

## **SFP-1/10GB-SR-I-OPC**

MSA and TAA 1/10GBase-SR SFP+ Dual-Rate Transceiver (MMF, 850nm, 300m, LC, DOM, -40 to 85C)

### **Features**

- Supports Rate Selectable 1.25Gbps or 9.83Gbps to 11.3Gbps Bit Rates
- Compliant with IEEE 802.3-2012 10GBASE-SR/SW and 1000BASE-SX
- Compliant with SFF-8431
- Hot-Pluggable SFP+ Footprint
- 850nm VCSEL Laser Transmitter
- Duplex LC Connector
- Built-In Digital Diagnostic Functions
- Class 1 Laser
- Operating Temperature: -40 to 85 Celsius
- RoHS Compliant and Lead-Free



### **Applications:**

- 10GBase-SR Ethernet

### **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 can operate at temperatures between -40 and 85C. 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. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

## Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Maximum Supply Voltage	Vcc	-0.5		4	V	1
Storage Temperature	Tstg	-40		85	°C	
Operating Case Temperature	Tc	-40		85	°C	
Data Rate (RS0 = Low)	DR		1.25		Gbps	2
Data Rate (RS0 = High)	DR	9.83	10.3125	11.3	Gbps	2
Bit Error Rate	BER			10 <sup>-12</sup>		

### Notes:

1. For the electrical power interface.
2. IEEE 802.3-2012.

## Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Module Supply Voltage	Vcc	3.14	3.3	3.46	V	
Module Supply Current	Icc		180	300	mA	1
Transmitter						
Input Differential Impedance	RIN		100		Ω	
Differential Data Input Swing	VIN,pp	180		700	mVp-p	
Transmit Disable Voltage	VD	2		Host_Vcc	V	
Transmit Enable Voltage	VEN	Vee		Vee+0.8	V	
Receiver						
Differential Data Output Swing	VOU,pp	300		850	mVp-p	
Data Output Rise/Fall Time (20-80%)	Tr/Tf	28			ps	
LOS Assert	VLOSA	2		Host_Vcc	V	
LOS De-Assert	VLOSD	Vee		Vee+0.5	V	

### Notes:

1. For the electrical power interface.

**Optical Characteristics RS0 = Low (1G Operation)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
<b>Transmitter</b>						
Output Optical Power	P <sub>TX</sub>	-9.5		-1	dBm	1
Optical Center Wavelength	λ <sub>C</sub>	840	850	860	nm	
Rise/Fall Time (20-80%)	T <sub>r</sub> /T <sub>f</sub>			300	ps	
Extinction Ratio	ER	9			dB	
Spectral Width (RMS)	Δλ			0.45	nm	
Relative Intensity Noise	RIN			-120	dB/Hz	
Transmitter Jitter	TJ					2
Launch Power of Off Transmitter	P <sub>off</sub>			-30	dBm	3
<b>Receiver</b>						
Optical Center Wavelength	λ <sub>C</sub>	840		860	nm	
Receiver Sensitivity @1.25Gbps	R <sub>X_SEN</sub>			-17	dBm	4
Receiver Overload	P <sub>OL</sub>	0.5			dBm	
Optical Return Loss	ORL	12			dB	
LOS Assert	LOSA	-30			dBm	
LOS De-Assert	LOSD			-18	dBm	
LOS Hysteresis	LOSH	0.5			dB	

**Notes:**

1. Class 1 Product.
2. According to IEEE 802.3-2012 requirements.
3. Average.
4. Measured with worst ER, BER<10<sup>-12</sup>, and 2<sup>7</sup>-1 PRBS.

**Optical Characteristics RS0 = High (10G Operation)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
<b>Transmitter</b>						
Output Optical Power	P <sub>TX</sub>	-5		-1	dBm	1
Optical Center Wavelength	$\lambda_C$	840	850	860	nm	
Optical Modulation Amplitude	OMA		-1.5		dBm	2
Extinction Ratio	ER	3	5.5		dB	
Spectral Width (RMS)	$\Delta\lambda$			0.45	nm	
Relative Intensity Noise	RIN			-128	dB/Hz	
Transmitter Dispersion Penalty	TDP			3.9	dB	
Transmitter Jitter	TJ					3
Launch Power of Off Transmitter	P <sub>off</sub>			-30	dBm	4
<b>Receiver</b>						
Optical Center Wavelength	$\lambda_C$	840		860	nm	
Receiver Sensitivity @10.3Gbps	R <sub>X_SEN</sub>			-10	dBm	1
Receiver Overload	P <sub>OL</sub>	0.5			dBm	
Receiver Reflectance	TR <sub>RX</sub>			-12	dB	
LOS Assert	LOSA	-30			dBm	
LOS De-Assert	LOSD			-14	dBm	
LOS Hysteresis	LOSH	0.5			dB	

**Notes:**

1. Class 1 Product.
2. IEEE 802.3-2012.
3. According to IEEE 802.3-2012 requirements.
4. Average.
5. Measured with worst ER, BER<10<sup>-12</sup>, and 2<sup>31</sup>-1 PRBS.

