

FEATURES

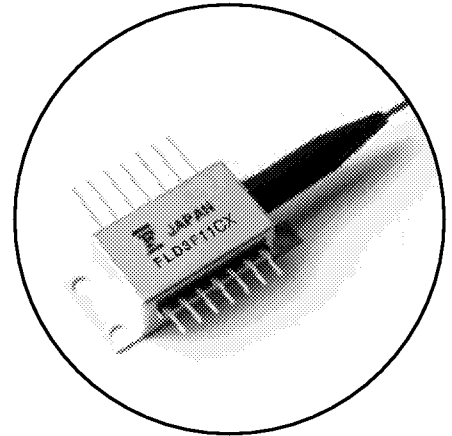
- Direct Modulated MQW DFB Laser
- $\lambda/4$ shifted MQW-DFB chip
- Built-in TEC, Thermistor and Monitor PD
- 14-Pin Butterfly Type Module
- 2.5 Gb/s Transmission Spans
- Low Residual Chirp
- Simplifies Driver Design
- Optimized for 2.5 Gb/s Modulation Rates

APPLICATIONS

This MQW laser is intended for application in long haul 2.5 Gb/s of 1,310nm fiber transmission systems. Transmission span of 40km is possible without amplifications.

DESCRIPTION

The MQW (Multiple Quantum Well) DFB Laser is a high power laser capable of 2.5 Gb/s transmission. It is packaged in a "butterfly" type module. The module employs a high efficiency optical coupling system, coupling the laser output through a built-in optical isolator into a single mode fiber pigtail. The modules also include a monitor photodiode, a thermoelectric cooler (TEC) and thermistor.



ABSOLUTE MAXIMUM RATINGS ($T_c=25^\circ\text{C}$)

Parameter	Symbol	Ratings	Unit
Storage Temperature	T_{stg}	-40 to +70	$^\circ\text{C}$
Operating Case Temperature	T_{op}	-20 to +65	$^\circ\text{C}$
Optical Output Power	P_f	5.0	mW
Laser Forward Current	I_f	150	mA
Laser Reverse Voltage	V_R	2	V
Photodiode Forward Current	I_{DF}	10	mA
Photodiode Reverse Voltage	V_{DR}	20	V
TEC Voltage	V_c	2.5	V
TEC Current	I_c	1.4	A
Lead Soldering Time	T_{sold}	10 @ 260 $^\circ\text{C}$	sec
Operating and Storage Humidity	X_{op}, X_{st}	95 @ Top and $T_{st}<30^\circ\text{C}$	%

TEC AND THERMISTOR CHARACTERISTICS

(Thermistor Resistance is set to 10.0k Ω , unless otherwise specified)

Parameter	Symbol	Limits		Unit	Conditions
		Min.	Max.		
Cooler Capacity	ΔT	40	-	$^\circ\text{C}$	CW, $P_f=2.0$ mW, $T_c=+65^\circ\text{C}$
TEC Current	I_c	-	1.0	A	$\Delta T=40^\circ\text{C}$, $P_f=2.0$ mW, $T_c=+65^\circ\text{C}$
TEC Voltage	V_c	-	2.0	V	$\Delta T=40^\circ\text{C}$, $P_f=2.0$ mW, $T_c=+65^\circ\text{C}$
Cooler Power	P_{tec}	-	1.4	W	$\Delta T=40^\circ\text{C}$, $P_f=2.0$ mW, $T_c=+65^\circ\text{C}$
TEC Resistance	R_{tec}	2.0	3.2	Ω	$\Delta T=40^\circ\text{C}$, $P_f=2.0$ mW, $T_c=+65^\circ\text{C}$
Thermistor Resistance	R_{tr}	9.5	10.5	k Ω	-
Thermistor B Constant	B	3,270	3,630	K	-

www.DataSheet4U.com **1,310nm MQW-DFB** _____ **FLD3F11CX**
Direct Modulation Laser

OPTICAL AND ELECTRICAL CHARACTERISTICS
(Thermistor Resistance is set to 10.0kΩ, unless otherwise specified)

