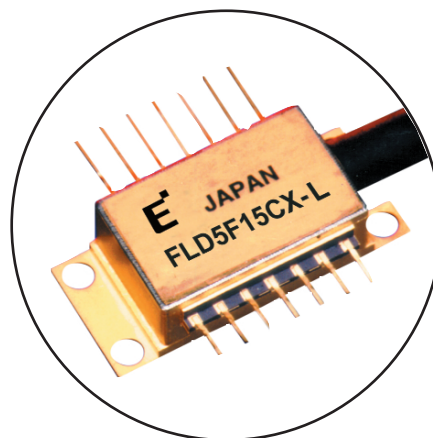


# 1,550nm Continuous Wave DFB Laser

## FLD5F15CX-L

### FEATURES

- Continuous Wave (CW) Light Source for DWDM system
- Output Power: 16dBm
- Available at L-band ITU-T Wavelengths between 1570.416 to 1608.329nm
- Built-in TEC, Thermistor, Monitor PIN PD and Optical Isolator
- Polarization maintaining (PANDA) fiber



### APPLICATIONS

10 and 40 Gb/s long haul DWDM Transmission systems.

### DESCRIPTION

The laser is for a high power (16dBm) CW operation, at selected L-band ITU-T grid wavelengths. The module includes an optical isolator monitor photodiode, thermistor and a thermo-electric cooler. This laser is designed for use with external modulation components (such as LiNbO<sub>3</sub> modulators). The device comes in “butterfly” type, 14-pin package, and operates between 0 to 70°C.

### ABSOLUTE MAXIMUM RATINGS (T<sub>c</sub>=25°C, unless otherwise specified)

| Parameter                  | Symbol           | Condition     | Rating |       | Unit |
|----------------------------|------------------|---------------|--------|-------|------|
|                            |                  |               | Min.   | Max.  |      |
| Storage Temperature        | T <sub>stg</sub> | -             | -40    | +85   | °C   |
| Operating Case Temperature | T <sub>op</sub>  | -             | 0      | +70   | °C   |
| Optical Output Power       | P <sub>f</sub>   | CW            | -      | 50    | mW   |
| LD Forward Current         | I <sub>F</sub>   | CW            | -      | 420   | mA   |
| LD Reverse Voltage         | V <sub>R</sub>   | CW            | -      | 2     | V    |
| PD Reverse Voltage         | V <sub>DR</sub>  | -             | -      | 20    | V    |
| PD Forward Current         | I <sub>PF</sub>  | -             | -      | 10    | mA   |
| Cooler Voltage             | V <sub>c</sub>   | Cooling       | -      | +5.00 | V    |
|                            |                  | Heating       | -2.50  | -     |      |
| Cooler Current             | I <sub>c</sub>   | Cooling       | -      | +1.85 | A    |
|                            |                  | Heating       | -0.60  | -     |      |
| Thermistor Temperature     | T <sub>th</sub>  | ATC Operation | -      | +70   | °C   |
| Lead Soldering Time        | -                | 260°C         | -      | 10    | sec  |

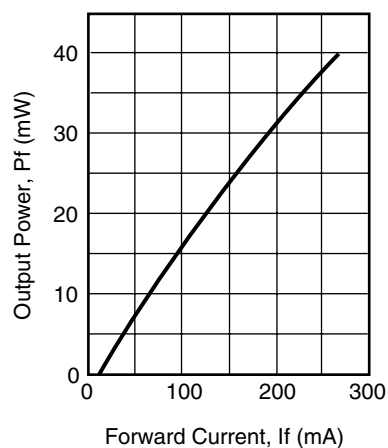
OPTICAL AND ELECTRICAL CHARACTERISTICS ( $T_L=T_{set}$ ,  $T_c=25^\circ\text{C}$ , BOL, unless otherwise specified)

