

## SFP-10GB-CW-49-10-FT-OPC

Fortinet® Compatible TAA 10GBase-CWDM SFP+ Transceiver (SMF, 1490nm, 10km, LC, DOM)

### Features

- Single 3.3V Power Supply Voltage
- CWDM DFB Laser Transmitter
- Compliant with IEEE 802.3ae 10GBASE-LR/LW
- Up to 10.7Gbps Bi-Directional Data Links
- Single-Mode Fiber
- Hot-Pluggable
- Duplex LC Connector
- Operating Temperature: 0 to 70 Celsius
- RoHS Compliant and Lead-Free
- Excellent ESD Protection
- RoHS Compliant and Lead Free



### Applications:

- 10x Gigabit Ethernet over CWDM
- 8x/10x Fibre Channel
- Access, Metro and Enterprise
- Mobile Fronthaul CPRI/OBSAI

### Product Description

This Fortinet® compatible SFP+ transceiver provides 10GBase-CWDM throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1490nm via an LC connector. The listed reach has been determined using a link budget calculation and tested in a standard environment. Actual link distances achieved will be dependent upon the deployed environment. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Fortinet®. 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.

### CWDM Available Wavelengths

Wavelengths	Min.	Typ.	Max.
27	1264.5	1271	1277.5
29	1284.5	1291	1297.5
31	1304.5	1311	1317.5
33	1324.5	1331	1337.5
35	1344.5	1351	1357.5
37	1364.5	1371	1377.5
39	1384.5	1391	1397.5
41	1404.5	1411	1417.5
43	1424.5	1431	1437.5
45	1444.5	1451	1457.5
47	1464.5	1471	1477.5
49	1484.5	1491	1497.5
51	1504.5	1511	1517.5
53	1524.5	1531	1537.5
55	1544.5	1551	1557.5
57	1564.5	1571	1577.5
59	1584.5	1591	1597.5
61	1604.5	1611	1617.5

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Maximum Supply Voltage	Vcc	-0.5		4.0	V	1
Storage Temperature	Tstg	-40		90	°C	2
Operating Case Temperature	Tc	0		70	°C	3
Maximum Bitrate	BER			10 <sup>-12</sup>		
Data Rate	DR		10.3125		Gbps	4

#### Notes:

1. For the electrical power interface.
2. Ambient temperature.
3. Case temperature.

## Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	V <sub>cc</sub>	3.14	3.30	3.46	V	
Power Supply Current	I <sub>cc</sub>		200	310	mA	1
Power Consumption	PC		0.65	1.0	W	
Transmitter						
Differential Data Input Swing	V <sub>IN,pp</sub>	180		700	mV	
Input Differential Impedance	R <sub>IN</sub>		100		Ω	
Transmit Disable Voltage	V <sub>D</sub>	2		V <sub>cc</sub>	V	
Transmit Enable Voltage	V <sub>EN</sub>	V <sub>ee</sub>		V <sub>ee</sub> +0.8	V	
Receiver						
Differential Data Output Swing	V <sub>OUT,pp</sub>	300		850	mV	
Output Differential Impedance	T <sub>r</sub> /T <sub>f</sub>	28			ps	
LOS Assert	V <sub>LOSA</sub>	2		Host_V <sub>cc</sub>	V	
LOS De-Assert	V <sub>LOSD</sub>	V <sub>ee</sub>		V <sub>ee</sub> +0.5	V	

### Notes:

1. For the electrical power interface.

## Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
<b>Transmitter</b>						
Optical Power (Average)	P <sub>TX</sub>	2		7	dBm	1
Transmitter Dispersion Penalty	TDP			3	dB	
Optical Extinction Ratio	ER	3.5			dB	
Optical Wavelength	λ <sub>C</sub>	λ-6.5	λ	λ+6.5	nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Relative Intensity Noise	RIN			-128	dB/Hz	
Launch Power of Off Transmitter	P <sub>off</sub>			-30	dBm	1
<b>Receiver</b>						
Receiver Sensitivity @10.3Gbps	R <sub>X_SEN</sub>			-14.4	dBm	2
Receiver Overload	P <sub>OL</sub>	2			dBm	
Receiver Wavelength	λ <sub>C</sub>	1260		1620	nm	
Receiver Reflectance	TR <sub>RX</sub>			-12	dB	
LOS Assert	LOSA	-30			dBm	
LOS De-Assert	LOSD			-17	dBm	
LOS Hysteresis	LOSH	0.5			dB	

