# 25G SFP28 LR Optical Transceiver
# PN: VS-25ER1xS-AA

## Product Overview

Vitex's VS-25ER1xS-AA is a high-performance optical transceiver. They are compliant with SFF-8472 and 8431 standards, providing a fast and reliable interface for 25G Ethernet applications. With a hot pluggable design, and metal enclosure for EMI resistance, this SFP28 is capable of being used in applications of up to 40km.

### Features

- Up to 25.78Gbps Data Links
- Hot-pluggable SFP28 footprint
- DML Laser and APD receiver
- Duplex LC connector
- Up to 40km transmission on SMF
- Metal enclosure, for lower EMI
- 2-wire interface with integrated Digital Diagnostic monitoring
- Single 3.3V power supply
- Power dissipation < 2.0W
- Case operating temperature
    - Commercial: 0°C to +70°C
    - Industrial: -40°C to +85°C
- Compliant with SFF-8472 &8431
- RoHS Compliant.

### Applications

- 25GBASE-ER
- eCPRI

## Ordering Information

| Part Number | Description |
|---|---|
| **VS-25ER1CS-AA** | 25G SFP28, ER, 40km SMF, 1310nm, Duplex-LC, C-temp |
| **VS-25ER1IS-AA** | 25G SFP28, ER, 40km SMF, 1310nm, Duplex-LC, I-temp |

## General Specifications

| Parameter | Symbol | Min | Typical | Max | Unit | Remarks |
|---|---|---|---|---|---|---|
| Storage Temperature | $T_s$ | -40 | | 85 | ºC | |
| Relative Humidity | $R_H$ | 0 | | 85 | % | |
| Power Supply Voltage (Maximum) | VCC | -0.3 | | 4 | V | |
| Signal Input Voltage | $V_{SI}$ | Vcc-0.3 | | Vcc+0.3 | V | |
| Case Operating Temperature | Tcase | 0 | | 70 | ºC | Commercial |
| | | -40 | | 85 | ºC | Industrial |
| Power Supply Voltage (Recommended) | VCC | 3.14 | 3.3 | 3.47 | V | |
| Power Supply Current | ICC | | | 550 | mA | Commercial |
| | | | | 600 | mA | Industrial |
| Data Rate | BR | | 25.78 | | Gbps | TX Rate/RX Rate |
| Transmission Distance | TD | | 40 | | km | |
| Coupled fiber | Single mode fiber | | | | | 9/125um SMF |

## Optical – Transmitter

| Parameter | Symbol | Min | Typical | Max | Unit | Remarks |
|---|---|---|---|---|---|---|
| Lane Wavelengths(Range) | λ | 1295 | | 1325 | nm | |
| Side-mode suppression ratio (SMSR) | SMSR | 30 | | | dB | |
| Average Launched Power | $P_O$ | 0 | | +6.0 | dBm | |
| Average Launched Power(Laser Off) | Poff | | | -30 | dBm | |
| Extinction Ratio | ER | 4 | | | dB | |
| Spectrum Bandwidth(-20dB) | Δλ | | | 1 | nm | |
| $RIN_{20}OMA$ | $RIN_{20}OMA$ | | | -130 | dB/Hz | |
| Optical return loss tolerance | | | | 20 | dB | |
| Transmitter reflectance | | | | -12 | dB | |
| Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3} | {0.31,0.4,0.45,0.34,0.38,0.4} | | | | | Measured with a PRBS $2^{31}$-1 test pattern, @ 25.78Gb/s |

## Optical – Receiver

| Parameter | Symbol | Min | Typical | Max | Unit | Remarks |
|---|---|---|---|---|---|---|
| Input Optical Wavelength | λ | 1295 | | 1325 | nm | |
| Damage threshold | | -3 | | | dBm | |
| Input Saturation Power (Overload) | Past | -6 | | | dBm | |
| Receiver sensitivity (OMA) | $P_{Sens-OMA}$ | | | -19 | dBm | Measured with BER =<$5x10^{-5}$ @PRBS=$2^{31}$-1 NRZ |
| Los Of Signal Assert | PA | -35 | | | dBm | |
| Los Of Signal De-assert | PD | | | -20 | dBm | |
| LOS -Hysteresis | PHys | 0.5 | | | dB | |

