

Product Specification

10Gb/s 80Km SFP+ BIDI Transceivers

SFP-10G-B45L&B54L-80D

PRODUCT FEATURES

- Operating data rate up to 10.3125Gbps
- Up to 80km transmission distance
- 1490nm EML laser and APD receiver
- 1550nm EML laser and APD receiver
- Hot pluggable 20pin connector
- Low power consumption <2 W
- Single +3.3V±5% power supply
- Compliant with SFF-8472&SFF-8431
- Fully RoHS Compliant
- Compliant with IEEE802.3ae 10GBASE-ZR/ZW
- Operating temperature range:

Commercial: 0°C to +70°C

Industrial: -40°C to +85°C

Application

- 10GBASE-ZR at 10.31Gbps
- 10GBASE-ZW at 9.95Gbps
- Other Optical Links

• Ordering information

Part Number	Product Description
OFSFBI10G80C-95	10G SFP+ 80km BIDI transceiver 1490 Tx/ 1550 Rx, C-TEMP
OFSFBI10G80C-59	10G SFP+ 80km BIDI transceiver 1550 Tx/ 1490 Rx, C-TEMP
OFSFBI10G80F-95	10G SFP+ 80km BIDI transceiver 1490 Tx/ 1550 Rx, I-TEMP
OFSFBI10G80F-59	10G SFP+ 80km BIDI transceiver 1550 Tx/ 1490 Rx, I-TEMP

DESCRIPTION

The SFP-10G-B45L&B54L-80D Transceiver is intended for 80km reach service from 0.6Gb/s to 10.3125Gb/s BI-direction single mode high-speed communications equipment where low-cost, extraordinary performance and reliability are essential. It consumes low power, operates base on 3.3V DC power supply and is offered in the industrial temperature range. They are compliant with SFP28 MSA, SFF-8431 and SFF-8432.

The low jitter and low bit error rate optical assembly features a EML laser transmitter and APD/TIA receiver. The differential AC coupled Tx and Rx data interfaces are CML compatible. The device is Class I laser safety compliant.

Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
Storage Temperature Range	Ts	°C	-40	85
Relative Humidity	RH	%	0	85

Recommended Operating Conditions

Parameter	Symbol	Unit	Min	Typ	Max
Case Operating Temperature	Tcase	0		70	°C
		-40		85	°C
Power Supply Voltage	Vcc	V	3.14	3.3	3.46
Bit Rate	BR	Gb/s	0.6	10.3125	
Bit Error Ratio	BER				1E-12
Max Supported Link Length	L	Km			80

Electric Ports Definition

Parameter	Symbol	Unit	Min	Typ	Max	Note
Transmitter						
Input Differential Impedance	R _{IN}	Ω		100		
Single-ended Data Input Swing	V _{IN}	mVp-p	90		450	
Transmit Disable Voltage	V _{DIS}	V	2		V _{CCHOST}	

Transmit Enable Voltage	V _{EN}	V	V _{EE}		V _{EE} +0.8	
Transmit Fault Assert Voltage	V _{FA}	V	2		V _{CCHOST}	
Transmit Fault De-Assert Voltage	V _{FDA}	V	V _{EE}		V _{EE} +0.4	
Receiver						
Single-ended Data Output Swing	V _{OD}	mVp-p	200		450	
LOS Fault	V _{LOSFT}	V	2		V _{CCHOST}	
LOS Normal	V _{LOSNR}	V	V _{EE}		V _{EE} +0.4	

Optical Characteristics *(TA and Vcc= 3.14 to 3.46V)*

Parameter	Symbol	Unit	Min	Typ	Max	Note
Transmitter						
Center Wavelength (OFSFBI10G80x-95)	λ	nm	1480	1490	1500	
Center Wavelength (OFSFBI10G80x-59)	λ	nm	1540	1550	1560	
Average Output Power	P _{av}	dBm	-2		4	
Spectral Width (-20dB)	σ	nm			1	
Extinction Ratio	ER	dB	8.2			
Side Mode Suppression Ratio	SMSR	dB	30			
Average Launch Power of OFF Transmitter	POFF	dBm			-30	
Relative Intensity Noise	RIN	dB/Hz			-128	
Receiver						
Center Wavelength (OFSFBI10G80x-95)	λ_C	nm	1540	1550	1560	
Center Wavelength (OFSFBI10G80x-59)	λ_C	nm	1480	1490	1500	
Receiver Sensitivity	RSENSE	dBm			-24	1
Receiver Overload	P _{max}	dBm	-5			
Receiver Reflectance		dB			-12	
LOS Assert	LOSA	dBm	-38			
LOS De-Assert LOS	LOSD	dBm			-24	
LOS Hysteresis		dB	0.5			

