FU-68PDF-2

1.55μm DFB-LD MODULE WITH PORALIZATION MAINTAINING FIBER PIGTAIL

DESCRIPTION

Module type FU-68PDF-2 is a 1.55μm DFB-LD module with poralization maintaining optical fiber. This module is suitable to a light source for use in communication systems with external modulator.

FEATURES

- Distributed feedback (DFB) laser diode
- Input impedance is 25Ω
- Emission wavelength is in 1.55μm band
- Polarization maintaining optical fiber pig-tail
- Built-in optical isolator
- Built-in thermal electric cooler
- Butterfly package
- Narrow spectral line width
- With photodiode for optical output monitor

APPLICATION

Trunk Line, CATV

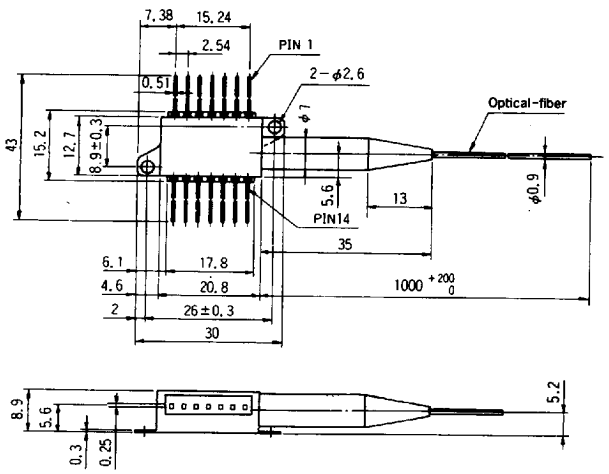
ABSOLUTE MAXIMUM RATINGS (T_{LD} = 25℃)

Parameter		Symbol	Conditions	Rating	Unit
Laser diode	Optical output power from fiber end	P_F	CW	15	mW
	Forward current	I_F	CW	150	mA
	Reverse voltage	V_{RL}	–	2	V
Photodiode for monitoring	Reverse voltage	V_{RD}	–	20	V
	Forward current	I_{FD}	–	2	mA
Cooler (Note)	Voltage	V_{pem}	–	2.4	V
	Current	I_{pem}	–	1.2	A
Operating case temperature		T_C	–	−20~+65	℃
Storage temperature		T_{stg}	–	−40~+70	℃

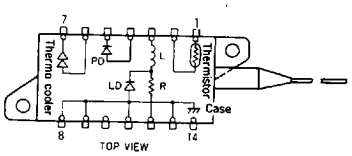
Note. Even if the thermo-electric cooler (TEC) is operated within the rated conditions, uncontrolled current loading or operation without heatsink may easily damage the module by exceeding the storage temperature range. Thermistor resistance should be properly monitored by the feedback circuit during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

OUTLINE DIAGRAM

(Unit : mm)



PIN	FUNCTION
1	THERMISTER
2	THERMISTER
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



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MITSUBISHI ELECTRIC

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ELECTRICAL/OPTICAL CHARACTERISTICS (T_{LD} = 25℃, T_C = 25℃, unless otherwise noted)

Parameter	Symbol	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
Threshold current	I_{th}	CW	–	12	40	mA
Operating current	I_{OP}	CW	–	55	90	mA
Operating voltage	V_{OP}	CW, $I_F = I_{OP}$ (Note 1)	–	1.3	1.8	V
Input impedance	Zin	$I_F = I_{OP}$	–	25	–	Ω
Optical output power from fiber end	P_F	CW, $I_F = I_{OP}$	4	6	–	mW
Light-emission central wavelength	λc	CW, $I_F = I_{OP}$	1530	1550	1570	nm
Spectral line width	Δf	CW, $I_F = I_{OP}$	–	20	30	MHz
Side mode suppresion ratio	Sr	CW, $I_F = I_{OP}$	33	40	–	dB
Cutoff frequency (−1.5dB optical)	fc	$I_F = I_{OP}$	2	–	–	GHz
Extinction ratio	Ex	CW, $I_F = I_{OP}$	20	25	–	dB
Relative intensity noise	Nr	CW, $I_F = I_{OP}$	–	− 155	− 145	dB/Hz
Tracking error (Note 2)	Er	T_C = − 20∼ + 65℃, APC, ATC	–	0.3	–	dB
Differential efficiency	η	–	0.09	0.15	0.35	mW/mA
Monitor current	I_{mon}	CW, $I_F = I_{OP}$, V_{RD} = 5V	0.1	–	–	mA
Optical isolation	Iso	–	30	–	–	dB
Dark current (PD)	I_D	V_{RD} = 5V	–	0.1	1	μA
Capacitance (PD)	Ct	V_{RD} = 5V, f = 1MHz	–	10	–	pF

Note 1. I_F : LD forward current

2. $$Er = MAX \left| 10 \cdot \log \frac{P_F}{P_F(25℃)} \right|$$

THERMAL CHARACTERISTICS (T_{LD} = 25℃, T_C = − 20∼ + 65℃)

Parameter	Symbol	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
Thermistor resistance	R_{th}	T_{LD} = 25℃	9.5	10	10.5	kΩ
B constant of thermistor resistance	B	–	–	3950	–	K
Cooling capacity	ΔT	T_C = 65℃	40	–	–	℃
Cooler current	I_{pe}	ΔT = 40℃	–	0.6	1	A
Cooler voltage	V_{pe}	ΔT = 40℃	–	1.2	2	V

OPTICAL-FIBER SPECIFICATIONS

Parameter	Limits	Unit
Type	PM (Note 3)	–
Mode-field dia.	11 ± 1	μm
Cladding dia.	125 ± 3	μm
Jacket dia.	0.9 typ.	mm
Poralization axis	slow axis	–

Note 3. Panda fiber (Sumitomo : PM-155)

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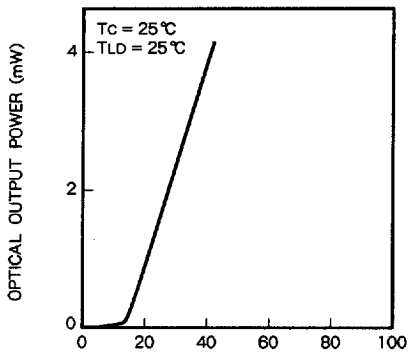
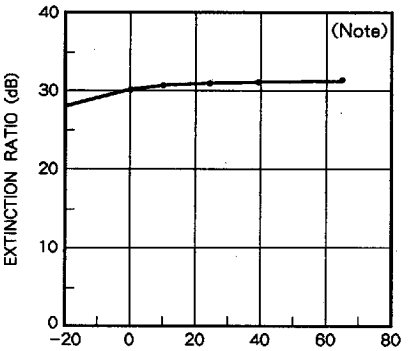
TYPICAL CHARACTERISTICS



FORWARD CURRENT VS. OPTICAL OUTPUT POWER



TEMPERATURE DEPENDENCE OF EXTINCTION RATIO

Note. The direction of polarization is set into the slow axis of a fiber.
Polarization extinction ratio is the worst value when the polarization interference is caused by bending a fiber.

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