Kokyo 株式会社 光響
Email : info@symphotony.com
Web : https://www.symphotony.com/

FITEL

1480nm Pump Laser Diode Module
Component Specifications
(with Isolator, RoHS6/6)

FOL1437R40-317 (400mW, SMF pigtail)
FOL1437R45-317 (450mW, SMF pigtail)
FOL1437R50-317 (500mW, SMF pigtail)
FOL1437R40-417 (400mW, PMF pigtail)
FOL1437R45-417 (450mW, PMF pigtail)
FOL1437R50-417 (500mW, PMF pigtail)

RoHS Compliant 2011/65/EU

Date: 7/7/2014

Version: A

Doc. Number: OD-YCE0005

Furukawa Electric Co., Ltd.

1480nm Laser Diode Module(with Isolator)

(Tc=70°C, IfBOL≤1800mA, λ=1460-1490nm, Pf=400~500mW)

FOL1437R40-317 (400mW, SMF pigtail)
FOL1437R45-317 (450mW, SMF pigtail)
FOL1437R50-317 (500mW, SMF pigtail)
FOL1437R40-417 (400mW, PMF pigtail)
FOL1437R45-417 (450mW, PMF pigtail)
FOL1437R50-417 (500mW, PMF pigtail)

1. Absolute Maximum Ratings

Parameter	Sym.	Min.	Max.	Unit
Storage Temperature	Tstg	-40	85	°C
Operating Case Temperature	Tc	-20	70	°C
LD Forward Current	If	-	2100	mA
LD Reverse Voltage	Vr	-	2	V
PD Forward Current	IfPD	-	5	mA
PD Reverse Voltage	VrPD	-	20	V
TEC Current*	Itec	-1.1	4.5	A
TEC Voltage	Vtec	-	4.5	V
Relative Humidity	RH	0	85	%
Torque Force	-	-	0.08	N m
Electrostatic Discharge(ESD) (HBM)	-	-	500	V

*LD modules are subject to damage by TEC current in wrong polarity and may be damaged even if the operating conditions are within the maximum ratings, because the threshold of damage by reverse TEC current varies by ambient temperature.

2. Performance Specification (Ts=25°C Unless otherwise specified)

Parameter	Sym.	Min.	Typ.	Max.	Unit	Condition
Fiber-coupled Power	Pf				mW	
FOL1437R40-317,-417		400				IfBOL =< 1400mA Note 2
FOL1437R45-317,-417		450				IfBOL =< 1600mA Note 2
FOL1437R50-317,-417		500				IfBOL =< 1800mA Note 2
Threshold Current	Ith	-	-	120	mA	Ts=25°C, CW
LD Forward Voltage	Vf				V	Pf=Rated Power, BOL
FOL1437R40-317,-417		-	-	2.3		
FOL1437R45-317,-417		-	-	2.4		
FOL1437R50-317,-417		-	-	2.5		
LD Forward Current (BOL)	IfBOL				mA	Pf=Rated Power
FOL1437R40-317,-417		-	-	1400		
FOL1437R45-317,-417		-	-	1600		
FOL1437R50-317,-417		-	-	1800		
LD Forward Current (EOL)	IfEOL				mA	IfEOL=IfBOL x 1.15
FOL1437R40-317,-417		-	-	1610		
FOL1437R45-317,-417		-	-	1840		
FOL1437R50-317,-417		-	-	2070		
Monitor Current	Im	100	-	2000	uA	VrPD=5V, Pf=Rated Power
Monitor Dark Current	Id	-	-	100	nA	VrPD=5V
Monitor Capacitance	Cm	-	-	15	pF	-
Center Wavelength	λc	1460	-	1490	nm	RMS(-20dB), Pf=Rated Power
Spectral Width	Δλ	-	-	8	nm	RMS(-20dB), Pf=Rated Power

Ts: Sensor temperature, Tc : Case temperature
BOL: Beginning of Life EOL: End of Life

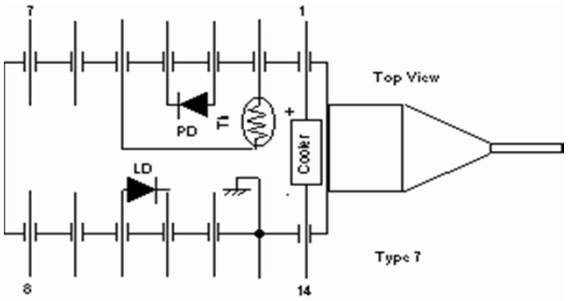
2. Performance Specification (continued) (Ts=25°C Unless otherwise specified)

