

X2-10GB-SR-PRO

Cisco® X2-10GB-SR Compatible TAA Compliant 10GBase-SR X2 Transceiver (MMF, 850nm, 300m, DOM, 0 to 70C, SC)

Features

- X2 MSA 2.0 Compliance
- Duplex SC Connector
- Commercial Temperature 0 to 70 Celsius
- Multi-mode Fiber
- Hot Pluggable
- Excellent ESD Protection
- Metal with Lower EMI
- RoHS Compliant and Lead Free



Applications:

- 10GBase-SR Ethernet
- 8x/10x Fibre Channel
- Access, Datacenter and Enterprise
- Mobile Fronthaul CPRI/OBSAI

Product Description

This Cisco® X2-10GB-SR compatible X2 transceiver provides 10GBase-SR throughput up to 300m over multi-mode fiber (MMF) using a wavelength of 850nm via a SC connector. It is guaranteed to be 100% compatible with the equivalent Cisco® 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.

Proline's 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.



Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|-----------------------------|-------------------|------|------|------|------|
| Storage Ambient Temperature | T _S | -40 | | 85 | °C |
| Supply Voltage (3.3V) | V ₃ | 0 | | 4 | V |
| Supply Voltage (APS) | V _{APS} | 0 | | 1.5 | V |
| Optical Receiver Input | P _{IMAX} | | | 1 | dBm |

General Specifications

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|----------------------------|--------------------|-------|---------|-------------------|------|
| Data Rate | DR | | 10.3125 | | GBd |
| Bit Error Rate | BER | | | 10 ⁻¹² | |
| Total Power Consumption | P | | | 2.2 | W |
| Supply Voltage (+3.3V) | V _{CC3} | 3.14 | 3.3 | 3.47 | V |
| Supply Voltage (APS) | V _{CCAPS} | 1.152 | 1.2 | 1.248 | V |
| Supply Current (+3.3V) | I _{CC3} | | | 300 | mA |
| Supply Current (APS) | I _{CCAPS} | | | 1000 | mA |
| Case Operating Temperature | T _C | 0 | | 70 | °C |

Link Distance

| Parameter | Fiber Type | Modal Bandwidth@ 850nm (MHz-km) | Distance Range (m) |
|-----------|----------------|---------------------------------|--------------------|
| 10.3 GBd | 62.5/125μm MMF | 160 | 2-26 |
| | 62.5/125μm MMF | 200 | 2-33 |
| | 50/125μm MMF | 400 | 2-66 |
| | 50/125μm MMF | 500 | 2-82 |
| | 50/125μm MMF | 2000 | 2-300 |

Electrical Characteristics - DC

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|--|-----------------|------|------|------|-----------|---------------------|
| A. 1.2V COMS I/O DC Characteristics (PRTAD; LASI; RESET; TX_ON/OFF) | | | | | | |
| External Pull-Up Resistor for Open Drain | R_{PU} | 10 | | 22 | $K\Omega$ | |
| Output High Voltage | V_{OH} | 1 | | | V | |
| Output Low Voltage | V_{OL} | | | 0.15 | V | |
| Input High Voltage | V_{IH} | 0.84 | | 1.2 | V | |
| Input Low Voltage | V_{IL} | | | 0.36 | V | |
| Input Pull-Down Current | IPD | 20 | 120 | 120 | μA | $V_{IN}=1.2V$ |
| B. XAUI I/O DC Characteristics (TXLAN[0..3]; RXLANE[0..3]) | | | | | | |
| Differential Input Amplitude (pk-pk) | V_{IN_XAUI} | 200 | | 1600 | mV | AC Coupled |
| Differential output Amplitude (pk-pk) | V_{OUT_XAUI} | 800 | | 1600 | mV | AC Coupled |
| C. MDIO I/O DC Characteristics (MDIO; MDC) | | | | | | |
| Output Low Voltage | V_{OL} | | | 0.2 | V | $I_{OL} = 100\mu A$ |
| Output Low Current | I_{OL} | | | 4 | mA | |
| Input High Voltage | V_{IH} | 0.84 | | 1.2 | V | |
| Input Low Voltage | V_{IL} | | | 0.36 | V | |
| Pull-Up Supply Voltage | V_{PU} | | 1.2 | | V | |
| Input Capacitance | C_{IN} | | | 10 | pF | |
| Load Capacitance | C_{LOAD} | | | 470 | pF | |
| External Pull-Up Resistance | RPU | 200 | | | Ω | |

