

25G SFP28 BIDI 10km Transceivers TVCSFP28BD-X-X

Features

- Electrical interface specifications per SFF-8431
- Management interface specifications SFF-8472
- SFP28 MSA package with Single LC receptacle
- 1270nm DFB Laser, PIN photo-detector
- Up to 25.78G bi-directional data links
- Single +3.3V power supply
- Class 1 laser safety certified
- Up to 10km on 9/125µm SMF
- Simplex LC connector compliant
- Single +3.3V DC power supply
- Hot-pluggable SFP footprint
- Class 1 laser safety certified
- Low power dissipation
- Operating temperature Options: +0 ~ +70°C
- RoHS compliance

Applications

- 25GBASE-LR at 25.78Gbps
- 25GBASE-BX at 25.78Gbps
- Wireless



Description

TVCSFP28BD-X-X transceiver is designed for 25GBASE-LR/LW and 24.33G CPRI applications.

The transceiver consists of two sections: The transmitter section incorporates a DFB laser. And the receiver section consists of a PIN photodiode integrated with a TIA. All modules satisfy class I laser safety requirements. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage.

Ordering Information

Part No.	Specification								
	Pack	Rate	Tx	Pout	Rx	Sen	Temp	Reach	Others
TVCSFP28BD-1-A	SFP28	25G	1270nm DFB	-4 ~ +2dBm	PIN	<-10.6dBm	0 ~ 70°C	10km	DDM/RoHS
TVCSFP28BD-1-B	SFP28	25G	1330nm DFB	-4 ~ +2dBm	PIN	<-10.6dBm	0 ~ 70°C	10km	DDM/RoHS

About BIDI optical module: BIDI optical module is a single fiber bi-directional optical module, using WDM technology, transmitting and receiving two different directions of the center wavelength, to achieve bi-directional transmission of optical signals on a fiber. Optical modules generally have two ports: transmitting port (TX) and receiving port (RX), while BIDI optical module has only one port, through the filter in the optical module for filtering, while completing the transmission of one wavelength optical signal and the reception of another wavelength optical signal (BIDI optical module wavelengths are combined form). Therefore, BIDI optical module must be used in pairs (A and B), as its biggest advantage is to save fiber resources.

Specification

Absolute Maximum Ratings					
Parameter	Symbol	Min.	Max.	Unit	
Storage Temperature	T _s	-40	+85	°C	
Supply Voltage	V _{CC3}	3.1	3.6	V	
Relative Humidity(Non-condensing)	RH	5	85	%	

Recommended Operating Conditions					
Parameter	Symbol	Min.	Typical	Max.	Unit
Temperature	T _c	0		70	°C
Power Supply Voltage	V _{CC3}	3.135	3.3	3.465	V
	I _{CC3}	–	–	450	mA
Power Dissipation	P _D	–	–	1.5	W
Data Rate	–	--	24.33	25.78	Gbps
Transmission Distance	–	–	–	10	km

Transmitter Operating Characteristic: Optical, Electrical						
Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Center Wavelength	λ _c	1260	1270	1280	nm	Tx1270nm
Center Wavelength	λ _c	1320	1330	1340	nm	Tx1330nm
Laser Off Power	P _{off}	-	-	-30	dBm	
Average Optical Power	P _{avg}	-4	-	+2	dBm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Extinction Ratio	ER	3	-	-	dB	
Tx_Disable	Disable	–	2	–	VCC	V
	Enable	–	VEE	–	VEE+ 0.8	V

Receiver Operating Characteristic: Optical, Electrical						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Center Wavelength	λ _r	1320	1330	1340	nm	Rx1330nm
Center Wavelength	λ _r	1260	1270	1280	nm	Rx1270nm
Receiver Sensitivity (OMA)	–	–	–	-10.6	dBm	Note1
LOS Assert	LOS A	-30	–	–	dBm	
LOS Dessert	LOS D	–	–	-12	dBm	
LOS Hysteresis	LOSH	0.5	–	6	dB	
Overload	Pin	0.5	–	–	dBm	
Return Loss of Receiver	–	12	–	–	dB	

