26	0.9	TM	1,4-16
LDX-3110-750	750 ±5 nm	100	1,500	1200	100	225	25	270	1600	1.9	6	26	0.9	TM	1,4-16
LDX-3210-750	750 ±5 nm	100	2,000	1600	100	250	25	575	2200	1.9	6	26	1.1	TM	1,4-16
LDX-3315-750	750 ±5 nm	150	3,000	2400	200	300	25	830	3300	1.9	6	26	1.2	TM	1,4-6,9,10,14,15
LDX-3530-750	750 ±5 nm	300	5,000	4000	300	600	25	1660	5900	1.9	6	26	1.1	TM	1,4,9,10
LDX-3105-760	760 ±5 nm	50	1,000	800	100	200	25	250	1100	1.9	7	28	2.0	TM	1,4-16
LDX-3210-760	760 ±5 nm	100	2,000	1600	100	250	25	800	2100	1.9	7	28	2.0	TM	1,4-16
LDX-3315-760	760 ±5 nm	150	3,000	2400	200	300	25	800	3200	1.9	7	28	2.0	TE or TM	1,4-7,9-12,14,15
LDX-3630-760	760 ±5 nm	300	6,000	4800	300	600	25	1400	6200	1.9	7	28	2.0	TM	1,4,9,10



## 780nm-830nm Laser Diodes

Part Number	Wavelength (nm)	Emitter Size (um)	Output Power (mW)	Output from Fiber (mW)	Min Fiber Size HHL & BTF (um)	Min Fiber Size 9mm SMA (um)	Operating Temp (°C)	Threshold Current (mA) Typ.	Operating Current (mA) Typ.	Operating Voltage (V) Typ.	Beam Divergence (FWHM) $\theta_{//}$ (°)	Beam Divergence (FWHM) $\theta_{\perp}$ (°)	Spectral Width (nm) FWHM	Polarization	Acceptable Packages
LDX-3105-780	780 ±3 nm	50	1,200	960	100	200	25	300	1250	1.9	7	26	1.0	TM	1,4-16
LDX-3210-780	780 ±3 nm	100	2,500	2000	100	250	25	300	2350	1.8	7	26	1.9	TE	1,4-16
LDX-3315-780	780 ±3 nm	150	3,500	2800	200	300	25	550	3500	1.8	7	26	1.7	TE	1,4-7,9-12,14,15
LDX-3520-780	780 ±3 nm	200	5,000	4000	200	350	25	800	5000	1.8	7	26	1.8	TE	1,4-6,9,10,14,15
LDX-3315-785	785 ±3 nm	150	3,500	2800	200	300	25	575	3200	1.8	7	26	1.5	TE	1,4-16
LDX-3520-785	785 ±3 nm	200	5,000	4000	200	350	25	800	5000	1.8	7	26	1.8	TE	1,4-6,9,10,14,15
LDX-3105-792	792 ±3 nm	50	1,200	960	100	200	25	300	2350	1.8	7	26	1.9	TM	1,4-16
LDX-3210-792	792 ±3 nm	100	2,500	2000	100	250	25	380	2900	1.8	7	26	1.5	TE or TM	1,4-16
LDX-3315-792	792 ±3 nm	150	3,500	2800	200	300	25	670	3200	1.9	7	26	1.0	TM	1,4-7,9-12,14,15
LDX-3310-797	797 ±3 nm	100	3,000	2400	100	250	25	380	2900	1.8	7	36	1.5	TE	1,4-16
LDX-3415-797	797 ±3 nm	150	4,000	3200	200	300	25	670	3200	1.9	7	36	1.0	TE	1,4-16
LDX-3105-808	808 ±3 nm	50	1,200	960	100	200	25	300	1350	1.9	7	36	1.3	TE	1,4-16
LDX-3210-808	808 ±3 nm	100	2,000	1600	100	250	25	300	2000	2.0	7	36	1.9	TE	1,4-16
LDX-3310-808	808 ±3 nm	100	3,000	2400	100	250	25	400	2900	1.8	7	36	1.1	TE	1,4-16
LDX-3410-808	808 ±3 nm	100	4,000	3200	100	250	25	425	3600	1.9	7	36	1.6	TE	1,4-7,9-12,14,15
LDX-3415-808	806 ±3 nm	150	4,000	3200	200	300	25	370	3600	2.0	7	36	2.0	TE	1,4-6,9,10,14,15
LDX-3610-808	808 ±3 nm	100	6,000	4800	100	250	25	370	5800	2.0	7	36	2.0	TE	3-16
LDX-3620-808	808 ±3 nm	200	6,000	4800	200	350	25	750	5500	1.8	7	36	1.8	TE	1,4-6,9,10,14,15
LDX-3A20-808	808 ±5 nm	200	10,000	8000	200	350	25	1450	10000	1.8	7	28	1.3	TM	3,9
LDX-3415-825	825 ±5 nm	150	4,000	3200	200	300	25	500	3750	1.8	7	36	1.8		1,4-7,9-12,14,15
LDX-3110-830	830 ±5 nm	100	1,600	1280	100	250	25	220	1750	2	7	40	2.0	TE	1,4-16



## 860nm-1030nm Laser Diodes

Part Number	Wavelength (nm)	Emitter Size (um)	Output Power (mW)	Output from Fiber (mW)	Min Fiber Size HHL & BTF (um)	Min Fiber Size 9mm SMA (um)	Operating Temp (°C)	Threshold Current (mA) Typ.	Operating Current (mA) Typ.	Operating Voltage (V) Typ.	Beam Divergence (FWHM) $\theta//$ (°)	Beam Divergence (FWHM) $\theta\perp$ (°)	Spectral Width (nm) FWHM	Polarization	Acceptable Packages
LDX-3203-860	860 ±10 nm	30	1,000	800	100	200	25	200	1100	1.8	7	36	3.0	TE	1,4-16
LDX-3105-860	860 ±10 nm	50	1,000	800	100	200	25	150	1000	1.8	7	42	3.0	TE	1,4-16
LDX-3110-860	860 ±10 nm	100	1,500	1200	100	250	25	275	1500	1.8	7	36	3.0	TE	1,4-16
LDX-3210-860	860 ±10 nm	100	2,000	1500	100	250	25	325	2000	1.8	7	36	3.0	TE	1,4-16
LDX-3310-860	860 ±10 nm	100	3,000	2400	100	250	25	400	2800	1.8	7	36	3.0	TE	1,4-16
LDX-3415-860	860 ±10 nm	150	4,000	3200	200	300	25	575	3900	1.8	7	36	3.0	TE	1,4-6,9,10,14,15
LDX-3520-860	860 ±10 nm	200	5,000	4000	200	300	25	750	4900	1.8	7	36	3.0	TE	1,4-6,9,10,14,15
LDX-3210-885	885 ±10 nm	100	2,500	2000	100	250	25	200	2500	2.0	7	44	2.4	TE	1,4-7,9-12,14,15
LDX-3615-885	885 ±10 nm	150	6,000	4800	200	300	25	350	4600	2	7	28	2.0	TE	1,4-6,9,10,14,15
LDX-3210-900	900 ±5 nm	100	2,000	1600	100	250	25	200	2100	1.9	7	44	2.2	TE	1,4-16
LDX-3310-915	915 ±10 nm	100	3,000	2400	100	250	25	250	2800	1.8	7	28	3.0	TE	1,4-16
LDX-3615-915	915 ±10 nm	150	6,000	4800	200	300	25	500	4700	1.8	7	28	3.0	TE	1,4-6,9,10,14,15
LDX-3A10-915	915 ±10 nm	100	10,000	8000	100	250	25	550	10000	1.8	7	28	3.0	TE	3-16
LDX-3310-940	940 ±10 nm	100	3,000	2400	100	250	25	250	2800	1.7	7	26	2.5	TE	1,4-16
LDX-3615-940	940 ±10 nm	150	6,000	4800	200	300	25	500	4700	1.8	7	28	3.0	TE	1,4-16
LDX-3F20-940	940 ±10 nm	200	16,000	12800	200	350	25	650	16000	1.8	7	28	3.0	TE	3-16
LDX-3A10-960	960 ±10 nm	100	10,000	8000	100	250	25	550	10000	1.5	7	28	3.0	TE	3,4,9,10
LDX-3105-980	980 ±10 nm	50	1,600	1280	100	200	25	200	1900	1.8	7	26	3.0	TE	1,4-16
LDX-3410-980	980 ±10 nm	100	4,000	3200	100	250	25	300	4400	1.8	7	26	2.0	TE	1,4-6,9,10,14,15
LDX-3A10-980	980 ±10 nm	100	10,000	8000	100	250	25	550	10000	1.5	7	28	3.0	TE	3-16
LDX-3515-980	980 ±10 nm	150	5,000	4000	200	300	25	400	5000	1.7	7	26	2.6	TE	1,4-6,9,10,14,15
LDX-3615-980	980 ±10 nm	150	6,000	4800	200	300	25	500	4700	1.8	7	28	3.0	TE	1,4-16
LDX-3310-1030	1030 ±10 nm	100	3,000	2400	100	250	25	200	3800	2	7	38	4.0	TE	1,4-6,9,10,14,15
LDX-3520-1030	1030 ±10 nm	200	5,000	4000	200	350	25	410	6250	2.1	7	38	4.2	TE	1,9



