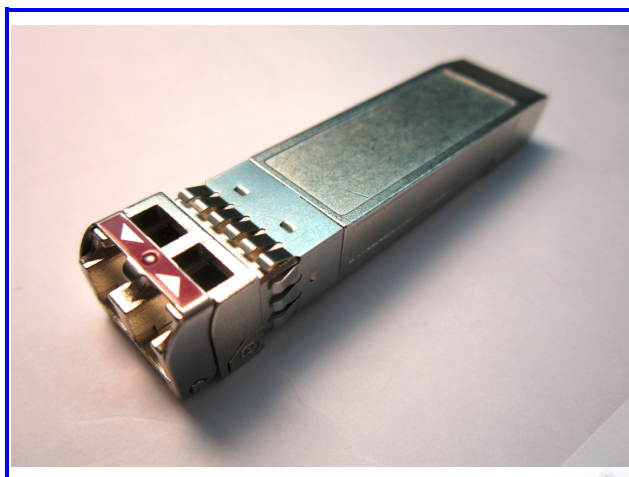




**RoHS compliant**  
**Single-mode , SFP28 LC Duplex Connector**  
**25G Ethernet/CPRI**  
**SFP28 O-Band DWDM 40km**



### Features

- Compliant with SFP+ MSA SFF-8431
- Compliant with SFF8472 diagnostic monitoring interface Duplex LC connector
- Single power supply 3.3V
- EML laser and APD receiver
- Link distance up to 40km over single mode fiber
- Support CPRI line bit rate option 10: 24330.24 Mbit/s
- Class 1 laser product complies with EN 60825-1
- Internal transmitter/receiver CDR
- Hot Pluggable

### Ordering Information

| PART NUMBER      | WAVELENGTH | TEMPERATURE    | Distance |
|------------------|------------|----------------|----------|
| LE38-J3L-TC-N-EA | 1290.54 nm | 0°C to 70 °C   | 40km     |
| LE38-J3L-TC-N-EB | 1291.10 nm | 0°C to 70 °C   | 40km     |
| LE38-J3L-TC-N-EC | 1291.65 nm | 0°C to 70 °C   | 40km     |
| LE38-J3L-TC-N-ED | 1295.00 nm | 0°C to 70 °C   | 40km     |
| LE38-J3L-TC-N-EE | 1295.56 nm | 0°C to 70 °C   | 40km     |
| LE38-J3L-TC-N-EF | 1296.12 nm | 0°C to 70 °C   | 40km     |
| LE38-J3L-TC-N-EG | 1299.49 nm | 0°C to 70 °C   | 40km     |
| LE38-J3L-TC-N-EH | 1300.05 nm | 0°C to 70 °C   | 40km     |
| LE38-J3L-TC-N-EI | 1300.62 nm | 0°C to 70 °C   | 40km     |
| LE38-J3L-TC-N-EJ | 1304.01 nm | 0°C to 70 °C   | 40km     |
| LE38-J3L-TC-N-EK | 1304.58 nm | 0°C to 70 °C   | 40km     |
| LE38-J3L-TC-N-EL | 1305.15 nm | 0°C to 70 °C   | 40km     |
| LE38-J3L-TI-N-EA | 1290.54 nm | -40°C to 85 °C | 40km     |
| LE38-J3L-TI-N-EB | 1291.10 nm | -40°C to 85 °C | 40km     |
| LE38-J3L-TI-N-EC | 1291.65 nm | -40°C to 85 °C | 40km     |



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Note: Attenuation of 0.35 dB/km @1310nm is used for the link length calculations



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### Diagnostics

| PARAMETER        | RANGE       | ACCURACY   | UNIT               | CALIBRATION |
|------------------|-------------|------------|--------------------|-------------|
| Temperature      | -40 to 85   | $\pm 3$    | $^{\circ}\text{C}$ | Internal    |
| Voltage          | 3.14to 3.46 | $\pm 0.1$  | V                  |             |
| Bias Current     | 0 to 120    | $\pm 10\%$ | mA                 |             |
| TX Power         | 0 to +5     | $\pm 3$    | dB                 |             |
| RX average Power | -5 to -20   | $\pm 3$    | dB                 |             |

