## DATASHEET

## RAYMARK: RM-SFP-SX

1.25Gb/s SFP (Small Form Pluggable) Short Wavelength (850nm) Transceiver

## RM-SFP-SX Overview

Raymark RM-SFP-SX SFP optical transceivers are based on the Gigabit Ethernet IEEE 802.3 standard and Fibre Channel FC-PI Rev.5.0,providing a fast and reliable interface for GE/FC applications.The product implements digital diagnostics via a 2-wire serial bus,compliant with the INF-8074i Small Form Factor Pluggable Multi-Source Agreement (MSA) and SFF-8472 standard.

## Product Features

- Up to 1.25 Gb/s bi-directional data links
- Compliant with IEEE 802.3z Gigabit Ethernet and 1000BASE-SX
- Compliant with SFP MSA
- Hot-pluggable SFP footprint
- 850nm VCSEL laser transmitter
- Duplex LC connector
- Built-in digital diagnostic functions
- Up to 550m on 50/125um MMF
- Upto 300m on 62.5/125um MMF
- Single power supply 3.3V
- RoHS Compliant
- Class 1 laser product complies with EN 60825-1
- Operating temperature range (Case Temperature): Commercial Level: 0°C to 70°C

## Applications

- 1.25 Gb/s Gigabit Ethernet
- 1.063 Gb/s Fiber Channel

## Ordering Information

| Part Number | Description | Color on Clasp |
|---|---|---|
| RM-SFP-SX | GE/FC SFP 850nm LC Connectors 550m on MMF, with DOM function, Commercial Temperature | black |

## General Specifications

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|---|---|---|---|---|---|---|
| Data Rate | DR | | 1.25 | | Gb/s | 1 |
| | DR | | 1.063 | | Gb/s | 2 |
| Bit Error Rate | BER | | | $10^{-12}$ | | |
| Operating Temperature | Tc | 0 | | 70 | °C | 3 |
| Storage Temperature | Tsto | -40 | | 85 | °C | 4 |
| Supply Current | Icc | | 130 | 280 | mA | 5 |
| Input Voltage | Vcc | 3.14 | 3.3 | 3.46 | V | |
| Maximum Voltage | Vmax | -0.5 | | 4 | V | 5 |

**Notes:**

1. Case temperature
2. Ambient temperature
3. For electrical power interface

## Link Distances

| Data Rate | Fiber Type | Distance Range (m) |
|---|---|---|
| 1.25 Gb/s | 62.5/125um MMF | 300 |
| 1.25 Gb/s | 50/125um MMF | 550 |

## Optical – Characteristics – Transmitter

### $V_{CC}$=3.14V to 3.46V, $T_C$

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|---|---|---|---|---|---|---|
| Output Optical Power | $P_{TX}$ | -9.5 | | -3 | dBm | 1 |
| Optical Center Wavelength | $\lambda_C$ | 830 | | 860 | nm | |
| Extinction Ratio@1.25Gb/s | ER | 9 | | | dB | |
| Spectral Width (RMS) | $\Delta\lambda$ | | | 0.85 | nm | |
| Optical Rise/Fall Time(20%-80%) | $t_r/t_f$ | | | 300 | ps | |
| Relative Intensity Noise | RIN | | | -120 | dB/Hz | |
| Deterministic Jitter Contribution | TX_DJ | | 20 | 60 | ps | |
| Total Jitter Contribution | TX_TJ | | 65 | 125 | ps | |
| Mask Margin | | | 45 | | % | |

**Notes:**

1. Average

## Optical – Characteristics – Receiver

### $V_{CC}$=3.14V to 3.46V, $T_C$

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|---|---|---|---|---|---|---|
| Receiver Overload | $P_{OL}$ | 0 | | | dBm | |
| Optical Center Wavelength | $\lambda_C$ | 770 | | 860 | nm | |
| Receiver Sensitivity @ 1.063Gb/s | $R_{X\_SEN1}$ | | | -23 | dBm | 1 |
| Receiver Sensitivity @ 1.25Gb/s | $R_{X\_SEN2}$ | | | -23 | dBm | 2 |
| Optical Return Loss | ORL | 12 | | | dB | |
| Receiver Electrical 3dB Upper cutoff frequency | | | | 1500 | MHz | |
| LOS Assert | $LOS_A$ | -30 | | | dBm | |
| LOS De-Assert | $LOS_D$ | | | -23 | dBm | |
| LOS Hysteresis | $LOS_H$ | 0.5 | | | dB | |

