

# SO-SFP-MR25-BX40D-35

SFP BIDI, 100Mbps-2.7Gbps, TX/RX=1310/1550nm, SM, DDM, 18dB, 40km, LC

## OVERVIEW

The SO-SFP-MR25-BX40D-35 series are small form factor pluggable module for OC-48 / STM-16 and Fiber Channel single fiber communications by using 1310nm/1550nm transmitter and 1550nm/1310nm receiver. It is with the SFP 20-pin connector to allow hot plug capability. The transmitter section uses a Distributed feedback laser and is a class 1 laser compliant according to International Safety Standard IEC 60825. The receiver section PIN or APD mounted in an optical header and a limiting post-amplifier IC. The SO-SFP-MR25-BX40D-35 series are designed to be compliant with SFF-8472 SFP MSA.

## PRODUCT FEATURES

- Support up to 2.5Gbps data links
- A type: 1310nm FP Tx/1550nm Rx
- 15km with 9/125  $\mu$ m SMF
- Single 3.3V power supply and TTL logic interface
- Hot-Pluggable SFP footprint simplex LC connector interface
- Class 1 FDA and IEC60825-1 laser safety compliant
- Operating case temperature
  - Standard: 0°C ~ +70°C
  - Industrial: -40°C ~ +85°C
- Compliant with SFP MSA
- Compliant with SFF-8472

## APPLICATIONS

- Single fiber SAN, WAN, WDM links
- Sonet / SDH
- Fibre Channel / Ethernet
- Equipment connectivity

## ORDERING INFORMATION

| Part Number             | Description  |
|-------------------------|--|
| SO-SFP-MR25-BX40D-35    | SFP BIDI, 100Mbps-2.7Gbps, TX/RX=1310/1550nm, SM, DDM, 18dB, 40km, LC            |
| SO-SFP-MR25-BX40D-35 -I | SFP BIDI, 100Mbps-2.7Gbps, TX/RX=1310/1550nm, SM, DDM, 18dB, 40km, LC, ind. temp |

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## ABSOLUTE MAXIMUM RATINGS

| Parameter                   | Symbol | Min  | Max | Unit |
|-----------------------------|--------|------|-----|------|
| Storage Temperature         | TS     | -40  | +85 | °C   |
| Supply Voltage              | VCC    | -0.5 | 3.6 | V    |
| Operating Relative Humidity |        |      | 95  | %    |

## RECOMMENDED OPERATING CONDITIONS

| Parameter                  | Symbol       | Min                     | Typ   | Max  | Unit |
|----------------------------|--------------|-------------------------|-------|------|------|
| Case Operating Temperature | TA           | SO-SFP-MR25-BX40D-35    | 0     | +70  | °C   |
|                            |              | SO-SFP-MR25-BX40D-35 -I | -40   | +85  |      |
| Power Supply Voltage       | Vcc          | 3.15                    | 3.3   | 3.45 | V    |
| Power Supply Current       | Icc          |                         |       | 300  | mA   |
| Data rate                  | FC           |                         | 1.063 |      | Gbps |
|                            | 2xFC         |                         | 2.125 |      |      |
|                            | OC-48/STM-16 |                         | 2.5   |      |      |

## PERFORMANCE SPECIFICATIONS – ELECTRICAL TRANSMITTER

| Parameter                              | Symbol          | Min | Typ | Max     | Unit | Notes                            |
|--|-----------------|-----|-----|---------|------|----------------------------------|
| LVPECL Compatible Inputs(Differential) | V <sub>IN</sub> | 400 |     | 2000    | mVpp | AC coupled inputs                |
| Input Impedance (Differential)         | Z <sub>IN</sub> | 85  | 100 | 115     | ohms | R <sub>in</sub> > 100 kohms @ DC |
| TX Disable                             | Disable         | 2   |     | Vcc     | V    |                                  |
|  | Enable          | 0   |     | 0.8     |      |                                  |
| TX FAULT                               | Fault           | 2   |     | Vcc+0.3 | V    |                                  |
|  | Normal          | 0   |     | 0.5     |      |                                  |

## PERFORMANCE SPECIFICATIONS – ELECTRICAL RECEIVER

| Parameter                       | Symbol           | Min | Typ | Max     | Unit | Notes              |
|---------------------------------|------------------|-----|-----|---------|------|--------------------|
| CML Outputs (Differential)      | V <sub>out</sub> | 370 |     | 2000    | mVpp | AC coupled outputs |
| Output Impedance (Differential) | Z <sub>out</sub> | 85  | 100 | 115     | ohms |                    |
| Rx_LOS Output Voltage – High    |                  | 2   |     | Vcc+0.3 | V    |                    |
| Rx_LOS Output Voltage – Low     |                  | 0   |     | 0.8     | V    |                    |
| MOD_DEF ( 2:0 )                 | VoH              | 2.5 |     |         | V    | With Serial ID     |
|                                 | VoL              | 0   |     | 0.5     | V    |                    |

