



Overview:

10GSFP+ SR300 Small Form Factor Pluggable SFP+ transceivers are compliant with the current SFP+ Multi-Source Agreement (MSA) Specification. The high performance uncooled 850nm VCSEL transmitter and high sensitivity PIN receiver provide superior performance for 10GBase-SR Ethernet applications up to 300m optical links.

Applications:

- 10GBase-SR Ethernet
- High speed I/O for file server
- Mass storage system I/O
- Bus extension application

Features:

- Compliant with IEEE802.3ae 10GBase-SR Ethernet Standard
- Compliant with SFF8472 diagnostic monitoring interface
- Compliant with SFP+ MSA
- Hot Pluggable
- 850nm VCSEL laser transmitter
- Duplex LC connector
- 2-wire interface for management and diagnostic monitor
- Single +3.3V power supply voltages
- Transmission distance of 300m over multi-mode OM3 fiber
- RoHS Compliant Part

Absolute Maximum Ratings :

| Parameters | Symbol | Min. | Max. | Unit |
|---------------------------|-----------------|------|------|------|
| Storage Temperature | T _{ST} | -40 | +85 | °C |
| Supply Voltage | V _{CC} | -0.5 | +4.0 | V |
| Storage Relative Humidity | RH | 5 | 95 | % |



10G SFP+ SR Transceiver
Hot Pluggable, Duplex LC, 850nm VCSEL, Multi-mode,
300M, DDM

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Recommended Operating Conditions :

| Parameters | Symbol | Min. | Typ. | Max. | Unit |
|---|-----------------|------|------|------|------|
| Case Operating Temperature (normal) | T _{OP} | 0 | - | +70 | °C |
| Case Operating Temperature (industrial) | T _{OP} | -40 | - | +85 | °C |
| Supply Voltage | V _{CC} | +3.1 | +3.3 | +3.5 | V |
| Supply Current | I _{CC} | | 180 | 250 | mA |

Transmitter Electro-optical Characteristics :

V_{CC}= 3.1V to 3.5V, T_{OP} = 0 °C to 70 °C(normal); T_{OP} = -40 °C to 85 °C(industrial)

| Parameters | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|--------------------------------|-------------|---------|-------------------|-------|------|
| Operating Data Rate | DR | 9.953 | 10.3125 | 11.3 | Gb/s | |
| Bit Error Rate | BER | | | 10 ⁻¹² | | |
| Optical Launch Power | P _o | -6.5 | | -1 | dBm | 1 |
| Optical Launch Power (OMA) | P _{o-OMA} | -4.3 | | -2.8 | dBm | 1 |
| Center Wavelength | λ | 840 | 850 | 860 | nm | |
| Spectral Width (RMS) | Δλ | 0.05 | | 0.45 | nm | |
| Optical Extinction Ratio | ER | 3.5 | | | dB | |
| Average Launch power of OFF Transmitter | P _{OFF} | | | -30 | dBm | |
| Optical Eye Mask | | IEEE802.3ae | | | | |
| Relative Intensity Noise | RIN | | | -128 | dB/Hz | |
| Differential Data Input Swing | V _{IN} | 180 | | 850 | mV | |
| TX Disable Input Voltage-Low (TX ON) | TDISV _L | GND | | 0.5 | V | |
| TX Disable Input Voltage-High (TX OFF) | TDISV _H | 2.0 | | V _{CC} | V | |
| TX Fault Output Voltage-Low (TX Normal) | TFLT _V _L | GND | | 0.8 | V | |
| TX Fault Output Voltage-High (TX Fault) | TFLT _V _H | 2.0 | | V _{CC} | V | |

Note1: The optical power is launched into a 50/125μm multi-mode fiber



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Receiver Electro-optical Characteristics :

$V_{CC} = 3.1V$ to $3.5V$, $T_{OP} = 0\text{ }^{\circ}C$ to $70\text{ }^{\circ}C$ (normal); $T_{OP} = -40\text{ }^{\circ}C$ to $85\text{ }^{\circ}C$ (industrial)

