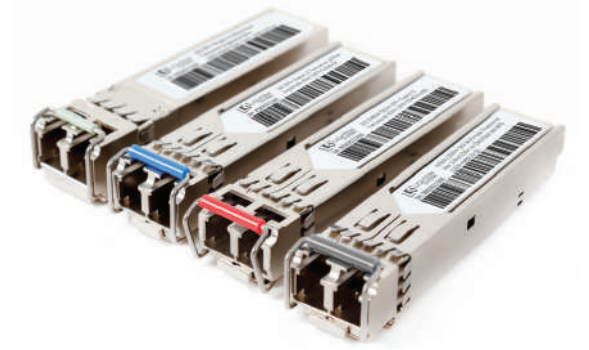


## Lightem 1.25G CWDM SFP Transceiver 40km LCWS125SXXD40

### FEATURES

- Standard SFP package.
- 40km transmission
- Operating Wavelength CWDM – 1270-1610nm
- Duplex LC, Single-Mode Transceiver
- Single +3.3V Power Supply
- Standard Operating Range: 0°C to 70°C Operating temperature
- Optional Industrial grade: -40°C to 85°C Operating temperature
- Uncooled DFB laser transmitter with internal isolator.
- Class 1/CDRHClass I Laser Eye Safe
- RoHS Compliant Products Available



### APPLICATIONS

- Metro/Access Networks
- Gigabit Ethernet
- Fiber Channel
- Other Optical Link
- Compatible with HP, Extreme, Cisco, Nortel, Alcatel applications.

### ABSOLUTE MAXIMUM RATINGS

| Parameter           | Symbol  | Min. | Typ. | Max. | Unit | Note |
|---------------------|---------|------|------|------|------|------|
| Storage Temperature | TC      | -40  | -    | +85  | °C   |      |
| Supply Voltage      | VCCT, R | -0.5 | -    | 4    | V    |      |
| Relative Humidity   | RH      | 5    | -    | +95  | %    |      |

### RECOMMENDED OPERATING CONDITIONS

| Parameter                     | Symbol  | Min. | Typ.  | Max.             | Unit |
|-------------------------------|---------|------|-------|------------------|------|
| Case operating Temperature    | TC      |      |       | +70 (Commercial) | °C   |
|                               | TI      | -40  |       | +85 (Industrial) | °C   |
| Supply Voltage                | VCCT, R | 3.13 | +3.3  | 3.47             | V    |
| Power Supply Current          | Icc     |      | -     | 250 (Commercial) | mA   |
|                               | Icc     |      |       | 300 (Industrial) | mA   |
| Data Rate (Gigabit Ethernet)  |         |      | 1.25  |                  | Gbps |
| Data Rate (Fiber Channel)     |         |      | 1.063 |                  | Gbps |
| Distance on 9/125um G.652 SMF | Lmax    |      |       | 40               | km   |

# TELECOM/DATACOM SYSTEM

## ELECTRICAL CHARACTERISTICS (TOP = 25°C, VCC = 3.3 VOLTS)

| Parameter                     | Symbol                | Min                  | Typ | Max                  | Unit | Note |
|-------------------------------|-----------------------|----------------------|-----|----------------------|------|------|
| <b>Transmitter</b>            |                       |                      |     |                      |      |      |
| Input differential impedance  | RIN                   |                      | 100 |                      | Ω    | 1    |
| Single ended data input swing | V <sub>in</sub> , pp  | 250                  |     | 1200                 | mV   |      |
| TX Disable High               |                       | V <sub>cc</sub> -1.3 |     | V <sub>cc</sub>      | V    |      |
| TX Disable Low                |                       | V <sub>cc</sub>      |     | V <sub>cc</sub> +0.8 | V    |      |
| TX Fault High                 |                       | V <sub>cc</sub> -0.5 |     | V <sub>cc</sub>      | V    |      |
| TX Fault Low                  |                       | V <sub>ee</sub>      |     | V <sub>cc</sub> +0.5 | V    |      |
| <b>Receiver</b>               |                       |                      |     |                      |      |      |
| Single ended data out swing   | V <sub>out</sub> , pp | 300                  | 400 | 800                  | mV   | 2    |
| Data output rise time         | t <sub>r</sub>        |                      |     | 175                  | ps   | 3    |
| Data output fall time         | t <sub>f</sub>        |                      |     | 175                  | ps   | 3    |
| LOS Fault                     |                       | V <sub>cc</sub> -0.5 |     | V <sub>cc</sub>      | V    |      |
| LOS Low                       |                       | V <sub>cc</sub>      |     | V <sub>cc</sub> +0.5 | V    |      |

