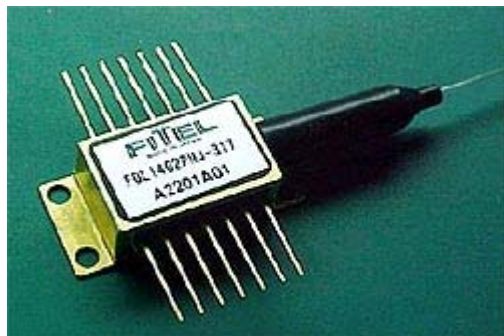


## FOL1402P series

### 1480nm Pump LDM (High Efficiency)

FOL1402Pxy (High Efficiency)



#### Applications

- Pump Source for Er-Doped Fiber Amplifier
  - C- and/or L-Band EDFA
  - Single Channel Amplifier to DWDM Amplifier
- Pump Source for Raman Amplifier

#### Description

- The FOL1402P-High Efficiency Version has been designed for use in a wide variety of optical amplifier, such as EDFA or 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 250 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 250 mW (CW) by the same operating current as conventional version
- 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
- Internal optical Isolator (optional)
- Single mode fiber and Polarization maintaining fiber pigtail
- Wavelength stabilization available with external FBG (optional)
- Epoxy free design inside the module for long term reliability

#### Absolute Maximum Ratings

Parameters	Symbol	Min	Max	Unit
Storage Temperature	T <sub>stg</sub>	-40	85	°C
Operating Case Temperature	T <sub>c</sub>	-20	70	°C
LD Forward Current	I <sub>f</sub>	-	1000	mA
LD Reverse Voltage	V <sub>r</sub>	-	2	V
PD Forward Current	I <sub>fPD</sub>	-	5	mA
PD Reverse Voltage	V <sub>rPD</sub>	-	20	V
TEC Current	I <sub>c</sub>	-0.6	2	A
TEC Voltage	V <sub>c</sub>	-	4.5	V

## Optical and Electrical Specifications

(Sensor Temperature (Ts) = 25°C)

Parameters	Symbol	Min	Typ	Max	Unit	Conditions	
Output Power	Pf*1)				mW		
FOL1402PLG		170	-	-			IfBOL=<600mA
FOL1402PLH		180	-	-			
FOL1402PMJ		200	-	-			
FOL1402PMK		210	-	-			IfBOL=<700mA
FOL1402PML		220	-	-			
FOL1402PNK		210	-	-			
FOL1402PNL		220	-	-			
FOL1402PNM		230	-	-			IfBOL=<800mA
FOL1402PNN		240	-	-			
FOL1402PNO		250	-	-			
Center Wavelength (FP)	$\lambda_c$	1460	-	1490	nm	RMS(-20dB), Rated Power	
Center Wavelength (FBG)	$\lambda_c^{*2)}$	$\lambda_c-1.5$	$\lambda_c$	$\lambda_c+1.5$	nm	RMS(-20dB), Rated Power	
Spectral Width(FP)	$\Delta\lambda$	-	-	8	nm	RMS(-20dB), Rated Power	
Spectral Width(FBG)	$\Delta\lambda$	-	-	3	nm	RMS(-20dB), Rated Power	
LD Operating Forward Voltage	Vf	-	-	2.5	V	Rated Power	
LD Forward Current at EOL	IfEOL	-	-	1.2 x IfBOL	mA	End of Life	
Monitor Current	Im	50	-	1000	$\mu$ A	V <sub>rPD</sub> =5V, Rated Power	
Monitor Dark Current	Id	-	-	100	nA	V <sub>rPD</sub> =5V	
Extinction Ratio	Re	16	-	-	dB	Type4 and Type6	
Isolation	Iso	30	-	-	dB	Type3 and Type4	
TEC Spec.	-	Refer to below			-	-	
Thermistor Resistance	Rth	9.5	10	10.5	k $\Omega$	Ts=25°C	
Thermistor B Constant	Bth	-	3900	-	K	Ts=25°C	

\*1)Pf; Available Pf may depend upon center wavelength selected.

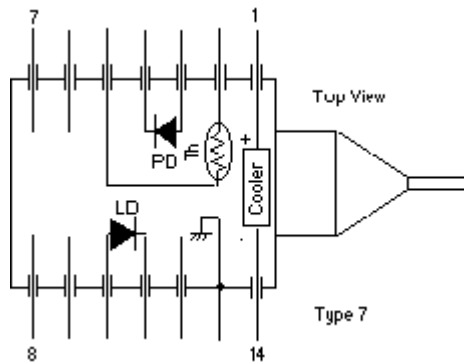
\*2) $\lambda_c$ ; Selected center wavelength from 1380nm to 1490nm available.

