T-SFP+-CWDM-10KM

10Gbps SFP+ CWDM Transceiver 10KM

Features

Compliant with SFF-8431, SFF-8432 and IEE802.3ae
4-Wavelengths CWDM DFB transmitter from
1270nm to 1330nm, PIN photo-detector
Operating Case Temperature: 0 to 70℃
Low Power Consumption
Application for 10km SMF connection
All metal housing for superior EMI performance
Advanced firmware allow customer system encryption information to be stored in transceiver
Cost effective SFP+ solution, enables higher port densities and greater bandwidth
RoHS compliant

Applications

10G BASE-LR at 10.3125Gbps
Other Optical Links

Description

The T-SFP+-CWDM-10KM series single-mode transceiver is a “Limiting module”, designed for 10GBASE-LR, and 2G/4G/8G/10G Fiber- Channel 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.

Regulatory Compliance

Feature	Agency	Standard	Certificate / Comments
Laser Safety	FDA	CDRH 21 CFR 1040 and Laser Notice No.50	1120292-000
Product Safety	UL	UL and CUL EN60950-2:2007	E347511
Environmental Protection	SGS	RoHS Directive 2002/95/EC	GZ1001008918/CHEM
EMC	WALTEK	EN55022:2006+A1:20077 EN55024:1998+A1+A2:2003	WT10093759-D-E-E

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	Tc	-40	+85	°C
Operating Case Temperature	Tc	0	+70	°C
Supply Voltage	Vin	0	+3.6	V
Relative Humidity	RH	5	95	%
RX Input Average Power	P_{max}		0	dBm

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.

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Supply Voltage	V_{cc}	3.13	3.3	3.46	V
Supply Current	I_{cc}		360	450	mA
Operating Case Temperature	Tca	-5		70	°C
Module Power Dissipation	Pm		1.2	1.5	W

Notes:

1. Supply current is shared between VCCTX and VCCRX.

Digital Diagnostic Functions

Parameter	Symbol	Min.	Max	Unit	Notes
Accuracy					
Transceiver Temperature	DMI_Temp	-3	+3	degC	Over Operating Temp
TX Output Optical Power	DMI_TX	-3	+3	dB	
RX Input Optical Power	DMI_RX	-3	+3	dB	-3dBm to -12dBm range
Transceiver Supply Voltage	DMI_VCC	-0.08	+0.08	V	Full operating range
Bias Current Monitor	DMI_Ibias	-10%	10%	mA	
Dynamic Range Accuracy					
Transceiver Temperature	DMI_Temp	-5	70	degC	
TX Output Optical Power	DMI_TX	-1	+2	dB	
RX Input Optical Power	DMI_RX	-18	0	dB	
Transceiver Supply Voltage	DMI_VCC	3.0	3.6	V	
Bias Current Monitor	DMI_Ibias	0	100	mA	

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Data Rate			10.3125		Gbps	
Power Consumption			1200	1500	mV	
Transmitter						
Single Ended Output Voltage Tolerance		-0.3		4.0	V	
C Common Mode Voltage Tolerance		15			mV	
Tx Input Diff Voltage	VI	400		1600	mV	
Tx Fault	VoL	-0.3		0.4	V	At 0.7mA
Data Dependent Input Jitter	DDJ			0.10	UI	
Data Input Total Jitter	TJ			0.28	UI	
Receiver						
Single Ended Output Voltage Tolerance		-0.3		4.0	V	
Rx Output Diff Voltage	V_o	300		850	mV	
Rx Output Rise and Fall Time	Tr / Tf	30			ps	20% to 80%
Total Jitter	TJ			0.70	UI	
Deteministic Jitter	DJ			0.42	UI	

