

## NS-SFP+CxxL10D

### 10KM SFP+ CWDM Optical Transceiver

#### Features

Compliant with SFF-8431 and IEEE802.3ae  
 Data rate selectable  $\leq 4.25$ Gbps or 9.95Gbps to 10.3Gbps bit rates  
 DFB transmitter and PIN receiver  
 Wavelength selectable to ITU-T standards covering  
 CWDM grid wavelengths  
 Low Power Dissipation 2W Maximum  
 -5°C to 70°C Operating Case Temperature  
 Single 3.3V power supply  
 Diagnostic Performance Monitoring of module temperature, supply  
 Voltages, laser bias current, transmit optical power, receive optical power  
 RoHS compliant and lead free

#### Applications

10GBASE-LR

#### Description

PRONETS SFP+LR CWDM Transceiver is designed for 10GBASE-LR applications. The transceiver consists of two sections: The transmitter section incorporates a DFB laser. And the receiver section consists of a PIN photodiode integrated with a TIA. All modules satisfy class I laser safety requirements. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage

#### Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	3.8	V
Storage Temperature	Tst	-40	85	°C
Relative Humidity	Rh	0	85	%

#### Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Supply Voltage	Vcc	3.13	3.3	3.47	V
Supply current	Icc	420		610	mA
Operating Case temperature	Tca	-5	-	70	°C
Module Power Dissipation	Pm	-	1.4	2	W

#### Notes:

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

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

#### Transmitter Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit
Center Wavelength	$\lambda_c$	1270	$\lambda_c$	1610	nm
Center wavelength stability	$\Delta\lambda_D$	-6.5	$\lambda_c$	6.5	nm
Optical Average Power	Po	-4,6	-	0	dBm
Optical OMA Power	Pom		-4		dBm



Side Mode Suppression Ratio	SMSR	30	-	-	dB
Optical Transmit Power (disabled)	PTX_DISABLE	-	-	-30	dBm
Extinction Ratio	ER		8.2		dB
RIN <sub>21</sub> OMA [1]			-128		dB/Hz
Optical Return Loss Tolerance			21		dB

**Notes:**

[1] RIN measurement is made with a return loss at 21 dB.

**Transmitter Specifications – Electrical**

Parameter	Symbol	Min	Typical	Max	Unit
Data Rate	Mra	-	10.3	11.3	Gbps
Input differential impedance	Rim	-	100	-	Ω
Differential data Input	VtxDIFF	120	-	850	mV
Transmit Disable Voltage	VD	2.0	-	Vcc3+0.3	V
Transmit Enable Voltage	Ven	0	-	+0.8	V
Transmit Disable Assert Time	Vn	-	-	100	us

**Receiver Specifications – Optical**

Parameter	Symbol	Min	Typical	Max	Unit
Input Operating Wavelength	λ	1260	-	1620	nm
Average receive power	-	-	-1.0		dBm
Receiver sensitivity	-	-	-14.4		dBm
Maximum Input Power	RX-overload	-	-	+2	dBm
Reflectance	Rrx	-	-	-27	dB
Loss of Signal Asserted		-	-35		dBm
LOS De-Asserted		-	-30		dBm
LOS Hysteresis		-	-35		dB

**Receiver Specifications – Electrical**

Parameter	Symbol	Min	Typical	Max	Unit
Data Rate	Mra	-	10.3	11.3	Gbps
Differential Output Swing	Vout P-P	350	-	850	mV
Rise/Fall Time	Tr / Tf	24	-	-	ps
Loss of Signal - Asserted	VOH	2	-	Vcc3+0.3-	V
Loss of Signal - Negated	VOL	0	-	+0.4	V

