

1310nm/1490nm Single-mode SFP Transceiver

Bi-directional LC Simplex Connector (10km~60km), 3.3V

1.0625Gbps Fiber Channel/1.25Gbps Gigabit Ethernet

Features

- Up to 1.25GBd bi-Directional data links
- Single LC connector
- Compliant with IEEE802.3z Gigabit Ethernet
- Compliant with SFP MSA
- Hot-pluggable SFP footprint
- Built-in digital diagnostic functions
- Single power supply 3.3V
- RoHS compliance
- Class 1 laser product complies with EN 60825-1



Ordering Information

PART NUMBER	TX/RX	VOLTAGE	TEMPERATURE	LD Type	Distance
CFORTH-SFP-34-10	1310/1490	3.3V	0°C to 70°C	1310 FP	10km
CFORTH-SFP-43-10	1490/1310	3.3V	0°C to 70°C	1490 DFB	10km
CFORTH-SFP-34-20	1310/1490	3.3V	0°C to 70°C	1310 FP	20km
CFORTH-SFP-43-20	1490/1310	3.3V	0°C to 70°C	1490 DFB	20km
CFORTH-SFP-34-40	1310/1490	3.3V	0°C to 70°C	1310 DFB	40km
CFORTH-SFP-43-40	1490/1310	3.3V	0°C to 70°C	1490 DFB	40km
CFORTH-SFP-34-60	1310/1490	3.3V	0°C to 70°C	1310 DFB	60km
CFORTH-SFP-43-60	1490/1310	3.3V	0°C to 70°C	1490 DFB	60km

General Specifications

PARAMETER	SYMBOL	MIN	Typ	MAX	UNITS	NOTE
Data Rate	DR		1.25 1.062		GB	IEEE802.3 FC-PI-2 Rev 5
Bit Error Rate	BER			10 ⁻¹²		
Operating Temperature	T _{OP}	0		70	°C	
Storage Temperature	T _S	-40		85	°C	
Supply Current	I _S		200	300	mA	
Input Voltage	V _{CC}	3	3.3	3.6	V	
Maximum Voltage	V _{MAX}	-0.5		4	V	