### Notes:

1. Average.
2. Average. Measured with worst ER, BER<10<sup>-12</sup>, and 2<sup>31</sup>-1 PRBS.

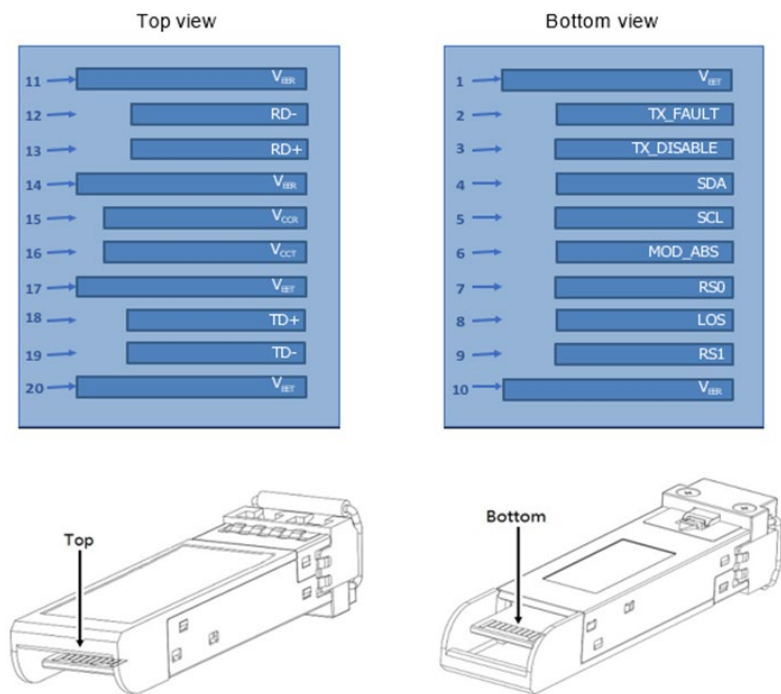
## Pin Descriptions

Pin	Symbol	Name/Description	Notes
1	VeeT	Transmitter Ground (Common with Receiver Ground).	1
2	Tx_Fault	Transmitter Fault.	2
3	Tx_Disable	Transmitter Disable. Laser output disabled on “high” or “open.”	3
4	SDA	2-Wire Serial Interface Data.	4
5	SCL	2-Wire Serial Interface Clock.	4
6	MOD_ABS	Module Absent. Grounded within the module.	4
7	RS0	No Connection Required.	
8	Rx_LOS	Loss of Signal Indication. “Logic 0” indicates normal operation.	5
9	RS1	No Connection Required.	1
10	VeeR	Receiver Ground (Common with Transmitter Ground).	1
11	VeeR	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	VeeR	Receiver Ground (Common with Transmitter Ground).	1
15	VccR	Receiver Power Supply.	
16	VccT	Transmitter Power Supply.	
17	VeeT	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	VeeT	Transmitter Ground (Common with Receiver Ground).	1

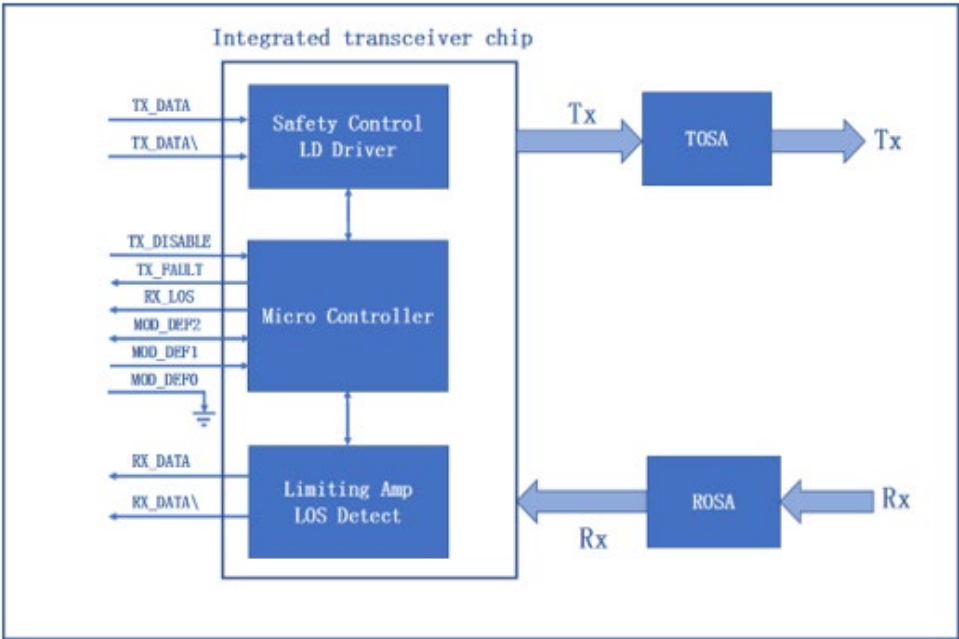
## Notes:

1. The circuit ground is isolated from the chassis ground.
2. Tx\_Fault is the open collector output and should be pulled up with 4.7kΩ to 10kΩ on the host board to a voltage between 2V and Vcc+0.3V.
3. Disabled: T<sub>DIS</sub>>2V or open, enabled: T<sub>DIS</sub><0.8V.
4. Should be pulled up with 4.7kΩ to 10kΩ on the host board to a voltage between 2V and Vcc+0.3V.
5. LOS is an open collector output and should be pulled up with 4.7kΩ to 10kΩ on the host board to a voltage between 2V and Vcc+ 0.3V. The “logic 0” indicates normal operation. “Logic 1” indicates that the receiver signal is lost.

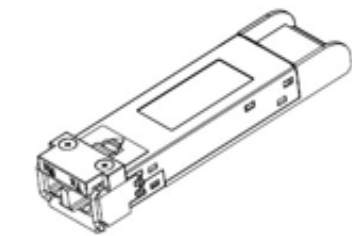
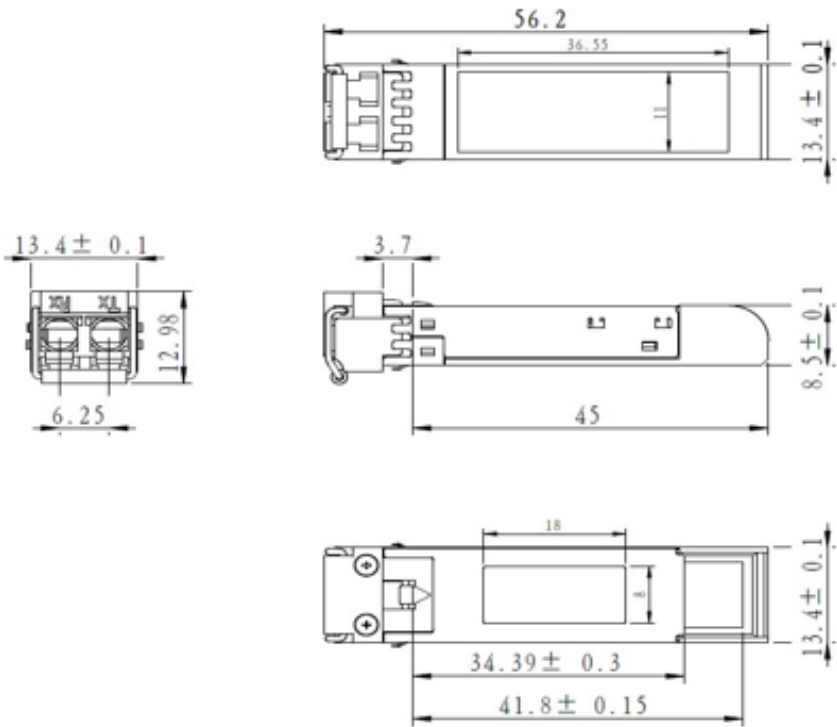
Electrical Pad Layout



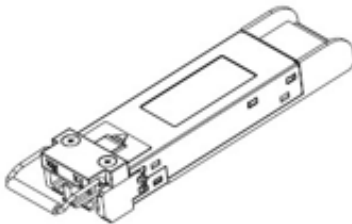
Block Diagram of Transceiver



Mechanical Specifications



LATCHED



UNLATCHED