

# 1,550nm Continuous Wave DFB Laser

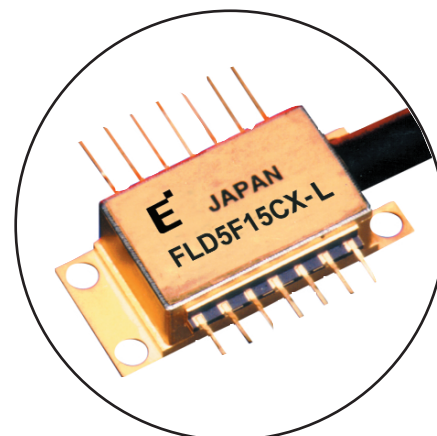
## FLD5F15CX-L

### 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<sub>L</sub>=T<sub>set</sub>, T<sub>C</sub>=25°C, BOL, unless otherwise specified)

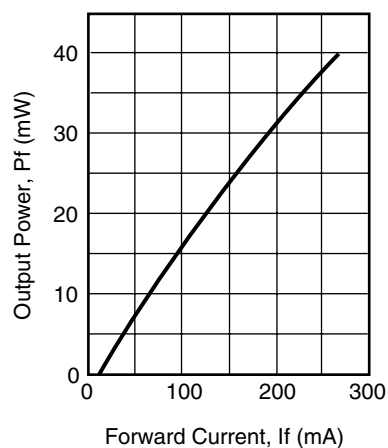
| Parameter                                  | Symbol           | Test Conditions                                              | Limits   |       |       | Unit  |
|--------------------------------------------|------------------|--------------------------------------------------------------|----------|-------|-------|-------|
|                                            |                  |                                                              | Min.     | Typ.  | Max.  |       |
| Laser Set Temperature (BOL)                | T <sub>set</sub> | -                                                            | 15       | -     | 35    | °C    |
| Optical Output Power                       | P <sub>f</sub>   | -                                                            | 40       | -     | -     | mW    |
| Threshold Current                          | I <sub>th</sub>  | -                                                            | 3        | -     | 45    | mA    |
| Forward Voltage                            | V <sub>F</sub>   | -                                                            | -        | -     | 3.0   | V     |
| Slope Efficiency                           | η                | -                                                            | -        | 0.14  | -     | mW/mA |
| Operating Forward Current                  | I <sub>op</sub>  | -                                                            | -        | -     | 350   | mA    |
| Peak Wavelength                            | λ <sub>p</sub>   | ORL>40dB                                                     | Note (3) |       |       | nm    |
| Wavelength Drift                           | Δλ               | 20 years                                                     | -        | -     | 200   | pm    |
| Wavelength Stability with Case Temperature | -                | T <sub>C</sub> =0 to +70°C                                   | -1       | -     | 1     | pm/°C |
| Spectral Width (-3dB)                      | Δλ               | ORL>40dB                                                     | -        | 5     | 10    | MHz   |
| Side Mode Suppression                      | Sr               |                                                              | 35       | -     | -     | dB    |
| Monitor Current                            | I <sub>m</sub>   | P <sub>f</sub> =40mW                                         | 0.1      | -     | 2.0   | mA    |
| Monitor Dark Current                       | I <sub>dm</sub>  | V <sub>PD</sub> =5V                                          | -        | -     | 100   | nA    |
| Monitor Capacitance                        | C <sub>t</sub>   | V <sub>PD</sub> =5V, f=1 MHz                                 | -        | -     | 10    | pF    |
| Tracking Error (Note 1)                    | TE               | I <sub>m</sub> =constant, T <sub>C</sub> =0 to +70°C         | -0.5     | -     | +1.0  | dB    |
| Optical Isolation                          | I <sub>S</sub>   | T <sub>C</sub> =0 to +70°C                                   | 22       | -     | -     | dB    |
| Polarization Extinction Ratio              | PER              |                                                              | 20       | -     | -     | dB    |
| Relative Intensity Noise                   | RIN              | CW, ORL>40dB<br>average of f=DC to 7.5GHz                    | -        | -     | -140  | dB/Hz |
| Cooler Current                             | I <sub>c</sub>   | T <sub>L</sub> =T <sub>set</sub> ,<br>T <sub>C</sub> =+70°C, | -        | -     | 1.4   | A     |
| Cooler Voltage                             | V <sub>c</sub>   |                                                              | -        | -     | 4.2   | V     |
| Cooler Power                               | P <sub>c</sub>   |                                                              | -        | -     | 5.9   | W     |
| Thermistor Resistance                      | R <sub>th</sub>  | T <sub>C</sub> , T <sub>L</sub> =25°C                        | 9.5      | 10.0  | 10.5  | kΩ    |
| Thermistor B Constant (Note 2)             | B                |                                                              | 3,270    | 3,450 | 3,630 | K     |

Note 1. TE=10\*log[P<sub>f</sub>(T<sub>C</sub>)/P<sub>f</sub>(25)]