### Absolute Maximum Ratings

| PARAMETER                   | SYMBOL   | MIN  | MAX | UNITS              | NOTE |
|-----------------------------|----------|------|-----|--------------------|------|
| Storage Temperature         | $T_s$    | -40  | +85 | $^{\circ}\text{C}$ |      |
| Supply Voltage              | $V_{cc}$ | -0.4 | 3.6 | V                  |      |
| Operating Relative Humidity | $RH$     | 5    | 85  | %                  |      |

### Recommended Operating Conditions

| PARAMETER                              | SYMBOL            | MIN  | MAX  | UNITS              | NOTE             |
|----------------------------------------|-------------------|------|------|--------------------|------------------|
| Case operating Temperature             | $T_c$             | 0    | 70   | $^{\circ}\text{C}$ | LE38-J3L-TC-N-Ex |
|                                        |                   | -40  | 85   |                    | LE38-J3L-TI-N-Ex |
| Signaling speed variation form nominal |                   | -100 | +100 | ppm                |                  |
| Supply Voltage                         | $V_{cc}$          | 3.14 | 3.46 | V                  |                  |
| Supply Current                         | $I_{TX} + I_{RX}$ |      | 545  | mA                 | LE38-J3L-TC-N-Ex |
|                                        |                   |      | 666  |                    | LE38-J3L-TI-N-Ex |
| Power Consumption                      | $P$               | ---  | 1.8  | W                  | LE38-J3L-TC-N-Ex |
|                                        |                   |      | 2.2  |                    | LE38-J3L-TI-N-Ex |



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### Transmitter Electro-optical Characteristics

$V_{CC} = 3.14 \text{ V to } 3.46 \text{ V}$  ,  $T_c = -40^{\circ}\text{C to } 85^{\circ}\text{C}$

| PARAMETER                                                | SYMBOL          | MIN                                | TYP.     | MAX      | UNITS   | NOTE                                          |
|----------------------------------------------------------|-----------------|------------------------------------|----------|----------|---------|-----------------------------------------------|
| Data Rate                                                | $B$             | 24                                 | 25.78125 | 26.5     | Gbps    |                                               |
| Average Optical Power                                    | $P_{out}$       | +0                                 | ---      | +5       | dBm     |                                               |
| Extinction Ratio                                         | $ER$            | 6                                  | ---      | ---      | dB      |                                               |
| Central Wavelength -BOL                                  |                 | X-50                               | X        | X+50     | pm      | X = specified center wavelength               |
| Central Wavelength -EOL                                  |                 | X-100                              | ---      | X+100    | pm      |                                               |
| Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3} |                 | {0.31, 0.4, 0.45, 0.34, 0.38, 0.4} |          |          |         | Hit ratio $5 \times 10^{-5}$ hits per sample. |
| Spectral Width (-20dB)                                   | $\Delta\lambda$ | ---                                | ---      | 1        | nm      |                                               |
| Side Mode Suppression Ratio                              | $SMSR$          | 30                                 |          |          | dB      |                                               |
| Max. $P_{out}$ TX-DISABLE Asserted                       | $P_{OFF}$       | ---                                | ---      | -45      | dBm     |                                               |
| Transmitter and dispersion penalty                       | $TDP$           |                                    |          | 1        | dB      |                                               |
| Differential Input Voltage                               | $V_{DIFF}$      | 200                                |          | 1000     | mV      |                                               |
| Transmit Fault Output-Low                                | $TX\_FAULT_L$   | 0.0                                | ---      | 0.5      | V       |                                               |
| Transmit Fault Output-High                               | $TX\_FAULT_H$   | 2.4                                | ---      | $V_{CC}$ | V       |                                               |
| TX_DISABLE Assert Time                                   | $t_{off}$       | ---                                | ---      | 100      | $\mu s$ |                                               |
| TX_DISABLE Negate Time                                   | $t_{on}$        | ---                                | ---      | 2        | ms      |                                               |
| Time to initialize, include reset of TX_FAULT            | $t_{init}$      | ---                                | ---      | 300      | ms      |                                               |
| Tx_Fault assert for cooled module                        | $t_{fault}$     | ---                                | ---      | 50       | ms      |                                               |
| TX_DISABLE time to start reset                           | $t_{reset}$     | 10                                 | ---      | ---      | $\mu s$ |                                               |



