



SFP-10GBASE-SR-A-SKY

MSA Compliant 10GBase-SR SFP+ Transceiver (MMF, 850nm, 300m, LC, DOM, CDR)

Product Description

This MSA compliant SFP+ transceiver provides 10GBase-SR throughput up to 300m over multi-mode fiber (MMF) using a wavelength of 850nm via an LC connector. It has been programmed, uniquely serialized, and tested for data-traffic and application to ensure that it will initialize and perform identically. All of our transceivers comply with Multi-Source Agreement (MSA) standards to provide 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 11.3Gbps
- Distance up to 300m at 50/125 um MMF
- 850nm VCSEL Transmitter
- Built-in dual CDR
- Compliant with MSA SFP+ Specification SFF-8431
- Duplex LC Connector Interface, Hot-Pluggable
- Power Dissipation: 1.5W
- Compliant with IEEE 802.3ae 10GBASE-SR/SW
- Operating Temperature: 0 to 70 Celsius
- Dispersion Tolerance up to 40ps/nm over G.651
- RoHS Compliant and Lead-Free



Applications:

- 10GBase Ethernet

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
Storage Temperature	Tstg	-40		85	°C	
Operating Case Temperature	Tc	0		70	°C	
Relative Humidity	RH	5		95	%	
Supply Voltage	Vcc	-0.5		3.6	V	
Input Voltage	VIN	-0.5		Vcc	V	
Output Current	Io			20	mA	
Baud Rate			10.3125 9.95		Gbps	
Data Rate			10.3125		Gbps	

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.15	3.3	3.45	V	
Module Supply Current	Icc			435	mA	
Surge Current						
50/125µm MMF			300		m	
Transmitter						
Differential CML Input	VIN	120		850	Ω	AC coupled inputs
Differential Input Impedance	ZIN	85	100	115	mVp-p	RIN > 100kΩ @ DC
Tx_Disable Input Voltage - High		2		Vcc+0.3	V	
Tx_Disable Input Voltage - Low		0		0.8	V	
Tx_Fault Output Voltage - High		2		Vcc+0.3	V	1
Tx_Fault Output Voltage - Low		0		0.8	V	2
Receiver						
Differential CML Output	VOUT	100		850	mVp-p	AC coupled outputs
Differential Output Impedance	ZOUT	85	100	115	Ω	
Rx_LOS Output Voltage - High		2		Vcc+0.3	V	1
Rx_LOS Output Voltage - Low		0		0.8	V	2
MOD_DEF(2.0)	VOH	2.5			V	With serial ID
	VOL	0		0.5	V	

Notes:

1. Io = 400µA. Host_Vcc.
2. Io = 4.0mA.

Optical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter							
Center Wavelength		λ_C	840	850	860	nm	
Spectral Width (RMS)		$\Delta\lambda$			0.45	nm	
Average Output Power		POUT	-6		-1	dBm	
Extinction Ratio		ER	3.0	5.0		dB	
Transmitter Dispersion Penalty		TDP			3.9	dB	
Input Differential Impedance		ZIN	90	100	110	Ω	
Tx_Disable Assert Time		t_off			10	us	
Tx_Disable Negate Time		t_on			1	ms	
Tx_Disable Time to Start Reset		t_reset	10			us	
Time to Initialize (Includes Reset of Tx_Fault)		t_init			300	ms	
Tx_Fault from Fault to Assertion		t_fault			100	us	
Total Jitter		TJ			0.28	UI(p-p)	
Data-Dependent Jitter		DDJ			0.1	UI(p-p)	
Uncorrelated Jitter		UJ			0.023	RMS	
Output Optical Eye			IEEE 802.3-2005 Compliant				
Receiver							
Center Wavelength		λ_C	840	850	860	nm	
Receiver Sensitivity		Pmin			-11.1	dBm	1
Output Differential Impedance		RIN	90	100	110	Ω	
Receiver Overload		Pmax	-1			dBm	
Optical Return Loss		ORL			-12	dB	
LOS De-Assert		LOSD			-12.5	dBm	
LOS Assert		LOSA	-25			dBm	
LOS Hysteresis			0.5			dB	
LOS	High		2.0		Vcc+0.3	V	
	Low		0		0.8	V	

Notes:

1. Measured with a PRBS 2³¹-1 test pattern @10.3125Gbps and BER≤10⁻¹².

Pin Descriptions

Pin	Symbol	Name/Description	Plug Seq.	Notes
1	VeeT	Transmitter Ground.	1	
2	Tx_Fault	Transmitter Fault Indication.	3	1
3	Tx_Disable	Transmitter Disable. Module disables on “high” or “open.”	3	2
4	SDA	Module Definition 2. Data Line for Serial ID.	3	
5	SCL	Module Definition 1. Clock Line for Serial ID.	3	
6	MOD_ABS	Module Definition 0.	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 the 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 $\pm$ 5% Receiver Power.	2	7
16	VccT	3.3V $\pm$ 5% Transmitter Power.	2	7
17	VeeT	Transmitter Ground.	1	5
18	TD+	Transmitter Data In.	3	8
19	TD-	Inverse Transmitter Data In.	3	8
20	VeeT	Transmitter Ground.	1	5

