

SP10-BDxxxx20x

SFP+ 10Gb/s Bi-Directional 1270/1330nm 20km Transceiver

PRODUCT FEATURES

- Up to 10.3Gbps
- Up to 20km transmission distance
- DFB Laser and PIN receiver
- Single LC interface with integrated DDM
- Hot-pluggable SFP+ footprint
- Compliant with SFF-8472/SFF-8431/SFF-8432
- Single 3.3V power supply
- Power dissipation < 1W
- RoHS compliant
- Case operating temperature:

Commercial: 0°C to +70°C

Industrial: -40°C to +85°C



APPLICATIONS

- 10GBASE-LR/LW

PRODUCT DESCRIPTION

SP10-BDxxxx20C SFP+ 10Gbps Bidi transceiver is designed to transmit and receive optical data over single mode optical fiber for link length 10km, its electrical interface is compliant to SFI electrical specifications. The transmitter input and receiver output impedance is 100 ohms differential. Data lines are internally AC coupled.

Ordering information

Part Number	Data Rate (Gbps)	Media	Wavelength (nm)	Transmission Distance(km)	Temperature Range Tcase/ °C	
SP10-BD273320C	10.3	Single mode fiber	T1270 /R1330	20	0~70	Commercial
SP10-BD332720C	10.3	Single mode fiber	T1330 /R1270	20	0~70	Commercial
SP10-BD273320I	10.3	Single mode fiber	T1270 /R1330	20	-40~85	Industrial
SP10-BD332720I	10.3	Single mode fiber	T1330 /R1270	20	-40~85	Industrial

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Power Supply Voltage	V _{cc}	-0.5		4	V
Storage Temperature Range	T _s	-40		85	°C
Relative Humidity - Storage	RH _s	0		95	%
Relative Humidity - Operating	RH _o	0		85	%

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Case Operating Temperature Range	T _c	0	-	70	°C
		-40	-	85	
Power Supply Voltage	V _{cc}	3.14	3.3	3.47	V
Supply Current	I _{cc}	-	-	300	mA
Data Rate	BR	-	10.3125	-	Gbps

Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Transmitter					
Differential Input Voltage Swing	V _{IN}	180	-	700	mV
Tx Differential Input Impedence	Z _{IN}	-	100	-	ohm
Transmitter Disable Voltage	V _{DIS}	2.0	-	V _{CC} +0.3	V
Transmitter Enable Voltage	V _{EN}	0	-	0.8	V
T _{FAULT} Logic High	V _{TFH}	2.4	-	V _{CC}	V
T _{FAULT} Logic Low	V _{TFL}	V _{EE}	-	V _{EE} +0.4	V
Receiver					
Differential output Voltage Swing	V _{OUT}	300	-	850	mV
Rx Differential Output Impedence	Z _{OUT}	-	100	-	ohm
LOS Assert Voltage	V _{LOSA}	2.4	-	V _{CC}	V
LOS De-assert Voltage	V _{LOSD}	V _{EE}	-	V _{EE} +0.4	V

Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Transmitter						
Laser Type		DFB				
Center Wavelength()	λ	1260	1270	1280	nm	
Center Wavelength()	λ	1320	1330	1340	nm	
Spectral Width@-20dB	$\Delta\lambda$	-	-	1	nm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Launch Optical Power	Pout	-4.2	-	3	dBm	1
Extinction Ratio	ER	3.5	-	-	dB	
Relative Intensity Noise	RIN	-	-	-128	dB/Hz	
Eye Diagram	Complies with IEEE802.3ae eye masks when filtered					
Receiver						
Receiver Type		PIN				
Center Wavelength	λ	1320	1330	1340	nm	
Center Wavelength	λ	1260	1270	1280	nm	
Receiver Sensitivity	Sen	-	-	-14.4	dBm	2
Receiver Overload	P _{SAT}	0.5	-	-	dBm	
Receiver Reflectance	RFL	-	-	-12	dB	
LOS Assert	LOSA	-30	-	-	dBm	
LOS De-Assert	LOSD	-	-	-17	dBm	
LOS Hysteresis	LOSH	0.5	3	5	dB	

Notes

1. Average power figures are informative only, per IEEE 802.3ae.
2. Measured with $2^{31}-1$ PRBS@10.3125Gbps, BER< 10^{-12}