## Thermo-Electric Cooler Characteristic & Power Consumption

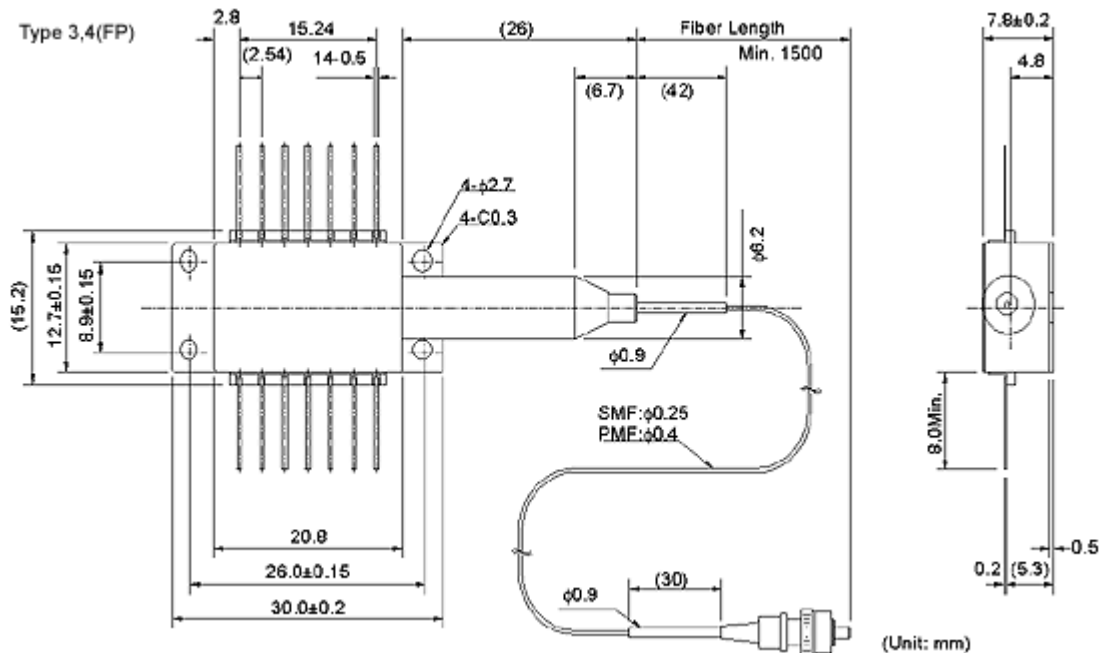
Part Number	Itec [A]	Vtec [V]	*4) Ptotal [W]	Condition
PL* series Pf=170 to 180[mW]	1.2	2.7	4.4	Max Val., Ts=25°C, $\Delta$ T=45°C, IfEOL
PM* series Pf=200 to 220[mW]	1.4	3.1	5.8	
PN* series Pf=210 to 250[mW]	1.7	3.6	7.8	

