

## 14xx-nm Pump Laser Diode Module (with FBG)



### Applications

- Pump Source for Raman Amplifier
  - C/L-band Raman

## Product Type : FOL1404Q/1405R Series

### Descriptions

- The FOL14xx series (with FBG) has been designed for use in a wide variety of optical amplifier, such as Raman Amplifier used in optical transmission systems, especially in dense wavelength-division-multiplexing (DWDM) systems.
- A strained multi-quantum well laser diode chip is integrated with thermo-electric cooler (TEC), thermistor and PIN photodiode in a hermetically sealed 14 pin butterfly package.
- A 2-lens-system couples a round shape light from the laser chip efficiently to the fiber and enables the output power up to 320 mW.
- This laser module complies with telecom requirements described in Telcordia™ GR-468 requirement and manufactured in an ISO™9001 certified production line.

### Features

- Rated output power up to 320 mW (CW)
- Widely deployed reliable package design with industry compatible 14 pin butterfly footprint
- Internal Thermo-electric cooler (TEC) and Thermistor for stable operation
- Integrated PIN photodiode for back facet monitor
- Polarization maintaining fiber pigtail
- Wavelength stabilization available with external FBG
- EU RoHS compliant (Exemption 7(c)-1, 13(a) applied)

**Absolute Maximum Rating**

Parameters	Sym.	Min.	Max.	Unit
Storage Temperature	Tstg	-40	85	°C
Operating Case Temperature	Tc	-20	70	°C
LD Forward Current	If	-	1300	mA
1404Q 1405R			1600	
LD Reverse Voltage	Vr	-	2	V
PD Forward Current	IfPD	-	5	mA
PD Reverse Voltage	VrPD	-	20	V
TEC Current	Ic	-1.1	4.5	A
TEC Voltage	Vc	-	4.2	V
1404Q 1405R			4.5	

**Specifications**

LD Temperature (Ts) = 25°C

Parameters	Sym.	Min.	Typ.	Max.	Unit	Conditions
Output Power <sup>1)</sup>	Pf	Table A			mW	
Forward Current	If	Table A				
Center Wavelength	$\lambda$	$\lambda-1.5$	$\lambda$	$\lambda+1.5$	nm	RMS(-20dB), Rated Power $\lambda=1400\sim 1500\text{nm}$ for FBG
Spectral Width	$\Delta\lambda$	-	-	3	nm	RMS(-20dB), Rated Power
Forward Voltage	Vf	Table A			V	Rated Power
Forward Current at EOL	IfEOL	-	-	1.2xIfBOL	mA	
Monitor Current	Im	100	-	1500	$\mu\text{A}$	VrPD=5V, Rated Power
1404Q 1405R		100	-	2000		
Monitor Dark Current	Id	-	-	100	nA	VrPD=5V
Extinction Ratio	Re	16	-	-	dB	
TEC Specification	-	Table A				
Thermistor Resistance	Rth	9.5	10	10.5	k $\Omega$	Ts = 25°C
Thermistor B Constant	Bth	-	3900	-	-	Ts = 25°C

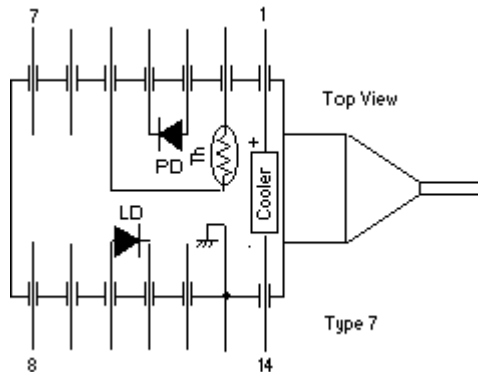
1) Pf: Available Pf may depend upon center wavelength selected.

**Table A**

\*:EOL

Part Number	Pf(mW)	If(mA) max	Vf(V) max	Tc(°C)	Itec(A)* max	Vtec(V)* max	Wtotal(W)* max
FOL1404QPK	210	900	2.5	70	2.7	2.5	8.7
FOL1404QPL	220	900	2.5	70	2.7	2.5	8.7
FOL1404QPM	230	900	2.5	70	2.7	2.5	8.7
FOL1404QQN	240	1000	2.5	70	3.0	2.7	10.5
FOL1404QQO	250	1000	2.5	70	3.0	2.7	10.5
FOL1404QQP	260	1000	2.5	70	3.0	2.7	10.5
FOL1405RSA	270	1200	2.6	70	2.7	3.4	12.3
FOL1405RSB	280	1200	2.6	70	2.7	3.4	12.3
FOL1405RTC	290	1300	2.6	70	2.9	3.7	14.1
FOL1405RTD	300	1300	2.6	70	2.9	3.7	14.1
FOL1405RTV	320	1300	2.6	70	2.9	3.7	14.1

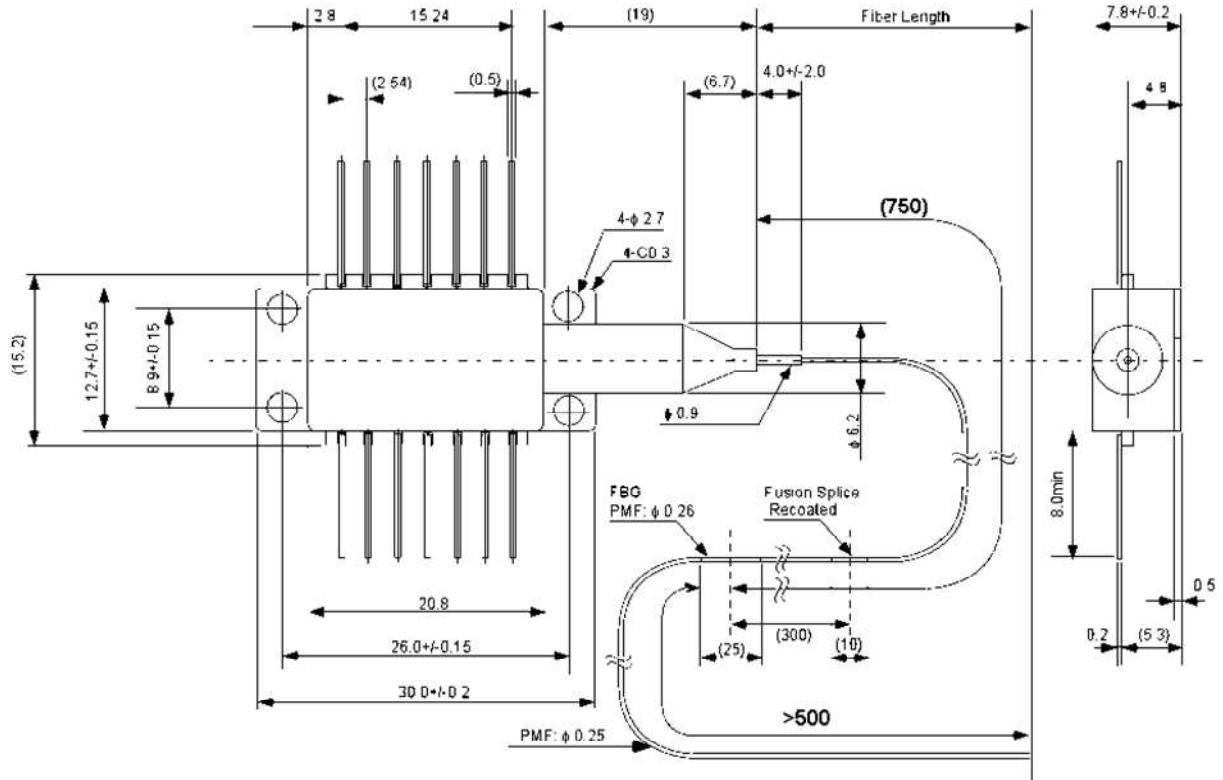
**Pin Assignment**



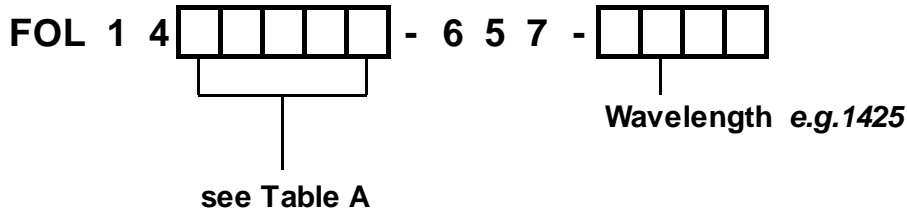
Pin#	Function	Pin#	Function
1	Cooler(+)	8	No Connection
2	Thermistor	9	No Connection
3	PD anode(-)	10	LD anode(+)
4	PD cathode(+)	11	LD cathode(-)
5	Thermistor	12	No Connection
6	No Connection	13	Case GND
7	No Connection	14	Cooler(-)

## Dimensions

### FOL14xxxxx-657-xxxx (w/FBG)



## Ordering information



## Safety information

This product complies with 21 CFR 1040.10 and 1040.11, Class 3b laser product. Invisible laser radiation is emitted from the end of the fiber or connector. Avoid direct exposure to the beam.



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