**SFP-2-5G-DW-C-80-AA-C**

Arris-Aurora® Compatible TAA Compliant 2.5GBase-DWDM 50GHz SFP Transceiver (SMF, Tunable, 80km, LC, DOM)

**Features:**

- SFF-8432 and SFF-8472 Compliance
- Duplex LC Connector
- Single-mode Fiber
- Commercial Temperature 0 to 70 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free



**Applications:**

- 1000Base Ethernet over DWDM

**Product Description**

This Arris-Aurora® SFP transceiver provides 2500Base-DWDM throughput up to 80km over single-mode fiber (SMF) using a tunable wavelength via an LC connector. It is guaranteed to be 100% compatible with the equivalent Arris-Aurora® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs' transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S. – made or designated country end products."

TAA COMPLIANT

**Rev. 071223**

**Tunable SFP+ Channel Number and Wavelength**

| Channel No. | Frequency (THz) | Center Wavelength (nm) | Channel No | Frequency (THz) | Center Wavelength (nm) |
|---|---|---|---|---|---|
| **1** | 191.35 | 1566.72 | **49** | 193.75 | 1547.32 |
| **2** | 191.40 | 1566.31 | **50** | 193.80 | 1546.92 |
| **3** | 191.45 | 1565.90 | **51** | 193.85 | 1546.52 |
| **4** | 191.50 | 1565.50 | **52** | 193.90 | 1546.12 |
| **5** | 191.55 | 1565.09 | **53** | 193.95 | 1545.72 |
| **6** | 191.60 | 1564.68 | **54** | 194.00 | 1545.32 |
| **7** | 191.65 | 1564.27 | **55** | 194.05 | 1544.92 |
| **8** | 191.70 | 1563.86 | **56** | 194.10 | 1544.53 |
| **9** | 191.75 | 1563.45 | **57** | 194.15 | 1544.13 |
| **10** | 191.80 | 1563.05 | **58** | 194.20 | 1543.73 |
| **11** | 191.85 | 1562.64 | **59** | 194.25 | 1543.33 |
| **12** | 191.90 | 1562.23 | **60** | 194.30 | 1542.94 |
| **13** | 191.95 | 1561.83 | **61** | 194.35 | 1542.54 |
| **14** | 192.00 | 1561.42 | **62** | 194.40 | 1542.14 |
| **15** | 192.05 | 1561.01 | **63** | 194.45 | 1541.75 |
| **16** | 192.10 | 1560.61 | **64** | 194.50 | 1541.35 |
| **17** | 192.15 | 1560.20 | **65** | 194.55 | 1540.95 |
| **18** | 192.20 | 1559.79 | **66** | 194.60 | 1540.56 |
| **19** | 192.25 | 1559.39 | **67** | 194.65 | 1540.16 |
| **20** | 192.30 | 1558.98 | **68** | 194.70 | 1539.77 |
| **21** | 192.35 | 1558.58 | **69** | 194.75 | 1539.37 |
| **22** | 192.40 | 1558.17 | **70** | 194.80 | 1538.98 |
| **23** | 192.45 | 1557.77 | **71** | 194.85 | 1538.58 |
| **24** | 192.50 | 1557.36 | **72** | 194.90 | 1538.19 |
| **25** | 192.55 | 1556.96 | **73** | 194.95 | 1537.79 |
| **26** | 192.60 | 1556.56 | **74** | 195.00 | 1537.40 |
| **27** | 192.65 | 1556.15 | **75** | 195.05 | 1537.00 |
| **28** | 192.70 | 1555.75 | **76** | 195.10 | 1536.61 |
| **29** | 192.75 | 1555.34 | **77** | 195.15 | 1536.22 |
| **30** | 192.80 | 1554.94 | **78** | 195.20 | 1535.82 |
| **31** | 192.85 | 1554.54 | **79** | 195.25 | 1535.43 |
| **32** | 192.90 | 1554.13 | **80** | 195.30 | 1535.04 |
| **33** | 192.95 | 1553.73 | **81** | 195.35 | 1534.64 |
| **34** | 193.00 | 1553.33 | **82** | 195.40 | 1534.25 |
| **35** | 193.05 | 1552.93 | **83** | 195.45 | 1533.86 |
| **36** | 193.10 | 1552.52 | **84** | 195.50 | 1533.47 |
| **37** | 193.15 | 1552.12 | **85** | 195.55 | 1533.07 |
| **38** | 193.20 | 1551.72 | **86** | 195.60 | 1532.68 |
| **39** | 193.25 | 1551.32 | **87** | 195.65 | 1532.29 |
| **40** | 193.30 | 1550.92 | **88** | 195.70 | 1531.90 |
| **41** | 193.35 | 1550.52 | **89** | 195.75 | 1531.51 |
| **42** | 193.40 | 1550.12 | **90** | 195.80 | 1531.12 |
| **43** | 193.45 | 1549.72 | **91** | 195.85 | 1530.72 |
| **44** | 193.50 | 1549.32 | **92** | 195.90 | 1530.33 |
| **45** | 193.55 | 1548.91 | **93** | 195.95 | 1529.94 |
| **46** | 193.60 | 1548.52 | **94** | 196.00 | 1529.55 |
| **47** | 193.65 | 1548.11 | **95** | 196.05 | 1529.16 |
| **48** | 193.70 | 1547.72 | **96** | 196.10 | 1528.77 |

