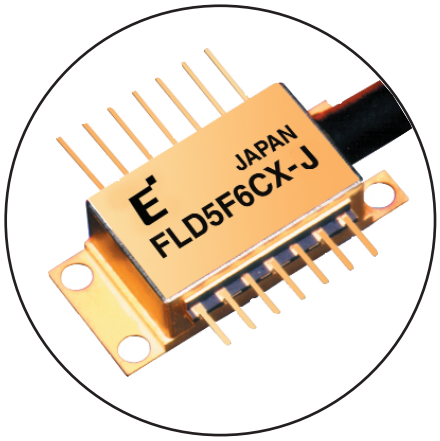
1,550nm DFB DWDM Direct Modulation Laser

FLD5F6CX-J

FEATURES

- Direct Modulated DFB Laser
- Built-in TEC, Thermistor and Monitor PD
- 14-Pin Butterfly Type Module
- 10mW Output Power
- Low Residual Chirp
- Optimized for 2.5 Gb/s Modulation Rates
- Selected wavelengths according to ITU-T grid available



APPLICATIONS

This laser is intended for the application of 2.5 Gb/s long haul Dense Wavelength Division Multiplexing (DWDM). Transmission spans of 100 km (1800ps/nm) are possible.

DESCRIPTION

The FLD5F6CX-J 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 module also includes a monitor photodiode, a thermoelectric cooler (TEC) and thermistor. This device is optimally designed for use in DWDM direct modulation transmission systems. Selected wavelengths are available to the specified ITU-T grid.

ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

Parameter	Symbol	Condition	Rating		Unit
			Min.	Max.	
Storage Temperature	T_{stg}	-	-40	+70	°C
Operating Case Temperature	T_{op}	-	-20	+65	°C
Optical Output Power	P_f	CW	-	12	mW
Laser Forward Current	I_F	CW	-	150	mA
Laser Reverse Voltage	V_R	CW	-	2	V
Photodiode Forward Current	-	-	-	10	mA
Photodiode Reverse Voltage	V_{DR}	-	-	20	V
TEC Voltage	V_C	Cooling	-	+2.5	V
		Heating	-2.5	-	
TEC Current	I_C	Cooling	-	+1.4	A
		Heating	-0.9	-	
Thermistor Temperature	Tth	ATC Operation	-20	+65	°C
Lead Soldering Time	T_{sold}	260°C	-	10	sec
Environmental Operating Humidity	X_{op}	Top<30°C	-	95	%
Environmental Storage Humidity	X_{st}	Tstg<30°C	-	95	%

Edition 1.1
July 2004

Eudyna

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

Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Laser Set Temperature	T_{set}	-	20	-	35	°C
Threshold Current	I_{th}	CW	3	-	40	mA
Forward Voltage	V_{FDC}	CW, I_F=30 mA, pin 12,-13	-	1.6	1.75	V
Series Resistance	R_S	CW, pin 12,-13	22	25	28	Ω
Optical Output Power	P_f	CW	10.0	-	-	mW
Slope Efficiency	η	CW, Pf=10mW	0.14	-	-	mW/mA
Threshold Power	P_{th}	I_F=I_{th}, CW	-	-	150	μW
Tracking Error (Note 1)	TE	Pf=10mW, T_C=-20 to 65°C,APC	-0.5	-	+0.5	dB
Monitor Current	I_m	CW, Pf=10mW, V_{DR}=5V	0.25	-	2.5	mA
Photodiode Dark Current	I_D	V_{DR}=5V	-	2	100	nA
Photodiode Capacitance	C_t	V_{DR}=5V, f=1 MHz	-	-	10	pF
Photodiode Cutoff Frequency	f_{cm}	V_{DR}=5V, 50Ω load	100	-	-	MHz
Peak Wavelength	λ_p	Note (2)	Note (4)			nm
Wavelength Drift	Δλ	after 20 years	-200	-	+200	pm
Wavelength Stabiltiy with Case Temperature	dλ/dTc	T_C=-20 to 65°C	-1	-	+1	pm/°C
Side Mode Suppression	Sr	Note (2)	33	35	-	dB
Spectral Width (-20dB)	δλ	Note (2)	-	-	0.5	nm
Rise Time (10%-90%)	t_r	Note (2)	-	0.1	0.125	nsec
Fall Time (10%-90%)	t_f	Note (2)	-	0.1	0.125	nsec
Cutoff Frequency	f_c	P_f=10mW, -3 dB	4.0	-	-	GHz
In-Band Ripple (Window)	S_{21}	f=50 MHz to 3 GHz	-1.5	-	+1.5	dB
RF Return Loss	S_{11}	f=50 MHz to 2 GHz	8	-	-	dB
		f=2 GHz to 3 GHz	6	-	-	dB
		f=3 GHz to 5 GHz	3	-	-	dB
Optical Isolation	I_S	Tc=-20 to 65°C	25	35	-	dB
Relative Intensity Noise	RIN	f=2.5 GHz Pf=10 mW, ORL=24 dB	-	-	-140	dB/Hz
Kinks	Kns	up to 12 mW	None			
Pulsation	-	-	None			
BER Performance	ER	Note (3)	No Floor			
Dispersion Penalty	dP	Note (3)	-	-	2.0	dB