Electrical Characteristics - AC

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes | |
|---|------------------------|---------------------------|-------|------|------------------|---|--|
| A. XAUI Input AC Characteristics (TXLANE[0..3]) | | | | | | | |
| Baud Rate | BR _{XAUI_IN} | | 3.125 | | GBd | | |
| Baud Rate Tolerance | BR _{TOL_XAUI} | -100 | | 100 | ppm | | |
| Differential Input Impedance | Z _{IN_XAUI} | | 100 | | Ω | | |
| Differential Return Loss | RL _{IN} | 10 | | | dB | 100MHz to 2.5 GHz | |
| Input Differential Skew | T _{IN_SKEW} | | | 75 | ps | Crossing Point | |
| Jitter Amplitude Tolerance | J _{XAUI_TOL} | | | 0.65 | UI _{PP} | IEEE 802.3ae | |
| B. XAUI Output AC Characteristics (RXLANE[0..3]) | | | | | | | |
| Baud Rate | BR _{XAUI_OUT} | | 3.125 | | GBd | | |
| Baud Rate Variation | BR _{XAUI_VAR} | -100 | | 100 | ppm | | |
| XAUI Eye Mask (far-end) | | According to IEEE 802.3ae | | | | | |
| Output Differential Skew | T _{OUT_SKEW} | | | 15 | ps | | |
| Output Differential Impedance | Z _{OUT_XAUI} | | 100 | | Ω | DC | |
| Differential Output Return Loss | RL _{OUT} | 10 | | | dB | 100 MHz to 2.5 GHz | |
| Total Jitter | TJ _{XAUI} | | | 0.35 | UI | Near-end No pre-equalization 1 UI=320 ps | |
| Deterministic Jitter | DJ _{XAUI} | | | 0.17 | UI | | |
| C. Power-On Reset Characteristics | | | | | | | |
| Power-On Reset and TX_ONOFF Characteristics | | According to X2 MSA Issue | | | | | |
| D. MDIO I/O AC Characteristics (MDIO; MDC) | | | | | | | |
| MDIO Data Hold Time | T _{HOLD} | 10 | | | ns | | |
| MDIO Data Setup Time | T _{SU} | 10 | | | ns | | |
| Delay from MDC Rising Edge to MDIO Data Change | T _{DELAY} | | | 300 | ns | | |
| MDC Clock Rate | f _{MAX} | | | 2.5 | MHz | | |

