

FU-45SDF-3 Analog Application

1.3 μ m DFB-LD Module with Singlemode Fiber Pigtail

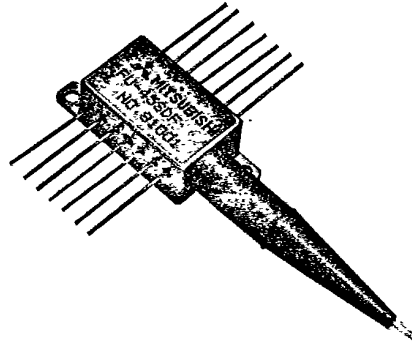
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Module type FU-45SDF-3 has been developed for coupling a singlemode optical fiber and a 1.3 μ m wavelength InGaAsP LD (Laser diode).

The module is the optimum light source for use in high capacity long haul analog optical communication systems.

FEATURES

- Distributed Feedback (DFB) Laser diode
- High-speed response
- Emission wavelength is in 1.3 μ m band
- With optical isolator
- With thermal electric cooler
- Butterfly package
- With photodiodes for optical output monitor
- Diodes are hermetically sealed

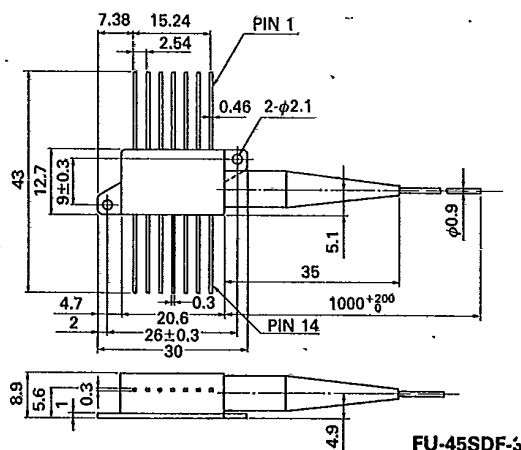


FU-45SDF-3

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

Items		Symbols	Conditions	Ratings	Units
Laser diode	Optical output power from fiber end	P _F	CW	4	mW
	Reverse Voltage	V _{RL}	—	2	V
Photodiode for monitoring	Reverse Voltage	V _{RD}	—	20	V
	Forward Current	I _{FD}	—	2	mA
Operating case temperature		T _C	—	−20~65	°C
Storage temperature		T _{slg}	—	−40~70	°C

OUTLINE DRAWINGS Unit (mm)



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

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Analog Application

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CHARACTERISTICS (T_C=25°C, T_{LD}=25°C, unless otherwise noted)

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Items	Symbols	Conditions	Min.	Typ.	Max.	Units
Threshold current	I _{th}	CW	—	15	40	mA
Operating current	I _{op}	CW	—	46	80	mA
Operating voltage	V _{op}	CW, I _F =I _{op} (Note 1)	—	1.3	1.8	V
Optical output power from fiber end	P _F	CW, I _F =I _{op}	1	2	—	mW
Central wavelength	λ _C	CW, I _F =I _{op}	1290	1310	1330	nm
Side mode suppression ratio	S _r	CW, I _F =I _{op}	30	35	—	dB
Cutoff frequency (-1.5dB)	f _c	I _F =I _{op}	2	—	—	GHz
2nd order distortion	D ₂	2 tone test (Note 2) : f ₁ =244MHz f ₂ =250MHz ΔM=0.35 (each) I _F (average)=I _{op} Rmodule >25dB	—	-40	-30	dBc
3rd order distortion	D ₃		—	-60	-45	dBc
Relative intensity noise	N _r		—	-155	-150	dB/Hz
Tracking error (Note 3)	E _t	T _C =-20~65°C, APC, ATC	—	0.3	—	dB
Differential efficiency	η	—	0.02	0.06	0.2	mW/mA
Monitor current	I _{mon}	CW, I _F =I _{op} , V _{RD} =5V	0.2	—	—	mA
Dark current (Photodiode)	I _D	V _{RD} =5V	—	0.1	1	μA
Capacitance (Photodiode)	C _t	V _{RD} =5V, f=1MHz	—	10	—	pF

Note 1) I_F: Forward current, (LD)

Note 2) f₁, f₂: Modulation frequency

ΔM: Optical modulation depth/Carrier

Rmodule: Optical return loss from fiber to LD module

$$Rmodule = -10 \cdot \log \frac{P_{FR}}{P_F}$$

where P_{FR}: Reflected optical power to LD module

Note 3) E_t=MAX $\left| 10 \cdot \log \frac{P_t}{P_F(25^\circ C)} \right|$

THERMAL CHARACTERISTICS (T_{LD}=25°C, T_C=-20~65°C)

Items	Symbols	Conditions	Min.	Typ.	Max.	Units
Thermister resistance	R _{th}	T _{LD} =25°C	9.5	10	10.5	kΩ
B constant of thermister resistance	B	—	—	3950	—	K
Cooling capacity	ΔT	T _C =65°C	40	—	—	°C
Cooler current	I _{pe}	ΔT=40°C	—	0.6	1	A
Cooler voltage	V _{pe}	ΔT=40°C	—	1.2	2	V

FIBER PIGTAIL SPECIFICATIONS

Items	Specifications	Units
Type	SM	—
Mode-field dia.	10±1	μm
Cladding dia.	125±2	μm
Jacket dia.	0.9	mm

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EXAMPLE OF CHARACTERISTICS

