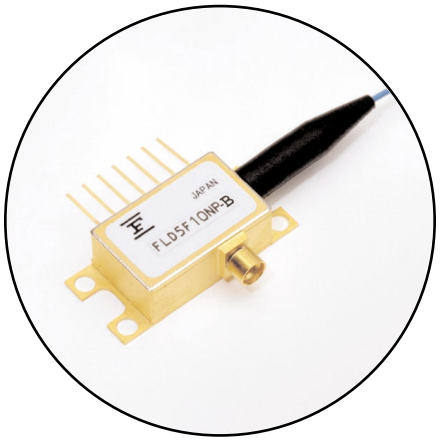
1,550nm MQW-DFB Modulator Integrated Laser

FLD5F10NP-B

FEATURES

- Modulator Integrated DFB Laser Diode Module
- CW operation of DFB laser section
- Modulation voltage applied only to modulator section
- High speed butterfly package with SMP connection
- Built-in optical isolator, monitor photodiode, thermistor, and thermo-electric cooler
- λ/4 shifted MQW-DFB chip



APPLICATION

This MI laser is intended for intermediate short reach applications (≥ 20km) at 10Gb/s.

DESCRIPTION

The Modulator Integrated DFB Laser (MI DFB Laser) has an electro-absorption modulator monolithically integrated with a conventional Distributed Feed-Back (DFB) λ/4 shifted Multi QuantumWell (MQW) laser. The modulation voltage is applied to the modulator section while the laser section operates CW allowing extremely low wavelength chirping. Extinction ratios of more than 8.3 dB can be achieved with 2.6 Vp-p modulation. The MI laser is installed in a butterfly type package. The module incorporates a highly stable YAG welded optical coupling system. The module includes an optical isolator, monitor photodiode, thermistor and a thermo-electric cooler.

ABSOLUTE MAXIMUM RATINGS (T_{op}=25°C, unless otherwise specified)

Parameter	Symbol	Condition	Ratings	Unit
Operating Case Temperature	T_{op}	-	-20 to +70	°C
Storage Temperature	T_{stg}	-	-40 to +85	°C
Optical Output Power	P_f	CW	5	mW
Laser Forward Current	I_F	CW	150	mA
Laser Reverse Voltage	V_R	CW	2	V
Modulator Forward Voltage	V_M	CW	-5 to +1	V
Photodiode Forward Current	I_{DF}	-	1	mA
Photodiode Reverse Voltage	V_{DR}	-	10	V
TEC Voltage	V_c	-	2.5	V
TEC Current	I_c	-	1.4	A
Lead Soldering Time	T_{sold}	260°C	10	sec

Edition 1.0
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OPTICAL & ELECTRICAL CHARACTERISTICS ($T_L = T_{set}$, T_C = 25°C, BOL, unless otherwise specified)

Parameter	Symbol	Test Condition	Limits			Unit
			Min.	Type	Max.	
Peak Wavelength	λ_p	Note (2)	1530	-	1565	nm
Sidemode Suppression Ratio	SSR		35	-	-	dB
On Level Modulation	V_o	-	0.7	-	0	V
Modulator Drive Voltage	V_{mod}	(Vo-Vmod)≥-3.3V, Rext=8.3dB	-	-	2.6	V
Threshold Current	I_{th}	CW, V_m=Vo	-	-	30	mA
Operating Current	I_{op}	CW, V_m=Vo, I_F=I_{th}	50	-	100	mA
Dispersion Penalty	dP	Note (1)	-	-	2	dB
Optical Output Power (Avg. Power)	Pf		-2	-	-	dBm
Forward Voltage	V_F	CW, I_F=I_{op}	-	1.4	2.0	V
Extinction Ratio	R_{ext}	f=10Gb/s, I_F=I_{op}, V_m=Vo/|Vo-Vmod|	8.3	-	-	dB
Rise Time	T_r	Note (2), 20 to 80%	-	20	40	ps
Fall Time	T_f		-	20	40	ps
RF Return Loss	S_{11}	f=DC-5GHz, 50Ω Test Set, V_m=Vo, I_F=I_{op}	8	-	-	dB
RF Return Loss	S_{11}	f=5-10GHz, 50Ω Test Set, V_m=Vo, I_F=I_{op}	3	-	-	dB
Cut-off Frequency	S_{21}	-3dB bandwidth, V_m=Vo-0.5|Vmod|, I_F=I_{op}	10	-	-	GHz
Monitor Current	I_m	Note (2)	0.04	-	1.1	mA
Relative Intensity Noise	RIN	f=10 MHz ~ 8.5 GHz, V_m=Vo, I_F=I_{op}, 8% Reflection	-	-	-120	dB/Hz
Optical Isolation	I_S	Tc=-20 to +65°C	25	35	-	dB
TEC Power Dissipation	P_{TEC}	I_F=I_{op}	-	-	2.4	W
Thermistor Resistance	R_{tr}	T_C, T_L=+25°C	9.5	10.0	10.5	KΩ
Thermistor B Constant	B		3270	3450	3630	K