**Absolute Maximum Ratings**

| Parameter | Symbol | Min. | Max. | Unit | Notes |
|---|---|---|---|---|---|
| **Maximum Supply Voltage** | VccT | 0 | +3.6 | V | +3.3V |
| **Optical Receiver Input** | $P_{IMAX}$ | | +5 | dBm | Average |
| **Operating Case Temperature** | Tc | 0 | 70 | °C | |
| **Storage Temperature** | $T_{STR}$ | -40 | 85 | °C | |
| **ESD SFI pins** | ESD1 | | 1 | kV | HBM |
| **ESD except for SFI pins** | ESD2 | | 2 | kV | HBM |

**Electrical Characteristics**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| **Supply Voltage** | Vcc | 3.135 | 3.300 | 3.465 | V | +3.3V |
| **Supply Current** | Icc3 | | | 0.54 | A | Note 1 |
| **Power Consumption** | $P_{DS}$ | | | 1.7 | W | Note 2 |
| **Low Speed Control Pin Logic Levels** | | | | | | |
| **Host Vcc Range** | Host_Vcc | 3.14 | | 3.47 | V | with ± 5% variation |
| **TX_Fault, RX_LOS** | $V_{OL}$ | 0.0 | | 0.4 | V | Note 3 |
| | $V_{OH}$ | Vcc-0.5 | | Vcc+0.3 | V | Note 3 |
| **TX_Disable** | VIL | -0.3 | | 0.8 | V | Pulled up with 10k ohms to VccT in the module |
| | VIH | 2.0 | | VccT +0.3 | V | |

**Notes:**

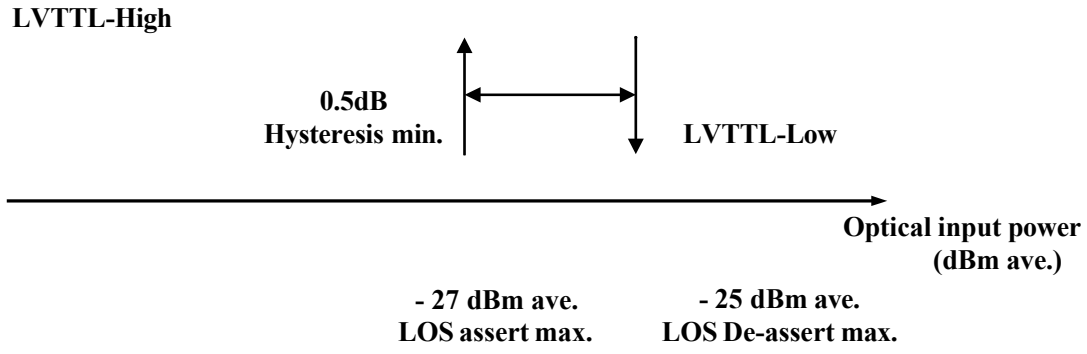
1. < 0.64 A Tc<25degC
2. <2.0 W Tc<25degC
3. Rpullup (Rp) is the pull up resistor. Active bus termination may be used by the host in place of a pullup resistor. Pull ups can be connected to multiple power supplies, however the host board design shall ensure that no module pin has voltage exceeding module. Measures at the Host side of the connector.