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### Receiver Electro-optical Characteristics

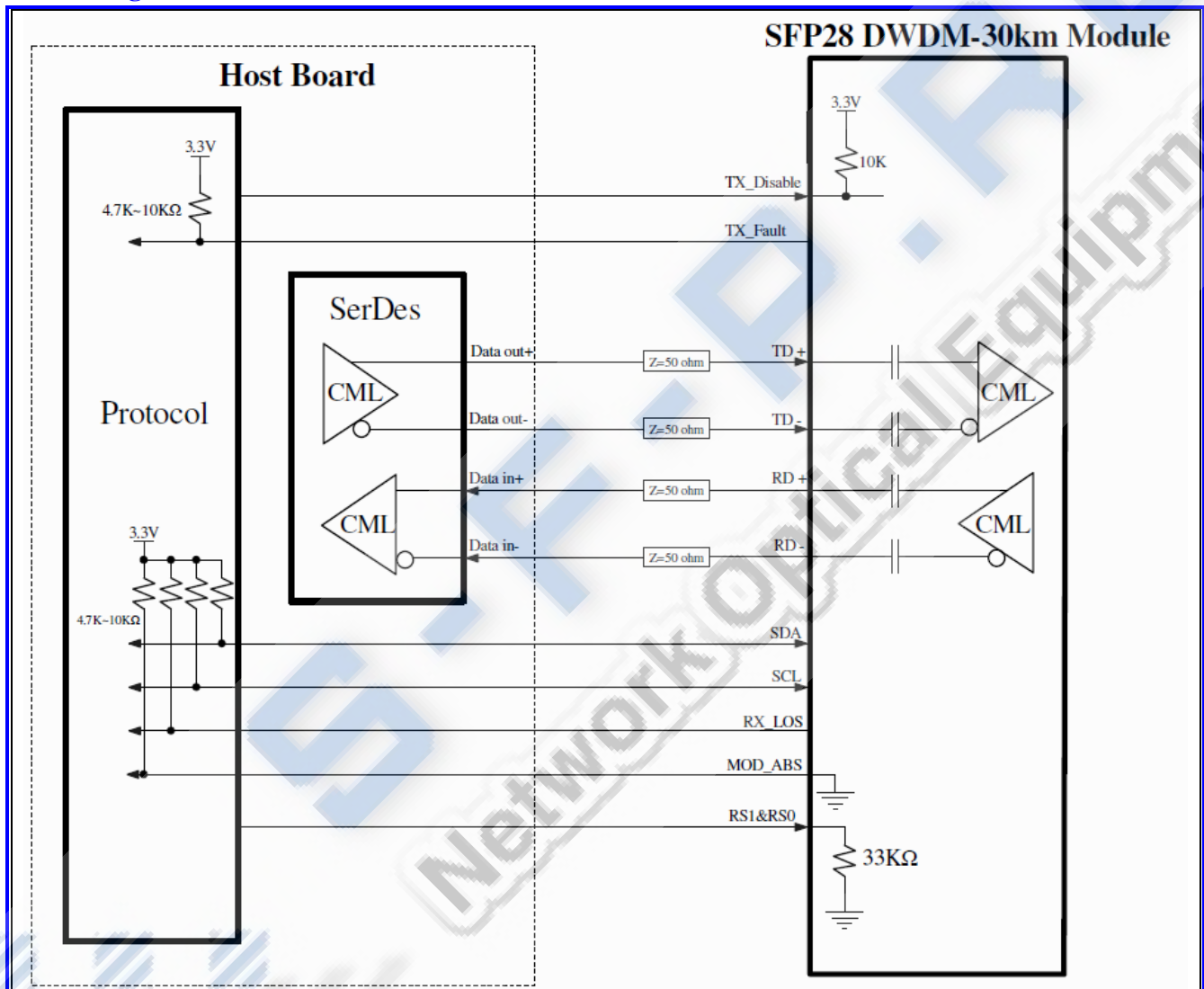
$V_{CC} = 3.14V$  to  $3.46V$ ,  $T_c = -40^{\circ}C$  to  $85^{\circ}C$

