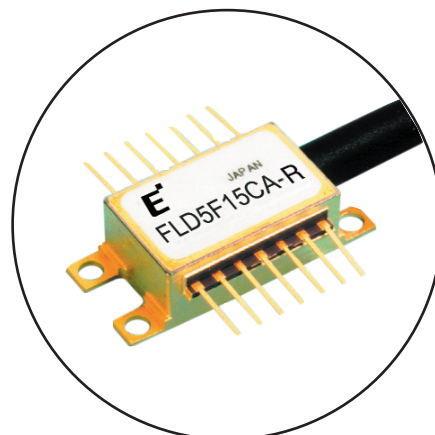


FEATURES:

- CW light source with integrated wavelength locker
- Output Power: 13dBm (min.)
- Tunable over 8 ITU-T 50GHz spaced channels (2.8nm)
- Available at C-band ITU-T grid wavelengths between 1528.773 to 1570.005nm
- Wavelength stability better than $\pm 25\text{pm}$ drift over 20 years operation and (0 to 70°C) case temperature variation
- Built-in optical isolator, Thermistor, TEC, Wavelength Monitor PIN-PD, Power Monitor PIN-PD
- Polarization maintaining (PANDA) fiber



APPLICATIONS:

Long haul DWDM transmission system
Metropolitan DWDM transmission system
Optical Test Equipment

DESCRIPTION:

The Eudyna Tunable LD module with Wavelength Locker (FLD5F15CA-R) is a high power CW laser (13dBm) with polarization maintaining fiber. It is intended for use with an external modulator. The oscillation wavelength can be tuned across a 2.8nm range (8 ITU-T 50GHz spaced channels) via adjustment of the chip temperature with the built-in TEC. The tuned wavelength can be locked onto the desired ITU-T grid channel via use of the built-in Wavelength Monitor. This laser is available at any of the 104 ITU-T wavelengths in the C-band (1528.773 to 1570.005nm). The device comes in a standard 14-pin butterfly package, and operates between 0 to 70°C.

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

Parameter	Symbol	Condition	Ratings		Unit
			Min.	Max.	
Storage Temperature	T_{stg}	-	-40	+85	$^\circ\text{C}$
Operating Case Temperature	T_{op}	-	0	+70	$^\circ\text{C}$
Optical Output Power	P_f	CW	-	30	mW
LD Forward Current	I_f	CW	-	300	mA
LD Reverse Voltage	V_R	-	-	2	V
PD Reverse Voltage	V_{DR}	-	-	20	V
PD Forward Current	I_{PF}	-	-	10	mA
Cooler Voltage	V_c	Cooling	-	+5.00	V
		Heating	-2.50	-	
Cooler Current	I_c	Cooling	-	+1.85	A
		Heating	-0.60	-	
Thermistor Temperature	T_{th}	ATC Operation	0	+70	$^\circ\text{C}$
Lead Soldering Time	-	260°C	-	10	sec

OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_L=T_{set}$, (CH.1 to CH.8) $T_c=25^\circ\text{C}$, BOL, unless otherwise specified)

Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Laser Set Temperature (BOL)	T_{set}	-	11	-	47	$^\circ\text{C}$
Laser Set Temperature (EOL)	T_{set}	-	10	-	48	$^\circ\text{C}$
Optical Output Power	P_f	-	20	-	-	mW
Threshold Current	I_{th}	-	3	-	45	mA
Forward Voltage	V_F	-	-	-	2.2	V
Slope Efficiency	η	-	-	0.14	-	mW/mA
Operating Forward Current	I_{op}	-	-	-	250	mA
Peak Wavelength	λ_p	CH.1 to CH.8, ORL>40dB	Note (4)			nm
Wavelength Stability with Case Temperature and Aging	-	$I_{m1}, I_{m2}=\text{constant}$, $T_c=0$ to 70°C , 20 years	-25	-	+25	pm
Wavelength Stability with LD Current Change	-	$T_L=T_{set}$	-	-	25	pm/mA
Spectral Width (-3dB)	$\Delta\lambda$	ORL>40dB	-	3	10	MHz
Side Mode Suppression	S_r		33	-	-	dB
Power Monitor Current	I_{m1}	$P_f=20\text{mW}$	0.1	-	1.8	mA
Power Monitor Dark Current	I_{dm1}	$V_{pd}=5\text{V}$	-	-	100	nA
Power Monitor Capacitance	C_{t1}	$V_{pd}=5\text{V}$, $f=1\text{MHz}$	-	-	10	pF
Wavelength Monitor Current	I_{m2}	$P_f=20\text{mW}$, WL Locked	0.1	-	1.8	mA
Wavelength Monitor Dark Current	I_{dm2}	$V_{pd}=5\text{V}$	-	-	100	nA
Wavelength Monitor Capacitance	C_{t2}	$V_{pd}=5\text{V}$, $f=1\text{MHz}$	-	-	10	pF
Wavelength difference between lock point and $I_{m2\text{peak}}$ (Note 2)	$\Delta\lambda$ locked		17.0	-	33.0	GHz
I_{m2} peak/bottom Ratio	$I_{m2\text{peak}}/I_{m2\text{bottom}}$		1.0	-	4.5	dB
Tracking Error (Note 3)	TE	$I_{m1,2}=\text{constant}$, $T_c=0$ to $+70^\circ\text{C}$	-0.5	-	+0.5	dB
Optical Isolation	I_S	$T_c=0$ to $+70^\circ\text{C}$	22	-	-	dB
Polarization Extinction Ratio	PER		20	-	-	dB
Relative Intensity Noise	RIN	CW, ORL>40dB average of $f=\text{DC}$ to 7.5GHz	-	-	-140	dB/Hz
Cooler Current	I_c	$T_L=T_{set}$, $T_c=+70^\circ\text{C}$	-	-	1.05	A
Cooler Voltage	V_c		-	-	3.80	V
Cooler Power	P_c		-	-	4.00	W
Thermistor Resistance	R_{th}	$T_L=25^\circ\text{C}$, $T_c=+25^\circ\text{C}$	9.5	10.0	10.5	k Ω
Thermistor B Constant (Note 2)	B		3,270	3,450	3,630	K