## Optical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| **Transmitter** | | | | | | |
| **Data Rate** | | 9.95 | | 11.3 | Gbps | NRZ |
| **Frequency range** | | 191.35 | | 196.10 | THz | 50GHz grid, 96 channels |
| **Frequency accuracy** | | -2.5 | | +2.5 | GHz | EOL |
| **Optical transmit power** | Po | -1.0 | | +3.0 | dBm | EOL |
| **Shuttered output power** | | | | -35 | dBm | |
| **Optical power stability** | ΔPo | -1.0 | | +1.0 | dB | All channels, SOL |
| **Side mode suppression** | SMSR | 35 | | | dB | ±2.5nm, modulated |
| **Spectral width** | Δλ | | 0.3 | 0.5 | nm | -20dB, modulated |
| **Extinction ratio** | ER | 9.0 | | | dB | Filtered, 10.709Gb/s |
| **Eye diagram compliance** | | GR-253, ITU-T G.691 | | | | |
| **Mask margin** | | 10 | | | % | |
| **Tuning speed** | | | | 10 | s | warmed-up, from any CH to any other CH |
| **Receiver** | | | | | | |
| **Data Rate** | | 9.95 | | 11.3 | Gbps | NRZ |
| **Input operating wavelength** | | 1525 | | 1575 | nm | |
| **Minimum Receiver Sensitivity (Back to Back)** | Prmin | | | -24 | dBm | 10.709Gb/s, 1E-12, OSNR>35dB |
| **Minimum receiver sensitivity (-300~+1400ps/nm)** | Prmin | 0 | | -21 | dBm | |
| **Maximum input power (overload)** | Pro | -7 | | | dBm | |
| **Receiver Reflectance** | RL | | | -27 | dB | |
| **LOS Assert** | | | | -27 | dBm | Note 1 |
| **LOS De-Assert** | | | | -25 | dBm | Note 1 |
| **LOS Hysteresis** | | 0.5 | | 4.0 | dB | Note 1 |
| **LOS Assert Time** | | | | 100 | us | |
| **LOS De-Assert Time** | | | | 100 | us | |

**Notes:**

1.