| PARAMETER                                   | SYMBOL      | MIN  | TYP.     | MAX      | UNITS | NOTE      |
|---------------------------------------------|-------------|------|----------|----------|-------|-----------|
| Data Rate                                   | $B$         | 24   | 25.78125 | 26.5     | Gbps  |           |
| Rx Sensitivity@25.78Gbps                    | $P_{IN}$    | -20  | ---      | -5       | dBm   | @BER=5E-5 |
| Operating Center Wavelength                 | $\lambda_C$ | 1270 | ---      | 1310     | nm    |           |
| Optical Return Loss                         | $ORL$       | 26   | ---      | ---      | dB    |           |
| Loss of signal -Deasserted                  | $P_D$       | ---  | ---      | -20      | dBm   |           |
| Loss of signal -Asserted                    | $P_A$       | -35  | ---      | ---      | dBm   |           |
| Differential Output Voltage                 | $V_{DIFF}$  | 500  | ---      | 1000     | mV    |           |
| 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  | ---      | $V_{CC}$ | V     |           |

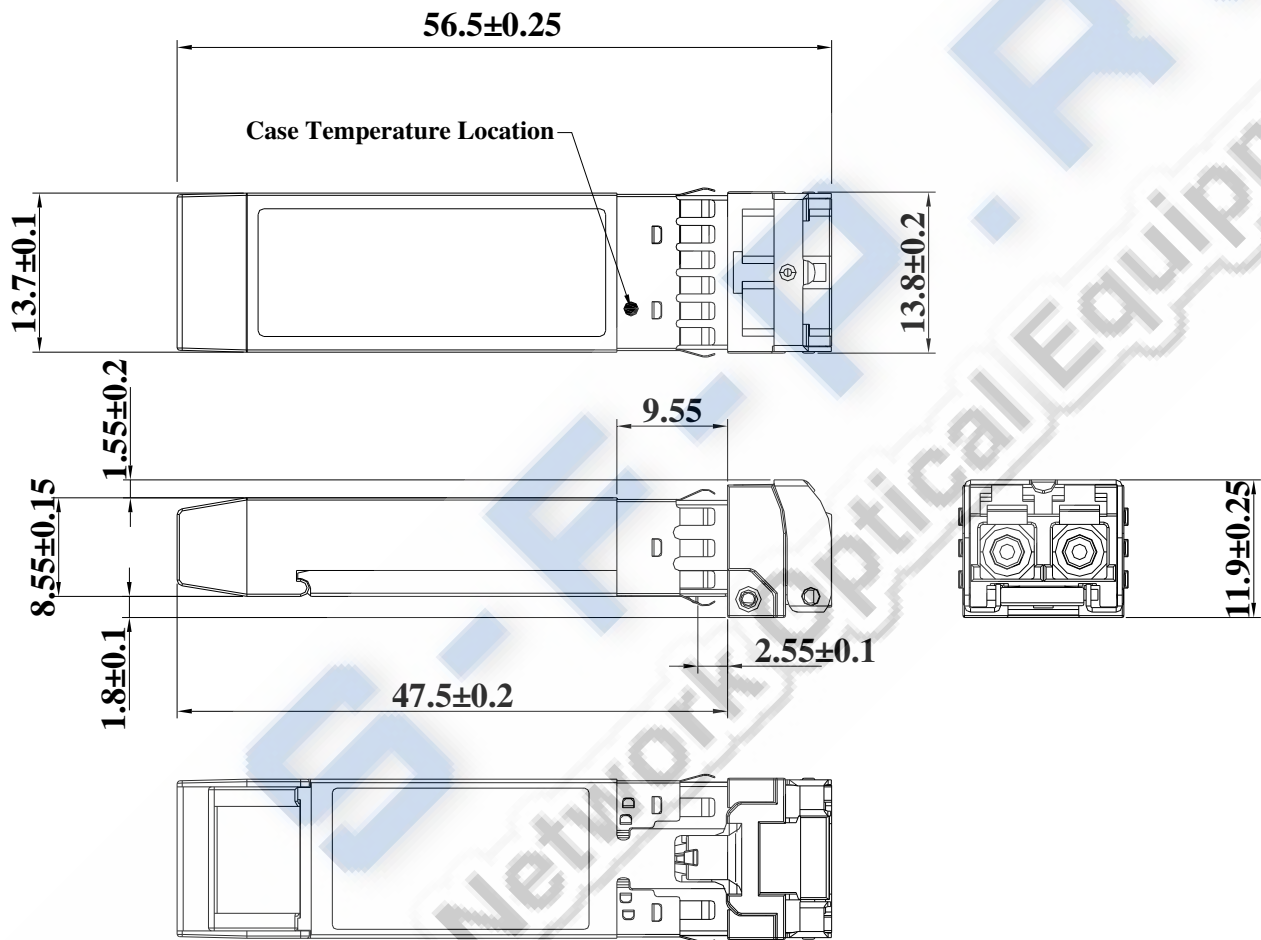
### Timing Parameters

| PARAMETER          | SYMBOL          | MIN | TYP. | MAX | UNITS | NOTE |
|--------------------|-----------------|-----|------|-----|-------|------|
| Time to initialize | $t_{start\_up}$ |     |      | 10  | s     |      |

## Block Diagram of Transceiver



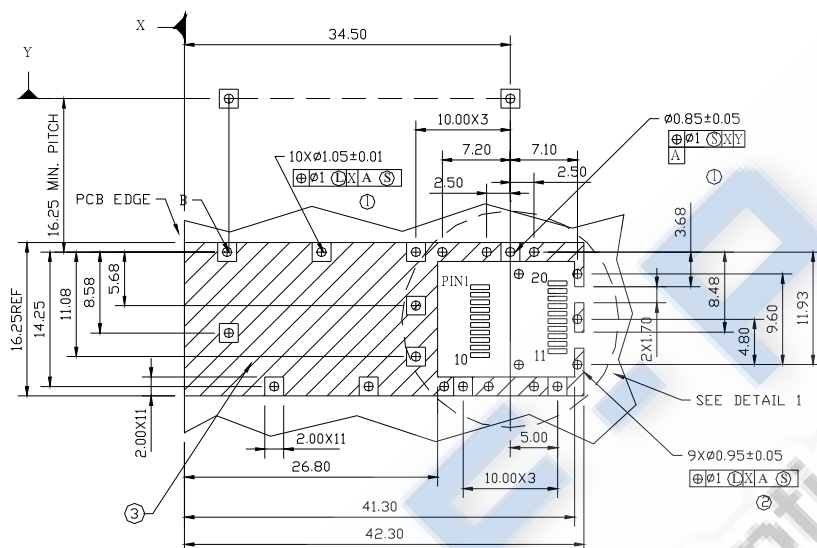
## Dimensions



**DIMENSIONS ARE IN MILLIMETERS**

The bail color is red.