| Parameter                                  | Symbol          | Test Conditions                                             | Limits   |       |       | Unit                 |
|--------------------------------------------|-----------------|-------------------------------------------------------------|----------|-------|-------|----------------------|
|                                            |                 |                                                             | Min.     | Typ.  | Max.  |                      |
| Laser Set Temperature (BOL)                | $T_{set}$       | -                                                           | 15       | -     | 35    | $^\circ\text{C}$     |
| Optical Output Power                       | $P_f$           | -                                                           | 40       | -     | -     | mW                   |
| Threshold Current                          | $I_{th}$        | -                                                           | 3        | -     | 45    | mA                   |
| Forward Voltage                            | $V_F$           | -                                                           | -        | -     | 3.0   | V                    |
| Slope Efficiency                           | $\eta$          | -                                                           | -        | 0.14  | -     | mW/mA                |
| Operating Forward Current                  | $I_{op}$        | -                                                           | -        | -     | 350   | mA                   |
| Peak Wavelength                            | $\lambda_p$     | ORL>40dB                                                    | Note (3) |       |       | nm                   |
| Wavelength Drift                           | $\Delta\lambda$ | 20 years                                                    | -        | -     | 200   | pm                   |
| Wavelength Stability with Case Temperature | -               | $T_c=0$ to $+70^\circ\text{C}$                              | -1       | -     | 1     | pm/ $^\circ\text{C}$ |
| Spectral Width (-3dB)                      | $\Delta\lambda$ | ORL>40dB                                                    | -        | 5     | 10    | MHz                  |
| Side Mode Suppression                      | $S_r$           |                                                             | 35       | -     | -     | dB                   |
| Monitor Current                            | $I_m$           | $P_f=40\text{mW}$                                           | 0.1      | -     | 2.0   | mA                   |
| Monitor Dark Current                       | $I_{dm}$        | $V_{PD}=5\text{V}$                                          | -        | -     | 100   | nA                   |
| Monitor Capacitance                        | $C_t$           | $V_{PD}=5\text{V}$ , $f=1\text{ MHz}$                       | -        | -     | 10    | pF                   |
| Tracking Error (Note 1)                    | TE              | $I_m=\text{constant}$ ,<br>$T_c=0$ to $+70^\circ\text{C}$   | -0.5     | -     | +1.0  | dB                   |
| Optical Isolation                          | IS              | $T_c=0$ to $+70^\circ\text{C}$                              | 22       | -     | -     | dB                   |
| Polarization Extinction Ratio              | PER             |                                                             | 20       | -     | -     | dB                   |
| Relative Intensity Noise                   | RIN             | CW, ORL>40dB<br>average of $f=\text{DC}$ to $7.5\text{GHz}$ | -        | -     | -140  | dB/Hz                |
| Cooler Current                             | $I_c$           | $T_L=T_{set}$ ,<br>$T_c=+70^\circ\text{C}$ ,                | -        | -     | 1.4   | A                    |
| Cooler Voltage                             | $V_c$           |                                                             | -        | -     | 4.2   | V                    |
| Cooler Power                               | $P_c$           |                                                             | -        | -     | 5.9   | W                    |
| Thermistor Resistance                      | $R_{th}$        | $T_c$ , $T_L=25^\circ\text{C}$                              | 9.5      | 10.0  | 10.5  | k $\Omega$           |
| Thermistor B Constant (Note 2)             | B               |                                                             | 3,270    | 3,450 | 3,630 | K                    |

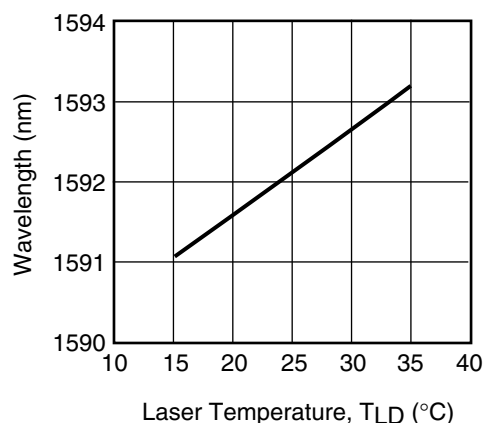
Note 1.  $TE=10\cdot\log[P_f(T_c)/P_f(25)]$ Note 2. Relation between resistance and temperature ( $^\circ\text{K}$ ) is:  $R_{th}(T) = R_{th}(25) \cdot \exp[B(1/T - 1/298)]$ 

Note 3. The selected wavelength is available in accordance with Table 1.

