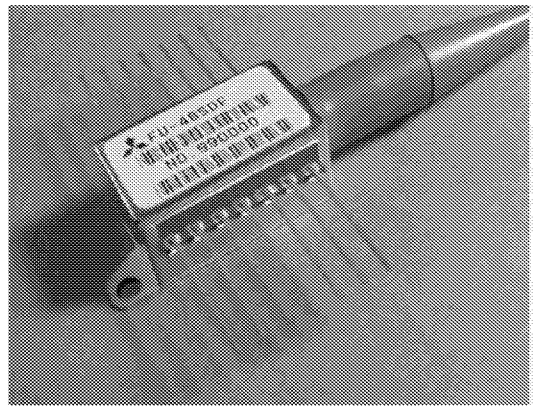
MITSUBISHI (OPTICAL DEVICES)

FU-48SDF-30M14D/15D/16D/17D

1.3 μm DFB-LD MODULE WITH SINGLEMODE FIBER PIGTAIL(CATV)

DESCRIPTION

Module type FU-48SDF-30M series has been developed for coupling a singlemode optical fiber and a 1.3 μm wavelength InGaAsP DFB LD (Laser diode). The module is suitable to light source for use in multi-channel long haul AM CATV systems.



FEATURES

- Distributed Feedback Laser Diode Module
- Suitable light source for CATV application
- High-power
- Emission wavelength is in the 1.3μm band
- Built-in optical isolator
- Built-in thermal electric cooler
- Butterfly package

APPLICATION

CATV

ABSOLUTE MAXIMUM RATINGS (Tld=25°C)

Parameter		Symbol	Conditions	Rating	Unit
Laser diode	Optical output power from fiber end	Pf	CW	20	mW
	Forword current	If	CW	150	mA
	Reverse voltage	Vrl	-	2	V
Photodiode	Reverse voltage	Vrd	-	20	V
for monitoring	Forward current	Ifd	-	2	mA
Cooler	Cooler voltage	Vpe	-	2.4	V
(Note)	Cooler current	Ipe	-	1.2	A
Operating case temperature		Tc	-	-20~+65	°C
Storage temperature		Tstg	-	-40~+70	°C

Note. Even if the thermo-electric cooler (TEC) is operated within the rated conditions, uncontrolled current loading or operation without heatsink may easily damage the module by exceeding the storage temperature range. Thermistor resistance should be properly monitored by the feedback circuit during TEC operation to avoid the catastrophic damage.

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ELECTRICAL/OPTICAL CHARACTERISTICS (Tld=25°C,Tc=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Threshold Current	Ith	CW	-	10	30	mA
Operating Current	Iop	CW, If=Iop (Note1)	-	45	70	mA
Modulation Current	Imod	Imod=Iop-Ith	-	35	50	mA
Operating Voltage	Vop	CW, If=Iop	-	1.3	1.8	V
Input impedance	Zin	If = Iop	-	25	-	Ω
Oupput Power from Fiber End	Pf	CW, If=Iop -30M14D	6	8	10	mW
		-30M15D	8	10	12	mW
		-30M16D	9	12	15	mW
		-30M17D	12	13	15	mW
Central Wavelength	λc	CW, If=Iop	1290	1310	1330	nm
Side Mode Suppression Ratio	Sr	CW, If=Iop	30	35	-	dB
Cut-off Frequency (-1.5dB)	fc	If = Iop	2	3	-	GHz
Composite Second Order	CSO	79 channel loading 55.25MHz-547.25MHz (6MHz spacing) Optical loss=12dB If=Iop (Note2)	-	-	-60	dBc
Composite Triple Beat	CTB		-	-	-65	dBc
Carrier to Noise Ratio	CNR	-30M14D	48.5	49.5	-	dBc
		-30M15D	49.5	50.5	-	dBc
		-30M16D	50.5	51.5	-	dBc
		-30M17D	51	52	-	dBc
Optical Modulation Depth	m		3.0	3.5	5	%
RIN (Note 3)		CW, If=Iop				
	Nr2	f=55.25MHz	-	-160	-155	dB/Hz
	Nr78	f=547.25MHz	-	-160	-155	dB/Hz
Tracking Error (Note 4)	Er	Tc=-20~65°C, APC, ATC	-	0.3	0.5	dB
Differential Efficiency	η	-30M14D	0.2	0.27	-	mW/mA
		-30M15D	0.2	0.3	-	mW/mA
		-30M16D	0.2	0.3	-	mW/mA
		-30M17D	0.24	0.33	-	mW/mA
Monitor Current	Imon	CW, If=Iop, Vrd=5V	0.1	-	3	mA
Dark current(PD)	Id	Vrd=5V	-	0.1	1	mA
Capacitance (PD)	Ct	Vrd=5V,f=1MHz	-	10	20	pF
Isolation	Iso	Tc = 0~65°C	25	37	-	dB

Note 1. If : LD forward current

Note 2. Detailed test conditions;

12dB Optical loss includes 26.5km fiber loss.