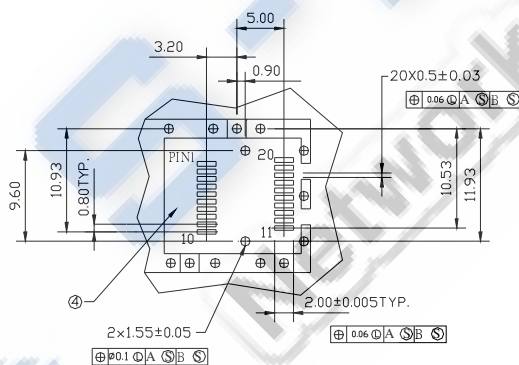
## SFP host board mechanical layout



### LEGEND

- 1.PADS AND VIAS ARE CHASSIS GROUND
- 2.THROUGH HOLES, PLATING OPTIONAL
- 3.HATCHED AREA DENOTES COMPONENT AND TRACE KEEPOUT(EXCEPT CHASSIS GROUND)
- 4.AREA DENOTES COMPONENT KEEPOUT (TRACES ALLOWED)

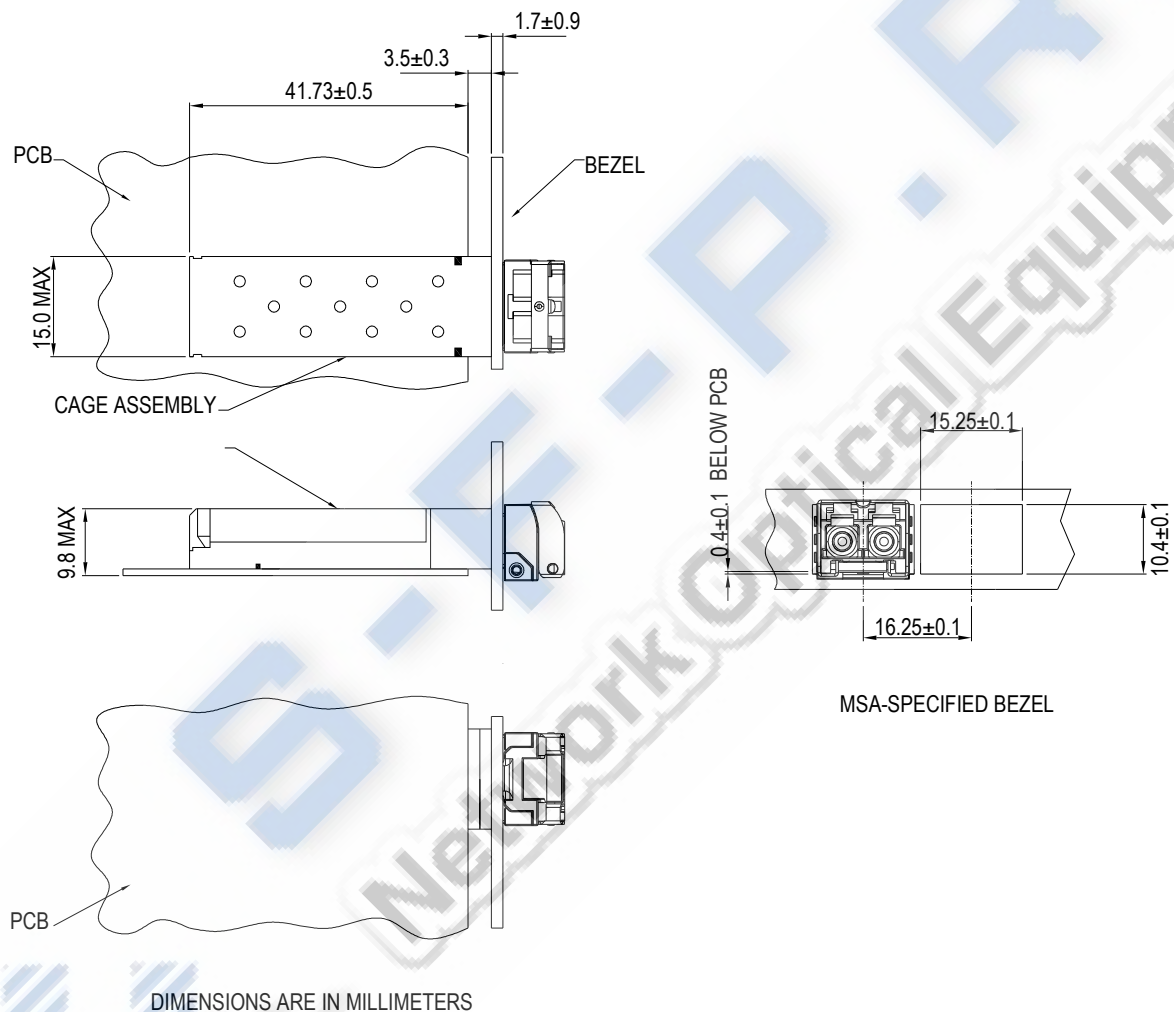
DIMENSIONS ARE IN MILLIMETERS



DETAIL 1

Unit: mm

## Assembly drawing



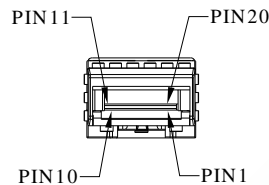
Unit: mm



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## Pin Assignment

Pin-Out



| Pin | Signal Name            | I/O | Logic | Description                                            | Note |
|-----|------------------------|-----|-------|--------------------------------------------------------|------|
| 1   | <i>VeeT</i>            |     |       | Transmit Ground                                        |      |
| 2   | <i>TX_FAULT</i>        | O   | LVTTL | Transmit Fault                                         |      |
| 3   | <i>TX_DISABLE</i>      | I   | LVTTL | Transmit Disable                                       |      |
| 4   | <i>SDA</i>             | I/O | LVTTL | 2-wire Serial Interface Data Line                      |      |
| 5   | <i>SCL</i>             | I/O | LVTTL | 2-wire Serial Interface Clock                          |      |
| 6   | <i>MOD_ABS</i>         |     |       | Module Absent, connected to VeeT or VeeR in the module |      |
| 7   | <i>RS0</i>             | I   | LVTTL | Rate select 0, not used                                | (2)  |