Parameter	Symbol	Limits		Unit	Conditions
		Min.	Max.		
Threshold Current	I _{th}	4	20	mA	CW
Forward Voltage (pin 12,13)	V _{FDC}	-	1.84	V	CW, I _F =30 mA
Series Resistance (pin 12,13)	R _S	22	28	Ω	CW
Reverse Voltage	V _r	2	-	V	CW, at I _R <1500μA
Optical Output Power	P _f	2	-	mW	CW
Slope Efficiency	n	0.06	-	mW/mA	CW, P _f =2.0 mW
Threshold Power	P _{th}	-	50	μW	I _F =I _{th} , CW
Tracking Error at I _{mon}	TE	-0.5	+0.5	dB	P _f =2.0mW, T _C =-20 to 65°C, APC (Note 1)
Monitor Current	I _m	0.15	1.5	mA	CW, P _f =2.0mW, V _{DR} =5V
Photodiode Dark Current	I _D	-	100	nA	V _{DR} =5V
Photodiode Capacitance	C _t	-	10	pF	V _{DR} =5V, f=1 MHz
Photodiode Cutoff Frequency	f _{cm}	100	-	MHz	V _{DR} =5V, 50 Ω load
Peak Wavelength	λ _p	1,290	1,330	nm	2.5 Gb/s NRZ pseudo-random, I _b =0.8 I _{th} P _{peak} =2.0 mW
SideMode Suppression Ratio	SSR	33	-	dB	
Spectral Width (-20 dB)	Δλ	-	0.6	nm	
Rise Time (10%-90%)	t _r	-	0.125	nsec	
Fall Time (10%-90%)	t _f	-	0.125	nsec	
Cutoff Frequency	f _c	4.0	-	GHz	
In-Band Ripple (Window)	S ₂₁	-	±1.5	dB	f=50 MHz-3 GHz
RF Return Loss	S ₁₁	8	-	dB	f=45 MHz-3 GHz
		3			f=3 GHz-5 GHz
Optical Isolation	I _s	25	-	dB	T _c =-20 to 65°C
Relative Intensity Noise	RIN	-	-135	dB/Hz	f=0.5 GHz P _f =2.0 mW, ORL=24 dB
Kinks (upto 2.4 mW)	Kns		None		-
Pulsation	-		None		-
BER Performance	ER		No Floor		Note (2)

Note 1. TE=10xlog{P_f(T_{case})/P_f(T_c=25°C)}dB.

2. Bit rate=2.48832 Gb/s, PRBS=2²³-1, Input power to measurement receiver=-28±1 dBm, Dispersion=-240 ps/nm, Laser bias current=0.8I_{th} at T_L=10 to 15°C, Output Power=2.0mW peak, Test time=400sec. each, Specification limit=1x10⁻¹²

