1,310nm MQW-DFB CATV Laser

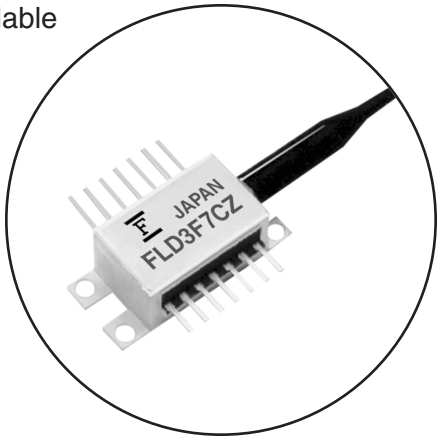
FLD3F7CZ

FEATURES

- Direct Modulation MQW DFB Laser
- Built-in TEC, Thermistor and Monitor PD
- Optical Isolator
- 14 Pin Butterfly Type Module

BENEFITS

- 78 Channel NTSC Loading (112 Channel device available)
- Low Residual CSO & CTB
- 11 dB Link Budget Available



APPLICATIONS

This MQW DFB laser is intended for application in analog AM, CATV at 1,310nm. Transmission spans of 30 km are possible without amplification.

DESCRIPTION

This MQW (Multiple Quantum Well) DFB laser for analog AM application is a high power laser capable of carrying 78 channels with excellent CSO, CTB, and CNR performance. 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 module also includes a monitor photodiode, a thermoelectric cooler (TEC) and a thermistor.

ABSOLUTE MAXIMUM RATINGS (T_C=25°C)

Parameter	Symbol	Ratings	Unit
Storage Temperature	T_{stg}	-40 to +70	°C
Operating Case Temperature	T_{op}	-20 to +65	°C
Optical Output Power	P_f	20	mW
Laser Forward Current	I_F	150	mA
Laser Reverse Voltage	V_R	2	V
Photodiode Reverse Voltage	V_{DR}	20	V
TEC Voltage	V_c	2.5	V
TEC Current	I_c	1.4	A

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TEC & THERMISTOR CHARACTERISTICS (T_L=25±1°C)

Parameter	Symbol	Limits		Unit	Conditions
		Min.	Max.		
TEC Current	I_C	-	1.0	A	ΔT=40°C
TEC Voltage	V_C	-	2.0	V	ΔT=40°C
TEC Capacity	ΔT	40	-	°C	I_C=1A
Thermistor Resistance	R_{tr}	9.5	10.5	kΩ	-
Thermistor B Constant	B	Typ. 3,900		K	-

T_C = Case Temperature, T_L = Laser Temperature

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_L=25±1°C)

Parameter	Symbol	Limits		Unit	Conditions
		Min.	Max.		
Threshold Current	I_{th}	-	20	mA	CW
Forward Voltage (pin 3-13)	V_F	-	1.5	V	CW, I_F=30mA
Optical Output Power	P_f	8	20	mW	CW
Slope Efficiency	S	0.20	-	mW/mA	CW, I_F=Iop
Tracking Error	T_E	-0.5	+0.5	dB	Note (1)
Monitor Current	I_m	120	1200	μA	CW, I_F=Iop, V_{DR}=5V
Photodiode Dark Current	I_d	-	100	nA	V_{DR}=5V
Photodiode Capacitance	C_t	-	12	pF	V_{DR}=5V, f=1MHz
Peak Wavelength	λ_p	1,290	1,330	nm	CW, I_F=Iop
SideMode Suppression Ratio	SSR	25	-	dB	CW, I_F=Iop
Bandwidth (-1dB)	f_c	1.5	-	GHz	Note (2)
Isolation	I_s	25	-	dB	Tc=0 to 65°C
Relative Intensity Noise	RIN	-	-155	dB/Hz	Note (3)
Composite Second Power	CSO	-	-57	dBc	Note (4)
Composite Triple Beat	CTB	-	-65	dBc	
Carrier to Noise Ratio	CNR	50	-	dB	

