



DS-SFP-FC16GELW-SKY

Cisco® DS-SFP-FC16GELW Compatible 16GBase-LW Fibre Channel SFP+ Transceiver (SMF, 1310nm, 25km, LC)

Product Description

This Cisco® DS-SFP-FC16GELW compatible SFP+ transceiver provides 16GBase-LW Fibre Channel throughput up to 25km over single-mode fiber (SMF) using a wavelength of 1310nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Cisco® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. It is built to meet or exceed the specifications of Cisco®, as well as to comply with MSA (Multi-Source Agreement) standards to ensure seamless network integration. 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:

- SFF-8432 and SFF-8472 Compliance
- Duplex LC Connector
- Commercial Temperature 0 to 70 Celsius
- Single-mode Fiber
- Hot Pluggable
- Excellent ESD Protection
- Metal with Lower EMI
- RoHS Compliant and Lead Free



Applications:

- Fibre Channel
- Access and Enterprise

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
Storage Temperature	Tstg	-40		85	°C
Relative Humidity	RH	5		95	%
Supply Voltage	Vcc	-0.5		4.0	V
Operating Temperature	Tc	0	25	70	°C
Data Rate			4.25/8.5/14.025		Gbps

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Module Supply Current	Icc			550	mA	
Power Dissipation	P _{DISS}			1800	mW	
Supply Voltage	Vcc	3.135	3.3	3.465	V	
Transmitter						
Input Differential Impedance	ZIN		100		Ω	
Differential Data Input Swing	VIN,pp	180		700	mVp-p	
Tx_Fault	Transmitter Fault	VOH	2.0	Host_Vcc	V	
	Normal Operation	VOL	0	0.8	V	
Tx_Disable	Transmitter Disable	VIH	2.0	Host_Vcc	V	
	Transmitter Enable	VIL	0	0.8	V	
Receiver						
Output Differential Impedance	ZOUT		100		Ω	
Differential Data Output Swing	VOUT,pp	300		850	mVp-p	1
Data Output Rise/Fall Time	Tr/Tf	28			ps	2
Rx_LOS	Loss of Signal (LOS)	VOH	2.0	Host_Vcc	V	3
	Normal Operation	VOL	0	0.8	V	3

Notes:

1. Internally AC coupled but requires an external 100Ω differential load termination.
2. 20-80%.
3. LOS is an open collector output that should be pulled up with 4.7kΩ on the host board.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Launch Optical Power @14.025Gbps	P _{o,RH}	-5		2	dBm	1, 2
Launch Optical Power @4.25Gbps, 8.5Gbps	P _{o,RL}	-5		-1	dBm	3
Center Wavelength	λ_C	1295	1310	1325	nm	4
Extinction Ratio	ER	3.5			dB	
Transmitter and Dispersion Penalty @8.5Gbps	TDP			3.2	dB	7
Transmitter and Dispersion Penalty @14.025Gbps	TDP			4.4	dB	7
Spectral Width	$\Delta\lambda$			1	nm	4, 5
Optical Rise/Fall Time @4.25Gbps	T _r /T _f			90	ps	8
Optical Return Loss Tolerance	ORLT			12	dB	
POUT @Tx_Disable Asserted	P _{off}			-30	dBm	9
Receiver						
Center Wavelength	λ_C	1260	1310	1370	nm	
Unstressed Receiver OMA Sensitivity	RxSENS			-15.4	dBm	10
Unstressed Receiver OMA Sensitivity = 8.5	RxSENS			-13.7	dBm	10
Unstressed Receiver OMA Sensitivity	RxSENS			-12.0	dBm	11
Receiver Overload (P _{avg})	POL	0.5			dBm	
Optical Return Loss	ORL	12			dB	
LOS De-Assert	LOSD			-16	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5			dB	

Notes:

1. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
2. High-Bandwidth Mode. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
3. Low-Bandwidth Mode. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
4. Also specified to meet curves in FC-PI-5 Rev 6.10 Figures 23, 24, and 25, which allow trade-off between wavelength, spectral width, and OMA for 4.25Gbps and 8.5Gbps operation.
5. 20dB spectral width.
6. Equivalent extinction ratio specification for Fibre Channel. Allows smaller ER at higher average power.
7. For 14.025Gbps and 8.5Gbps operation, Jitter values for gamma T and gamma R are controlled by TDP.
8. Unfiltered, 20-80%. Complies with IEEE 802.3 (Gig. E), FC 4x eye masks when filtered.
9. The optical power is launched into 9/125 μ m SMF.
10. Measured with PRBS 2⁷-1 at 10⁻¹² BER.
11. Measured with PRBS 2³¹-1 at 10⁻¹² BER.

Pin Descriptions

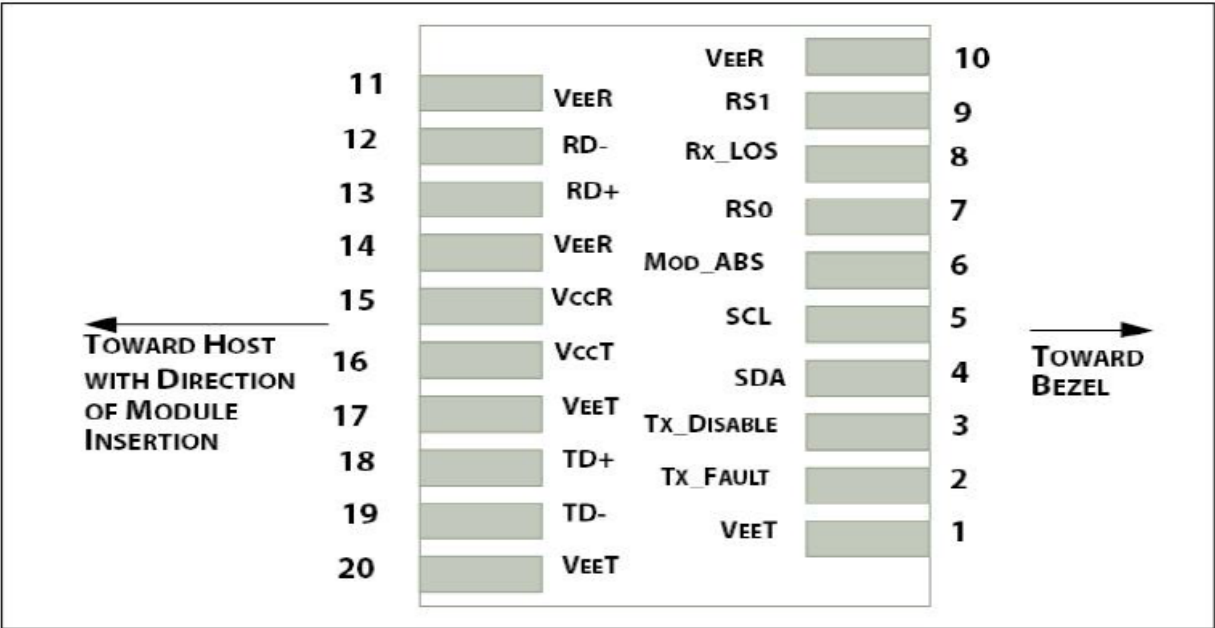
Pin	Symbol	Name/Description	Notes
1	VeeT	Transmitter Ground.	1
2	Tx_Fault	Transmitter Fault (LVTTL-O). "High" indicates a fault condition.	2
3	Tx_Disable	Transmitter Disable (LVTTL-I). "High" or "open" disables the transmitter.	3
4	SDA	2-Wire Serial Interface Data (LVCMOS-I/O) (MOD-DEF2).	4
5	SCL	2-Wire Serial Interface Clock (LVCMOS-I/O) (MOD-DEF1).	4
6	MOD_ABS	Module Absent (Output). Connected to the VeeT or VeeR in the module.	5
7	RS0	Rate Select 0. Not used. Presents high input impedance.	6
8	Rx_LOS	Receiver Loss of Signal (LVTTL-O).	2
9	RS1	Rate Select 1. Not used. Presents high input impedance.	6
10	VeeR	Receiver Ground.	1
11	VeeR	Receiver Ground.	1
12	RD-	Inverse Received Data Out (CML-O).	
13	RD+	Received Data Out (CML-O).	
14	VeeR	Receiver Ground.	
15	VccR	+3.3V Receiver Power.	
16	VccT	+3.3V Transmitter Power.	
17	VeeT	Transmitter Ground.	1
18	TD+	Transmitter Data In (CML-I).	
19	TD-	Inverse Transmitter Data In (CML-I).	
20	VeeT	Transmitter Ground.	1

