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## 10G 1550nm 40Km SFP+ Transceiver VS-10ER1CS-AA

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### Product Overview

The VS-10ER1CS-AA is a 10G, 1550nm SFP+ transceiver designed for 40km reach. It supports bit rates from 9.95Gb/s to 10.7Gb/s and operates in temperatures from 0 to 70°C. It features a duplex LC connector, hot-pluggable functionality, a 3.3V power supply, low power dissipation, a 1550nm EML transmitter, and a high-performance PIN receiver, enabling up to 40km transmission over single-mode fiber.

### Features

- Supports 9.95Gb/s to 10.7Gb/s bit rates
- 0 to 70°C operating case temperature
- SFP+ package with duplex LC Receptacle connector
- Hot-pluggable capability
- Single 3.3V power supply
- Low Power dissipation
- 1550nm EML transmitter and High-performance PIN receiver
- Up to 40km transmission distance over SMF
- Built-in CDR
- SFI electrical interface
- Low EMI and excellent ESD protection
- Built- in Digital Diagnostic monitoring (DDM) function
- Class I laser product
- RoHS-6 compliance

### Applications

- 10GBASE-ER/EW
- 8Gb/s Fiber Channel

### Standards

- Complies with SFP+ MSA
- Complies with SFF-8472
- Compliant with IEEE 802.3ae

### Ordering Information

| Part Number   | Description                                      |
|---------------|--------------------------------------------------|
| VS-10ER1CS-AA | 10G SFP+ ER, 40km SMF, 1550nm, Duplex-LC, I-temp |

## General Specifications

| Parameter                          | Symbol    | Min  | Typical | Max  | Unit | Remarks   |
|------------------------------------|-----------|------|---------|------|------|-----------|
| Storage Ambient Temperature        | $T_{STG}$ | -40  |         | 85   | °C   |           |
| Operating Case Temperature         | $T_c$     | 0    |         | 70   | °C   |           |
| Operating Humidity                 | OH        | 5    |         | 95   | %    |           |
| Power Supply Voltage (Maximum)     | $V_{CC}$  | -0.5 |         | 3.6  | V    |           |
| Power Supply Voltage (Recommended) | $V_{CC}$  | 3.13 | 3.3     | 3.47 | V    |           |
| Power Supply Current               | $I_{CC}$  |      |         | 450  | mA   | Case 70°C |
| Data Rate                          |           | 9.95 |         | 11.3 | Gbps |           |
| Data Rate Drift                    |           | -100 |         | +100 | PPM  |           |

## Optical – Transmitter

| Parameter                          | Symbol          | Min  | Typical | Max  | Unit | Remarks                         |
|------------------------------------|-----------------|------|---------|------|------|---------------------------------|
| Centre Wavelength                  | $\lambda_c$     | 1530 | 1550    | 1565 | nm   |                                 |
| Spectral Width (-20dB)             | $\Delta\lambda$ |      |         | 1    | nm   |                                 |
| Average Output Power               | $P_{out}$       | -4.7 |         | 4    | dBm  | Launched into SMF Fiber         |
| Average Power of OFF Transmitter   |                 |      |         | -30  | dBm  |                                 |
| Extinction Ratio                   | ER              | 3    |         |      | dB   |                                 |
| Side Mode Suppression Ratio        | SMSR            | 30   |         |      | dB   |                                 |
| Transmitter and Dispersion Penalty | TDP             |      |         | 3    | dB   | PRBS2 <sup>31</sup> -1@10.3Gbps |

## Optical – Receiver

| Parameter                | Symbol      | Min  | Typical | Max   | Unit | Remarks                                                            |
|--------------------------|-------------|------|---------|-------|------|--------------------------------------------------------------------|
| Operating Wavelength     | $\lambda_c$ | 1260 |         | 1600  | nm   |                                                                    |
| Sensitivity              | SEN         |      |         | -15.8 | dBm  | PRBS2 <sup>31</sup> -1@10.3125Gbps<br>BER $\leq 1 \times 10^{-12}$ |
| Saturation Optical Power | SAT         | 0    |         |       | dBm  |                                                                    |
| LOS De-Assert            | $LOS_D$     |      |         | -18   | dBm  |                                                                    |
| LOS Assert               | $LOS_A$     | -30  |         |       | dBm  |                                                                    |
| LOS Hysteresis           | HYS         | 0.5  |         | 5     | dB   |                                                                    |