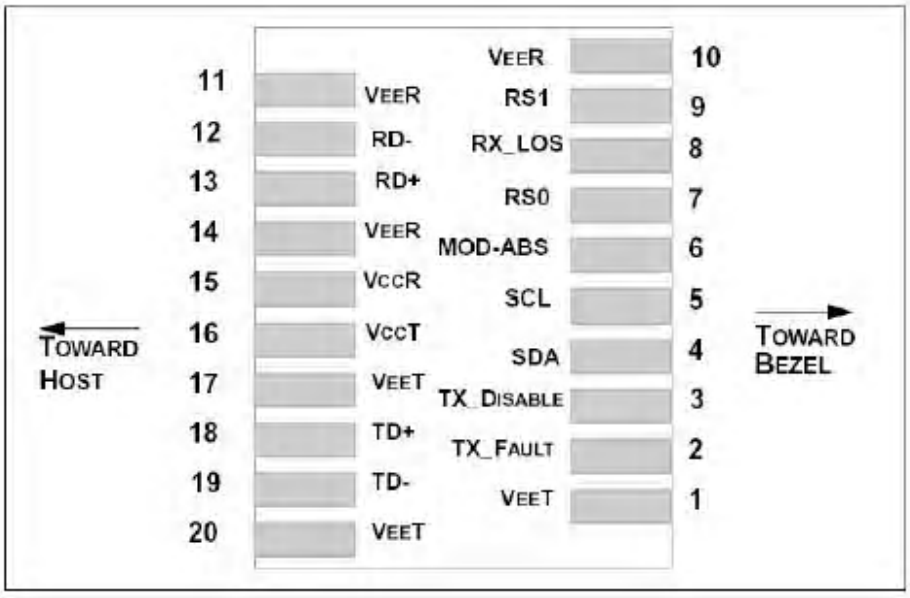
Optical Characteristics

Parameter	Unit	Values
Operating Reach	m	10km
Transmit		
Center wavelength (range)	nm	1270-1330
Side Mode Suppression Ratio (min)	dB	30
Launched Power		
– maximum	dBm	+0.5
– minimum	dBm	-8.2 Notes1
– OMA	dBm	-5.2
– OMA-TDP (min)	dBm	-6.2
Transmitter and dispersion penalty	dB	0 Notes4
Average launch power of OFF transmitter (max)	dBm	-30
Extinction ratio (min)	dB	3.5 Notes2
RIN12 OMA (max)	dB/Hz	-128
Optical Return Loss Tolerance (min)	dB	12

Receiver		
Center wavelength (range)	nm	1260-1355
Receive Overload(max) in average power[1]	dB	0.5
Receive Sensitivity(min) in average power[1]	dBm	-14.4 Notes3
Receiver sensitivity(max) in M-OMA (footnote 2)	dBm	-12.6 Notes3
Receiver Reflectance (max)	dB	-12
Stressed receiver sensitivity (max) in OMA[2]	dBm	-10.3
Vertical eye closure penalty (min)[3]	dB	2.2
Stressed eye jitter (min)[2]	Ulp-p	0.7
Receive electrical 3dB upper cutoff frequency (max)	GHz	12.3
Receive Power(damaged, Max)	dBm	1.5

Notes:

1. The optical power is launched into SMF
2. Measured with a PRBS 231-1 test pattern@10.3125Gbps
3. Measured with a PRBS 231-1 test pattern@10.3125Gbps BER≤10-12
4. In G.652 and G.655(NDSF)



Pin Definition

Parameter	Unit	Values
1	VEET (1)	Transmitter Ground
2	Tx_Fault (2)	Transmitter Fault
3	Tx_DIS (3)	Transmitter Disable. Laser output disable on high or open
4	SDA (2)	2-wire serial interface data line
5	SCL (2)	2-wire serial interface data line
6	MOD_ABS (4)	Module Absent. Grounded within the module
7	RSO (5)	Rate Select 0
8	RX_LOS (2)	Loss of Singal Indication. Logic 0 indicates 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	Receiver Ground
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.

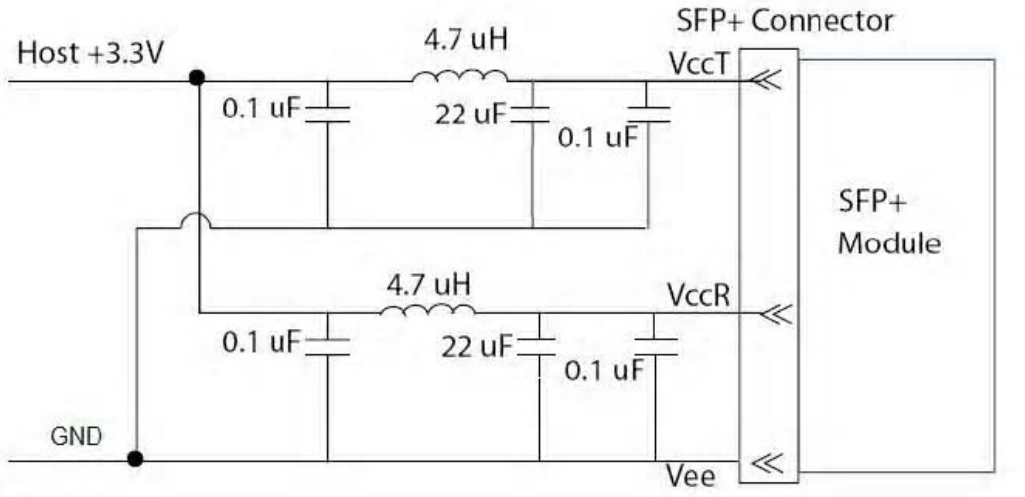
[2].Should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15Vand 3.6V.

[3] Tx_Disable is an input contact with a 4.7 kΩ to 10 kΩ pull-up to VccT inside the module.