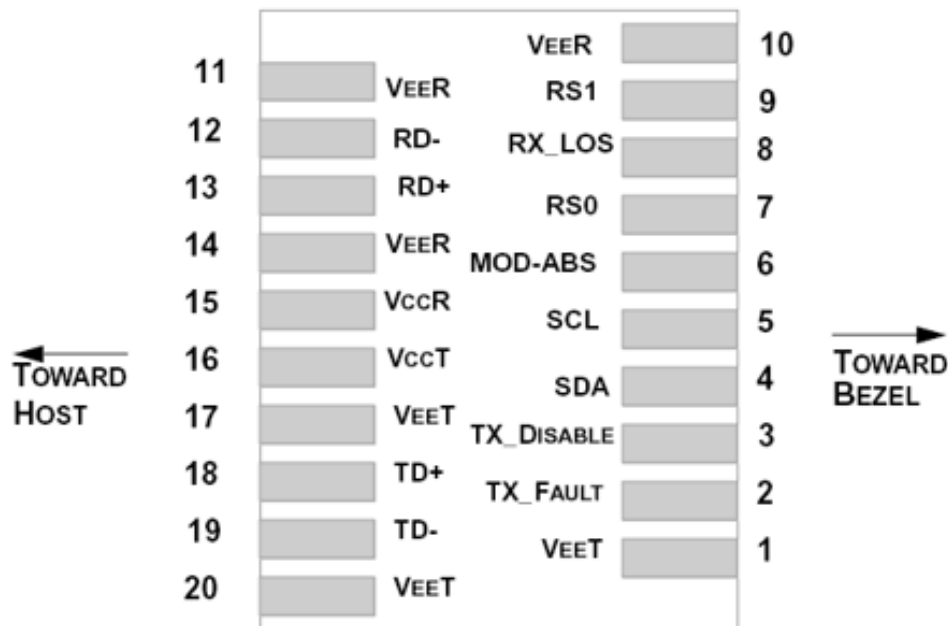
Notes:

- Tx_Fault is an open collector/drain output that should be pulled up with a 4.7k Ω to 10k Ω resistor on the host board. Pull-up voltage is 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.
- Tx_Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7k Ω to 10k Ω 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.
- Modulation absent. Connected to the VeeT or VeeR in the module.
- LOS (Loss of Signal) is an open collector/drain output that should be pulled up with a 4.7k Ω to 10k Ω resistor. Pull-up voltage is 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.

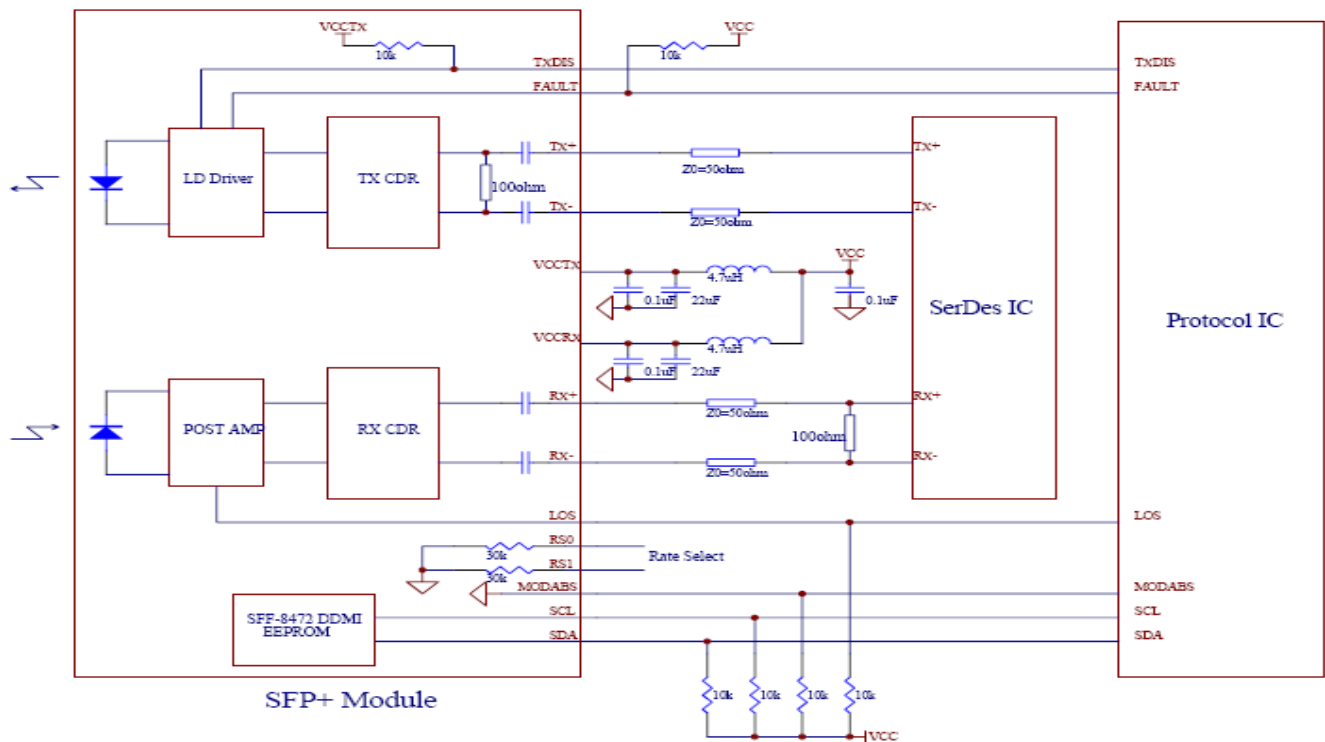
5. VeeR and VeeT may be internally connected within the SFP+ module.
6. RD-/+. These are the differential receiver outputs. They are AC-coupled, 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 400mV and 2000mV differential (50mV and 425mV 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 300mA. 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 and is thus not required on the host board. The inputs will accept differential swings of 120mV to 850mV (60mV to 425mV single-ended), though it is recommended that the values are between 120mV and 850mV differential (60mV and 425mV single-ended) for the best EMI performance.

