

Approved	Approved	Charged
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Specification for 1310nm DFB LD module

FU-48SDF-Y30M31B

FU-48SDF-Y30M51

FU-48SDF-Y30M52

FU-48SDF-Y30M53

FU-48SDF-Y30M54

FU-48SDF-Y30M55

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	x		
Date		Approved	
00.01.13		Nakamura	

MITSUBISHI ELECTRIC CORPORATION

MITSUBISHI (OPTICAL DEVICES)

FU-48SDF-Y30M31B/51/52/53/54/55**1.3 μ m DFB-LD MODULE WITH SINGLEMODE FIBER PIGTAIL(CATV)****DESCRIPTION**

Module type FU-48SDF-Y30Mxx series has been developed for coupling a singlemode optical fiber and a 1.3 μ m wavelength InGaAsP DFB LD (Laser diode).

These modules are suitable light source for use in multi-channel long haul AM CATV systems.

FEATURES

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

APPLICATION

CATV

ABSOLUTE MAXIMUM RATINGS (T_{ld}=25°C)

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

Note. Even if the thermo-electric cooler (TEC) is operated within the rated conditions, uncontrolled current loading or operation without heat sink 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.

MITSUBISHI (OPTICAL DEVICES)

FU-48SDF-Y30M31B/51/52/53/54/55**1.3 μ m DFB-LD MODULE WITH SINGLEMODE FIBER PIGTAIL(CATV)****ELECTRICAL/OPTICAL CHARACTERISTICS** (T_{ld}=25°C, T_c=25°C, unless otherwise noted)

Parameter	Symbol	Condition	Limits			Units
			Min.	Typ.	Max.	
Threshold Current	I _{th}	CW	-	10	30	mA
Operating Current	I _{op}	CW, I _f =I _{op} (Note1)	-	40	70	mA
Modulation Current	I _{mod}	I _{mod} =I _{op} -I _{th}	-	-	50	mA
Operating Voltage	V _{op}	CW, I _f =I _{op}	-	1.3	1.8	V
Input impedance	Z _{in}	I _f = I _{op}		25		ohm
Output Power from Fiber End	P _f	CW, I _f =I _{op} -Y30M31B -Y30M52 -Y30M53 -Y30M54 -Y30M55 -Y30M51	4	5	6	mW
			6	7	8	
			8	9	10	
			10	11	12	
			12	13	14	
			14	-	-	
Central Wavelength	I _c	CW, I _f =I _{op}	1290	1310	1330	nm
Side Mode Suppression Ratio	S _r	CW, I _f =I _{op}	30	35	-	dB
Cut-off Frequency	f _c	I _f = I _{op}	2	3	-	GHz
Composite Second Order	CSO	79 channel loading 55.25MHz-547.25MHz (6MHz spacing) I _f =I _{op} (Note2)	-	-	-60	dBc
Composite Triple Beat	CTB		-	-	-65	dBc
Carrier to Noise Ratio	CNR	-Y30M31B -Y30M52 -Y30M53 -Y30M54 -Y30M55 -Y30M51	50	-	-	dBc
			49.5	-	-	
			50	-	-	
			50.5	-	-	
			51	-	-	
			51	-	-	
Optical Modulation Depth	m	-Y30M31B	3.0	3.5	5	%
		-Y30M51~55	3.2	3.5	5	
RIN (Note 3)	Nr2	CW, I _f =I _{op} f=55.25MHz	-	-160	-155	dB/Hz
	Nr78	f=547.25MHz	-	-160	-155	dB/Hz
Tracking Error(Note 4)	E _r	T _c =-20~65°C, APC, ATC	-	0.3	0.5	dB
Differential Efficiency	η	I _f =I _{op} -Y30M31B -Y30M52~55 -Y30M51	0.1	0.2	0.35	mW/mA
			0.2	0.26	-	
			0.24	0.33	-	
Monitor Current	I _{mon}	CW, I _f =I _{op} , V _{rd} =5V	0.1	-	3	mA
Dark current(PD)	I _d	V _{rd} =5V	-	0.1	1	mA
Capacitance (PD)	C _t	V _{rd} =5V, f=1MHz	-	10	20	pF
Isolation	I _{so}	T _c = 0 to 65°C	25	37	-	dB

Note 1. I_f : LD forward current

Note 2. Detailed test conditions;

Type -Y30M31B, 52 : 8.5dB Optical loss includes 15km fiber loss.

Type -Y30M53, 54, 55, 51 : 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. E_r = MAX [10* log (P_f/P_f(25°C))]

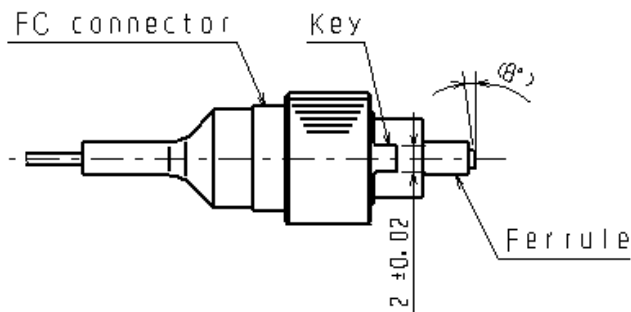
MITSUBISHI (OPTICAL DEVICES)

