

## Part Number: SFP+-10GBase-BXD-20 SFP+-10GBase-BXD-20-Ind

### Quick Spec:

Form Factor:	SFP+-BIDI
TX Wavelength:	1330nm
Reach:	20km
Cable Type:	SMF
Rate Category:	10GBase
Interface Type:	BX
DDM:	Yes
Connector Type:	Single-LC
Power Budget:	12dB



### Features

- Electrical interface compliant to SFF-8431
- Hot Pluggable
- Supports Multi Rate 1.25Gbps to 10.5Gbps
- 1270/1330 nm DFB LD Transmitter
- 1270/1330 nm PIN Receiver
- Low power consumption
- All-metal housing for superior EMI performance
- Advanced firmware allows customer system encryption information to be stored in transceiver
- Cost effective **SFP+-BIDI** solution, enables higher port densities and greater bandwidth
- RoHS Compliant and lead free
- Operating case temperature:
  - Standard: 0 to +70 °C
  - Industrial -40 to +85 °C

### Applications

- 10Gbps Ethernet or Sonet/SDH switches and routers
- 10G/8.5G/4.25G/2.125G/1.0625G Fiber Channel
- Other 10Gbps optical links

### Absolute maximum rating

These values represent the damage threshold of the module. Stress in excess of any of the individual Absolute Maximum Ratings can cause immediate catastrophic damage to the module even if all other parameters are within Recommended Operating Conditions.

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	3.6	V
Storage Temperature	Ts	-40	+85	°C
Relative Humidity	RH	5	95	%
RX Input Average Power	Pmax	-	0	dBm

## Recommended operating environment

Recommended Operating Environment specifies parameters for which the electrical and optical characteristics hold unless otherwise noted.

Parameter	Symbol	Min.	Typical	Max	Unit
Operating Case Temperature - Standard	T <sub>c</sub>	0	25	70	°C
Operating Case Temperature - Industrial	T <sub>c</sub>	-40		+85	°C
Power Supply Voltage	V <sub>CC</sub>	3.15	3.300	3.45	V
Power Supply Current	I <sub>CC</sub>			430	mA
Surge Current	I <sub>Surge</sub>			+30	mA
Baud Rate			9.953/10.3125		GBaud

Table 4: Recommended Operating Environment

## Performance Specifications – Electrical Transmitter

Parameter	Symbol	Min	Typ	Max	Unit	Notes
CML Inputs(Differential)	V <sub>IN</sub>	150		1200	mVpp	AC coupled inputs
Input Impedance (Differential)	C <sub>IN</sub>	85	100	115	ohms	R <sub>in</sub> > 100 kohms @ DC
Tx_DISABLE Input Voltage – High		2		V <sub>CC</sub> +0.3	V	
Tx_DISABLE Input Voltage – Low		0		0.8	V	
Tx_FAULT Output Voltage – High		2		V <sub>CC</sub> +0.3	V	I <sub>o</sub> = 400µA; Host V <sub>CC</sub>
Tx_FAULT Output Voltage – Low		0		0.8	V	I <sub>o</sub> = -4.0Ma

## Performance Specifications – Electrical Receiver

Parameter	Symbol	Min	Typ	Max	Unit	Notes
CML Outputs (Differential)	V <sub>out</sub>	350		700	mVpp	AC coupled inputs
Output Impedance (Differential)	Z <sub>out</sub>	85	100	115	ohms	
Rx_LOS Output Voltage – High		2		V <sub>CC</sub> +0.3	V	I <sub>o</sub> = 400µA; Host V <sub>CC</sub>
Rx_LOS Output Voltage – Low		0		0.8	V	I <sub>o</sub> = -4.0Ma
MOD_DEF ( 2:0)	V <sub>oH</sub> V <sub>oL</sub>	2.5 0		0.5	V V	With Serial ID

## Optical and Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Power Budget		12			dB
Data Rate			9.953/10.3125		Gbps

## Optical and Electrical Characteristics Transmitter

Parameter	Symbol	Min	Typ	Max	Unit
Center Wavelengths	$\lambda_C$	1320	1330	1340	nm
Spectral Width (-20dB)	$\Delta\lambda$			1	nm
Average Output Power	$P_{out}$	-2		3	dBm
Extinction Ratio	$E_r$	3.5			dB
Side Mode Suppression Ratio	$SMSR$	30			dB
Transmitter Dispersion Penalty	$TDP$			2	dB
Average Power of OFF Transmitter				-30	dBm
Relative Intensity Noise	$RIN$			-128	dB/Hz
Input Differential Impedance	$Z_{IN}$	90	100	110	$\Omega$
TX Disable Assert Time	$t_{off}$			10	us

## Optical and Electrical Characteristics Receiver

Parameter	Symbol	Min	Typ	Max	Unit
Center Wavelengths	$\lambda_C$	1260	1270	1280	nm
Sensitivity	$P_{in}$			-14	dBm
Receiver Overload	$P_{max}$	0.5			dBm
Output Differential Impedance	$P_{in}$	90	100	110	$\Omega$
LOS De-Assert	$LOSD$			-18	dBm
LOS Assert	$LOSA$	-30			dBm
LOS High		2.0		VCC+0.3	V
LOS Low		0		0.8	V

## PIN Function Definitions

PIN	Signal Name	Description
1	VEET	Transmitter Signal Ground
2	TX_Fault	Transmitter Fault Indication. Logic "1" Output = Laser Fault. Logic "0" Output = Normal Operation
3	TX_Disable	Logic "1" Input (or no connection) = Laser off, Logic "0" = Laser on.
4	SDA	Modulation Definition 2 – Two wires serial ID Interface
5	SDL	Modulation Definition 1 – Two wires serial ID Interface
6	MOD-ABS	Modulation Definition 0 – Ground in Module
7	RS0	RX Rate Select (LVTTL). This pin has an internal 30k pulldown to ground. A signal on this pin will not affect module performance.
8	RX_LOS	Loss of Signal Out (OC).
9	RS1	TX Rate Select (LVTTL). This pin has an internal 30k pulldown to ground. A signal on this pin will not affect module performance.
10	VEER	Receiver Signal Ground
11	VEER	Receiver Signal Ground
12	RD-	Inverse Receiver Data Out
13	RD+	Receiver Data Out
14	VEER	Receiver Signal Ground
15	VCCR	Receiver Power – 3.3V±5%
16	VCCT	Transmitter Power – 3.3V±5%
17	VEET	Transmitter Signal Ground
18	TD+	Transmitter Data In
19	TD-	Inverse Transmitter Data In
20	VEET	Transmitter Signal Ground

### ESD

This transceiver is specified as ESD threshold 1kV for high speed pins and 2kV for all other electrical input pins, tested per MIL-STD-883, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

### LASER SAFTY

This is a Class 1 Laser Product according to IEC 60825-1:1993+A1:1997+A2:2001. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (July 26, 2001)