

TSSLS-CBDCE3 Optical Transceiver

10G SFP+ BIDI TX1270nm RX1330nm Single-mode Transceiver, With Diagnostic Monitoring

Features

- Simplex LC Connector Bi-Directional SFP+ Optical Transceiver
- Compliant with SFF-8431, SFF-8432 and IEE802.3ae
- Hot Pluggable
- Data rate up to 11.3Gbps
- 1270nm DFB transmitter, 1330nm PIN photo-detector
- Low power consumption < 1.0W
- Distance up to 10km
- Specifications compliant with SFF 8472
- 2-wire interface with integrated Digital Diagnostic monitoring
- Operating case temperature: Standard: 0°C~+70°C
Industrial: -40°C~+85°C
- RoHS6 compliant (lead free)

Applications

- 10GBASE-LR at 10.3125Gbps
- 10GBASE-LW at 9.95Gbps

Product Description

The TSSLS-CBDCE3 single mode transceiver is small form factor pluggable module for duplex optical data communications such as 10GBASE-LR/LW defined by IEEE 802.3ae. It is with the SFP+ 20-pin connector to allow hot plug capability.

Absolute Maximum Ratings

These values represent the damage threshold of the module. Stress in excess of any of the individual Absolute Maximum Ratings can cause immediate catastrophic damage to the module even if all other parameters are within Recommended Operating Conditions.

Parameters	Symbol	Min.	Max.	Unit
Power Supply Voltage	VCC	-0.5	+3.6	V
Storage Temperature	Tc	-40	+85	°C
Relative Humidity	RH	0	85	%

Recommended Operating Conditions

Recommended Operating Environment specifies parameters for which the electrical and optical characteristics hold unless otherwise noted.

Parameter	Symbol	Min	Typical	Max	Unit
Power Supply Voltage	VCC	3.15	3.30	3.45	V
Operating Case Temperature (Standard)	Tca	0	-	70	°C
Operating Case Temperature (Industrial)	Tca	-40	-	85	°C

Notes:

[1] Supply current is shared between VCCTX and VCCR_X.

[2] In-rush is defined as current level above steady state current requirements.

Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max	Unit
Transmitter					
Data Rate	Mra	1.0	10.3	11.3	Gbps
Input differential impedance ¹	Rin	-	100	-	Ω
Differential Input Voltage swing	Vin	150	-	1200	mV
Transmit Disable Voltage	VD	2.0	-	VCC+0.3	V
Transmit Enable Voltage ²	Ven	Vee	-	Vee+0.8	V
Transmit Disable Assert Time	Vn	-	-	100	us
Receiver					
Data Rate	Mra	-	10.3	11.3	Gbps
Output differential impedance ¹	Rout	-	100	-	Ω
Differential Output Swing ³	Vout	300	-	700	mV
Loss of Signal –Asserted ⁴	-	2.0	-	VCC+0.3	V
Loss of Signal –Negated ⁴	-	Vee	-	Vee+0.8	V

Notes:

[1] AC coupled.

[2] Or open circuit.

Information and specifications are subject to change without notice.
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[3] Into 100 ohm differential termination.

[4] LOS is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

Optical characteristics

Parameter	Symbol	Min	Typical	Max	Unit
Transmitter					
Center Wavelength	λ	1260	1310	1355	nm
Average Optical Power ^{1/2}	Po	-8.2	-	+0.5	dBm
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Average Launch Power of OFF Transmitter	Poff	-	-	-30	dBm
Extinction Ratio	ER	3.5	-	-	dB
Optical Return Loss Tolerance	ORL	-	-	12	dB
Eye Mask	-	Compliant with IEEE 802.3			
Receiver					
Receiver sensitivity in OMA ^{2/3}	Rsen	-	-	-14.4	dBm
Receiver Overload	Pmax	0.5	-	-	dBm
Center Wavelength	λ	1320	-	1340	nm
Receiver Reflectance	Rrx	-	-	-12	dB
LOS De-Assert	Lsa	-	-	-15	dBm
LOS Assert	Lda	-30	-	-	dBm
LOS Hysteresis	Lh	0.5	-	-	dB

Notes:

[1] Output power is coupled into a 9/125 μ m SMF.