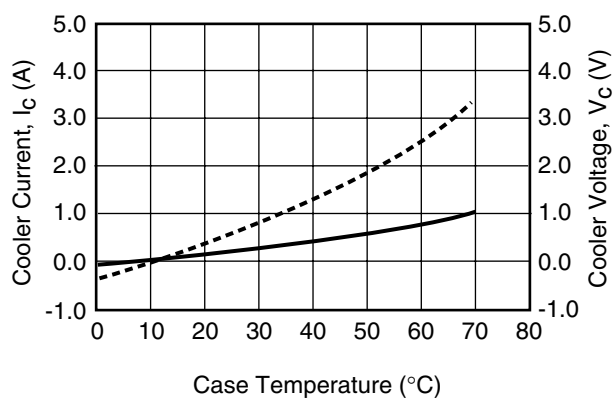
**Fig. 1 Forward Current vs Output Power**



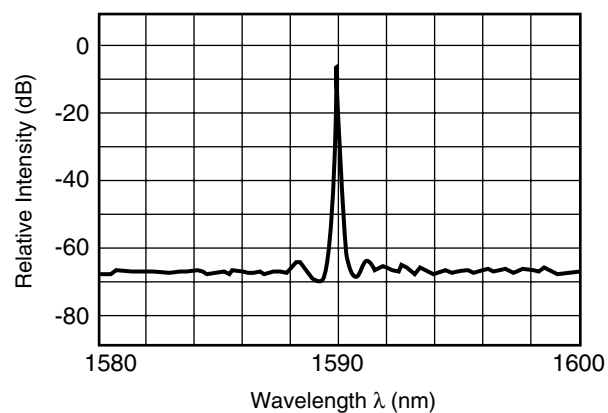
**Fig. 2 Temperature Dependence of Wavelength(ACC Operation)**



