

# 25GBASE-ER SFP28 1310nm 30km DOM Transceiver

SFP-25G-ER-S-LL



## Application

- High-speed storage area networks
- CPRI 10

## Features

- UP to 25.78Gb/s data links
- Hot-Pluggable SFP28 footprint
- Duplex LC connector
- DML laser transmitter, APD photo-detector
- Up to 30km on SMF without FEC
- Single 3.3V power supply
- Operating case temperature range: 0~ 70° C
- RoHS compliant
- 2-wire interface for management specifications compliant with SFF 8472 digital diagnostic monitoring interface for optical transceivers

## Description

SFP28 transceivers are designed for use in Ethernet links up to 25.78 Gb/s data rate and up to 30km (without FEC) link length.

They are compliant SFF-8472, and compatible with SFF-8432 and applicable portions of SFF-8431. The product is RoHS compliant and lead-free per Directive 2011/96/EU.

## Product Specifications

### I. Absolute Maximum Ratings

Parameter	Symbol	Min	Typ.	Max	Unit
<b>Storage Temperature</b>	$T_S$	-40		85	°C
<b>Case Operating Temperature</b>	$T_A$	0		70	°C
<b>Maximum Supply Voltage</b>	$V_{CC}$	0		3.6	V
<b>Relative Humidity</b>	RH	0		85	%

### II. Electrical Characteristics (TOP= 0 to 70 ° C, VCC = 3.15 to 3.46 Volts)

Parameter	Symbol	Min	Typ.	Max	Unit	Note
<b>Supply Voltage</b>	$V_{CC}$	3.15		3.46	V	
<b>Supply Current</b>	$I_{CC}$			450	mA	
<b>Power Consumption</b>	$P$			1.5	W	
<b>Data Rate</b>	$R$	-	25.8		Gb/s	

Parameter	Symbol	Min	Typ.	Max	Unit	Note
<b>Transmitter</b>						
<b>Input Differential impedance</b>	$R_{in}$		100		$\Omega$	1
<b>Differential input Voltage Swing</b>	$V_{in,pp}$	180		700	mV	2
<b>Transmit Disable Voltage</b>	$V_D$	2		$V_{cc}$	V	3
<b>Transmit Enable Voltage</b>	$V_{EN}$	$V_{ee}$		$V_{ee}+0.8$	V	
<b>Receiver</b>						
<b>Single Ended Output Voltage Tolerance</b>	V	-0.3		4	V	
<b>Rx Output Diff Voltage</b>	$V_o$	185		800	mV	
<b>LOS Fault</b>	$V_{LOS\ fault}$	2		$V_{cc\_HOST}$	V	4
<b>LOS Normal</b>	$V_{LOS\ norm}$	$V_{ee}$		$V_{ee}+0.8$	V	4

**Notes:**

1. Connected directly to TX data input pins. AC coupling from pins into laser driver IC.
2. Per SFF-8431 Rev 3.0
3. Into 100 ohms differential termination.
4. LOS is an open collector output. Should be pulled up with 4.7k – 10k $\Omega$  on the host board. Normal operation is logic 0; loss of signal is logic 1. Maximum pull-up voltage is 5.5V.

### III. Optical Characteristics (TOP = 0 to 70° C, VCC = 3.15 to 3.46 Volts)

Parameter	Symbol	Min	Typ.	Max	Unit	Note
<b>Transmitter</b>						
<b>Center Wavelength</b>	$\lambda_t$	1295		1325	nm	
<b>Spectral Width</b>	$\Delta\lambda$			1	nm	
<b>Average Optical Power</b>	$P_{avg}$	0		+6	dBm	1
<b>Laser Off Power</b>	$P_{off}$			-30	dBm	
<b>Side Mode Suppression Ratio</b>		30				
<b>Extinction Ratio</b>	ER	4			dB	
<b>Optical Return Loss Tolerance</b>				-12	dB	
<b>Receiver</b>						
<b>Center Wavelength</b>	$\lambda_r$	1260		1370	nm	
<b>Receiver Sensitivity</b>	$S_{en}$			-19	dBm	2
<b>Los Assert</b>	$LOS_A$	-30			dBm	
<b>Los Dessert</b>	$LOS_D$			-19	dBm	
<b>Los Hysteresis</b>	$LOS_H$	0.5			dB	
<b>Overload</b>		-6			dBm	