Fig. 1 Forward Current vs Output Power

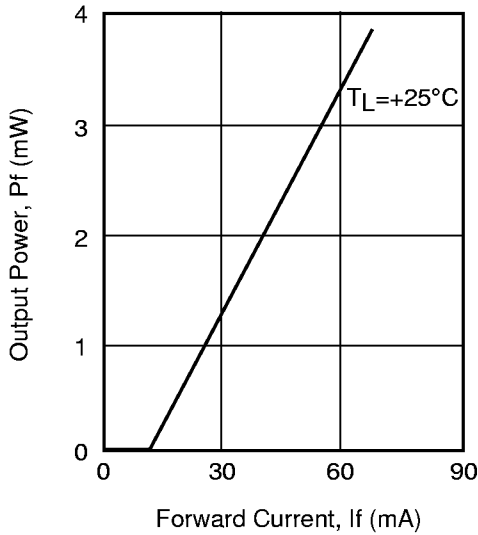


Fig. 2 Tracking

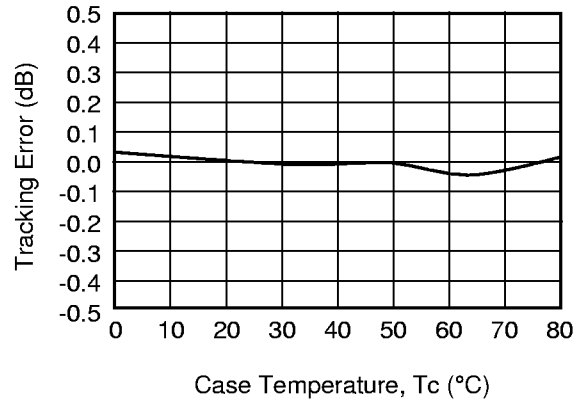


Fig. 3 Frequency Response

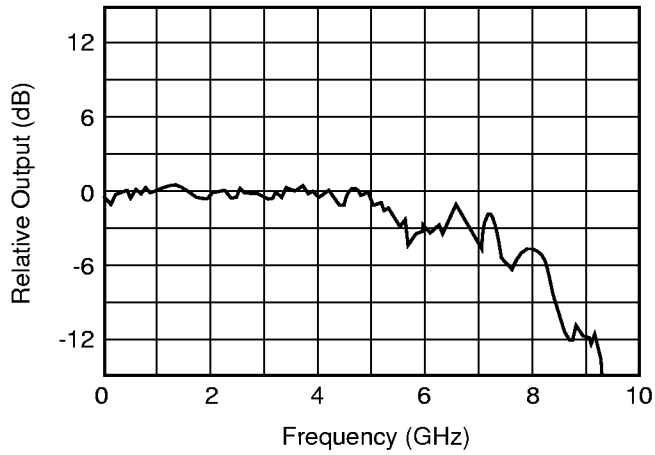


Fig. 4 RF Return Loss

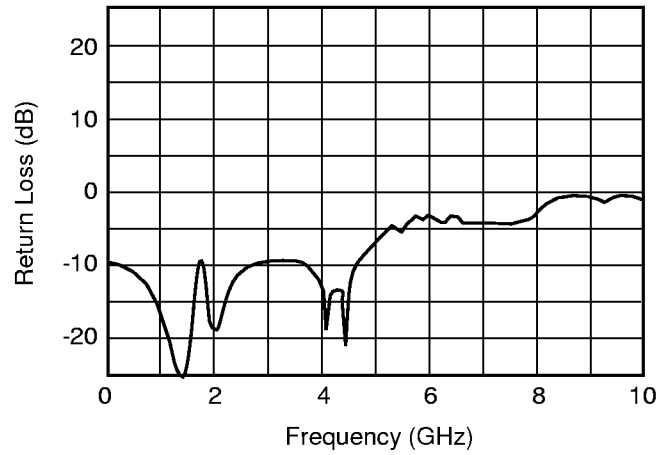


Fig. 5 Relative Intensity Noise

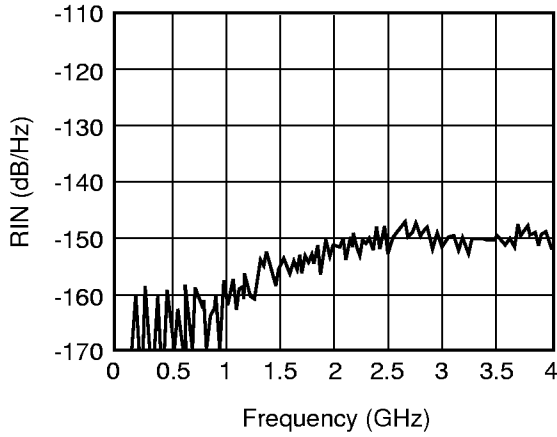


Fig. 6 Cooler Voltage -Current

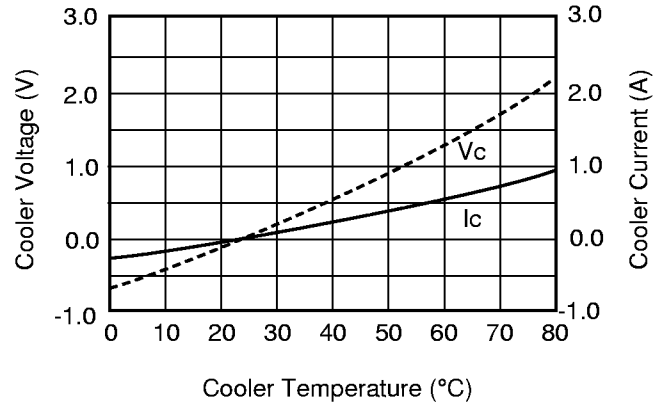
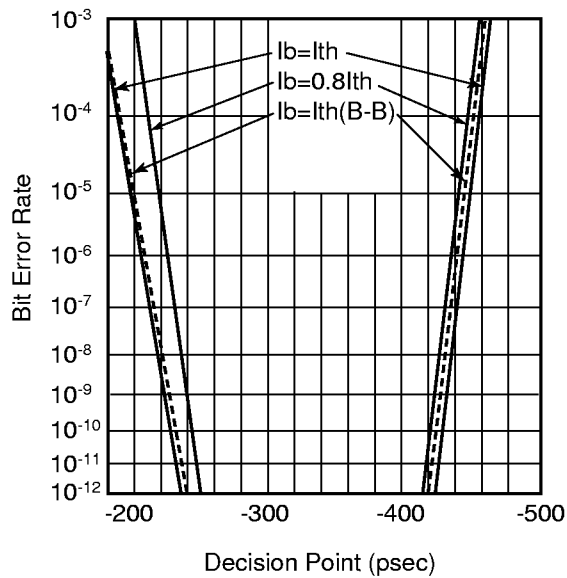
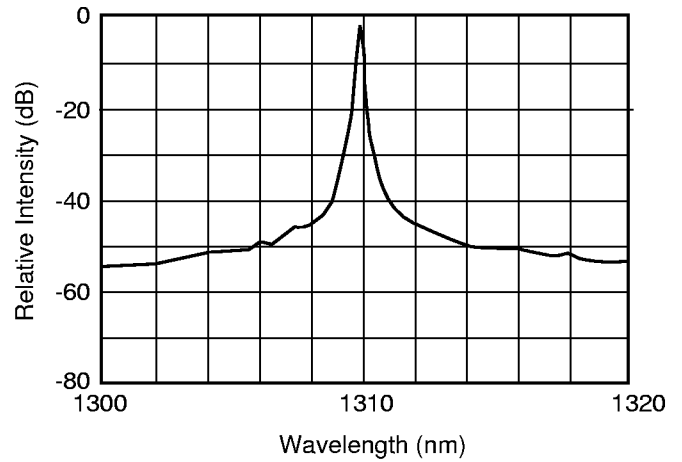