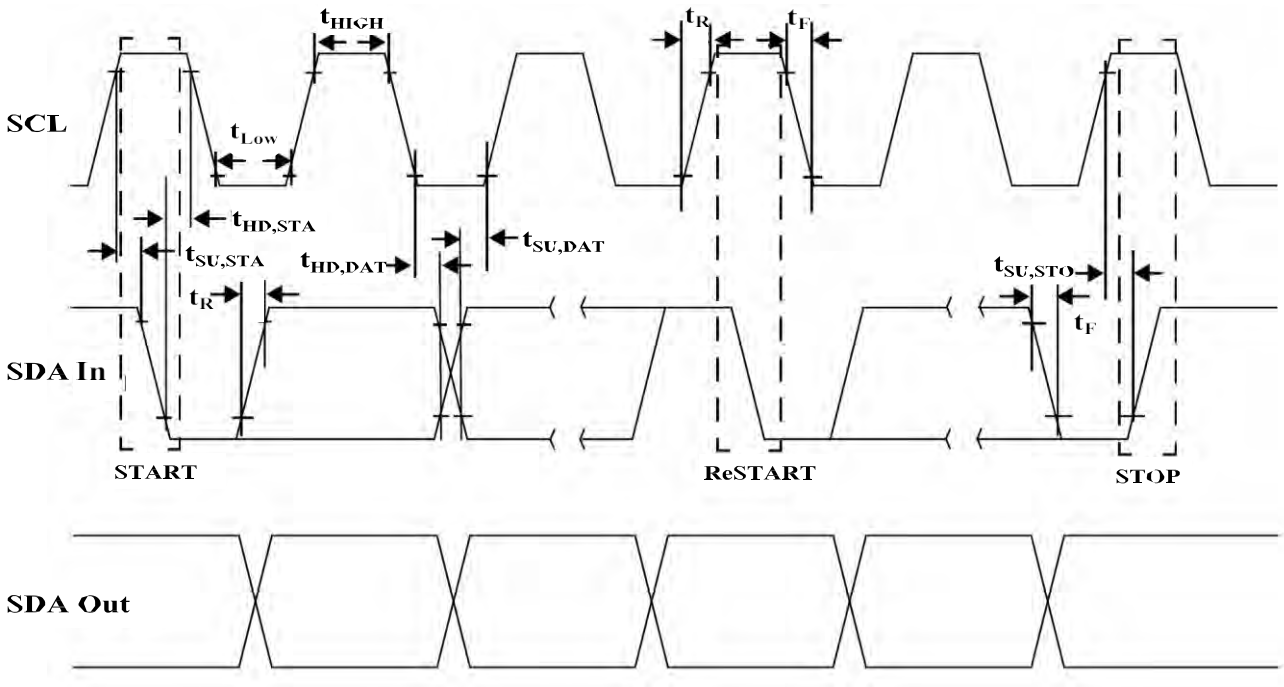


**SFP+ 2 Wire Interface Timing Requirements**

| Parameter | Symbol | Min | Max | Unit | Conditions |
|---|---|---|---|---|---|
| **Clock Frequency** | fSCL | 100 | 400 | kHz | |
| **Clock Pulse Width Low** | tLOW | 1.3 | | µs | |
| **Clock Pulse Width High** | tHIGH | 0.6 | | µs | |
| **Time bus free before new transaction can start** | tBUF | 20 | | µs | Between STOP and START |
| **START Hold time** | tHD,STA | 0.6 | | µs | |
| **START Set-Up time** | tSU,STA | 0.6 | | µs | |
| **Data in Hold time** | tHD,DAT | 0 | | µs | |
| **Data in Set-Up time** | tSU,DAT | 0.1 | | µs | |
| **Input Rise time (100 kHz)** | tR,100 | | 1000 | ns | Note 1 |
| **Input Rise time (400 kHz)** | tR,400 | | 300 | ns | Note 1 |
| **Input Fall time (100 kHz)** | tF,100 | | 300 | ns | Note 1 |
| **Input Fall time (400 kHz)** | tF,400 | | 300 | ns | Note 1 |
| **STOP Set-Up time** | tSU,STO | 0.6 | | µs | |
| **Serial Interface Clock Holdoff "Clock Stretching"** | T_clock_hold | | 500 | µs | Maximum time the SFP+ may hold the SCL line low before continuing R or W operation |
| **Complete Single or Sequential Write** | tWR | | 40 | ms | Complete (up to) 8 Byte Write |
| **Endurance (Write Cycles)** | | 10 k | | Cycles | @ Max Operating Temperature |