## Electrical – Transmitter

| Parameter | Symbol | Min | Typical | Max | Unit | Remarks |
|---|---|---|---|---|---|---|
| Input differential impedance | Rin | | 100 | | Ω | 1 |
| Single ended data input swing | Vin,pp | 180 | | 700 | mV | |
| Transmitter Fault Output-High | VFaultH | 2 | - | Vcc+0.3 | V | |
| Transmitter Fault Output-Low | VFaultL | 0 | - | 0.8 | V | |
| Transmitter Disable Voltage- High | VDisH | 2 | - | Vcc+0.3 | V | |
| Transmitter Disable Voltage- low | VDisL | 0 | - | 0.8 | V | |

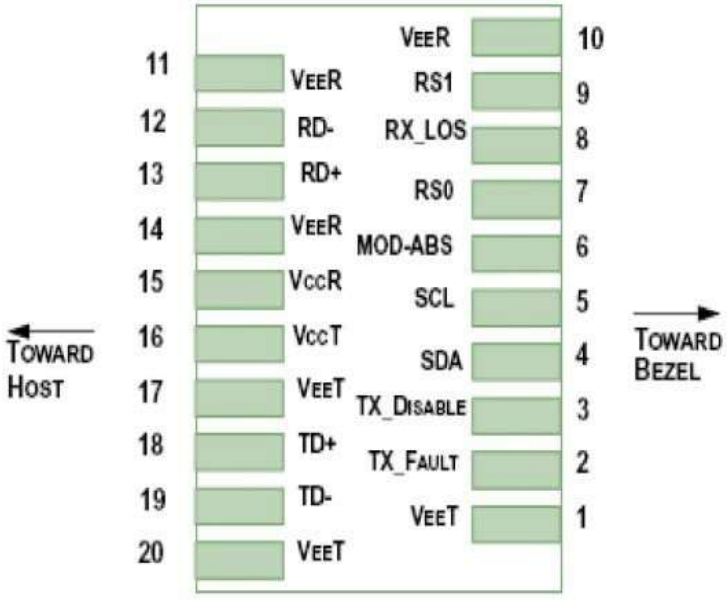
1. Connected directly to TX data input pins. AC coupled thereafter

## Electrical – Receiver

| Parameter | Symbol | Min | Typical | Max | Unit | Remarks |
|---|---|---|---|---|---|---|
| Differential data output swing | Vout,pp | 300 | | 850 | mV | 1 |
| LOS Output Voltage-High | VLOSH | 2 | | Vcc+0.3 | V | |
| LOS Output Voltage-Low | VLOSL | 0 | | 0.8 | V | |