Note (1) FUJITSU Test System
9.95328Gb/s, PRBS, 2^{23}-1, IF=Iop, Vm=Vo and (Vo-Vmod)
Dispersion=400ps/nm, Dispersion penalty at
Bit Error Rate = 1.0E-10

Note (2) FUJITSU Test System
9.95328Gb/s, PRBS, 2^{23}-1, IF=Iop, Vm=Vo and (Vo-Vmod)

Fig. 1 Lasing Spectrum

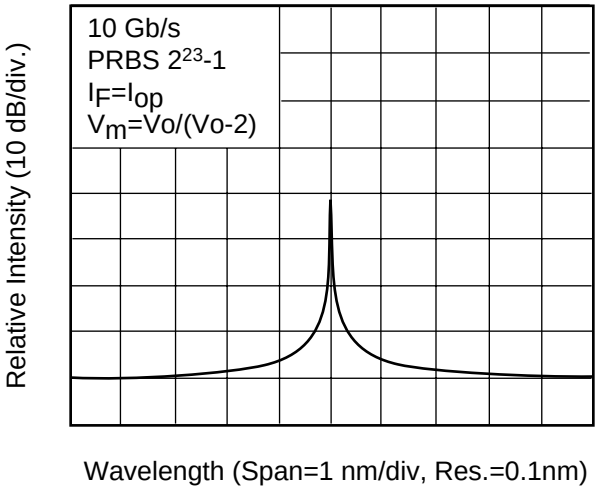


Fig. 2 Forward Current vs. Output Power and Forward Current vs. Forward Voltage

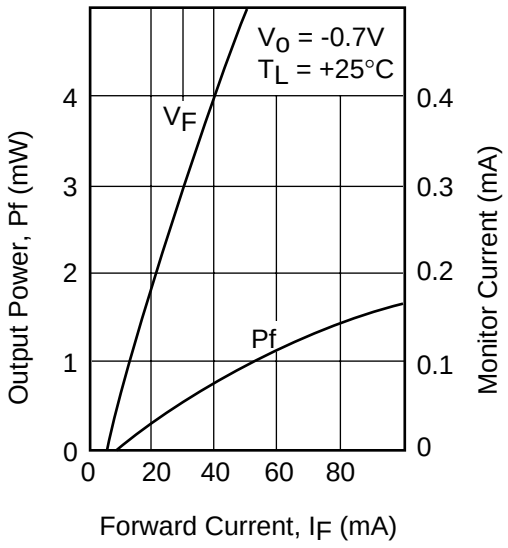


Fig. 3 Extinction Ratio vs. Modulation Voltage

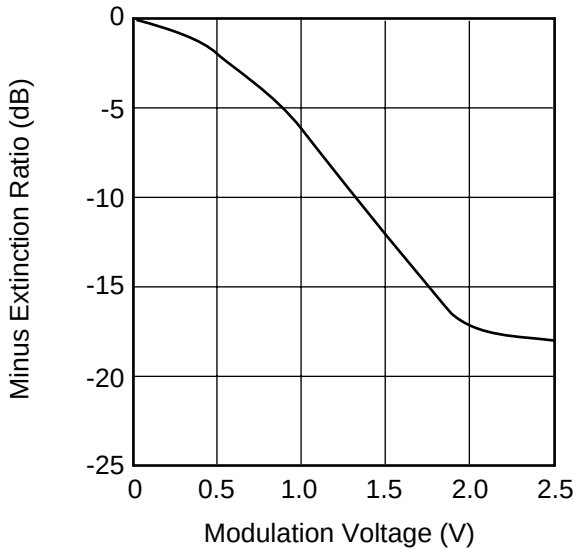


Fig. 4 Cut-off Frequency (S21)

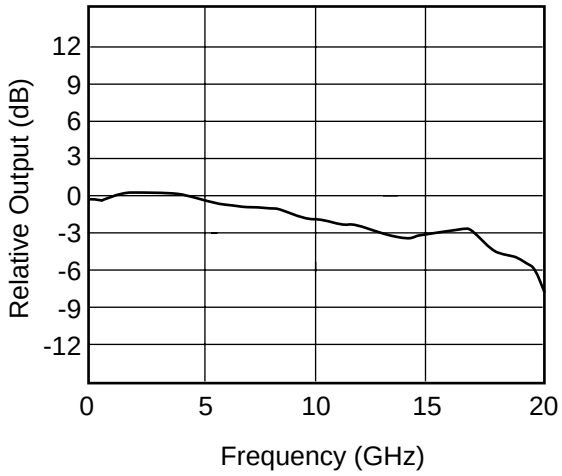


Fig. 5 RF Return Loss (S11)