**Notes:**

1. Average power figures are informative only, per IEEE802.3CC.

2. Receiver sensitivity is informative. Shall be measured with conformance test signal for . BER =  $5 \times 10^{-5}$ .

## IV. Timing Characteristics

Parameter	Symbol	Min	Typ.	Max	Units
<b>TX_Disable Assert Time</b>	$t_{off}$			100	us
<b>TX_Disable Negate Time</b>	$t_{on}$			2	ms
<b>Time to Initialize 2-wire interface</b>	$t_{2w\_start\_up}$			300	ms
<b>Time to Initialize</b>	$t_{start\_up}$			300	ms
<b>Time to Initialize cooled module and time to power up a cooled module to Power level II</b>	$t_{start\_up\_cooled}$			90	s
<b>Time to Power Up to Level II</b>	$t_{power\_level2}$			300	ms
<b>Time to Power Down from Level II</b>	$t_{power\_down}$			300	ms
<b>Tx_Fault assert</b>	$Tx\_Fault\_on$			1	ms
<b>Tx_Fault assert for cooled module</b>	$Tx\_Fault\_on\_cooled$			50	ms
<b>TX_FAULT Reset</b>	$t_{reset}$	10			us
<b>Rx_LOS assert delay</b>	$t_{los\_on}$			100	us
<b>Rx_LOS negate delay</b>	$t_{los\_off}$			100	us

## V. Digital Diagnostic Specifications

Parameter	Symbol	Max	Min	Accuracy	Unit
<b>Transceiver Temperature</b>	DDDTemp	0	+70	±3.0°C	°C
<b>Transceiver Supply Voltage</b>	DDDVoltage	3.15	3.45	±3.0%	V
<b>Transceiver Bias Current</b>	DDDBias	0	35	±10%	mA
<b>Transceiver Output Power</b>	DDDTx-Power	-5	+5	±2dB	dBm
<b>Receiver Average Optical Input Power</b>	DDDRx-Power	-16	-3	±2dB	dBm

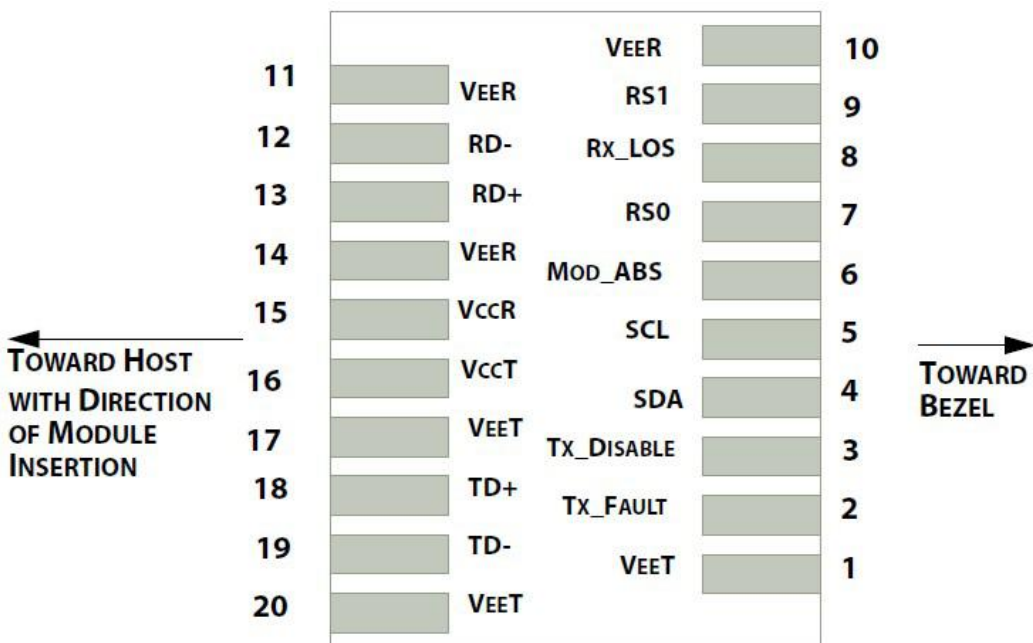
## VI. Pin Description

Pin	Symbol	Name/Description	Ref.
1	VeeT	Module transmitter ground	1
2	Tx Fault	Module transmitter fault	2
3	Tx Disable	Transmitter Disable; Turns off transmitter laser output	3
4	SDL	2 wire serial interface data input/output (SDA)	4
5	SCL	2 wire serial interface clock input (SCL)	4
6	MOD-ABS	Module Absent, connect to VeeR or VeeT in the module	2
7	RS0	Rate select0: module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.	
8	LOS	Receiver Loss of Signal Indication	
9	RS1	Rate select1: module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.	
10	VeeR	Module receiver ground	1

11	VeeR	Module receiver ground	1
12	RD-	Receiver inverted data out put	
13	RD+	Receiver non-inverted data out put	
14	VeeR	Module receiver ground	1
15	VccR	Module receiver 3.3V supply	
16	VccT	Module transmitter 3.3V supply	
17	VeeT	Module transmitter ground	1
18	TD+	Transmitter non-inverted data out put	
19	TD-	Transmitter inverted data out put	
20	VeeT	Module transmitter ground	1

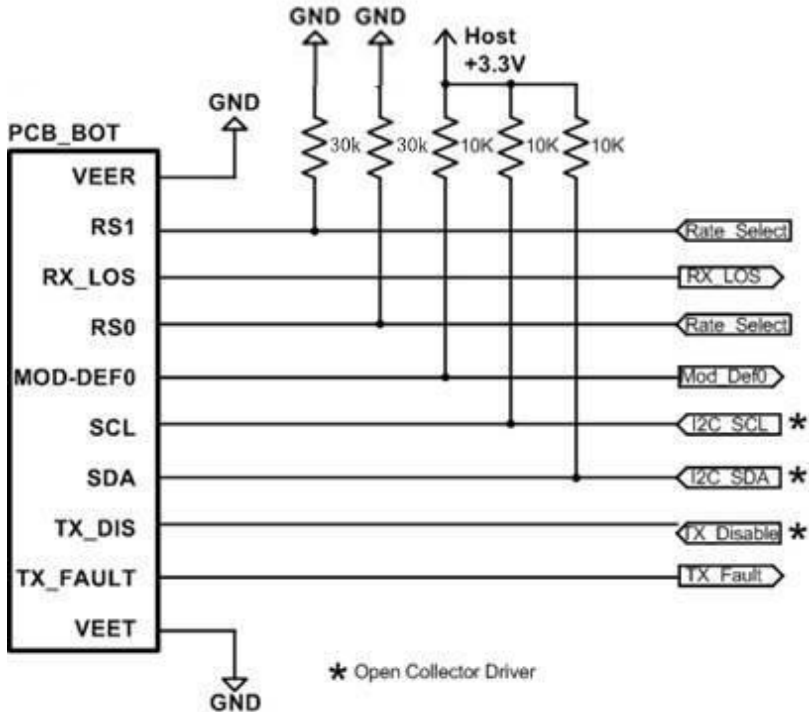
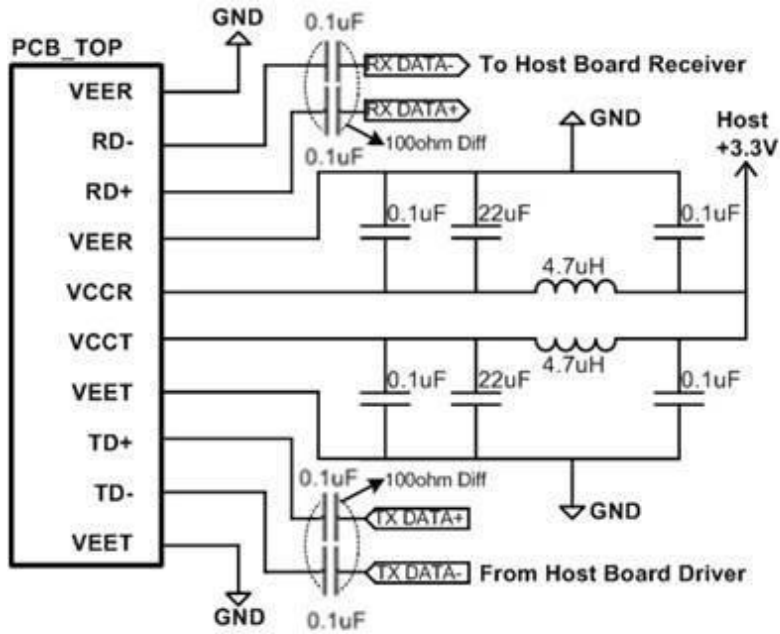
**Notes:**

