

MITSUBISHI (OPTICAL DEVICES)
FU-445SDF-WM1

**1.3 μm UNCOOLED DFB-LD MODULE WITH SINGLEMODE FIBER PIGTAIL
(BIAS CIRCUIT INTEGRATED, DIGITAL APPLICATION)**

DESCRIPTION

Module type FU-445SDF-WM1 is a 1.3 μm Uncooled DFB-LD module with single-mode optical fiber. This module is suitable to a light source for use in 2.5Gb/s digital optical communication systems.

FEATURES

- $\lambda/4$ shifted Multi quantum wells (MQW) DFB Laser Diode module
- Input impedance is 25 Ω
- Emission wavelength is in 1.3 μm band
- High-speed response
- Built-in optical isolator
- Built-in thermistor and bias T
- 8-pin Mini-DIL package with Gull wing leads
- With photodiode for optical output monitor



APPLICATION

High speed transmission systems (~2.5Gb/s)

ABSOLUTE MAXIMUM RATINGS (Tc=25°C)

Parameter		Symbol	Conditions	Rating	Unit
Laser diode	Optical output power	Pf	CW	6	mW
	Forward current	If	CW	100	mA
	Reverse voltage	Vrl	—	2	V
Photodiode	Reverse voltage	Vrd	—	20	V
	Forward current	lfd	—	2	mA
Operating case temperature		Tc	—	-10 ~ +85	°C
Storage temperature		Tstg	—	-40 ~ +85	°C

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ELECTRICAL/OPTICAL CHARACTERISTICS ($T_c = -10 \sim 85^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Threshold current	I _{th}	CW, T _c =25°C	-	10	25	mA
		CW	2	-	40	
Optical output power at threshold current	P _{th}	CW, I _{bias} =I _{th}	-	-	50	μW
Operating current	I _{op}	CW, P _f =2mW, T _c =25°C	-	40	70	mA
		CW, P _f =2mW, T _c =85°C	-	60	90	
Operating voltage	V _{op}	CW, P _f =2mW	-	1.2	1.5	V
Input impedance	Z _{in}	-	-	25	-	Ω
Optical output power from fiber end	P _f	CW, nominal	-	2	-	mW
Light-emission central wavelength	λ_c	CW, P _f =1mW	1290	1310	1330	nm
Wavelength temperature coefficient	λ_{ct}	-	-	0.09	0.1	nm/°C
Spectral width	$\Delta\lambda$	(Note 1), -20dB	-	-	0.8	nm
Side mode suppression ratio	S _r	(Note 1)	30	45	-	dB
Cutoff frequency (-1.5dB optical)	f _c	P _f =1mW	3.5	-	-	GHz
Rise and fall time (10~90%)	t _r , t _f	(Note 1)	-	125	150	psec
Dispersion penalty	P _p	(Note 1), -300ps/nm disp.	-	-	0.5	dB
Relative intensity noise	N _r	CW, P _f =1mW, f=1GHz	-	-150	-140	dB/Hz
Tracking error (Note 2)	E _r	CW, APC(I _{mon} =Const.)	-	0.5	1.25	dB
Differential efficiency	η	CW, T _c =25°C	0.06	-	0.2	mW/ mA
		CW	0.04	-	0.27	
Monitor current	I _{mon}	CW, P _f =1mW, V _{rd} =5V	0.05	-	1	mA
Optical isolation	I _{so}	-	20	-	-	dB
Dark current (PD)	I _d	V _{rd} =5V	-	-	0.1	μA
Capacitance (PD)	C _t	V _{rd} =5V, f=1MHz	-	-	10	pF
Thermistor resistance	R _{th}	T _c =25°C	9.5	10	10.5	k Ω
B constant of R _{th}	B	-	-	3950	-	K

Note 1) 2.48832Gb/s NRZ, 2²³-1, P_{f_ave}=1mW, I_{bias}=I_{th}, optical return loss of the connectors should be greater than 40dB in order to ensure the specified performance.

Note 2) $E_r = \max|10 \times \log(P_f / P_{f@25^\circ\text{C}})|$

FIBER PIGTAIL SPECIFICATIONS

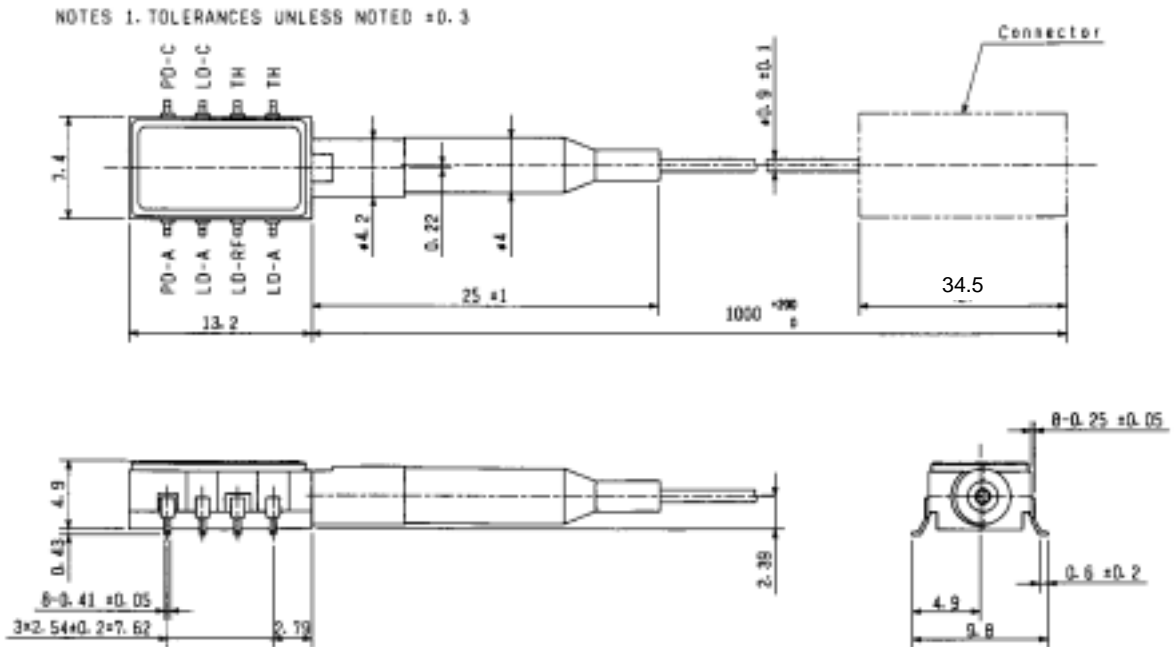
Parameter	Limits	Unit
Type	SM	-
Mode field diameter	9.5 \pm 1	μm
Cladding diameter	125 \pm 2	μm
Secondary coating outer diameter	0.9 \pm 0.1	mm
Connector	SC/PC	-
Optical return loss of connector	40 (min)	dB

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OUTLINE DIAGRAM

(Unit : mm)



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