



SPB32010103D000

MSA Compliant 10GBase-BX SFP+ Transceiver (SMF, 1330nmTx/1270nmRx, 10km, SC, DOM)

Product Description

This MSA compliant SFP+ transceiver provides 10GBase-BX throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1330nmTx/1270nmRx via an SC connector. This bidirectional unit must be used with another transceiver or network appliance of complementing wavelengths. It can operate at temperatures between 0 and 70C. All of our transceivers are built to comply with Multi-Source Agreement (MSA) standards and are uniquely serialized and tested for data-traffic and application to ensure seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows access to real-time operating parameters. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

Skylane's transceivers are RoHS compliant and lead-free.

Features:

- Operating Data Rate Up to 10.31Gbps
- 1330nm DFB Transmitter
- 1270nm PIN Receiver
- SC/UPC Connector Interface
- Hot-Pluggable
- Single 3.3V Power Supply
- Operating Temperature: 0 to 70 Celsius
- Power Dissipation: 1.5W
- Excellent ESD Protection
- RoHS Compliant and Lead-Free
- RoHS Compliant and Lead Free



Applications:

- 10GBase-BX Ethernet
- Access, Metro and Enterprise
- 8x/10x Fibre Channel

For your product safety, please read the following information carefully before any manipulation of the transceiver:



ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 / JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.



LASER SAFETY

This is a Class1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Case Temperature	T _c	0		70	°C	
Storage Temperature	T _{stg}	-40		85	°C	
Relative Humidity	RH			95	%	
Supply Voltage	V _{cc}	-0.5		3.6	V	
Baud Rate			9.95/10.31		Gbps	
Power Budget		12			dB	

Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage		V _{cc}	3.15	3.3	3.45	V	
Power Supply Current		I _{cc}			455	mA	
Surge Current		I _{surge}			30	mA	
Transmitter							
CML Differential Inputs		V _{IN}	150		1200	mVp-p	1
Input AC Common-Mode Voltage			0		25	mV	RMS
Input Differential Impedance		Z _{IN}	85	100	115	Ω	2
Tx_Disable	High		2		V _{cc}	V	
	Low		0		0.8	V	
Tx_Fault	High		2		V _{cc} +0.3	V	3
	Low		0		0.5	V	4
Receiver							
CML Differential Outputs		V _{OUT}	350		700	mVp-p	5
Output Differential Impedance		Z _{OUT}	85	100	115	Ω	
Rx_LOS	High		2		V _{cc} +0.3		3
	Low		0		0.8		4
MOD_DEF(0.2)		V _{OH}	2.5			V	6
		V _{OL}	0		0.5	V	

Notes:

1. AC coupled inputs.
2. R_{IN}>100kΩ @ DC.
3. I_o=400μA Host_V_{cc}.
4. I_o=-4.0mA.
5. AC coupled outputs.
6. With serial ID.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength	λ_C	1320	1330	1340	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Average Output Power	POUT	-2		3	dBm	1
Extinction Ratio	ER	3.5			dB	
Average Power of Off Transmitter	POFF			-30	dBm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Transmitter Dispersion Penalty	TDP			2	dB	
Tx_Disable Assert Time	T_off			10	us	
Receiver						
Center Wavelength	λ_C	1260	1270	1280	nm	
Receiver Sensitivity	PMIN			-14	dBm	2
Receiver Overload	PMAX	0.5			dBm	
LOS De-Assert				-16	dBm	
LOS Assert		-28			dBm	
LOS Hysteresis		0.5			dB	

Notes:

1. The output is coupled into a 9/125 μ m SMF.
2. Minimum average optical power measured at BER less than $1E^{-12}$ with the measure pattern PRBS $2^{31}-1$.

Pin Descriptions

Pin	Symbol	Name/Description	Plug Seq.	Notes
1	VeeT	Transmitter Ground.	1	5
2	Tx_Fault	Transmitter Fault Indication.	3	1
3	Tx_Disable	Transmitter Disable. Module disables on “high” or “open.”	3	2
4	SDA	Transmitter Disable. 2-Wire Serial ID Interface.	3	3
5	SCL	Module Definition 2. 2-Wire Serial ID Interface.	3	3
6	MOD_ABS	Module Definition 1.	3	3
7	RS0	Rx Rate Select (LVTTTL). Rate Select 0. Optionally controls the SFP+ module receiver. This pin is pulled “low” to the VeeT with a >30K resistor.	3	
8	LOS	Loss of Signal.	3	4
9	RS1	Tx Rate Select (LVTTTL). Rate Select 1. Optionally controls the SFP+ module transmitter. This pin is pulled “low” to VeeT with a >30K resistor.	1	
10	VeeR	Receiver Ground.	1	5
11	VeeR	Receiver Ground.	1	5
12	RD-	Inverse Received Data Out.	3	6
13	RD+	Received Data Out.	3	6
14	VeeR	Receiver Ground.	1	5
15	VccR	+3.3V±5% Receiver Power.	2	7
16	VccT	+3.3V±5% Transmitter Power.	2	7
17	VeeT	Transmitter Ground.	1	5
18	TD+	Transmit Data In.	3	8
19	TD-	Inverse Transmit Data In.	3	8
20	VeeT	Transmitter Ground.	1	5

