# 10Gbps SFP+ Tx1270nm/Rx1330nm BiDi 10Km Transceiver

LF-BL23TG-10Dx

## Product Feature

- Up to 11.3G/s data links
- DFB laser transmitter and PIN photo-detector
- Up to 10km on 9/125μm SMF
- Hot-pluggable SFP+ footprint
- Single LC/UPC type pluggable optical interface
- Low power dissipation
- Metal enclosure, for lower EMI
- RoHS compliant and lead-free
- Single +3.3V power supply
- Support Digital Diagnostic Monitoring interface
- Compliant with SFF-8472
- Case operating temperature Commercial: 0°C to +70°C
  Industrial: -40°C to +85°C

## Applications

- 10GBASE-BX&10GBASE-BX/LW
- 10GSONET/SDH,OTU2/2e
- Other Optical Links

## Product Description

LF-BL23TG-10Dx Small Form Factor Pluggable transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA). The transceiver consists of five sections: the LD driver, the limiting amplifier, the digital diagnostic monitor, the DFB laser and the PIN photo-detector .The module data link up to 10KM in 9/125um single mode fiber.

The optical output can be disabled by a TTL logic high-level input of Tx Disable, and the system also can disable the module via I2C. Tx Fault is provided to indicate that degradation of the laser. Loss of signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with partner. The system can also get the LOS (or Link)/Disable/Fault information via I2C register access.

## Product Selection

| Part Number | Operating Case temperature | DDMI |
|---|---|---|
| LF-BL23TG-10DC | Commercial(0~70℃) | Yes |
| LF-BL23TG-10DI | Industrial(-40~85℃) | Yes |

