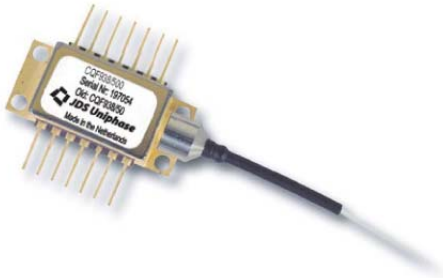


High Power 1550 nm CW DFB Lasers with PM Fiber CQF938 Series



- Key Features**
- 1550 nm DFB laser diode
 - Three power versions available at a minimum of 40, 50, and 63 mW, respectively
 - 25 Ω electrical matching
 - Polarization maintaining fiber
 - Built-in thermoelectric cooler
 - Cooled built-in optical isolator
 - Excellent relative intensity noise (-160 dB/Hz maximum)
 - Narrow linewidth (1 MHz maximum)
 - High side-mode suppression ratio (45 dB typical)

Applications

- HFC networks, CATV networks, and metro architectures where high power, low RIN, and narrow linewidths are required

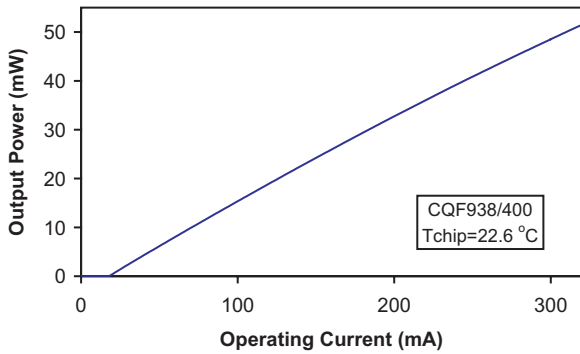
In modern hybrid fiber coax (HFC) and cable television (CATV) systems, 1550 nm externally modulated laser sources are used for super trunking and distribution. Due to the availability of the erbium-doped fiber amplifier (EDFA), which allows re-amplification of the optical signal without conversion into radio frequency (RF), such systems are very flexible in providing custom-made solutions with good carrier-to-noise ratios (CNR). In short haul metro links, the high power of the JDS Uniphase CQF938 eliminates the need for additional amplifiers.

The CQF938 high power 1550 nm continuous wave (CW) distributed feedback (DFB) laser is available in a standard 14-pin butterfly package equipped with a polarization maintaining fiber (PMF) to facilitate coupling to a modulator. It shows superb thermal stability, high side-mode suppression ratios (SMSR), very low relative intensity noise (RIN), and small linewidths.

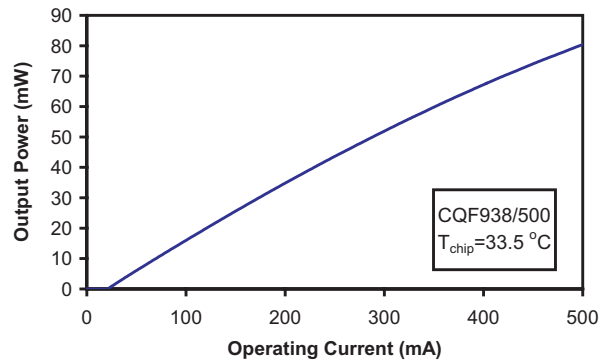
The modulation bandwidth is in excess of 1 GHz, and permits various techniques for stimulated Brillouin scattering (SBS) suppression. SBS is a detrimental effect that can occur at very high power levels into the fiber, and which leads to noise bursts.

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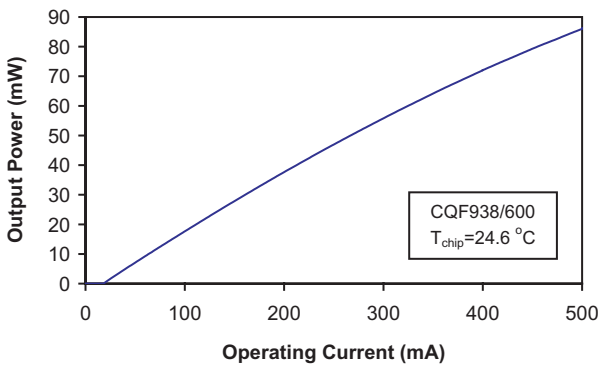
Typical Performance Characteristics