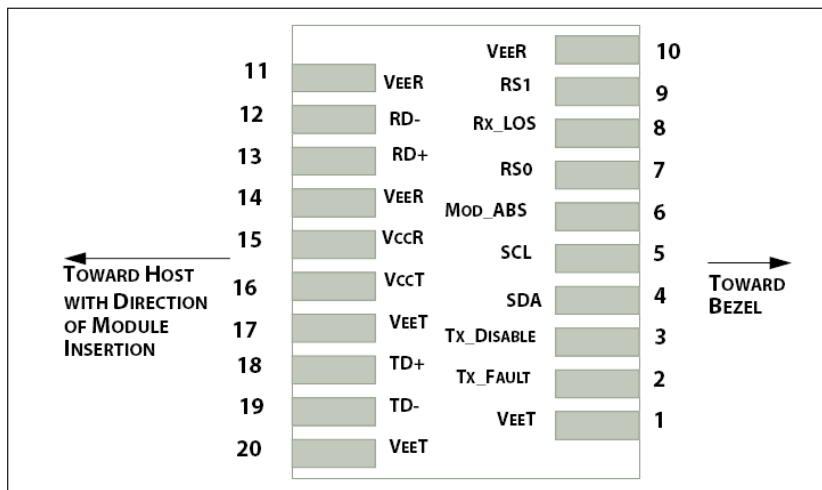
Note1: Measured at all data rates specified in data rate table with 2³¹-1 PRBS data pattern, BER<1E-12 with FEC

Control and Status I/O Timing Characteristics					
Parameter	Symbol	Min.	Max.	Unit	Note
TX Disable Assert Time	t_off	–	100	µs	Note1
TX Disable Negate Time	t_on	–	2	ms	Note2
Time to initialize including reset of TX_Fault	t_init	–	300	ms	Note3
TX Fault Assert Time	t_fault	–	1	ms	Note4
Tx_Fault Reset	t_reset	10	–	µs	Note5
LOS Assert Time	t_loss_on	–	100	µs	Note6
LOS Deassert Time	t_loss_off	–	100	µs	Note7
Serial ID Clock Rate	f_serial_clock	100	400	kHz	Note8

Notes:

- [1] Time from rising edge of TX Disable to when the optical output falls below 10% of nominal
- [2] Time from falling edge of TX Disable to when the modulated optical output rises above 90% of nominal
- [3] From power on or negation of TX Fault using TX Disable
- [4] Time from fault to TX fault on
- [5] Time TX Disable must be held high to reset TX_fault
- [6] Time from LOS state to RX LOS assert
- [7] Time from non-LOS state to RX LOS deassert.
- [8] Time from rising or falling edge of Rate Select input until receiver bandwidth is in conformance with appropriate specification