Transmitter Electro-optical Characteristics

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

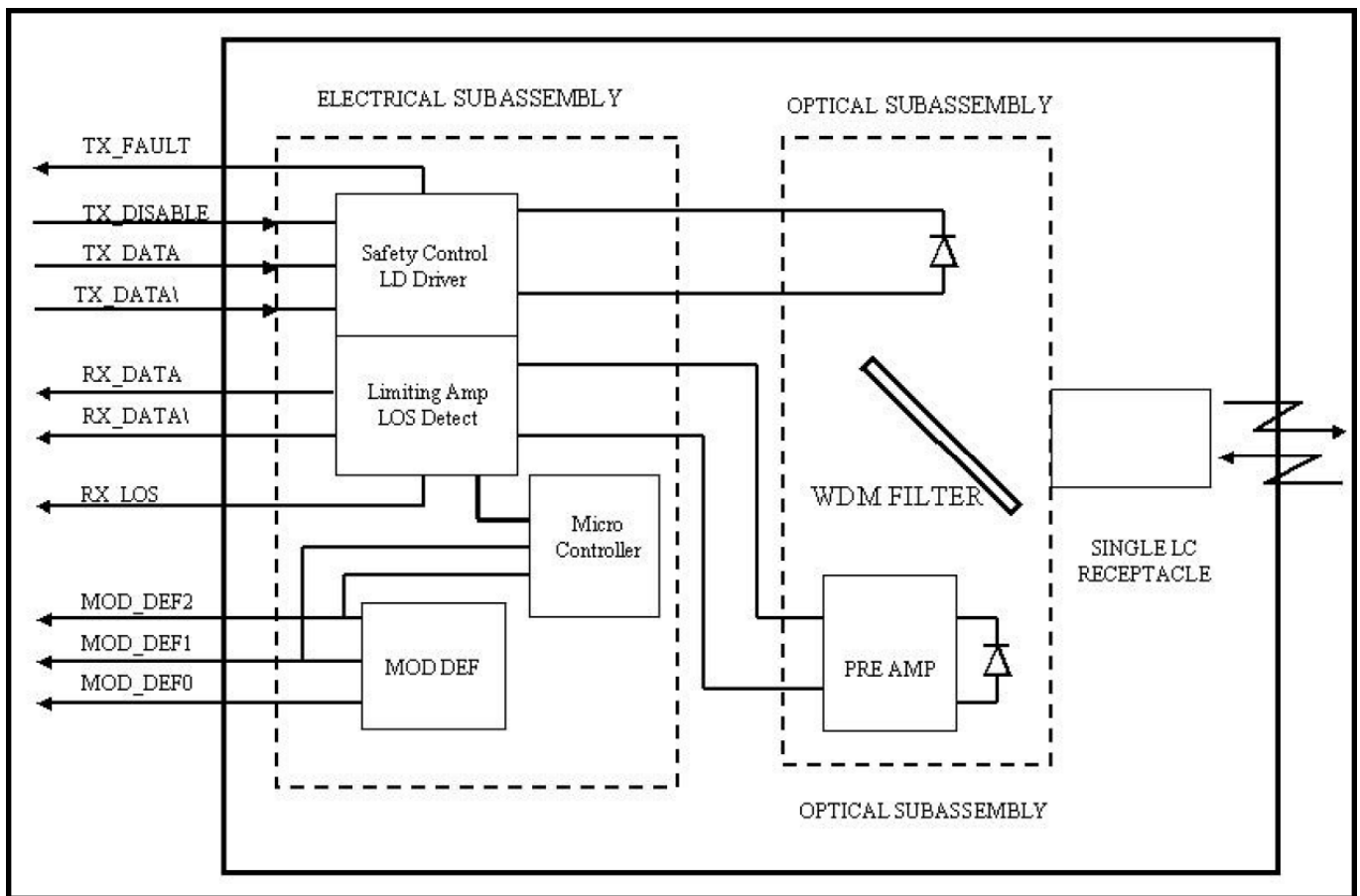
PARAMETER		SYMBOL	MIN	TYP.	MAX	UNITS	NOTE	
Output Optical Power 9/125 μm fiber	CFORTH-SFP-34-10 CFORTH-SFP-43-10	P_{out}	-9	---	-3	dBm		
	CFORTH-SFP-34-20 CFORTH-SFP-43-20	P_{out}	-8	---	-2	dBm		
	CFORTH-SFP-34-40 CFORTH-SFP-43-40	P_{out}	-3	---	+2	dBm		
	CFORTH-SFP-34-60 CFORTH-SFP-43-60	P_{out}	0	---	+5	dBm		
	Extinction Ratio		ER	9	---	---	dB	
	Center Wavelength	CFORTH-SFP-34-10 CFORTH-SFP-34-20 CFORTH-SFP-34-40 CFORTH-SFP-34-60	λ_C	1290	1310	1330	nm	
CFORTH-SFP-43-10 CFORTH-SFP-43-20 CFORTH-SFP-43-40 CFORTH-SFP-43-60		λ_C	1470	1490	1510	nm		
CFORTH-SFP-34-10 CFORTH-SFP-34-20		$\Delta\lambda$	---	---	2.5	nm		
CFORTH-SFP-43-10 CFORTH-SFP-43-20 CFORTH-SFP-34-40 CFORTH-SFP-43-40 CFORTH-SFP-34-60 CFORTH-SFP-43-60		$\Delta\lambda$	---	---	1.0	nm		
Side Mode Suppression Ratio		CFORTH-SFP-43-10 CFORTH-SFP-43-20 CFORTH-SFP-34-40 CFORTH-SFP-43-40 CFORTH-SFP-34-60 CFORTH-SFP-43-60	$SMSR$	30	---	---	dB	
Rise/Fall Time, (20–80%)			$T_{r,f}$	---	150	260	ps	
Relative Intensity Noise			RIN	---	---	-120	dB/Hz	
Deterministic Jitter Contribution			T_{X_DJ}	---	30	60	ps	
Total Jitter Contribution		T_{X_TJ}	---	60	120	ps		
Output Eye	Compliant with IEEE802.3							

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-34-10	P_{IN}	---	---	-21	dBm	BER < 10^{-12}
	CFORTH-SFP-43-10						
	CFORTH-SFP-34-20	P_{IN}	---	---	-23	dBm	
	CFORTH-SFP-43-20						
	CFORTH-SFP-34-40						
	CFORTH-SFP-43-40						
	CFORTH-SFP-34-60						
CFORTH-SFP-43-60	P_{IN}	---	---	-25	dBm		
Operating Center Wavelength	CFORTH-SFP-34-10	λ_C	1450	---	1530	nm	
	CFORTH-SFP-34-20						
	CFORTH-SFP-34-40						
	CFORTH-SFP-34-60						
	CFORTH-SFP-43-10	λ_C	1260	---	1360	nm	
	CFORTH-SFP-43-20						
	CFORTH-SFP-43-40						
	CFORTH-SFP-43-60						
Optical Return Loss		ORL	14	---	---	dB	
Optical isolation		ISO	---	---	-40	dB	
Loss of Signal-Deasserted	CFORTH-SFP-34-10	P_{LOS_D}	---	---	-21	dBm	
	CFORTH-SFP-43-10						
	CFORTH-SFP-34-20	P_{LOS_D}	---	---	-23	dBm	
	CFORTH-SFP-43-20						
	CFORTH-SFP-34-40						
	CFORTH-SFP-43-40						
	CFORTH-SFP-34-60						
CFORTH-SFP-43-60	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 Section

The driver accept differential input data and provide bias and modulation currents for driving a laser. An automatic power-control (APC) feedback loop is incorporated to maintain a constant average optical power. an eye safe optical subassembly (OSA) mates to the fiber cable.

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”).

TX_FAULT

When the TX_FAULT signal is high, output indicates a laser fault of some kind. Low indicates normal operation.

Receiver Section

The receiver utilizes a PIN detector integrated with a trans-impedance preamplifier in an OSA. This OSA is connected to a Limiting Amplifier which providing post-amplification quantization, and optical signal detection. The limiting Amplifier is AC-coupled to the transimpedance amplifier, with internal 100Ω differential termination.

