TSSLS-CXXCE3 Optical Transceiver

CWDM SFP+ Single-mode Transceiver, With Diagnostic Monitoring
Duplex SFP+ 10km Transceiver

Features

- All metal housing for superior EMI performance
- Operating data rate up to 11.1Gbps
- High sensitivity PD photo diode and TIA
- LC duplex connector
- Hot plug gable 20pin connector
- Low power consumption C、E<1 W、T<1.5W
- operating wide temperature range: Commercial: 0 ~ +70°C
  Extended: -10 ~ +80°C
  Industrial: -40 ~ +85°C
- Single +3.3V±5% power supply
- Digital Monitoring SFF-8472 Rev 10.2 compliant

Applications

- 10GBASE-LR/LW
- 10G Fiber Channel
- SFP+ MSA (SFF-8472)
- IEEE802.3ae

Product Description

The laser based 10Gigabit SFP+ Transceiver is designed to transmit and receive serial optical data over single mode optical fiber with 10Km.

They are compliant with SFF-8431, SFF-8432, 10GFC Rev 4.0, and 10GBASE-LR/LW. The transmitter converts serial CML electrical data into serial optical data compliant with the IEEE 802.3ae standard. The receiver converts serial optical data into serial CML electrical data. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472.

Package	Data rate	Laser	Optical Power	Detector	Sensitivity	Temp	Reach	Other
SFP+	Up to 11.1G	CWDM	1~7dBm	PIN	< -14.4dBm	0~70°C -20~85°C -40~85°C	10km	DDM

8 Jinxiu Middle Road, Pingshan, Shenzhen, Guangdong, 518118, P. R. China
+86 755 32983688 | info@china-tscom.com | www.china-tscom.com

CWDM:1271nm、1291nm、1311nm、1331nm、1351nm、1371nm、1391nm、1411nm、1431nm、1451nm、1471nm、1491nm

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	+3.6	V
Storage Temperature	Ts	-40	+85	℃
Relative Humidity	RH	5	95	%
Damage Threshold	THd	-	0	dBm

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
Supply Voltage	VCC		3.14	3.3	3.46	V
Operating Case Temperature	T	C	0	-	70	°C
		E	-10		80	
		T	-40		85	

Notes:
[1] Supply current is shared between VCCTX and VCCRX.
[1] In-rush is defined as current level above steady state current requirements.

Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max	Unit
Data Rate	VCC	-	10.3125	11.3	Gbps
Power Consumption	P	-	-	1500	mW
Transmitter					
Input Differential Impedance	RIN	-	100	-	Ω
Single-ended Data Input Swing	VIN	180	-	700	mVp-p
Transmit Disable Voltage	VDIS	2	-	VCCHOST	V
Transmit Enable Voltage	VEN	VEE	-	VEE+0.8	V
Transmit Fault Assert Voltage	VFA	2	-	VCCHOST	V
Transmit Fault De-Assert VoltageVoltage	VFDA	VEE	-	VEE+0.4	V

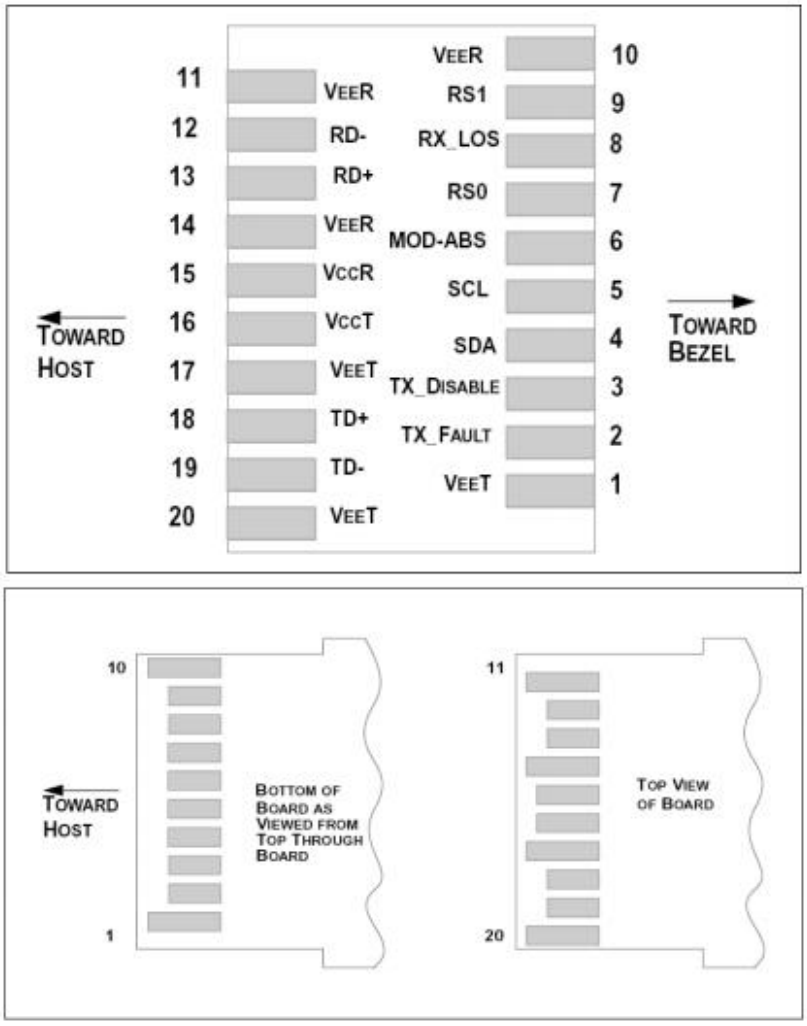
Receiver					
Single-ended Data Output Swing	VOD	350	-	850	mVp-p
LOS Fault	VLOSFT	2	-	VCCHOST	V
LOS Normal	VLOSNR	VEE	-	VEE+0.4	V