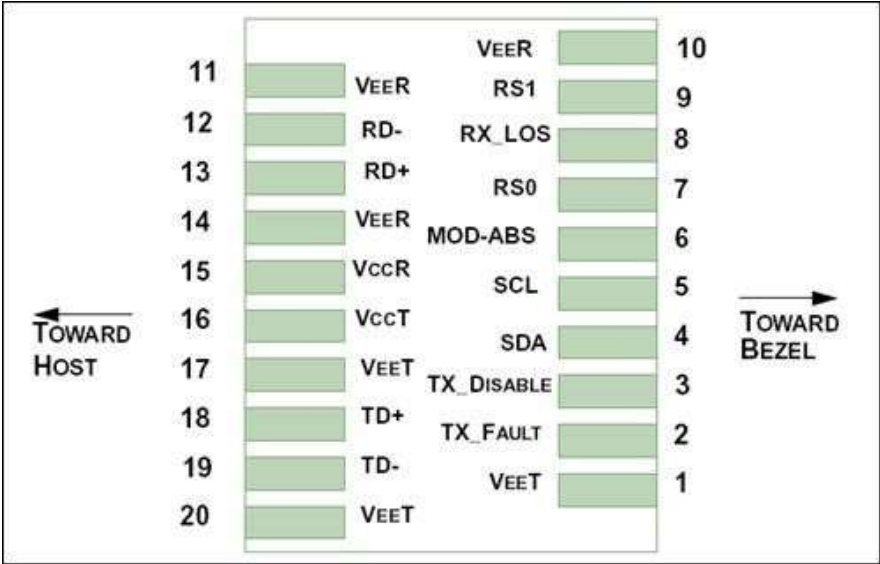
Electrical – Transmitter

| Parameter                     |         | Symbol | Min  | Typical | Max             | Unit     | Remarks |
|-------------------------------|---------|--------|------|---------|-----------------|----------|---------|
| Data Input Differential Swing |         |        | 180  |         | 700             | mV       |         |
| Input Differential Impedance  |         |        | 85   | 100     | 115             | $\Omega$ |         |
| TX Disable                    | Disable |        | 2    |         | $V_{CC}+0.3$    | V        |         |
|                               | Enable  |        | -0.3 |         | 0.8             | V        |         |
| TX Fault                      | Fault   |        | 2.4  |         | $V_{CC_{Host}}$ | V        |         |
|                               | Normal  |        | -0.3 |         | 0.4             | V        |         |

Electrical – Receiver

| Parameter                      |  | Symbol | Min  | Typical | Max | Unit | Remarks                            |
|--------------------------------|--|--------|------|---------|-----|------|------------------------------------|
| Differential data output swing |  | Vout   | 350  |         | 850 | mV   |                                    |
| Rx_LOS Output Voltage - High   |  | High   | 2.4  |         | VCC | V    |                                    |
| Rx_LOS Output Voltage - Low    |  | Low    | -0.3 |         | 0.4 | V    |                                    |
| Output Rise Time, 20%~80%      |  | TR     |      |         | 70  | ps   | PRBS2 <sup>31</sup> -1@10.3125Gbps |
| Output Fall Time, 20%~80%      |  | TF     |      |         | 70  | ps   | PRBS2 <sup>31</sup> -1@10.3125Gbps |

