



## Features

- SFP Multi-Source Agreement compliant
- Compliant with IEEE802.3z Gigabit Ethernet Standard
- Compliant with Fiber Channel 100-SM-LC-L standard
- Industry standard small form pluggable (SFP) package
- Simplex LC connector
- Differential LVPECL inputs and outputs
- Single power supply 3.3V
- TTL signal detect indicator
- Hot Pluggable
- Class 1 laser product complies with EN 60825-1
- RoHS Compliant

## Absolute Maximum Ratings

| Parameter           | Symbol   | Min. | Max.     | Units | Note |
|---------------------|----------|------|----------|-------|------|
| Storage Temperature | $T_S$    | -40  | 85       | °C    |      |
| Supply Voltage      | $V_{CC}$ | -0.5 | 4.0      | V     |      |
| Input Voltage       | $V_{IN}$ | -0.5 | $V_{CC}$ | V     |      |
| Output Current      | $I_o$    | ---  | 50       | mA    |      |
| Operating Current   | $I_{OP}$ | ---  | 400      | mA    |      |

## Recommended Operating Conditions

| Parameter                  | Symbol            | Min. | Max. | Units | Note          |
|----------------------------|-------------------|------|------|-------|---------------|
| Case Operating Temperature | $T_C$             | 0    | 70   | °C    | OP6C-W10-B4-C |
|                            |                   | -40  | 85   | °C    | OP6C-W10-B4-I |
| Supply Voltage             | $V_{CC}$          | 3.1  | 3.5  | V     |               |
| Supply Current             | $I_{TX} + I_{RX}$ | ---  | 250  | mA    |               |

### Transmitter Electro-optical Characteristics

V<sub>CC</sub> = 3.1 V to 3.5 V, T<sub>C</sub> = 0 °C to 70 °C ( -40 °C to 85 °C)

| Parameter                              | Symbol      | Min. | Typ. | Max. | Units | Note                      |
|----------------------------------------|-------------|------|------|------|-------|---------------------------|
| Output Optical Power<br>9/125 μm fiber | $P_{out}$   | -9   | ---  | -3   | dBm   | Average                   |
| Extinction Ratio                       | $ER$        | 9    | ---  | ---  | dB    |                           |
| Center Wavelength                      | $\lambda_C$ | 1270 | 1310 | 1355 | nm    |                           |
| Spectral Width (RMS)                   | $\lambda$   | ---  | ---  | 2.5  | nm    |                           |
| Rise/Fall Time (20–80%)                | $T_{r, f}$  | ---  | ---  | 260  | ps    |                           |
| Relative Intensity Noise               | $RIN$       | ---  | ---  | -120 | dB/Hz |                           |
| Total Jitter                           | $TJ$        | ---  | ---  | 227  | ps    |                           |
| Output Eye                             |             |      |      |      |       | Compliant with IEEE802.3z |
| Max $P_{out}$ TX-DISABLE Asserted      | $P_{OFF}$   | ---  | ---  | -45  | dBm   |                           |
| Differential Input Voltage             | $V_{DIFF}$  | 0.4  | ---  | 2.0  | V     |                           |

