

**Features**

- „ SFP Multi-Source Agreement compliance
- „ Compliant with IEEE802.3z Gigabit Ethernet Standard
- „ Compliant with Fiber Channel 100-SM-LC-L standard
- „ Industry standard small form pluggable (SFP) package
- „ Simplex LC connector
- „ Differential LVPECL inputs and outputs
- „ Single power supply 3.3V
- „ TTL signal detect indicator
- „ Hot Pluggable
- „ Class 1 laser product complies with EN 60825-1
- „ RoHS compliant



**Ordering Information**

Model Number	Reach	TX/RX	Input/Output	Signal Detect	Temperature	LD Type
ESSFP-BIDI-10-31	10 km	1310/1550	AC/AC	TTL	0 °C to 70°C	1310 FP
ESSFP-BIDI-10-31-I	10 km	1310/1550	AC/AC	TTL	-40 °C to 85°C	1310 FP

**Note: All information contained in this document is subject to change without notice.**

**Absolute Maximum Ratings**

Parameter	Symbol	Min.	Max.	Units	Note
Storage Temperature	$T_S$	-40	85	°C	
Supply Voltage	$V_{CC}$	-0.5	4.0	V	
Input Voltage	$V_{IN}$	-0.5	$V_{CC}$	V	
Output Current	$I_o$	---	50	mA	
Operating Current	$I_{OP}$	---	400	mA	

**Recommended Operating Conditions**

Parameter	Symbol	Min.	Max.	Units	Note
Case Operating Temperature	$T_C$	0	70	°C	ESSFP-BIDI-10-31
		-40	85	°C	ESSFP-BIDI-10-31-I
Supply Voltage	$V_{CC}$	3.1	3.5	V	
Supply Current	$I_{TX} + I_{RX}$	---	250	mA	

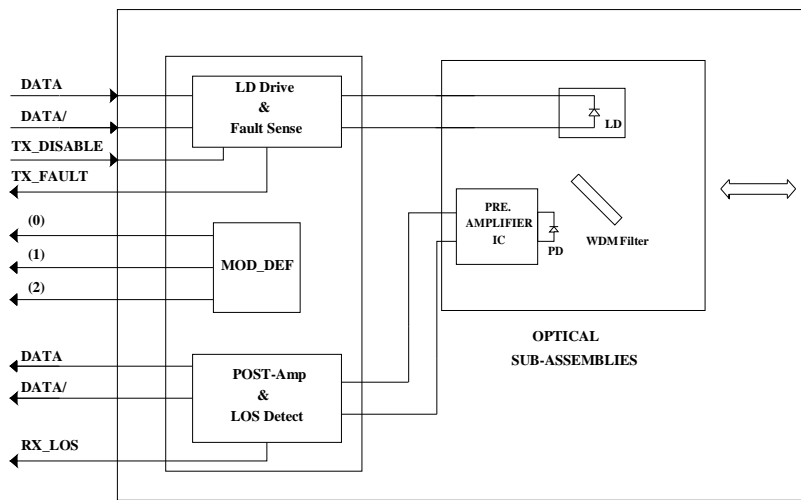
**Transmitter Electro-optical Characteristics**
 **$V_{CC} = 3.1\text{ V to }3.5\text{ V}$ ,  $T_C = 0\text{ °C to }70\text{ °C}$  (-40 °C to 85 °C)**

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Output Optical Power 9/125 $\mu\text{m}$ fiber	$P_{out}$	-9	---	-3	dBm	Average
Extinction Ratio	$ER$	9	---	---	dB	
Center Wavelength	$\lambda_c$	1270	1310	1355	nm	
Spectral Width (RMS)	$\Delta$	---	---	2.5	nm	
Rise/Fall Time, (20-80%)	$T_{r,f}$			260	ps	
Relative Intensity Noise	$RIN$	---	---	-120	dB/Hz	
Total Jitter	$TJ$	---	---	227	ps	
Output Eye		Compliant with IEEE802.3z				
Max. $P_{out}$ TX-DISABLE Asserted	$P_{OFF}$	---	---	-45	dBm	
Differential Input Voltage	$V_{DIFF}$	0.4	---	2.0	V	

**Receiver Electro-optical Characteristics**
 **$V_{CC} = 3.1\text{ V to }3.5\text{ V}$ ,  $T_C = 0\text{ }^\circ\text{C to }70\text{ }^\circ\text{C}$  ( $-40\text{ }^\circ\text{C to }85\text{ }^\circ\text{C}$ )**

<i>Parameter</i>	<i>Symbol</i>	<i>Min.</i>	<i>Typ.</i>	<i>Max.</i>	<i>Units</i>	<i>Note</i>
Optical Input Power-maximum	$P_{IN}$	-1	---	---	dBm	BER < $10^{-12}$
Optical Input Power-minimum (Sensitivity)	$P_{IN}$	---	---	-21	dBm	BER < $10^{-12}$
Operating Center Wavelength	$\lambda_C$	1480	---	1580	nm	
Optical Return Loss	$ORL$	14	---	---	dB	=1480~1580nm
Optical isolation	$ISO$	---	---	-40		=1260~1360nm
Signal Detect-Asserted	$P_A$	---	---	-21	dBm	
Signal Detect-Deasserted	$P_D$	-35	---	---	dBm	
Differential Output Voltage	$V_{DIFF}$	0.5	---	1.2	V	
Data Output Rise, Fall Time (20-80%)	$T_{r,f}$	---	---	0.35	Ns	
Receiver Loss of Signal Output Voltage-Low	$RX\_LOS_L$	0	---	0.5	V	
Receiver Loss of Signal Output Voltage-High	$RX\_LOS_H$	2.4	---	VCC	V	

