

Bi-Directional Transceiver

SFP, LC Simplex Connector , 3.3V

1.0625 Gbps Fiber Channel/1.25 Gbps Gigabit Ethernet



Features

- Compliant with Gigabit Interface Converter Specification
- Compliant with IEEE802.3z Gigabit Ethernet standard
- Compliant with SFF8472 diagnostic monitoring interface
- Compliant with Fiber Channel standard
- Simplex LC connector
- Single power supply 3.3V
- RoHS Compliance
- Hot Pluggable
- Class 1 laser product complies with EN 60825-1

Ordering Information

PART NUMBER	TX/RX	VOLTAGE	TEMPERATURE	LD Type	Distance
CFORTH-SFP-35-10	1310/1550	3.3V	0°C to 70°C	1310 FP	10km
CFORTH-SFP-53-10	1550/1310	3.3V	0°C to 70°C	1550 DFB	10km
CFORTH-SFP-35-20	1310/1550	3.3V	0°C to 70°C	1310 FP	20km
CFORTH-SFP-53-20	1550/1310	3.3V	0°C to 70°C	1550 DFB	20km
CFORTH-SFP-35-40	1310/1550	3.3V	0°C to 70°C	1310 DFB	40km
CFORTH-SFP-53-40	1550/1310	3.3V	0°C to 70°C	1550 DFB	40km
CFORTH-SFP-35-60	1310/1550	3.3V	0°C to 70°C	1310 DFB	60km
CFORTH-SFP-53-60	1550/1310	3.3V	0°C to 70°C	1550 DFB	60km

Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTE
Storage Temperature	T_S	-40	85	°C	
Maximum Voltage	V_{MAX}	-0.5	4.0	V	
Input Voltage	V_{IN}	-0.5	V_{CC}	V	

Recommended Operating Conditions

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTE
Ambient Operating Temperature	T_{AMB}	0	70	°C	
Supply Voltage	V_{CC}	3.0	3.6	V	



CFORTH-BIDI-SFP 1310/1550nm DATASHEET

Supply Current	$I_{TX} + I_{RX}$	---	300	mA	
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Transmitter Electro-optical Characteristics

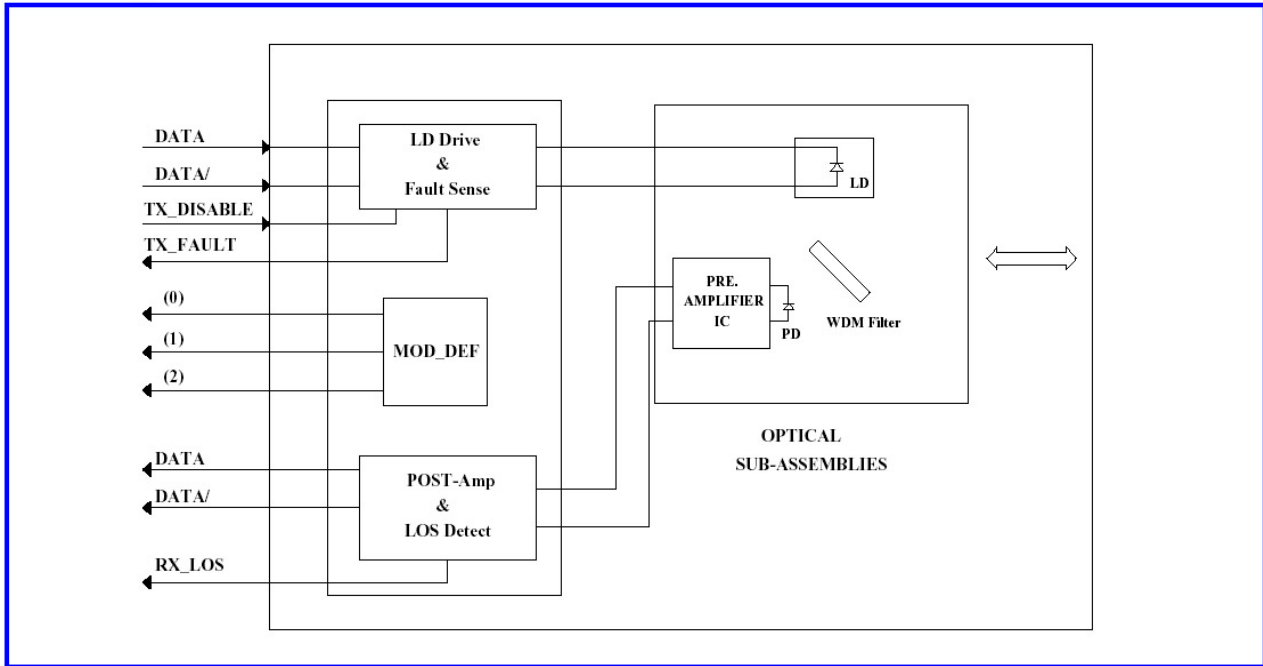
$V_{CC} = 3.0\text{ V to }3.6\text{ V}, T_A = 0^\circ\text{C to }70^\circ\text{C}$