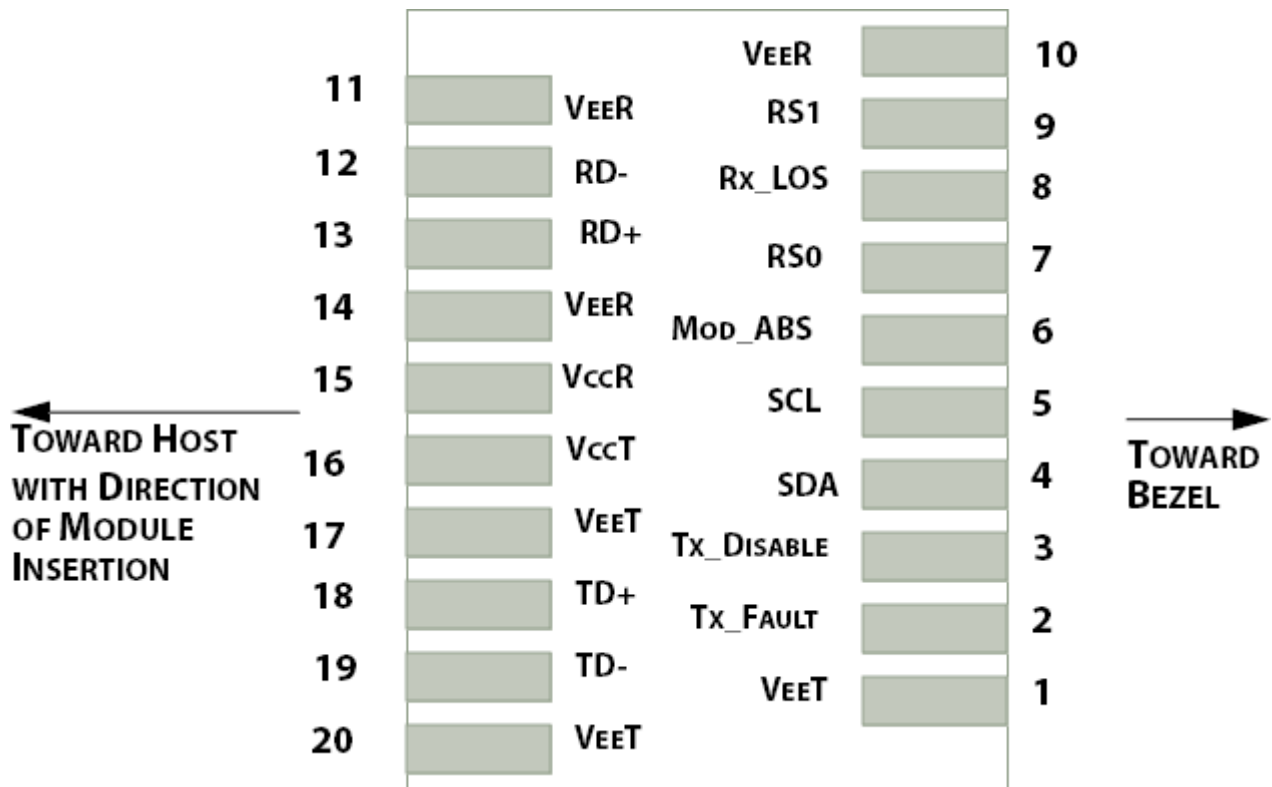


Figure1.Electrical Pin-out Details

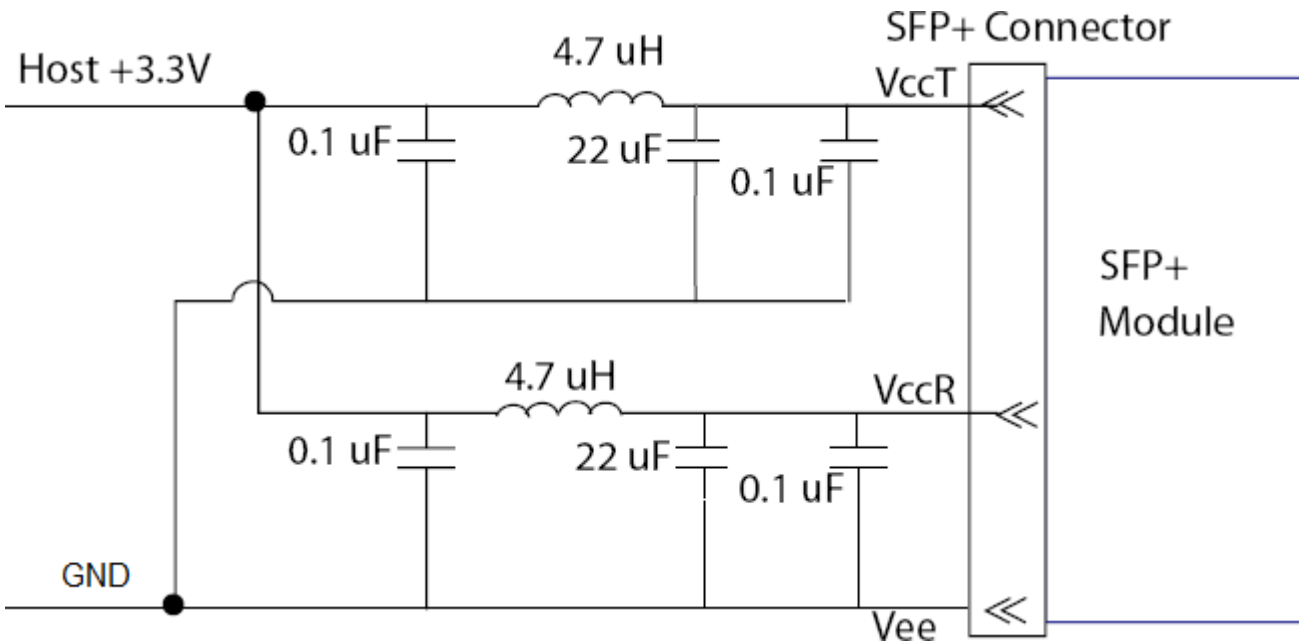
### Pin Descriptions

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]	RS0 for Rate Select: Open or Low = Module supports ≤4.25Gbps High = Module supports 9.95 Gb/s to 10.3125 Gb/s
8	RX_LOS [2]	Loss of Signal indication. Logic 0 indicates normal operation
9	RS1 [5]	No connection required
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

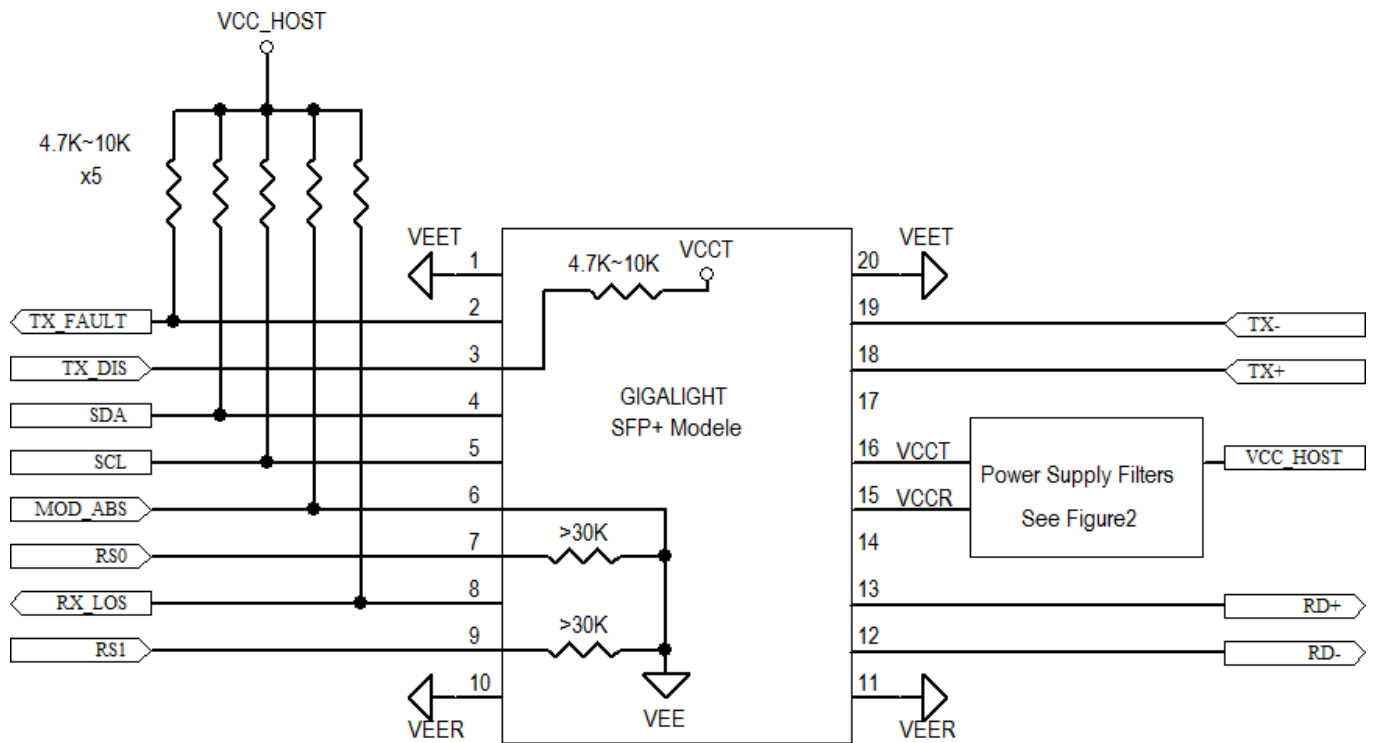


**Notes:**

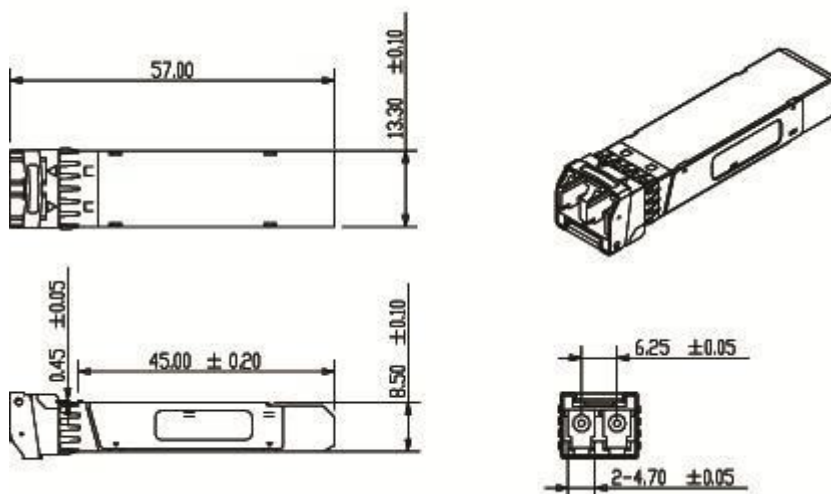
- [1] Module circuit ground is isolated from module chassis ground within the module. [2].should be pulled up with 4.7k - 10k ohms on host board to a voltage between 3.15V and 3.6V.
- [3]Tx\_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VccT inside the module. [4]Mod\_ABS is connected 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 in the slot.
- [5] RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.



**Figure2. Host Board Power Supply Filters Circuit**



**Figure3. Host-Module Interface**



**Figure6. Mechanical Specifications**



**NETS**

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### Ordering information

Part Number	Product Description
NS-SFP+C27L10D	10Gbps, 1270nm SFP+ LR10 10km, -5°C ~ +70°C
NS-SFP+C29L10D	10Gbps, 1290nm SFP+ LR10 10km, -5°C ~ +70°C