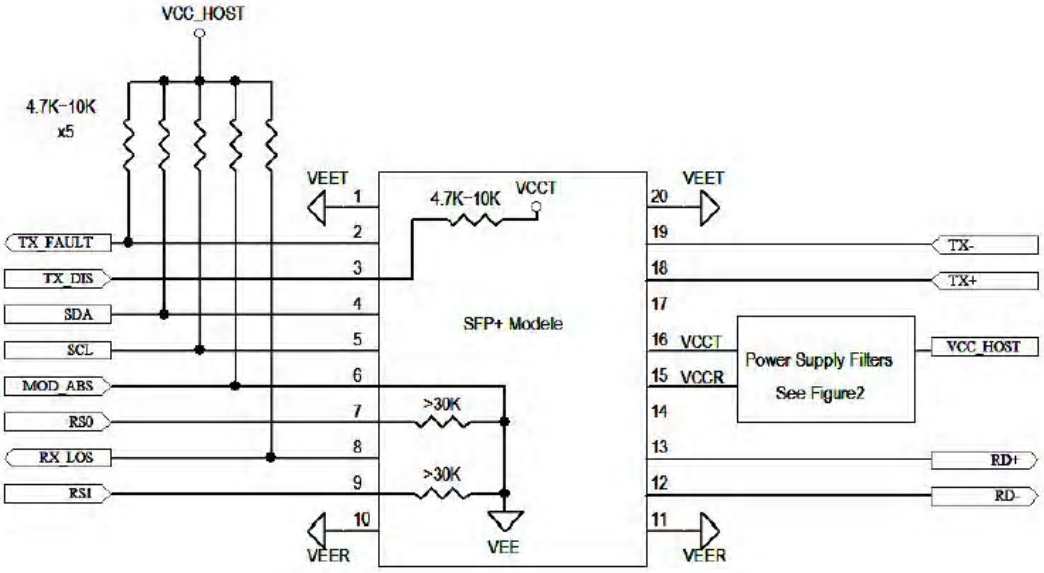
[4]Mod_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to Vcc_Host with a resistor in the range 4.7 kΩ to10 kΩ.Mod_ABS is asserted “High” when the SFP+ module is physically absent from a host slot.

[5] RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.value cannot be compliant.

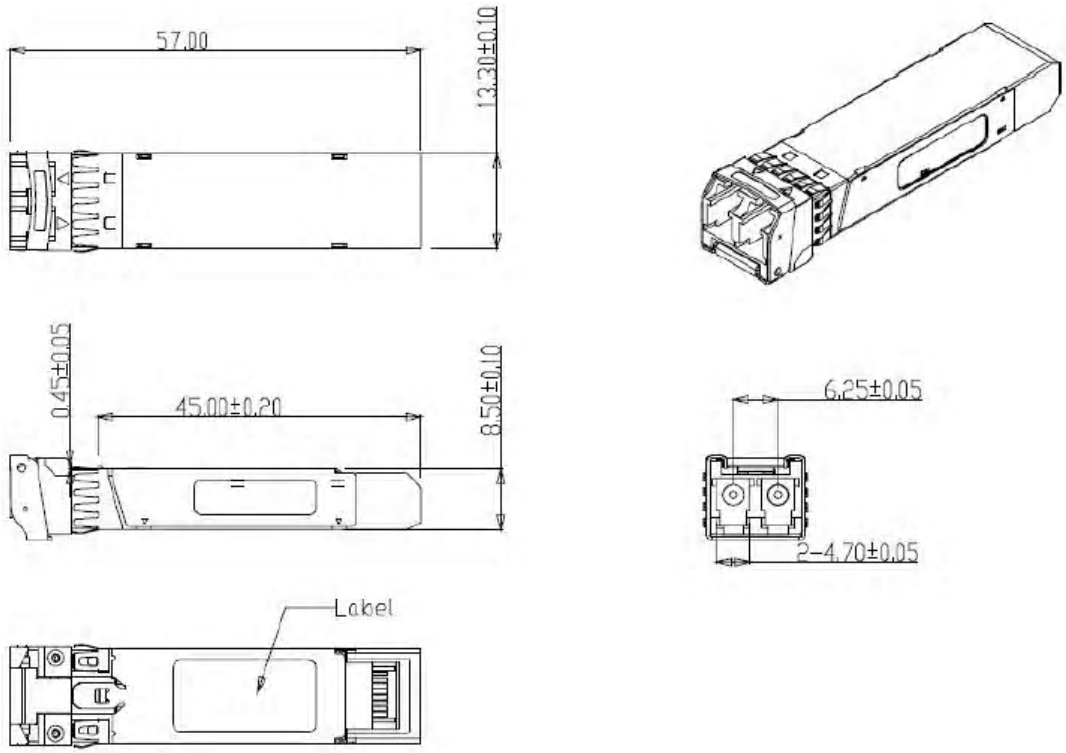
Host Board Power Supply Filters Circuit



Host-Module Interface



Mechanical Specifications



Ordering information

Part Number	Product Description
T-SFP+-CWDM-10KM	**9.95~10.3Gbps CWDM SFP+ 10km -5℃~+70℃ (1270~1330nm)**

Notice:

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