Parameter	Sym.	Min.	Typ.	Max.	Unit	Condition
TEC Current	Ic				A	Ts=25°C, Tc=70°C, IfEOL,Note 1
FOL1437R40-317,-417		-	-	2.6		
FOL1437R45-317,-417		-	-	2.9		
FOL1437R50-317,-417		-	-	3.2		
TEC Voltage	Vc				V	Ts=25°C, Tc=70°C, IfEOL,Note 1
FOL1437R40-317,-417		-	-	3.2		
FOL1437R45-317,-417		-	-	3.5		
FOL1437R50-317,-417		-	-	3.8		
Total Power Consumption	Wtotal				W	Ts=25°C, Tc=70°C, IfEOL,Note 1
FOL1437R40-317,-417		-	-	11		
FOL1437R45-317,-417		-	-	13		
FOL1437R50-317,-417		-	-	15		
Polarization Extinction Ratio	PER	16	-	-	dB	Iop=500mA, Type 417 only
Thermistor Resistance	Rth	9.5	10	10.5	k ohms	Ts=25°C
Thermistor B Constant	Bth	-	3900	-	K	-
Tracking Error	TE	-0.5	-	0.5	dB	Tc=-20 to 70°C referred to 25°C
Return Loss	RL	25	-	-	dB	λ=1550nm
Isolation	ISO	30	-	-	dB	λ=1480nm

Ts: Sensor temperature, Tc : Case temperature
BOL: Beginning of Life EOL: End of Life

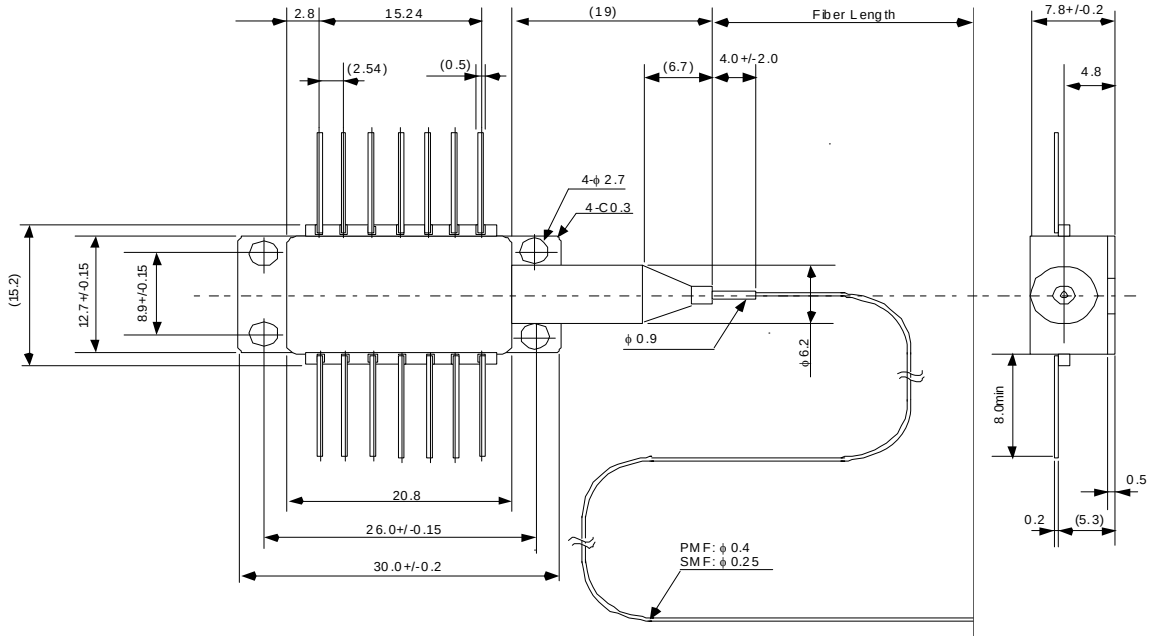
3.Dimension & Pin Assignment

3.1 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 Ground
7	No Connection	14	Cooler (-)