**Notes:**

1. From (VIL, MAX -0.15) to (VIH, MIN +0.15)



**SFP+ Timing Requirements**

| Parameter | Symbol | Min | Max | Unit | Conditions |
|---|---|---|---|---|---|
| **Tx_Disable assert time** | t_off | | 100 | µs | Rising edge of TX_Disable to fall of output signal below 10% of nominal. |
| **TX_Disable negate time** | T_on | | 2 | ms | Falling edge of TX Disable to rise output sognal above 90% of nominal. This only applies in normal operation, not during start up or fault recovery. |
| **Time to initialize 2-wire interface** | t_2w_start_up | | 300 | ms | From power on or hot plug after the supply meeting |
| **Time to initialize cooled module and time to power up a cooled module to Power Level II** | t_start_up_ cooled | | 90 | sec | From power supplies meeting or hot plug, or Tx disable negated during power up or Tx_Fault recovery, until cooled power level II part during fault recovery is fully operational. Also, from stop bit-low-to-high SDA transition enabling Power Level II until cooled module is fully operational. |
| **Tx_Fault assert for cooled module** | Tx_fault_on_ cooled | | 1 | ms | From occurrence of fault to assertion of TX_Fault |
| **Tx_Fault Reset** | t_reset | 10 | | µs | Time TX_disable must be held high to reset TX_Fault |
| **RX_LOS assert delay** | t_los_on | | 100 | µs | From occurrence of loss of signal to assertion of RX_LOS |
| **Rx_LOS negate delay** | t_los_off | | 100 | µs | From occurrence of presence of signal to negation of RX_LOS. |
| **Maximum Current Ramp on Power Supply** | | | | | |
| **Icc instantaneous peak current** | | | 600 | mA | Note 1,2 |
| **Icc sustained peak current** | | | 500 | mA | Note 1,2 |

**Notes:**

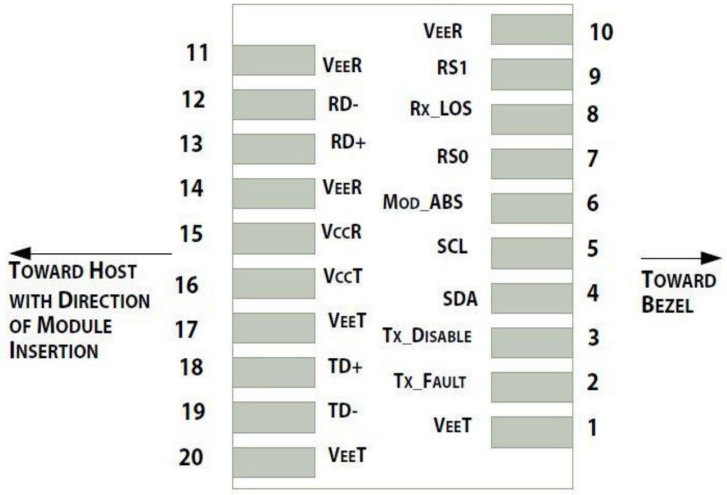
1. The maximum currents are the allowed currents for each power supply VccT or VccR, therefore the total module peak currents can be twice this value. The instantaneous peak current is allowed to exceed to specified maximum current capacity of the connector contact for a short period.
2. Not to exceed the sustained peak limit for the more than 50 µs; may exceed this limit for shorter durations.

**Pin Descriptions**

| Pin | Logic | Symbol | Power Sequence Order | Name/Descriptions | Ref. |
|---|---|---|---|---|---|
| **1** | | VeeT | 1 | Module Transmitter Ground | 1 |
| **2** | LVTTL-O | TX_Fault | 3 | Module Transmitter Fault | 2 |
| **3** | LVTTL-I | TX_Disable | 3 | Transmitter Disable; Turn off laser output | 3 |
| **4** | LVTTL-I/O | SDA | 3 | 2-Wire Serial Interface Data Line | |
| **5** | LVTTL-I/O | SCL | 3 | 2-Wire Serial Interface Clock | |
| **6** | | Mod_Abs | 3 | Module Absent, connected to VeeT or VeeR in the module | 4 |
| **7** | LVTTL-I | RS0 | 3 | NA. 30kohm pull down inside the module | |
| **8** | LVTTL-O | RX_LOS | 3 | Receiver Loss of Signal Indicator | 2 |
| **9** | LVTTL-I | RS1 | 3 | NA. 30kohm pull down inside the module | |
| **10** | | VeeR | 1 | Module Receiver Ground | 1 |
| **11** | | VeeR | 1 | Module Receiver Ground | 1 |
| **12** | CML-O | RD- | 3 | Receiver Inverted Data Output(SFI) | |
| **13** | CML-O | RD+ | 3 | Receiver Non-Inverted Data Output(SFI) | |
| **14** | | VeeR | 1 | Module Receiver Ground | 1 |
| **15** | | VccR | 2 | Module Receiver 3.3V Supply | 5 |
| **16** | | VccT | 2 | Module Transmitter 3.3V Supply | 5 |
| **17** | | VeeT | 1 | Module Transmitter Ground | 1 |
| **18** | CML-I | TD+ | 3 | Transmitter Non-Inverted Data Output(SFI) | |
| **19** | CML-I | TD- | 3 | Transmitter Inverted Data Output(SFI) | |
| **20** | | VeeT | 1 | Module Transmitter Ground | 1 |

