SFP+-BIDI-LL-20KM
10Gb/s BIDI SFP+ 20km Transceiver

PRODUCT FEATURES



Up to 11.3Gbps Data Links

Up to 20km transmission on SMF

Power dissipation<1.0 W

1270nm DFB laser and PIN receiver for SFP+-BIDI-LL-20KM

1330nm DFB laser and PIN receiver for SFP+-BIDI-LL-20KM

2-wire interface with integrated Digital Diagnostic monitoring

EEPROM with Serial ID Functionality

Compliant with SFP+ MSA with LC connector

Single + 3.3V Power Supply

- Case operating temperature：Commercial: 0°C to +70°C

  Industrial: -40°C to +85°C

APPLICATIONS

10GBASE-BX & 10GBASE-LR/LW

10G SONET/SDH, OTU2/2e

STANDARD

Compliant with SFF-8472

Compliant to SFF-8431

Compliant to 802.3ae 10GBASE-LR/LW

RoHS Compliant.

PRODUCT DESCRIPTION

SFP+-BIDI-LL-20KM is hot pluggable 3.3V Small-Form-Factor transceiver module. It designed expressly for high-speed communication applications that require rates up to 11.3Gbps,it designed to be compliant with SFF-8472 and SFP+ MSA. The module data link up to 20km in 9/125um single mode fiber.

Ordering information

Product part Number	Data Rate (Gbps)	Media	Wavelength (nm)	Transmission Distance(km)	Temperature Range (Tcase) (℃)	
SFP+-BIDI-LL-20KM	10.3125	Single mode fiber	1270/1330	20	0~70	commercial
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SFP+-BIDI-LL-20KM	10.3125	Single mode fiber	1270/1330	20	-40~85	Industrial
SFP+-BIDI-LL-20KM	10.3125	Single mode fiber	1330/1270	20	-40~85	Industrial

Ⅰ Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	Ts	-40	-	85	ºC	
Relative Humidity	RH	5	-	95	%	
Power Supply Voltage	VCC	-0.3	-	4	V	
Signal Input Voltage		Vcc-0.3	-	Vcc+0.3	V	

Ⅱ Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	Tcase	0	-	70	ºC	Without air flow
		-40	-	85	ºC	Industrial
Power Supply Voltage	VCC	3.14	3.3	3.47	V	
Power Supply Current	ICC	-		300	mA	
Data Rate	BR		10.3125	11.3	Gbps	
Transmission Distance	TD		-	20	km	
Coupled fiber	Single mode fiber					9/125um SMF

Ⅲ Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Average Launched Power	PO	-6	-	-0.5	dBm	
Average Launched Power(Laser Off)	Poff	-	-	-30	dBm	Note (1)
Center Wavelength Range	λC	1260	1270	1280	nm	SFP+-BIDI-LL-20KM
		1320	1330	1340	nm	SFP+-BIDI-LL-20KM
Side mode suppression ratio	SMSR	30	-	-	dB	
Spectrum Bandwidth(-20dB)	σ	-	-	1	nm	
Extinction Ratio	ER	3.5		-	dB	Note (2)
Output Eye Mask	Compliant with IEEE 802.3ae					Note (2)
Receiver						
Input Optical Wavelength	λIN	1320	1330	1340	nm	SFP+-BIDI-LL-20KM
		1260	1270	1280	nm	SFP+-BIDI-LL-20KM
Receiver Sensitivity	Psen	-	-	-15	dBm	Note (3)
Input Saturation Power (Overload)	PSAT	0.5	-	-	dBm	Note (3)
LOS Assert	LOSA	-30	-	-	dBm	
LOS De-assert	LOSD	-	-	-17	dBm	
LOS -Hysteresis	PHys	0.5	-	5	dB	

Note:

1. The optical power is launched into SMF
2. Measured with RPBS 2^31-1 test pattern @10.3125Gbs
3. Measured with RPBS 2^31-1 test pattern @10.3125Gbs BER=<10^-12

