

Preliminary DATA SHEET

CFORTH-SFP28-xx-15

- 25Gb/s SFP28 Tx1270nm/Rx1330nm 15km Bi-directional Transceiver
- 25Gb/s SFP28 Tx1330nm/Rx1270nm 15km Bi-directional Transceiver

CFORTH-SFP28-xx-15 Overview

CFORTH-SFP28-xx-15 optical transceivers are based on 25G Ethernet IEEE 802.3cc standard. They are compliant with SFF-8402, SFF-8432 and SFF-8472, providing a fast and reliable interface for 25G Ethernet applications. The product implements digital diagnostics via a 2-wire serial bus and is compliant with the SFF-8472 standard.

Product Features

- Operating data rate support 24.3Gbps to 26.5Gbps
- Compliant with IEEE 802.3cc
- Compliant with SFF-8402
- Compliant with SFF-8432
- Compliant with SFF-8472
- Internal CDR on both Transmitter and Receiver channel
- Hot-pluggable SFP28 footprint
- DFB laser transmitter and PIN PD Receiver
- Simplex LC connector
- Built-in digital diagnostic functions
- Up to 15km on SMF
- Single power supply 3.3V
- RoHS Compliant
- Operating temperature range (Case Temperature): 0°C to 70°C

Applications

- 25GBASE-LR Ethernet
- CPRI and eCPRI Wireless Networks

Ordering Information

Part Number	Description	Bail Color
CFORTH-SFP28-23-15	25GBASE SFP28 BIDI, TX1270nm/RX1330nm LC Connector 15km on SMF, Commercial Temperature	Yellow
CFORTH-SFP28-32-15	25GBASE SFP28 BIDI, TX1330nm/RX1270nm LC Connector 15km on SMF, Commercial Temperature	Blue

General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Data Rate	DR	24.3		26.5	Gb/s	1
Bit Error Rate	BER			5×10^{-5}		2
Operating Temperature	T_C	0		70	°C	3
Storage Temperature	T_{STO}	-40		85	°C	4
Supply Current	I_{CC}		220	450	mA	5
Input Voltage	V_{CC}	3.14	3.3	3.46	V	
Maximum Voltage	V_{MAX}	-0.5		4	V	5

Notes:

- IEEE 802.3cc
- Measured with data rate at 25.78Gb/s, PRBS $2^{31}-1$
- Case temperature
- Ambient temperature
- For electrical power interface

Link Distances

Data Rate	Fiber Type	Distance Range (km)	Remarks
25.78 Gb/s	9/125um SMF	15	1

Notes:

1. This module requires RS-FEC on the host ports for operation at 25G

Optical Characteristics – Transmitter

$V_{CC}=3.14V$ to $3.46V, T_C$

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Output Optical Power	P_{TX}	0	3.5	6	dBm	1
Optical Center Wavelength(T1270/R1330)	λ_{C1}	1260	1270	1280	nm	
Optical Center Wavelength(T1330/R1270)	λ_{C2}	1320	1330	1340	nm	
Transmitter and Dispersion Penalty	TDP			2.7	dB	
Extinction Ratio	ER	3.5			dB	
Side Mode Suppression Ratio	SMSR	30			dB	
Transmitter Reflectance				-12	dB	
Launch Power of OFF Transmitter	P_{OUT_OFF}			-30	dBm	1

Notes:

1. Average

Optical – Characteristics – Receiver

$V_{CC}=3.14V$ to $3.46V, T_C$

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Optical Center Wavelength(T1270/R1330)	λ_{C1}	1310	1330	1350	nm	
Optical Center Wavelength(T1330/R1270)	λ_{C2}	1250	1270	1290	nm	
Receive Overload	P_{OL}	2			dBm	
Receiver Sensitivity@ 25.78Gb/s	R_{X_SEN1}			-13.9	dBm	1
OMA Receiver Sensitivity@ 25.78Gb/s	R_{X_SEN2}			-14.5	dBm	2
Receiver Reflectance	TR_{RX}			-26	dB	
LOS Assert	LOS_A	-30			dBm	
LOS De-Assert	LOS_D			-17	dBm	
LOS Hysteresis	LOS_H	0.5			dB	

Notes:

1. Average, measured with Tx signal of 3.5dB ER, data rate at 25.78Gb/s and PRBS $2^{31}-1$, BER 5×10^{-5} ;
2. OMA, measured with Tx signal of 3.5dB ER, data rate at 25.78Gb/s and PRBS $2^{31}-1$, BER 5×10^{-5} ;