**Notes:**

1. AC coupled
2. Into 100 ohm differential termination
3. 20-80%

## OPTICAL CHARACTERISTICS

| Tx/Rx: 1310/1490nm           | Symbol                          | Min   | Typ | Max   | Unit | Ref |
|------------------------------|---------------------------------|-------|-----|-------|------|-----|
| <b>Transmitter</b>           |                                 |       |     |       |      |     |
| Output Optical Power         | PO                              | -5    | -   | 0     | dBm  | 1   |
| Optical Wavelength - 1490nm  | λ                               | x-6.5 | x   | x+6.5 | nm   | 2   |
| Special Width (-20dB)        | PO                              | -     | -   | 1     | nm   |     |
| Slide Mode Suppression Ratio | Δλ                              | 30    | -   | -     | dBm  |     |
| Optical Rise/Fall Time       | t <sub>r</sub> / t <sub>f</sub> | -     | -   | 260   | ps   | 3   |
| Total Jitter                 | TJ                              | -     | -   | 0.35  | UI   |     |
| Optical Extinction Ratio     | ER                              | 9     | -   | -     | dB   |     |
| <b>Receiver</b>              |                                 |       |     |       |      |     |
| Rx Sensitivity @ 1.25Gb/s    | SENS                            | -     | -   | -25   | dBm  | 4.5 |
| Receiver Overload            | -                               | 0     | -   | -     | dBm  | 6   |
| Optical Center Wavelength    | λ <sub>c</sub>                  | 1270  | -   | 1600  | nm   |     |
| LOS De-Assert                | LOSD                            | -     | -   | -26   | dBm  | 6   |
| LOS Assert                   | LOSA                            | -40   | -   | 5     | dBm  | 6   |
| LOS Hysteresis               | -                               | 0.5   | -   | -     | dB   |     |

**Notes:**

1. Class 1 laser safety
2. The transmitter center wavelength  
"x" = 1271, 1291, 1311, 1331, 1351, 1371, 1391, 1411, 1431, 1451, 1471, 1491, 1511, 1531, 1511, 1571, 1591, 1611
3. Unfiltered, 20-80%. Complies with Gigabit Ethernet eye masks when filtered
4. Measured with conformance signals defined in FC PI-2 Rev. 10.0 specification
5. Measured with PRBS 27 -1 at 10-12 BER

# TELECOM/DATACOM SYSTEM

## DIGITAL DIAGNOSTIC MONITORING INTERFACE

| Parameter    | Range         | Accuracy | Calibration |
|--------------|---------------|----------|-------------|
| Temperature  | 0~+70°C (C)   | ±3°C     | Internal    |
|              | -40~+85°C (I) |          |             |
| Voltage      | 2.97~3.63V    | ±3%      | Internal    |
| Bias Current | 0~100mA       | ±10%     | Internal    |
| TX Power     | -5 ~ -0dBm    | ±3dB     | Internal    |
| RX Power     | -25 ~ -0dBm   | ±3dB     | Internal    |