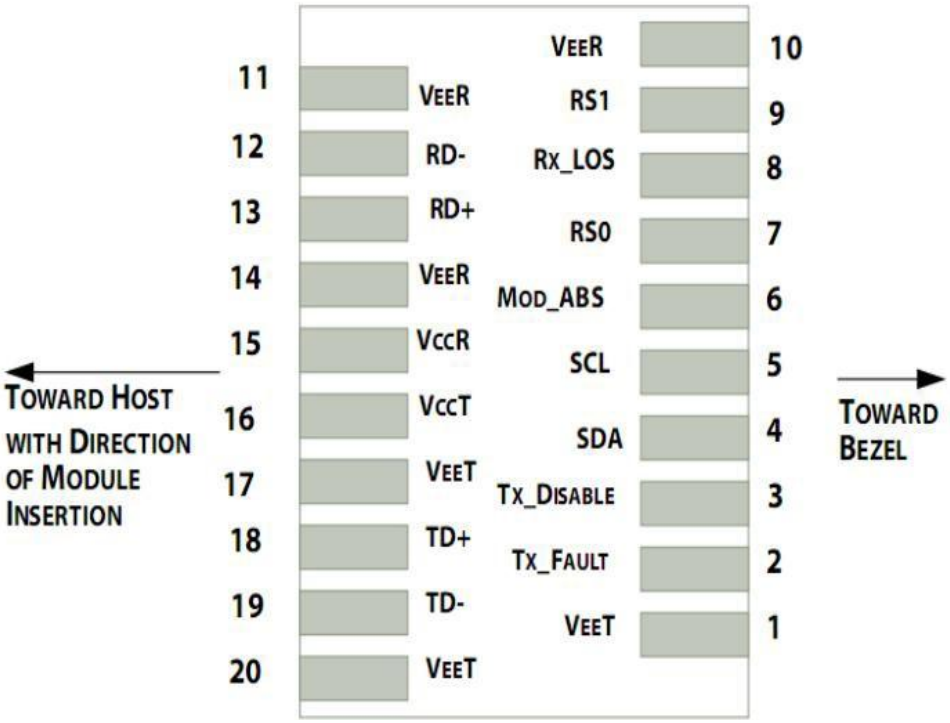
## Pin Descriptions

| Pin | Symbol | Name/Description | NOTE |
|---|---|---|---|
| 1 | VEET | Transmitter Ground (Common with Receiver Ground) | 1 |
| 2 | TFAULT | Transmitter Fault. | |
| 3 | TDIS | Transmitter Disable. Laser output disabled on high or open. | 2 |
| 4 | SDA | 2 wire ID interface,SDA | 3 |
| 5 | SCL | 2 wire ID interface,SCL | 3 |
| 6 | MOD_DEF(0) | Module Definition 0. Grounded within the module. | 3 |
| 7 | RS0 | No connection required | 4 |
| 8 | LOS | Loss of Signal indication. Logic 0 indicates normal operation. | 5 |
| 9 | RS1 | Receiver Ground (Common with Transmitter Ground) | 1 |
| 10 | VEER | Receiver Ground (Common with Transmitter Ground) | 1 |
| 11 | VEER | Receiver Ground (Common with Transmitter Ground) | 1 |
| 12 | RD- | Receiver Inverted DATA out. AC Coupled | |
| 13 | RD+ | Receiver Non-inverted DATA out. AC Coupled | |
| 14 | VEER | Receiver Ground (Common with Transmitter Ground) | 1 |
| 15 | VCCR | Receiver Power Supply | |
| 16 | VCCT | Transmitter Power Supply | |
| 17 | VEET | Transmitter Ground (Common with Receiver Ground) | 1 |
| 18 | TD+ | Transmitter Non-Inverted DATA in. AC Coupled. | |
| 19 | TD- | Transmitter Inverted DATA in. AC Coupled. | |

| | | | |
|---|---|---|---|
| 20 | VEET | Transmitter Ground (Common with Receiver Ground) | 1 |

**Notes:**

- Circuit ground is internally isolated from chassis ground.
- Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
- Should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V.MOD_DEF (0) pulls line low to indicate module is plugged in.
- This is an optional input used to control the receiver bandwidth for compatibility with multiple data rates (most likely Fiber Channel 1x and 2x Rates).If implemented, the input will be internally pulled down with > 30kΩ resistor. The input states are:
- Low (0 – 0.8V): Reduced Bandwidth
- (>0.8, < 2.0V): Undefined
- High (2.0 – 3.465V): Full Bandwidth
- Open: Reduced Bandwidth
- LOS is open collector output should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.




Pin-out of Connector Block on Host Board

## Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Storage Temperature | Ts | -50 | | +95 | ℃ | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Relative Humidity | RH | 0 | | 95 | % | |
| Power Supply Voltage | VCC | -0.5 | | +4 | V | |

## Recommended Operating Conditions

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Case Operating Temperature | Tc | 0 | | 70 | ℃ | Commercial |
| | TI | -40 | | 85 | ℃ | Industrial |
| Power Supply Voltage | VCC | 3.13 | 3.3 | 3.47 | V | |
| Power Supply Current | ICC | | | 300 | mA | |
| Data Rate | BR | | 10.31 | | Gbps | |
| 9/125um G.652 SMF | Lmax | | | 10 | km | |

## Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| **Transmitter** | | | | | | |
| Tx Disable Input-High | VDISH | 2 | | Vcc+0.3 | V | |
| Tx Disable Input-Low | VDISL | 0 | | 0.8 | V | |
| Tx Fault Input-High | VTxFH | 2 | | Vcc+0.3 | V | |
| Tx Fault Input-Low | VTxFL | 0 | | 0.8 | V | |
| **Receiver** | | | | | | |
| LOSS -High | VLOSH | 2 | | Vcc+0.3 | V | |
| LOSS -Low | VLOSL | 0 | | 0.8 | V | |