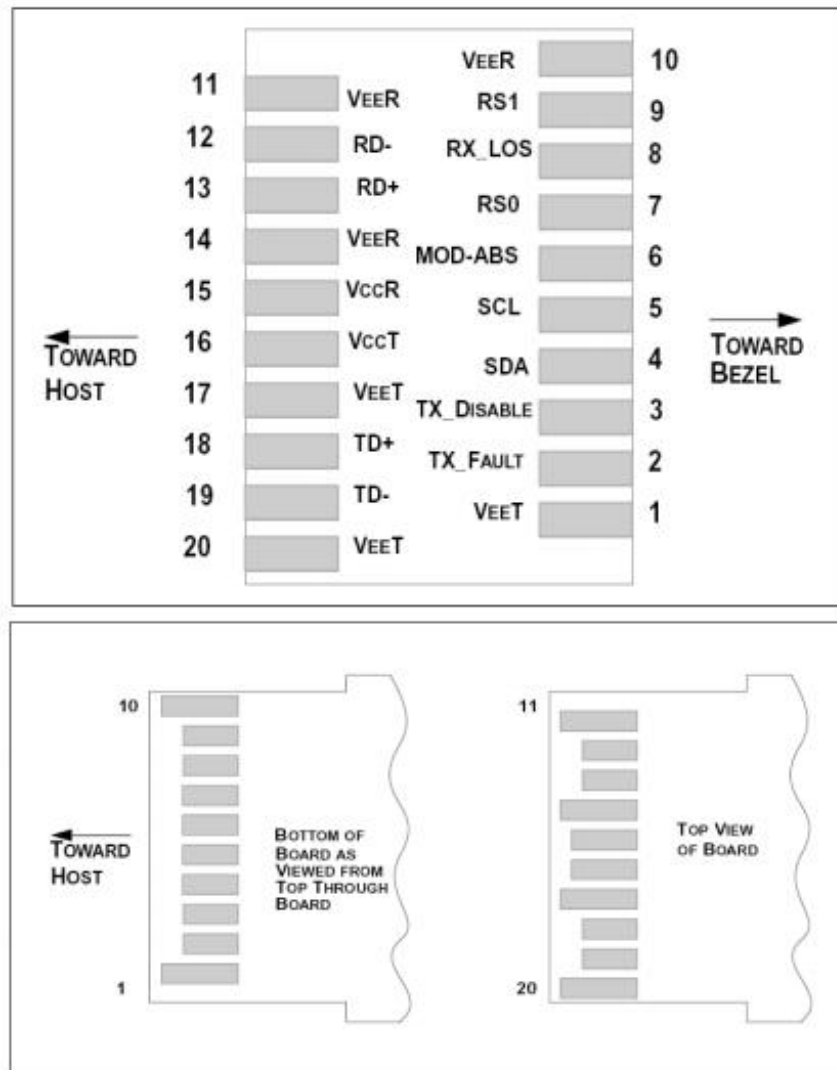
[2] A received power below this value cannot be compliant.

[3] Measured with a PRBS2³¹-1 test pattern @10.3125Gbps, BER $\leq 10^{-12}$

Low Speed Characteristics

Parameter	Symbol	Min	Typical	Max	Unit
Power Consumption	-	-	-	1	W
TX_Fault, RX_LOS	VOL	0	-	0.4	V
	VOH	Host_VCC-0.5	-	Host_VCC+0.3	V
TX_DIS	VIL	-0.3	-	0.8	V
	VIH	2.0	-	VCCT+0.3	V
RS0, RS1	VIL	-0.3	-	0.8	V
	VIH	2.0	-	VCCT+0.3	V

SFP+ Transceiver Electrical Pad Layout



Pin definition

Pin	Symbol	Name/Description
1	VEET [1]	Transmitter Ground
2	Tx_FAULT [2]	Transmitter Fault
3	Tx_DIS [3]	Transmitter Disable. Laser output disabled on high or open
4	SDA [2]	2-wire Serial Interface Data Line
5	SCL [2]	2-wire Serial Interface Clock Line
6	MOD_ABS [4]	Module Absent. Grounded within the module
7	RS0 [5]	Rate Select 0
8	RX_LOS [2]	Loss of Signal indication. Logic 0 indicates normal operation
9	RS1 [5]	Rate Select 1
10	VEER [1]	Receiver Ground