Notes:

1. Tx_Fault is an open collector/drain output that should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board. Pull-up voltage between 2.0V and VccT/R+0.3V. When “high,” output indicates a laser fault of some kind. “Low” indicates normal operation. In the “low” state, the output will be pulled to <0.8V.
2. Tx_Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7kΩ to 10kΩ resistor. Its states are:

Low (0V to 0.8V):	Transmitter On
(>0.8V and <2V):	Undefined
High (2.0V to 3.465V):	Transmitter Disabled
Open:	Transmitter Disabled.
3. Modulation absent. Connected to the VeeT and VeeR in the module.
4. LOS (Loss of Signal) is an open collector/drain output that should be pulled up with a 4.7kΩ to 10kΩ resistor. Pull-up voltage between 2.0V and VccT/R+0.3V. When “high,” this output indicates that the

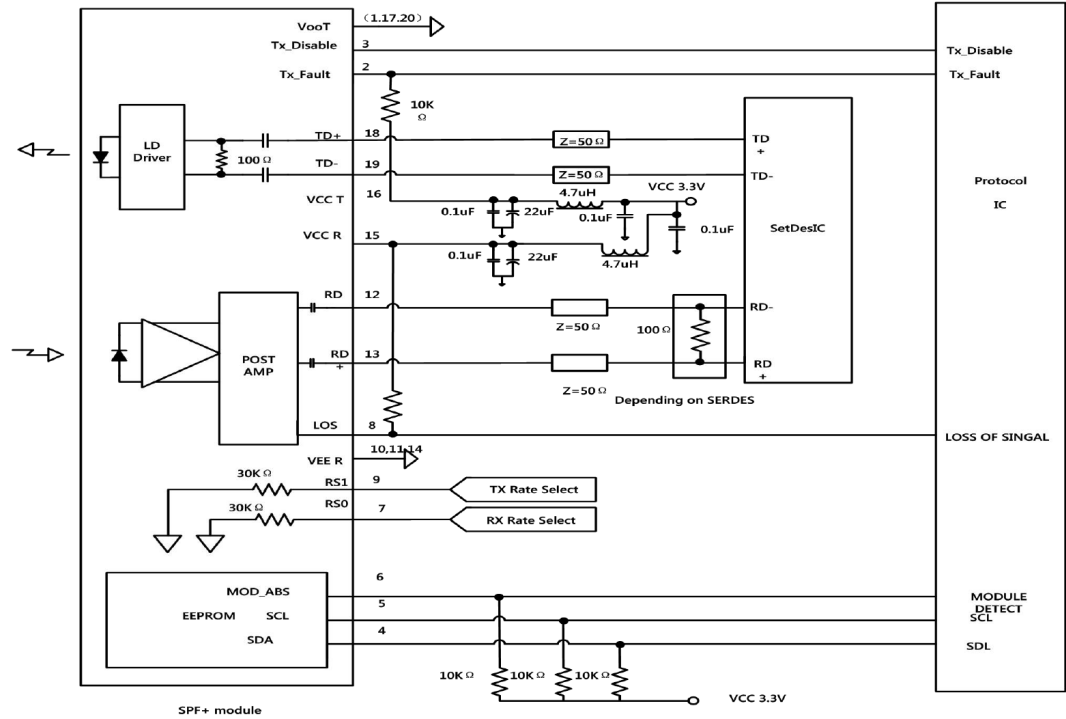
received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). “Low” indicates normal operation. In the “low” state, the output will be pulled to <0.8V.

5. VeeR and VeeT may be internally connected within the SFP module.
6. RD-/+. These are the differential receiver outputs. They are AC-coupled, 100Ω differential lines that should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 400mV and 2000mV differential (200mV – 1000mV single ended) when properly terminated.
7. VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V±5% at the SFP connector pin. Maximum supply current is 545mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1Ω should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply filtering network is used, hot-plugging of the SFP transceiver module will result in an in-rush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP transceiver module.
8. TD-/+. These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module.

