

SO-SFP-8GFC-ZR-Cxx

SFP+, 8/4/2/1 Gbps FC/FICON, CWDM, SM, DDM, 23dB, 70km

OVERVIEW

The SO-SFP-8GFC-ZR-Cxx fiber optical SFP+ (small form pluggable) transceivers include an APD receiver and temperature stabilized DFB-EML transmitter. The modules operate at data-rates up to 8.5 Gbps CWDM modules operate at nominal Coarse Wavelength Division Multiplexing (CWDM) wavelengths. Eight center wavelengths available from 1470 nm to 1610 nm with each step being 20 nm. The CWDM characteristics are fully compliant to the wavelength parameters specified in ITU standards G.694.2 and G.695. The transceiver is compliant to wavelength requirements from ITU-T G.695. 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

- Up to 8.5 Gbps data-rates
- Up to 70km on 9/125um SMF (G.652)
- Duplex LC connector
- Compliant with SFP+ MSA
- Hot-Pluggable SFP footprint
- Built-in digital diagnostic functions
- Single power supply 3.3V
- RoHS6 compliant
- Class 1 laser product complies with EN 60825-1
- Operating temperature range: 0°C to 70°C.
- Power consumption <1.5W

APPLICATIONS

- 8G/4G/2G Fibre Channel, 10G Fibre Channel

ORDERING INFORMATION

| Part Number | Description |
|---------------------|--|
| SO-SFP-8GFC-ZR-Cxx* | SFP+, 8/4/2/1 Gbps FC/FICON, CWDM, SM, DDM, 23dB, 70km |

*xx = Refers to notation for frequency data. Please see extended order information on last page for additional information.

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GENERAL SPECIFICATIONS

| Parameter | Symbol | Min | Typ | Max | Unit | Notes |
|-------------------------|-------------|------|-----|-------------------|------|--------------------------------|
| Data Rate | <i>DR</i> | | | 8.5 | Gbps | |
| Bit Error Rate | <i>BER</i> | | | 10 ⁻¹² | | |
| Operating Temperature | <i>TOP</i> | 0 | | 70 | °C | Case temperature |
| Storage Temperature | <i>TSTO</i> | -40 | | 85 | °C | Ambient temperature |
| Supply Current | <i>IS</i> | | 330 | 450 | mA | For electrical power interface |
| Input Voltage | <i>VCC</i> | 3.13 | 3.3 | 3.47 | V | |
| Maximum Voltage | <i>VMAX</i> | -0.5 | | 3.6 | V | For electrical power interface |
| Total Power Dissipation | | | 1.2 | 1.5 | W/1 | |

OPTICAL CHARACTERISTICS – TRANSMITTER

| Parameter | Symbol | Min | Typ | Max | Unit | Notes |
|------------------------------------|-----------------|---------|-----|---------|-------|-----------------------------------|
| Output Optical Power | <i>PTX</i> | -0.5 | | +4 | dBm | Average, coupled into 9/125um SMF |
| Extinction ratio | <i>Er</i> | 8.2 | | | dB | |
| Optical Center Wavelength | λ_c | ITU-5.5 | ITU | ITU+7.5 | nm | |
| Spectral Width (-20dB) | $\Delta\lambda$ | | | 1 | nm | |
| Side Mode Suppression Ratio | <i>SMSR</i> | 30 | | | dB | |
| Transmitter and Dispersion Penalty | <i>TDP</i> | | | 3 | dB | 1600ps/nm, 8.5Gbps |
| Relative Intensity noise | <i>RIN</i> | | | -128 | dB/Hz | Peak-to-Peak |
| Launch Power OFF | <i>Poff</i> | | | -30 | dBm | Average |