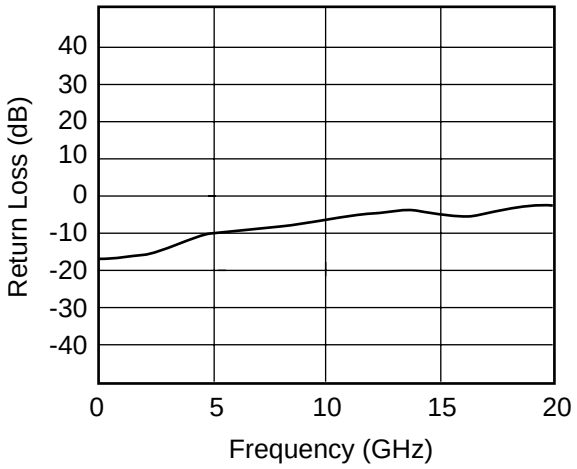
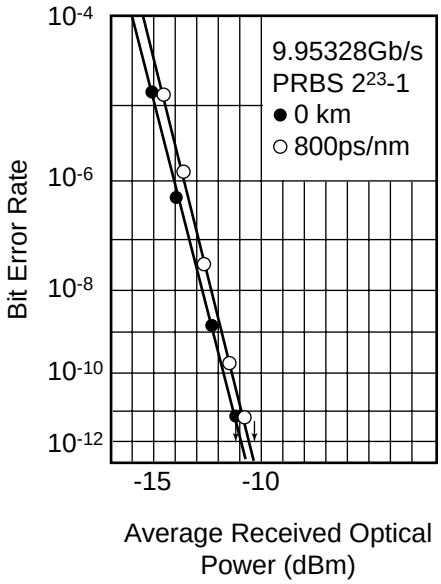
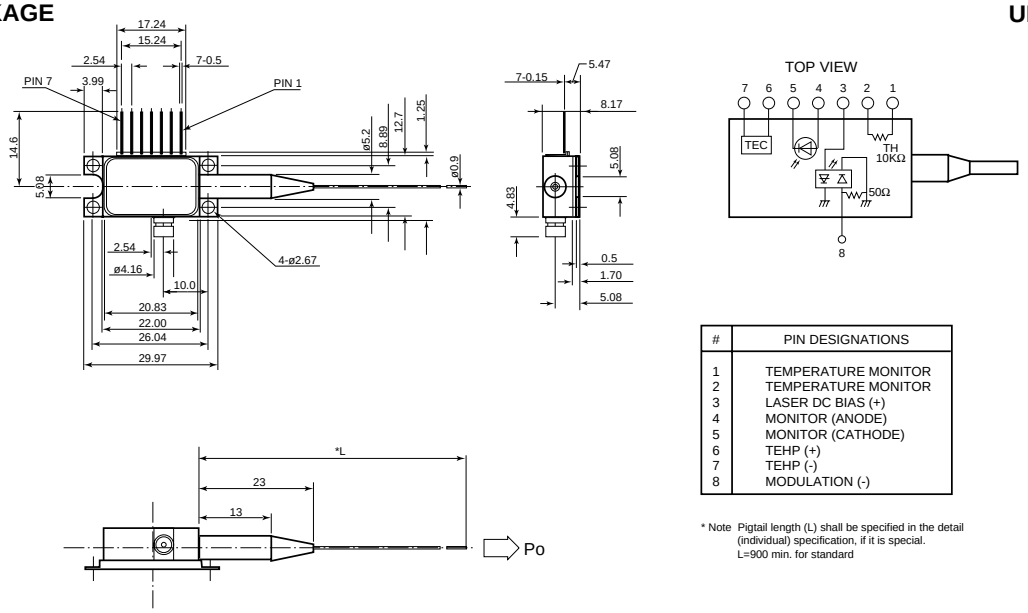


Fig. 6 Transmission Characteristics



Notes

"NP" PACKAGE **UNIT: mm**



#	PIN DESIGNATIONS
1	TEMPERATURE MONITOR
2	TEMPERATURE MONITOR
3	LASER DC BIAS (+)
4	MONITOR (ANODE)
5	MONITOR (CATHODE)
6	TEHP (+)
7	TEHP (-)
8	MODULATION (-)

* Note Pigtail length (L) shall be specified in the detail (individual) specification, if it is special. L=900 min. for standard

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CAUTION

Fujitsu Compound Semiconductor Products contain **gallium arsenide (GaAs)** which can be hazardous to the human body and the environment. For safety, observe the following procedures:

- **Do not put this product into the mouth.**
- **Do not alter the form of this product into a gas, powder, or liquid through burning, crushing, or chemical processing as these by-products are dangerous to the human body if inhaled, ingested, or swallowed.**
- **Observe government laws and company regulations when discarding this product. This product must be discarded in accordance with methods specified by applicable hazardous waste procedures.**

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