Note1: Measured at 10.3125Gb/s, ER>8.2dB, PRBS 2³¹-1 and BER better than or equal to 1E-12;

PIN Assignment

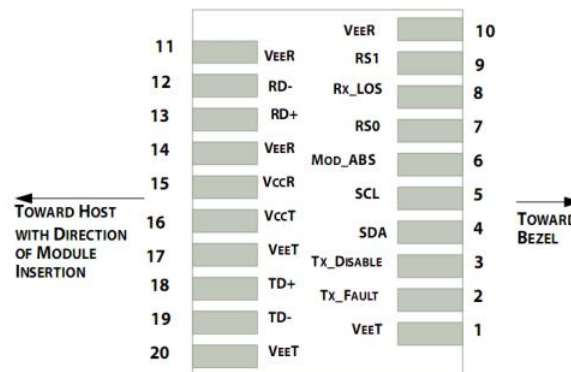


Figure 1.Pin function definitions

Table 1: Transceiver pin descriptions

Pin Number	Symbol	Name	Description
1,17,20	VeeT	Transmitter Signal Ground	Connected to signal ground on the host board.
2	TX Fault	Transmitter Fault Out (OC)	Module transmitter fault output.
3	TX Disable	Transmitter Disable In (LVTTL)	Module transmitter disable control.
4	SDA	Module Definition Identifiers	Serial ID with SFF 8472 Diagnostics Module Definition pins should be pulled up to Host Vcc with 10 kΩ resistors.
5	SCL		
6	MOD-ABS		
7	RS0	Receiver Rate Select (LVTTL) Transmitter Rate Select (LVTTL)	Rate Select 0, optionally controls SFP+module receiver. These pin are pulled low to VeeT with a >30K resistor.
9	RS1		
8	LOS	Loss of Signal Out (OC)	Receiver loss of signal.
10,11,14	VeeR	Receiver Signal Ground	Connected to signal ground on the host board.
12	RD-	Receiver Negative DATA Out	Receiver inverted data output, internally AC coupled and terminated
13	RD+	Receiver Positive DATA Out	Receiver non-inverted data output, internally AC coupled and terminated.
15	VccR	Receiver Power Supply	Receiver Power 3.3V Supply.
16	VccT	Transmitter Power Supply	Transmitter Power 3.3V Supply.
18	TD+	Transmitter Positive DATA In	Transmitter non-inverted data input, internally AC coupled and terminated.
19	TD-	Transmitter Negative	Transmitter inverted data Input, internally AC