Note 1. $TE=10\cdot\log[P_f(T_c)/P_f(25)]$

Note 2. Relation between resistance and temperature ($^\circ\text{K}$) is: $R_{th}(T) = R_{th}(25^\circ\text{C})\cdot\exp[B(1/T-1/298)]$

Note 3. At the shortest wavelength of each sub-band, wavelength at lock point is longer than I_{m2} peak. (Increasing wavelength shall give a decrease in wavelength monitor current) The value is written in frequency: $f=c/\lambda_p$, $c=2.99792458\cdot 10^8\text{m/s}$

Note 4. Reference Table 1 for Wavelength Table

Fig. 1 Forward Current vs Output Power

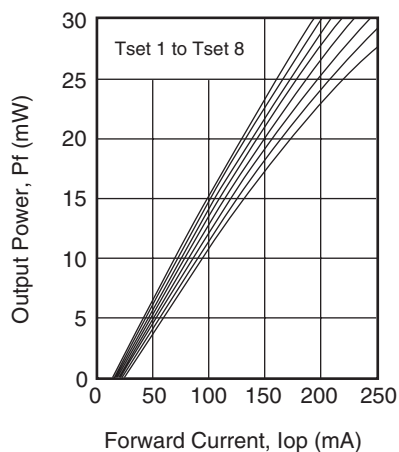


Fig. 2 Temperature Dependence of Wavelength(ACC Operation)