Notes:

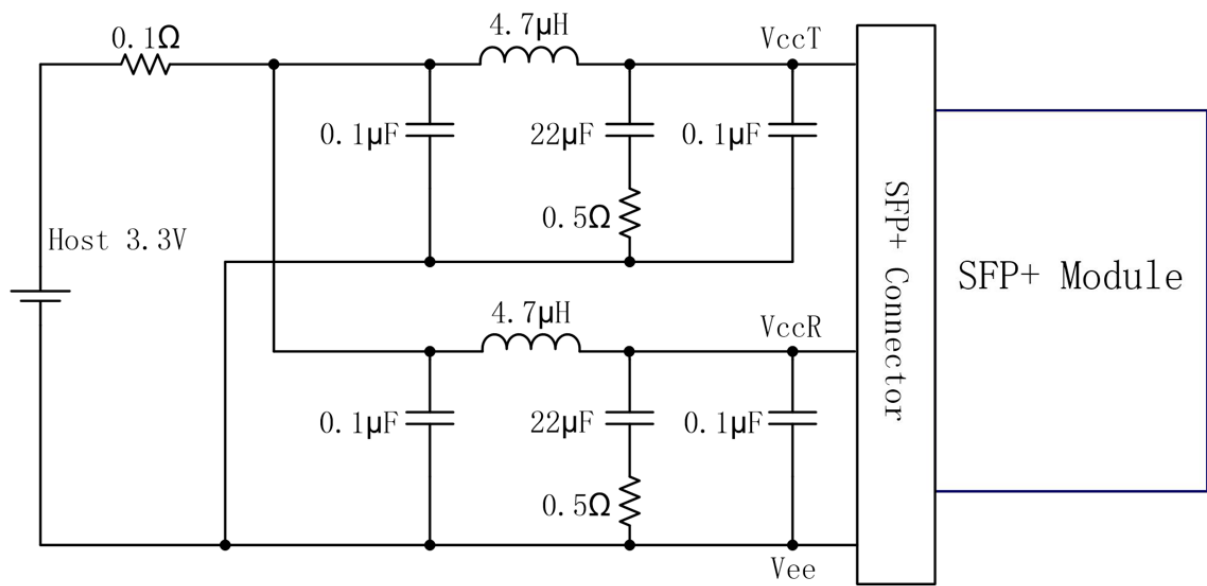
1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that, on the host board, requires a 4.7k Ω to 10k Ω pull-up resistor to the Host_Vcc.
3. This input is internally biased "high" with a 4.7k Ω to 10k Ω pull-up resistor to the VccT.
4. 2-Wire Serial Interface Clock and Data lines require an external pull-up resistor dependent on the capacitance load.
5. This is a ground return that, on the host board, requires a 4.7k Ω to 10k Ω pull-up resistor to the Host_Vcc.
6. Rate select can also be set through the 2-wire bus in accordance with SFF-8472 v. 11.0. Rx Rate Select is set at Bit 3, Byte 110, and Address A2h. Tx Rate Select is set at Bit 3, Byte 118, and Address A2h.

