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10G SFP+ BIDI 10-40km Transceivers

TVBSFPPBD-X-X



Features

- Electrical interface specifications per SFF-8431
- Management interface specifications SFF-8472
- SFP+ MSA package with Single LC receptacle
- 1270nm DFB Laser, PIN photo-detector
- Up to 11.3G bi-directional data links
- Single +3.3V power supply
- Class 1 laser safety certified
- Simplex LC connector compliant
- Single +3.3V DC power supply
- Class 1 laser safety certified
- Low power dissipation
- Operating temperature Options：+0 ~ +70°C
- Up to 10km/20km/40km on 9/125μm SMF
- RoHS compliance

Applications

- 10GBASE-BX Ethernet
- 10GBASE-LR at 10.3125Gbps
- 10GBASE-LW at 9.953Gbps
- CPRI 2/3/4/5/6/7/8 and OBSAI 2X/4X/8X

Description

TVBSFPPBD-X-X transceivers, according to Enhanced 8.5 and 11.3 Gigabit Small Form Factor Pluggable “SFP+” Multi-Sourcing Agreement (MSA) SFF-8431 and SFF-8472 - revision 10.4, are designed for 10G Ethernet serial optical data communications between 10km and 20km and 40km on a singlemode fiber. They are compliant with IEEE Std 802.3-2005 10Gb Ethernet 10GBASE-LR/LW.

Ordering Information

Part No.	Specification								
	Pack	Rate	Tx	Pout	Rx	Sen	Temp	Reach	Others
TVBSFPPBD-1-A	SFP+	10G	1270nm DFB	-5.2 ~ +2dBm	PIN	<-14.4dBm	0 ~ 70℃	10km	DDM/RoHS
TVBSFPPBD-1-B	SFP+	10G	1330nm DFB	-5.2 ~ +2dBm	PIN	<-14.4dBm	0 ~ 70℃	10km	DDM/RoHS
TVBSFPPBD-2-A	SFP+	10G	1270nm DFB	-3.2 ~ +3dBm	PIN	<-14.4dBm	0 ~ 70℃	20km	DDM/RoHS
TVBSFPPBD-2-B	SFP+	10G	1330nm DFB	-3.2 ~ +3dBm	PIN	<-14.4dBm	0 ~ 70℃	20km	DDM/RoHS
TVBSFPPBD-4-A	SFP+	10G	1270nm DFB	0 ~ +6dBm	PIN	<-14.4dBm	0 ~ 70℃	40km	DDM/RoHS
TVBSFPPBD-4-B	SFP+	10G	1330nm DFB	0 ~ +6dBm	PIN	<-14.4dBm	0 ~ 70℃	40km	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	℃
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	℃
Power Supply Voltage	V_{CC3}	3.135	3.3	3.465	V
	I_{CC3}	–	–	350	mA
Power Dissipation	P_D	–	–	1.2	W
Data Rate	–	1	10.3125	11.3	Gbps
Transmission Distance	–	–	–	10、20、40	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		Poff	-	-	-30	dBm	
Average Optical Power		Pavg	-5.2	-	+2	dBm	10km
Average Optical Power		Pavg	-3.2	-	+3	dBm	20km
Average Optical Power		Pavg	0	-	+6	dBm	40km
Side Mode Suppression Ratio		SMSR	30	-	-	dB	
Extinction Ratio		ER	3.5	-	-	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	λr	1320	1330	1340	nm	Rx1330nm
Center Wavelength	λr	1260	1270	1280	nm	Rx1270nm
Receiver Sensitivity (OMA)	–	–	–	-14.4	dBm	Note1
LOS Assert	LOS A	-30	–	–	dBm	
LOS Dessert	LOS D	–	–	-15	dBm	
LOS Hysteresis	LOSH	0.5	–	6	dB	
Overload	Pin	+2	–	–	dBm	
Return Loss of Receiver	–	12	–	–	dB	

Note1:Measured at all data rates specified in data rate table with 2^31-1 PRBS data pattern,BER<1E-12

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

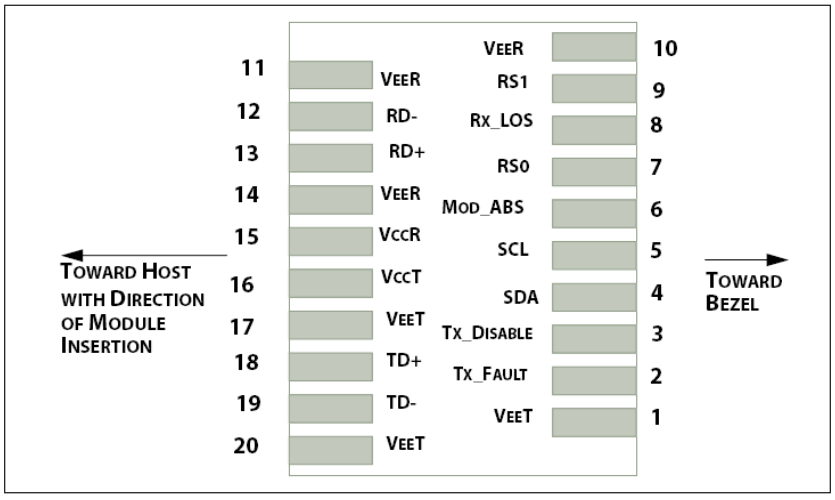
[5] Time TX Disable must be held high to reset TX_fault