- 1.The module ground pins shall be isolated from the module case.
- 2.This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host\_Vcc on the host board.
- 3.This pin shall be pulled up with 4.7K-10Kohms to VccT in the module.
- 4.This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host\_Vcc on the host board.



**Diagram of Host Board Connector Block Pin Numbers and Names**

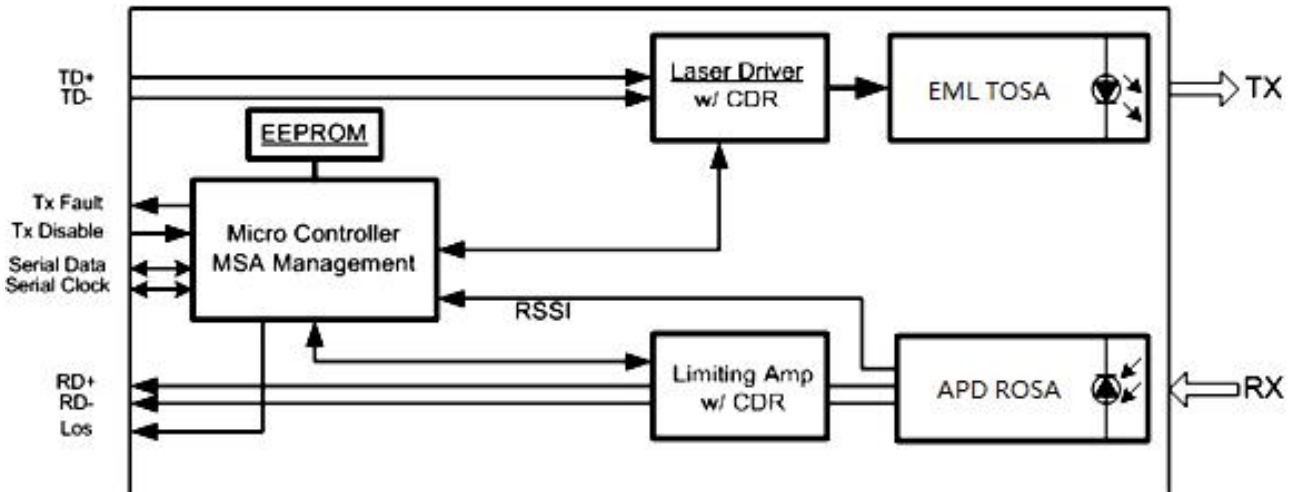
**VII .Recommended Circuit:**



**Recommended High-speed Interface Circuit**



### VIII. Transceiver Block Diagram



### IX. Mechanical Dimensions

