

# Optical Components

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## OL5450L-2, OL5451L-2, OL5453L-2

### Series

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#### 2mW Coaxial DFB Laser Diode Modules

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### 1. DESCRIPTION

The OL5450L-2, OL5451L-2, OL5453L-2 series consist of an MQW-DFB laser diode, a monitor PD, a single-stage optical isolator, a single-mode fiber and a coaxial package.

These modules are coaxial DFB Laser Diode Modules for 2.5Gbit/s transmission with high power at high temperature.

### 2. FEATURES

- Fiber output power:  $P_f=2.0\text{mW}$
- Wide operating temperature range:  $T_c=0$  to  $+85^\circ\text{C}$
- Side mode suppression: 32dB
- Multi-quantum-well (MQW) DFB structure
- Internal monitor PD for power control
- Built-in single-stage optical isolator
- Coaxial Package
- No TEC required

### 3. APPLICATION

- OC-48, STM-16

#### 4.OPTICAL AND ELECTRICAL CHARACTERISTICS

(Tc = 0 to +85°C, unless otherwise specified)

| Parameter                    | Symbol | Test Conditions               | Min. | Typ.  | Max.        | Unit  |
|------------------------------|--------|-------------------------------|------|-------|-------------|-------|
| Fiber Output Power           | Pf     | CW                            | 2.0  |       |             | mW    |
| Fiber Output Power (Average) | PAVG   | Modulated                     | 1.0  |       |             | mW    |
| Threshold Current            | Ith    | Tc=+25°C ,CW,BOL              |      | 7     | 15          | mA    |
|                              |        | Tc=+85°C,CW,BOL               |      | 25    | 40          |       |
|                              |        | Tc=+85°C,CW,EOL               |      |       | 1.5*Ith-BOL |       |
| Operation Current            | Iop    | Pf=2.0mW,CW                   |      | 70    | 110         | mA    |
| Slope efficiency             | η      | Pf=2.0mW,<br>CW,Tc=+25°C      | 0.05 | 0.073 |             | W/A   |
| Modulation Current           | Imod   | Pf=2.0mW,CW,Tc=+25°C          |      | 30    | 40          | mA    |
| Peak Wavelength              | λp     | Pf=2.0mW,CW                   | 1500 |       | 1580        | nm    |
| Spectral Width               | Δλ     | Pf=2.0mW,CW,-20dB             |      | 0.2   | 0.5         | nm    |
| Side-mode suppression ratio  | SMSR   | Pf=2.0mW,CW                   | 32   | 40    |             | dB    |
| Rise/Fall times              | Tr/Tf  | PAVG=1.0mW,20-80%<br>ExR*=9dB |      | 0.09  | 0.15        | ns    |
| Relative Intensity Noise     | RIN    | Pf=2.0mW,CW                   |      | -140  | -130        | dB/Hz |
| Monitor Current              | Im     | Pf=2.0mW,CW, Tc=+25°C         | 50   | 400   | 2200        | μA    |
| Tracking Error**             | TRE    | Pf=2.0mW,CW                   | -1   | ---   | +1          | dB    |

\*ExR=Extinction ratio

\*\*TRE=10\*log{(Pf@0~+85°C)/(Pf@25°C)} at Im hold(@25°C)

#### 5.ABSOLUTE MAXIMUM RATING

(Tc = +25°C, unless otherwise specified)

| Parameter                        | Symbol | Rating     | Unit |
|----------------------------------|--------|------------|------|
| Fiber Output Power               | Pf     | 4          | mW   |
| LD Reverse Voltage               | Vrl    | 2          | V    |
| Monitor PD Forward Current       | Ifd    | 10         | mA   |
| Monitor PD Reverse Current       | Ird    | 3          | mA   |
| Monitor PD Reverse Voltage       | Vrd    | 30         | V    |
| Operating Case Temperature (Tc)  | Tc     | 0 to +85   | °C   |
| Storage Temperature              | Tstg   | -40 to +85 | °C   |
| Lead Soldering Temperature (10s) | -      | 260        | °C   |

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## 6.CONNECTOR AND FIBER SPECIFICATIONS

| Parameter           | Specifications   | Unit |
|---------------------|------------------|------|
| Type                | SM               | ---  |
| Mode Field Diameter | 9+/-1            | μm   |
| Cladding Diameter   | 125+/-2          | μm   |
| Jacket Diameter     | 900              | μm   |
| Length              | 1(Min)           | m    |
| Connector Type      | FC/SC/LC/MU/MU-J | ---  |

