

SO-SFP-MR120D-Cxx

SFP, 100Mbps-2.7Gbps, Multirate, CWDM, SM, DDM, 33dB, 120km

OVERVIEW

The SO-SFP-MR120D-Cxx fiber optical SFP+ (Small Form Pluggable) transceivers include a APD diode and uncooled CWDM DFB transmitter. The modules operate at multiple data-rates up to 2.667 Gbps and supports protocols like, SONET OC-48/SDH STM-16/OC-12/OC-3, Gigabit Ethernet 1000BASE, Fibre Channel 1G/2G. The CWDM modules operate at nominal Coarse Wavelength Division Multiplexing (CWDM) wavelengths on the 20nm grid as defined in the ITU-T 694.2 standard. There are eighteen center wavelengths available from 1270nm to 1610nm, with each step 20nm. The module has a duplex LC optical interface and all mechanical characteristics are compliant with the current SFP+ specification (SFF-8431 and SFF-8432). All SFP modules fulfill the content of the serial EEPROM described in the SFP MSA, Appendix B4, table 3.1, at base data fields (defined as addresses 0 to 63) and extended data fields (defined as addresses 64 to 95). The nominal transmitter output wavelength is stated at the reserved addresses 60-61 according to SFF document SFF-8472 rev 10.4, "Digital Diagnostics Monitoring Interface". Wavelengths stated in the specification are measured in vacuum. All requirements in this specification are valid throughout the specified lifetime and operational environmental temperature range unless otherwise stated. The transceiver modules are compliant to RoHS-6/6.

PRODUCT FEATURES

- Operating data-rate up to 2.67 Gbps
- 18 CWDM wavelengths available from 1270nm - 1610nm
- APD Receiver for extended transmission distance
- Hot-pluggable SFP footprint with duplex LC connector
- Built-in digital diagnostic functions
- Up to 40km on 9/125um SMF (G.652)
- Single power supply 3.3V
- RoHS6 compliant
- Class 1 laser product complies with EN 60825-1
- Operating temperature range: 0°C to 70°C.
- Industrial temperature -40°C to +85°C.
- Compliant with SFF-8472 (DDMI)

ORDERING INFORMATION

| Part Number | Description |
|---------------------|--|
| SO-SFP-MR120D-Cxx | SFP, 100Mbps-2.7Gbps, Multirate, CWDM, SM, DDM, 33dB, 120km |
| SO-SFP-MR120D-Cxx-I | SFP, 100Mbps-2.7Gbps, Multirate, CWDM, SM, DDM, 33dB, 120km, ind. temp |

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APPLICATIONS

- SDH / Sonet
- 2/1G Fibre Channel
- Gigabit Ethernet / Fast Ethernet
- CWDM, Optical networking and equipment connectivity

GENERAL SPECIFICATIONS

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|-----------------------------|-----------|------|-----|------------|------|--------------------------------|
| Data Rate | DR | 0.1 | | 2.67 | Gbps | |
| Bit Error Rate | BER | | | 10^{-12} | | |
| Operating Temperature | T_{OP} | 0 | | 70 | °C | Case temperature |
| | | -20 | | +85 | | Extended temperature |
| Operating Relative Humidity | | | | 95 | % | |
| Storage Temperature | T_{STO} | -40 | | 85 | °C | Ambient temperature |
| Supply Current | I_S | | 200 | 300 | mA | For electrical power interface |
| Input Voltage | V_{CC} | 3.15 | 3.3 | 3.45 | V | |
| Maximum Voltage | V_{MAX} | -0.5 | | 3.6 | V | For electrical power interface |

OPTICAL CHARACTERISTICS – TRANSMITTER

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|-----------------------------|---|--------------------------|-----|-----|------|-----------------------------------|
| Output Optical Power | P_{TX} | +3 | | +6 | dBm | Average, coupled into 9/125um SMF |
| Extinction ratio | E_r | 8.2 | | | dB | |
| Optical Center Wavelength | λ_C | According to ITU-T 694.2 | | | nm | |
| Spectral Width (-20dB) | $\Delta\lambda$ | | | 1 | nm | |
| Side Mode Suppression Ratio | SMSR | 30 | | | dB | |
| Rise/Fall Time | t_r/t_f | | | 150 | Ps | 20% to 80% |
| Output Optical Eye | ANSI Fibre Channel and Gigabit Ethernet Compliant | | | | | |
| TX-DISABLE Assert Time | t_{off} | | | 10 | µsec | Average |
| Launch Power OFF | Poff | | | -45 | dBm | Average |

