TSSLS-NCNCH7C Optical Transceiver

10G SFP+ ER 1310nm 40km Single-mode Transceiver, With Diagnostic Monitoring Duplex SFP+ 40km Transceiver

Features

- Up to 11.3Gb/s data links
- 1310nm DFB transmitter and APD photo-detector receiver
- Up to 40km on 9/125μm SMF
- Hot-pluggable SFP+ footprint
- Duplex LC/UPC type pluggable optical interface
- Support Digital Diagnostic Monitoring interface
- Single +3.3V power supply
- Low Power Consumption <1.5W
- Compliant with SFF+MSA and SFF-8472
- Metal enclosure, for lower EMI
- Meet ESD requirements, resist 8KV direct contact voltage
- 0°C to 70°C operating wide temperature range
- RoHS6 compliant (lead free)

Applications

- 10GBASE-ER/EW & 10G Ethernet
- SDH STM64
- Other Optical Links

Product Description

The laser based 10Gigabit SFP+ Transceiver is designed to transmit and receive serial optical data over single mode optical fiber with 40Km.

They are compliant with SFF-8431, SFF-8432, 10GFC Rev 4.0, and 10GBASE-ER/EW. 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.

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

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	Tc	-40	+85	℃
Operating Case Temperature	Tc	0	+70	℃
Relative Humidity	RH	5	95	%
RX Input Average Power	Pmax	-	-5	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	3.13	3.3	3.46	V
Operating Case temperature	Tca	-5	-	70	℃
Module Power Dissipation	Pm	-	1.2	1.5	W

Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max	Unit
Transmitter					
Data Rate	BR	-	-	11.3	Gbps
Input differential impedance[1]	R_{IN}	80	100	120	Ω
Differential Data Input	V_{IN}	180	-	700	mVp-p
Transmit Disable Voltage	V_{DIS}	2.0	-	V_{CCHOST}	V
Transmit Enable Voltage[2]	V_{EN}	V_{EE}	-	V_{EE}+0.8	V
Transmit Fault Assert Voltage	V_{fa}	2.2	-	V_{CCHOST}	V
Transmit Fault De-Assert Voltage	V_{FDA}	V_{EE}	-	V_{EE}+0.4	V
Receiver					
Data Rate	BR	-	-	11.3	Gbps
Output differential impedance[1]	Rout	80	100	120	Ω
Differential Data Output	V_{OD}	450	600	850	mVp-p
Output Rise Time	t_{RISE}	25	-	-	pS
Output Fall Time	t_{FALL}	25	-	-	pS
LOS Fault	V_{LOSFT}	2.0	-	V_{CCHOST}	V

LOS Normal	V_{LOSNR}	V_{EE}	-	V_{EE}+0.4	V

Notes:
[1] AC coupled.
[2] Or open circuit.

Transmitter Specifications – Optical

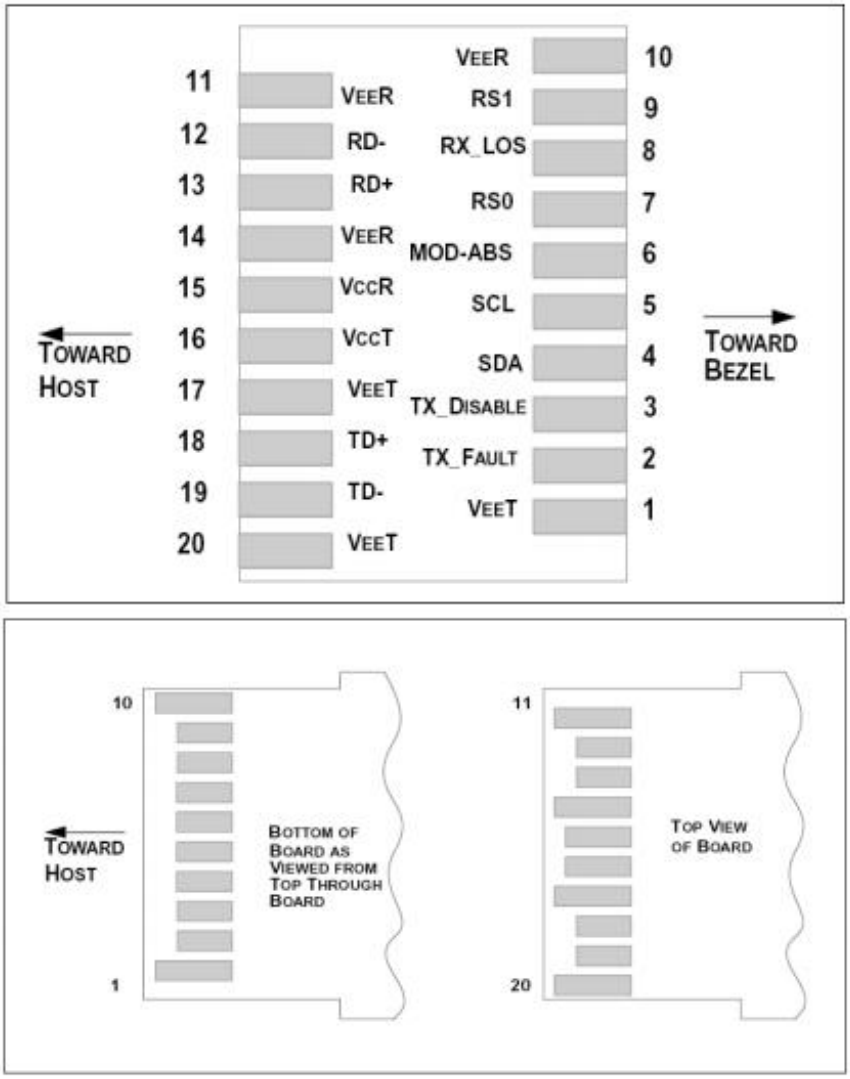
Parameter	Symbol	Min	Typical	Max	Unit
Center Wavelength	λc	1260	1310	1355	nm
Spectral Width (-20dB)	Δλ20	-	-	1	nm
Average Optical Power	Po	-1	-	3	dBm
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Optical Transmit Power (disabled)	PTX_DISAB	-	-	-30	dBm
Extinction Ratio	ER	3.5	-	-	dB
Relative Intensity Noise	RIN	-	-	-128	dB/Hz
Optical Return Loss Tolerance	Orl	-15	-	-	dB

Receiver Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit
Input Operating Wavelength	λ	1260	-	1610	nm
Average receive power	Pavg	-30	-	-5	dBm
Receiver sensitivity in 10.3Gbps(OMA)	Rsen1	-	-	-25	dBm
Reflectance	Rrx	-	-	-15	dB
LOS Asserted	Lsa	-28	-	-	dBm
LOS De-Asserted	Lda	-	-	-16	dBm
LOS Hysteresis	Lh	0.5	-	-	dB

Notes:
[1] Measured with conformance test signal for BER = 10^{-12}. The stressed sensitivity values in the table are for system level BER measurements which include the effects of CDR circuits. It is recommended that at least 0.4 dB additional margin be allocated if component level measurements are made without the effects of CDR circuits.

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.

Ordering Information

Part Number	Product Description
TSSLS-NCNCH7C	10Gbps SFP+ ER 1310nm 40km, APD photo-detector, 0°C ~ +70°C

Important Notice

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8 Jinxiu Middle Road, Pingshan, Shenzhen, Guangdong, 518118, P. R. China
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