## Electrical – Characteristics – Transmitter

### $V_{CC}$=3.14V to 3.46V, $T_C$

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|---|---|---|---|---|---|---|
| Input differential impedance | $R_{IN}$ | | 100 | | Ω | |
| Single ended data input swing | $V_{IN\_PP}$ | 250 | | 1200 | mV | |
| Transmit disable voltage | $V_D$ | 2 | | $V_{CC}$ | V | |
| Transmit enable voltage | $V_{EN}$ | $V_{EE}$ | | $V_{EE}$+0.8 | V | |

## Electrical – Characteristics – Receiver

### $V_{CC}$=3.14V to 3.46V, $T_C$

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|---|---|---|---|---|---|---|
| Single ended data output swing | $V_{OUT\_PP}$ | 250 | 450 | 550 | mV | |
| Data output rise/fall time (20%-80%) | $t_r/t_f$ | | 90 | 175 | ps | |
| LOS Fault | $V_{LOS\_A}$ | 2 | | $V_{CC\_HOST}$ | V | |
| LOS Normal | $V_{LOS\_D}$ | $V_{EE}$ | | $V_{EE}$+0.5 | V | |

## DDM Threshold Information

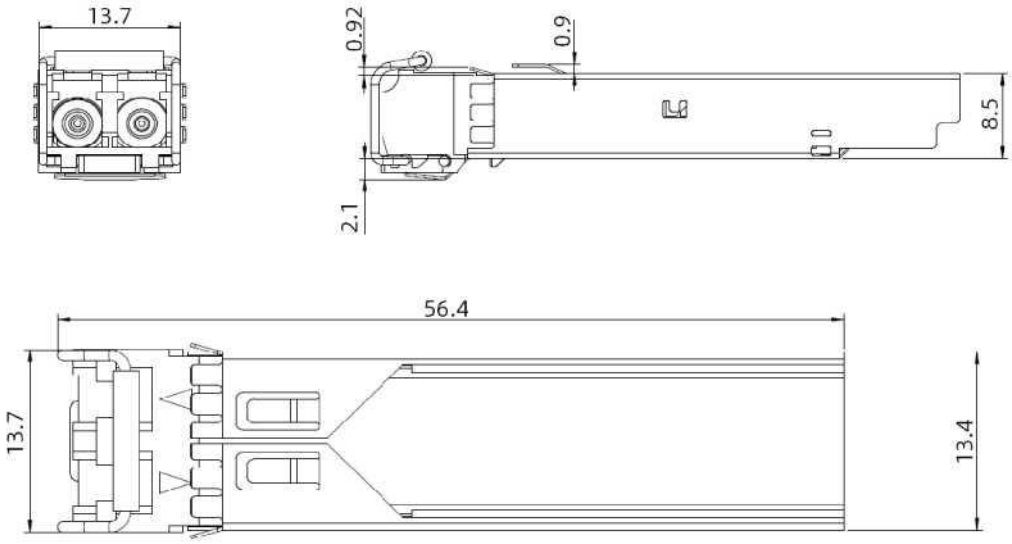
| Parameter | Alarm Threshold | | Warning Threshold | |
|---|---|---|---|---|
| | High Value | Low Value | High Value | Low Value |
| **Temperature (°C)** | 75 (4B 00) | -5 (FB 00) | 70 (46 00) | 0 (00 00) |
| **Vcc (V)** | 3.63(8D CC) | 2.97 (74 04) | 3.46 (87 28) | 3.13 (7A 44) |
| **Bias (mA)** | 15 (1D 4C) | 1 (01 F4) | 12 (17 70) | 2 (03 E8) |
| **TxPower (dBm)** | -2.71 (14 F0) | -9.97 (03 EF) | -3.50 (11 72) | -9.00 (04 EA) |
| **RxPower (dBm)** | 3.01 (4E 20) | -26.02 (00 19) | 0.00 (27 10) | -23.01 (00 32) |

## Product Weight

Net weight of module：15.1g/pcs

Net weight of dust cap：0.95g/pcs

## Dimensions




ALL DIMENSIONS ARE ±0.3mm UNLESS OTHERWISE SPECIFIED

UNIT: mm