1. Into 100 ohms differential termination

## Electrical Connector Layout



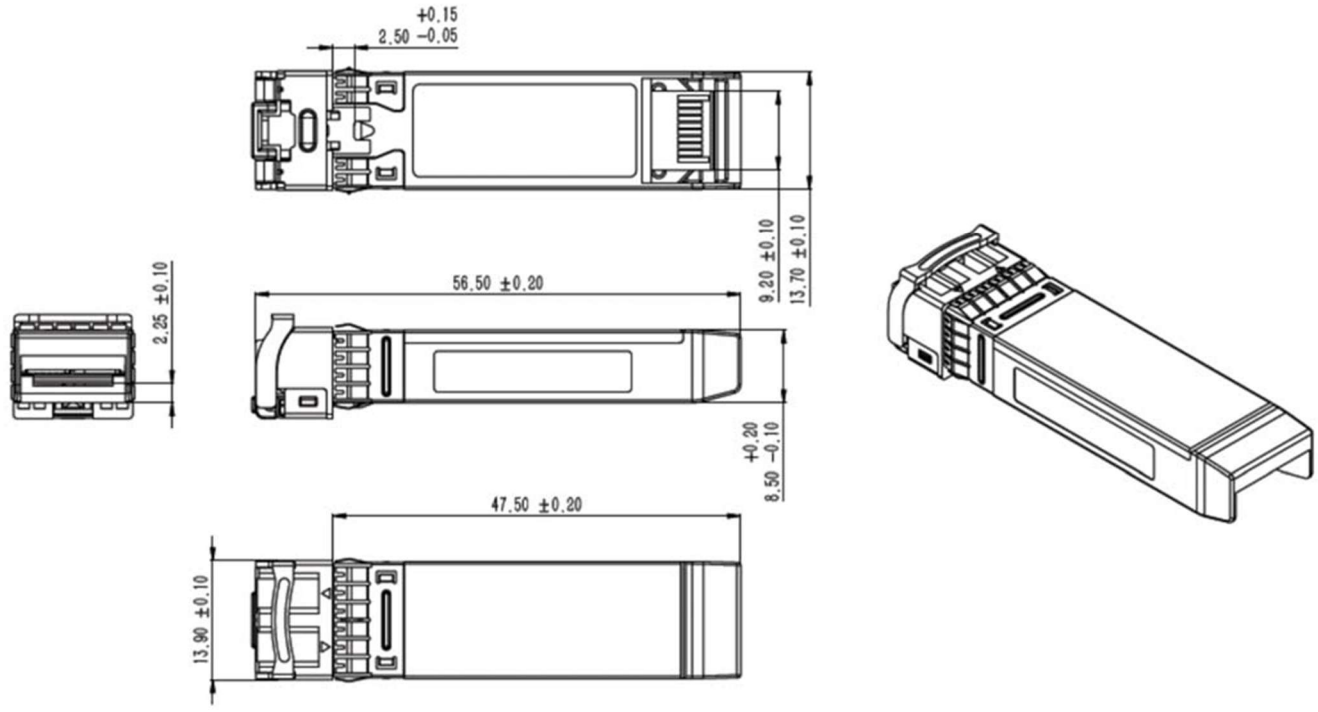

## Electrical Pin Definition

| PIN # | Symbol | Description | Remarks |
|---|---|---|---|
| 1 | $V_{EET}$ | Transmitter Ground (Common with Receiver Ground) | 1 |
| 2 | $T_{FAULT}$ | Transmitter Fault. | 2 |
| 3 | $T_{DIS}$ | Transmitter Disable. Laser output disabled on high or open. | 3 |
| 4 | SDA | 2-wire Serial Interface Data Line | 4 |
| 5 | SCL | 2-wire Serial Interface Clock Line | 4 |
| 6 | MOD_ABS | Module Absent. Grounded within the module | 4 |
| 7 | RS0 | Rate Select 0, internal pull down | 5 |
| 8 | LOS | Loss of Signal indication. Logic 0 indicates normal operation. | 6 |
| 9 | RS1 | Rate Select 1, internal pull down | 5 |
| 10 | $V_{EER}$ | Receiver Ground (Common with Transmitter Ground) | 1 |
| 11 | $V_{EER}$ | 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 | $V_{EER}$ | Receiver Ground (Common with Transmitter Ground) | 1 |
| 15 | $V_{CCR}$ | Receiver Power Supply | |
| 16 | $V_{CCT}$ | Transmitter Power Supply | |

| | | | |
|---|---|---|---|
| 17 | $V_{EET}$ | 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 | $V_{EET}$ | Transmitter Ground (Common with Receiver Ground) | 1 |

1. Circuit ground is internally isolated from chassis ground.
2. TFAULT is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V.A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
3. Laser output disabled on TDIS>2.0V or open, enabled on TDIS<0.8V.
4. Should be pulled up with 4.7kΩ- 10kΩ host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.
5. Rate select can also be set through the 2-wire bus in accordance with SFF-8472. Rx Rate Select is set at Bit 3, Byte 110, Address A2h. Tx Rate Select is set at Bit 3, Byte 118, Address A2h.
6. LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

## Mechanical Dimensions



## Revision History

| Date | Rev | Description |
|---|---|---|
| 1/4/2019 | 1.0 | Initial Release |
| 2/21/2025 | 2.0 | New branding guidelines |

## For more information

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