## 7.ORDERING INFORMATION

OL545 0 L – 2 – AF SC

### Pin Assignment

0: C type

1: A type

3: B type

(See P.4)

### Flange type

AF: Angled Flange

SF: Straight Flange

NF: No Flange

### Connector type

SC: SC Connector

FC: FC Connector

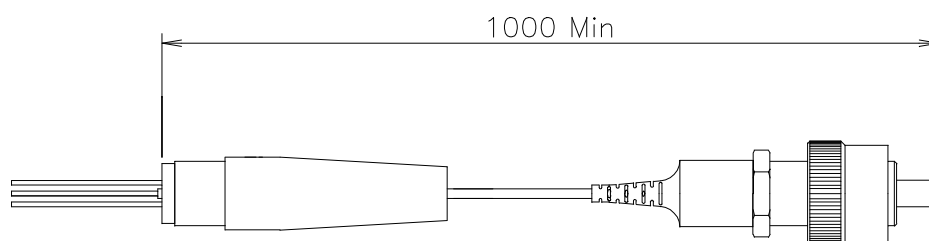
LC: LC Connector

MU: MU Connector

MUJ: MU-J Connector

## 8.OUTLINE DRAWING

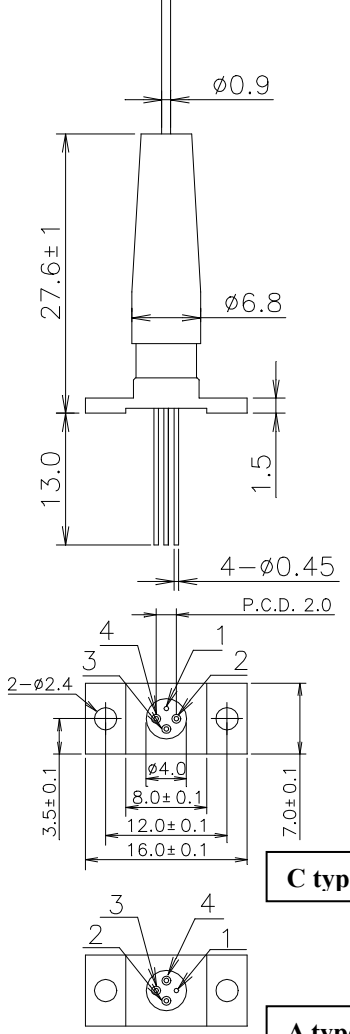
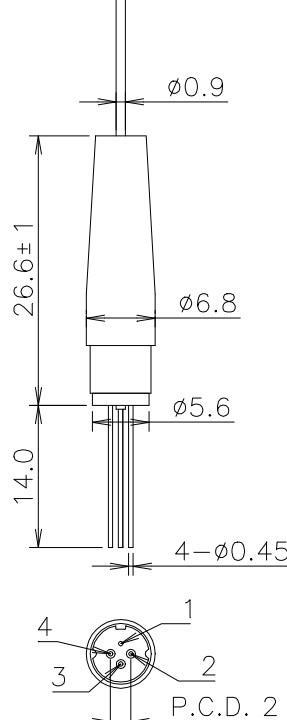
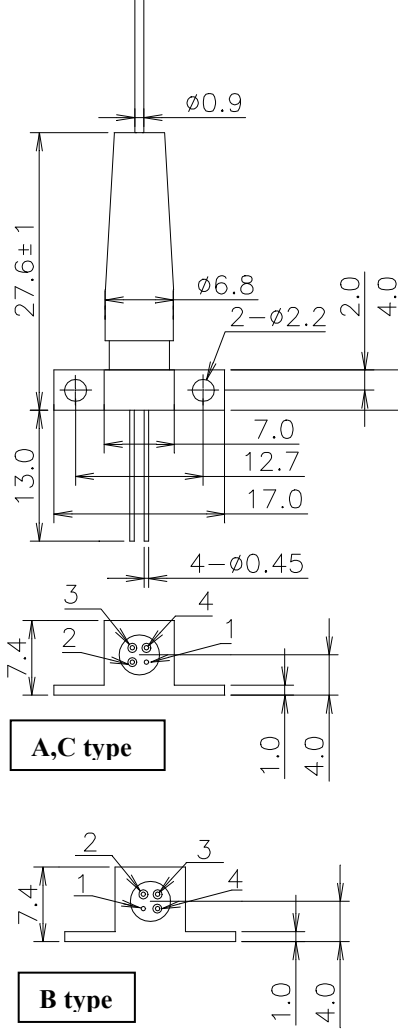
Length (mm)



