

10G SFP10 LR Optical Transceiver

Part Number: VS-10LR1IS-AA

VS-10LR1IS-AA is a high performance SFP+ transceiver module for 10 Gigabit Ethernet data links over single-mode fiber operating at industrial temperature range of -40°C to +85°C .

Features

- Supports from 9.83 Gb/s to 11.3 Gb/s bit rates
- Compliant with IEEE 802.3ae 10GBASE-LR/LW
- Compliant with 10G FC 1200-SM-LL-L
- Compliant with SFF-8431
- Hot-pluggable SFP+ footprint
- 1310nm DFB laser transmitter
- Duplex LC connector
- Built-in digital diagnostic functions
- Up to 10km on SMF
- Single power supply 3.3V
- RoHS Compliant
- Operating temperature range (Case Temperature): -40°C to +85°C

Applications

- 10GBASE-LR/LW Ethernet
- 10G Fiber Channel
- 10G CPRI

Ordering Information

Part Number	Data Rate	Link Length	Laser	Detector	Fiber Type	Temperature
VS-10LR1IS-AA	10G	Up to 10km	1310nm DFB	1310nm PIN ROSA	SMF	-40 to +85°C

Product Overview

Vitex **VS-10LR1IS-AA** (10GE SFP+) is a 10Gb/s transceiver module designed for optical communication applications compliant to Ethernet 10GBASE-LR/LW 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 _S	-40	85	°C
Power Supply Voltage	V _{CC}	-0.5	4	V

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	T _C	-40		85	°C
Power Supply Voltage	V _{CC}	3.14	3.3	3.46	V
Supply Current	I _{CC}		200	285	mA
Data Rate	DR	9.83	10.3125	11.3	Gb/s
Bit Error Rate	BER			10 ⁻¹²	

Electrical Specifications

Parameter	Symbol	Min	Typical	Max	Unit
Electrical Transmitter Characteristics					
Input differential impedance	R _{IN}		100		Ω
Differential data input swing	V _{IN PP}	180		700	mV
Transmit disable voltage	V _D	2		V _{CC}	V
Transmit enable voltage	V _{EN}	V _{EE}		V _{EE} +0.8	V
Electrical Receiver Characteristics					
Differential data output swing	V _{OUT PP}	300		850	mV
Data output rise/fall time (20%-80%)	t _r /t _f	28			ps
LOS Assert	V _{LOS A}	2		V _{CC HOST}	V
LOS De-Assert	V _{LOS D}	V _{EE}		V _{EE} +0.5	V

Optical – Transmitter

Parameter	Symbol	Min	Typical	Max	Unit
Output Optical Power ¹	P _{TX}	-8.2		-0.5	dBm
Optical Center Wavelength	λ _C	1260		1355	nm
Optical Modulation Amplitude ²	OMA	-5.2			dBm
Extinction Ratio	ER	3.5	5.5		dB
Spectral Width (RMS) (-20dB)	Δλ			1	nm
Side Mode Suppression Ratio	SMSR	30			dB
Relative Intensity Noise	RIN			-128	dB/Hz
Transmitter Dispersion Penalty	TDP			3.2	dB
Transmitter Jitter ²					
Launch Power of OFF Transmitter ¹	P _{OUT_OFF}			-30	dBm

Note:

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

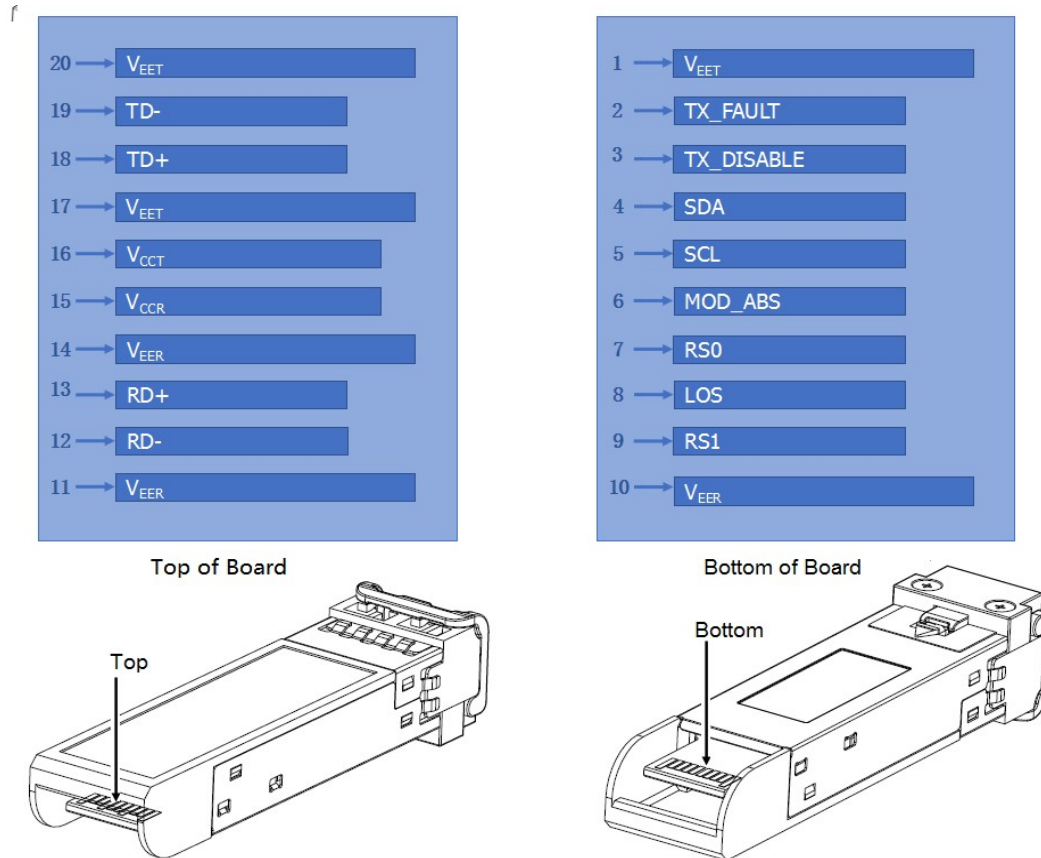
Optical – Receiver

Parameter	Symbol	Min	Typical	Max	Unit
Optical Center Wavelength	λ _C	1260		1600	nm
Average Receive Power	P _{RX}	-14.4		0.5	dBm
Receiver Sensitivity @ 10.3Gb/s ¹	R _{X_SEN}			-14.4	dBm
Receiver Reflectance	TR _{RX}			-12	dB
LOS Assert	LOS _A	-30			dBm
LOS De-Assert	LOS _D			-17	dBm
LOS Hysteresis	LOS _H	0.5			dB

Note:

- 1) Testing the resulting value using the minimum ER value within the defined range: BER<10⁻¹²; 2³¹-1 PRBS

Electrical Connector Layout



Electrical Pin Definition

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

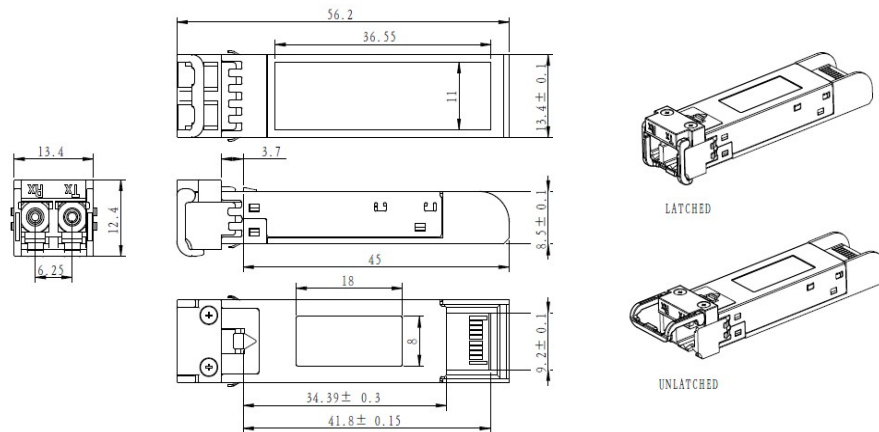
14	V _{EER}	Receiver ground (common with transmitter ground)
15	V _{CCR}	Receiver power supply
16	V _{CCT}	Transmitter power supply
17	V _{EET}	Transmitter ground (common with receiver ground)
18	TD+	Transmitter Non-Inverted DATA in. AC coupled
19	TD-	Transmitter Inverted DATA in. AC coupled
20	V _{EET}	Transmitter ground (common with receiver ground)

Note:

- 1) Circuit ground is isolated from chassis ground
- 2) TX_FAULT is the open collector output and should be pulled up with 4.7k-10k ohm on host board to a voltage between 2V and V_{CC}+0.3V
- 3) Disabled: T_{DIS}>2V or open, Enabled: T_{DIS}<0.8V
- 4) Should Be pulled up with 4.7k –10k ohm on host board to a voltage between 2V and V_{CC}+0.3V
- 4) LOS is open collector output and should be pulled up with 4.7k-10k ohm on host board to a voltage between 2V and V_{CC}+0.3V, the logic “0” indicates normal operation, and the logic “1” indicates that the receiver signal is lost

Mechanical Dimensions

Note: All units are in mm



ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED

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