Optical Characteristics

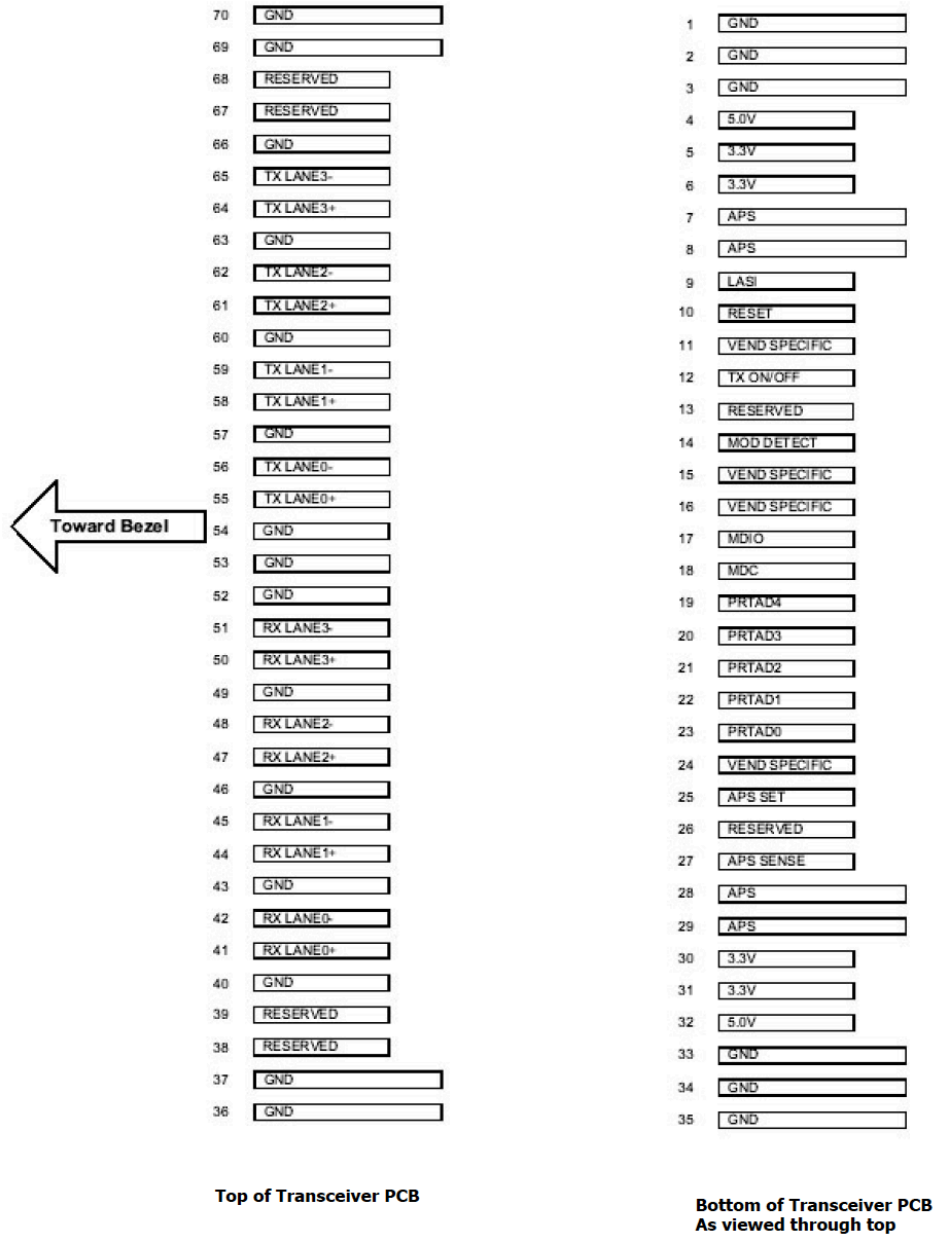
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|--|------------------|---|------|-------|---------|-------|
| Transmitter | | | | | | |
| Optical Wavelength | λ | 840 | 850 | 860 | nm | |
| Launch Power | P_{OUT} | -7.3 | | -1.3 | dBm | |
| Launch Power in OMA | P_{OUT_OMA} | -4.3 | | -2.8 | dBm | |
| Launch Power of OFF Transmitter | P_{OUT_OFF} | | | -30 | dBm | |
| Side Mode Suppression Ratio | SMSR | 30 | | | dB | |
| Spectral Width (RMS) | $\Delta \lambda$ | | | 0.45 | nm | |
| Optical Extinction Ratio | ER | 3 | | | dB | |
| Optical Modulation amplitude | OMA | 525 | | | μ W | |
| Optical Return Loss Tolerance | ORL_T | | | 12 | dB | |
| Relative Intensity Noise | RIN | | | -128 | dB/Hz | |
| Transmitter Dispersion Penalty | TDP | | | 3.9 | dB | |
| Eye Mask Definition | | According to IEE 802.3ae and 10Gbase-SR | | | | |
| Receiver | | | | | | |
| Center Wavelength Range | λ_C | 840 | | 860 | nm | |
| Optical Input Power | P_{IN} | -9.9 | | -1 | dBm | |
| Receiver Sensitivity in OMA | P_{IN_OMA} | | | -11.1 | dBm | |
| Stressed Receiver Sensitivity | P_{IN_S} | | | -7.5 | dBm | |
| Receiver Reflectance | TR_{RX} | | | -12 | dB | |
| Receiver electrical 3dB upper cutoff frequency | FR | | | 12.3 | GHz | |