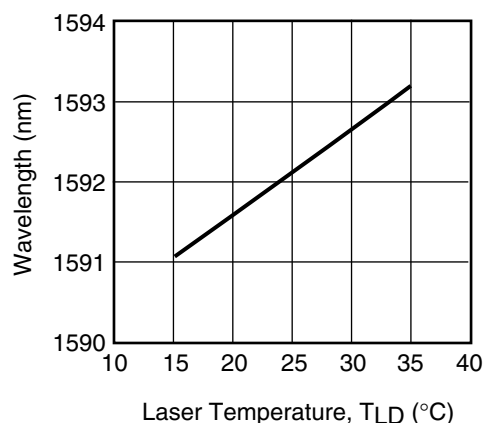
Note 2. Relation between resistance and temperature (°K) is: R<sub>th</sub> (T) = R<sub>th</sub> (25)\*exp[B(1/T-1/298)]

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

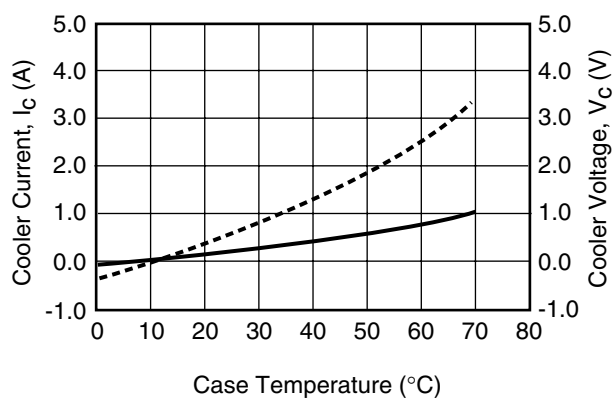
**Fig. 1 Forward Current vs Output Power**



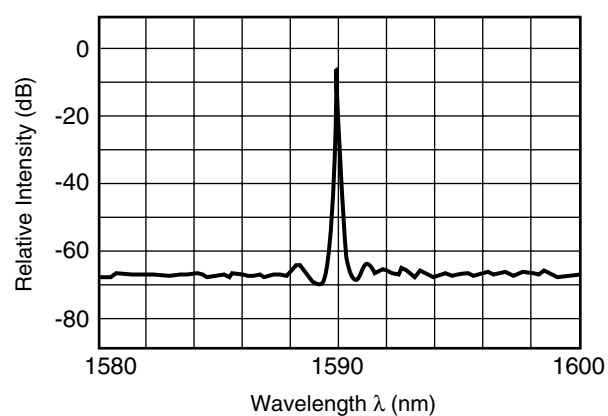
**Fig. 2 Temperature Dependence of Wavelength(ACC Operation)**



**Fig. 3 Cooler Voltage -Current**



**Fig.4 Spectrum**



**Table 1 Wavelength Table**

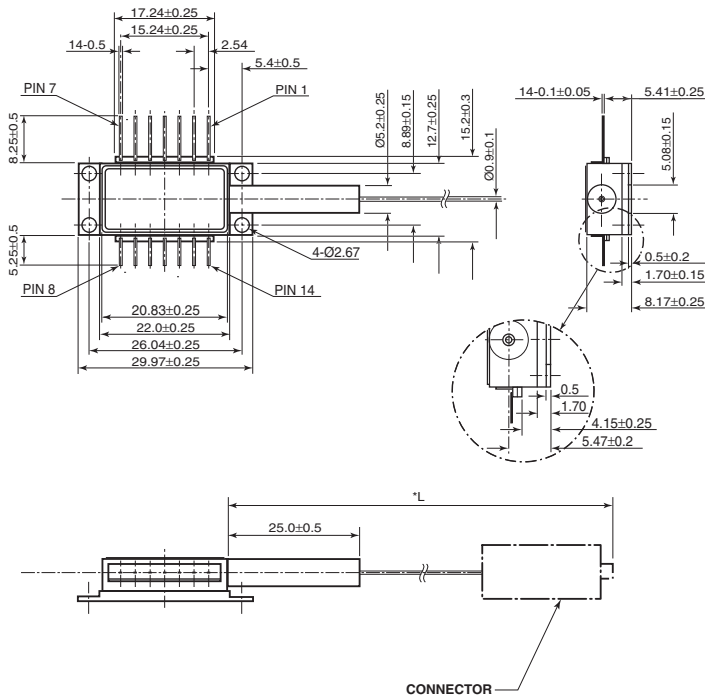
| Part Number     | Wavelength (nm)<br>(TL=Tset)<br>(in vacuum) | Tolerance (nm) | Part Number     | Wavelength (nm)<br>(TL=Tset)<br>(in vacuum) | Tolerance (nm) |
|-----------------|---------------------------------------------|----------------|-----------------|---------------------------------------------|----------------|
| 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

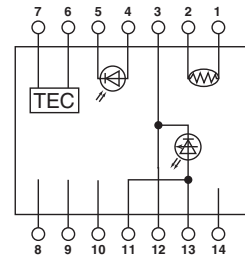
## "CX" PACKAGE

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.



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](http://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.

Eudyna Devices Inc. reserves the right to change products and specifications without notice. The information does not convey any license under rights of Eudyna Devices Inc. or others.

© 2004 Eudyna Devices USA Inc.  
Printed in U.S.A.