## 1064nm-1850nm Laser Diodes

Part Number	Wavelength (nm)	Emitter Size (um)	Output Power (mW)	Output from Fiber (mW)	Min Fiber Size HHL & BTF (um)	Min Fiber Size 9mm SMA (um)	Operating Temp (°C)	Threshold Current (mA) Typ.	Operating Current (mA) Typ.	Operating Voltage (V) Typ.	Beam Divergence (FWHM) $\theta//$ (°)	Beam Divergence (FWHM) $\theta\perp$ (°)	Spectral Width (nm) FWHM	Polarization	Acceptable Packages
LDX-3105-1064	1064 ±10 nm	50	1,500	1200	100	200	25	170	1750	1.4	7	38	3.0	TE	1,4-16
LDX-3310-1064	1064 ±10 nm	100	3,000	2400	100	250	25	300	3700	1.4	7	38	3.0	TE	1,4-16
LDX-3515-1064	1064 ±10 nm	150	5,000	4000	200	300	25	250	7000	1.5	7	38	3.7	TE	1,4,9,10
LDX-3205-1120	1120 ±10 nm	50	2,000	1600	100	200	25	160	3200	1.9	7	28	4.3	TE	1,4-6,9,10,14,15
LDX-3310-1120	1120 ±10 nm	100	3,500	2800	100	250	20	250	5800	1.7	7	28	3.6	TE	1,4,9,10
LDX-3515-1120	1120 ±10 nm	150	5,000	4000	200	300	25	300	8500	2	7	28	5.5	TE	2,3
LDX-3105-1210	1210 ±10 nm	50	1,500	1200	100	200	25	350	5000	1.4	7	28	6.0	TE	1,4,9,10
LDX-3210-1210	1210 ±10 nm	100	2,000	1600	100	250	25	600	7100	1.4	7	28	6.2	TE	1,4,9,10
LDX-3310-1290	1290 ±20 nm	100	3,500	2800	100	250	25	350	5700	1.5	8	30	6.4	TE	1,4,9,10
LDX-3510-1290	1290 ±20 nm	100	5,000	4000	100	250	25	430	9920	1.6	8	30	7.7	TE	2
LDX-3718-1290	1290 ±20 nm	180	7,000	5600	200	300	25	880	13800	1.5	8	30	6.6	TE	2
LDX-3310-1370	1370 ±20 nm	100	3,500	2800	100	250	25	320	6700	1.6	8	30	7.5	TE	1,4,9,10
LDX-3510-1370	1370 ±20 nm	100	5,000	4000	100	250	25	450	10800	1.6	8	30	8.4	TE	2
LDX-3310-1470	1470 ±20 nm	100	3,500	2800	100	250	25	410	7500	1.7	8	30	10.4	TE	1
LDX-3510-1470	1470 ±20 nm	100	5,000	4000	100	250	25	530	10960	1.6	8	30	9.8	TE	2
LDX-3718-1470	1470 ±20 nm	180	7,000	5600	200	300	25	800	15000	1.5	8	30	9.8	TE	2,4-15
LDX-2803-1550	1550 ±20 nm	35	800	640	100	200	25	300	3000	1.3	8	30	8.0	TE	1,4-6,9,10,14,15
LDX-3105-1550	1550 ±20 nm	50	1,000	800	100	200	25	350	3700	1.3	8	30	8.0	TE	1,4-6,9,10,14,15
LDX-3205-1550	1550 ±20 nm	50	1,750	1400	100	200	25	380	4500	1.3	8	30	9.0	TE	
LDX-3110-1550	1550 ±20 nm	100	1,500	1200	100	250	25	500	3700	1.1	8	30	7.0	TE	1,4-7,9-12,14,15
LDX-3210-1550	1550 ±20 nm	100	2,500	2000	100	250	25	500	6000	1.2	8	30	8.0	TE	1,4-6,9,10,14,15
LDX-3310-1550	1550 ±20 nm	100	3,500	2800	100	250	25	500	9200	1.4	8	30	10.0	TE	2
LDX-3518-1550	1550 ±20 nm	180	5,000	4000	200	300	25	800	14000	1.5	8	30	9.0	TE	2
LDX-3115-1620	1620 ±20 nm	150	1,000	800	200	300	20	1000	6100	1.2	7	40	7.0	TE	1,4
LDX-3120-1640	1640 ±20 nm	200	1,200	960	200	350	20	1300	6800	1.2	7	40	8.0	TE	1,4,9,10
LDX-3210-1675	1675 ±20 nm	100	2,000	1600	100	250	20	1300	7200	1.2	7	40	8.0	TE	2,4-15
LDX-3110-1850	1850 ±30 nm	100	1,000	800	100	250	15	400	5200	1.3	6	40	8.0	TE	1,4,9,10



## 660nm-1064nm Diode Arrays

Part Number	Wavelength (nm)	Emitter Size (um)	Output Power (mW)	Output from Fiber (mW)	Min Fiber Size HHL & BTF (um)	Min Fiber Size 9mm SMA (um)	Operating Temp (°C)	Threshold Current (mA) Typ.	Operating Current (mA) Typ.	Operating Voltage (V) Typ.	Beam Divergence (FWHM) $\theta_{//}$ (°)	Beam Divergence (FWHM) $\theta_{\perp}$ (°)	Spectral Width (nm) FWHM	Polarization	Acceptable Packages
LDX-4119-660	660 ±5 nm	100 x 19	10	N/A	N/A	N/A	15	9400	21000	2.1	7	40	1	TE	CS Package
LDX-4119-670	670 ±5 nm	100 x 19	10	N/A	N/A	N/A	15	9400	21000	2.1	7	40	1	TE	CS Package
LDX-4119-680	680 ±3 nm	150 x 19	12	N/A	N/A	N/A	15	9000	24000	2.5	7	40	1	TE	CS Package
LDX-4119-690	690 ±3 nm	150 x 19	12	N/A	N/A	N/A	15	6500	22000	2.3	7	36	1	TE	CS Package
LDX-4219-730	730 ±5 nm	150 x 19	20	N/A	N/A	N/A	20	12000	28000	1.9	7	26	1	TM	CS Package
LDX-4224-750	750 ±5 nm	100 x 24	20	N/A	N/A	N/A	20	12000	28000	1.9	7	26	1	TM	CS Package
LDX-4219-760	760 ±5 nm	150 x 19	20	N/A	N/A	N/A	20	12000	28000	1.9	7	26	1	TM	CS Package
LDX-4319-795	795 ±5 nm	150 x 19	30	N/A	N/A	N/A	20	10000	28000	1.9	7	26	2	TM	CS Package
LDX-4424-1064	1064 ±10 nm	100 x 24	40	N/A	N/A	N/A	20	5000	30000	1.4	7	38	5	TE	CS Package
LDX-4419-1064	1064 ±10 nm	150 x 19	40	N/A	N/A	N/A	20	5000	30000	1.4	7	38	5	TE	CS Package

Other Array Wavelengths Available by Request

Standard Bar Package:

CS Package





## Part Numbering System

# LDX-XXXX-XXX-XXX-XXX

LDX Optronics

Chip Design

Wavelength

### Package Type

- C - C-Mount
- B - B-Mount
- Q - Q-Mount
- COS - Chip on Submount
- 9 - 9mm Package
- TO3 - TO-3 Package
- HHL - HHL Package
- 9-SMA - 9mm SMA Package
- HHL-FC - HHL Package
- BFC - 8 pin High Heat Load
- FCP - 2-pin Package
- CHIP - Unmounted Chip
- BAR - Unmounted Bar







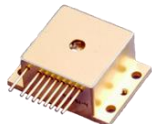
### Options


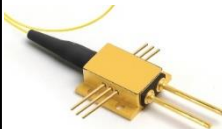


- TEC - Internal TEC
- PD - Photodiode
- T - Thermister
- L1 - FAC Lens, Best Collimation
- L2 - FAC Lens, Squared Beam
- AR - Low AR Coating

BAR - Unmounted Bar  
CHIP - Unmounted Chip  
FCP - 2-pin Package  
BFC - 8 pin High Heat Load



## Standard Package Types

Free Space Packages	
C-Mount Medium C-Mount (C1) Thick C-Mount (C2)	
B-Mount (4)	
Q-Mount (5)	
Chip on Submount (6)	
9mm Package (7)	
TO-3 Package (8) w/o TEC (9)	
HHL Package (10)	

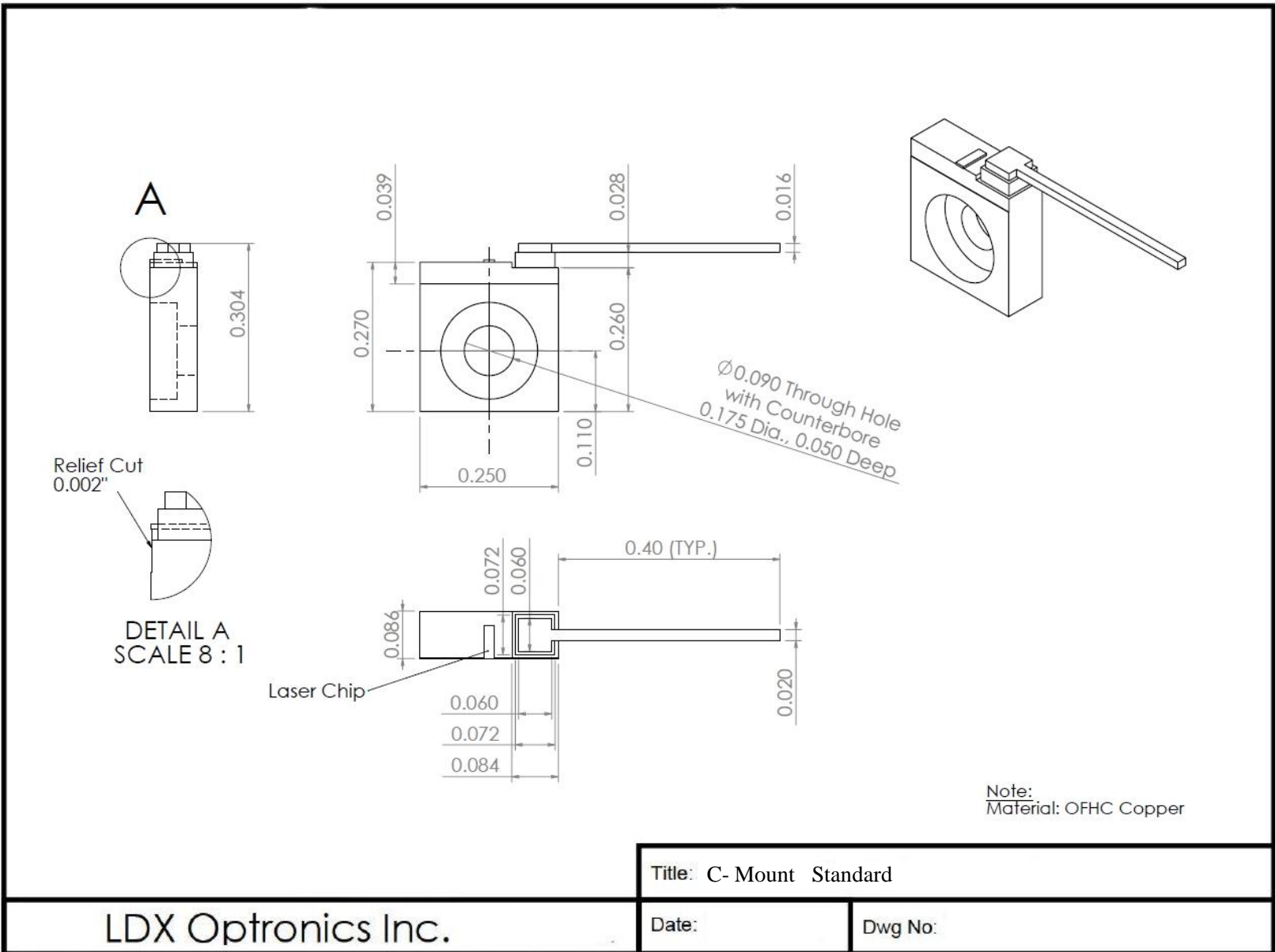
Fiber Coupled Packages	
9mm SMA FC Package (11)	
8-pin HHL FC Package (13) w/o TEC (14)	
HHL FC Package (12)	
2-pin FC Package (15)	