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11	VEER [1]	Receiver Ground
12	RD-	Receiver Inverted DATA out. AC Coupled
13	RD+	Receiver DATA out. AC Coupled
14	VEER [1]	Receiver Ground
15	VCCR	Receiver Power Supply
16	VCCT	Transmitter Power Supply
17	VEET [1]	Transmitter Ground
18	TD+	Transmitter DATA in. AC Coupled
19	TD-	Transmitter Inverted DATA in. AC Coupled
20	VEET [1]	Transmitter Ground

Notes:

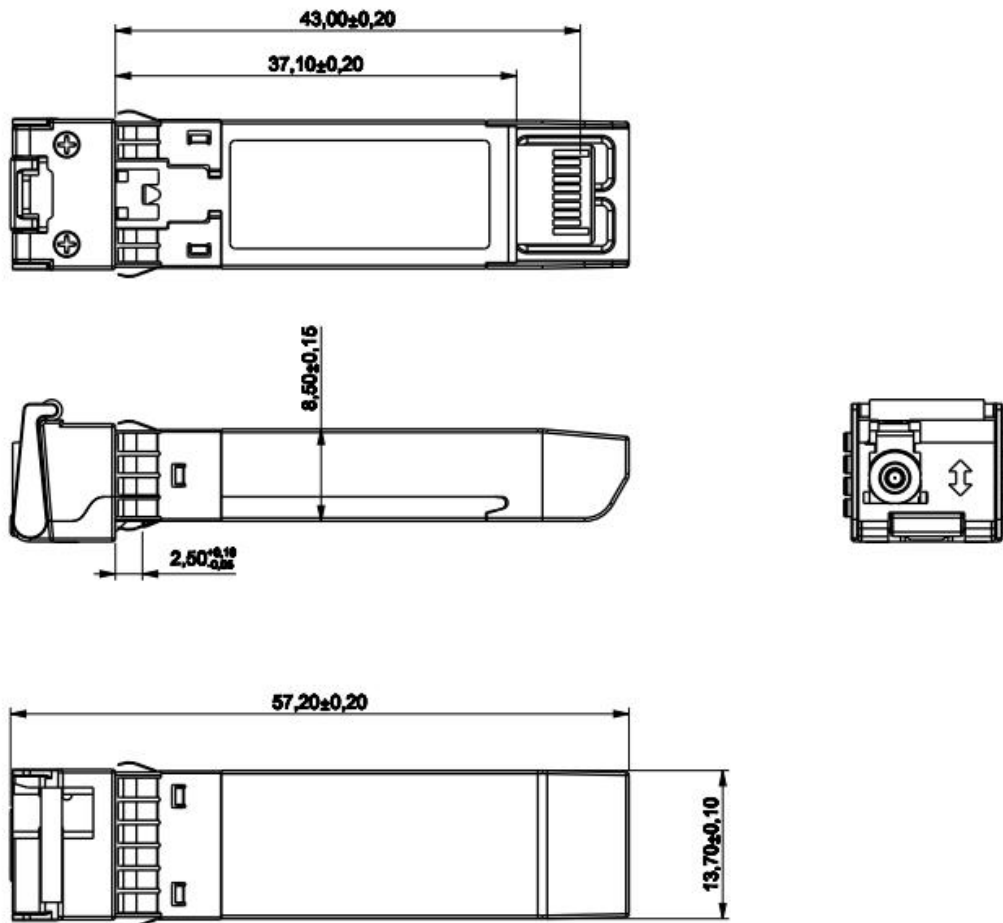
[1] Module circuit ground is isolated from module chassis ground within the module.

[2] Should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15V and 3.6V.

[3] Tx_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VCCT inside the module.

[4] Mod_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to VCC_Host with a resistor in the range 4.7 kΩ to 10 kΩ. Mod_ABS is asserted “High” when the SFP+ module is physically absent from a host slot.

[5] RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.

Mechanical

Ordering Information

Part Number	Product Description
TSSLS-CBDCE3C	10G SFP+ BIDI TX1270nm RX1330nm Optical Transceiver, 0°C ~ +70°C
TSSLS-CBDCE3T	10G SFP+ BIDI TX1270nm RX1330nm Optical Transceiver, -40°C ~ +85°C

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