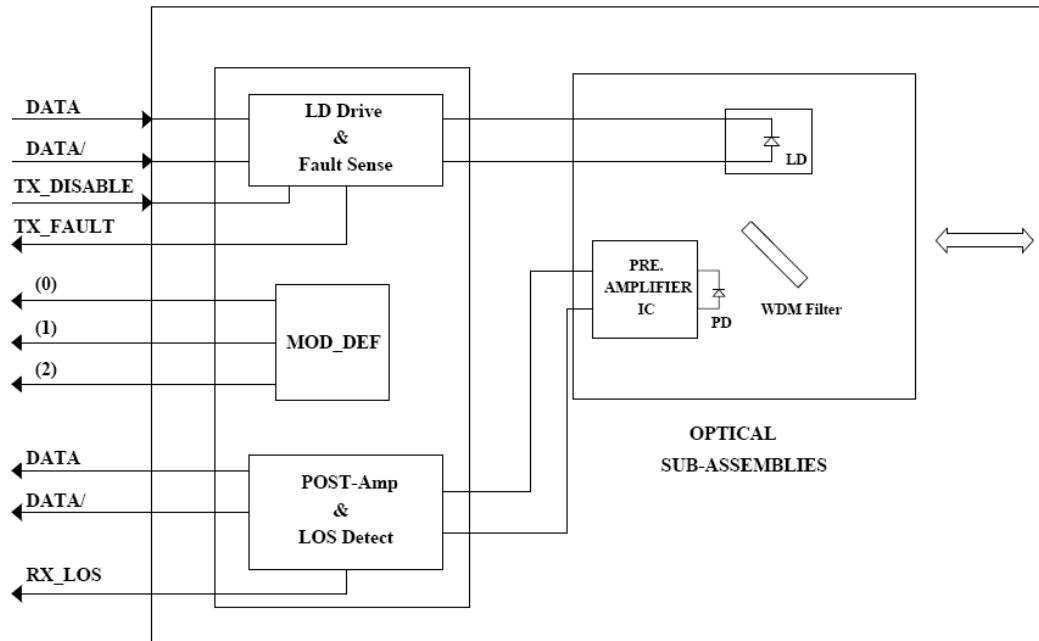


### Receiver Electro-optical Characteristics

V<sub>CC</sub> = 3.1 V to 3.5 V, T<sub>c</sub> = 0 °C to 70 °C (-40 °C to 85 °C)

| Parameter                                   | Symbol      | Min. | Typ. | Max.            | Units | Note                            |
|---------------------------------------------|-------------|------|------|-----------------|-------|---------------------------------|
| Optical Input Power-maximum                 | $P_{IN}$    | -1   | ---  | ---             | dBm   | BER < 10 <sup>-12</sup>         |
| Optical Input Power-minimum (Sensitivity)   | $P_{IN}$    | ---  | ---  | -21             | dBm   | BER < 10 <sup>-12</sup>         |
| Operating Center Wavelength                 | $\lambda_C$ | 1480 | ---  | 1500            | nm    |                                 |
| Optical Return Loss                         | ORL         | 14   | ---  | ---             | dB    | $\lambda=1480\sim1500\text{nm}$ |
| Optical isolation                           | ISO         | ---  | ---  | -40             | dB    | $\lambda=1260\sim1360\text{nm}$ |
| Loss of signal-Asserted                     | $P_A$       | ---  | ---  | -21             | dBm   |                                 |
| Loss of signal-Deasserted                   | $P_D$       | -35  | ---  | ---             | dBm   |                                 |
| Differential Output Voltage                 | $V_{DIFF}$  | 0.5  | ---  | 1.2             | V     |                                 |
| Data Output Rise, Fall Time (20%-80%)       | $T_{r,f}$   | ---  | ---  | 0.35            | ns    |                                 |
| Receiver Loss of Signal Output Voltage-Low  | $RX\_LOS_L$ | 0    | ---  | 0.5             | V     |                                 |
| Receiver Loss of Signal Output Voltage-High | $RX\_LOS_H$ | 2.4  | ---  | V <sub>CC</sub> | V     |                                 |

## Block Diagram of Transceiver



### Transmitter and Receiver Optical Sub-assembly Section

A 1310 nm InGaAsP laser and an InGaAs PIN photodiode integrate with an WDM filter to form a bi-directional single fiber optical subassembly (OSA). The laser of OSA is driven by a LD driver IC which converts differential input LVPECL logic signals into an analog laser driving current. And, The photodiode of OSA is connected to a circuit providing post-amplification quantization, and optical signal detection.

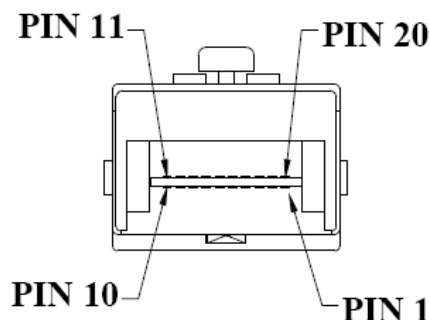
#### TX\_DISABLE

The TX\_DISABLE signal is high (TTL logic "1") to turn off the laser output.

#### Receive Loss (RX\_LOS)

The RX\_LOS is high (logic "1") when there is no incoming light from the companion transceiver. This signal is normally used by the system for the diagnostic purpose. The signal is operated in TTL level.