Electrical Characteristics – Transmitter

$V_{CC}=3.14V$ to $3.46V, T_C$

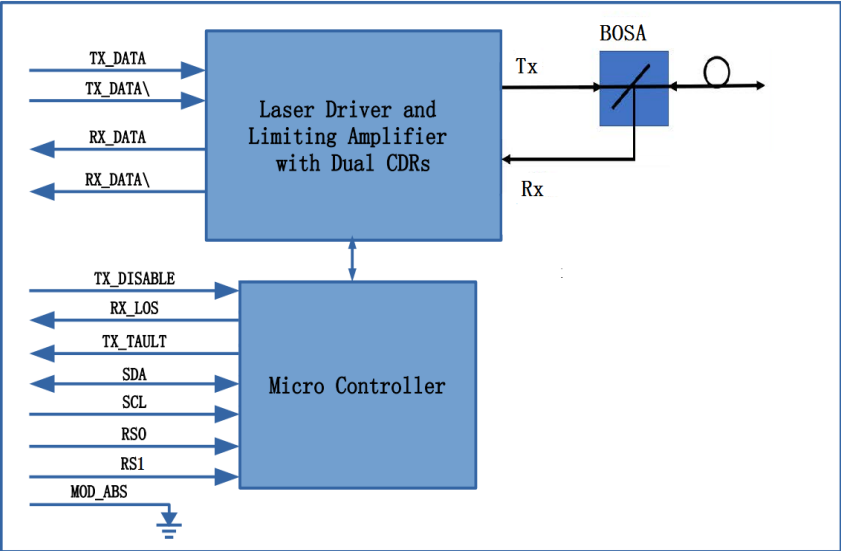
Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Input differential impedance	R_{IN}		100		Ω	
Differential data input swing	V_{IN_PP}	200		900	mV	
Transmit Disable Voltage	V_D	2		V_{CC}	V	
Transmit Enable Voltage	V_{EN}	V_{EE}		$V_{EE}+0.8$	V	

Electrical – Characteristics – Receiver

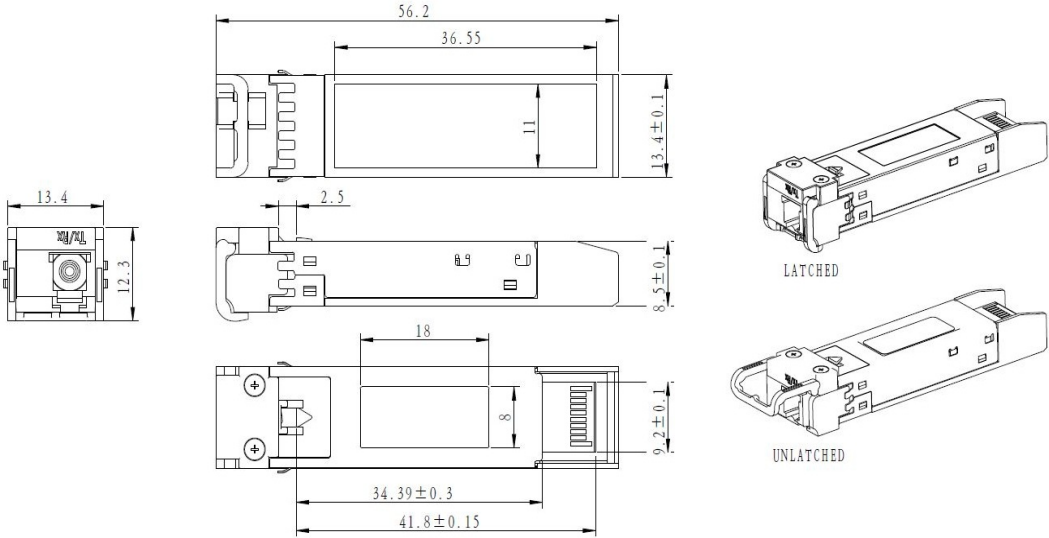
$V_{CC}=3.14V$ to $3.46V, T_C$

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Differential data output swing	V_{OUT_PP}	300		850	mV	
LOS Assert	V_{LOS_A}	2		V_{CC_HOST}	V	
LOS De-Assert	V_{LOS_D}	V_{EE}		$V_{EE}+0.8$	V	