| Parameters | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---------------------|-------|---------|-----------------|------|------|
| Operating Data Rate | DR | 9.953 | 10.3125 | 11.3 | Gb/s | |
| Receiver Sensitivity | P _{IN_min} | | | -9.9 | dBm | 1 |
| Receiver Sensitivity (OMA) | P _{IN_OMA} | | | -11.1 | dBm | 1 |
| Maximum Input Power | P _{IN_max} | | | -1 | dBm | 1 |
| Optical Center Wavelength | λ_C | 840 | 850 | 860 | nm | |
| Receiver Reflectance | RR | | | -12 | dB | |
| LOS De-Assert | LOS _D | | | -13 | dBm | |
| LOS Assert | LOS _A | -30 | | | dBm | |
| LOS Hysteresis | LOS _{HY} | 0.5 | | | dB | |
| Differential Data Output Swing | V _{OUT} | 300 | | 900 | mV | |
| Data Output Rise/Fall Time (20%~80%) | Tr/Tf | | | 30 | ps | |
| Receiver LOS Signal Output Voltage-Low | LOS _{V_L} | GND | | 0.5 | V | |
| Receiver LOS Signal Output Voltage-High | LOS _{V_H} | 2.4 | | V _{CC} | V | |

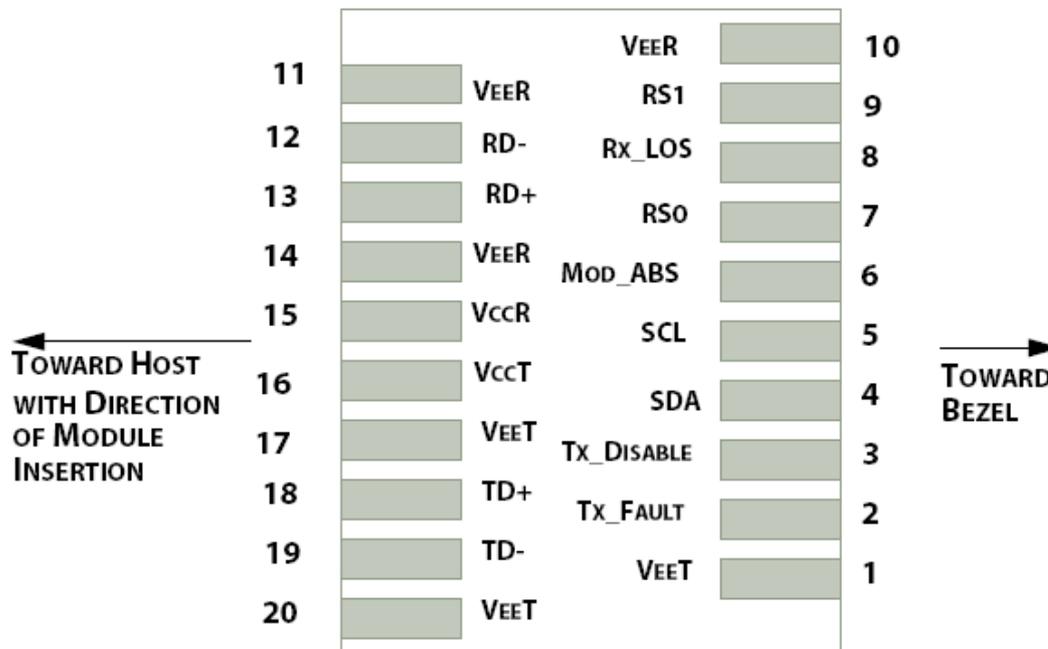
Note1: Measured with a PRBS 2³¹-1 test pattern @10.3125Gbps BER<10⁻¹²



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Pin Assignment :



Host PCB SFP+ pad assignment top view

Pin Description :

| Pin | Name | Function / Description |
|-----|------------|---|
| 1 | VeeT | Transmitter Ground |
| 2 | TX_Fault | Transmitter Fault Indication (1) |
| 3 | TX_Disable | Transmitter Disable – Turns off transmitter laser output (2) |
| 4 | SDA | 2-wire Serial Interface Data Line (SDA: Serial Data Signal) (3) |
| 5 | SCL | 2-wire Serial Interface Clock (SCL: Serial Clock Signal) (3) |
| 6 | Mod_ABS | Module Absent, connected to VeeT or VeeR in the module (3) |
| 7 | RS0 | Rate Select 0, optionally controls SFP+ module receiver (5) |
| 8 | Rx_LOS | Receiver Loss of Signal Indication (4) |
| 9 | RS1 | Rate Select 1, optionally controls SFP+ module transmitter (5) |
| 10 | VeeR | Receiver Ground |
| 11 | VeeR | Receiver Ground |
| 12 | RD- | Receiver Inverted Data output, Differential LVPECL, AC coupled |



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| | | |
|----|------|--|
| 13 | RD+ | Receiver Non-Inverted Data output, Differential LVPECL, AC coupled |
| 14 | VeeR | Receiver Ground |
| 15 | VccR | Receiver 3.3V Power Supply |
| 16 | VccT | Transmitter 3.3V Power Supply |
| 17 | VeeT | Transmitter Ground |
| 18 | TD+ | Transmitter Non-Inverted Data Input, Differential LVPECL, AC coupled |
| 19 | TD- | Transmitter Inverted Data Input, Differential LVPECL, AC coupled |
| 20 | VeeT | Transmitter Ground |

Note1: TX Fault is open collector/drain output which should be pulled up externally with a 4.7K~10KΩ resistor on the host board to supply $<V_{ccT}+0.3V$ or $V_{ccR}+0.3V$. When high, this output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to $<0.8V$.