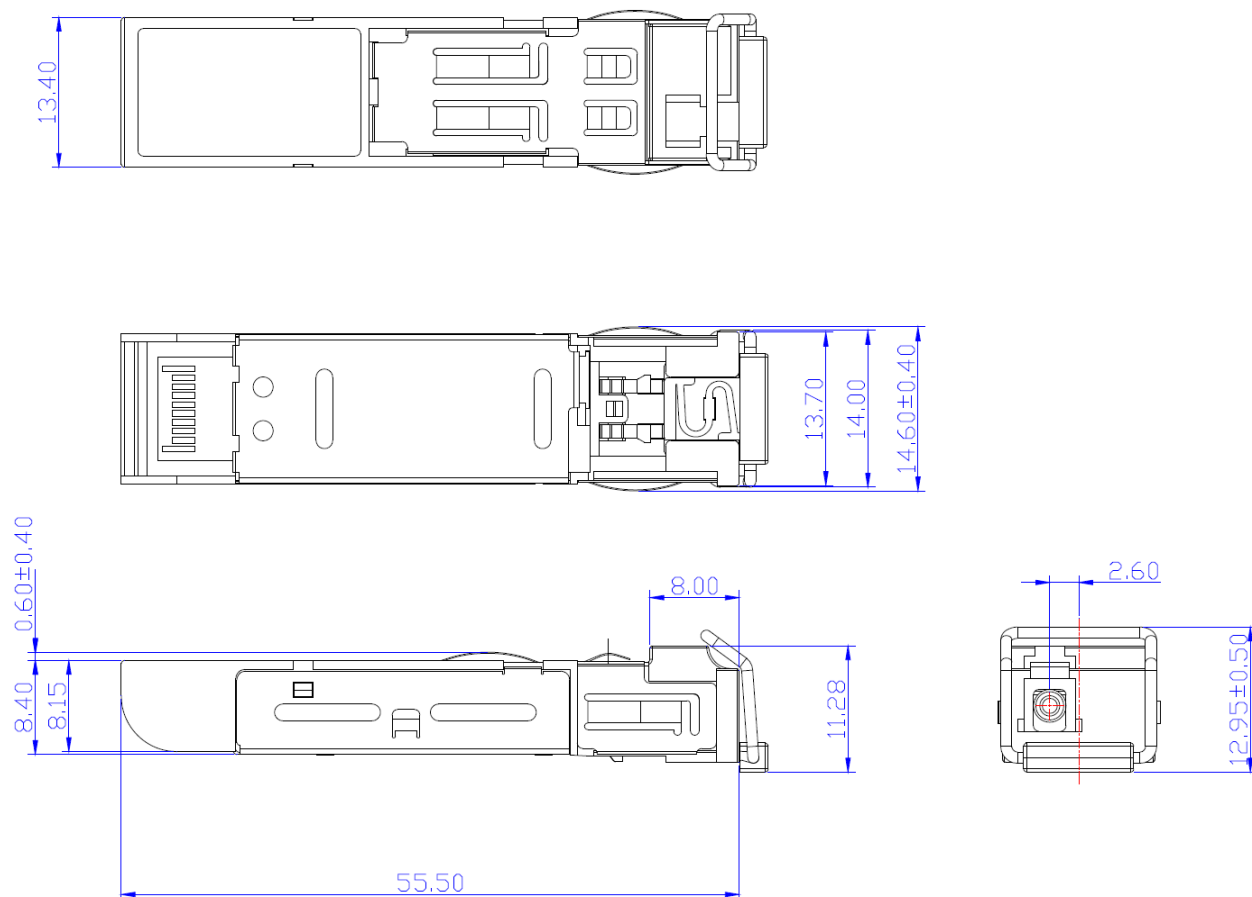
## Pin Assignment



## Pin Descriptions

| Pin | Signal Name      | Description                                       |
|-----|------------------|---------------------------------------------------|
| 1   | T <sub>GND</sub> | Transmitter Ground                                |
| 2   | TX_FAULT         | Transmit Fault                                    |
| 3   | TX_DISABLE       | Transmit Disable                                  |
| 4   | MOD_DEF(2)       | SDA Serial Data Signal                            |
| 5   | MOD_DEF(1)       | SCL Serial Clock Signal                           |
| 6   | MOD_DEF(0)       | TTL Low                                           |
| 7   | RATE SELECT      | Open Circuit                                      |
| 8   | RX_LOS           | Receiver Loss of Signal, TTL High, Open collector |
| 9   | R <sub>GND</sub> | Receiver Ground                                   |
| 10  | R <sub>GND</sub> | Receiver Ground                                   |
| 11  | R <sub>GND</sub> | Receiver Ground                                   |
| 12  | RX-              | Receive Data Bar, Differential PECL, ac coupled   |
| 13  | RX+              | Receive Data, Differential PECL, ac coupled       |
| 14  | R <sub>GND</sub> | Receiver Ground                                   |
| 15  | V <sub>CCR</sub> | Receiver Power Supply                             |
| 16  | V <sub>CCT</sub> | Transmitter Power Supply                          |
| 17  | T <sub>GND</sub> | Transmitter Ground                                |
| 18  | TX+              | Transmit Data, Differential PECL, ac coupled      |
| 19  | TX-              | Transmit Data Bar, Differential PECL, ac coupled  |
| 20  | T <sub>GND</sub> | Transmitter Ground                                |