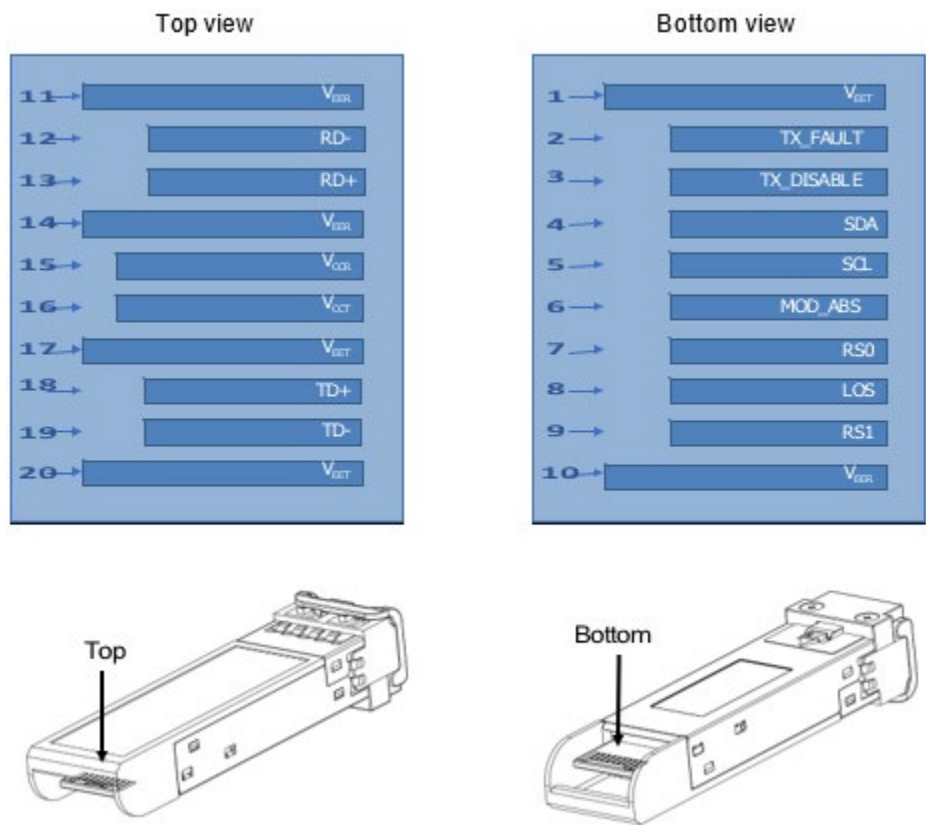
## Pin Descriptions

Pin	Symbol	Name/Description	Notes
1	VeeT	Transmitter Ground (Common with Receiver Ground).	1
2	Tx_Fault	Transmitter Fault.	
3	Tx_Disable	Transmitter Disable. Laser output disables on “high” or “open.”	2
4	SDA	2-Wire Serial Interface Data.	3
5	SCL	2-Wire Serial Interface Clock.	3
6	MOD_ABS	Module Absent. Grounded within the module.	3
7	RS0	Rate Selection.	
8	LOS	Loss of Signal Indication. “Logic 0” indicates normal operation.	4
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-	Inverse Receiver Data Out. AC Coupled.	
13	RD+	Received 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 Data In. AC Coupled.	
19	TD-	Inverse Transmitter Data In. AC Coupled.	
20	VeeT	Transmitter Ground (Common with Receiver Ground).	1

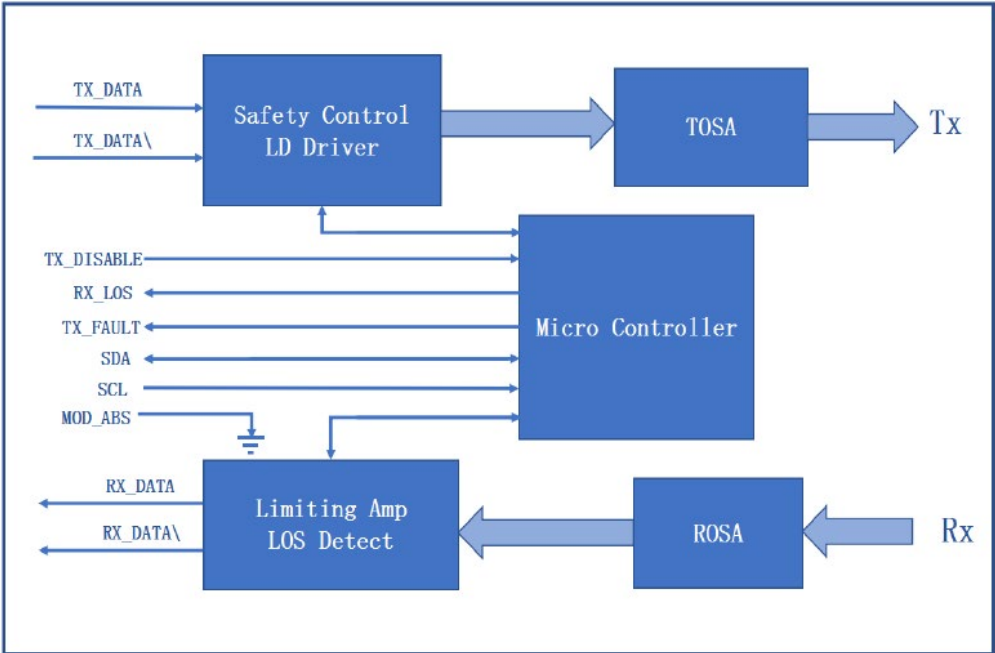
## Notes:

1. The circuit ground is isolated from the chassis ground.
2. Disabled:  $T_{DIS} > 2V$  or open. Enabled:  $T_{DIS} < 0.8V$ .
3. Should be pulled up with 4.7k $\Omega$  to 10k $\Omega$  on the host board to a voltage between 2V and  $V_{cc} + 0.3V$ .
4. LOS is an open collector output.

Electrical Pin-Out Details



Block Diagram



Mechanical Specifications