Pin Descriptions

| Pin# | Symbol | I/O | Logic | Description | Pin# |
|------|---------------|-----|------------|---|------|
| 1 | GND | I | Supply | Electrical ground | 1 |
| 2 | GND | I | Supply | Electrical ground | 2 |
| 3 | GND | I | Supply | Electrical ground | 3 |
| 4 | 5.0V | I | Supply | Power | 4 |
| 5 | 3.3V | I | Supply | Power | 5 |
| 6 | 3.3V | I | Supply | Power | 6 |
| 7 | APS | I | Supply | Adaptive Power Supply | 7 |
| 8 | APS | I | Supply | Adaptive Power Supply | 8 |
| 9 | LASI | O | Open Drain | Link Alarm Status Interrupt. 10-22k ohm pull up on host | 9 |
| 10 | REST | I | 1.2V CMOS | TX OFF when MDIO RESET | 10 |
| 11 | VEND SPECIFIC | | | Vendor Specific Pin. Leave unconnected | 11 |
| 12 | TX ON/OFF | I | 1.2V CMOS | Transmitter ON/OFF | 12 |
| 13 | Reserved | | | Reserved | 13 |
| 14 | MOD DETECT | O | | Pulled low inside module through 1k ohm | 14 |
| 15 | VEND SPECIFIC | | | Vendor Specific Pin. Leave unconnected | 15 |
| 16 | VEND SPECIFIC | | | Vender Specific Pin. Leave unconnected | 16 |
| 17 | MDIO | I/O | Open Drain | Management Data IO | 17 |
| 18 | MDC | I | 1.2V CMOS | Management data clock | 18 |
| 19 | PRTAD4 | I | 1.2V CMOS | Port Address bit 4 (Low=0) | 19 |
| 20 | PRTAD3 | I | 1.2V CMOS | Port Address bit 3 (Low=0) | 20 |
| 21 | PRTAD2 | I | 1.2V CMOS | Port Address bit 2 (Low=0) | 21 |
| 22 | PRTAD1 | I | 1.2V CMOS | Port Address bit 1 (Low=0) | 22 |
| 23 | PRTAD0 | I | 1.2V CMOS | Port Address bit 0 (Low=0) | 23 |
| 24 | VEND SPECIFIC | | | Vendor Specific Pin. Leave unconnected | 24 |
| 25 | APS SET | O | | Feedback output for APS | 25 |
| 26 | RESERVED | | | Reserved for Avalanche Photodiode use | 26 |
| 27 | APS SENSE | O | Analog | APS Sense Connection | 27 |
| 28 | APS | I | Supply | Adaptive Power Supply | 28 |
| 29 | APS | I | Supply | Adaptive Power Supply | 29 |
| 30 | 3.3V | I | Supply | Power | 30 |
| 31 | 3.3V | I | Supply | Power | 31 |
| 32 | 5.0V | | Supply | Power | 32 |
| 33 | GND | I | Supply | Electrical Ground | 33 |
| 34 | GND | I | Supply | Electrical Ground | 34 |
| 35 | GND | I | Supply | Electrical Ground | 35 |
| 36 | GND | I | Supply | Electrical Ground | 36 |
| 37 | GND | I | Supply | Electrical Ground | 37 |
| 38 | RESERVED | | | Reserved | 38 |