## PIN DESCRIPTION

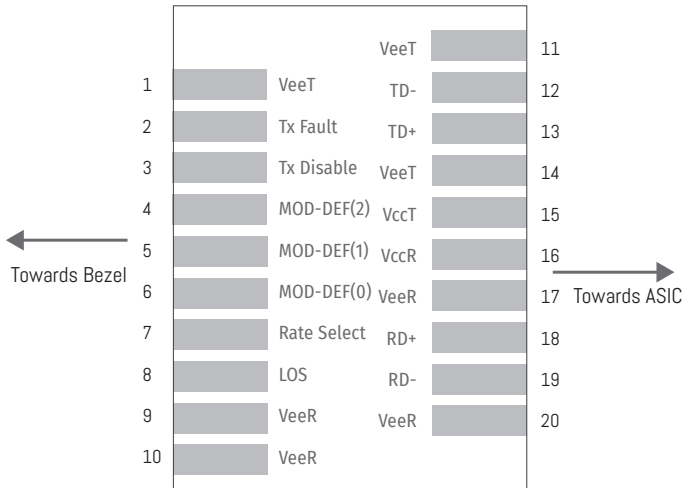
| Pin | Symbol  | Name /Description  | NOTE |
|-----|---------|--|------|
| 1   | VEER    | Transmitter Ground (Common with Receiver Ground)               | 1    |
| 2   | T FAULT | Transmitter Fault.   | 2    |
| 3   | T DIS   | Transmitter Disable. Laser output disabled on high or open.    | 3    |
| 4   | SDA     | 2-wire Serial Interface Data Line                              | 4    |
| 5   | SCL     | 2-wire Serial Interface Clock Line                             | 4    |
| 6   | MOD_ABS | Module Absent. Grounded within the module                      | 4    |
| 7   | RS0     | Rate Select 0  | 5    |
| 8   | LOS     | Loss of Signal indication. Logic 0 indicates normal operation. | 6    |
| 9   | RS1     | No connection required   | 1    |
| 10  | VEER    | Receiver Ground (Common with Transmitter Ground)               | 1    |
| 11  | VEER    | Receiver Ground (Common with Transmitter Ground)               | 1    |
| 12  | RD-     | Receiver Inverted DATA out. AC Coupled                         |      |
| 13  | RD+     | Receiver Non-inverted DATA out. AC Coupled                     |      |
| 14  | VEER    | Receiver Ground (Common with Transmitter Ground)               | 1    |
| 15  | VCCR    | Receiver Power Supply  |      |
| 16  | VCCR    | Transmitter Power Supply                                       |      |
| 17  | VEER    | Transmitter Ground (Common with Receiver Ground)               | 1    |
| 18  | TD+     | Transmitter Non-Inverted DATA in. AC Coupled.                  |      |
| 19  | TD-     | Transmitter Inverted DATA in. AC Coupled.                      |      |
| 20  | VEER    | Transmitter Ground (Common with Receiver Ground)               | 1    |

### Notes:

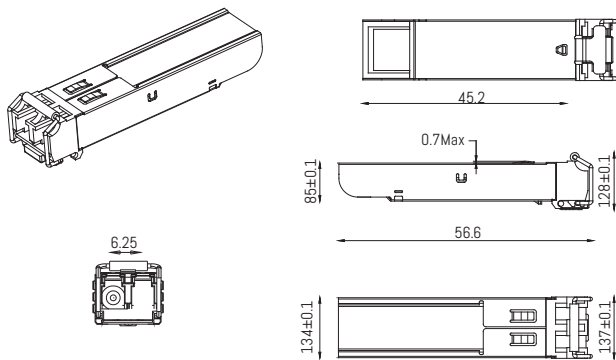
- Circuit ground is internally isolated from chassis ground.
- TFAULT is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3VA high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. Low output indicates normal operation. In the low state, the output is pulled to <0.8V.
- Laser output disabled on TDIS >2.0V or open, enabled on TDIS<0.8V.
- Should be pulled up with 4.7kΩ- 10kΩ host board to a voltage between 2.0V and 3.6V. MOD\_ABS pulls line low to indicate module is plugged in.
- Internally pulled down per SFF-8431 Rev 4.1.
- LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

# TELECOM/DATACOM SYSTEM

## PIN OUT OF CONNECTOR BLACK ON HOST BOARD



## MECHANICAL DIMENSIONS



Units in mm

## ORDERING INFORMATION

| PN                | DESCRIPTION   |
|-------------------|---|
| LCWS125SxxD40-x   | Lightem 1.25G CWDM SFP Duplex LC 1xx0nm 40km                  |
| xx -              | wavelength  |
|                   | 27- 1270nm      29- 1290nm      31- 1310nm      33- 1330nm    |
|                   | 35- 1350nm      37- 1370nm      39- 1390nm      41- 1410nm    |
|                   | 43- 1430nm      45- 1450nm      47- 1470nm      49- 1490nm    |
|                   | 51- 1510nm      53- 1530nm      55- 1550nm      57- 1570nm    |
|                   | 59- 1590nm      61- 1610nm                                    |
| x-                | l: optional industrial grade                                  |
| eg LCWS125S47D40l | Lightem 1.25G CWDM SFP Duplex LC 1470nm 40km Industrial grade |