PARAMETER		SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Output Optical Power 9/125 μm fiber	CFORTH-SFP-35-10	P_{out}	-9	---	-3	dBm	Average
	CFORTH-SFP-53-10						
	CFORTH-SFP-35-20	P_{out}	-8	---	-2	dBm	
	CFORTH-SFP-53-20						
	CFORTH-SFP-35-40	P_{out}	-3	---	+2	dBm	
	CFORTH-SFP-53-40						
CFORTH-SFP-35-60	P_{out}	0	---	+5	dBm		
CFORTH-SFP-53-60							
Extinction Ratio		ER	9	---	---	dB	
Center Wavelength	CFORTH-SFP-35-10	λ_C	1290	1310	1330	nm	
	CFORTH-SFP-35-20						
	CFORTH-SFP-35-40						
	CFORTH-SFP-35-60						
	CFORTH-SFP-53-10	λ_C	1530	1550	1570	nm	
	CFORTH-SFP-53-20						
	CFORTH-SFP-53-40						
	CFORTH-SFP-53-60						
Spectral Width (RMS)	CFORTH-SFP-35-10	$\Delta\lambda$	---	---	2.5	nm	
	CFORTH-SFP-35-20						
	CFORTH-SFP-53-10	$\Delta\lambda$	---	---	1.0	nm	
	CFORTH-SFP-53-20						
	CFORTH-SFP-35-40						
	CFORTH-SFP-53-40						
CFORTH-SFP-35-60	$\Delta\lambda$	---	---	1.0	nm		
CFORTH-SFP-53-60							
Side Mode Suppression Ratio	CFORTH-SFP-53-10	$SMSR$	30	---	---	dB	
	CFORTH-SFP-53-20						
	CFORTH-SFP-35-40						
	CFORTH-SFP-53-40						
	CFORTH-SFP-35-60						
CFORTH-SFP-53-60							
Rise/Fall Time, (20–80%)		$T_{r,f}$	---	150	260	ps	
Relative Intensity Noise		RIN	---	---	-120	dB/Hz	
Deterministic Jitter Contribution		$TX_ \Delta DJ$	---	30	60	ps	
Total Jitter Contribution		$TX_ \Delta TJ$	---	60	120	ps	
Output Eye		Compliant with IEEE802.3z					

Receiver Electro-optical Characteristics
 $V_{CC} = 3.0\text{ V to }3.6\text{ V}, T_A = 0^\circ\text{C to }70^\circ\text{C}$