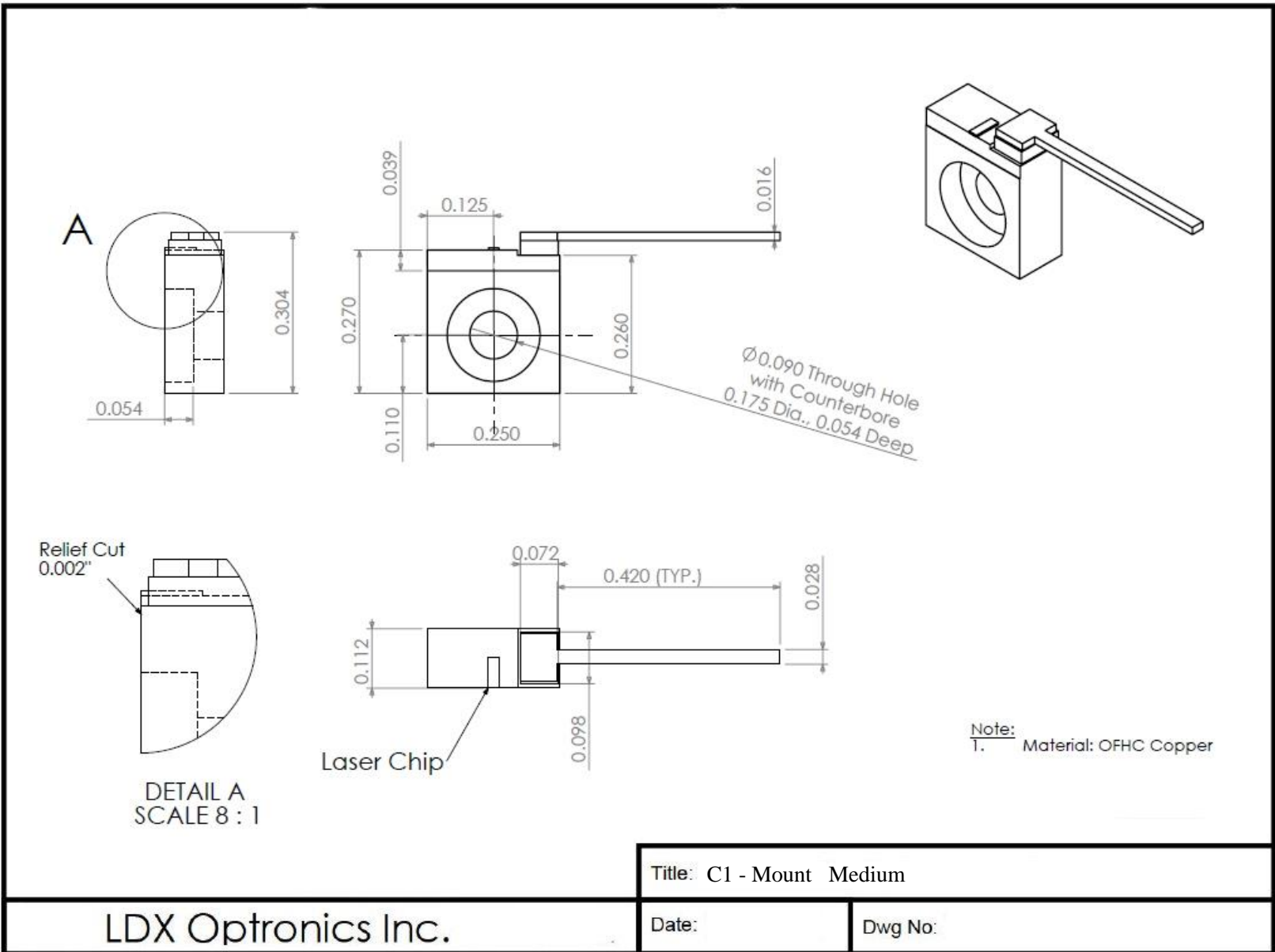
## Standard / Optional Features

Package Type	Package #	PD	Thermistor	TEC	FAC
Cstd	1	NO	NO	NO	O
Cmed	2	NO	NO	NO	O
Cthick	3	NO	NO	NO	O
B	4	NO	NO	NO	O
Q	5	NO	NO	NO	O
COS	6	NO	NO	NO	O
9MM	7	YES	NO	NO	O
TO3 w TEC	8	YES	YES	YES	O
TO3 w/o TEC	9	O	O	NO	O
HHL	10	YES	YES	YES	O
9MM SMA	11	YES	NO	NO	NO
HHLFC	12	YES	YES	YES	NO
BFC TEC	13	YES	YES	YES	NO
BFC w/o TEC	14	YES	YES	NO	NO
FCP	15	NO	NO	NO	NO
CHIP	16	NO	NO	NO	NO
BAR	17	NO	NO	NO	NO