OPTICAL CHARACTERISTICS – RECEIVER

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|---------------------------|---------------|------|-----|------|------|--|
| Optical Receiver Power | P_{RX} | | | -9 | dBm | Average |
| Optical Center Wavelength | λ_C | 1260 | | 1620 | nm | |
| Receiver Sensitivity | R_{X_SENS} | | | -30 | dBm | BER< 10^{-12} , PRBS $2^{31}-1$ @ 2400ps/nm |
| Loss of Signal-Asserted | P_{LOS_A} | -43 | | | dBm | |
| Loss of Signal-Deasserted | P_{LOS_D} | | | -31 | dBm | |
| Optical Return Loss | ORL | 12 | | | dB | |
| LOS Hysteresis | | 0.5 | | | dB | |

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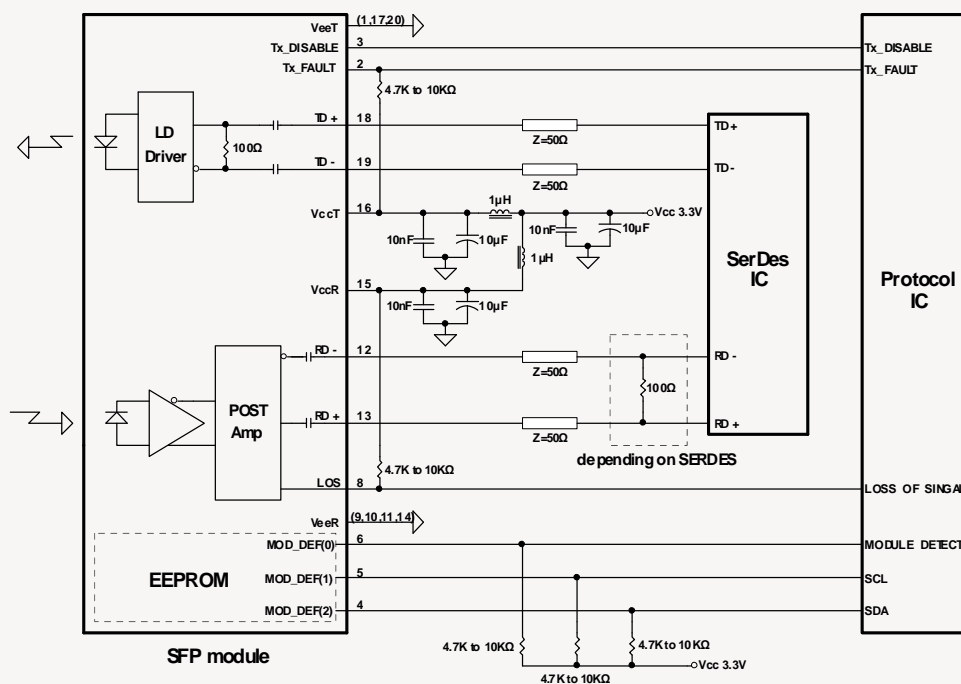
ELECTRICAL CHARACTERISTICS – HIGH-SPEED SIGNAL INTERFACE (CML)

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|--------------------------------|---------------|-----|-----|------|----------|-----------------------|
| Differential Input Impedance | R_{IN} | 85 | 100 | 115 | Ω | |
| Differential data input swing | V_{IN_PP} | 400 | | 1600 | mVpp | Internally AC coupled |
| Differential Output Impedance | R_{OUT} | 85 | 100 | 115 | Ω | |
| Differential data output swing | V_{OUT_PP} | 400 | | 1200 | mVpp | Internally AC coupled |