Note2: TX Disable input is used to shut down the laser output per the state table below. It is pulled up within the module with a 4.7K~10KΩ resistor. 1)Low(0~0.8V): Transmitter on; 2)Between(0.8V and 2V): Undefined; 3)High (2.0~ V_{ccT}): Transmitter Disabled; 4)Open: Transmitter Disabled

Note3: These are the module definition pins. They should be pulled up with a 4.7K~10KΩ resistor on the host board to supply less than $V_{ccT}+0.3V$ or $V_{ccR}+0.3V$. Mod-ABS is grounded by the module to indicate that the module is present.

Note4: LOS (Loss of signal) is an open collector/drain output which should be pulled up externally with a 4.7K~10KΩ resistor on the host board to supply $<V_{ccT}+0.3V$ or $V_{ccR}+0.3V$. When high, this output indicates the received optical power is below the worst case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to $<0.8V$.

Note5: No connect on this module.

Digital Diagnostic Functions :

As defined by the SFP MSA (SFF-8472) Carelink's SFP transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- Transceiver temperature
- Laser bias current
- Transmitted optical power
- Received optical power
- Transceiver supply voltage

It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory-set normal range.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Controller (DDC) inside the transceiver, which is accessed through the 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL pin) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of its memory map that are not write-protected. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA pin) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

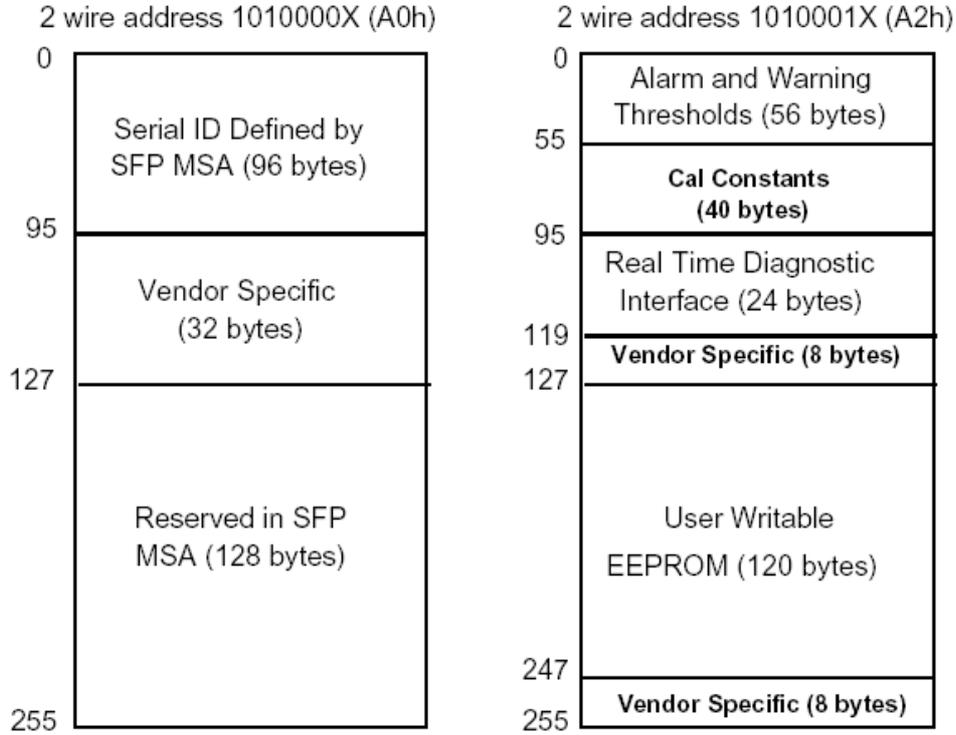
For more detailed information including memory map definitions, please see the SFP MSA (SFF-8472) Specification.



