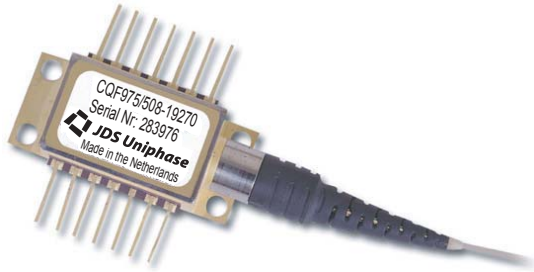


Product Bulletin



20 mW CW DWDM Laser with Integrated Wavelength Monitor CQF975/508 Series

The JDS Uniphase CQF975/508 series laser is specifically developed for dense wavelength division multiplexing (DWDM) systems, where it is used in combination with an external modulator, such as a LiNbO₃-based Mach-Zehnder modulator.

An integrated wavelength locker stabilizes the laser's wavelength. The wavelength locker consists of two back facet monitor diodes. One diode is unfiltered for use as a conventional power monitor; the other is filtered to provide wavelength dependent output.

Selected wavelengths comply with ITU recommendations, both in range (for the C and L band, 1527 to 1610 nm) and in channel definition, thus adhering to the 50 GHz grid. Each laser's wavelength is accurately measured, and the laser itself is accompanied by a datasheet with the laser performance at the temperature T_{λ} , where the required wavelength channel is reached.

The CQF975/508 shows high side mode suppression ratios, very low relative intensity noise (RIN), and small linewidths. It is available in a standard 14-pin butterfly package equipped with a polarization maintaining fiber to facilitate coupling to the modulator, and shows superb thermal stability.

Key Features

- 1550 nm DWDM distributed feedback (DFB) laser diode
- High output power (20 mW)
- Integrated wavelength reference module
- 1527 to 1610 nm wavelength range
- Excellent RIN (-135 dB/Hz maximum)
- Industry standard packaging and pinout
- Polarization maintaining fiber
- Cooled built-in optical isolator

Applications

- Hybrid fiber-coax (HFC) networks, cable-television (CATV) networks, and in DWDM metro architectures where low RIN and narrow linewidths are required