[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	LVTTL-O	TX_Fault	Module Transmitter Fault	Note2
3	LVTTL-I	TX_Disable	Transmitter Disable; Turns off transmitter laser output	Note3
4	LVTTL-I/O	SDA	2-wire Serial Interface Data Line (Same as MOD-DEF2 as defined in the INF-8074i)	Note4
5	LVTTL-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	LVTTL-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	LVTTL-O	RX_LOS	Receiver Loss of Signal Indication (In FC designated as RX_LOS, in SONET designated as LOS, and in Ethernet designated at 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-8472 4.2 2-wire Electrical Specifications.

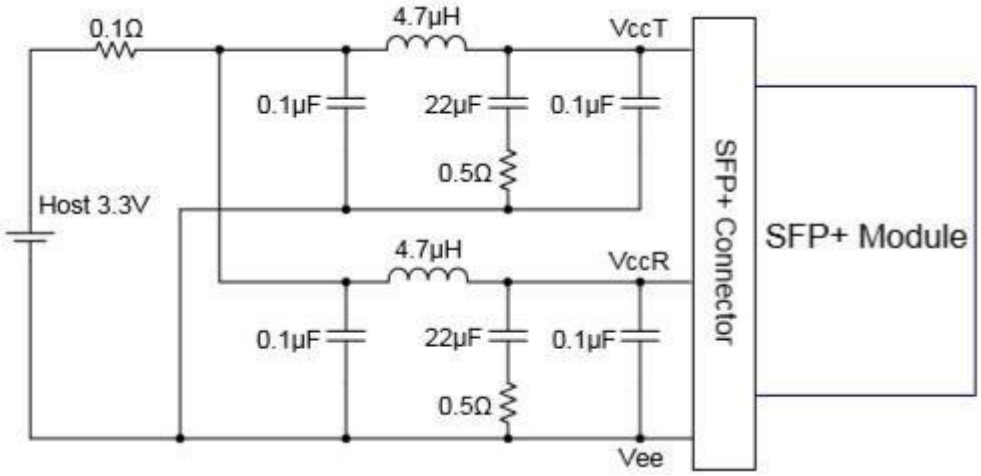
[5] This pin shall be pulled up with 4.7k-10kohms to Host_Vcc on the host board.

[6] If implementing SFF-8079 pin 7 are used for RS0.