TEC AND THERMISTOR CHARACTERISTICS (T_L=T_{set}, T_C=25°C, BOL, unless otherwise specified)

Parameter	Symbol	Test Conditions	Limit			Unit
			Min.	Typ.	Max.	
TEC Current	I_C	TL=Tset, Pf=10mW, Tc=65°C	-	-	1.0	A
TEC Voltage	V_C	TL=Tset, Pf=10mW, Tc=65°C	-	-	2.4	V
Cooler Power	P_C	TL=Tset, Pf=10mW, Tc=65°C	-	-	2.4	W
TEC Resistance	R_C	TL=Tset, Pf=10mW, Tc=65°C	2.0	2.4	3.2	Ω
Thermistor Resistance	R_{tr}	TL=25°C	9.5	10.0	10.5	kΩ
Thermistor B Constant	B	-	3,270	3,450	3,630	K

Note 1. TE=10*log{pf(Tcase)/Pf(Tc=25°C)}dB
Note 2. 2.5 Gb/s NRZ, Ppeak=2.0mW, Rext=8.2dB, PRBS=2^{23}-1,
Note 3. Bit rate=2.48832 Gb/s, PRBS=2^{23}-1, Dispersion=1,800 ps/nm, Ppeak=10mW, Rext=10dB
Decision point: Center of Back-to-Back at 10^{-9}, No Floor,
Receiver: Eudyna Standard Receiver
Note 4. The selected wavelengths available are listed in Fig. 8