Specifications

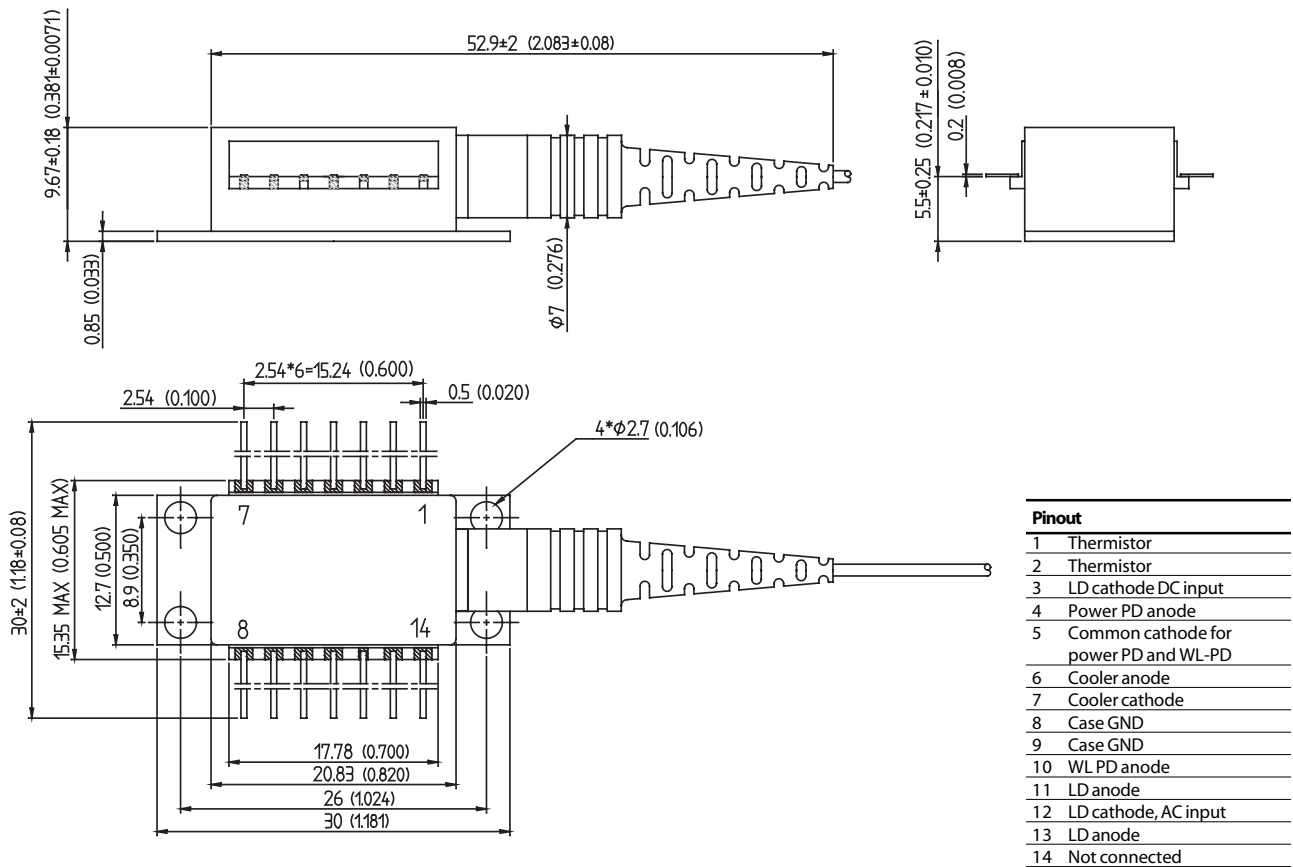
Limiting Values						
Parameter	Symbol	Conditions	Min	Max	Unit	
Laser Diode						
Radiant output power from pigtail	P_{peak}	-	-	40	mW	
Reverse voltage	V_R	-	-	2.0	V	
Forward current	I_F	-	-	300	mA	
Wavelength Reference Module						
Reverse voltage	V_R	-	-	10	V	
Forward current	I_F	-	-	5	mA	
Module						
Storage temperature range	T_{stg}	-	-40	85	°C	
Case operating temperature range	T_{op}	Cooler active	0	65	°C	
Fiber Pigtail						
Bending radius	R	-	35	-	mm	
Tensile strength fiber to case	F	-	-	5	N	
Characteristics ($R_{th} = 10\text{ k}\Omega$, $T_{case} = 25\text{ }^\circ\text{C}$, $P_O = \text{nominal unless otherwise specified}$)						
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Laser Diode						
Radiant output power from pigtail	P_O	-	20	-	-	mW
Operating current	I_{op}	-	-	-	200	mA
Threshold current	I_{th}	-	-	20	35	mA
Forward voltage	V_F	-	-	-	2.0	V
Laser diode set temperature for λ_c	T_λ	-	20	-	35	°C
Central wavelength	λ_c	-	1527	-	1610	nm
Spectral linewidth	$\Delta\lambda$	FWHM	-	< 5	20	MHz
Side mode suppression ratio	SMSR	-	30	45	-	dB
Optical isolation	ISO	-	30	35	-	dB
Relative intensity noise	RIN	50 KHz - 10 GHz	-	-	-135	dB/Hz
Temperature tracking error	TE	$0\text{ }^\circ\text{C} < T_{case} < 70\text{ }^\circ\text{C}$	-	-	10	%
Wavelength drift with case temperature	-	$0\text{ }^\circ\text{C} < T_{case} < 70\text{ }^\circ\text{C}$	-	-	0.001	nm/°C
Wavelength temperature tunability	-	$20\text{ }^\circ\text{C} < T_\lambda < 35\text{ }^\circ\text{C}$	0.08	-	0.12	nm/°C
Wavelength Reference Module ($V_R = 10\text{ V}$)						
Power monitoring photocurrent	I_{pwr}	At λ_c	20	-	500	μA
Wavelength monitoring photocurrent	I_{wav}	At λ_c	10	-	300	μA
Dark current	I_{md}	-	-	-	0.1	μA
Responsivity ratio ($XR = I_{wav} / I_{pwr}$)	XR	At λ_c	0.25	-	2	-
Filter slope (normalized to photocurrent at maximum transmission)	FS	At λ_c (note ¹)	0.25	-	1	nm^{-1}
Wavelength capture range	CR	At λ_c	50	-	-	GHz
Thermistor						
Resistance	R_{th}	$T_{th} = 25\text{ }^\circ\text{C}$	9.5	10	10.5	k Ω
Thermistor constant	B	-	3800	-	4100	K
Thermoelectric Cooler ($\Delta T = 45\text{ }^\circ\text{C}$)						
Cooler current	I_{cool}	-	-	-	1.2	A
Cooler voltage	V_{cool}	-	-	-	2.5	V