| | | | | | |
|----|------------|---|--------|----------------------------|----|
| 39 | RESERVED | | | Reserved | 39 |
| 40 | GND | I | Supply | Electrical ground | 40 |
| 41 | RX LANE 0+ | O | AC | Module XAUI Output Lane 0+ | 41 |
| 42 | RX LANE 0- | O | AC | Module XAUI Output Lane 0- | 42 |
| 43 | GND | I | Supply | Electrical ground | 43 |
| 44 | RX LANE 1+ | O | AC | Module XAUI Output Lane 1+ | 44 |
| 45 | RX LANE 1- | O | AC | Module XAUI Output Lane 1- | 45 |
| 46 | GND | I | Supply | Electrical ground | 46 |
| 47 | RX LANE 2+ | O | AC | Module XAUI Output Lane 2+ | 47 |
| 48 | RX LANE 2- | O | AC | Module XAUI Output Lane 2- | 48 |
| 49 | GND | I | Supply | Electrical ground | 49 |
| 50 | RX LANE 3+ | O | AC | Module XAUI Output Lane 3+ | 50 |
| 51 | RX LANE 3- | O | AC | Module XAUI Output Lane 3- | 51 |
| 52 | GND | I | Supply | Electrical ground | 52 |
| 53 | GND | I | Supply | Electrical ground | 53 |
| 54 | GND | I | Supply | Electrical ground | 54 |
| 55 | TX LANE 0+ | O | AC | Module XAUI Input Lane 0+ | 55 |
| 56 | TX LANE 0- | O | AC | Module XAUI Input Lane 0- | 56 |
| 57 | GND | I | Supply | Electrical ground | 57 |
| 58 | TX LANE 1+ | O | AC | Module XAUI Input Lane 1+ | 58 |
| 59 | TX LANE 1- | O | AC | Module XAUI Input Lane 1- | 59 |
| 60 | GND | I | Supply | Electrical ground | 60 |
| 61 | TX LANE 2+ | O | AC | Module XAUI Input Lane 2+ | 61 |
| 62 | TX LANE 2- | O | AC | Module XAUI Input Lane 2- | 62 |
| 63 | GND | I | Supply | Electrical ground | 63 |
| 64 | TX LANE 3+ | O | AC | Module XAUI Input Lane 3+ | 64 |
| 65 | TX LANE 3- | O | AC | Module XAUI Input Lane 3- | 65 |
| 66 | GND | I | Supply | Electrical ground | 66 |
| 67 | RESERVED | | | Reserved | 67 |
| 68 | RESERVED | | | Reserved | 68 |
| 69 | GND | I | Supply | Electrical Ground | 69 |
| 70 | GND | I | Supply | Electrical Ground | 70 |