FU-48SDF-Y30M31B/51/52/53/54/55**1.3 μm DFB-LD MODULE WITH SINGLEMODE FIBER PIGTAIL(CATV)****THERMAL CHARACTERISTICS** (T_{ld}=25°C, T_c=-20~+65°C)

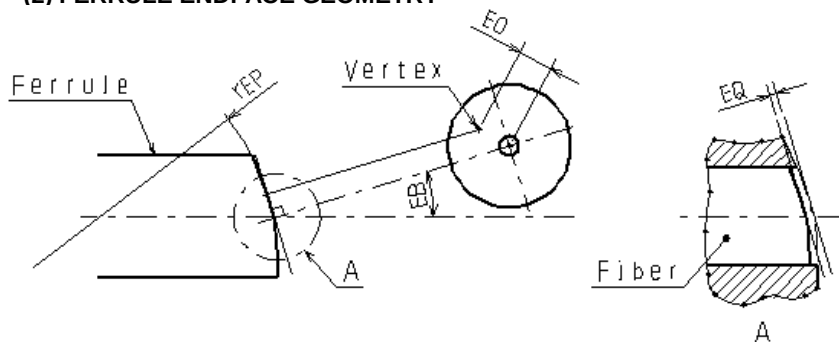
Parameter	Symbol	Conditions	Limits			Units
			Min.	Typ.	Max.	
Thermistor resistance	R _{th}	T _{ld} =25°C	9.5	10	10.5	K Ω
B constant of thermistor resistance	B	-	-	3950	-	K
Cooling capacity	ΔT	T _c =65°C	40	-	-	K
Cooler current	I _{pe}	ΔT =40K	-	0.6	1	A
Cooler voltage	V _{pe}	ΔT =40K	-	1.2	2	V

OPTICAL FIBER SPECIFICATION

Parameter	Limits	Unit
Type	SM	-
Mode field diameter	9.5 $\pm$ 1	μm
Cladding diameter	125 $\pm$ 2	μm
Jacket diameter	0.9 typ.	mm
Fiber pintail length	L _{fiber} =1000+200/-0 (L _{fiber} is defined in the outline drawing.)	mm

CONNECTOR SPECIFICATION**(1) CONNECTOR PARTS**

Part	Marker	Part No.
FC connector	SEIOH	PF11A
Ferrule	GIKEN	FF3A

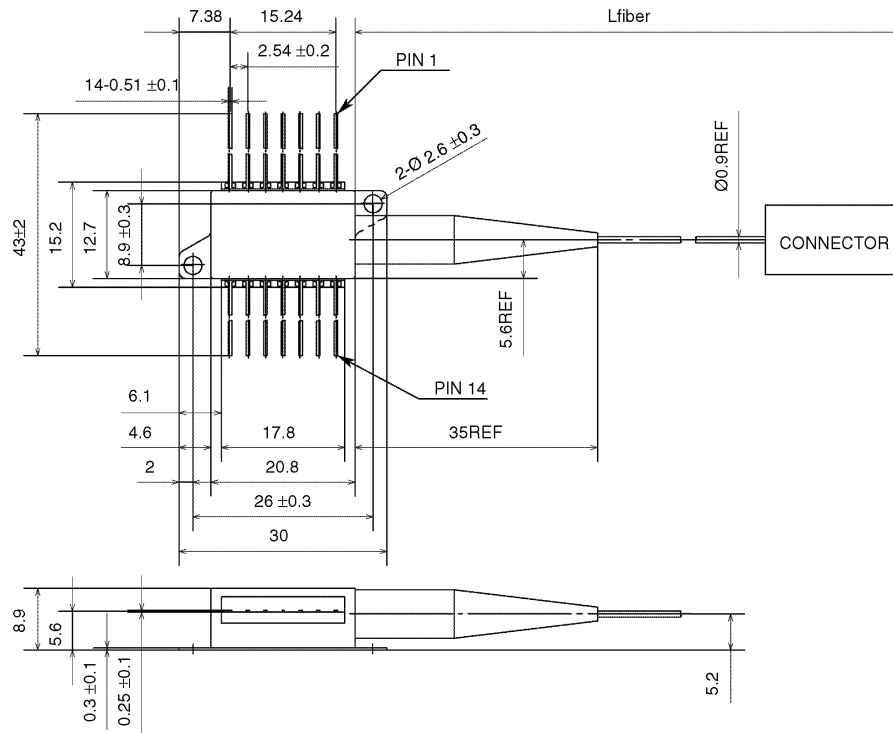
(2) FERRULE ENDFACE GEOMETRY

Reference	Dimensions
EB	8°
EO	50 μm MAX
rEP	5~12mm
EQ	$\pm 0.1\mu\text{m}$

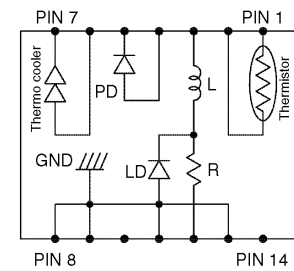
MITSUBISHI (OPTICAL DEVICES)

FU-48SDF-Y30M31B/51/52/53/54/55**1.3 μ m DFB-LD MODULE WITH SINGLEMODE FIBER PIGTAIL(CATV)****OUTLINE DIAGRAM**

(Unit : mm)



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

**FU-48SDF-Y30M31B/51/52/53/54/55**