Receiver responsivity=0.9A/W

Input equivalent noise current=7pA/(Hz)$^{1/2}$

Optical return loss of the connectors should be greater than 50dB in order to get the specified performance.

Note 3. Relative intensity noise does not include shot noise of receiver.

Note 4. Er=MAX|10×log(Pf(Tc)/Pf(25°C))|

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THERMAL CHARACTERISTICS (Tld=25°C,Tc=-20~+65°C)

Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Thermistor resistance	Rth	Tld=25°C	9.5	10	10.5	kΩ
B constant of thermistor resistance	B	-	-	3950	-	K
Cooling capacity	ΔT	Tc=65°C	40	-	-	°C
Cooler current	Ipe	ΔT=40°C	-	0.6	1	A
Cooler Voltage	Vpe	ΔT=40°C	-	1.2	2	V

OPTICAL FIBER SPECIFICATION

Parameter	Limits	Unit
Type	SM	-
Mode filed dia.	9.5±1	μm
Cladding dia.	125±2	μm
Jacket dia.	0.9 typ.	mm

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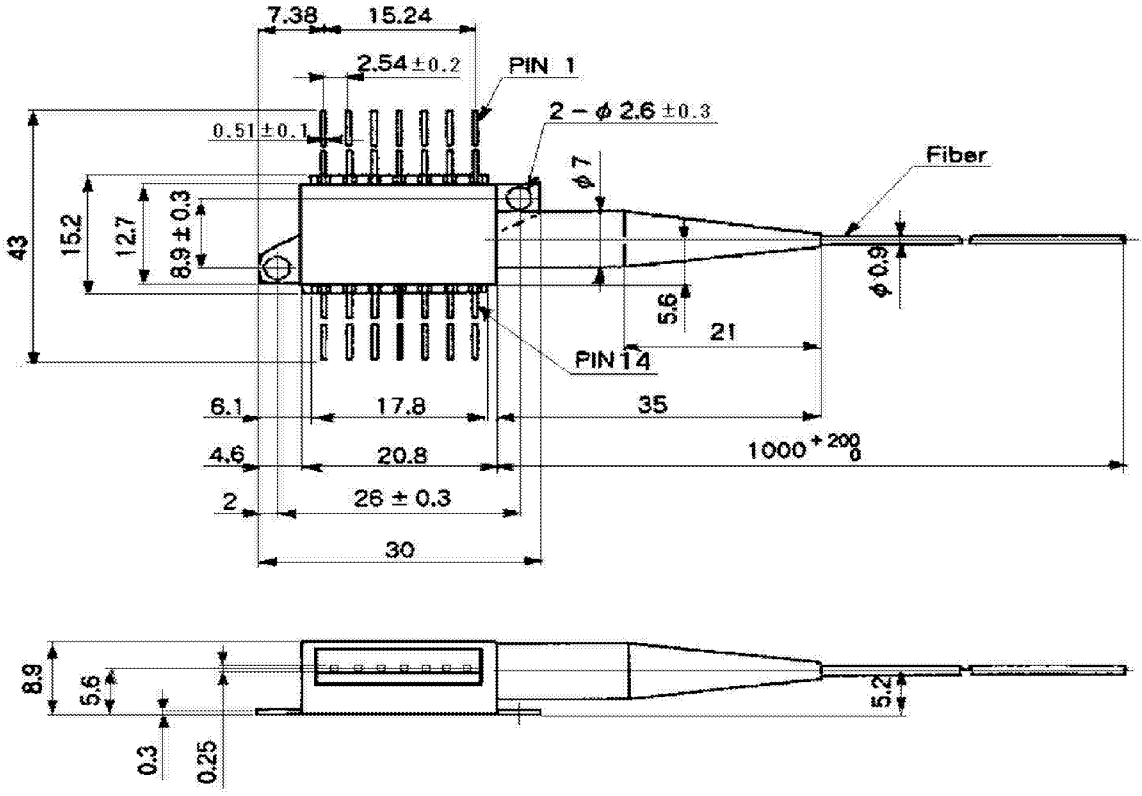
OUTLINE DIAGRAM

(Unit : mm)

NOTE. TOLERANCE UNLESS NOTED ±0.5



PIN	FUNCTION	PIN	FUNCTION
1	THERMISTOR	8	GND
2	THERMISTER	9	GND
3	LD BIAS(-)	10	NC
4	PD ANODE	11	LD ANODE, GND
5	PD CATHODE	12	LD RF
6	COOLER ANODE	13	LD ANODE, GND
7	COOLER CATHODE	14	NC