Note: Writing a "1" selects maximum bandwidth operation. Rate select is the logic OR of the input state of the Rate Select Pin and 2-wire bus.

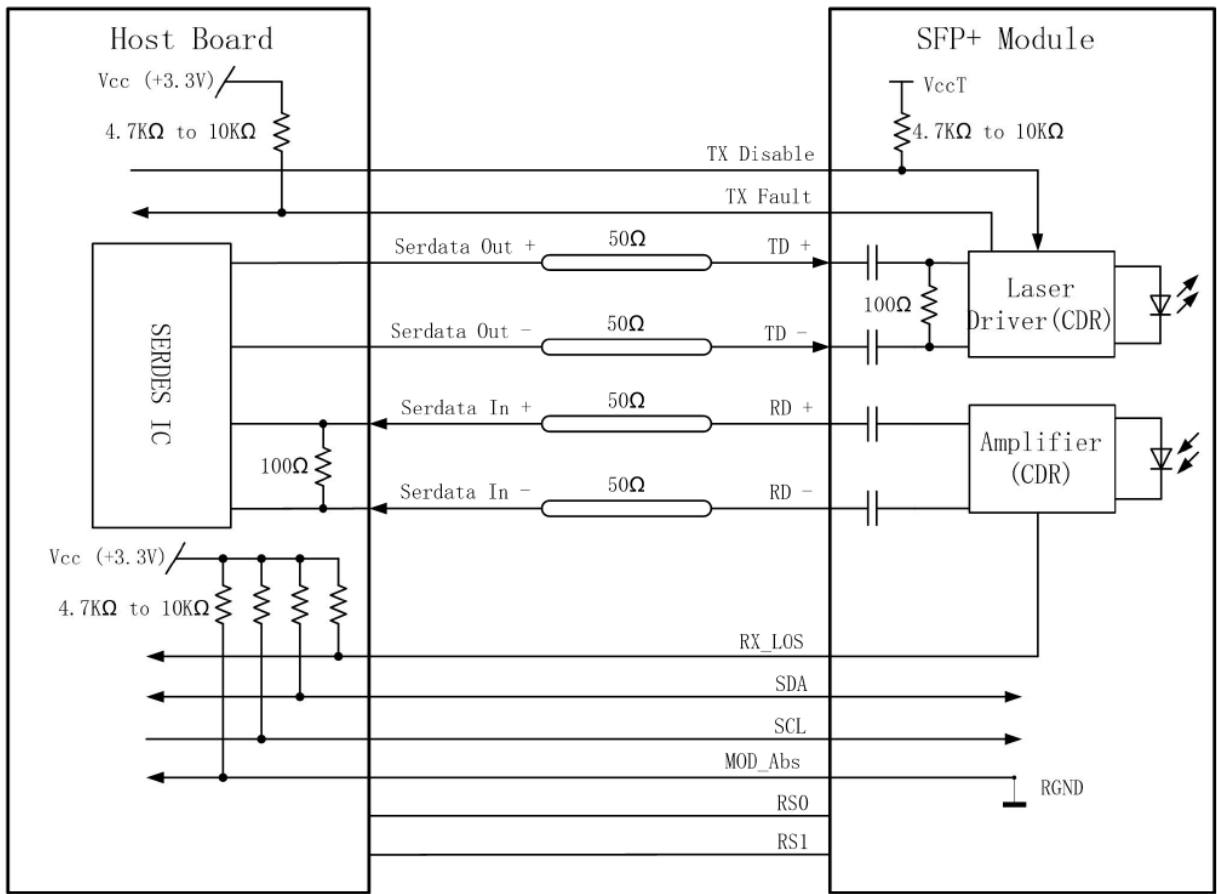
Electrical Pad Layout