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ALL DIMENSIONS IN MILLIMETERS

Flange Type

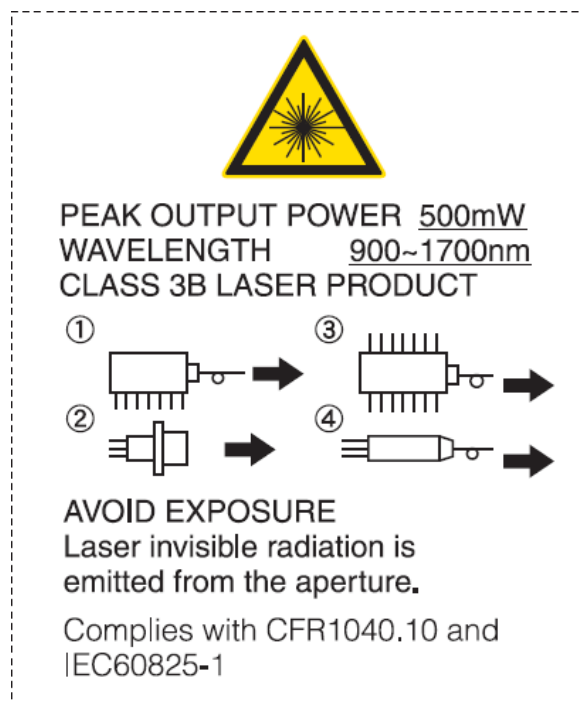
| Straight flange                                                                                                              | No flange                                                                          | Angled flange                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
|  <p><b>C type</b></p> <p><b>A type</b></p> |  |  <p><b>A,C type</b></p> <p><b>B type</b></p> |