## OPTICAL AND ELECTRICAL CHARACTERISTICS

| Parameter             | Symbol | Min   | Typ | Max | Unit |
|-----------------------|--------|-------|-----|-----|------|
| 9µm Core Diameter SMF | L      |       | 40  |     | km   |
| Data Rate             |        | 1.063 |     | 2.5 | Gbps |

## OPTICAL AND ELECTRICAL CHARACTERISTICS TRANSMITTER

| Parameter                   | Symbol          | Min                         | Typ  | Max  | Unit |
|-----------------------------|-----------------|-----------------------------|------|------|------|
| Centre Wavelength           | $\lambda_c$     | 1260                        | 1310 | 1360 | nm   |
| Spectral Width (RMS)        | $\Delta\lambda$ |                             |      | 1    | nm   |
| Side Mode Suppression Ratio | SMSR            | 30                          |      |      | dB   |
| Average Output Power        | $P_{out}$       | -2                          |      | +3   | dBm  |
| Extinction Ratio            | ER              | 8.2                         |      |      | dB   |
| Rise/Fall Time(20%~80%)     | $t_r/t_f$       |                             |      | 150  | ps   |
| Output Optical Eye          |                 | Compatible with ITU-T G.957 |      |      |      |
| TX Disable Assert Time      | $t_{off}$       |                             |      | 10   | us   |
| Pout@TX Disable Asserted    | $P_{out}$       |                             |      | -45  | dBm  |

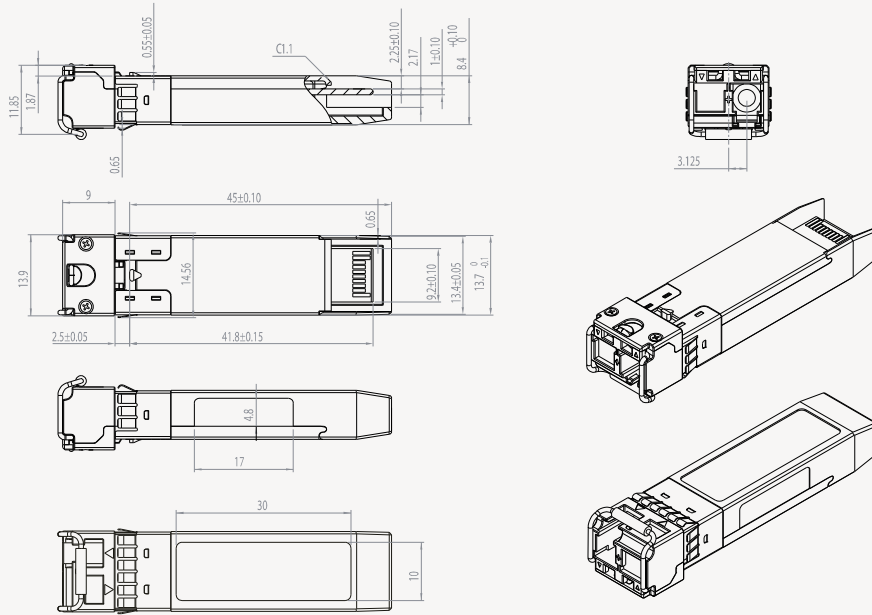
## OPTICAL AND ELECTRICAL CHARACTERISTICS RECEIVER

| Parameter                     | Symbol      | Min  | Typ  | Max  | Unit |
|-------------------------------|-------------|------|------|------|------|
| Centre Wavelength             | $\lambda_c$ | 1500 | 1550 | 1580 | nm   |
| Receiver Sensitivity@1250Mbps | $P_{min}$   |      |      | -20  | dBm  |
| Receiver Overload             | $P_{max}$   | -3   |      |      | dBm  |
| Reflection                    |             |      |      | -27  | dB   |
| LOS De-Assert                 | LOSD        |      |      | -21  | dBm  |
| LOS Assert                    | LOSA        | -45  |      |      | dBm  |
| LOS Hysteresis                |             | 0.5  |      |      | dB   |

## PIN ASSIGNMENT ACCORDING TO MSA

| PIN | Signal Name       | Description  | PIN | Signal Name       | Description                 |
|-----|-------------------|--|-----|-------------------|-----------------------------|
| 1   | V <sub>EE</sub> T | Transmitter Signal Ground  | 11  | V <sub>EE</sub> 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 <sub>EE</sub> R | Receiver Signal Ground      |
| 5   | SDL               | Modulation Definition 1 – Two wires serial ID Interface  | 15  | V <sub>CC</sub> R | Receiver Power – 3.3V±5%    |
| 6   | MOD-ABS           | Modulation Definition 0 – Ground in Module   | 16  | V <sub>CC</sub> 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 <sub>EE</sub> 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 <sub>EE</sub> R | Receiver Signal Ground   | 20  | V <sub>EE</sub> T | Transmitter Signal Ground   |

## MECHANICAL DIMENSIONS



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