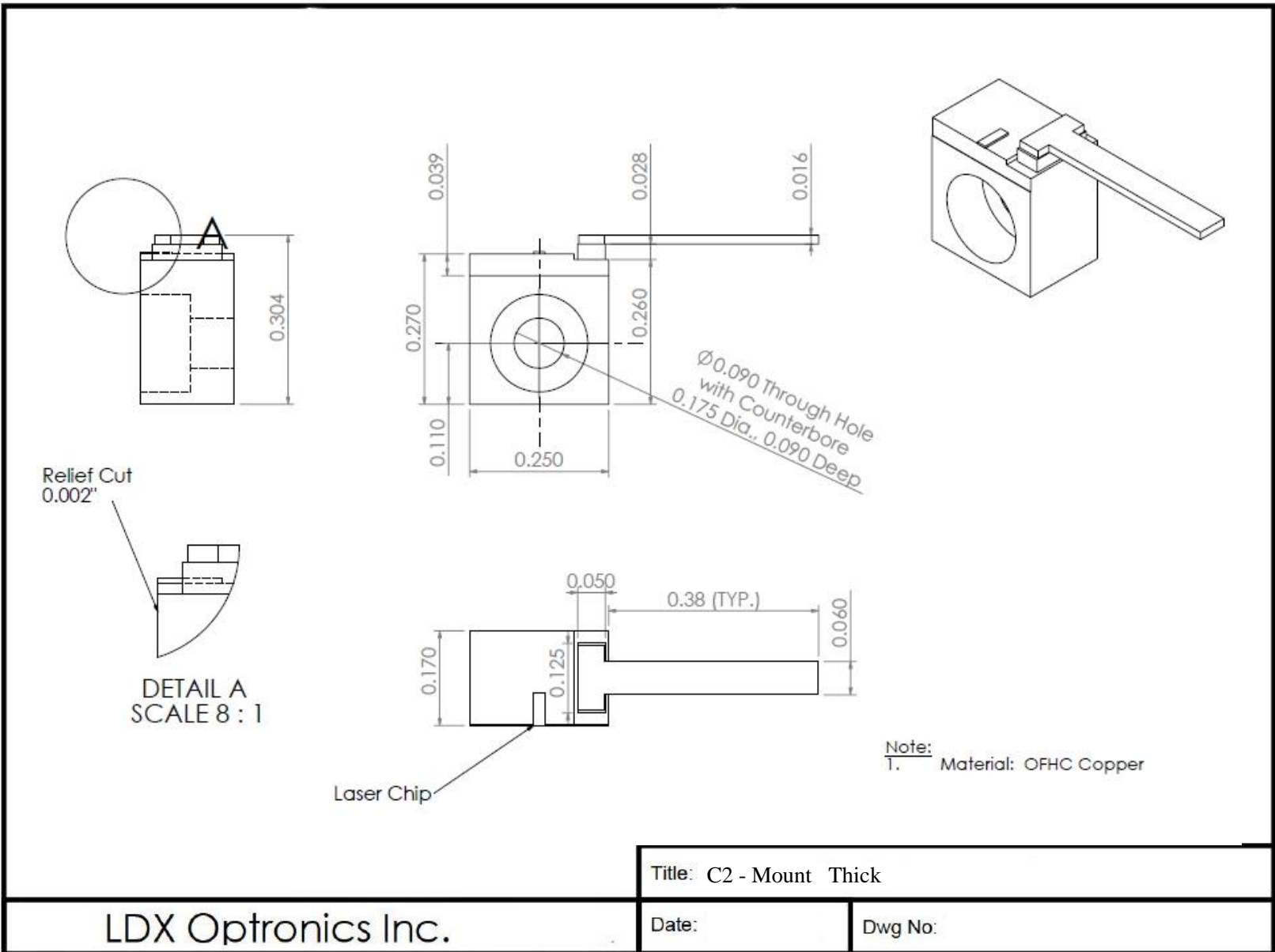
O - Optional

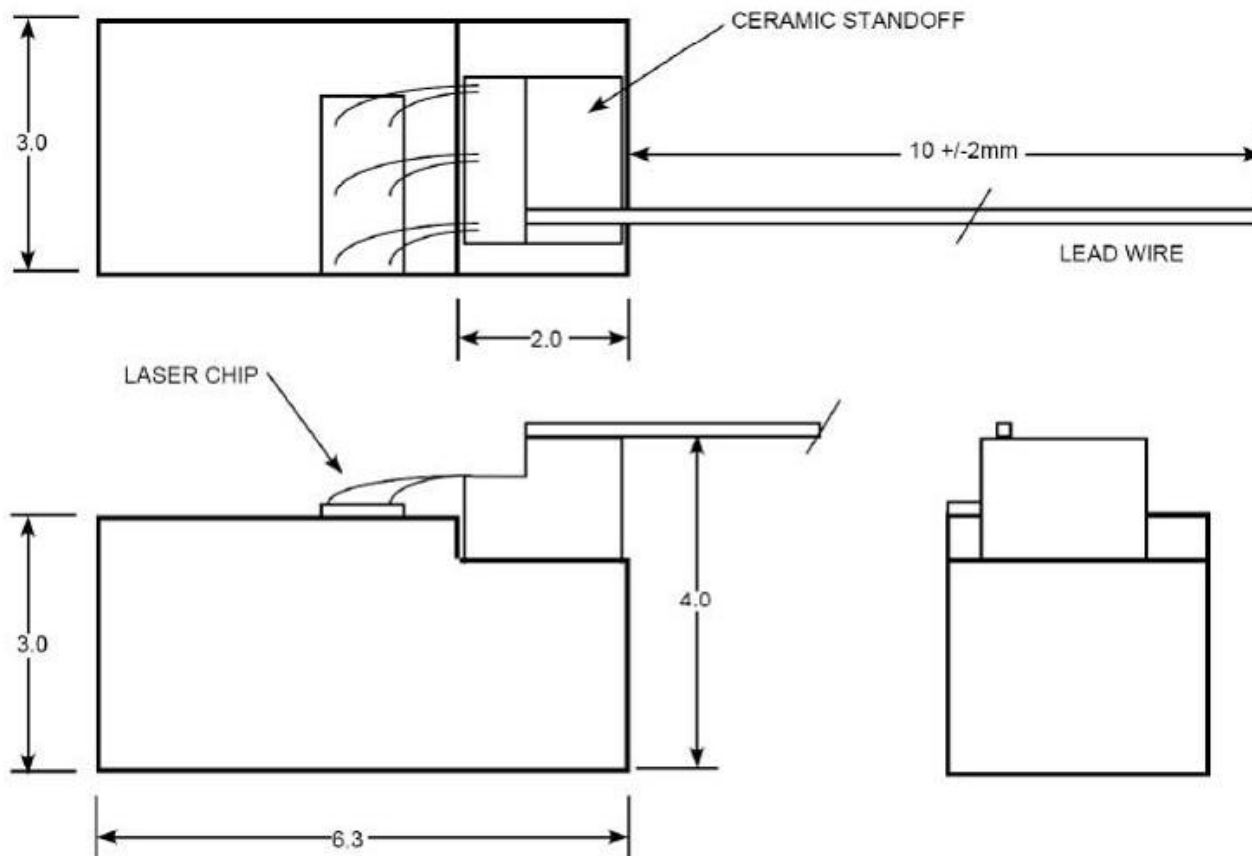






LDX Optronics Inc.



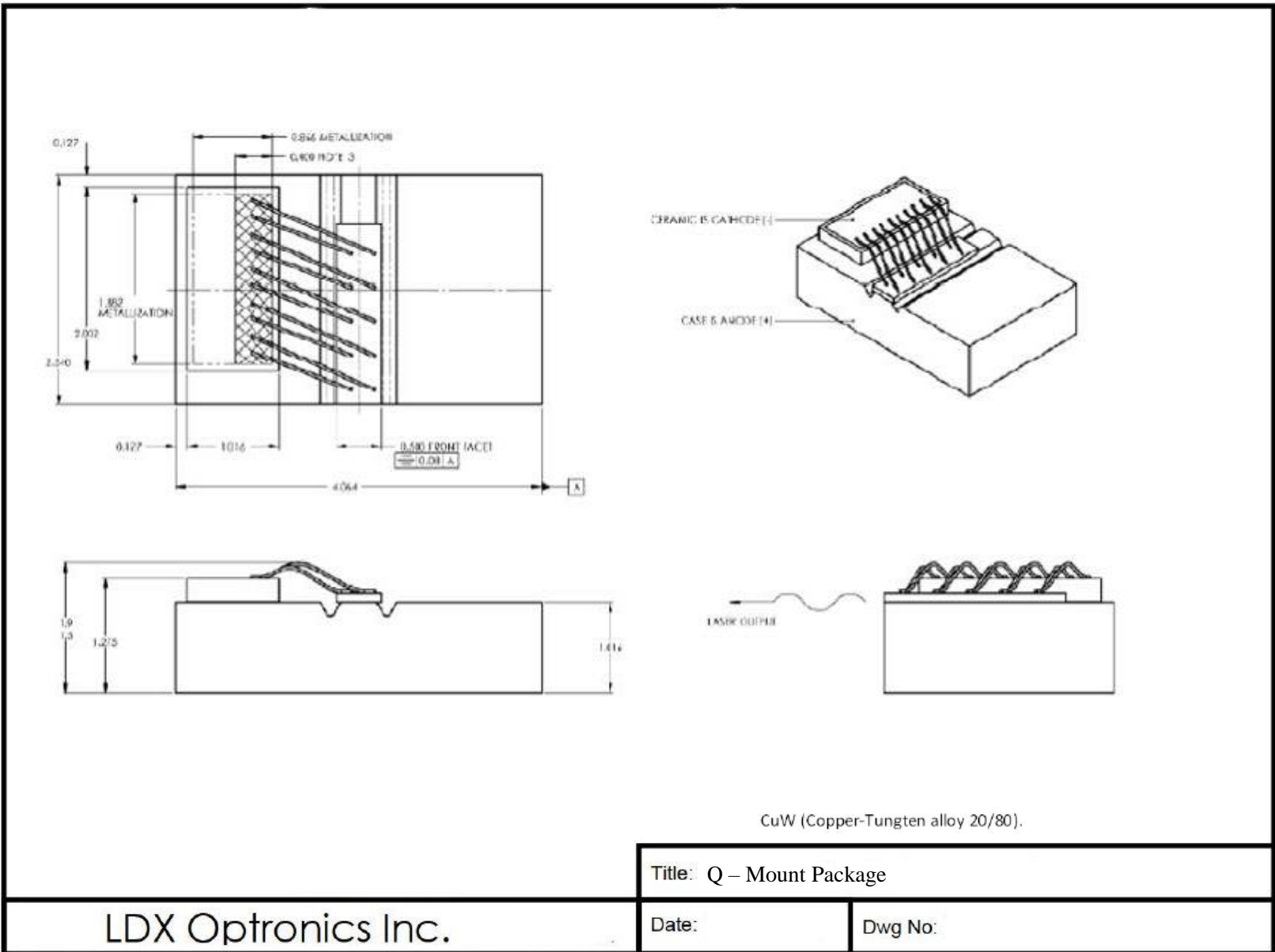


Title: B – Mount Package

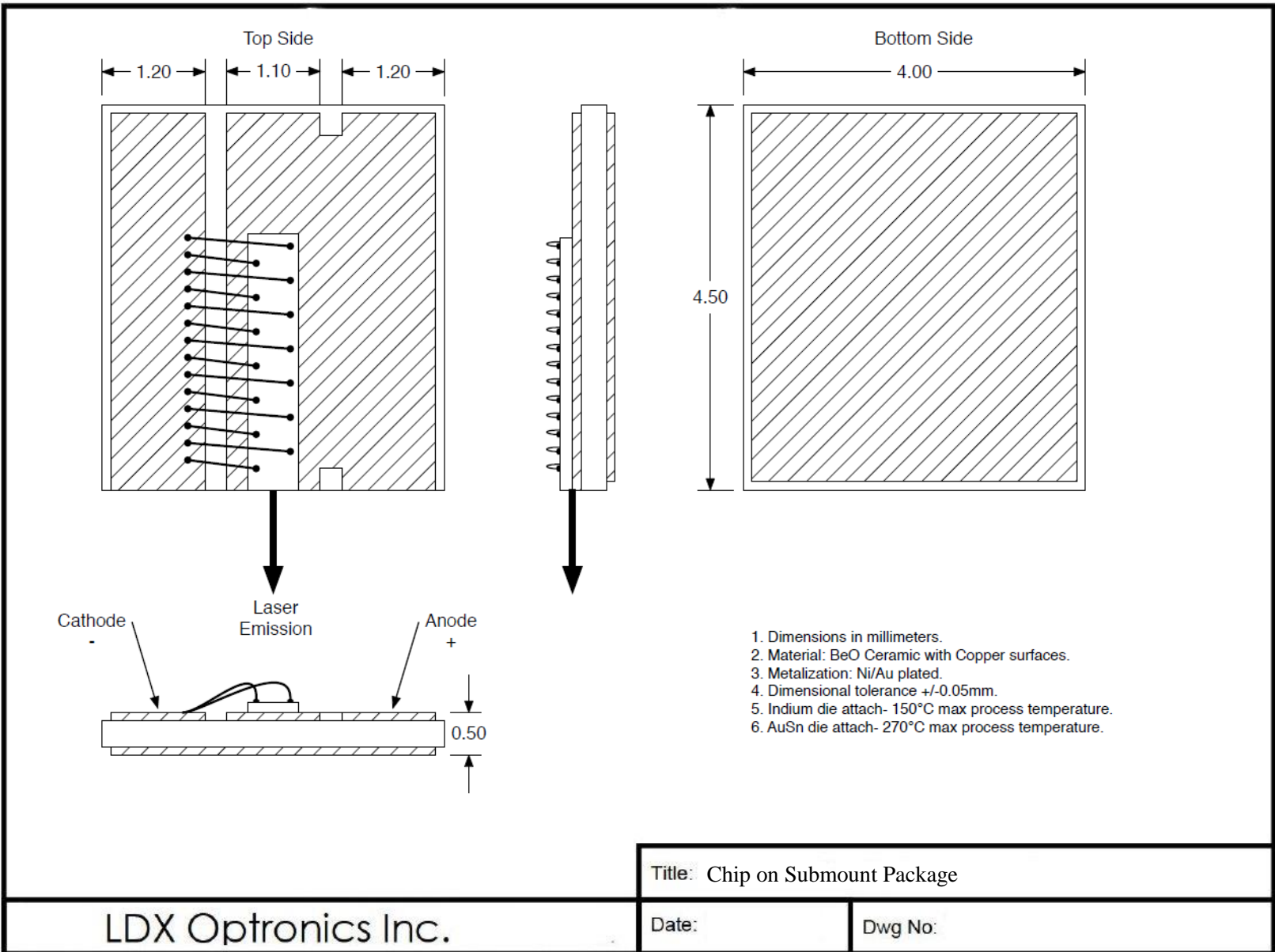
LDX Optronics Inc.