ELECTRICAL CHARACTERISTICS – LOW-SPEED SIGNAL INTERFACE (LVTTTL)

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|---------------------|--------|-----|-----|--------------|------|------------------|
| Input High Voltage | | 2.0 | | $V_{CC}+0.3$ | V | Tx-DIS, Tx-FAULT |
| Input Low Voltage | | GND | | 0.8 | V | |
| Output High Voltage | | 2.4 | | V_{CC} | V | Rx-LOS |
| Output Low Voltage | | GND | | 0.5 | V | |

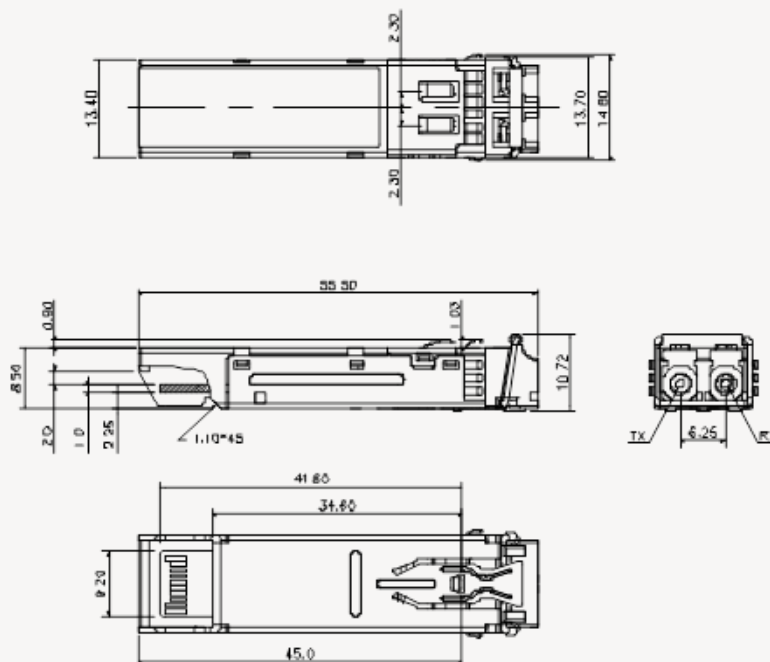
FUNCTIONAL DIAGRAM OF TRANSCEIVER



PIN ASSIGNMENT ACCORDING TO MSA

| PIN | Signal Name | Description | PIN | Signal Name | Description |
|-----|-------------------|--|-----|-------------------|-----------------------------|
| 1 | V _{EE} T | Transmitter Signal Ground | 11 | V _{EE} R | Receiver Signal Ground |
| 2 | TX_Fault | Transmitter Fault Indication. Logic "1" Output = Laser Fault. Logic "0" Output = Normal Operation | 12 | RD- | Inverse Receiver Data Out |
| 3 | TX_Disable | Logic "1" Input (or no connection) = Laser off, Logic "0" = Laser on. | 13 | RD+ | Receiver Data Out |
| 4 | SDA | Modulation Definition 2 – Two wires serial ID Interface | 14 | V _{EE} R | Receiver Signal Ground |
| 5 | SDL | Modulation Definition 1 – Two wires serial ID Interface | 15 | V _{CC} R | Receiver Power – 3.3V±5% |
| 6 | MOD-ABS | Modulation Definition 0 – Ground in Module | 16 | V _{CC} T | Transmitter Power – 3.3V±5% |
| 7 | RS0 | RX Rate Select (LVTTL). This pin has an internal 30k pull-down to ground. A signal on this pin will not affect module performance. | 17 | V _{EE} T | Transmitter Signal Ground |
| 8 | RX_LOS | Loss of Signal Out (OC). | 18 | TD+ | Transmitter Data In |
| 9 | RS1 | TX Rate Select (LVTTL). This pin has an internal 30k pull-down to ground. A signal on this pin will not affect module performance. | 19 | TD- | Inverse Transmitter Data In |
| 10 | V _{EE} R | Receiver Signal Ground | 20 | V _{EE} T | Transmitter Signal Ground |

MECHANICAL DIMENSIONS



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