

# SO-SFP-100BASE-BX20D-53

SFP BIDI, 100/155Mbps, TX/RX=1550/1310nm, SM, DDM, 13dB, 20km, LC

## OVERVIEW

The SO-SFP-100BASE-BX20D-53 series is small form factor pluggable module for IEEE 802.3ah 100BASE-BX10 and OC-3/STM-1 SONET/SDH single fiber applications by using 1310 nm/1550nm transmitter and 1550nm/1310nm receiver. It is with the SFP 20-pin connector to allow hot plug capability. The transmitter section uses a multiple quantum well A type / B type laser and is a class 1 laser compliant according to International Safety Standard IEC 60825. The receiver section uses an integrated A type/ B type detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC. The SO-SFP-100BASE-BX20D-53 series are designed to be compliant with SFF-8472.

## PRODUCT FEATURES

- Support 155Mbps data links
- B type: 1550nm FP TX / 1310nm RX
- 20km 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 specification
- Compliant with SFF-8472 MSA

## APPLICATIONS

- SONET OC-3 / SDH STM-1
- WDM fast Ethernet links
- Single fiber optical networking

## ORDERING INFORMATION

| Part Number               | Description  |
|---------------------------|--|
| SO-SFP-100BASE-BX20D-53   | SFP BIDI, 100/155Mbps, TX/RX=1550/1310nm, SM, DDM, 13dB, 20km, LC            |
| SO-SFP-100BASE-BX20D-53-I | SFP BIDI, 100/155Mbps, TX/RX=1550/1310nm, SM, DDM, 13dB, 20km, LC, ind. temp |

## 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-100BASE-BX20D-53   |     | +70  | °C   |
|                            |        | SO-SFP-100BASE-BX20D-53-I | -40 | +85  |      |
| Power Supply Voltage       | Vcc    | 3.15                      | 3.3 | 3.45 | V    |
| Power Supply Current       | Icc    |                           |     | 300  | mA   |
| Data rate                  | OC-3   |                           | 155 |      | Mbps |
|                            |        | 100M                      | 100 |      |      |

## 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              |
|---------------------------------|------------------|-----|-----|---------|------|--------------------|
| LVPECL Outputs (Differential)   | V <sub>out</sub> | 400 |     | 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 MMF | L      |     | 20  |     | km   |
| Data Rate             |        |     | 155 |     | Mbps |

## OPTICAL AND ELECTRICAL CHARACTERISTICS TRANSMITTER

| Parameter                | Symbol          | Min                   | Typ  | Max  | Unit |
|--------------------------|-----------------|-----------------------|------|------|------|
| Centre Wavelength        | $\lambda_c$     | 1500                  | 1550 | 1600 | nm   |
| Spectral Width (RMS)     | $\Delta\lambda$ |                       |      | 4    | nm   |
| Average Output Power     | $P_{out}$       | -15                   |      | -8   | dBm  |
| Extinction Ratio         | ER              | 8.2                   |      |      | dB   |
| Rise/Fall Time(20%~80%)  | $t_r/t_f$       |                       |      | 2    | ps   |
| Output Optical Eye       |                 | IUT-T G.957 Compliant |      |      |      |
| TX Disable Assert Time   | $t_{off}$       |                       |      | 10   | us   |
| Pout@TX Disable Asserted | $P_{out}$       |                       |      | -45  | dBm  |

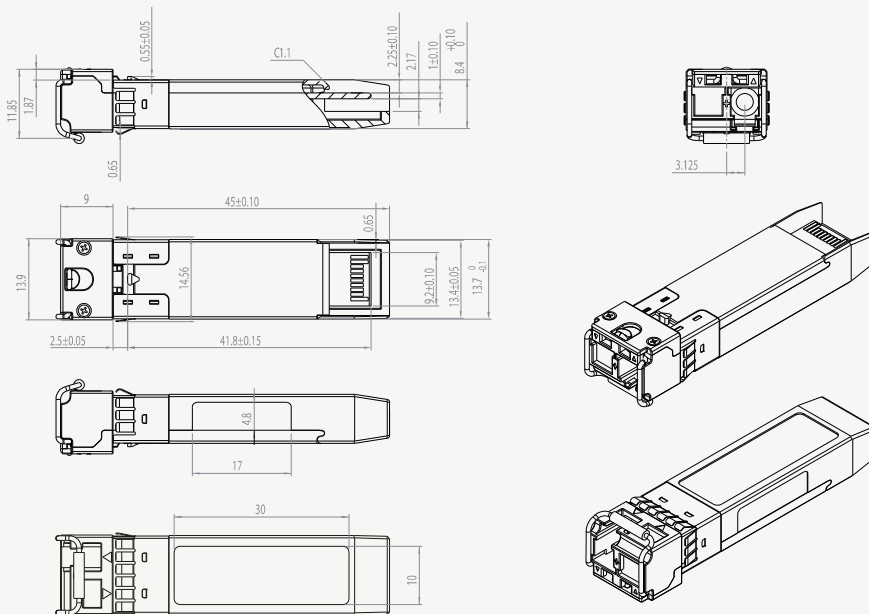
## OPTICAL AND ELECTRICAL CHARACTERISTICS RECEIVER

| Parameter            | Symbol    | Min  | Typ  | Max  | Unit |
|----------------------|-----------|------|------|------|------|
| Centre Wavelength    | $\lambda$ | 1260 | 1310 | 1360 | nm   |
| Receiver Sensitivity | $P_{min}$ | OC-3 |      | -28  | dBm  |
|                      |           | 100M |      | -29  | dBm  |
| Receiver Overload    | $P_{max}$ | -8   |      |      | dBm  |
| LOS De-Assert        | LOSD      |      |      | -30  | dBm  |
| LOS Assert           | LOSA      | -42  |      |      | 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



Subject to change without notice.

For more information, visit [smartoptics.com](http://smartoptics.com).