Date:

Dwg No:

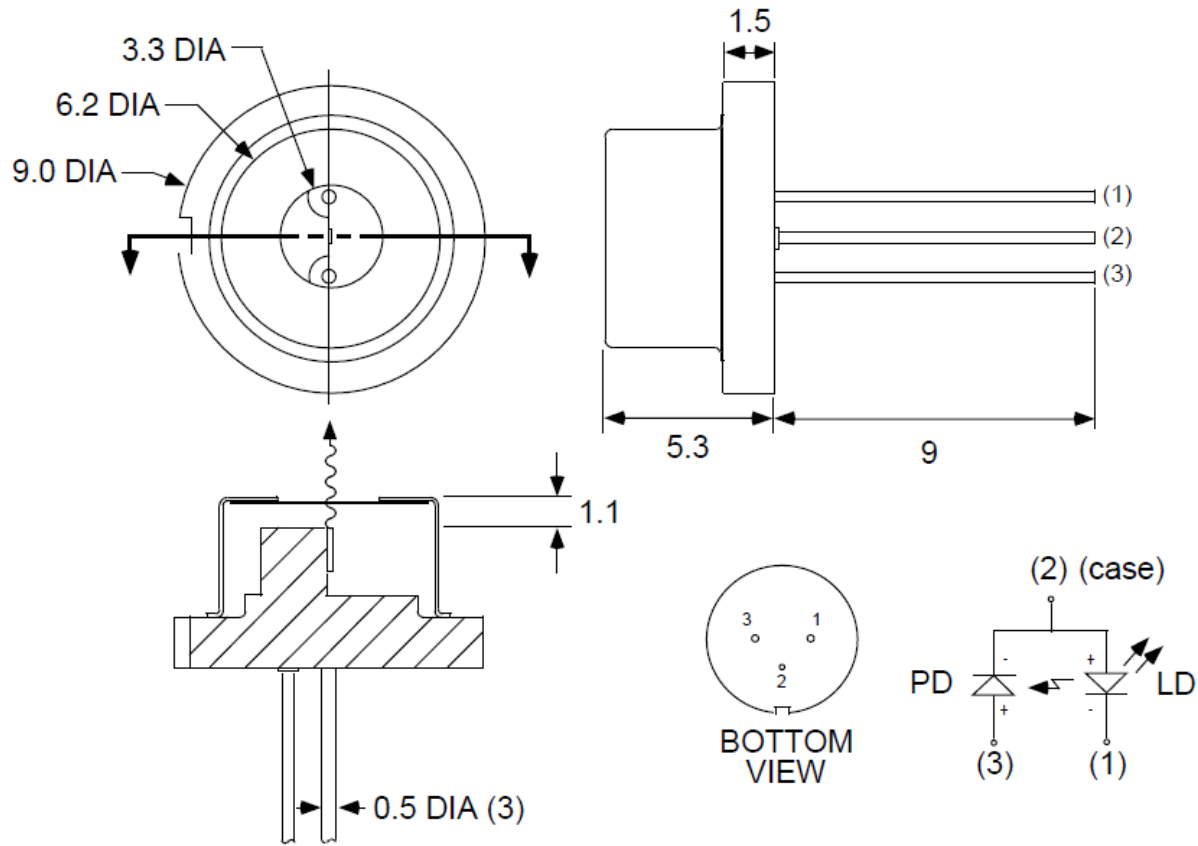


LDX Optronics Inc.



LDX Optronics Inc.



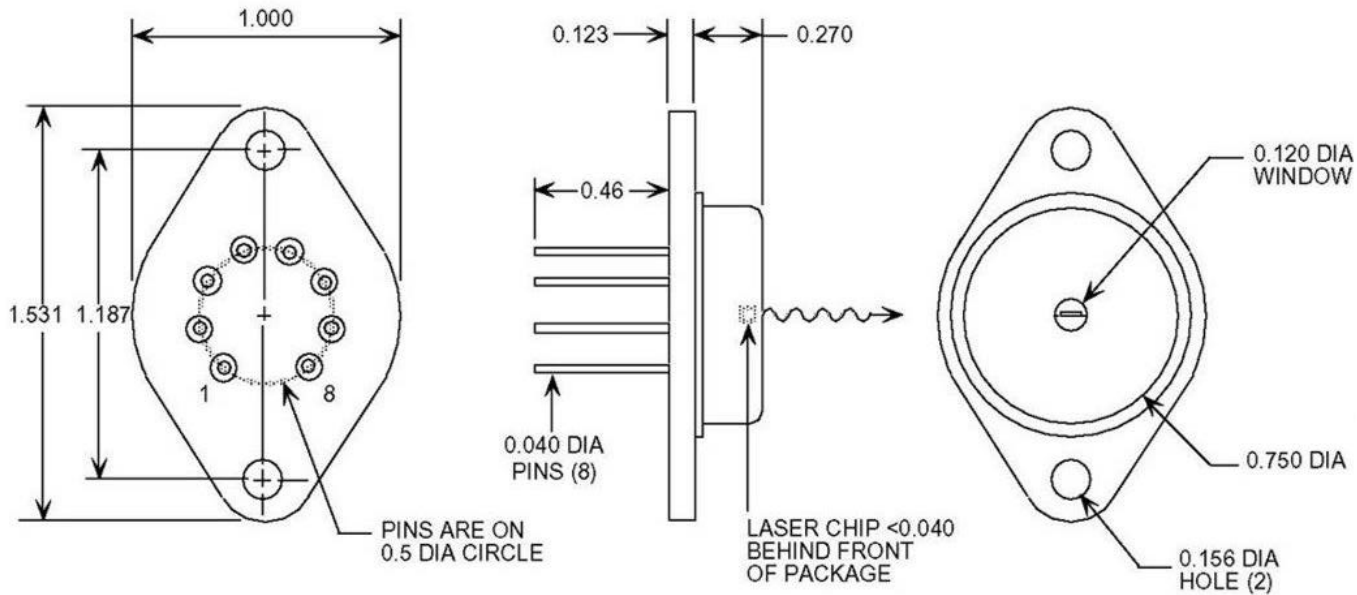


Title: 9mm Package

Date:

Dwg No:

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PIN 1: TEC (+)  
 PIN 2: THERMISTOR  
 PIN 3: THERMISTOR  
 PIN 4: LASER CATHODE (-)  
 PIN 5: LASER ANODE (+)  
 PIN 6: P.D. ANODE  
 PIN 7: P.D. CATHODE  
 PIN 8: TEC (-)

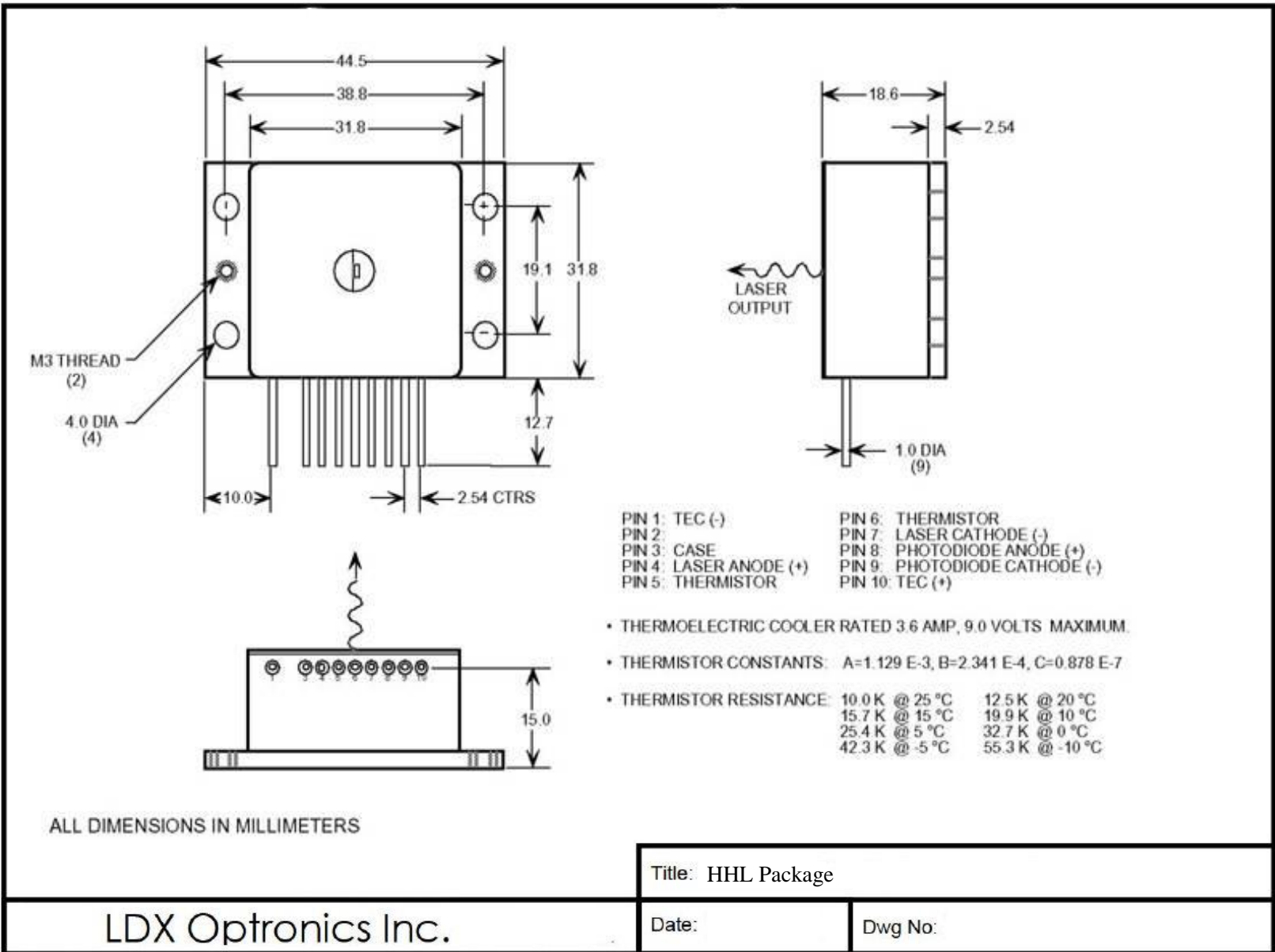
- THERMOELECTRIC COOLER RATED 6.2 VOLT, 1.8 AMP MAXIMUM.
- THERMISTOR CONSTANTS:  $A=1.129 \text{ E-3}$ ,  $B=2.341 \text{ E-4}$ ,  $C=0.878 \text{ E-7}$
- THERMISTOR RESISTANCE:
  - 10.0 K @ 25 °C
  - 12.5 K @ 20 °C
  - 15.7 K @ 15 °C
  - 19.9 K @ 10 °C
  - 25.4 K @ 5 °C