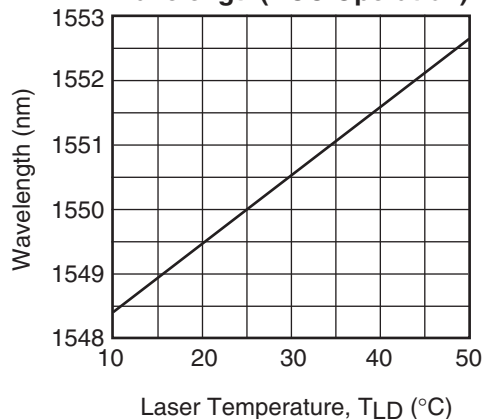


Fig. 3 Cooler Voltage -Current

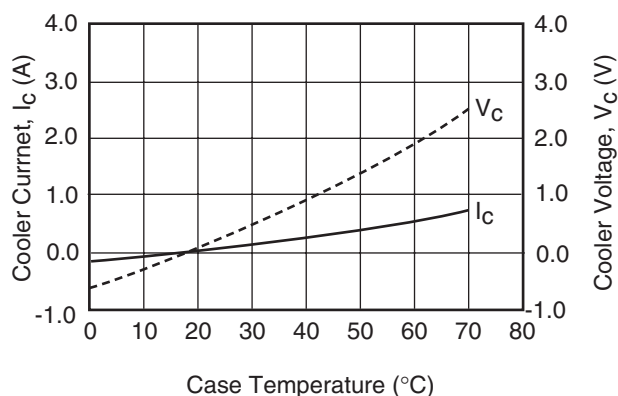


Fig.4 Spectrum

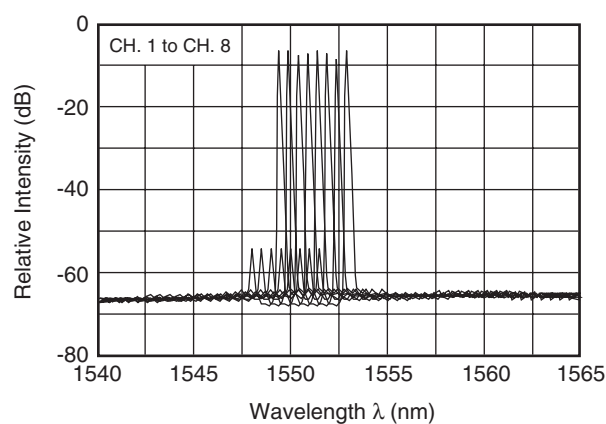


Fig. 5 Filter Curve

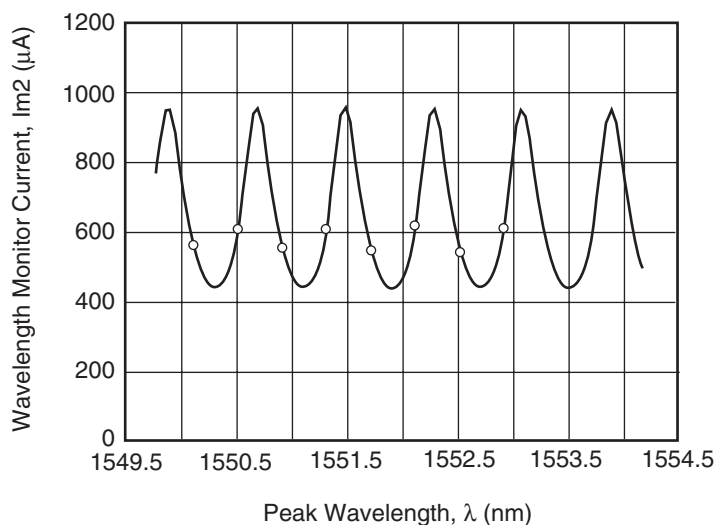


Table 1 Wavelength Table

Part Number	Wavelength (nm) (TL=Tset) (in vacuum)	Tolerance (nm)	Locking Curve Slope	Part Number	Wavelength (nm) (TL=Tset) (in vacuum)	Tolerance (nm)	Locking Curve Slope
FLD5F15CA-R9610	1528.773	±0.01	Negative	FLD5F15CA-R9290	1554.134	±0.01	Negative
	1529.163	±0.01	Positive		1554.537	±0.01	Positive
	1529.553	±0.01	Negative		1554.940	±0.01	Negative
	1529.944	±0.01	Positive		1555.343	±0.01	Positive
	1530.334	±0.01	Negative		1555.747	±0.01	Negative
	1530.725	±0.01	Positive		1556.151	±0.01	Positive
	1531.116	±0.01	Negative		1556.555	±0.01	Negative
	1531.507	±0.01	Positive		1556.959	±0.01	Positive
FLD5F15CA-R9570	1531.898	±0.01	Negative	FLD5F15CA-R9250	1557.363	±0.01	Negative
	1532.290	±0.01	Positive		1557.768	±0.01	Positive
	1532.681	±0.01	Negative		1558.173	±0.01	Negative
	1533.073	±0.01	Positive		1558.578	±0.01	Positive
	1533.465	±0.01	Negative		1558.983	±0.01	Negative
	1533.858	±0.01	Positive		1559.389	±0.01	Positive
	1534.250	±0.01	Negative		1559.794	±0.01	Negative
	1534.643	±0.01	Positive		1560.200	±0.01	Positive
FLD5F15CA-R9530	1535.036	±0.01	Negative	FLD5F15CA-R9210	1560.606	±0.01	Negative
	1535.429	±0.01	Positive		1561.013	±0.01	Positive
	1535.822	±0.01	Negative		1561.419	±0.01	Negative
	1536.216	±0.01	Positive		1561.826	±0.01	Positive
	1536.609	±0.01	Negative		1562.233	±0.01	Negative
	1537.003	±0.01	Positive		1562.640	±0.01	Positive
	1537.397	±0.01	Negative		1563.047	±0.01	Negative
	1537.792	±0.01	Positive		1563.455	±0.01	Positive
FLD5F15CA-R9490	1538.186	±0.01	Negative	FLD5F15CA-R9170	1563.863	±0.01	Negative
	1538.581	±0.01	Positive		1564.271	±0.01	Positive
	1538.976	±0.01	Negative		1564.679	±0.01	Negative
	1539.371	±0.01	Positive		1565.087	±0.01	Positive
	1539.766	±0.01	Negative		1565.496	±0.01	Negative
	1540.162	±0.01	Positive		1565.905	±0.01	Positive
	1540.557	±0.01	Negative		1566.314	±0.01	Negative
	1540.953	±0.01	Positive		1566.723	±0.01	Positive
FLD5F15CA-R9450	1541.349	±0.01	Negative	FLD5F15CA-R9130	1567.133	±0.01	Negative
	1541.746	±0.01	Positive		1567.542	±0.01	Positive
	1542.142	±0.01	Negative		1567.952	±0.01	Negative
	1542.539	±0.01	Positive		1568.362	±0.01	Positive
	1542.936	±0.01	Negative		1568.773	±0.01	Negative
	1543.333	±0.01	Positive		1569.183	±0.01	Positive
	1543.730	±0.01	Negative		1569.594	±0.01	Negative
	1544.128	±0.01	Positive		1570.005	±0.01	Positive
FLD5F15CA-R9410	1544.526	±0.01	Negative				
	1544.924	±0.01	Positive				
	1545.322	±0.01	Negative				
	1545.720	±0.01	Positive				
	1546.119	±0.01	Negative				
	1546.518	±0.01	Positive				
	1546.917	±0.01	Negative				
	1547.316	±0.01	Positive				
FLD5F15CA-R9370	1547.715	±0.01	Negative				
	1548.115	±0.01	Positive				
	1548.515	±0.01	Negative				
	1548.915	±0.01	Positive				
	1549.315	±0.01	Negative				
	1549.715	±0.01	Positive				
	1550.116	±0.01	Negative				
	1550.517	±0.01	Positive				
FLD5F15CA-R9330	1550.918	±0.01	Negative				
	1551.319	±0.01	Positive				
	1551.721	±0.01	Negative				
	1552.122	±0.01	Positive				
	1552.524	±0.01	Negative				
	1552.926	±0.01	Positive				
	1553.329	±0.01	Negative				
	1553.731	±0.01	Positive				