OPTICAL CHARACTERISTICS – RECEIVER

| Parameter | Symbol | Min | Typ | Max | Unit | Notes |
|---------------------------------|----------------|------|-----|-------|------|---|
| Optical Receiver Power | <i>PRX</i> | | | -7 | dBm | Average |
| Optical Center Wavelength | λ_c | 1260 | | 1620 | nm | |
| Receiver Sensitivity @ 10.3Gbps | <i>RX_SENS</i> | | | -23.5 | dBm | BER<10 ⁻¹² , PRBS 2 ³¹ -1 |
| Loss of Signal-Asserted | <i>PLOS_A</i> | -32 | | | dBm | |
| Loss of Signal-Deasserted | <i>PLOS_D</i> | | | -24 | dBm | |

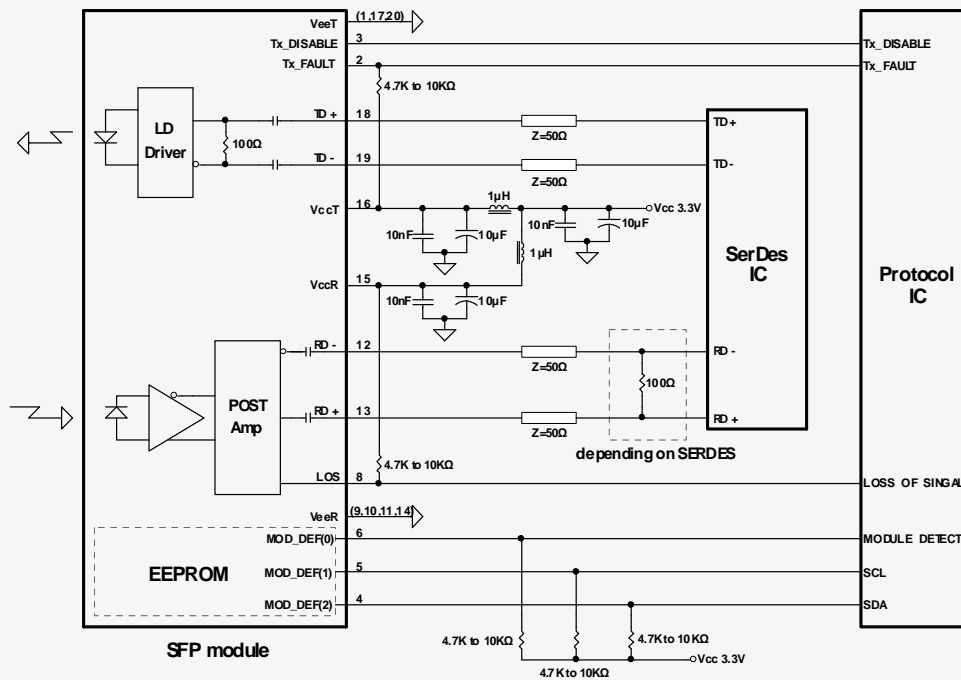
ELECTRICAL CHARACTERISTICS – HIGH-SPEED SIGNAL INTERFACE (CML)

| Parameter | Symbol | Min | Typ | Max | Unit | Notes |
|--------------------------------|----------------|-----|-----|------|------|-----------------------|
| Differential Input Impedance | <i>RIN</i> | | 100 | | Ω | |
| Differential data input swing | <i>VIN_PP</i> | 150 | | 1200 | mVpp | Internally AC coupled |
| Differential Output Impedance | <i>ROUT</i> | | 100 | | Ω | |
| Differential data output swing | <i>VOUT_PP</i> | 350 | | 700 | mVpp | Internally AC coupled |

ELECTRICAL CHARACTERISTICS – LOW-SPEED SIGNAL INTERFACE (LVTTTL)

| Parameter | Symbol | Min | Typ | Max | Unit | Notes |
|---------------------|--------|-----|-----|---------|------|------------------|
| Input High Voltage | | 2.0 | | VCC+0.3 | V | TX-DIS, TX-FAULT |
| Input Low Voltage | | GND | | 0.8 | V | |
| Output High Voltage | | 2.4 | | Vcc | V | RX-LOS |
| Output Low Voltage | | GND | | 0.5 | V | |