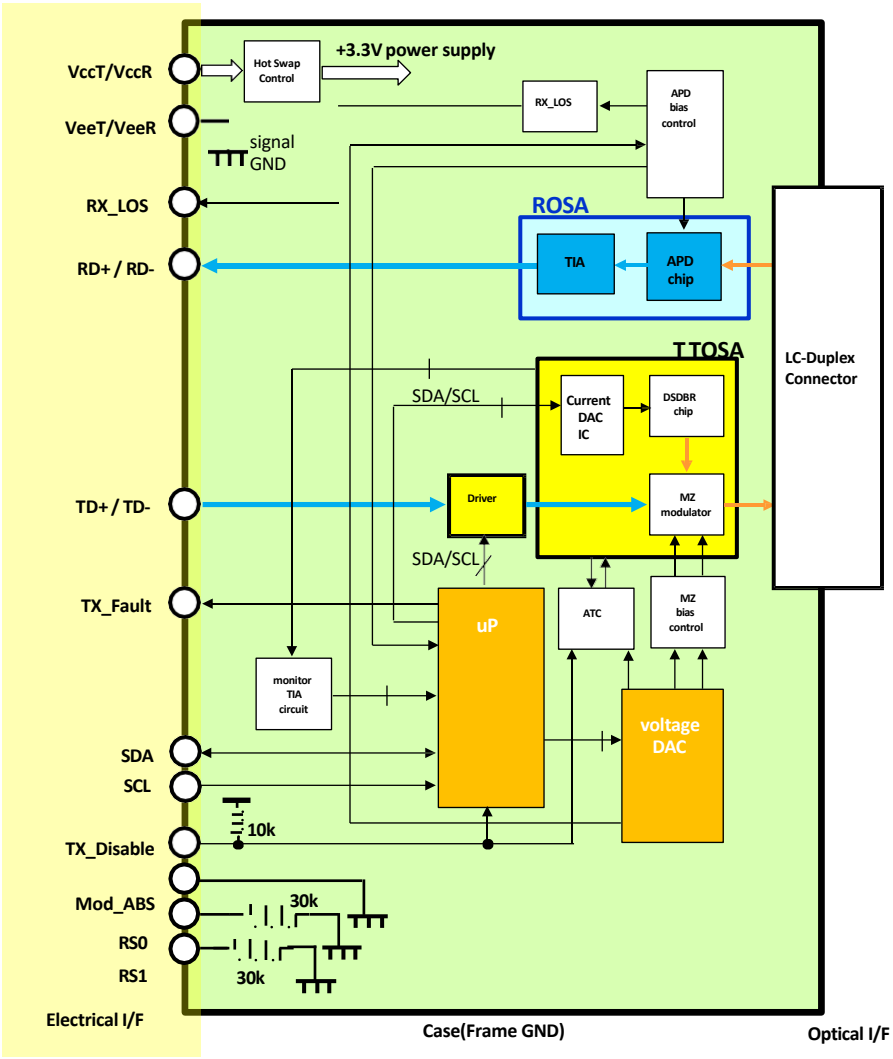
**Notes:**

1. The module signal ground pins, VeeR and Veet, are isolated from the module case.
2. This pin is an open drain output pib and shall be pulled up with a 4.7k-10kohms to Host_Vcc on the host board. Pull ups can be connected to multiple power supplies, however the host board design shall ensure that no module pin has voltage exceeding module VccT/R + 0.5V.
3. This pin is an input pin with 10kohms pull up to VccT in the module.
4. This pin shall be pulled up with 4.7k-10kohhms to Host_Vcc on the host board.
5. Vcct and VccR are tied together inside the module.