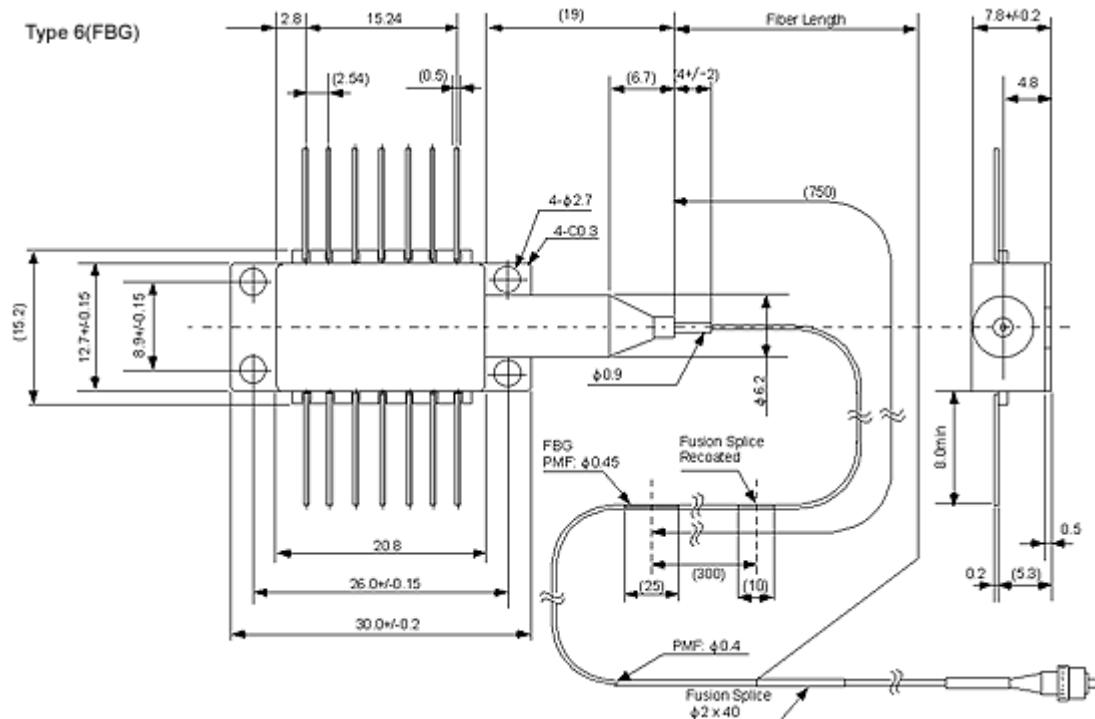
\*4) Ptotal = Wtec + Wld (Total Power Consumption)

### Dimensions & Pin Assignment

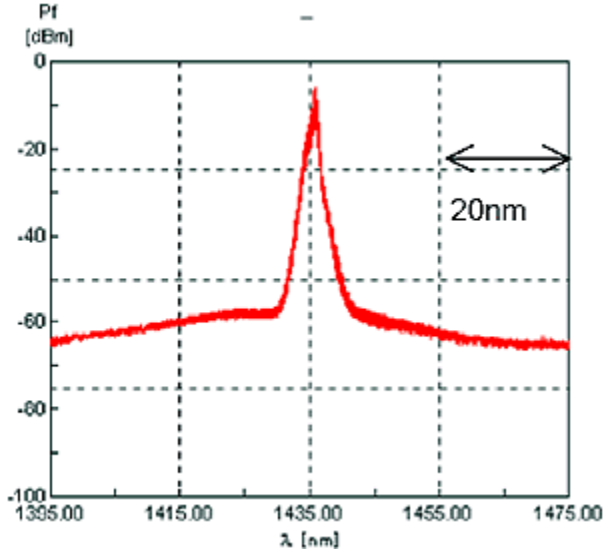


Pin No.	Function	Pin No.	Function
1	Cooler(+)	8	No Connection
2	Thermistor	9	No Connection
3	PD Anode(-)	10	LD Anode(+)
4	PD Cathode(+)	11	LD Cathode(-)
5	Thermistor	12	No Connection
6	No Connection	13	Case Ground
7	No Connection	14	Cooler(-)

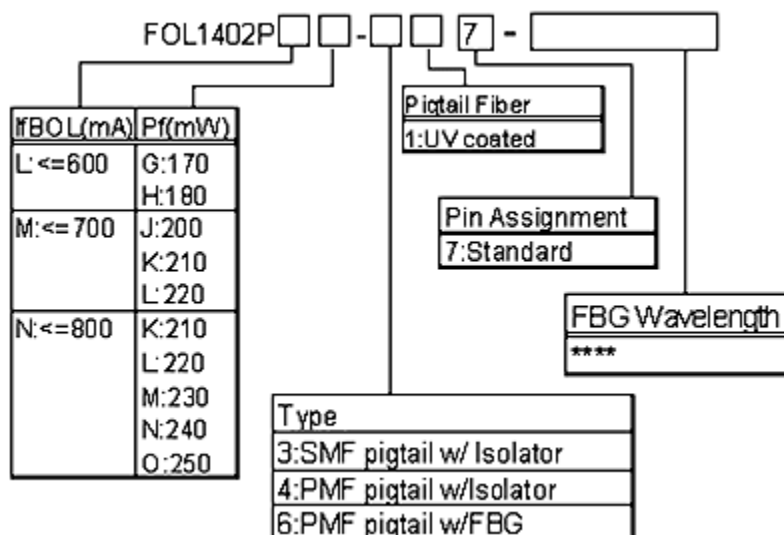




Spectrum (w/FBG)



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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