Pin Assignment

| OL5450L (C type)                                                                                                                                                                                                                                                    | OL5451L (A type)       | OL5453L (B type) |            |  |   |      |   |            |   |          |   |                        |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |            |   |            |   |          |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |          |   |            |   |            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------|------------|--|---|------|---|------------|---|----------|---|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--|------------|--|---|-----------------|---|------------|---|------------|---|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--|------------|--|---|-----------------|---|----------|---|------------|---|------------|
| <table><tr><th colspan="2">PIN configuration</th></tr><tr><th colspan="2">Assignment</th></tr><tr><td>1</td><td>CASE</td></tr><tr><td>2</td><td>LD cathode</td></tr><tr><td>3</td><td>PD anode</td></tr><tr><td>4</td><td>LD anode<br/>PD cathode</td></tr></table> | PIN configuration      |                  | Assignment |  | 1 | CASE | 2 | LD cathode | 3 | PD anode | 4 | LD anode<br>PD cathode | <table><tr><th colspan="2">PIN configuration</th></tr><tr><th colspan="2">Assignment</th></tr><tr><td>1</td><td>LD anode (CASE)</td></tr><tr><td>2</td><td>LD cathode</td></tr><tr><td>3</td><td>PD cathode</td></tr><tr><td>4</td><td>PD anode</td></tr></table> | PIN configuration |  | Assignment |  | 1 | LD anode (CASE) | 2 | LD cathode | 3 | PD cathode | 4 | PD anode | <table><tr><th colspan="2">PIN configuration</th></tr><tr><th colspan="2">Assignment</th></tr><tr><td>1</td><td>LD anode (CASE)</td></tr><tr><td>2</td><td>PD anode</td></tr><tr><td>3</td><td>PD cathode</td></tr><tr><td>4</td><td>LD cathode</td></tr></table> | PIN configuration |  | Assignment |  | 1 | LD anode (CASE) | 2 | PD anode | 3 | PD cathode | 4 | LD cathode |
| PIN configuration                                                                                                                                                                                                                                                   |                        |                  |            |  |   |      |   |            |   |          |   |                        |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |            |   |            |   |          |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |          |   |            |   |            |
| Assignment                                                                                                                                                                                                                                                          |                        |                  |            |  |   |      |   |            |   |          |   |                        |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |            |   |            |   |          |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |          |   |            |   |            |
| 1                                                                                                                                                                                                                                                                   | CASE                   |                  |            |  |   |      |   |            |   |          |   |                        |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |            |   |            |   |          |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |          |   |            |   |            |
| 2                                                                                                                                                                                                                                                                   | LD cathode             |                  |            |  |   |      |   |            |   |          |   |                        |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |            |   |            |   |          |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |          |   |            |   |            |
| 3                                                                                                                                                                                                                                                                   | PD anode               |                  |            |  |   |      |   |            |   |          |   |                        |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |            |   |            |   |          |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |          |   |            |   |            |
| 4                                                                                                                                                                                                                                                                   | LD anode<br>PD cathode |                  |            |  |   |      |   |            |   |          |   |                        |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |            |   |            |   |          |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |          |   |            |   |            |
| PIN configuration                                                                                                                                                                                                                                                   |                        |                  |            |  |   |      |   |            |   |          |   |                        |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |            |   |            |   |          |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |          |   |            |   |            |
| Assignment                                                                                                                                                                                                                                                          |                        |                  |            |  |   |      |   |            |   |          |   |                        |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |            |   |            |   |          |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |          |   |            |   |            |
| 1                                                                                                                                                                                                                                                                   | LD anode (CASE)        |                  |            |  |   |      |   |            |   |          |   |                        |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |            |   |            |   |          |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |          |   |            |   |            |
| 2                                                                                                                                                                                                                                                                   | LD cathode             |                  |            |  |   |      |   |            |   |          |   |                        |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |            |   |            |   |          |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |          |   |            |   |            |
| 3                                                                                                                                                                                                                                                                   | PD cathode             |                  |            |  |   |      |   |            |   |          |   |                        |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |            |   |            |   |          |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |          |   |            |   |            |
| 4                                                                                                                                                                                                                                                                   | PD anode               |                  |            |  |   |      |   |            |   |          |   |                        |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |            |   |            |   |          |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |          |   |            |   |            |
| PIN configuration                                                                                                                                                                                                                                                   |                        |                  |            |  |   |      |   |            |   |          |   |                        |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |            |   |            |   |          |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |          |   |            |   |            |
| Assignment                                                                                                                                                                                                                                                          |                        |                  |            |  |   |      |   |            |   |          |   |                        |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |            |   |            |   |          |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |          |   |            |   |            |
| 1                                                                                                                                                                                                                                                                   | LD anode (CASE)        |                  |            |  |   |      |   |            |   |          |   |                        |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |            |   |            |   |          |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |          |   |            |   |            |
| 2                                                                                                                                                                                                                                                                   | PD anode               |                  |            |  |   |      |   |            |   |          |   |                        |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |            |   |            |   |          |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |          |   |            |   |            |
| 3                                                                                                                                                                                                                                                                   | PD cathode             |                  |            |  |   |      |   |            |   |          |   |                        |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |            |   |            |   |          |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |          |   |            |   |            |
| 4                                                                                                                                                                                                                                                                   | LD cathode             |                  |            |  |   |      |   |            |   |          |   |                        |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |            |   |            |   |          |                                                                                                                                                                                                                                                                   |                   |  |            |  |   |                 |   |          |   |            |   |            |

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## 9. SAFETY INFORMATION ON THIS PRODUCT



|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Warning</b><br>Laser Beam    | <p>A laser beam is emitted from this laser diode during operation. The invisible or visible laser beam, directly or indirectly, may cause injury to the eye or loss of eyesight.</p> <p>Do not look directly into the laser beam.</p> <p>Avoid exposure to the laser beam, any reflected or collimated beam.</p>                                                                                                                                                             |
| <b>Caution</b><br>GaAs Product  | <p>The product contains gallium arsenide, GaAs.</p> <p>GaAs vapor and powder are hazardous to human health if inhaled, ingested or swallowed.</p> <p>Do not destroy or burn the product.</p> <p>Do not crush or chemically dissolve the product.</p> <p>Do not put the product in the mouth.</p> <p>Observe related laws and company regulations when discarding this product.</p> <p>The product should be excluded from general industrial waste or household garbage.</p> |
| <b>Caution</b><br>Optical Fiber | <p>A glass-fiber is attached on the product. Handle with care.</p> <p>When the fiber is broken or damaged, handle carefully to avoid injury from the damaged part or fragments.</p>                                                                                                                                                                                                                                                                                          |

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