Fig. 1 Forward Current vs Output Power

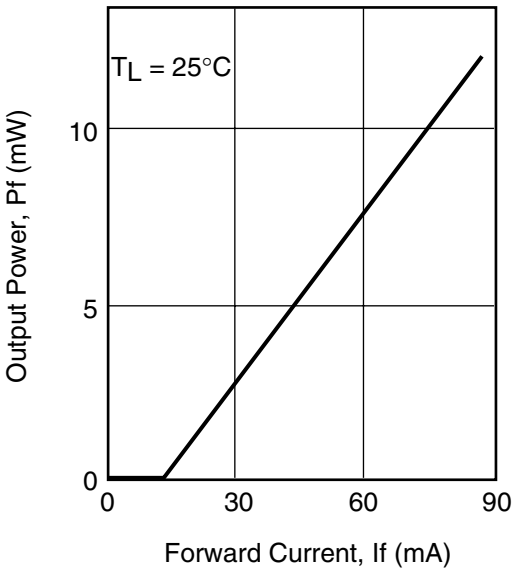


Fig. 2 Frequency Response

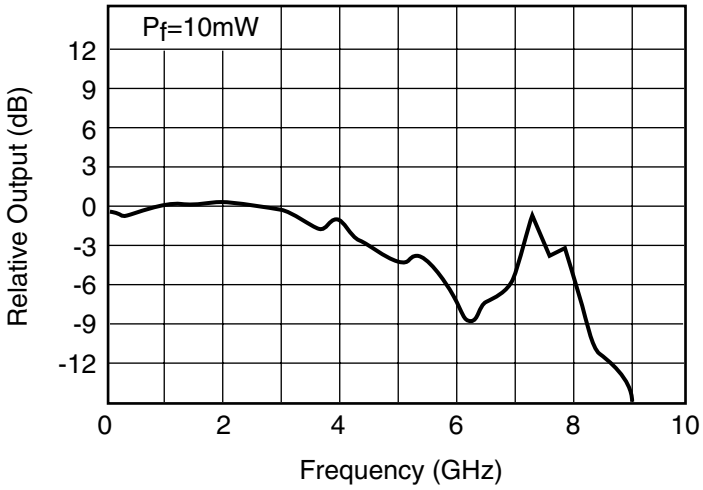


Fig. 3 RF Return Loss

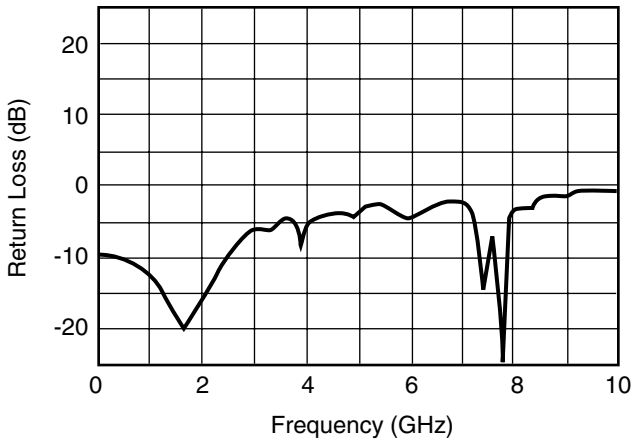


Fig. 4 Cooler Voltage -Current

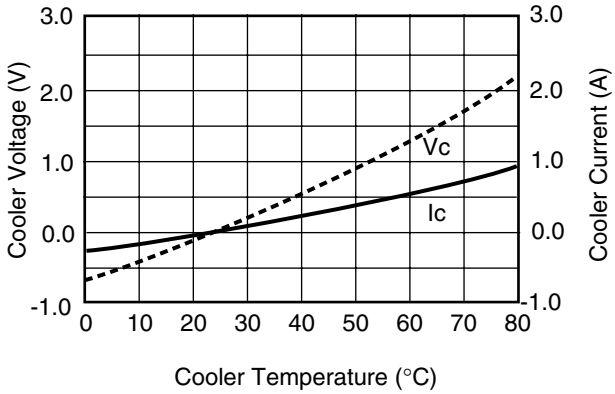


Fig. 5 Spectrum

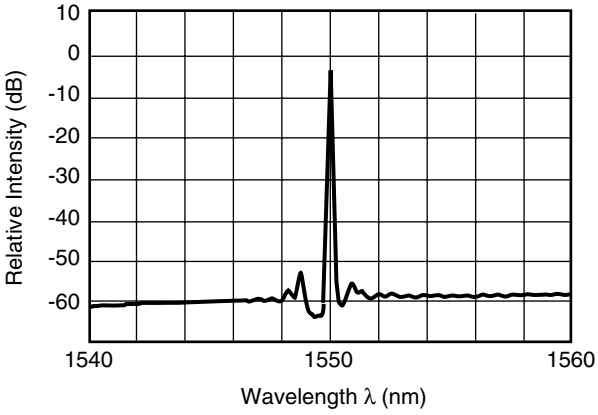


Fig. 6 Temperature Dependance of Wavelength(ACC Operation)

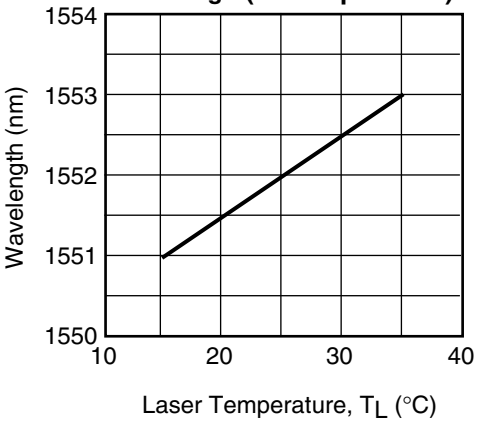


Fig. 7 Transmission Characteristics

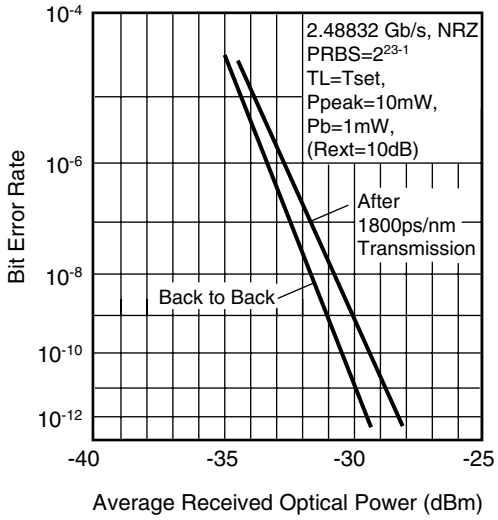
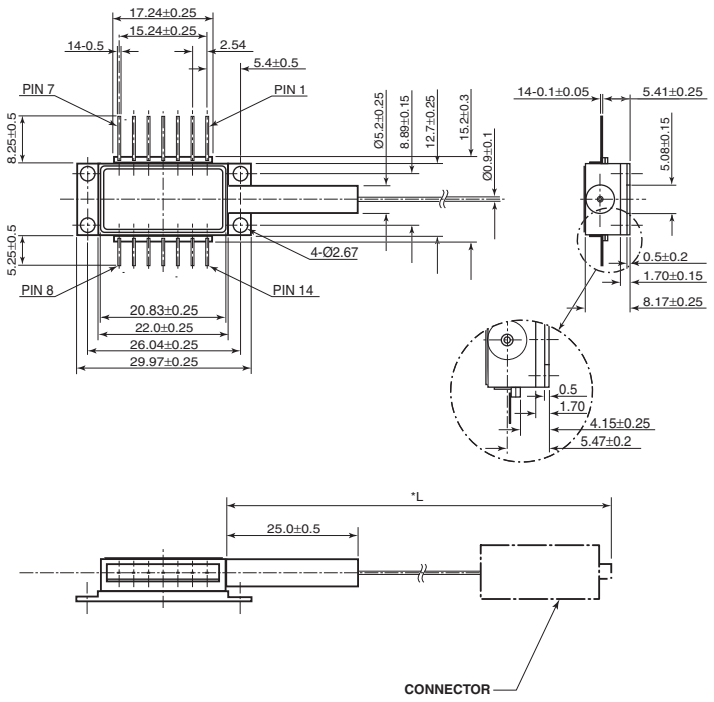