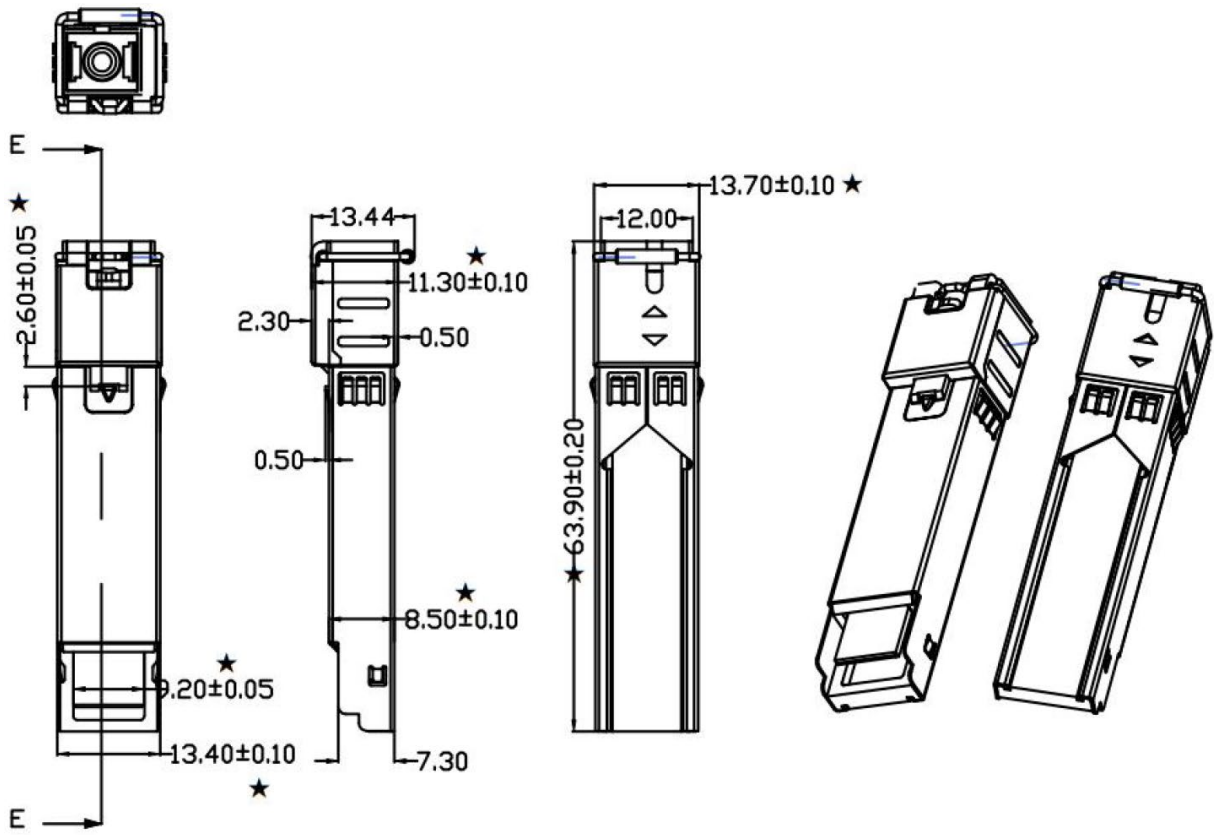
Pin-Out Details

← TOWARD HOST	11	VEER	VEER	10	→ TOWARD BEZEL
	12	RD-	RS1	9	
	13	RD+	RX_LOS	8	
	14	VEER	RS0	7	
	15	VCCR	MOD-ABS	6	
	16	VCCT	SCL	5	
	17	VEET	SDA	4	
	18	TD+ TX_DISABLE		3	
	19	TD- TX_FAULT		2	
	20	VEET	VEET	1	

Recommended Circuit Schematic



Mechanical Specifications



About Skylane Optics

Skylane is a leading provider of transceivers for optical communication.

We offer an extensive portfolio for the enterprise, access, datacenter and metropolitan fiber optical market as well as for smart home applications and home networks.

We cover the European, South American and North American market with a strong partner network and have offices in Belgium, Brazil, Sweden and USA.

Our offerings are characterized by high quality and performance. In combination with our strong technical support, we enable our customers to build cost optimized network solutions.

We offer an extensive range of high-quality products including transceivers (Optical and copper), Active Optical Cable (AOC), Direct Attach Cable (DAC), Mux/Demux, Coding Box.