Pin-Out Definition



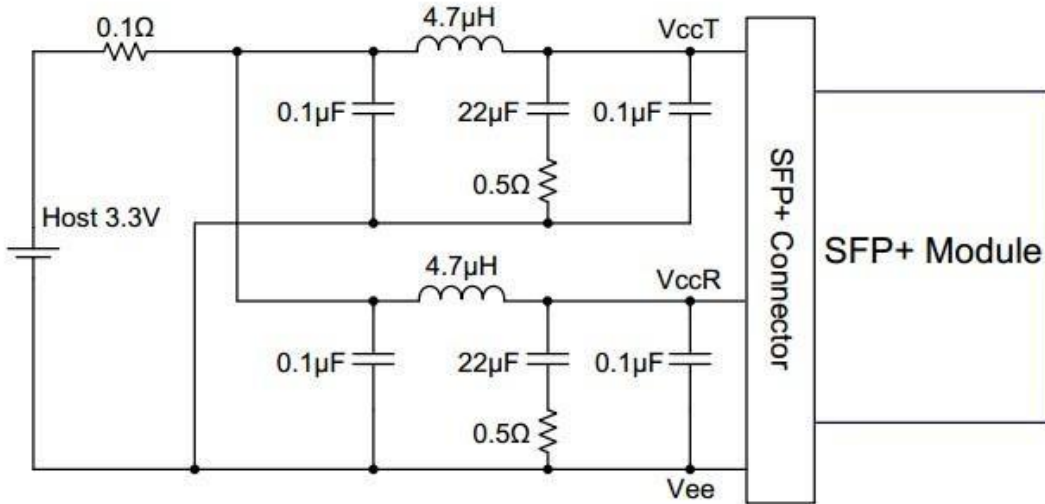
Pin Assignment

Pin	Logic	Symbol	Name/Description	Note
1		VeeT	Module Transmitter Ground	Note1
2	LVTTTL-O	TX_Fault	Module Transmitter Fault	Note2
3	LVTTTL-I	TX_Disable	Transmitter Disable; Turns off transmitter laser output	Note3
4	LVTTTL-I/O	SDA	2-wire Serial Interface Data Line (Same as MOD-DEF2 as defined in the INF-8074i)	Note4
5	LVTTTL-I/O	SCL	2-wire Serial Interface Clock (Same as MOD-DEF1 as defined in the INF-8074i)	Note4
6		MOD_ABS	Module Absent, connected to VeeT or VeeR in the module	Note5
7	LVTTTL-I	RS	Rate Select, optionally controls SFP module receiver. When High input data rate 10.3GBd and when LOW input data rate 1.25GBd.	Note6
8	LVTTTL-O	RX_LOS	Receiver Loss of Signal Indication (In FC designated as RX_LOS, in SONET designated as LOS, and in Ethernet designated as Signal Detect)	Note2
9		VeeR	Module Receiver Ground	Note1
10		VeeR	Module Receiver Ground	Note1
11		VeeR	Module Receiver Ground	Note1
12	CML-O	RD-	Receiver Inverted Data Output	
13	CML-O	RD+	Receiver Non-Inverted Data Output	
14		VeeR	Module Receiver Ground	Note1
15		VccR	Module Receiver 3.3 V Supply	
16		VccT	Module Transmitter 3.3 V Supply	
17		VeeT	Module Transmitter Ground	Note1
18	CML-I	TD+	Transmitter Non-Inverted Data Input	
19	CML-I	TD-	Transmitter Inverted Data Input	
20		VeeT	Module Transmitter Ground	Note1

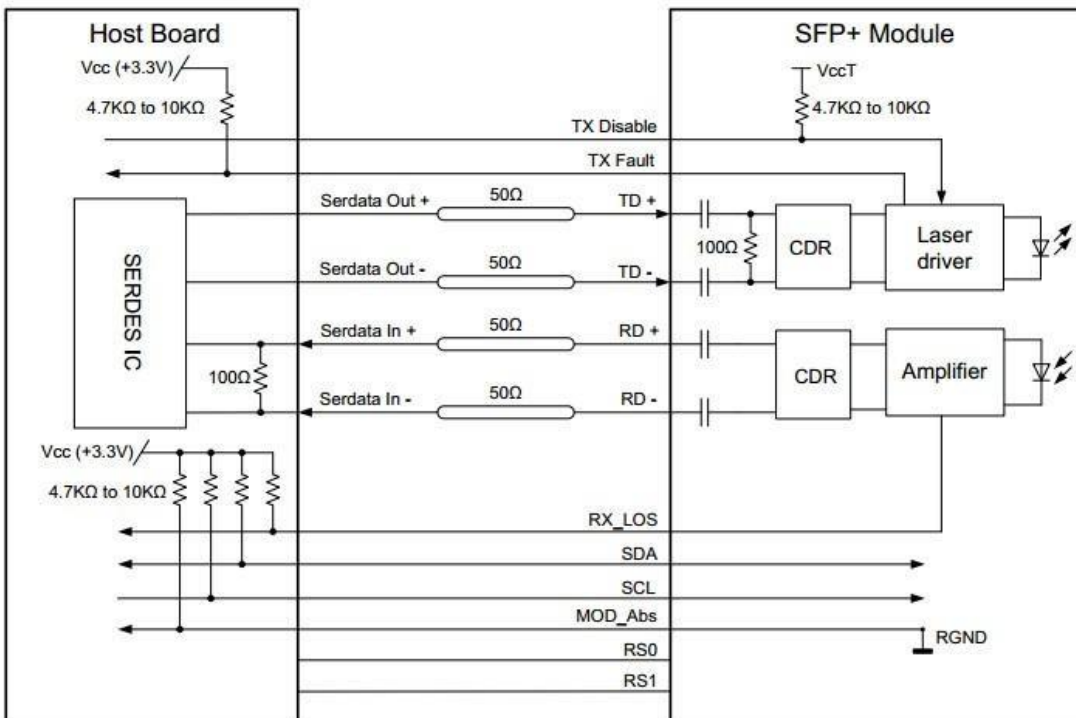
Notes:

- [1]The module signal ground pins, VeeR and VeeT, shall be isolated from the module case.
- [2]This pin is an open collector/drain output pin and shall be pulled up with 4.7k-10kohms to Host_Vcc on the host board. Pull ups can be connected to multiple power supplies, however the host board design shall ensure that no module pin has voltage exceeding module VccT/R + 0.5 V.
- [3]This pin is an open collector/drain input pin and shall be pulled up with 4.7k-10kohms to VccT in the module.
- [4]See sff-8431 4.2 2-wire Electrical Specifications .
- [5]This pin shall be pulled up with 4.7k-10kohms to Host_Vcc on the hostboard.
- [6]If implementing SFF-8079 pin 7 and 9 are used for AS0 and AS1 respectively.