Electrical Pad Layout

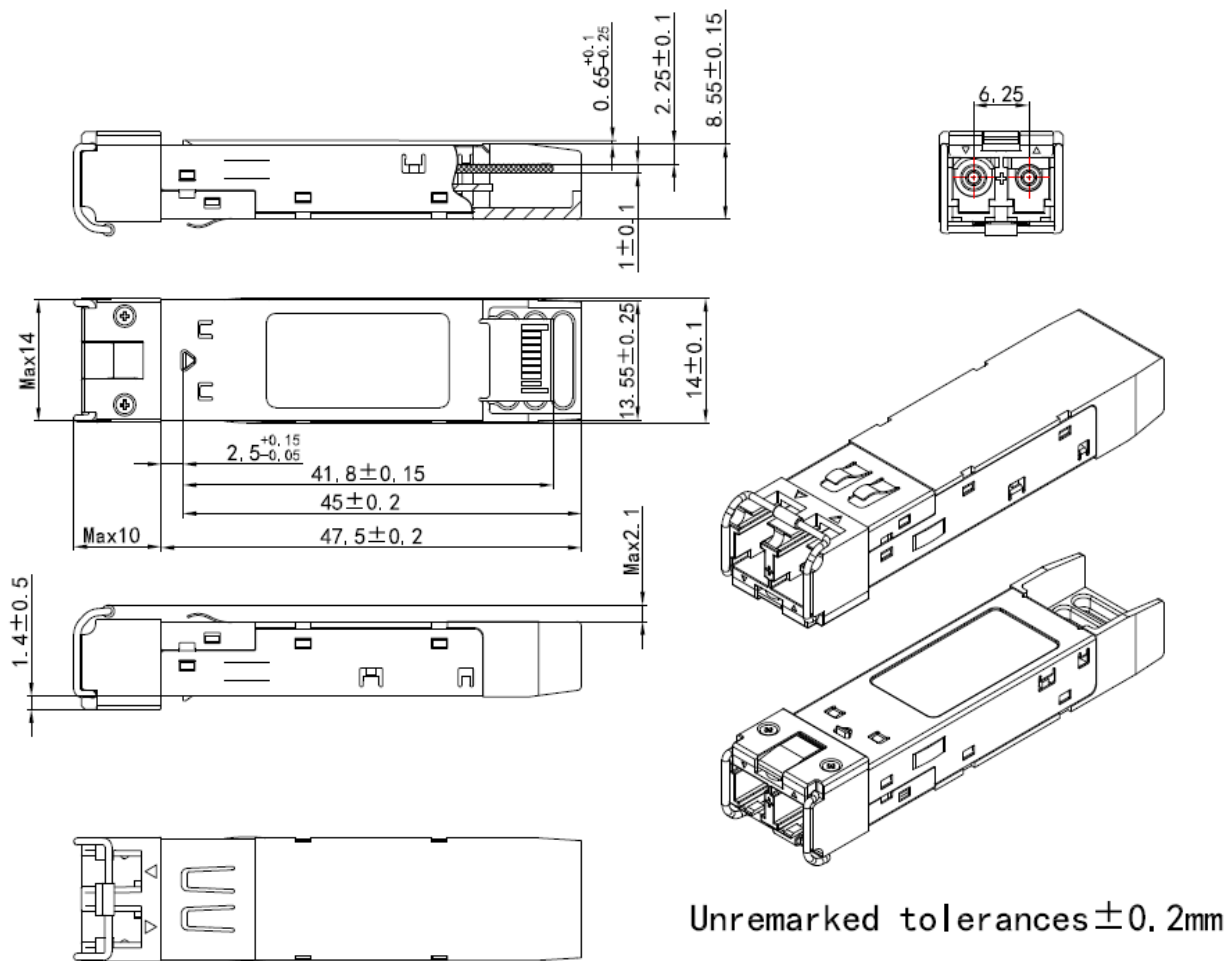




Recommended Circuit Schematic



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.