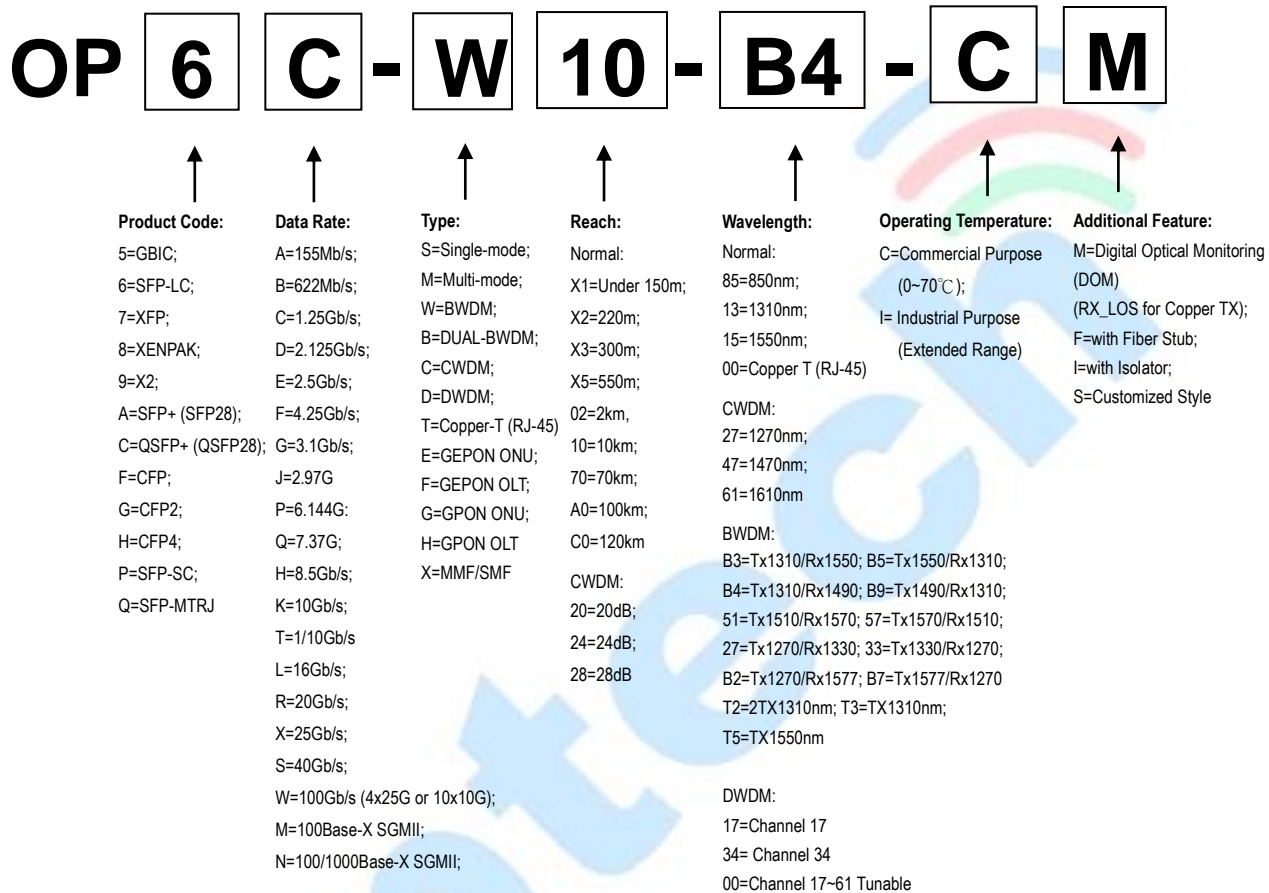
**Dimensions**



**DIMENSIONS ARE IN MILLIMETERS**

**ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED**

**Ordering Information**



| Model Number       | Part Number   | Reach | TX/RX     | Input/Out | Signal Detect | Temperature    | LD Type |
|--------------------|---------------|-------|-----------|-----------|---------------|----------------|---------|
| SFP-BWDM-10-3149   | OP6C-W10-B4-C | 10 km | 1310/1490 | AC/AC     | TTL           | 0°C to 70 °C   | 1310 FP |
| SFP-BWDM-10-3149-I | OP6C-W10-B4-I | 10 km | 1310/1490 | AC/AC     | TTL           | -40°C to 85 °C | 1310 FP |

**Note: All information contained in this document is subject to change without notice.**