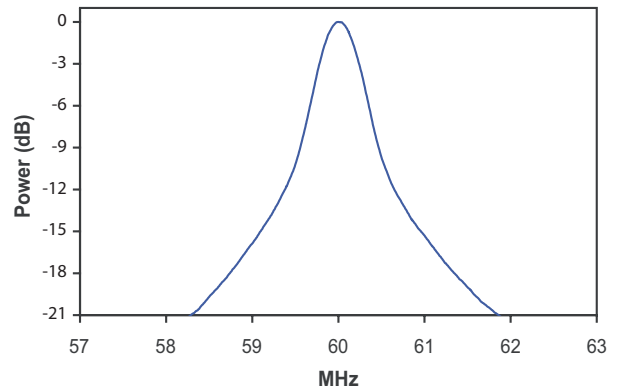
Typical CQF938/400 output power versus bias current drive.



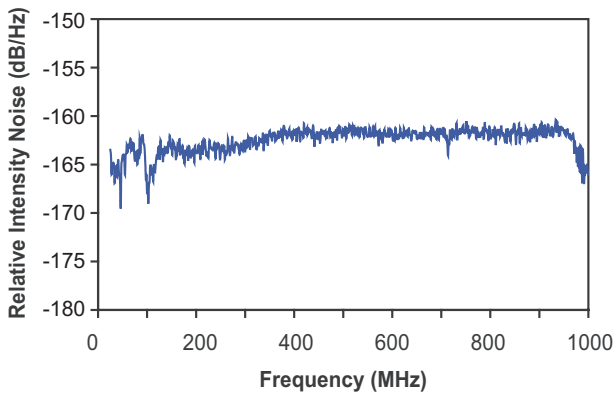
Typical CQF938/500 output power versus bias current drive.



Typical CQF938/600 output power versus bias current drive.



Linewidth at -3 dB is better than 1 MHz.

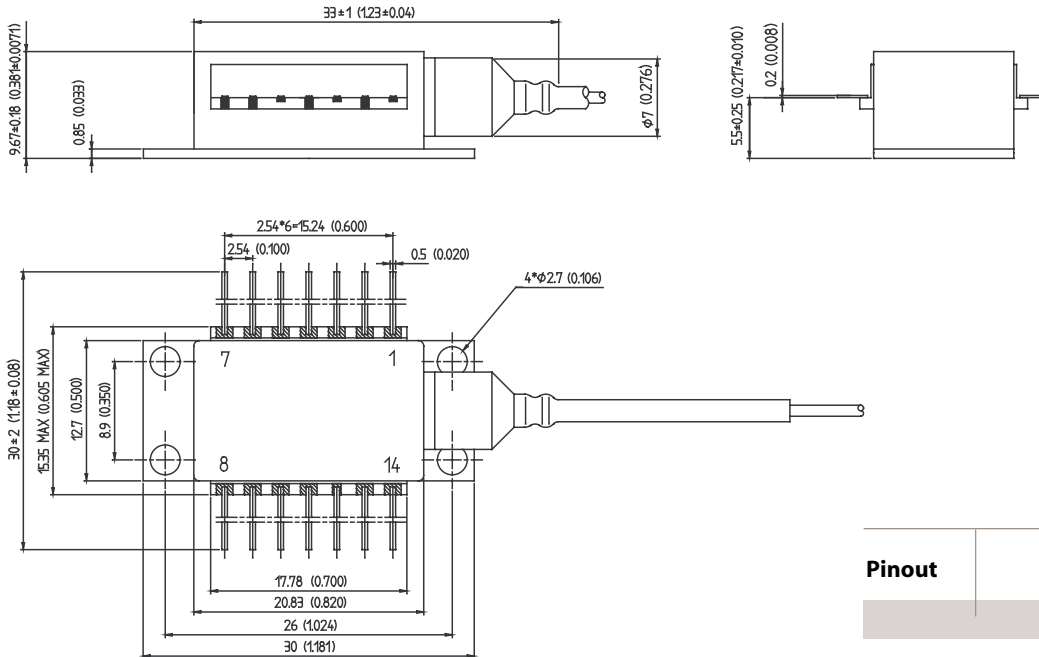


Relative intensity noise is better than -160 dB/Hz.