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Optical Input Power-maximum	P_{IN}	0	---	---	dBm	BER < 10^{-12}
Optical Input Power-minimum (Sensitivity)	CFORTH-SFP-35-10	P_{IN}	---	---	-21	BER < 10^{-12}
	CFORTH-SFP-53-10					
	CFORTH-SFP-35-20	P_{IN}	---	---	-23	
	CFORTH-SFP-53-20					
	CFORTH-SFP-35-40					
	CFORTH-SFP-53-40					
CFORTH-SFP-35-60	P_{IN}	---	---	-25	dBm	
Operating Center Wavelength	CFORTH-SFP-35-10	λ_C	1480	---	1580	nm
	CFORTH-SFP-35-20					
	CFORTH-SFP-35-40					
	CFORTH-SFP-35-60					
	CFORTH-SFP-53-10	λ_C	1260	---	1360	nm
	CFORTH-SFP-53-20					
	CFORTH-SFP-53-40					
	CFORTH-SFP-53-60					
Optical Return Loss	ORL	14	---	---	dB	
Optical isolation	ISO	---	---	-40	dB	
Loss of Signal-Deasserted	CFORTH-SFP-35-10	P_{LOS_D}	---	---	-21	dBm
	CFORTH-SFP-53-10					
	CFORTH-SFP-35-20	P_{LOS_D}	---	---	-23	
	CFORTH-SFP-53-20					
	CFORTH-SFP-35-40					
	CFORTH-SFP-53-40					
CFORTH-SFP-35-60	P_{LOS_D}	---	---	-25	dBm	
Loss of Signal-Asserted	P_{LOS_A}	-30	---	---	dBm	
Loss of Signal-Hysteresis		0.5	---	---	dB	
Data output rise/fall time(20%-80%)	T_R	---	---	300	ps	

Block Diagram of Transceiver



Transmitter and Receiver Optical Sub-assembly Section

A 1310/1550nm InGaAsP laser and an InGaAs PIN photodiode integrate with a 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_FAULT

When sensing an improper power level in the laser driver, the SFP set this signal high and turns off the Laser. TX_FAULT can be reset with the TX_DISABLE line. The signal is in TTL level.

