TSSLS-NFNCH4C Optical Transceiver

1550nm SFP+ Single-mode Transceiver, With Diagnostic Monitoring
Duplex SFP+ 40km Transceiver

Features

- Compliant to SFP+ MSA
- 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 pluggable 20pin connector
- Low power consumption <1.5W
- 0°C to 70°C operating wide temperature range
- Single +3.3V±5% power supply
- Digital Monitoring SFF-8472 Rev10.2 compliant
- Fully RoHS Compliant

Applications

- 10GBASE-ER/EW
- 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 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	-0.5	+3.6	V
Storage Temperature	Ts	-40	+85	°C
Relative Humidity	RH	0	95	%

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	Tc	0	-	70	°C

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

Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max	Unit
Transmitter					
Data Rate	BR	-	-	11.1	Gbps
Input differential impedance[1]	RIN	80	100	120	Ω
Differential Data Input	VIN	180	-	700	mVp-p
Transmit Disable Voltage	VDIS	2.0	-	VCCHOST	V
Transmit Enable Voltage[2]	VEN	VEE	-	VEE+0.8	V
Transmit Fault Assert Voltage	Vfa	2.0	-	VCCHOST	V
Transmit Fault De-Assert Voltage	VFDA	VEE	-	VEE+0.4	V
Receiver					
Data Rate	BR	-	-	11.1	Gbps
Output differential impedance[1]	Rout	80	100	120	Ω
Differential Data Output	VOD	350	-	850	mVp-p
Output Rise Time	tRISE	25	-	-	pS
Output Fall Time	tFALL	25	-	-	pS
LOS Fault	VLOSFT	2.0	-	VCCHOST	V
LOS Normal	VLOSNR	VEE	-	VEE+0.4	V

Notes:
[1] AC coupled.
[2] Or open circuit.
[3] Into 100 ohm differential termination.
[4] LOS is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

Transmitter Specifications – Optical

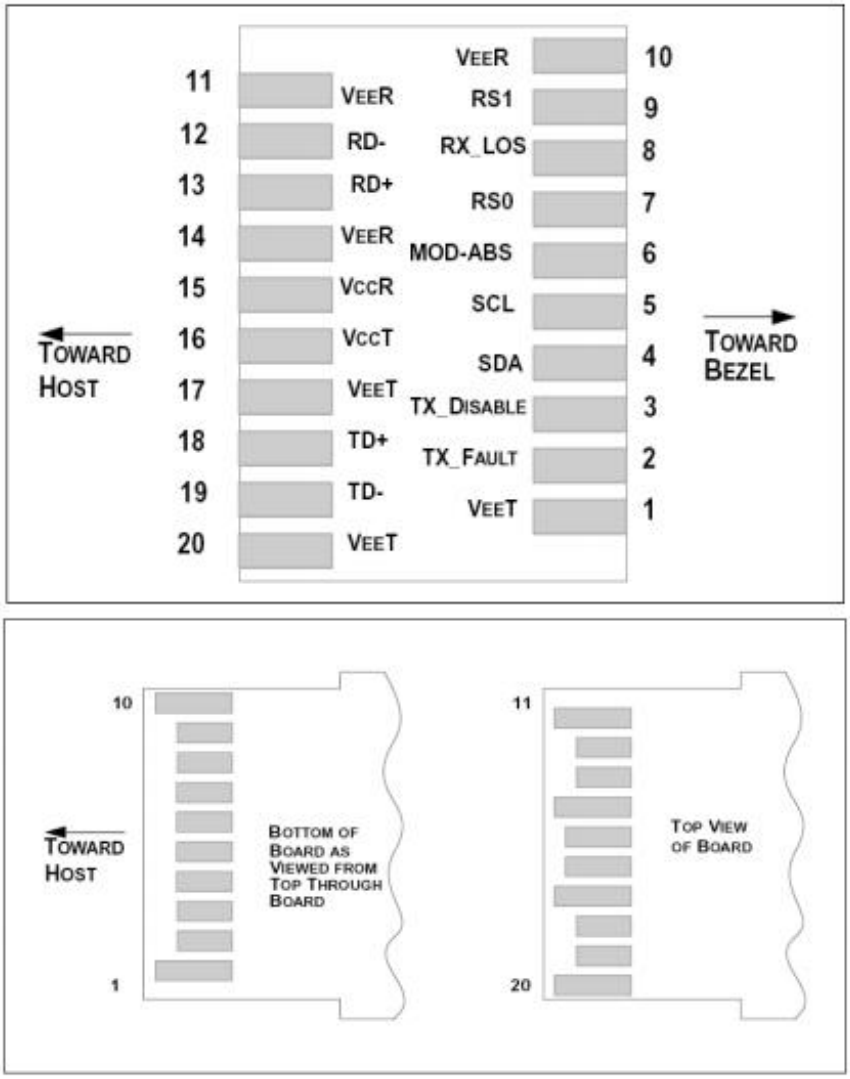
Parameter	Symbol	Min	Typical	Max	Unit
Nominal Wavelength	λ	1530	-	1565	nm
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Average Optical Power	Po	-2	-	4	dBm
Extinction Ratio	ER	8.2	-	-	dB
Average Launch Power of OFF Transmitter	POFF	-	-	-30	dBm
Relative Intensity Noise	RIN	-	-	- 128	dB/Hz

Receiver Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit
Center Wavelength	λ	1260	-	1620	nm
Receiver sensitivity[1]	RSEN	-	-	-16	dBm
Receiver Overload	PMAX	0.5	-	-	dBm
Optical Return Loss	RRL	27	-	-	dB
LOS Asserted	LSA	-35	-	-	dBm
LOS De-Asserted	LDA	-	-	-17	dBm
LOS Hysteresis	LH	0.5	-	-	dB

Notes:
[1] Measured at 1260-1620nm, ER>8.2dB, BER less than 10E-12 and PRBS 231 -1 test pattern.

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-NFNCH4C	10Gbps SFP+ 1550nm 40km Transceiver, 0°C ~ +70°C

Important Notice

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