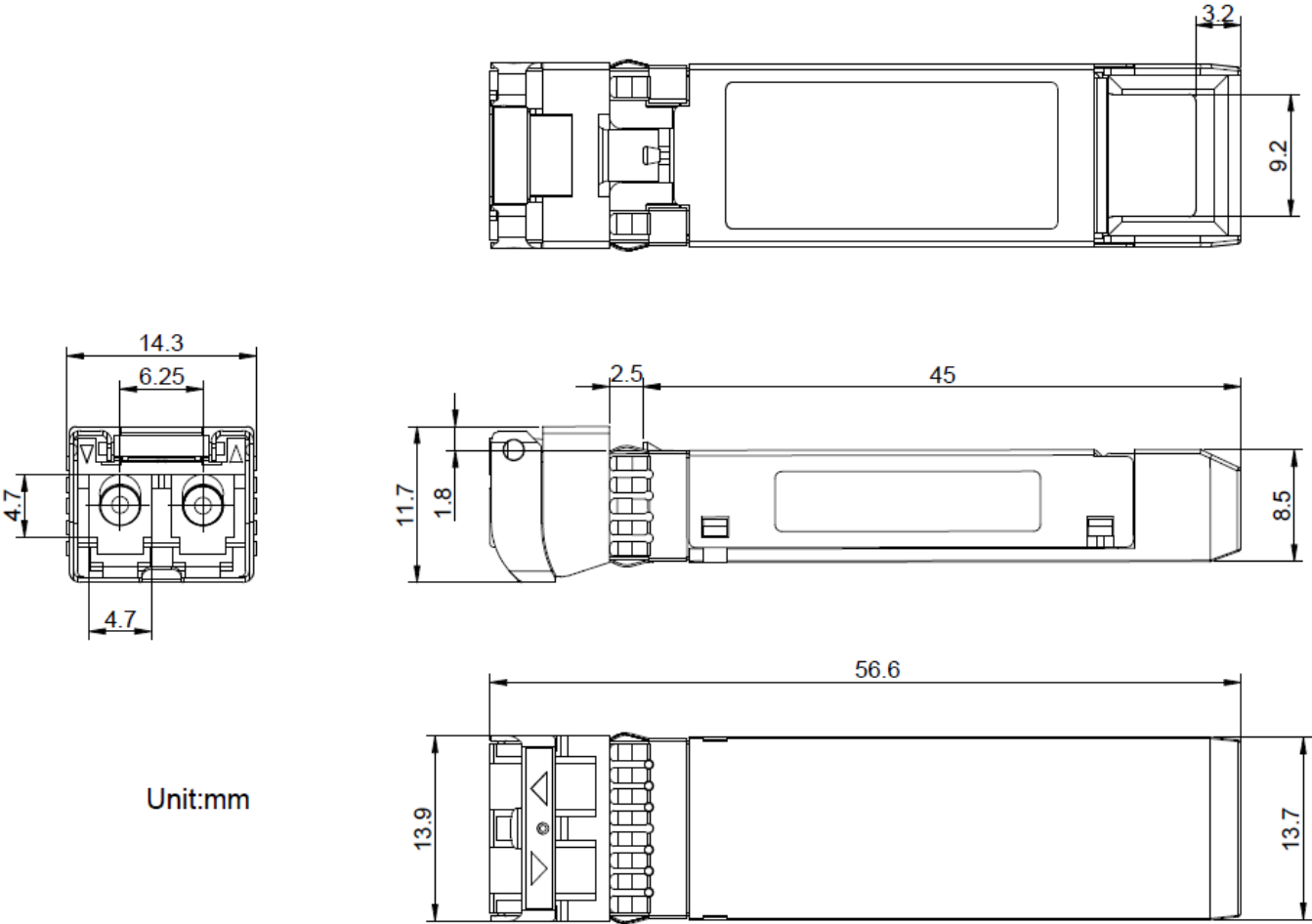
Recommended Host Board Power Supply Filter Network



Recommended Application Interface Block Diagram



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.