3.2 Dimension



4. Fiber Pigtail Specifications

Type 317 Series (Fiber type: SMF)

Parameter	Sym.	Min.	Typ.	Max.	Condition
Fiber	-	Single Mode Fiber			
Cutoff Wavelength (nm)	-	-	1260	-	-
Mode Field Diameter (um)	Dmf	-	10	-	at 1550nm
Cladding Diameter (um)	Dcl	122	125	128	-
UV Coating Diameter (um)	Duc	-	250	-	-
Bend Radius (mm)	-	30	-	-	-
Pigtail Length (m)	Lf	1.0	-	-	-
Fiber Connector	-	None			

Type 417 Series (Fiber type: PMF)

Parameter	Sym.	Min.	Typ.	Max.	Condition
Fiber	-	Polarization Maintaining Fiber			
Cutoff Wavelength (nm)		-	1400	-	-
Mode Field Diameter (um)	Dmf	-	10	-	at 1550nm
Cladding Diameter (um)	Dcl	122	125	128	-
UV Coating Diameter (um)	Duc	-	400	-	-
Bend Radius (mm)	-	30	-	-	-
Pigtail Length (m)	Lf	1.0	-	-	-
Fiber Connector	-	None			

5. Accompanying Data

Parameter	Conditions
Threshold Current	Ts=25°C, CW
LD Forward Current	Ts=25°C, Tc=70°C, Pf=Rated Power
LD Forward Voltage	Ts=25°C, Tc=70°C, Pf=Rated Power
Monitor Current	Ts=25°C, Tc=70°C, Pf=Rated Power
Center Wavelength (RMS(-20dB))	Ts=25°C, Tc=70°C, Pf=Rated Power
Spectral Width (RMS(-20dB))	Ts=25°C, Tc=70°C, Pf=Rated Power
TEC Current	Ts=25°C, Tc=70°C, IfEOL
TEC Voltage	Ts=25°C, Tc=70°C, IfEOL
Total Power Consumption	Ts=25°C, Tc=70°C, IfEOL
Polarization Extinction Ratio (Type 417 only)	Ts=25°C, Iop=500mA
If-Pf Curve	Ts=25°C, Tc=70°C, Iop=0~2100mA
Pf-Im Curve	Ts=25°C, Tc=70°C, Iop=0~2100mA
If-Vf Curve	Ts=25°C, Tc=70°C, Iop=0~2100mA
Spectrum	Ts=25°C, Tc=70°C, Pf=Rated Power

6. RoHS compliance

This product is compliant with RoHS requirements
(Directive 2011/65/EU, see highlights in the following table).

Material	Concentration
Cadmium (Cd)	<100ppm
Lead (Pb)	<1000ppm
Mercury (Hg)	<1000ppm
Hexavalent Chromium (Cr VI)	<1000ppm
Polybrominated biphenyls (PBB)	<1000ppm
Polybrominated diphenyl ethers (PBDE)	<1000ppm

Please note that current design meets RoHS directive by the use of some exemptions for Lead content.
Please ask technical contact for more detail.

7. Warning

(1) The laser light emitted from the optical fiber end is invisible and will be hazardous to the human eye. Avoid looking directly into the optical fiber, when the device is in operation.
(2) The device should be damaged by static electricity and surge current. Static electricity protection and surge protection are needed before handling.
(3) The device creates a large amount of heat when operated, so that the thermal dissipation should be carefully taken in account the board design.

8. Safety Information

The product complies with 21 CFR1040.10 and 1040.11, Class 4 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.

9. Limited Warranty

Furukawa Electric warrants the LD modules against defects in parts and workmanship for one full year from B/L date. This warranty shall be invalid by any abuse, misuse, misapplication or improper installation of the product.

<Note 1>

The TEC performance strongly depends upon the mounting conditions. These values are specified under Furukawa's measurement conditions. It is recommended to mount the LD module onto a sufficient heat sink with thermal grease and tighten the module with screws.

<Note 2>

Optical power is calibrated with a large area calorimeter by using an AR coated Super PC-Angled PC connectorized graded index jumper cable as shown below. All other optical performances are measured with FC/SPC connector. The output power measured directly from bare fiber may be different from Furukawa's shipping data because of reflection from the fiber end unless the fiber pigtail is angled polished.