**Fig. 3 Cooler Voltage -Current**



**Fig.4 Spectrum**



**Table 1 Wavelength Table**

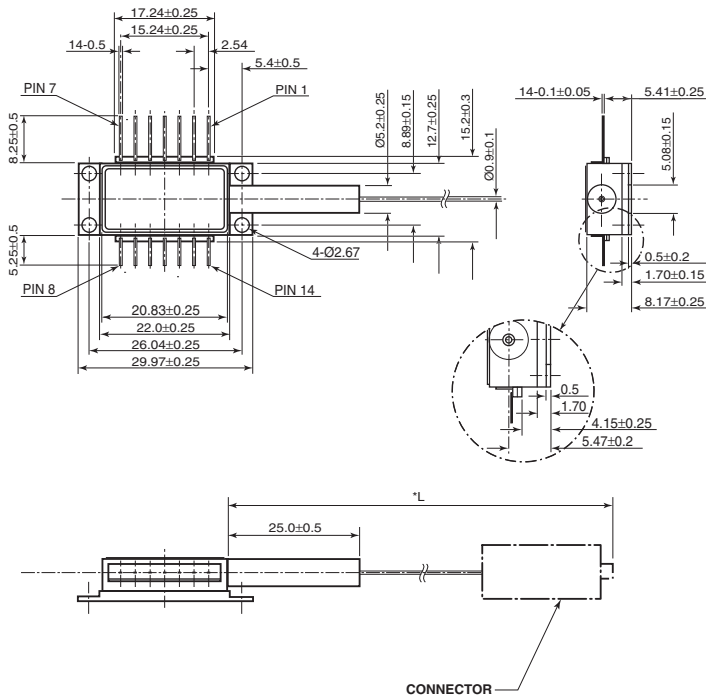
| Part Number     | Wavelength (nm)<br>(TL=Tset)<br>(in vacuum) | Tolerance (nm) | Part Number     | Wavelength (nm)<br>(TL=Tset)<br>(in vacuum) | Tolerance (nm) |
|-----------------|---------------------------------------------|----------------|-----------------|---------------------------------------------|----------------|
| FLD5F15CX-L9090 | 1570.416                                    | ±0.01          | FLD5F15CX-L8860 | 1589.568                                    | ±0.01          |
| FLD5F15CX-L9080 | 1571.239                                    | ±0.01          | FLD5F15CX-L8850 | 1590.411                                    | ±0.01          |
| FLD5F15CX-L9070 | 1572.063                                    | ±0.01          | FLD5F15CX-L8840 | 1591.255                                    | ±0.01          |
| FLD5F15CX-L9060 | 1572.888                                    | ±0.01          | FLD5F15CX-L8830 | 1592.100                                    | ±0.01          |
| FLD5F15CX-L9050 | 1573.714                                    | ±0.01          | FLD5F15CX-L8820 | 1592.946                                    | ±0.01          |
| FLD5F15CX-L9040 | 1574.540                                    | ±0.01          | FLD5F15CX-L8810 | 1593.793                                    | ±0.01          |
| FLD5F15CX-L9030 | 1575.368                                    | ±0.01          | FLD5F15CX-L8800 | 1594.641                                    | ±0.01          |
| FLD5F15CX-L9020 | 1576.196                                    | ±0.01          | FLD5F15CX-L8790 | 1595.489                                    | ±0.01          |
| FLD5F15CX-L9010 | 1577.025                                    | ±0.01          | FLD5F15CX-L8780 | 1596.339                                    | ±0.01          |
| FLD5F15CX-L9000 | 1577.855                                    | ±0.01          | FLD5F15CX-L8770 | 1597.189                                    | ±0.01          |
| FLD5F15CX-L8990 | 1578.686                                    | ±0.01          | FLD5F15CX-L8760 | 1598.041                                    | ±0.01          |
| FLD5F15CX-L8980 | 1579.518                                    | ±0.01          | FLD5F15CX-L8750 | 1598.893                                    | ±0.01          |
| FLD5F15CX-L8970 | 1580.350                                    | ±0.01          | FLD5F15CX-L8740 | 1599.746                                    | ±0.01          |
| FLD5F15CX-L8960 | 1581.184                                    | ±0.01          | FLD5F15CX-L8730 | 1600.600                                    | ±0.01          |
| FLD5F15CX-L8950 | 1582.018                                    | ±0.01          | FLD5F15CX-L8720 | 1601.455                                    | ±0.01          |
| FLD5F15CX-L8940 | 1582.854                                    | ±0.01          | FLD5F15CX-L8710 | 1602.311                                    | ±0.01          |
| FLD5F15CX-L8930 | 1583.690                                    | ±0.01          | FLD5F15CX-L8700 | 1603.168                                    | ±0.01          |
| FLD5F15CX-L8920 | 1584.527                                    | ±0.01          | FLD5F15CX-L8690 | 1604.026                                    | ±0.01          |
| FLD5F15CX-L8910 | 1585.365                                    | ±0.01          | FLD5F15CX-L8680 | 1604.885                                    | ±0.01          |
| FLD5F15CX-L8900 | 1586.203                                    | ±0.01          | FLD5F15CX-L8670 | 1605.744                                    | ±0.01          |
| FLD5F15CX-L8890 | 1587.043                                    | ±0.01          | FLD5F15CX-L8660 | 1606.605                                    | ±0.01          |
| FLD5F15CX-L8880 | 1587.884                                    | ±0.01          | FLD5F15CX-L8650 | 1607.466                                    | ±0.01          |
| FLD5F15CX-L8870 | 1588.725                                    | ±0.01          | FLD5F15CX-L8640 | 1608.329                                    | ±0.01          |

# 1,550nm Continuous Wave DFB Laser

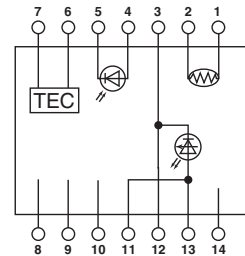
# FLD5F15CX-L

## "CX" PACKAGE

UNIT: mm



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



\* Pigtail length (L) and connector type are specified in the detail (individual) specification.

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