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Dimensions Diagram

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



Fiber termination: default 1.25 mm ferrule

Pinout

Pin	Description
1	Thermistor
2	Thermistor
3	LD cathode DC input via inductance
4	PD anode
5	PD cathode
6	Cooler anode
7	Cooler cathode
8	Case GND
9	Case GND
10	Not connected
11	LD anode, case
12	LD cathode, AC input
13	LD anode, case
14	Not connected

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Limiting Values

Parameter	Symbol	Conditions	Minimum	Maximum
Laser Diode				
Radiant output power from pigtail	P_{peak}	-	-	100 mW
Reverse voltage	V_R	-	-	2.0 V
Forward current	I_F	-	-	600 mA
Monitor Diode				
Reverse voltage	V_R	-	-	20 V
Forward current	I_F	-	-	10 mA
Module				
Storage temperature range	T_{stg}	(note ¹)	-40 °C	85 °C
Case operating temperature range	T_{op}	Cooler active	-20 °C	70 °C
Fiber Pigtail				
Bending radius	R	-	35 mm	-
Tensile strength fiber to case	F	(note ¹)	-	5 N

1. Mechanical integrity/environmental endurance tested according to Telcordia GR-468-CORE and MIL-STD-883
 ML = Median Life, EOL = End Of Life.

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Characteristics
 $(R_{th} = 10\text{ k}\Omega, T_{amb} \text{ at } 25\text{ }^\circ\text{C}, P_o = \text{nominal unless otherwise specified.})$

Parameter	Symbol	Conditions	Minimum	Typical	Maximum
Radiant output power from pigtail	P_o				
CQF938/400			40 mW	-	-
CQF938/500			50 mW	-	-
CQF938/600			60 mW	-	-
Differential energy	η				
CQF938/400			-	120 $\mu\text{W}/\text{mA}$	-
CQF938/500			-	150 $\mu\text{W}/\text{mA}$	-
CQF938/600			-	175 $\mu\text{W}/\text{mA}$	-
Operating current	I_{op}	-	-	375 mA	500 mA
Laser Diode					
Threshold current	I_{th}	-	-	25 mA	40 mA
Central wavelength	λ_c	-	1547 nm	1555 nm	1560 nm
Forward voltage	V_F	-	-	-	2.5 V
Side mode suppression ratio	SMSR	-	30 dB	45 dB	-
Optical isolation	ISO	-	30 dB	35 dB	-
Relative intensity noise	RIN	20 - 1000 MHz	-	-	-160 dB/Hz
Spectral linewidth	$\Delta\lambda$	Full width, half mean (FWHM)	-	-	1 MHz
Monitor Diode ($V_R = 10\text{ V}$)					
Monitor diode responsivity	R	-	5 $\mu\text{A}/\text{mW}$	75 $\mu\text{A}/\text{mW}$	-
Dark current	I_{md}	-	-	-	0.1 μA
Temperature tracking error	TE	$-20\text{ }^\circ\text{C} < T_{case} < 70\text{ }^\circ\text{C}$	-	-	10%
Thermistor					
Resistance	R_{th}	$T_{th} = 25\text{ }^\circ\text{C}$	9.5 k Ω	10 k Ω	10.5 k Ω
Thermistor constant	B	-	3800 K	-	4100 K
Thermoelectric Cooler ($\Delta T = 45\text{ }^\circ\text{C}$)					
Cooler current	I_{cool}	-	-	-	1.5 A
Cooler voltage	V_{cool}	-	-	-	4.0 V
Polarization Maintaining Fiber Pigtail (Fujikura Panda 8/125/400 with 900 μm loose tube)					
Mode field diameter	\varnothing_{mf}	-	9.5 μm	-	11.5 μm
Polarization extinction ratio	ER	E-field along slow axis	18 dB	20 dB	-
Length of pigtail	-	-	1 m	-	-
Reliability					
Long term wavelength drift (note ¹)	$ML\lambda$	EOL: $\Delta\lambda = 0.2\text{ nm}$	-	300 years	-

1. Mechanical integrity/environmental endurance tested according to Telcordia GR-468-CORE and MIL-STD-883
 ML = Median Life, EOL = End Of Life.

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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: CQF938/500 for 50mW optical output power.

Attention: Order confirmations on this part number are preceded by FG' (e.g., FG'CQF938/500).

CQF938/ 00

Code	P _o
4	40 mW
5	50 mW
6	63 mW

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