IV. Electrical Interface Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Total power supply current	Icc			300	mA	
Transmitter						
Differential Data Input Voltage	VDT	180	-	700	mVp-p	
Differential line input Impedance	RIN	85	100	115	Ohm	
Transmitter Fault Output-High	VFaultH	2.4	-	Vcc	V	
Transmitter Fault Output-Low	VFaultL	-0.3	-	0.8	V	
Transmitter Disable Voltage- High	VDisH	2	-	Vcc+0.3	V	
Transmitter Disable Voltage- low	VDisL	-0.3	-	0.8	V	
Receiver						
Differential Data Output Voltage	VDR	300	-	850	mVp-p	
Differential line Output Impedance	ROUT	80	100	120	Ohm	
Receiver LOS Pull up Resistor	RLOS	4.7	-	10	KOhm	
Data Output Rise/Fall time	tr/tf		-	38	ps	
LOS Fault	VLOS fault	Vcc–1.3		VccHOST	V	
LOS Normal	VLOS norm	Vee		Vee+0.8	V	

V. Pin Description

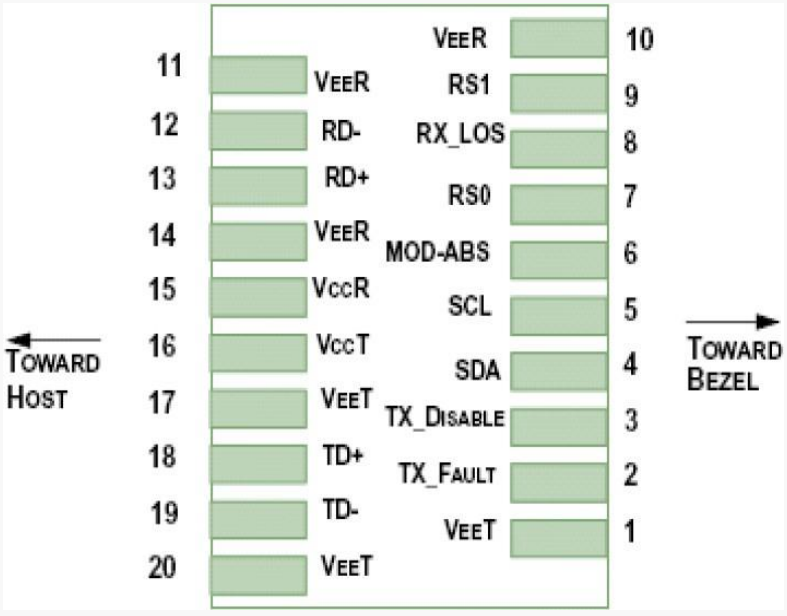


Diagram of Host Board Connector Block Pin Numbers and Name

Pin	Symbol	Name/Description	Note
1	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1
2	T_{FAULT}	Transmitter Fault.	2
3	T_{DIS}	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	Rate Select 0	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	6
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:

1. Circuit ground is internally isolated from chassis ground.
2. T_{FAULT} is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V.A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
3. Laser output disabled on T_{DIS} >2.0V or open, enabled on T_{DIS} <0.8V.
4. Should be pulled up with 4.7kΩ- 10kΩ host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.
5. Internally pulled down per SFF-8431 Rev 4.1.
6. LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

VI. Digital Diagnostic Functions

LONGLINE SFP+-BIDI-LL-20KM transceivers support the 2-wire serial communication protocol as defined in the SFP+MSA.

The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

Additionally, LONGLINE SFP+ transceivers provide a unique enhanced digital diagnostic monitoring interface, 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. It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory set normal range.

The SFP MSA defines a 256-byte memory map in EEPROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h).The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h), so the originally defined serial ID memory map remains unchanged.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through a 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL, Mod Def 1) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of the E2PROM that are not write-protected. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA, Mod Def 2) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.