1. $FS = \frac{1}{I\lambda} \cdot \frac{I_{\lambda+\Delta\lambda} - I_{\lambda-\Delta\lambda}}{2 \cdot \Delta\lambda}$ with $\Delta\lambda = 0.05\text{ nm}$

Specifications Continued

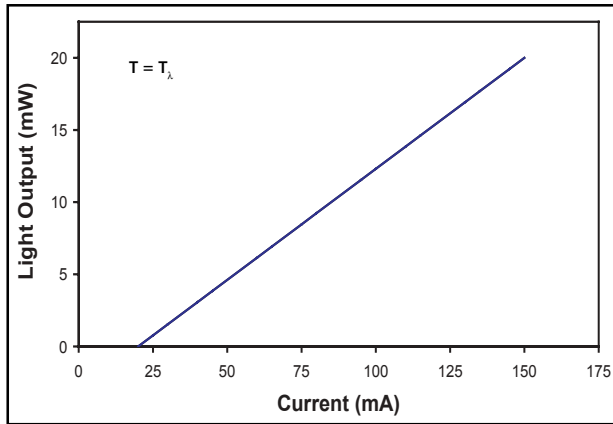
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Polarization Maintaining Fiber Pigtail (Fujikura SM15-P-8/125-UV/UV400 with 900 μm loose tube)						
Mode field diameter	\varnothing_{mf}	-	9.5	-	11.5	μm
Cladding diameter	\varnothing_{cl}	-	122	-	128	μm
Diameter of secondary coating	\varnothing_{sc}	-	380	-	420	μm
Diameter of loose tube	\varnothing_{LT}	-	0.8	-	1.0	mm
Length of loose tube	l_{LT}	-	0.9	-	-	m
Polarization extinction ratio	ER	E-field along slow axis	18	20	-	dB
Length of pigtail	-	-	0.9	-	-	m

Dimensions Diagram (Specifications in mm [inches] unless otherwise noted; tolerance = ±0.15 [±0.006])

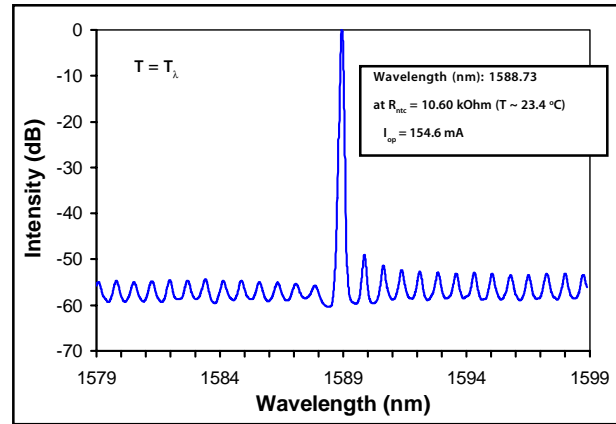


Fiber Termination: Default 1.25 mm ferrule

Typical Performance Characteristics



Typical L-I curve for the CQF975. Each laser is characterized at the temperature for which the specified wavelength channel λ_c is reached.