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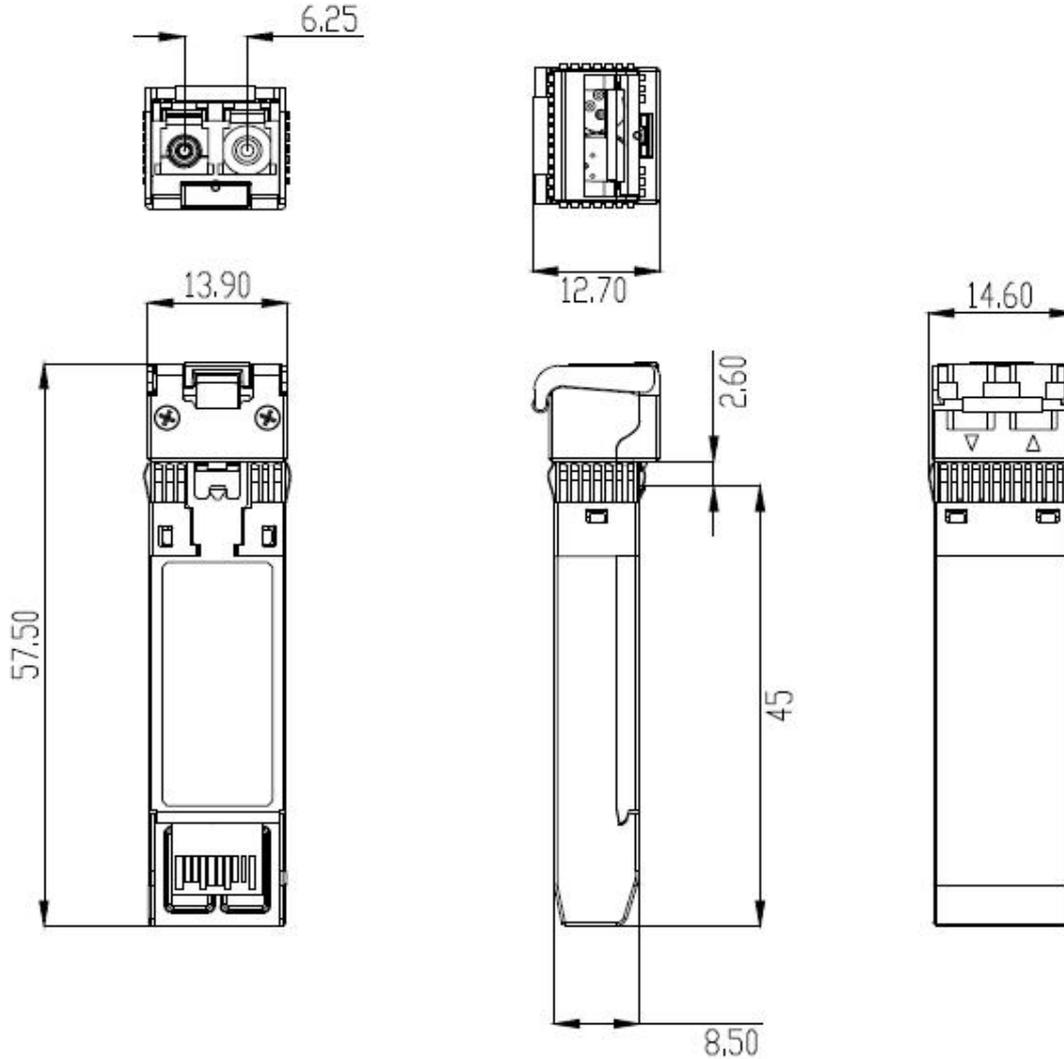
Digital Diagnostic Memory Map



Digital Diagnostic Monitoring Characteristics

| Parameter | Accuracy | Unit | Note |
|---------------------------|----------|------|------|
| Temperature | ±3 | °C | |
| Supply Voltage | ±0.1 | V | |
| TX Bias Current | ±5 | mA | |
| TX Output Power | ±3 | dB | |
| RX Received Optical Power | ±3 | dB | |

Mechanical Dimensions :



(All Dimensions are ± 0.20 mm Unless Otherwise Specified, Unit: mm)

Ordering Information :

| Part No. | TX | RX | Link | DDM | Temp. |
|---------------|-------|-------|-----------------------------------|-----|----------|
| 10GSFP+SR300 | 850nm | 850nm | OM3: 300m OM2: 82m OM1: 33m | Yes | 0~70°C |
| 10GSFP+SR300i | 850nm | 850nm | OM3: 300m OM2: 82m OM1: 33m | Yes | -40~85°C |