Title: TO-3 Package

LDX Optronics Inc.

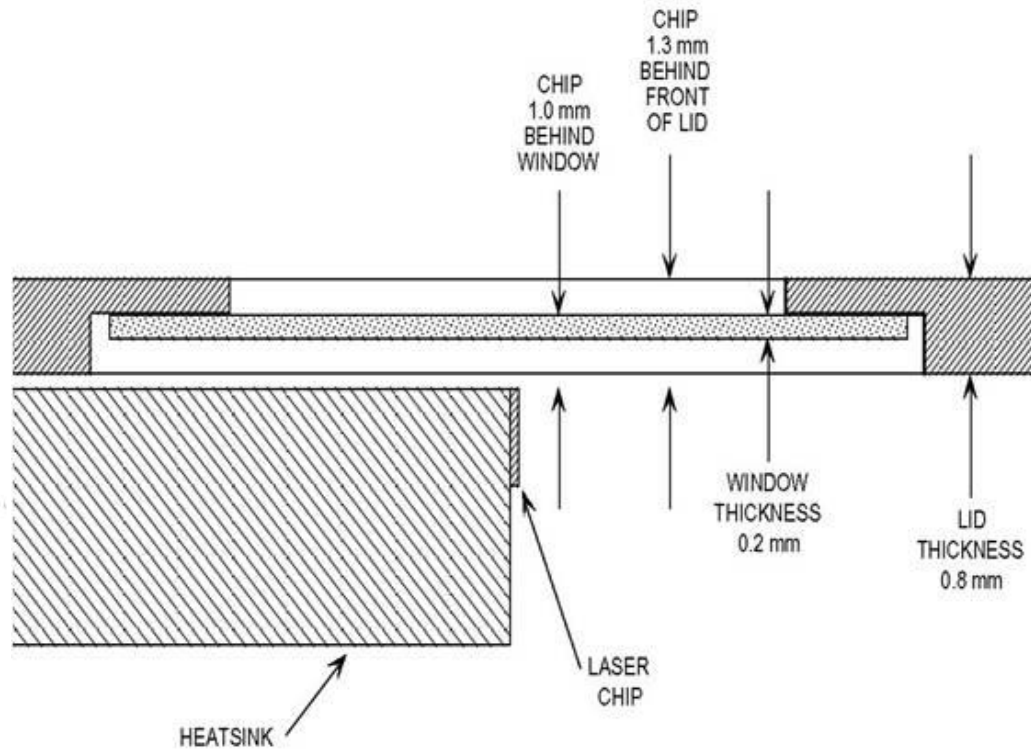
Date:

Dwg No:



LDX Optronics Inc.

HHL PACKAGE- WINDOW SECTION DETAIL

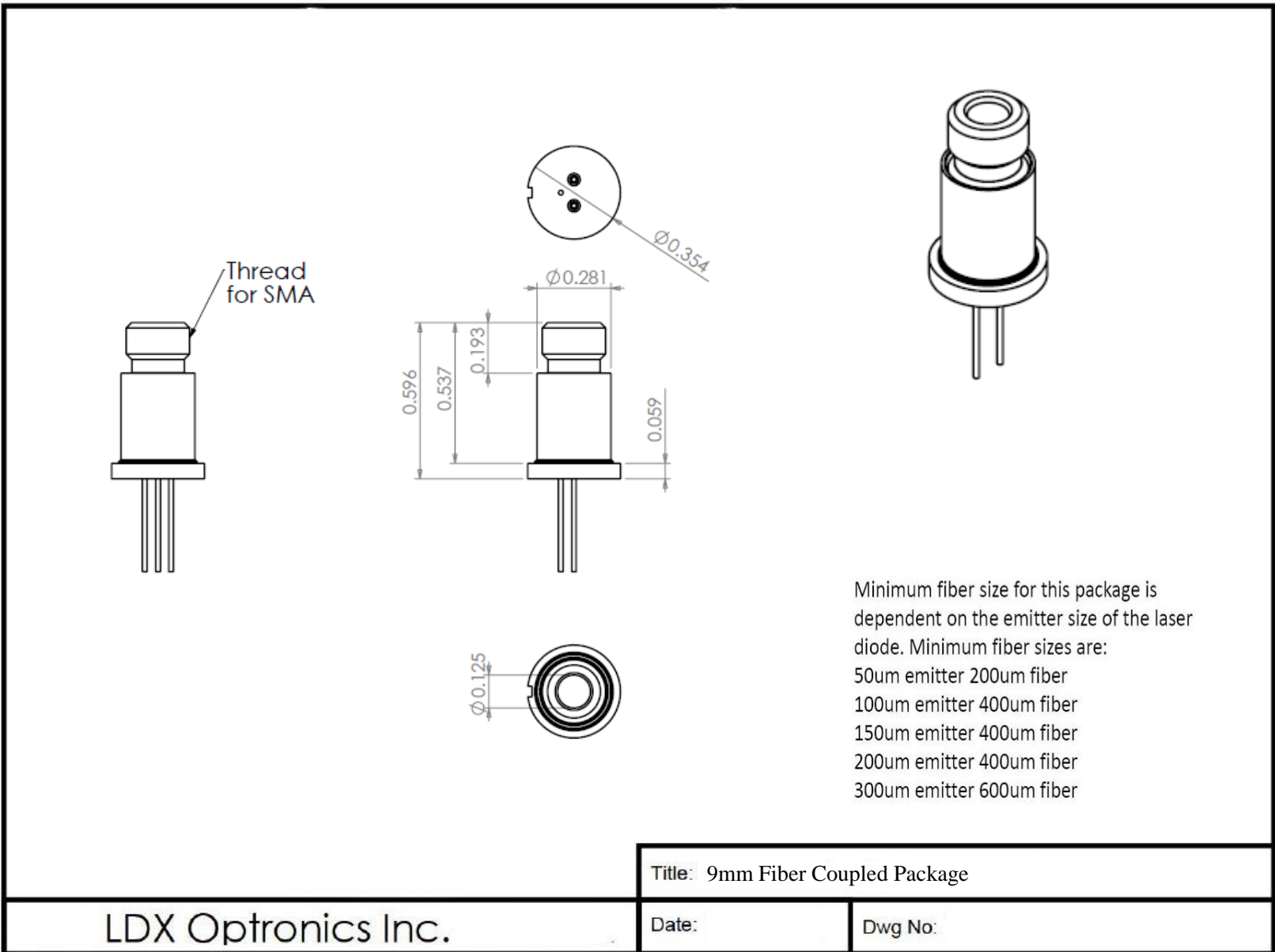


Title: HHL Package Window Detail

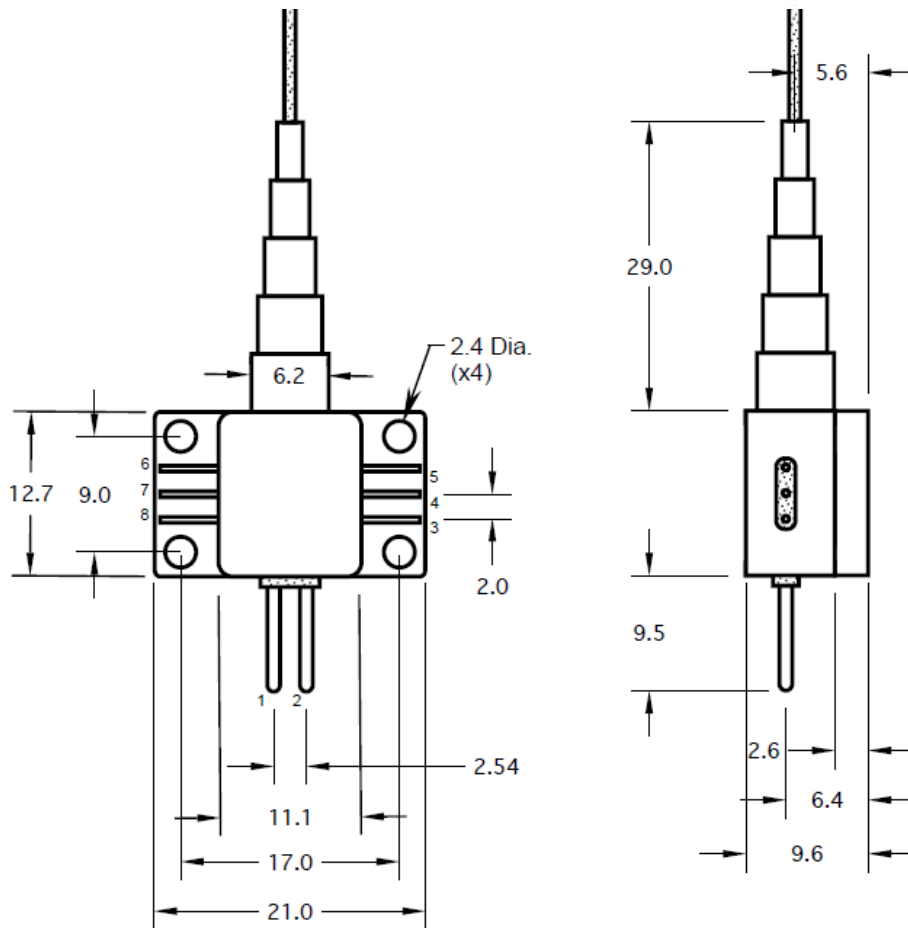
LDX Optronics Inc.