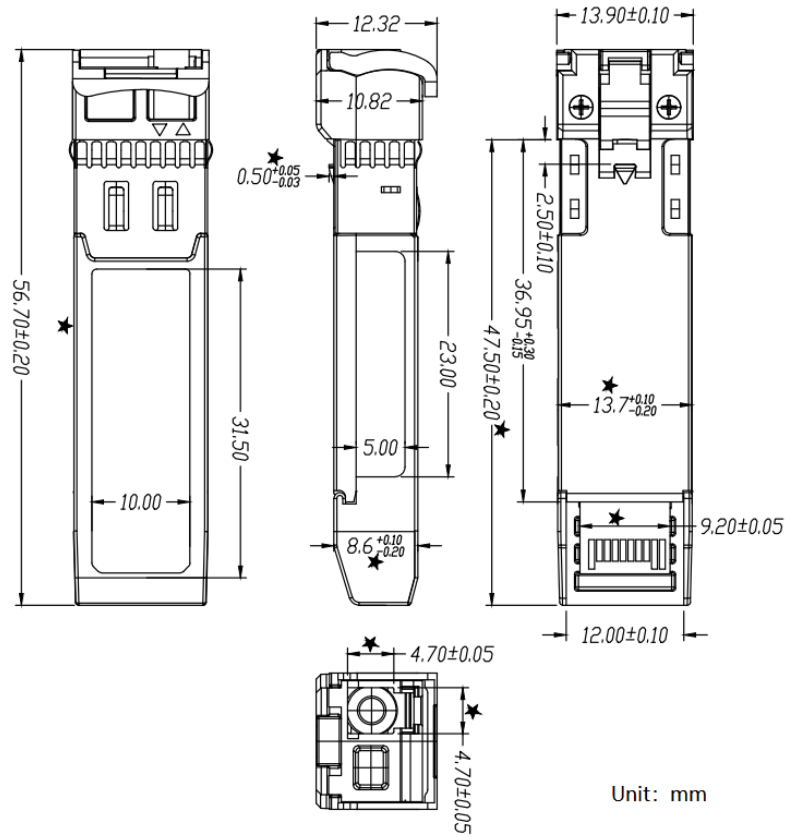
Recommended Host Board Power Supply Filter Network



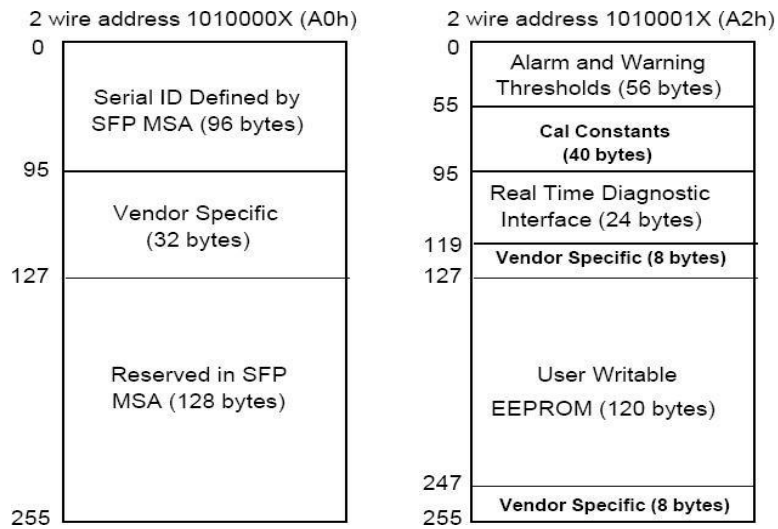
Recommended Application Interface Block Diagram



Mechanical Specifications



Digital Diagnostic Memory Map



Digital Diagnostic Accuracy Requirements

Parameters	Unit	Requirements
Temperature	°C	±3
Voltage	V	±3%
Bias current	mA	±10%
Rx power	dB	±3
Tx power	dB	±3