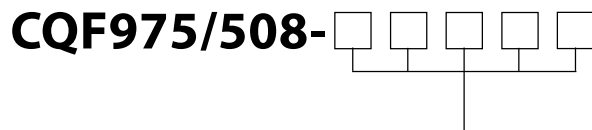
The use of multi-quantum well technology results in excellent side-mode suppression ratios and small linewidths. The inset shows how the wavelength is specified on each datasheet.

Ordering Information

For more information on this or other products and their availability, please contact your local JDS Uniphase account manager or JDS Uniphase directly at 1-800-498-JDSU (5378) in North America and +800-5378-JDSU worldwide or via e-mail at sales@jdsu.com.

Sample: CQF975/508-19270 for optical frequency 192.70 THz.

Attention: Order confirmations on this part number are preceded by FG' (e.g., FG'CQF975/508-19270).



Channel Code	Optical Frequency f_c (THz)	Wavelength (Vacuum) λ_c (nm)	Channel Code	Optical Frequency f_c (THz)	Wavelength (Vacuum) λ_c (nm)	Channel Code	Optical Frequency f_c (THz)	Wavelength (Vacuum) λ_c (nm)
19625	196.25	1527.61	19530	195.30	1535.04	19435	194.35	1542.54
19620	196.20	1527.99	19525	195.25	1535.43	19430	194.30	1542.94
19615	196.15	1528.38	19520	195.20	1535.82	19425	194.25	1543.33
19610	196.10	1528.77	19515	195.15	1536.22	19420	194.20	1543.73
19605	196.05	1529.16	19510	195.10	1536.61	19415	194.15	1544.13
19600	196.00	1529.55	19505	195.05	1537.00	19410	194.10	1544.53
19595	195.95	1529.94	19500	195.00	1537.40	19405	194.05	1544.92
19590	195.90	1530.33	19495	194.95	1537.79	19400	194.00	1545.32
19585	195.85	1530.73	19490	194.90	1538.19	19395	193.95	1545.72
19580	195.80	1531.12	19485	194.85	1538.58	19390	193.90	1546.12
19575	195.75	1531.51	19480	194.80	1538.98	19385	193.85	1546.52
19570	195.70	1531.90	19475	194.75	1539.37	19380	193.80	1546.92
19565	195.65	1532.29	19470	194.70	1539.77	19375	193.75	1547.32
19560	195.60	1532.68	19465	194.65	1540.16	19370	193.70	1547.72
19555	195.55	1533.07	19460	194.60	1540.56	19365	193.65	1548.12
19550	195.50	1533.47	19455	194.55	1540.95	19360	193.60	1548.51
19545	195.45	1533.86	19450	194.50	1541.35	19355	193.55	1548.92
19540	195.40	1534.25	19445	194.45	1541.75	19350	193.50	1549.32
19535	195.35	1534.64	19440	194.40	1542.14	19345	193.45	1549.72