NS-SFP+C31L10D	10Gbps, 1310nm SFP+ LR10 10km, -5°C ~ +70°C
NS-SFP+C33L10D	10Gbps, 1330nm SFP+ LR10 10km, -5°C ~ +70°C
NS-SFP+C35L10D	10Gbps, 1350nm SFP+ LR10 10km, -5°C ~ +70°C
NS-SFP+C37L10D	10Gbps, 1370nm SFP+ LR10 10km, -5°C ~ +70°C
NS-SFP+C39L10D	10Gbps, 1390nm SFP+ LR10 10km, -5°C ~ +70°C
NS-SFP+C41L10D	10Gbps, 1410nm SFP+ LR10 10km, -5°C ~ +70°C
NS-SFP+C43L10D	10Gbps, 1430nm SFP+ LR10 10km, -5°C ~ +70°C
NS-SFP+C45L10D	10Gbps, 1450nm SFP+ LR10 10km, -5°C ~ +70°C
NS-SFP+C47L10D	10Gbps, 1470nm SFP+ LR10 10km, -5°C ~ +70°C
NS-SFP+C49L10D	10Gbps, 1490nm SFP+ LR10 10km, -5°C ~ +70°C
NS-SFP+C51L10D	10Gbps, 1510nm SFP+ LR10 10km, -5°C ~ +70°C
NS-SFP+C53L10D	10Gbps, 1530nm SFP+ LR10 10km, -5°C ~ +70°C
NS-SFP+C55L10D	10Gbps, 1550nm SFP+ LR10 10km, -5°C ~ +70°C
NS-SFP+C57L10D	10Gbps, 1570nm SFP+ LR10 10km, -5°C ~ +70°C
NS-SFP+C59L10D	10Gbps, 1590nm SFP+ LR10 10km, -5°C ~ +70°C
NS-SFP+C61L10D	10Gbps, 1610nm SFP+ LR10 10km, -5°C ~ +70°C