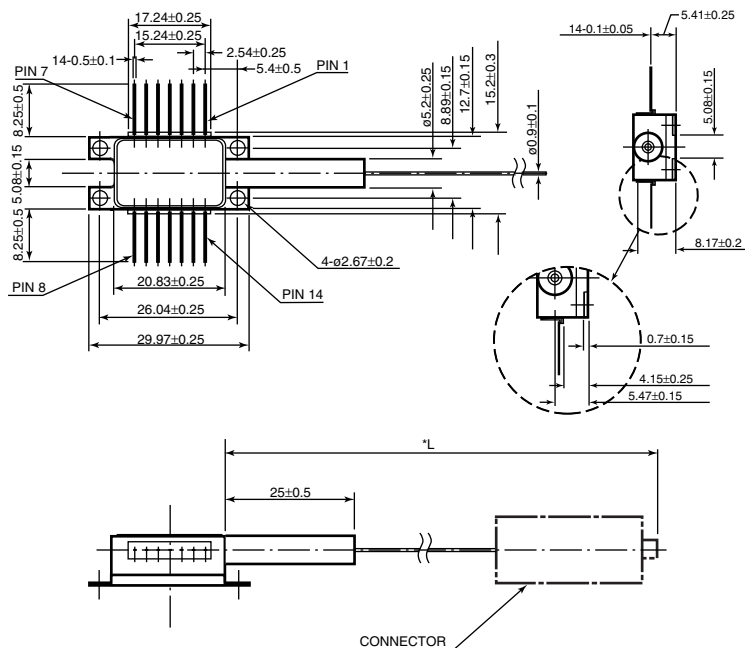
NOTE

Negative slope: Increasing wavelength shall give a decrease in wavelength monitor current.

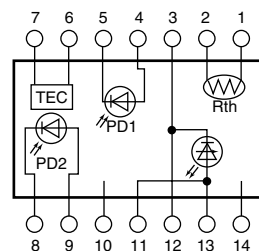
Positive slope: Increasing wavelength shall give an increase in wavelength monitor current.

"CA" PACKAGE

UNIT: mm



TOP VIEW



#	PIN DESIGNATIONS
1	Thermistor
2	Thermistor
3	LD Cathode
4	Power Monitor Anode
5	Power Monitor Cathode
6	Thermoelectric Cooler (+)
7	Thermoelectric Cooler (-)
8	Wavelength Monitor Cathode
9	Wavelength Monitor Anode
10	NC
11	LD Anode
12	LD Cathode
13	LD Anode
14	NC

* Pigtail length (L) and connector type are specified in the detail (individual) specification.
L = 1500MIN. for standard

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