Transmitter Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit
Transmitter					
Center Wavelength	λ	1271,1291,1311,1331,1351,1371, 1391,1411,1431,1451,1471,1491			nm
Wavelength Drift	Δλ	-6.5	-	+6.5	nm
Average Output Power	Pavg	1.0	-	7	dBm
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Average Launch Power of OFF Transmitter	POFF	-		-30	dBm
Extinction Ratio	ER	3.5	-	-	dB
Transmitter Dispersion Penalty	1271~1331	-	-	1	dB
	1351~1371	-	-	2	dB
	1391~1491	-	-	3	dB
Receiver					
Center Wavelength	λ	1260	-	1350	nm
Receiver Sensitivity(AVG)[1]	RSENSE	-	-	-14.4	dBm
Receiver Overload (AVG)	Pmax	2.2	-	-	dBm
Optical Return Loss	-	-	-	-26	dB
LOS Assert	LOSA	-30	-	-	dBm
LOS De-Assert LOS	LOSD	-	-	-17	dBm
LOS Hysteresis	RSENSE	0.5	1.9	-	dB

Notes:
[1] Measured at 10.3125Gbps, ER>3.5dB, PRBS 2^{31}-1 and BER better than or equal to 10E-12.

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
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.

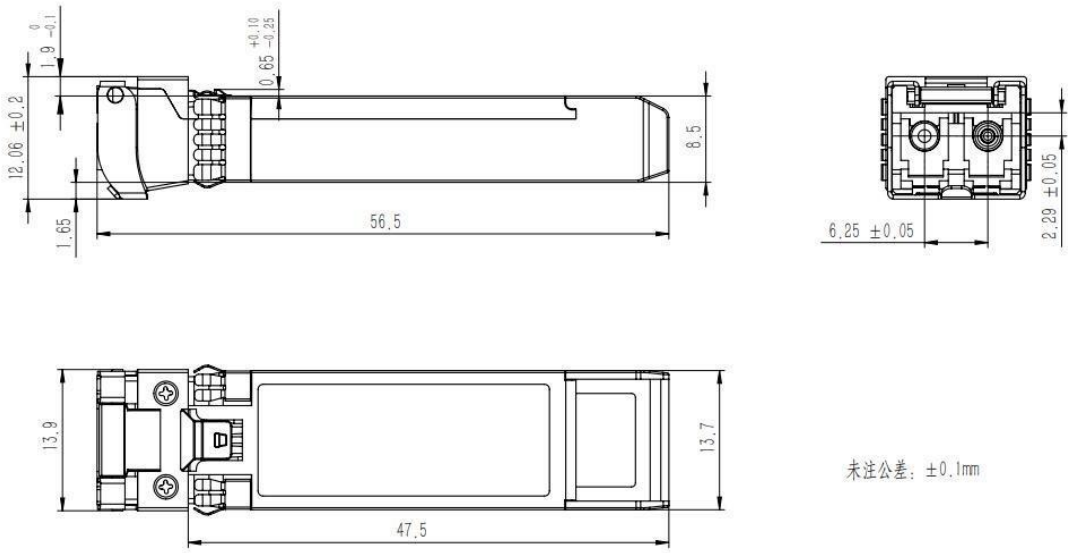
[2] Should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15Vand 3.6V.

[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 to10 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-CXXCEC	10Gbps SFP+ CWDM, 0°C ~ +70°C; 'XX' for 1271nm-1491nm
TSSLS-CXXCEE	10Gbps SFP+ CWDM, -20°C ~ +85°C; 'XX' for 1271nm-1491nm
TSSLS-CXXCET	10Gbps SFP+ CWDM, -40°C ~ +85°C; 'XX' for 1271nm-1491nm

Important Notice

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8 Jinxiu Middle Road, Pingshan, Shenzhen, Guangdong, 518118, P. R. China
+86 755 32983688 | info@china-tscom.com | www.china-tscom.com