Date:

Dwg No:



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• **Standard Pin Assignment:**

1. Laser Anode (+)
2. Laser Cathode (-)
3. TEC +
4. Photodiode Anode
5. Photodiode Cathode
6. Thermistor
7. Thermistor
8. TEC -

• **Thermoelectric Cooler:**

2.5 Amps, 3.5 Volts max.

• **Thermistor Constants:**

A= 1.129 E-3  
 B= 2.341 E-4  
 C= 0.878 E-7

• **Thermistor Resistance:**

4.37 K $\Omega$  @ 45 °C  
 6.53 K $\Omega$  @ 35 °C  
 10.0 K $\Omega$  @ 25 °C  
 15.7 K $\Omega$  @ 15 °C  
 25.4 K $\Omega$  @ 5 °C

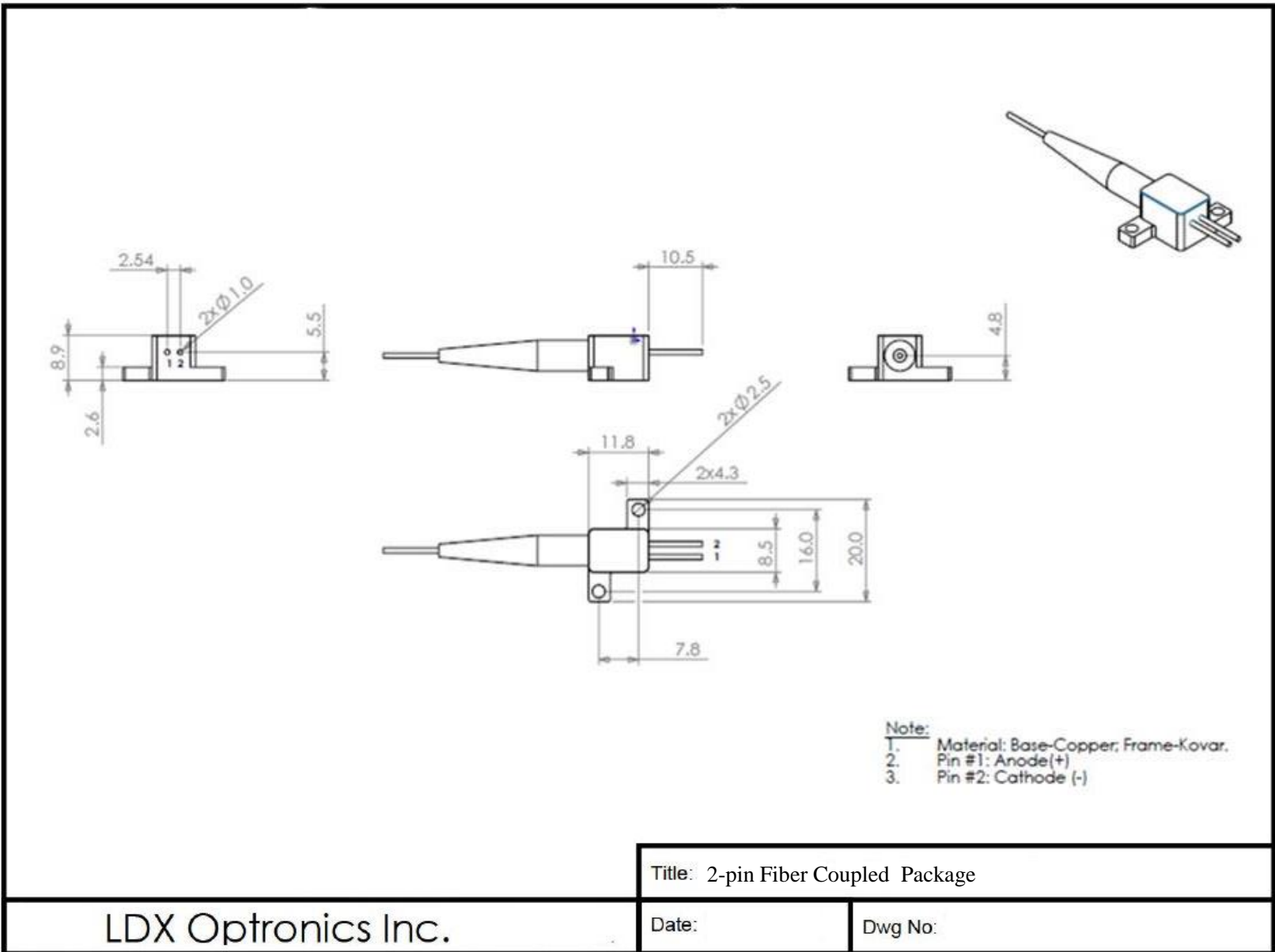
1. All dimensions in millimeters
2. Base: OFHC Copper
3. Small pins (x6) are 0.5mm dia., 2.0mm spacing
4. High-current pins (x2): 1.0mm dia., 2.54mm spacing

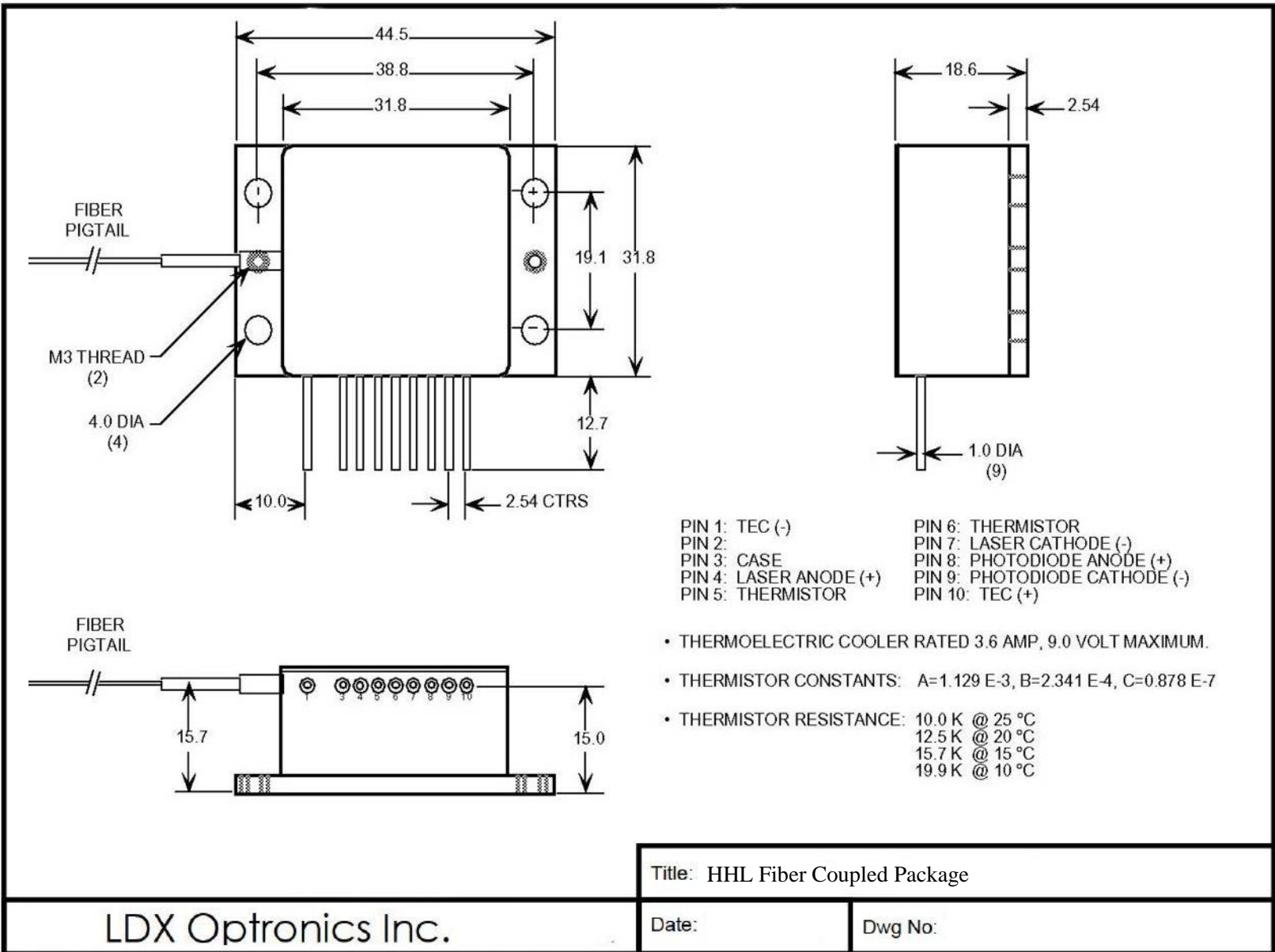
Title: 8-pin HHL Fiber Coupled package

LDX Optronics Inc.