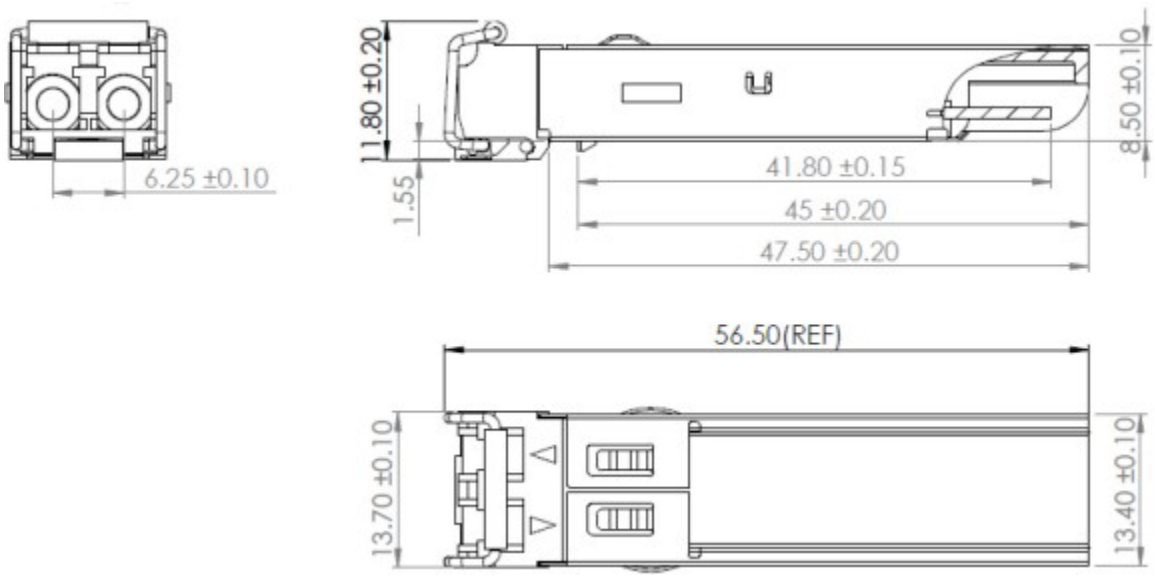

Pin-out of connector Block on Host board

**Recommended Circuit Schematic**



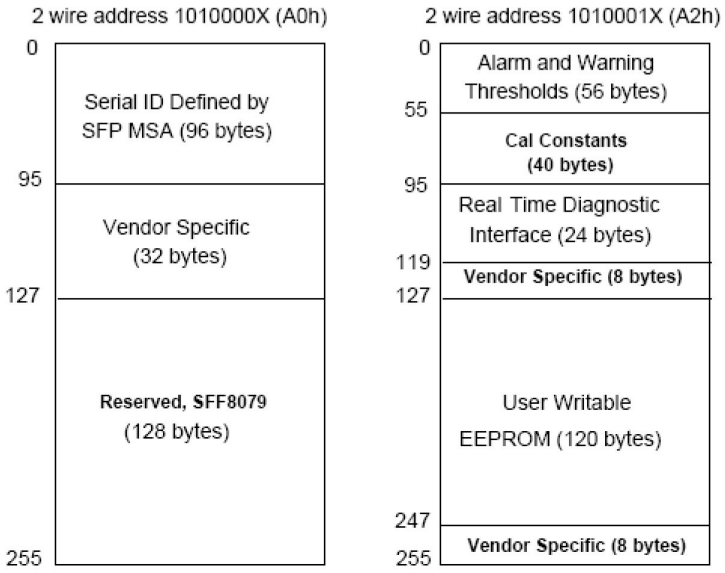
**Mechanical Specifications**

Small Form Factor Pluggable (SFP) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA).




**EEPROM Information**

EEPROM memory map specific data field description is as below:



**About ProLabs**

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

**Complete Portfolio of Network Solutions**

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

**Trusted Partner**

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.




**Contact Information**

ProLabs US

Email: sales@prolabs.com
Telephone: 952-852-0252

ProLabs UK

Email: salessupport@prolabs.com
Telephone: +44 1285 719 600