Fig. 7 Eye Opening



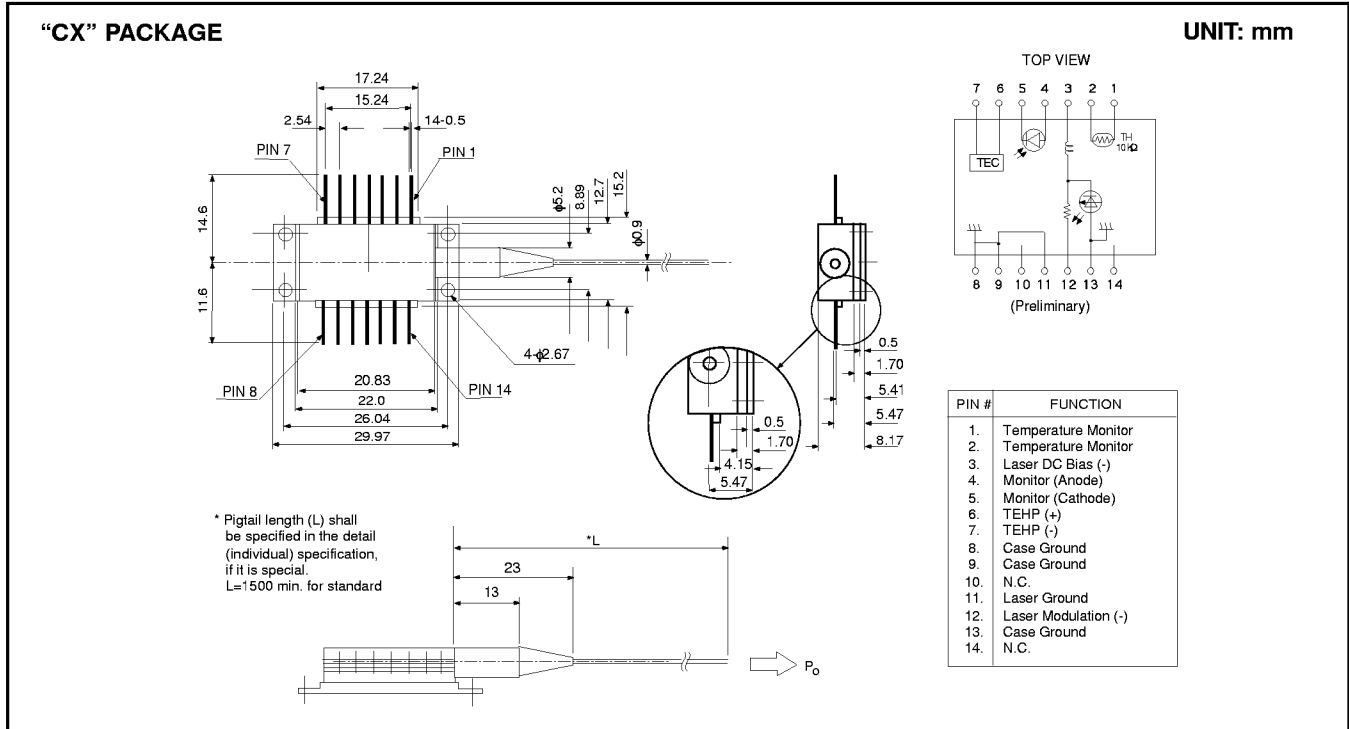
2.48832 Gb/s, NRZ
 PRBS $2^{23}-1$
 TL=25°C, I_{mod}=30mA
 lb=0.8, 1.0 x lth
 Dispersion=300ps/nm

Fig. 8 Spectrum



FLD3F11CX

1,310nm MQW-DFB Direct Modulation Laser



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