Block Diagram of Transceiver



**Transmitter and Receiver Optical Sub-assembly Section**

A 1310 nm InGaAsP laser and an InGaAs PIN photodiode integrate with an WDM filter to form a bi-directional single fiber optical subassembly (OSA). The laser of OSA is driven by a LD driver IC which converts differential input LVPECL logic signals into an analog laser driving current. And, The photodiode of OSA is connected to a circuit providing post-amplification quantization, and optical signal detection.

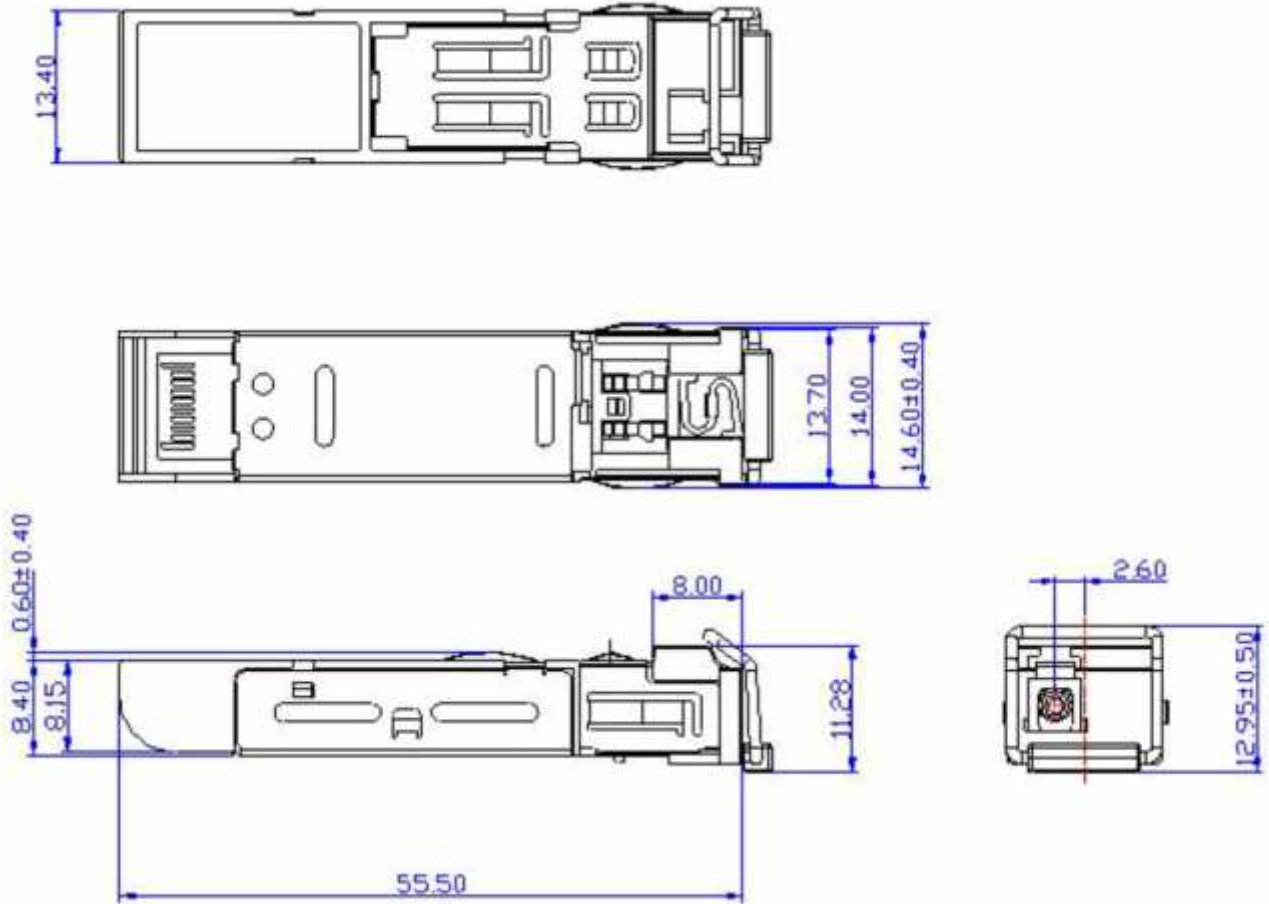
**TX\_DISABLE**

The TX\_DISABLE signal is high (TTL logic "1") to turn off the laser output.

**Receive Loss (RX\_LOS)**

The RX\_LOS is high (logic "1") when there is no incoming light from the companion transceiver. This signal is normally used by the system for the diagnostic purpose. The signal is operated in TTL level.

Dimensions



**DIMENSIONS ARE IN MILLIMETERS**

**ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED**