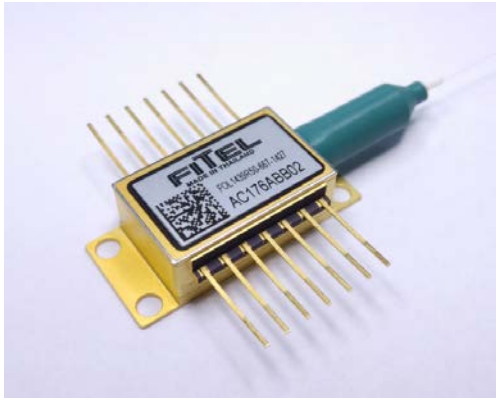


## 14xx-nm Pump Laser Diode Module (with FBG) (High output power / Low power consumption)



### Applications

- Pump Source for Raman Amplifier
  - C-band Raman

## Product Type : FOL1439 Series

### Descriptions

- The FOL1439 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 600 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 600 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   | -    | 2600 | mA   |
| 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   | -    | 4.5  | V    |

## Specifications

\* LD sub-mount temperature

| Parameters                 | Sym.            | Min.          | Typ.      | Max.           | Unit          | Conditions  |
|----------------------------|-----------------|---------------|-----------|----------------|---------------|---|
| Output Power <sup>1)</sup> | Pf              | Table A       |           |                | mW            |   |
| Forward Current            | If              | Table A       |           |                | mA            |   |
| Center Wavelength(FBG)     | $\lambda$       | $\lambda-1.5$ | $\lambda$ | $\lambda+1.5$  | nm            | RMS(-20dB), Rated Power<br>$\lambda=1420-1465\text{nm}$ 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           | -             | -         | 1.15xIf<br>BOL | mA            |   |
| Monitor Current            | Im              | 100           | -         | 2000           | $\mu\text{A}$ | VrPD=5V, Rated Power  |
| Monitor Dark Current       | Id              | -             | -         | 100            | nA            | VrPD=5V   |
| Extinction Ratio           | Re              | 16            | -         | -              | dB            |   |
| TEC Specification          | -               | Table A       |           |                |               |   |
| Thermistor Resistance      | Rth             | 9.5           | -         | 10.5           | k $\Omega$    | Ts* = 25°C  |
|                            |                 | 6.0           | -         | 7.0            |               | Ts* = 35°C  |
| Thermistor B Constant      |                 | -             | 3900      | -              | -             |   |

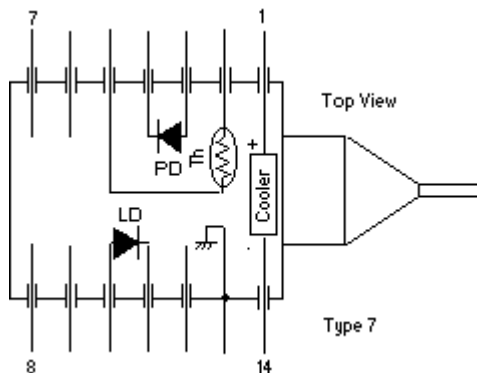
1) Pf: Available Pf may depend upon center wavelength selected.

## Table A

\*\*:End of Life

| Part Number | Pf(mW) | If(mA)<br>max | Tc(°C) | Ts(°C) | Vf(V)<br>max | Itec(A)**<br>max | Vtec(V)**<br>max | Wtotal(W)**<br>max |
|-------------|--------|---------------|--------|--------|--------------|------------------|------------------|--------------------|
| FOL1439R60  | 600    | 2300          | 70     | 25     | 2.1          | 3.3              | 3.9              | 16.0               |
| FOL1439R55  | 550    | 2200          | 70     | 35     | 2.1          | 2.5              | 3.0              | 11.0               |
| FOL1439R50  | 500    | 2000          | 70     | 35     | 2.0          | 2.3              | 2.8              | 9.0                |
| FOL1439R45  | 450    | 1800          | 70     | 35     | 1.9          | 2.1              | 2.6              | 8.0                |
| FOL1439R40  | 400    | 1600          | 70     | 35     | 1.7          | 1.9              | 2.4              | 6.5                |

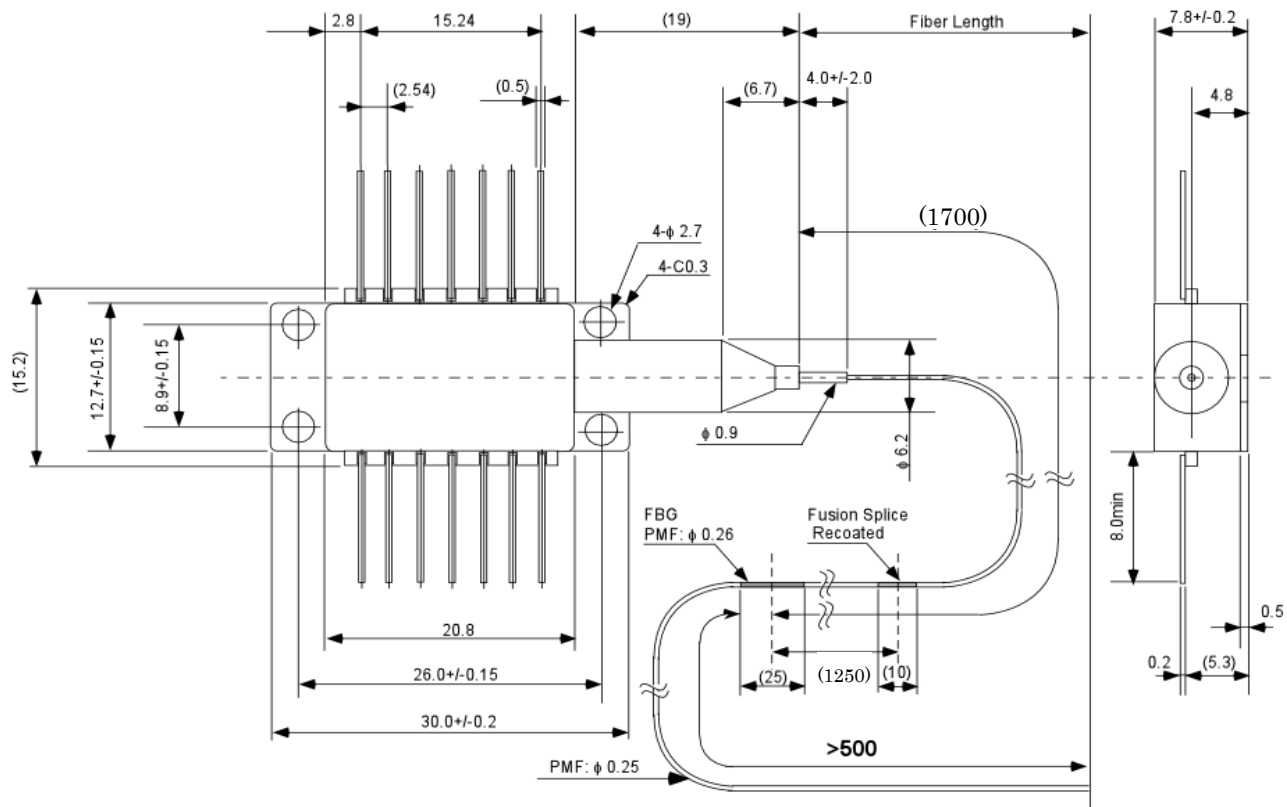
## Pin Assignment



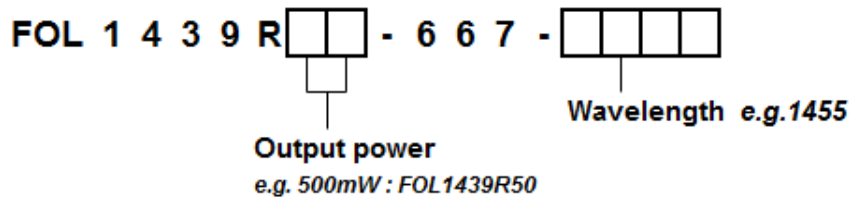
| Pin# | Function      | Pin# | Function      |
|------|---------------|------|---------------|
| 1    | Cooler(+)     | 8    | No Connection |
| 2    | Thermistor    | 9    | No Connection |
| 3    | PD anode(-)   | 10   | LD anode(+)   |
| 4    | PD cathode(+) | 11   | LD cathode(-) |
| 5    | Thermistor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

## Dimensions

### FOL1439Rxx-667-xxxx (w/1FBGs)



## Ordering information



## Safety information

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

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## FURUKAWA ELECTRIC CO., LTD.

**Japan**  
**Head Office**  
2-2-3, Marunouchi  
Chiyoda-ku  
Tokyo 100-8322,  
JAPAN  
Tel: +81-3-3286-3253  
Fax: +81-3-3286-3978  
<http://www.furukawa.co.jp>

**North America**  
**OFS**  
1 Brightwave Blvd.  
Carrollton, GA 30117, USA  
Tel: +1-770-798-5555  
<http://www.ofsoptics.com>  
E-mail: [info@ofsoptics.com](mailto:info@ofsoptics.com)

**Europe**  
**Furukawa Electric Europe Ltd.**  
Furukawa House  
77-85 Fulham Palace Road,  
London W6 8JD, United Kingdom  
Tel: +44-20-7313-5300  
Fax: +44-20-7313-5310  
<http://www.furukawa.co.uk>  
<http://www.furukawa.co.uk/contactus.php>

**ASIA**  
**Furukawa Electric Hong Kong Ltd.**  
Suite 1810, 18/F, Tower 2,  
33 Canton Road, China Hong Kong City  
Tsim Sha Tsui, Kowloon, Hong Kong  
Tel: 852-2512-8938  
Fax: 852-2512-9717  
<http://www.fehk.com.hk/>  
E-mail: [guest@fehk.cn](mailto:guest@fehk.cn)