(1) Total change in Pf over -20<Tc<+65°C, Test conditions: Pf=8mW at TL=Tc=25°C. Constant current operation with TEC operating.
(2) Test condition: Pf=8mW, No matching network is used in the measurement.
(3) Test condition: Pf; same power of Note 4, measuring bandwidth: 45-600MHz, Optical reflection=-40dB (no long-haul fiber is used in the measurement.)
(4) Test condition: Pf=8mW (minimum), Optical Modulation, Index=3.2% channel (minimum), 78 unmodulated carriers (55.25 to 547.25 MHz; ch. 2 to 78 plus A-1), Optical link loss=11dB (30 km singlemode fiber), Noise equivalent current of 1st stage of the receiver=7pA/$\sqrt{\text{Hz}}$, Receiver responsivity=0.86A/W, Optical reflection=-40dB (excluding reflection from long-haul fiber).

Fig. 1 Optical Output Power and Monitor Current vs. Laser Forward Current

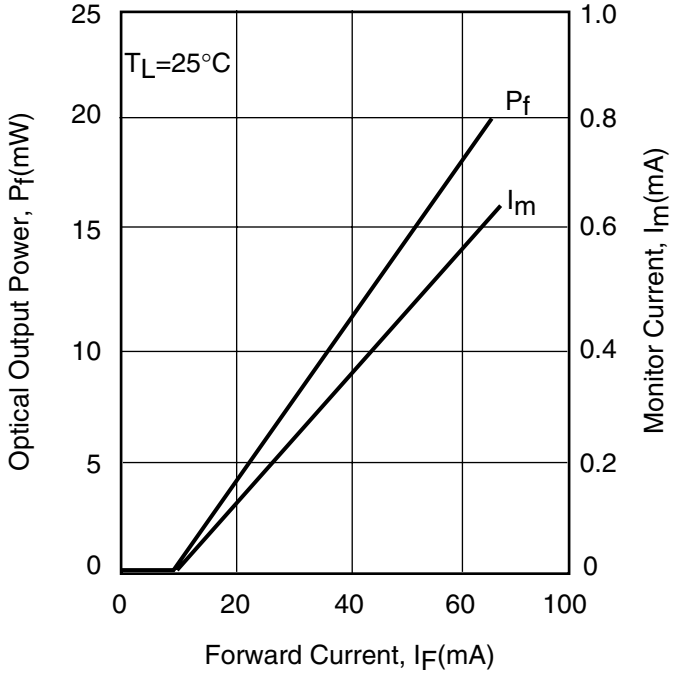


Fig. 2 Forward Current vs. Forward Voltage

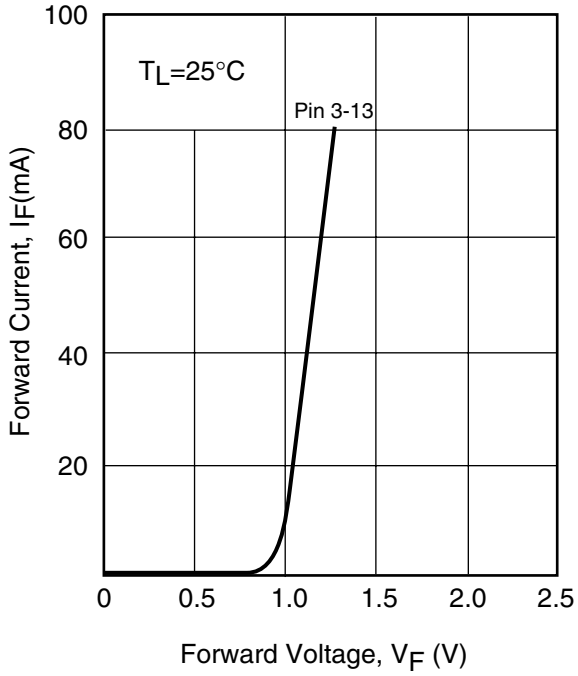


Fig. 3 Temperature Dependence of Threshold Current

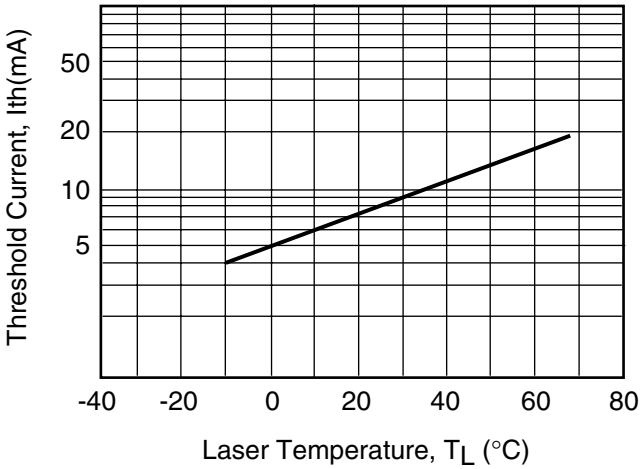


Fig. 4 Lasing Spectrum

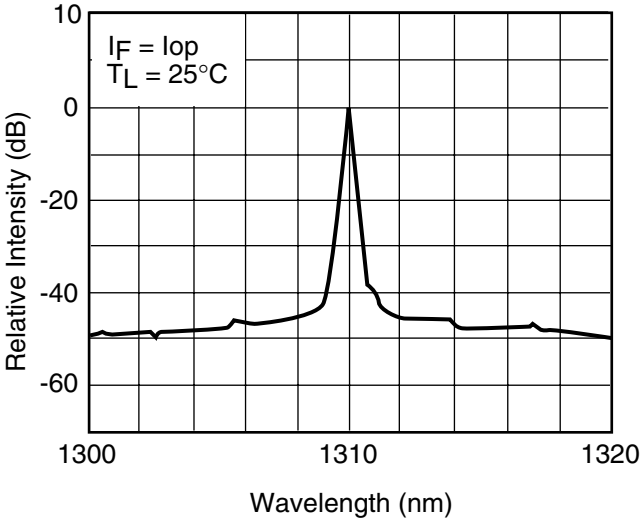


Fig. 5 Tracking Characteristics

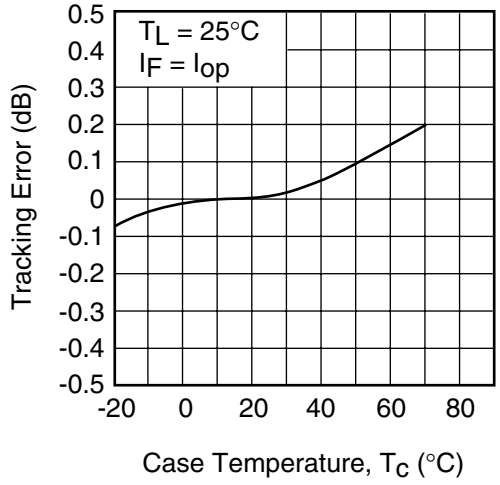


Fig. 6 Frequency Response

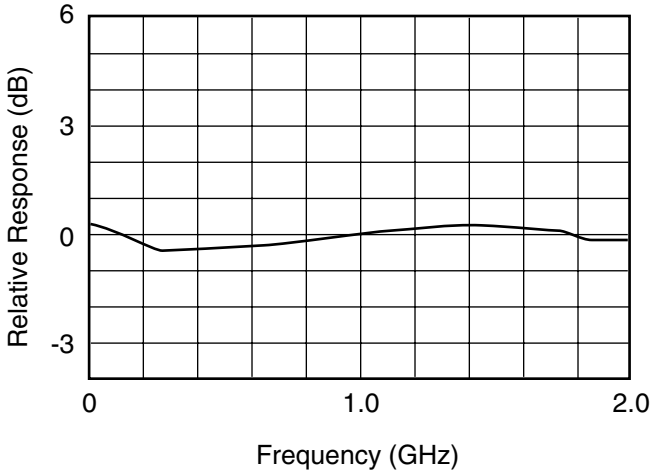


Fig. 7 RIN Characteristics

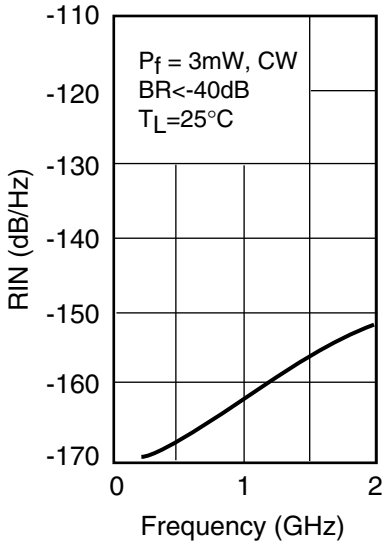


Fig. 8 Thermistor Resistance vs. Temperature

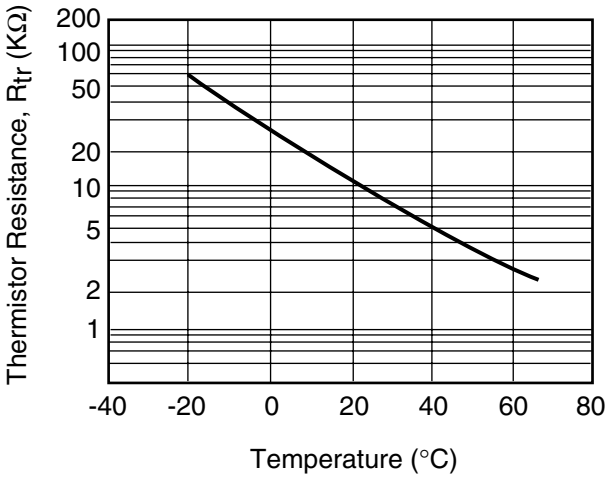


Fig. 9 Cooler voltage and Cooler Current vs. Case Temperature

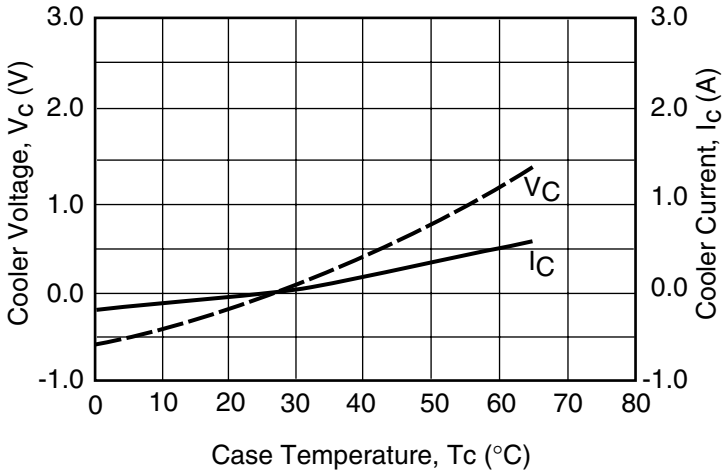


Fig. 10 CSO vs. Output Power

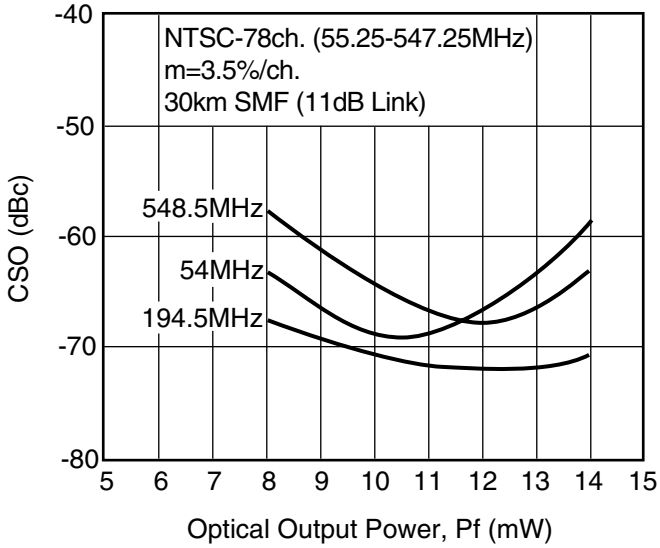


Fig. 11 CTB vs. Output Power

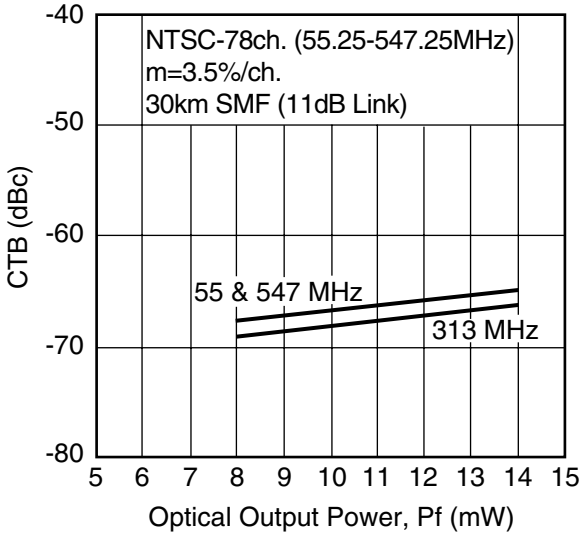
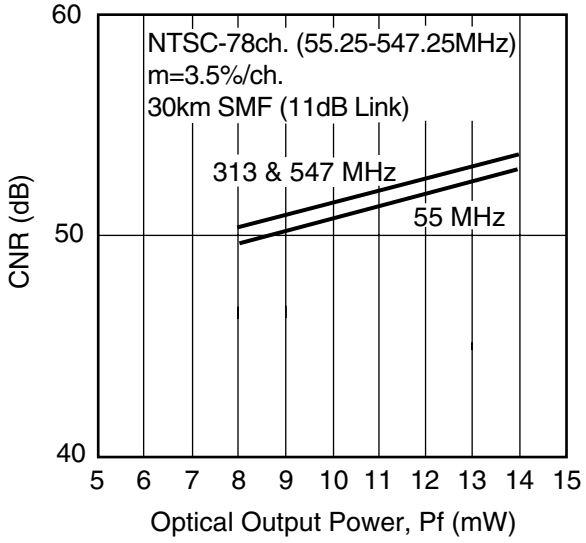
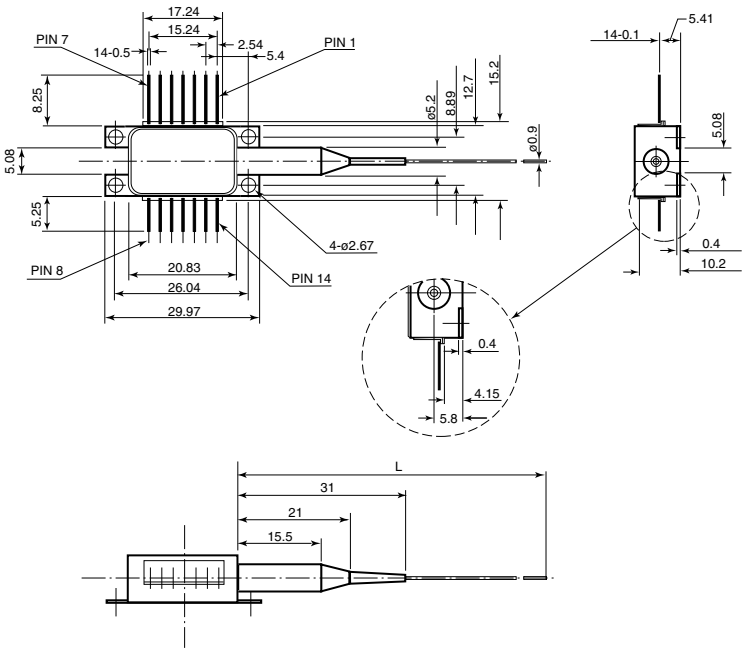
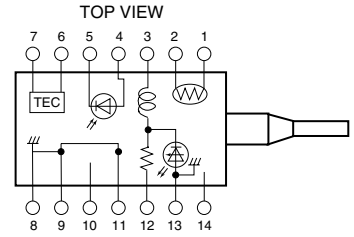


Fig. 12 CNR vs. Output Power



"CZ" 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	GROUND
9	GROUND
10	NC
11	LASER GROUND
12	LASER MODULATION (-)
13	GROUND
14	NC

* Note Fiber length (L) shall be specified in the detail (individual) specification, if it is special. L=1000±200 for standard.

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