Pin Description

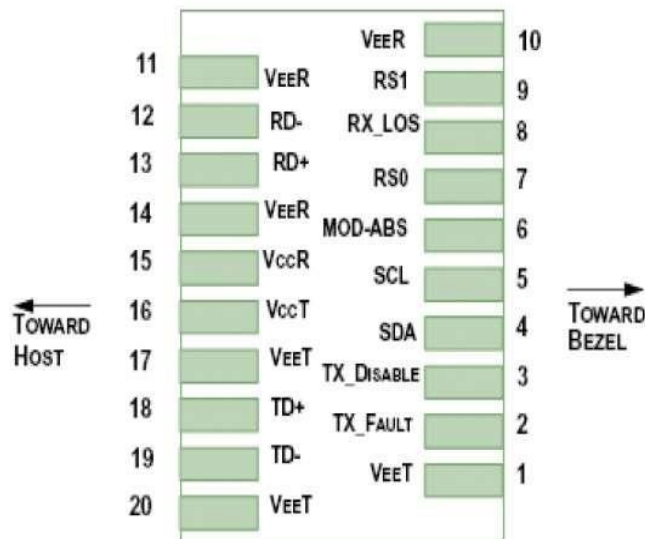


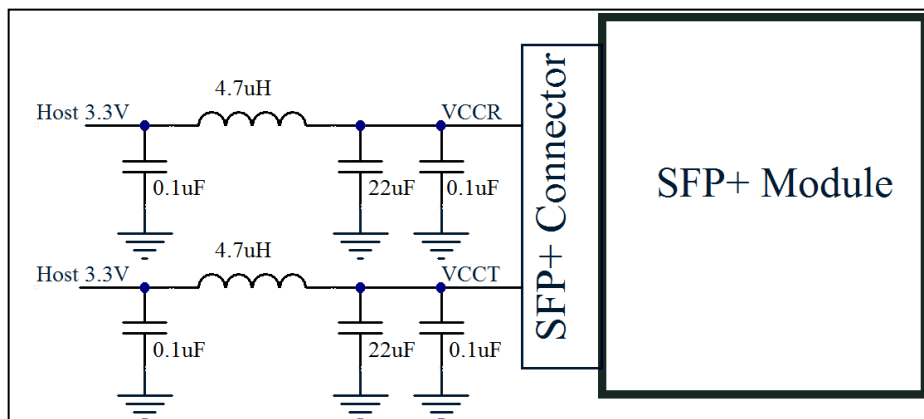
Diagram of Host Board Connector Block Pin Numbers and Name

Pin	Symbol	Description	Notes
1	VEET	Transmitter Ground	1
2	TFAULT	Transmitter Fault	2
3	TDIS	Transmitter Disable. Laser output disabled on high or open	3
4	SDA	2-wire Serial Interface Data Line	2
5	SCL	2-wire Serial Interface Clock Line	2
6	MOD_ABS	Module Absent. Grounded within the module	
7	RS0	Rate Select 0. Not Used.	4
8	RX_LOS	Loss of Signal indication. Logic 0 indicates normal operation	2
9	RS1	Rate Select 1. Not Used.	4
10	VEER	Receiver Ground	1
11	VEER	Receiver Ground	1
12	RD-	Receiver Inverted DATA out. AC Coupled.	
13	RD+	Receiver Non-inverted DATA out. AC Coupled.	
14	VEER	Receiver Ground	1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	Transmitter Ground	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	VEET	Transmitter Ground	1

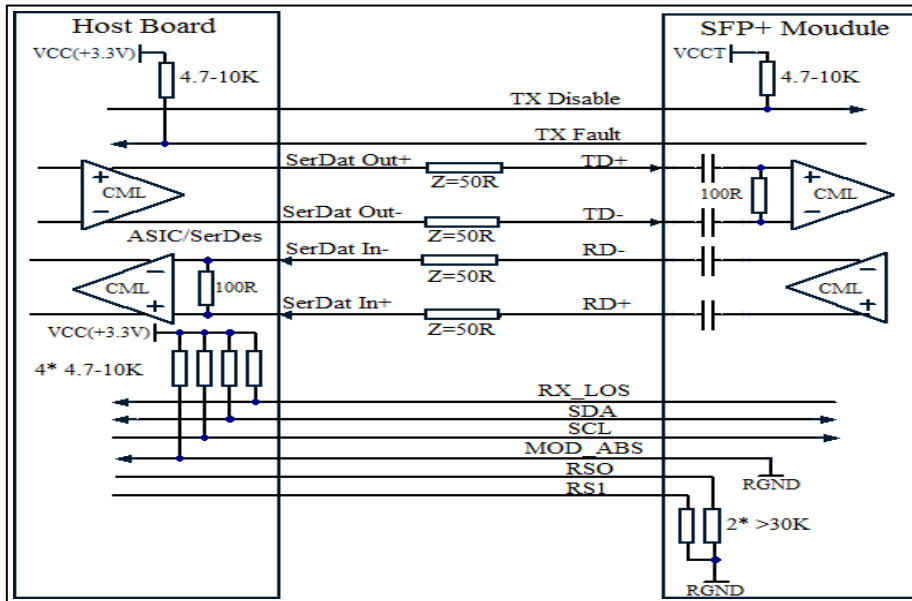
Notes:

1. Circuit ground is internally isolated from chassis ground.
2. Shall be pulled up with 4.7k-10k Ohms to a voltage between 3.15V and 3.6V on the host board.
3. Laser output disabled on $T_{DIS} > 2.0V$ or open, enabled on $T_{DIS} < 0.8V$.
4. Internally pulled down per SFF-8431 Rev 4.1.

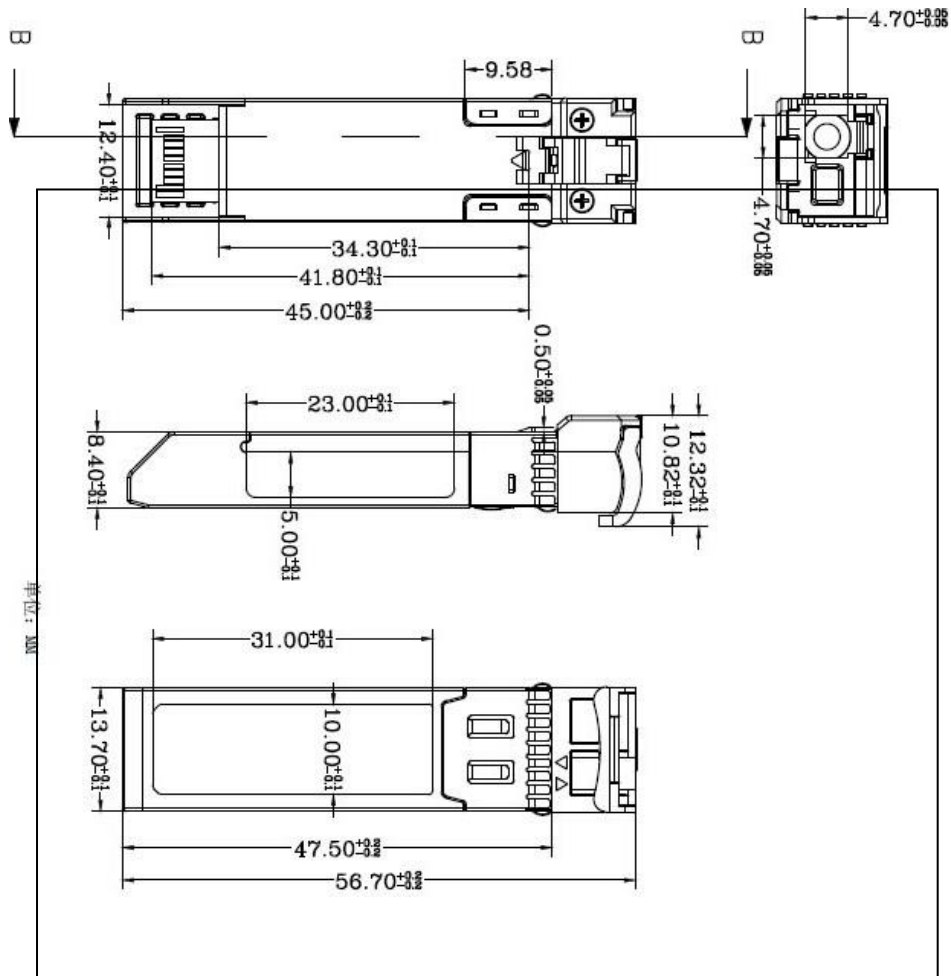
Recommended Host Board Supply Filtering Circuit



Recommended Interface Circuit



Mechanical Dimensions



Regulatory Compliance

Feature	Reference	Performance
CE-EMC	EN 55032: 2015	17706703 003
	EN 55024: 2010+A1	Compatible with standards
REACH	REACH SVHC 197	68.420.19.0344.01
FCC	FCC Rules and Regulations Part 15 Subpart B Class B	MTi190422E141C
RoHS	2011/65/EU and amendment (EU) 2015/863	68.420.17.1030.01