| 8   | <i>RX_LOS</i>          | O   | LVTTL | Receiver Loss of Signal                                |      |
| 9   | <i>RS1</i>             | I   | LVTTL | Rate select 1, not used                                | (2)  |
| 10  | <i>VeeR</i>            |     |       | Receiver Ground                                        |      |
| 11  | <i>VeeR</i>            |     |       | Receiver Ground                                        |      |
| 12  | <i>RD-</i>             | O   | CML   | Receive Data out Bar, AC coupled                       |      |
| 13  | <i>RD+</i>             | O   | CML   | Receive Data out, AC coupled                           |      |
| 14  | <i>VeeR</i>            |     |       | Receiver Ground                                        |      |
| 15  | <i>V<sub>CCR</sub></i> |     |       | Receiver Power Supply                                  |      |
| 16  | <i>V<sub>CCR</sub></i> |     |       | Transmitter Power Supply                               |      |
| 17  | <i>VeeT</i>            |     |       | Transmitter Ground                                     |      |
| 18  | <i>TD+</i>             | I   | CML   | Transmit Data in, AC coupled                           |      |
| 19  | <i>TD-</i>             | I   | CML   | Transmit Data in Bar, AC coupled                       |      |
| 20  | <i>VeeT</i>            |     |       | Transmitter Ground                                     |      |

Note (2):RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.