Block-Diagram-of-Transceiver

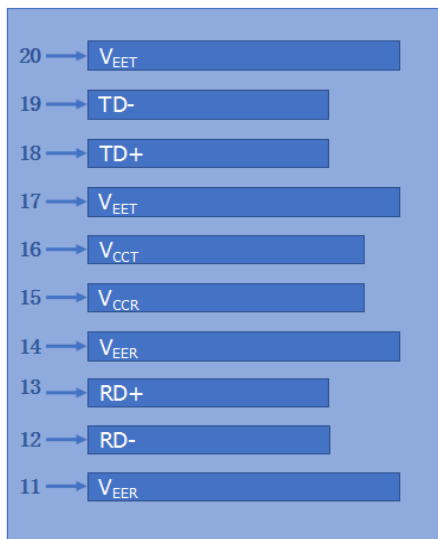


Dimensions

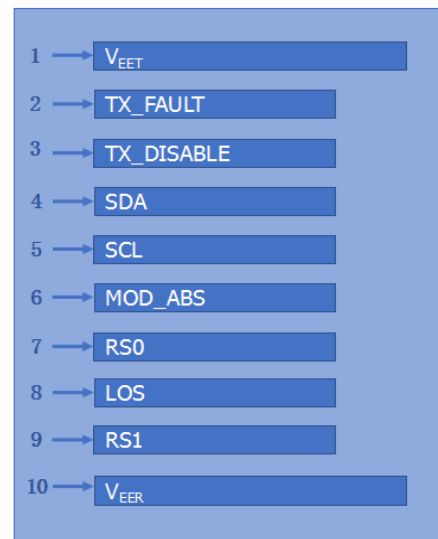


ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED
UNIT: mm

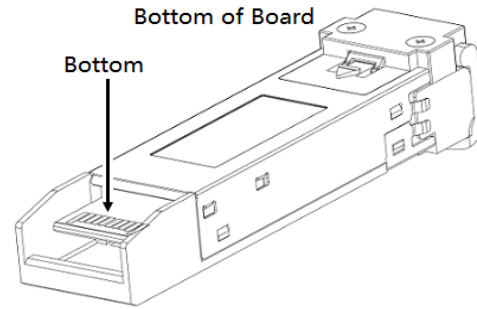
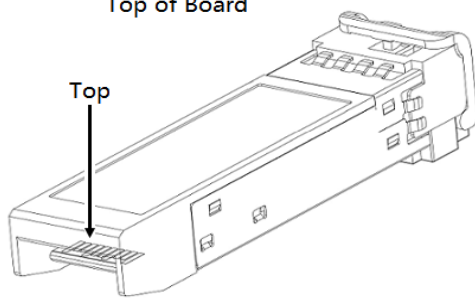
Electrical Pad Layout



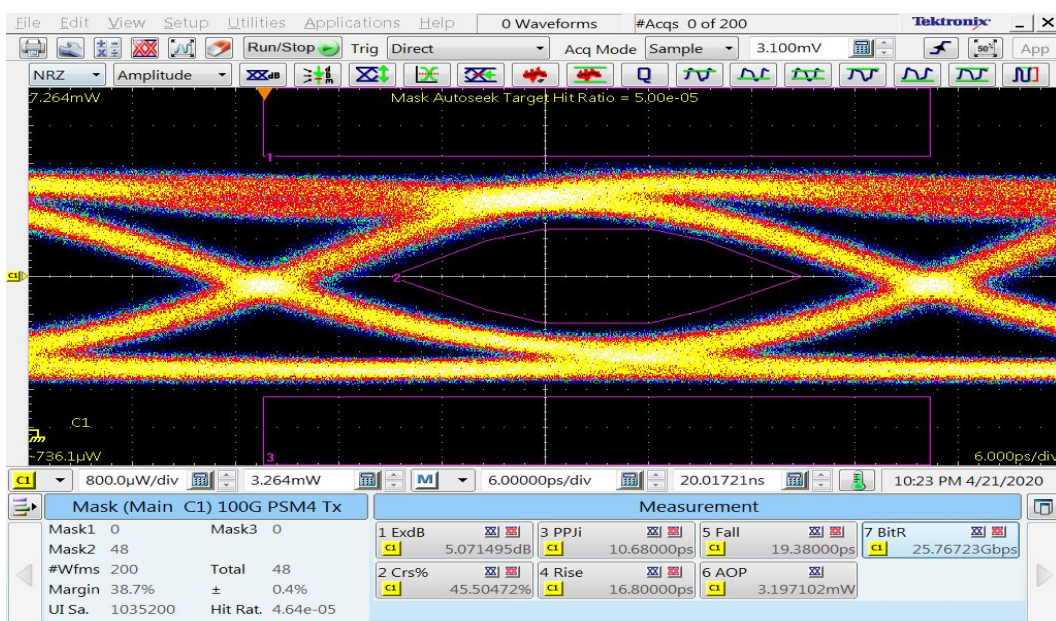
Top of Board



Bottom of Board



Typical Eye Diagram



Pin Assignment

PIN #	Symbol	Description	Remarks
1	V _{EET}	Transmitter ground (common with receiver ground)	1
2	TX_FAULT	Transmitter Fault	2
3	TX_DISABLE	Transmitter Disable. Laser output disabled on high or open	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	No connection required	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation	5
9	RS1	No connection required	1
10	V _{EER}	Receiver ground (common with transmitter ground)	1
11	V _{EER}	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	V _{EER}	Receiver ground (common with transmitter ground)	1
15	V _{CCR}	Receiver power supply	
16	V _{CCT}	Transmitter power supply	
17	V _{EET}	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	V _{EET}	Transmitter ground (common with receiver ground)	1

Notes:

- Circuit ground is isolated from chassis ground
- TX_FAULT is the open collector output and should be pulled up with 4.7k–10k ohm on host board to a voltage between 2V and V_{cc}+0.3V
- Disabled: T_{DIS}>2V or open, Enabled: T_{DIS}<0.8V
- Should be pulled up with 4.7k–10k ohm on host board to a voltage between 2V and V_{cc}+0.3V
- LOS is open collector output and should be pulled up with 4.7k–10k ohm on host board to a voltage between 2V and V_{cc}+0.3V, the logic "0" indicates normal operation, and the logic "1" indicates that the receiver signal is lost.

References

- Specification for SFP+ 1X 28Gbps Pluggable Transceiver Solution - SFF-8402.
- Specification for SFP+ Module and Cage - SFF-8432.
- Specification for Diagnostic Monitoring Interface for SFP+ - SFF-8472.