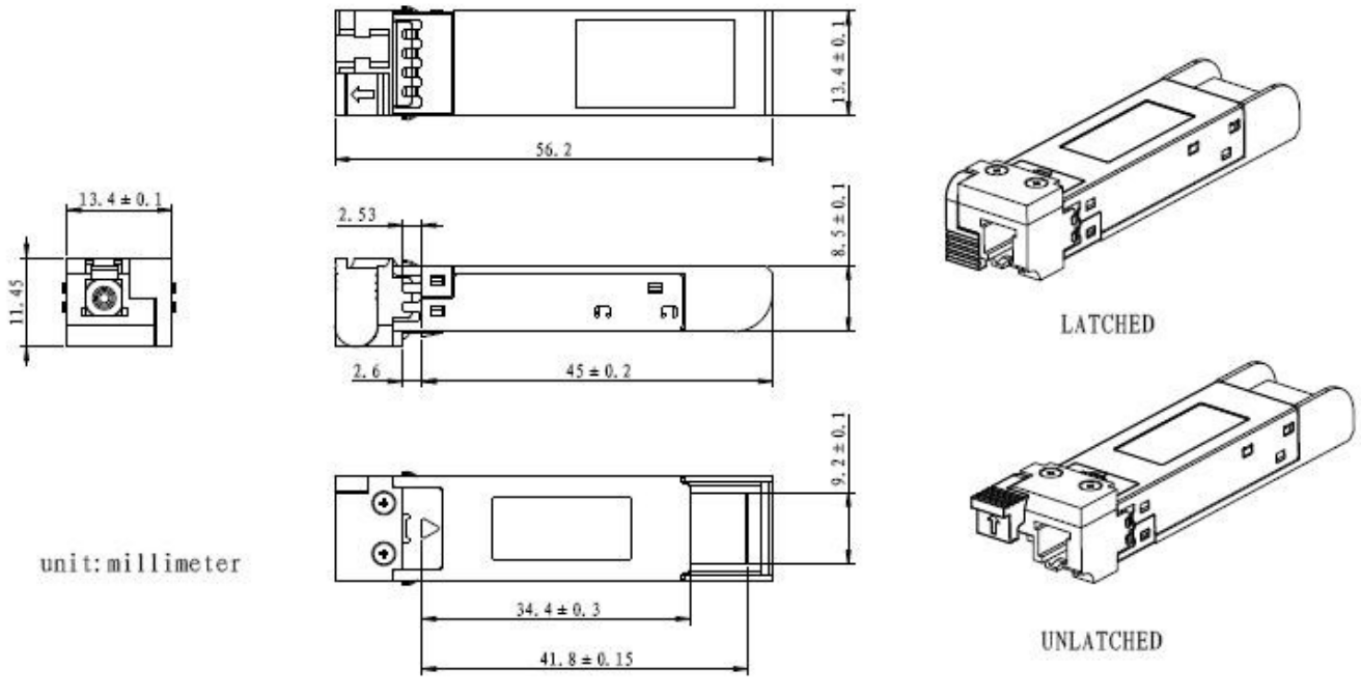
Receive Loss (RX_LOS)

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.

Controller Section

The micro controller unit monitors the operation information of LD driver and Limiting Amplifier. And report these status to the customer.

Dimensions



ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED

UNIT: mm

Pin Assignment

Pin	Signal Name	Description
1	V_{EET}	Transmit Ground (common with receiver ground)
2	T_{FAULT}	Transmit Fault. Not supported
3	T_{DIS}	Transmit Disable. Laser output disable on high or open
4	$MOD_DEF (2)$	Module Definition 2. Data line for serial ID
5	$MOD_DEF (1)$	Module Definition 1. Data line for serial ID
6	$MOD_DEF (0)$	Module Definition 0. Ground within the module
7	$RATE_SELECT$	No connection required
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation
9	V_{EER}	Receiver Ground (common with receiver ground)
10	V_{EER}	Receiver Ground (common with receiver ground)
11	V_{EER}	Receiver Ground (common with receiver ground)
12	$RD-$	Receive Inverted Data out. AC coupled
13	$RD+$	Receive Non-Inverted Data out. AC coupled
14	V_{EER}	Receiver Ground (common with receiver ground)
15	V_{CCR}	Receiver Power Supply
16	V_{CCT}	Transmitter Power Supply
17	V_{EET}	Transmitter Ground (common with receiver ground)
18	$TD+$	Transmit Non-Inverted Data in. AC coupled
19	$TD-$	Transmit Inverted Data in. AC coupled
20	V_{EET}	Transmitter Ground (common with receiver ground)

References

1. IEEE Standard 802.3. IEEE Standard Department, 2008.
2. Small Form Factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA)
3. Fiber Channel Draft Physical Interface Specification (FC-PI-2 Rev.5).
4. Digital Diagnostics Monitoring Interface for Optical Transceivers — SFF-8472.
5. Fiber Channel Physical and Signaling Interface (FC-PH/PH2/PH3).