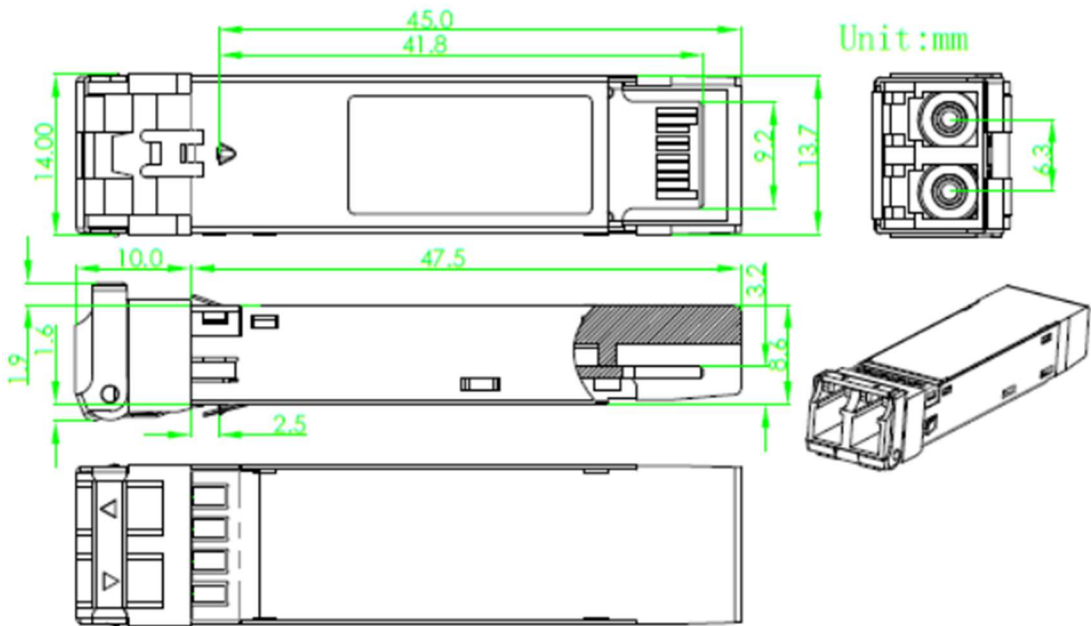
Electrical Connector Layout



Electrical Pin Definition

| PIN # | Symbol            | Description                  | Remarks                                                           |
|-------|-------------------|------------------------------|-------------------------------------------------------------------|
| 1     | V <sub>EE</sub> T | Transmitter Ground           |                                                                   |
| 2     | TX_Fault          | Transmitter Fault Indication | Low: normal; High: abnormal                                       |
| 3     | TX_Disable        | Transmitter Disable          | Low: transmitter on; High: transmitter off                        |
| 4     | SDA               | SDA                          | The data line of two wire serial interface                        |
| 5     | SCL               | SCL                          | The clock line of two wire serial interface                       |
| 6     | MOD_ABS           | Module Absent                | Connected to V <sub>EE</sub> T or V <sub>EE</sub> R in the module |
| 7     | RS0               | Not Connected                |                                                                   |
| 8     | RX_LOS            | Loss of Signal               | Low: signal detected; High: loss of signal                        |
| 9     | RS1               | Not Connected                |                                                                   |
| 10    | V <sub>EE</sub> R | Receiver Ground              |                                                                   |
| 11    | V <sub>EE</sub> R | Receiver Ground              |                                                                   |
| 12    | RD-               | Inv. Received Data Out       | AC-coupled, CML                                                   |
| 13    | RD+               | Received Data Out            | AC-coupled, CML                                                   |
| 14    | V <sub>EE</sub> R | Receiver Ground              |                                                                   |
| 15    | V <sub>CC</sub> R | Receiver Power               |                                                                   |
| 16    | V <sub>CC</sub> T | Transmitter Power            |                                                                   |
| 17    | V <sub>EE</sub> T | Transmitter Ground           |                                                                   |
| 18    | TD+               | Transmit Data In             | AC-coupled, CML                                                   |
| 19    | TD-               | Inv. Transmit Data In        | AC-coupled, CML                                                   |
| 20    | V <sub>EE</sub> T | Transmitter Ground           |                                                                   |

Mechanical Diagram





Revision History

| Date       | Rev | Description             |
|------------|-----|-------------------------|
| 07/15/2024 | 1.0 | Release version         |
| 01/24/2025 | 1.1 | New branding guidelines |

For more information

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