

## 10G SFP10 SR Optical Transceiver

### Part Number: VS-10SR1ES-AA

**VS-10SR1ES-AA** is a high performance SFP+ transceiver module for 10 Gigabit Ethernet data links over multi-mode fiber with an operating range of -5 to 85°C.

### Features

- Supports from 9.83 Gb/s to 11.3 Gb/s bit rates
- Compliant with IEEE 802.3ae 10GBASE-SR/SW
- Compliant with SFF-8431
- Hot-pluggable SFP+ footprint
- 850nm VCSEL laser transmitter
- Duplex LC connector
- Built-in digital diagnostic functions
- Up to 300m on OM3 MMF
- Low power consumption (<1W)
- Single power supply 3.3V
- RoHS Compliant
- Class 1 laser product complies with EN 60825-1
- Operating temperature range (Case Temperature): -5°C to 85°C

### Applications

- 10GBASE-SR/SW Ethernet
- 10G Fiber Channel
- 10G CPRI

### Ordering Information

Part Number	Data Rate	Link Length	Laser	Detector	Fiber Type	Temperature
<b>VS-10SR1ES-AA</b>	10G	Up to 300m with OM3	850nm VCSEL	850nm PIN ROSA	MMF	-5 to 85°C

### Product Overview

Vitex **VS-10SR1ES-AA** (10GE SFP+) is a 10Gb/s transceiver module designed for optical communication applications compliant to Ethernet 10GBASE-SR/SW standard.

The product is based on 10G Ethernet IEEE 802.3ae standard and SFF-8431 standard, providing a fast and reliable interface for 10G Ethernet applications. The product implements digital diagnostics via a 2-wire serial bus, compliant with the SFF-8472 standard.

### Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Storage Temperature	T <sub>S</sub>	-40	85	°C
Power Supply Voltage	V <sub>CC</sub>	-0.5	4	V

### Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	T <sub>C</sub>	-5		85	°C
Power Supply Voltage	V <sub>CC</sub>	3.14	3.3	3.46	V
Supply Current	I <sub>CC</sub>		180	290	mA
Data Rate	DR	9.83	10.3125	11.3	Gb/s
Bit Error Rate	BER			10 <sup>-12</sup>	

### Electrical Specifications

Parameter	Symbol	Min	Typical	Max	Unit
<b>Electrical Transmitter Characteristics</b>					
Input differential impedance	R <sub>IN</sub>		100		Ω
Differential data input swing	V <sub>IN PP</sub>	180		700	mV
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
<b>Electrical Receiver Characteristics</b>					
Differential data output swing	V <sub>OUT PP</sub>	300		850	mV
Data output rise/fall time (20%-80%)	t <sub>r</sub> /t <sub>f</sub>	28			ps
LOS Assert	V <sub>LOS A</sub>	2		V <sub>CC</sub>	V
LOS De-Assert	V <sub>LOS D</sub>	V <sub>EE</sub>		V <sub>EE</sub> +0.5	V

### Optical – Transmitter

Parameter	Symbol	Min	Typical	Max	Unit
Output Optical Power <sup>1</sup>	P <sub>TX</sub>	-7		-1	dBm
Optical Center Wavelength	$\lambda_C$	840		860	nm
Optical Modulation Amplitude <sup>2</sup>	OMA		-1.5		dBm
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 <sup>3</sup>					
Launch Power of OFF Transmitter <sup>1</sup>	P <sub>OUT_OFF</sub>			-30	dBm