CQF975/508-

Channel Code	Optical Frequency f_c (THz)	Wavelength (Vacuum) λ_c (nm)	Channel Code	Optical Frequency f_c (THz)	Wavelength (Vacuum) λ_c (nm)	Channel Code	Optical Frequency f_c (THz)	Wavelength (Vacuum) λ_c (nm)
19340	193.40	1550.12	19100	191.00	1569.59	18860	188.60	1589.57
19335	193.35	1550.52	19095	190.95	1570.01	18855	188.55	1589.99
19330	193.30	1550.92	19090	190.90	1570.42	18850	188.50	1590.41
19325	193.25	1551.32	19085	190.85	1570.83	18845	188.45	1590.83
19320	193.20	1551.72	19080	190.80	1571.24	18840	188.40	1591.26
19315	193.15	1552.12	19075	190.75	1571.65	18835	188.35	1591.68
19310	193.10	1552.52	19070	190.70	1572.06	18830	188.30	1592.10
19305	193.05	1552.93	19065	190.65	1572.48	18825	188.25	1592.52
19300	193.00	1553.33	19060	190.60	1572.89	18820	188.20	1592.95
19295	192.95	1553.73	19055	190.55	1573.30	18815	188.15	1593.37
19290	192.90	1554.13	19050	190.50	1573.71	18810	188.10	1593.79
19285	192.85	1554.54	19045	190.45	1574.13	18805	188.05	1594.22
19280	192.80	1554.94	19040	190.40	1574.54	18800	188.00	1594.64
19275	192.75	1555.34	19035	190.35	1574.95	18795	187.95	1595.07
19270	192.70	1555.75	19030	190.30	1575.37	18790	187.90	1595.49
19265	192.65	1556.15	19025	190.25	1575.78	18785	187.85	1595.91
19260	192.60	1556.56	19020	190.20	1576.20	18780	187.80	1596.34
19255	192.55	1556.96	19015	190.15	1576.61	18775	187.75	1596.76
19250	192.50	1557.36	19010	190.10	1577.03	18770	187.70	1597.19
19245	192.45	1557.77	19005	190.05	1577.44	18765	187.65	1597.62
19240	192.40	1558.17	19000	190.00	1577.86	18760	187.60	1598.04
19235	192.35	1558.58	18995	189.95	1578.27	18755	187.55	1598.47
19230	192.30	1558.98	18990	189.90	1578.69	18750	187.50	1598.89
19225	192.25	1559.39	18985	189.85	1579.10	18745	187.45	1599.32
19220	192.20	1559.79	18980	189.80	1579.52	18740	187.40	1599.75
19215	192.15	1560.20	18975	189.75	1579.93	18735	187.35	1600.17
19210	192.10	1560.61	18970	189.70	1580.35	18730	187.30	1600.60
19205	192.05	1561.01	18965	189.65	1580.77	18725	187.25	1601.03
19200	192.00	1561.42	18960	189.60	1581.18	18720	187.20	1601.46
19195	191.95	1561.83	18955	189.55	1581.60	18715	187.15	1601.88
19190	191.90	1562.23	18950	189.50	1582.02	18710	187.10	1602.31
19185	191.85	1562.64	18945	189.45	1582.44	18705	187.05	1602.74
19180	191.80	1563.05	18940	189.40	1582.85	18700	187.00	1603.17
19175	191.75	1563.46	18935	189.35	1583.27	18695	186.95	1603.60
19170	191.70	1563.86	18930	189.30	1583.69	18690	186.90	1604.03
19165	191.65	1564.27	18925	189.25	1584.11	18685	186.85	1604.46
19160	191.60	1564.68	18920	189.20	1584.53	18680	186.80	1604.88
19155	191.55	1565.09	18915	189.15	1584.95	18675	186.75	1605.31
19150	191.50	1565.50	18910	189.10	1585.36	18670	186.70	1605.74
19145	191.45	1565.90	18905	189.05	1585.78	18665	186.65	1606.17
19140	191.40	1566.31	18900	189.00	1586.20	18660	186.60	1606.61
19135	191.35	1566.72	18895	188.95	1586.62	18655	186.55	1607.04
19130	191.30	1567.13	18890	188.90	1587.04	18650	186.50	1607.47
19125	191.25	1567.54	18885	188.85	1587.46	18645	186.45	1607.90
19120	191.20	1567.95	18880	188.80	1587.88	18640	186.40	1608.33
19115	191.05	1568.39	18875	188.75	1588.30	18635	186.35	1608.76
19110	191.10	1568.77	18870	188.70	1588.73	18630	186.30	1609.19
19105	191.05	1569.18	18865	188.65	1589.15	18625	186.25	1609.62
						18620	186.20	1610.06



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