Date:

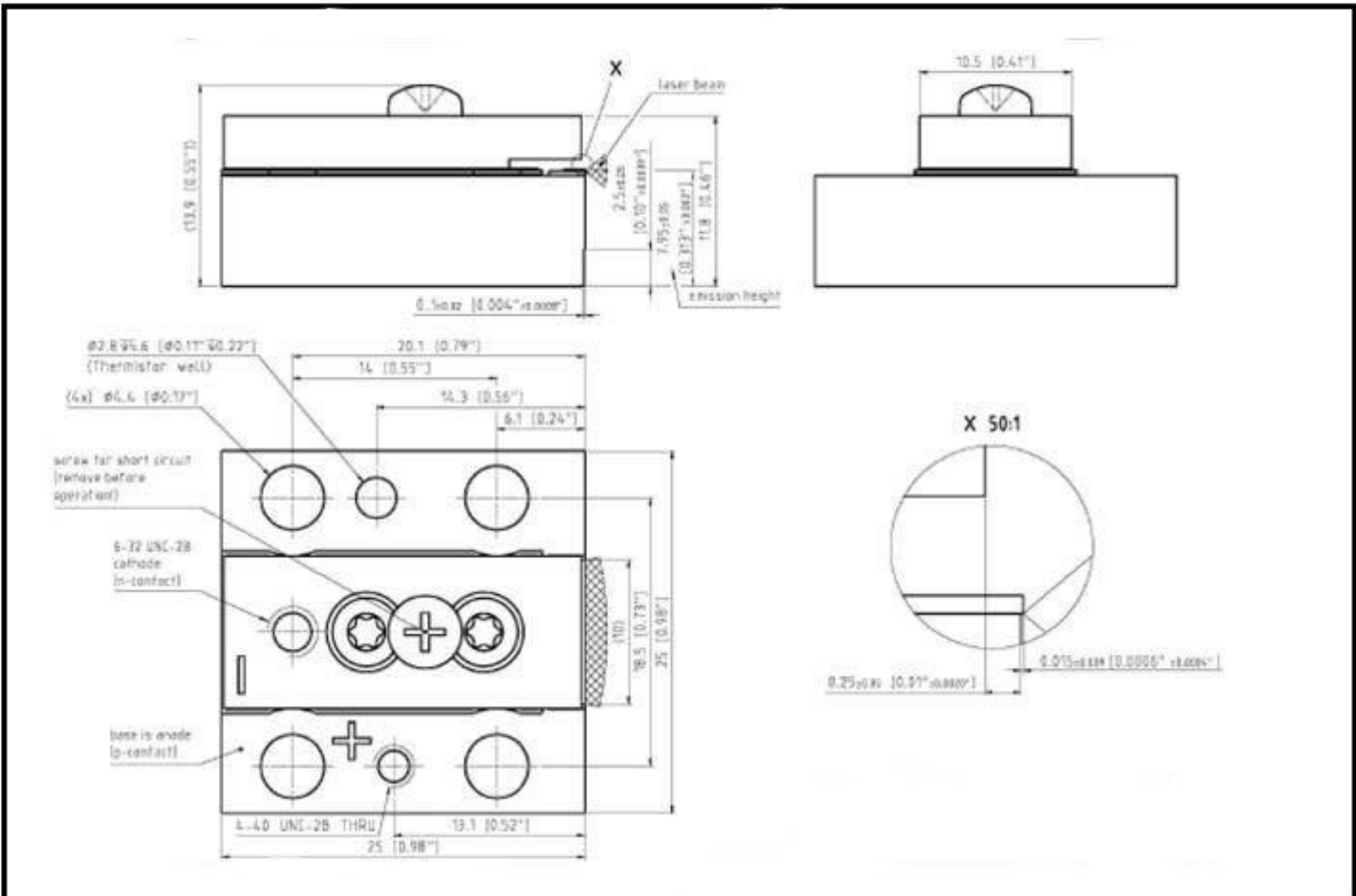
Dwg No:





LDX Optronics Inc.





Title: CS Package

LDX Optronics Inc.

Date:

Dwg No:

# General Precautions

- Special wavelength diodes and especially diodes in the red are much, much more susceptible to damage than standard infrared diodes.
- 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 have a success using these products.
- 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.
- 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.
- Operating the laser diode at a *temperature lower* than recommended will usually slightly increase the output power (higher efficiency) and improve lifetime.
- Operating the laser diode at a *temperature higher* than recommended will increase the threshold current and decrease the slope efficiency.
- 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.
- 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.
- 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.
- 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.
- Some laser diodes are susceptible to damage from *back reflections* into the device. This is more the case with lower wavelength material than with higher wavelengths. Thus, if attempting to collimate the output, care must be taken to avoid back reflections.
- 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 Precautions:

- *Heat:* This is the biggest cause of field failures.
- 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.
- Many customers do not appreciate the importance and/or the complexity of removing waste heat.
- 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.
- Waste heat must be removed efficiently and instantaneously, or the laser will heat up and burn out, or, as a minimum, experience an abbreviated lifetime.
- 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.
- The diode package should be attached to a heatsink plate at least several millimeters thick.
- 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
- 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.
- 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.
- 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. To avoid contamination of the laser facets (Epoxy Technology H21D, for example)
- 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).
- 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.

# Precautions for Free Space Packages:

1. Free space packages can be either a simple open heatsink 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.

# Precautions for Free Space Packages:

## C-Mount Package: (cont)

block must remain  $<120^{\circ}\text{C}$ . During soldering, the laser can also be damaged by contamination of the laser facets with solder flux fumes. Typical rosin-core electronics solder generated 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.

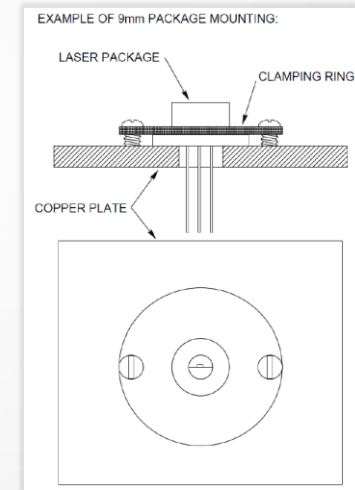
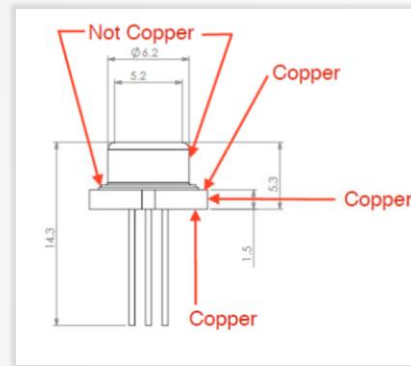
## Q-mount, B-mount, Chip on Submount (COS) and other open heatsinks:

1. To operate, these open heatsinks must be securely attached to a heatsink.
2. Thermal grease should not be used with open heatsinks. Most thermal greases tend to “creep” and the material will eventually contaminate the diode facets.
3. Attaching these open 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. 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  $<120^{\circ}\text{C}$  to prevent the laser 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 generated 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.

# Precautions for Free Space Packages:

## 9mm Package

1. It is important for good heat extraction from the 9mm laser package that the Copper portion of the base must be in good contact with the heatsink.
2. Not all parts of the 9mm package are made of Copper. See below drawing 1, which indicate 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 TE 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 direction, The narrow dimension (I.e. 1um) is along the Y directions.

# Precautions for Fiber Coupled Packages:

## Fiber Coupled 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 TE 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 needs to be taken 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 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. Insure there is not particles on the end of the fiber. All particles on the end of the fiber will become damage spot once the laser is turned on.

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#### **Frankfurt Laser Company**

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## International Distributors:

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Fax: 886.2.2345.0606  
E-Mail: [info@corremax.com.tw](mailto:info@corremax.com.tw)  
Website: [www.corremax-taiwan.com.tw](http://www.corremax-taiwan.com.tw)

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# LDX Optronics Inc.

## About LDX Optronics

LDX Optronics was incorporated in 1990 by Dr. Jeffrey A. Morris, its founder and president. LDX is focused on high power multimode laser diodes in the wavelength range of 400nm – 1900nm. We offer a range of standard products, but also provide custom solutions for specialized applications.

Our management team has over five decades of combined experience in semiconductor laser manufacturing. We emphasize quality and consistency in our manufacturing processes. Each wafer is extensively qualified and life tested, and each device undergoes a thorough burn-in prior to shipment.

LDX packages thousands of devices every year. Our package range includes a variety of open heatsinks, hermetically sealed window packages, fiber coupled packages, and customized assemblies including micro-lenses and photodiodes.

The LDX laboratories and offices are in Maryville, Tennessee. The 6,250 sq. ft. facility includes cleanrooms for laser packaging, optical assembly, burn-in, and characterization. LDX is a manufacturer and most of the facility is dedicated to manufacturing. Sales and marketing functions are handled by our partner RPMC Lasers Inc. in O'Fallon, MO.

## About RPMC Lasers Inc.

RPMC Lasers Inc is the leading laser distributor in North America. RPMC Lasers was started in 1996 to assist LDX in the sales and marketing of their quality products.

- We offer only diode lasers, laser modules, solid state lasers and amplifiers, ultra-short pulse lasers, microchip lasers, fiber lasers and amplifiers, and laser power measurement sensors and meters.
- We also offer custom solid-state lasers and laser diode subsystems.
- We sell at the manufacturer's standard prices.
- We are an OEM supplier working with the top manufacturers in the Industrial, Medical, Military and Scientific Markets.
- We represent industry leading firms located in the US, Europe, and Asia.

Our goal is to provide:

- A technical staff with the in-depth knowledge of the products we offer,
- Quality technical advice that permits informed customer decisions,
- Responses to every inquiry, typically within a few business hours,
- An attractive value proposition, the best laser at a fair price,
- High quality support after delivery.

RPMC offers over 1500 different laser diodes and solid-state lasers from technology leading manufacturers.

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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