		DATA In	coupled and terminated.
--	--	---------	-------------------------

Recommended Interface Circuit

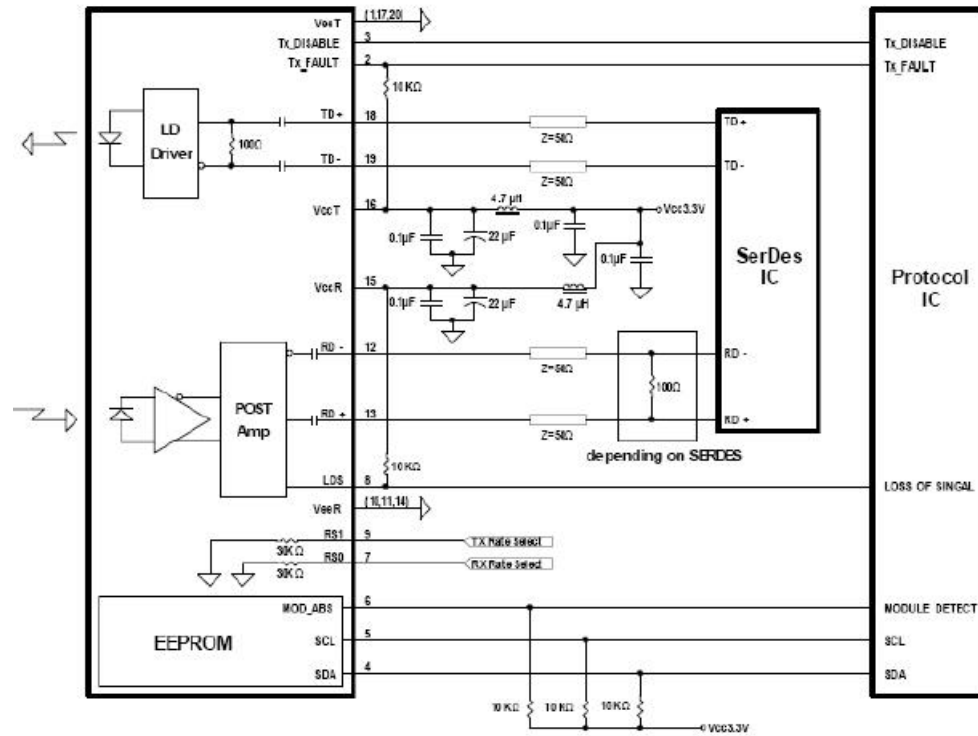
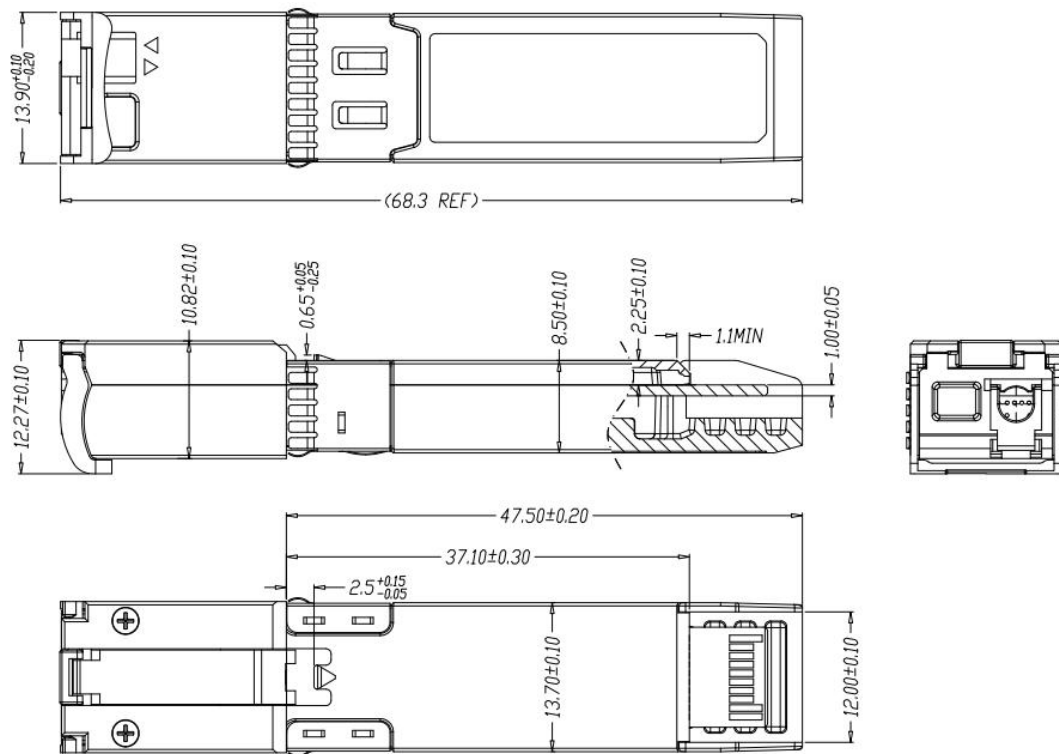


Figure 2. Typical application circuit

Mechanical Dimensions



Unremarked tolerances ± 0.2

Figure 3. Module Mechanical Dimensions

Digital Diagnostics Functions

As defined by the SFF-8472, The SFP28 transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- Transceiver temperature
- Laser bias current
- Transmitted optical power
- Received optical power
- Transceiver supply voltage

It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory-set

normal range. The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through the 2-wire serial interface. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially. The 2-wire serial interface provides sequential or random access to the 8 bit parameters, addressed from 0x00h to the maximum address of the memory. For more detailed information, including memory map definitions, please refer the SFF-8472 documentation.

Digital Diagnostic Monitor Accuracy

The following characteristics are defined over recommended operating conditions

Parameter	Accuracy	Unit
Internally measured transceiver temperature	+/-3	deg.C
Internally measured transceiver supply voltage	+/-3	%
Measured Tx bias current	+/-10	%
Measured Tx output power	+/-3	dB
Measured Rx received average optical power	+/-3	dB