## Optical Characteristics

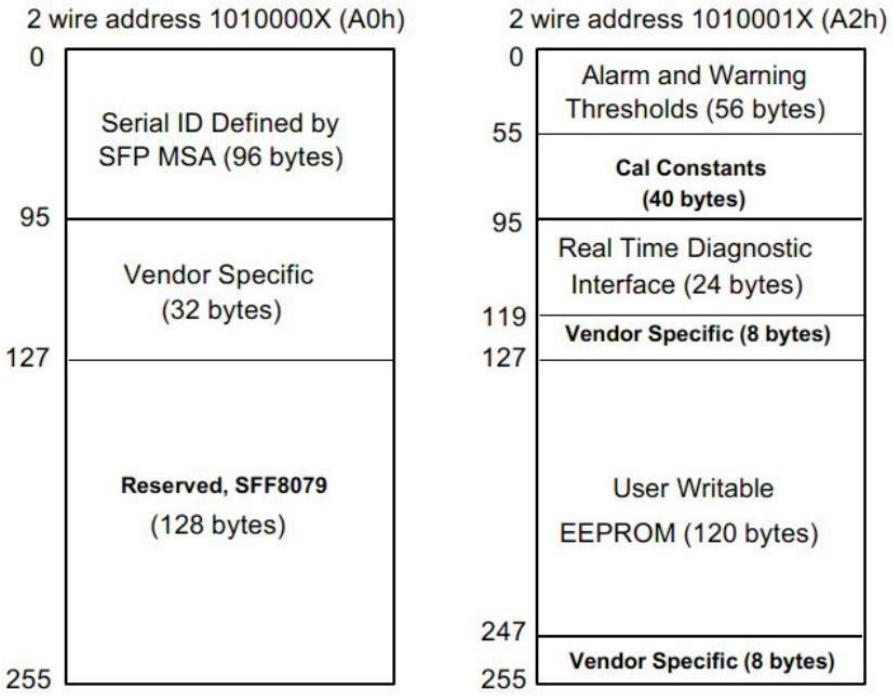
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| **Transmitter** | | | | | | |
| Average Output Power | POUT | -8.2 | | 0.5 | dBm | |
| Transmitter OFF Output Power | Poff | | | -45 | dBm | |
| Center Wavelength | λC | 1260 | 1270 | 1280 | nm | DFB Laser |

| | | | | | | |
|---|---|---|---|---|---|---|
| Side mode suppression ratio | SMSR | | | 30 | dB | |
| Spectum Bandwidth(-20dB) | σ | | | 1 | dB | |
| Extinction Ratio | ER | 3.5 | | | dB | |
| **Receiver** | | | | | | |
| Receiver Sensitivity | SENS | | | -14.4 | dBm | 1 |
| Receiver Overload | | 0.5 | | | dBm | |
| Input Optical Wavelength | λC | 1320 | 1330 | 1340 | nm | PIN-TIA |
| LOS De-assert | LOSD | | | -17 | dBm | |
| LOS Assert | LOSA | -30 | | | dBm | 2 |
| LOS Hysteresis | | 0.5 | | 5 | dB | |

Note:
Measured with PRBS=2^31-1 at BER = 10^–12@10.3125Gbps
When LOS de-asserted, the RX data+/- output is High-level (fixed).

## EEPROM Information

EEPROM memory map specific data field description is as below:

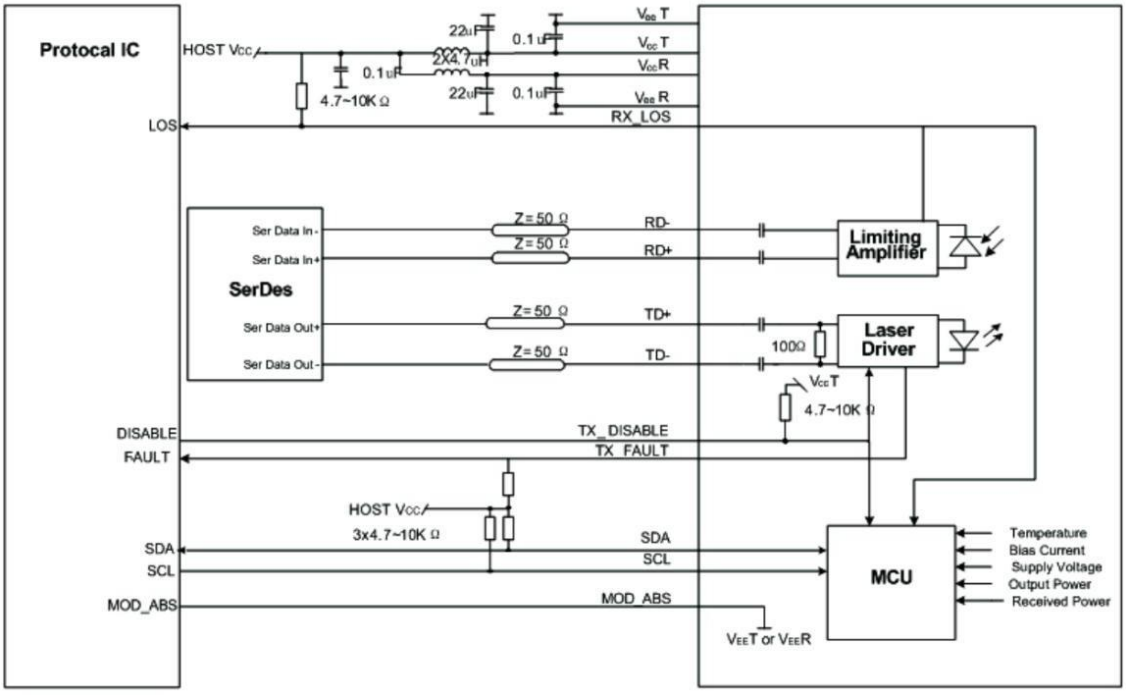


## Digital Diagnostic Monitoring Interface

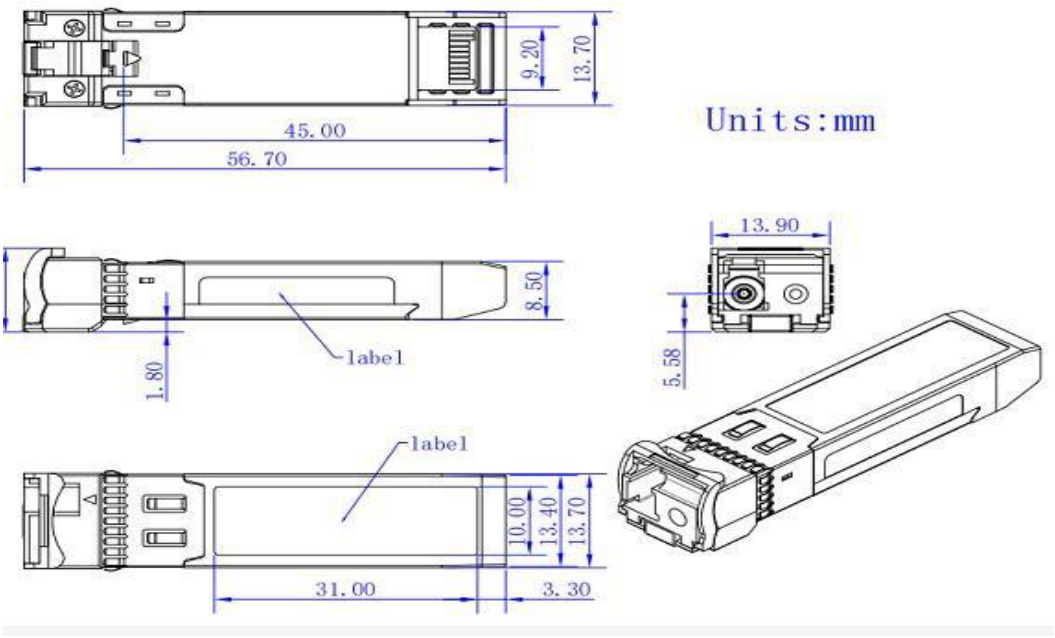
Five transceiver parameter values are monitored. The following table defines the monitored parameter’s accuracy.

| Parameter | Range | Accuracy | Calibration |
|---|---|---|---|
| Temperature | 0 to +70°C (C) | ±3°C | Internal |
| | -40 to +85°C (I) | | |
| Voltage | 2.97 to 3.63V | ±3% | Internal |
| Bias Current | 0 to 100mA | ±10% | Internal |
| TX Power | -9 to 1 dBm | ±3dBm | Internal |
| RX Power | -15 to 1 dBm | ±3dBm | Internal |

## Recommend Circuit Schematic



## Mechanical Specifications




## Ordering information

| Part Number | Product Description | | | | | |
|---|---|---|---|---|---|---|
| LF-BL23TG-10DC | 1270T/1330R, | 10Gbps, | LC, | 10km, | 0°C~+70°C, | with DDM |
| LF-BL23TG-10DI | 1270T/1330R, | 10Gbps, | LC, | 10km, | -40°C~+85°C, | with DDM |