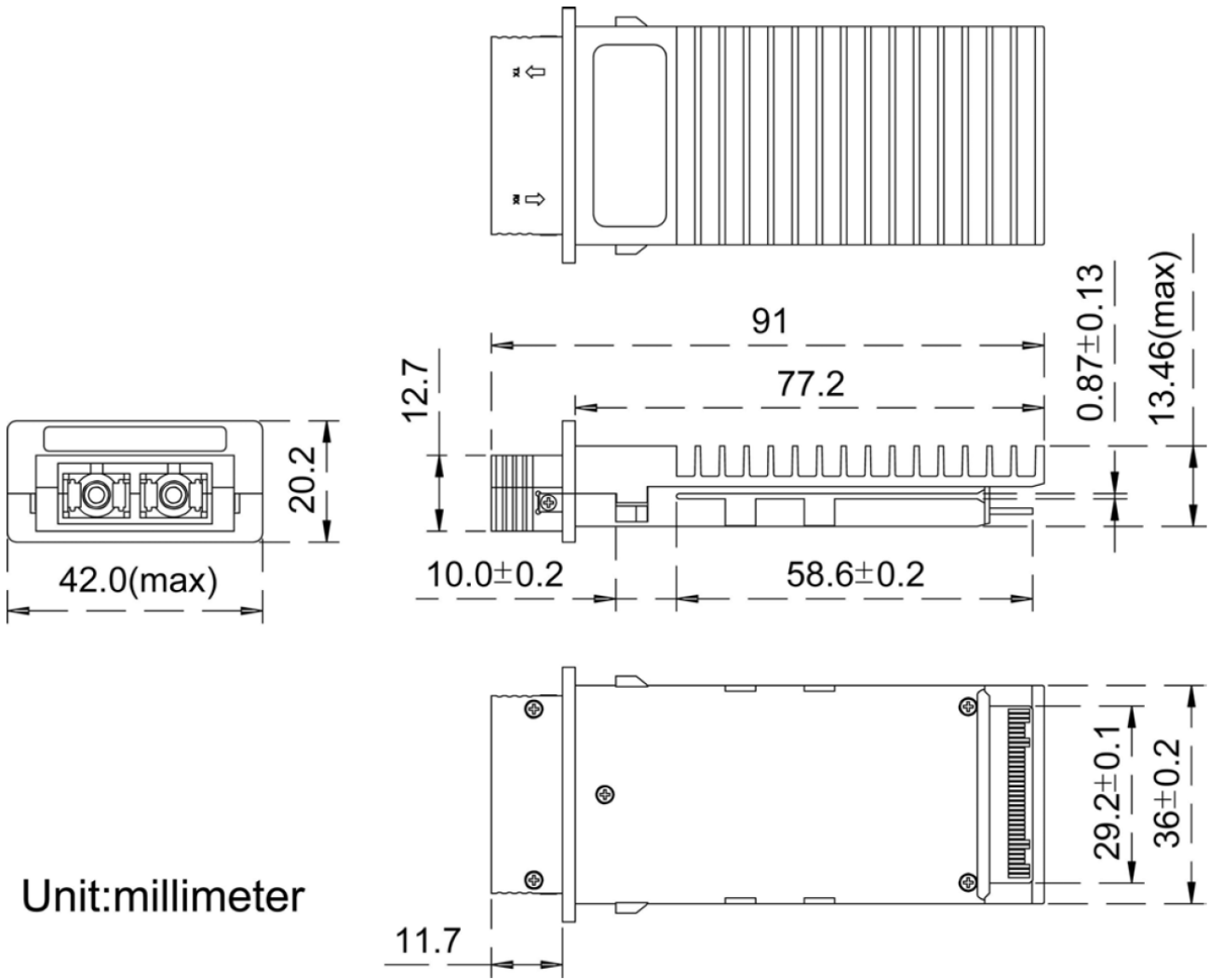
Electrical Pad Layout



Digital Diagnostic

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---------------------|------------------|------|------|------|------|-------|
| Temperature Monitor | T _{MON} | -5 | | 5 | °C | |
| Laser Bias Monitor | I _{MON} | -10 | | 10 | % | |
| TX Power Monitor | P _{TX} | -3 | | 3 | dBm | |
| RX Power Monitor | P _{RX} | -3 | | 3 | dBm | |

Mechanical Specifications



Unit: millimeter

About Us:

Proline Options is one of North America's leading providers of transceivers and high speed cabling. With a reputation for quality, tested products that cover the connectivity spectrum, Proline Options has a solution for you regardless of the specification.

At Proline Options, every product is tested in its intended application - never batch or spec tested only. We run bandwidth, distance and IOS network tests. We have documented an impressive 0.03% failure rate over the last 10 years. To continue this rate of success we invest millions annually in our own on-site testing lab.



Tel: 855.933.3223

Email: sales@prolineoptions.com

Email: techsupport@prolineoptions.com

Web: <https://www.prolineoptions.com>