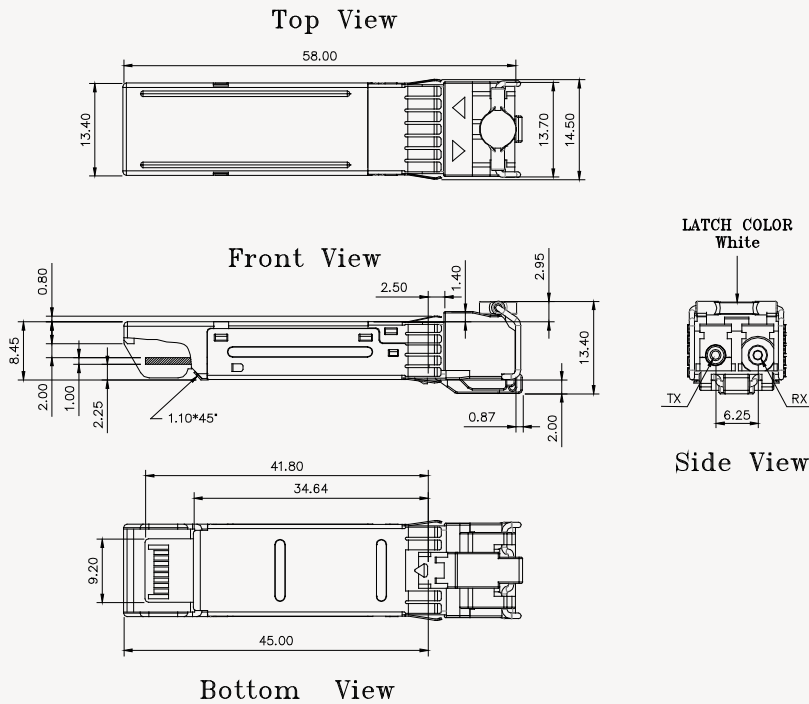
RECOMMENDED CIRCUIT SCHEMATIC



PIN FUNCTION DEFINITIONS

| 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 (LVTTTL). This pin has an internal 30k pulldown 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 (LVTTTL). This pin has an internal 30k pulldown 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 DRAWING



Subject to change without notice.

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EXTENDED ORDERING INFORMATION

| Part Number | Description |
|--------------------|--|
| SO-SFP-8GFC-ZR-C47 | SFP+, 8/4/2/1 Gbps FC/FICON, CWDM, 1470nm, SM, DDM, 23dB, 70km |
| SO-SFP-8GFC-ZR-C49 | SFP+, 8/4/2/1 Gbps FC/FICON, CWDM, 1490nm, SM, DDM, 23dB, 70km |
| SO-SFP-8GFC-ZR-C51 | SFP+, 8/5/2/1 Gbps FC/FICON, CWDM, 1510nm, SM, DDM, 23dB, 70km |
| SO-SFP-8GFC-ZR-C53 | SFP+, 8/5/2/1 Gbps FC/FICON, CWDM, 1530nm, SM, DDM, 23dB, 70km |
| SO-SFP-8GFC-ZR-C55 | SFP+, 8/5/2/1 Gbps FC/FICON, CWDM, 1550nm, SM, DDM, 23dB, 70km |
| SO-SFP-8GFC-ZR-C57 | SFP+, 8/5/2/1 Gbps FC/FICON, CWDM, 1570nm, SM, DDM, 23dB, 70km |
| SO-SFP-8GFC-ZR-C59 | SFP+, 8/5/2/1 Gbps FC/FICON, CWDM, 1590nm, SM, DDM, 23dB, 70km |
| SO-SFP-8GFC-ZR-C61 | SFP+, 8/6/2/1 Gbps FC/FICON, CWDM, 1610nm, SM, DDM, 23dB, 70km |