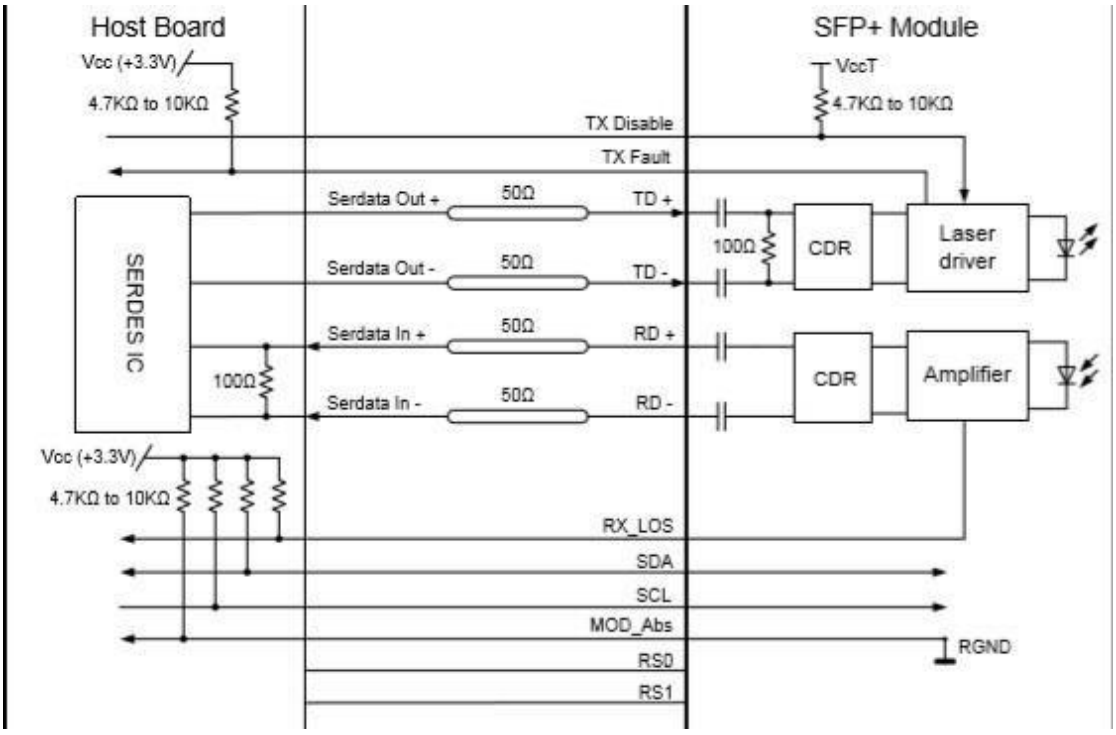
Diagnostic Monitor Specifications

The digital diagnostic monitoring interface also defines another 256-byte memory map in EEPROM,which makes use of the 8 bit address 1010001X (A2h). Please see Board Power Supply Filter Network below. For detail EEPROM information, please refer to document SFF-8472 Rev 11.0. The monitoring specification of this product is described in Table 10.

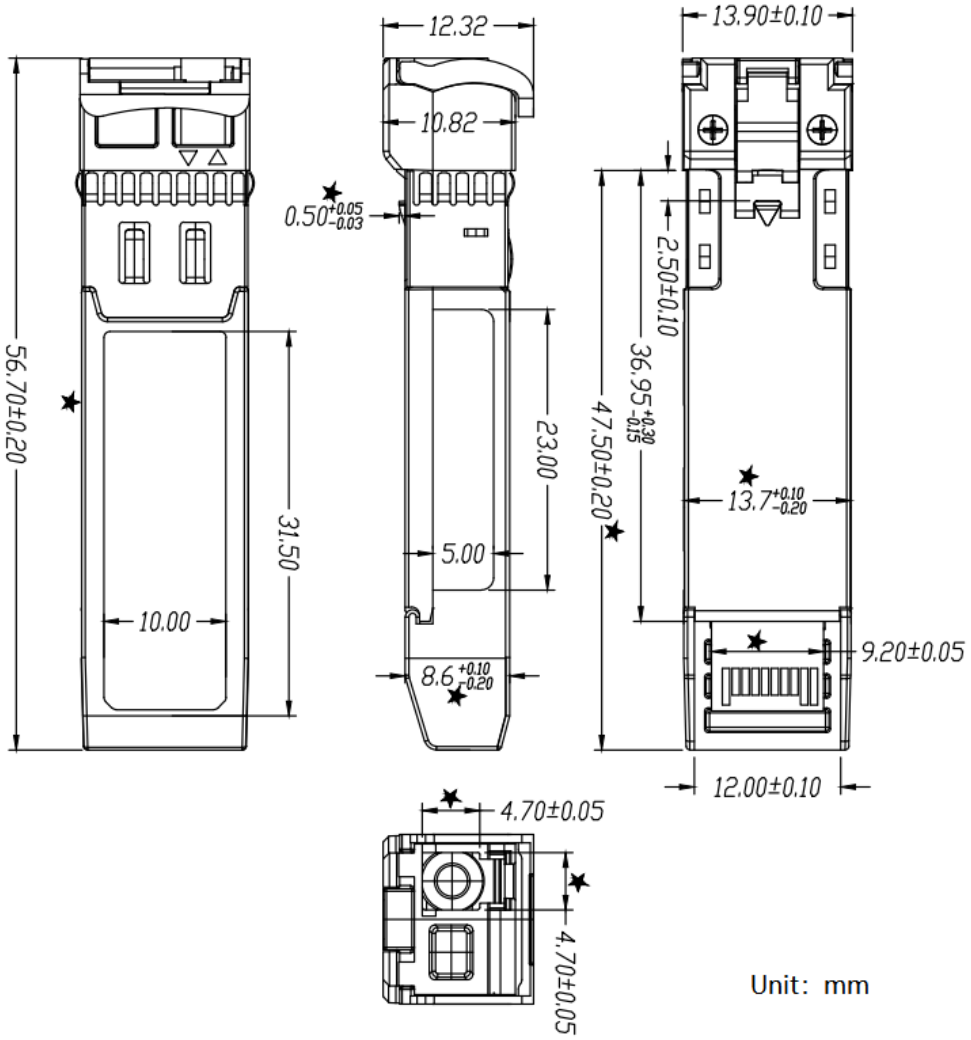
Board Power Supply Filter Network



Recommended Interface Circuit



Mechanical specifications



Digital Diagnostic Memory Map