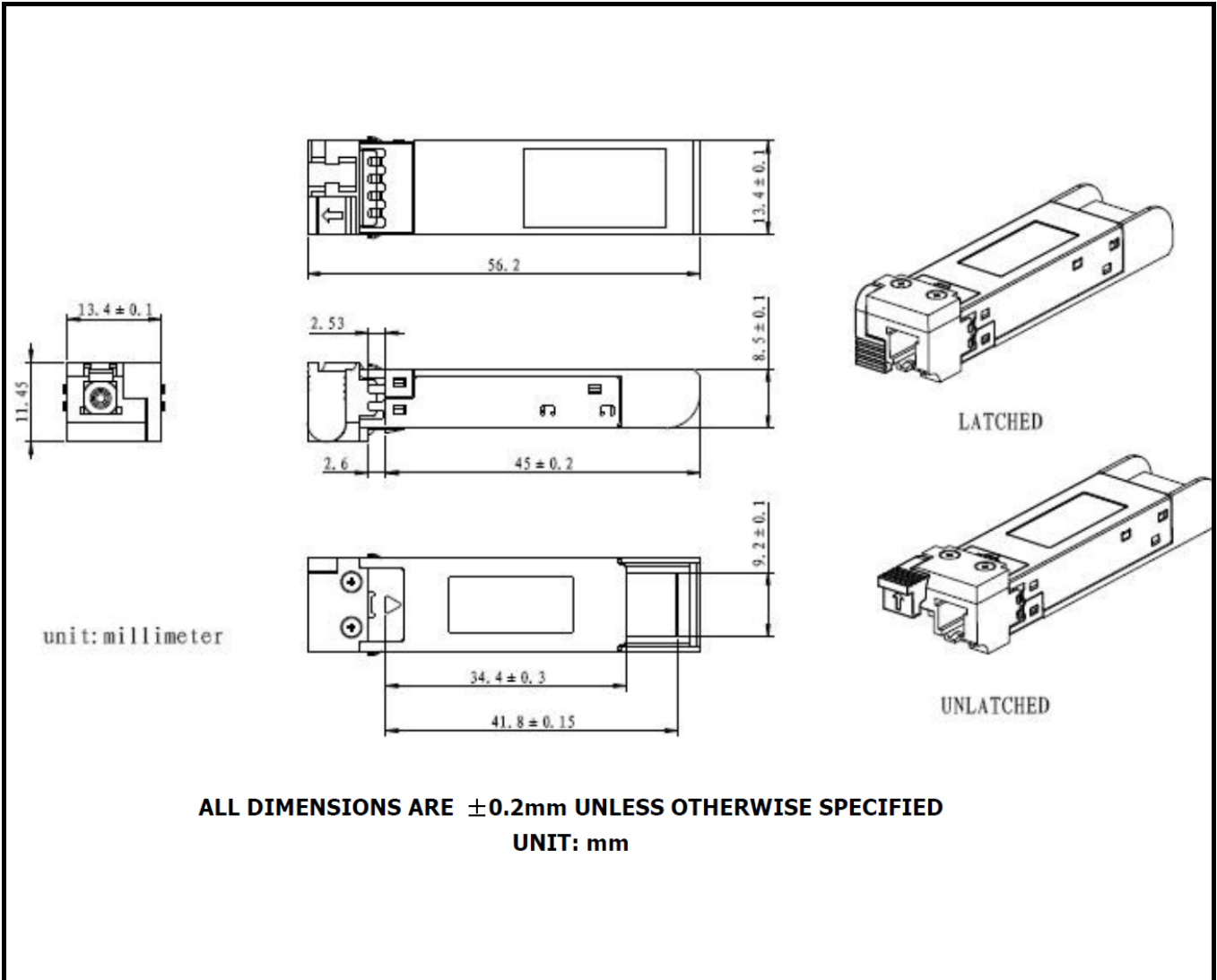
TX_DISABLE

The TX_DISABLE signal is high (TTL logic "1") to turn off the laser output. The laser will turn on within 1ms when TX_DISABLE is low (TTL logic "0").

Receive Loss (RX_LOS)

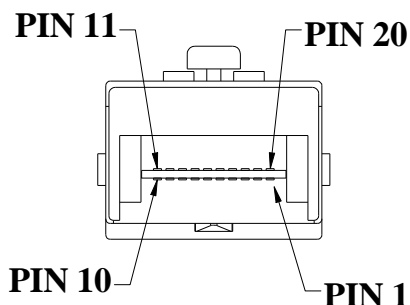
The RX_LOS is high (logic "1") when there is no incoming light from the companion transceiver. This signal is normally used by the system for the diagnostic purpose. The signal is operated in TTL level.

Dimensions



Pin Assignment

Pin-Out



Pin	Signal Name	Description
1	T_{GND}	Transmit Ground
2	TX_FAULT	Transmit Fault
3	$TX_DISABLE$	Transmit Disable
4	$MOD_DEF (2)$	SDA Serial Data Signal
5	$MOD_DEF (1)$	SCL Serial Clock Signal
6	$MOD_DEF (0)$	TTL Low
7	$RATE_SELECT$	Open Circuit
8	RX_LOS	Receiver Loss of Signal, TTL High, open collector
9	R_{GND}	Receiver Ground
10	R_{GND}	Receiver Ground
11	R_{GND}	Receiver Ground
12	$RX-$	Receive Data Bar, Differential PECL, AC coupled
13	$RX+$	Receive Data, Differential PECL, AC coupled
14	R_{GND}	Receiver Ground
15	V_{CCR}	Receiver Power Supply
16	V_{CCT}	Transmitter Power Supply
17	T_{GND}	Transmitter Ground
18	$TX+$	Transmit Data, Differential PCEL, AC coupled
19	$TX-$	Transmit Data Bar, Differential PCEL, AC coupled
20	T_{GND}	Transmitter Ground

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