Fig. 8 Wavelength Table

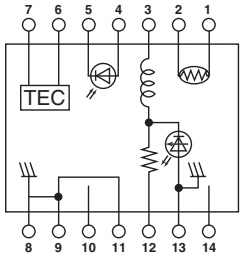
Part Number	Wavelength (nm) (TL=Tset) (in vacuum)	Tolerance (nm)
FLD5F6CX-J62	1527.99	±0.1
-J61	1528.77	±0.1
-J60	1529.55	±0.1
-J59	1530.33	±0.1
-J58	1531.12	±0.1
-J57	1531.90	±0.1
-J56	1532.68	±0.1
-J55	1533.47	±0.1
-J54	1534.25	±0.1
-J53	1535.04	±0.1
-J52	1535.82	±0.1
-J51	1536.61	±0.1
-J50	1537.40	±0.1
-J49	1538.19	±0.1
-J48	1538.98	±0.1
-J47	1539.77	±0.1
-J46	1540.56	±0.1
-J45	1541.35	±0.1
-J44	1542.14	±0.1
-J43	1542.94	±0.1
-J42	1543.73	±0.1
-J41	1544.53	±0.1
-J40	1545.32	±0.1
-J39	1546.12	±0.1
-J38	1546.92	±0.1
-J37	1547.72	±0.1
-J36	1548.51	±0.1
-J35	1549.32	±0.1
-J34	1550.12	±0.1
-J33	1550.92	±0.1
-J32	1551.72	±0.1
-J31	1552.52	±0.1
-J30	1553.33	±0.1
-J29	1554.13	±0.1
-J28	1554.94	±0.1
-J27	1555.75	±0.1
-J26	1556.55	±0.1
-J25	1557.36	±0.1
-J24	1558.17	±0.1
-J23	1558.98	±0.1
-J22	1559.79	±0.1
-J21	1560.61	±0.1
-J20	1561.42	±0.1
-J19	1562.23	±0.1
-J18	1563.05	±0.1

"CX" PACKAGE **UNIT: mm**



Grounded Type

PIN #	FUNCTION
1.	Thermistor
2.	Thermistor
3.	Laser DC Bias (-)
4.	Monitor (Anode)
5.	Monitor (Cathode)
6.	Thermoelectric Cooler (+)
7.	Thermoelectric Cooler (-)
8.	Case Ground
9.	Case Ground
10.	N.C.
11.	Case Ground
12.	Laser Modulation (-)
13.	Case Ground
14.	N.C.



For further information please contact:

Eudyna Devices USA Inc.
2355 Zanker Rd.
San Jose, CA 95131-1138, U.S.A.
TEL: (408) 232-9500
FAX: (408) 428-9111
www.us.eudyna.com

Eudyna Devices Europe Ltd.
Network House
Norreys Drive
Maidenhead, Berkshire SL6 4FJ
United Kingdom
TEL: +44 (0) 1628 504800
FAX: +44 (0) 1628 504888

Eudyna Devices Asia Pte Ltd.
Hong Kong Branch
Rm. 1101, Ocean Centre, 5 Canton Rd.
Tsim Sha Tsui, Kowloon, Hong Kong
TEL: +852-2377-0227
FAX: +852-2377-3921

Eudyna Devices Inc.
Sales Division
1, Kanai-cho, Sakae-ku
Yokohama, 244-0845, Japan
TEL: +81-45-853-8156
FAX: +81-45-853-8170

CAUTION

Eudyna Devices Inc. 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.**