**Note:**

- 1) Average
- 2) IEEE 802.3ae
- 3) According to IEEE 802.3ae requirement

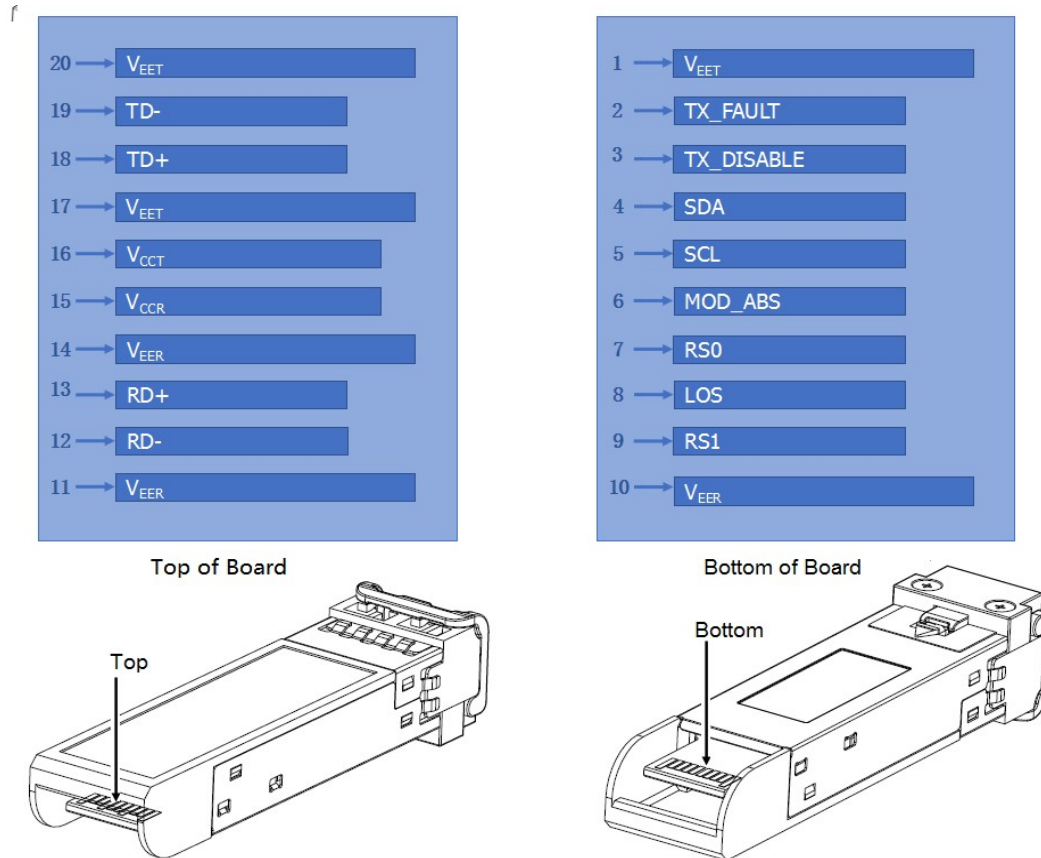
### Optical – Receiver

Parameter	Symbol	Min	Typical	Max	Unit
Optical Center Wavelength	$\lambda_C$	840		860	nm
Receiver Sensitivity @ 10.3Gb/s <sup>1</sup>	R <sub>X_SEN</sub>			-10	dBm
Receiver Overload	P <sub>OL</sub>	0.5			dBm
Receiver Reflectance	TR <sub>RX</sub>			-12	dB
LOS Assert	LOS <sub>A</sub>	-30			dBm
LOS De-Assert	LOS <sub>D</sub>			-14	dBm
LOS Hysteresis	LOS <sub>H</sub>	0.5			dB

**Note:**

- 1) Measured with worst ER; BER<10<sup>-12</sup>; 2<sup>31</sup>-1 PRBS

### Electrical Connector Layout



### Electrical Pin Definition

Pin	Symbol	Name/Description
1	V <sub>EET</sub>	Transmitter ground (common with receiver ground) <sup>1</sup>
2	TX_FAULT	Transmitter Fault
3	TX_DISABLE	Transmitter Disable. Laser output disabled on high or open <sup>2</sup>
4	SDA	2-wire Serial Interface Data Line <sup>3</sup>
5	SCL	2-wire Serial Interface Clock Line <sup>3</sup>
6	MOD_ABS	Module Absent. Grounded within the module <sup>3</sup>
7	RS0	No connection required
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation <sup>4</sup>
9	RS1	No connection required <sup>1</sup>
10	V <sub>EER</sub>	Receiver ground (common with transmitter ground) <sup>1</sup>
11	V <sub>EER</sub>	Receiver ground (common with transmitter ground) <sup>1</sup>
12	RD-	Receiver Inverted DATA out. AC coupled
13	RD+	Receiver Non-inverted DATA out. AC coupled

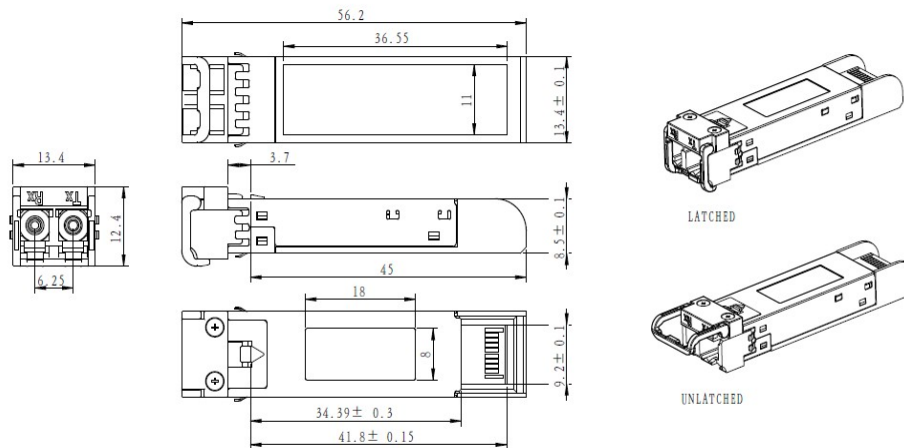
14	V <sub>EER</sub>	Receiver ground (common with transmitter ground) <sup>1</sup>
15	V <sub>CCR</sub>	Receiver power supply
16	V <sub>CCT</sub>	Transmitter power supply
17	V <sub>EET</sub>	Transmitter ground (common with receiver ground) <sup>1</sup>
18	TD+	Transmitter Non-Inverted DATA in. AC coupled
19	TD-	Transmitter Inverted DATA in. AC coupled
20	V <sub>EET</sub>	Transmitter ground (common with receiver ground) <sup>1</sup>

**Note:**

- 1) Circuit ground is isolated from chassis ground
- 2) Disabled: T<sub>DIS</sub>>2V or open, Enabled: T<sub>DIS</sub><0.8V
- 3) Should Be pulled up with 4.7k –10k ohm on host board to a voltage between 2V and 3.6V
- 4) LOS is open collector output

### Mechanical Dimensions

Note: All units are in mm



ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED

### Contact Information

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