

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	Ifd	—	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, $T_c = 25^\circ\text{C}$	-	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, $P_f = 2\text{mW}$, $T_c = 25^\circ\text{C}$	-	40	70	mA
		CW, $P_f = 2\text{mW}$, $T_c = 85^\circ\text{C}$	-	60	90	
Operating voltage	V_{op}	CW, $P_f = 2\text{mW}$	-	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, $P_f = 1\text{mW}$	1290	1310	1330	nm
Wavelength temperature coefficient	λ_{ct}	-	-	0.09	0.1	$\text{nm}/^\circ\text{C}$
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	$P_f = 1\text{mW}$	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, $P_f = 1\text{mW}$, $f = 1\text{GHz}$	-	-150	-140	dB/Hz
Tracking error (Note 2)	E_r	CW, APC ($I_{mon} = \text{Const.}$)	-	0.5	1.25	dB
Differential efficiency	η	CW, $T_c = 25^\circ\text{C}$	0.06	-	0.2	mW/ mA
		CW	0.04	-	0.27	
Monitor current	I_{mon}	CW, $P_f = 1\text{mW}$, $V_{rd} = 5\text{V}$	0.05	-	1	mA
Optical isolation	I_{so}	-	20	-	-	dB
Dark current (PD)	I_d	$V_{rd} = 5\text{V}$	-	-	0.1	μA
Capacitance (PD)	C_t	$V_{rd} = 5\text{V}$, $f = 1\text{MHz}$	-	-	10	pF
Thermistor resistance	R_{th}	$T_c = 25^\circ\text{C}$	9.5	10	10.5	k Ω
B constant of R_{th}	B	-	-	3950	-	K

Note 1) 2.48832Gb/s NRZ, $2^{23}-1$, $P_{f_ave} = 1\text{mW}$, $I_{bias} = I_{th}$, 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

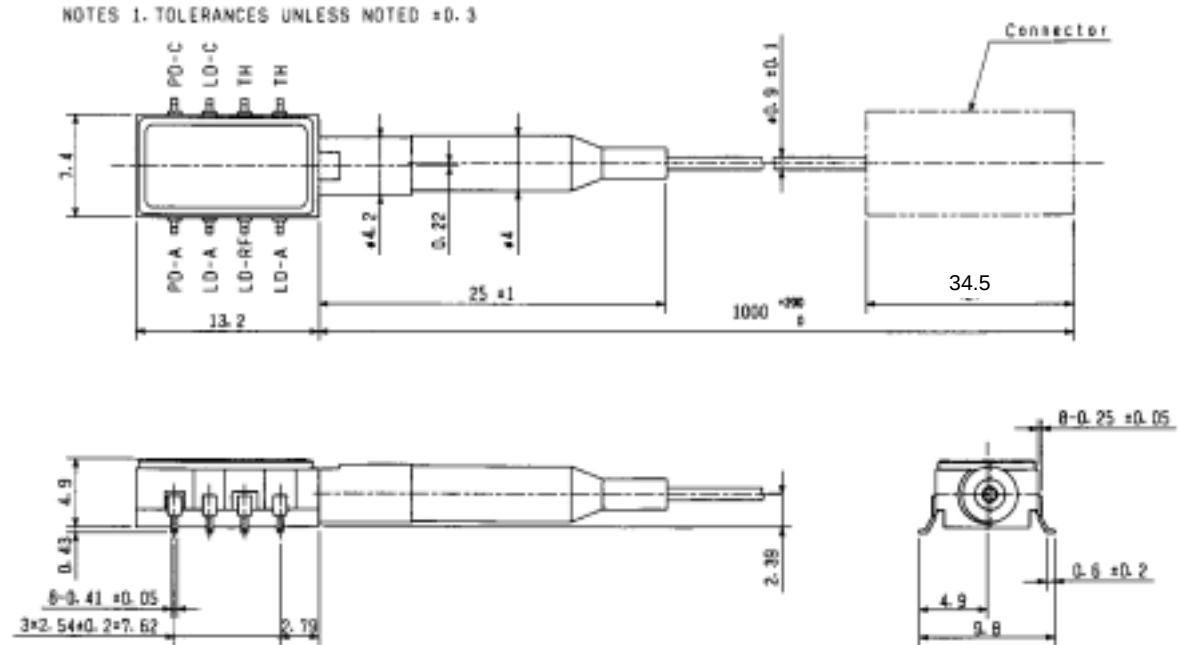
Parameter	Limits	Unit
Type	SM	-
Mode field diameter	9.5 ± 1	μm
Cladding diameter	125 ± 2	μm
Secondary coating outer diameter	0.9 ± 0.1	mm
Connector	SC/PC	-
Optical return loss of connector	40 (min)	dB

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OUTLINE DIAGRAM

(Unit : mm)



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