

T-10G-SFP+-T3-60KM**10Gbps SFP+ BIDI Optical Transceiver, 60km Reach****Features**

Supports 9.95Gbpto 10.3Gbps data rates

Simplex LC Connector Bi-Directional SFP+ Optical Transceiver

Distance up to 60km with 9/125 μ m SMF

Single 3.3V Power Supply

A: 1330nm DFB Laser Transmitter, 1270nm Receiver

B: 1270nm DFB Laser Transmitter, 1330nm Receiver

Compliant with MSA SFP+ Specification SFF-8431

Compliant with IEEE 802.3ae 10GBASE-LR/LW

SFP+ MSA SFF-8431 Compliant

Digital Diagnostic SFF-8472 Compliant

Operating Temperature

Standard: 0C~+70°C

**Applications**

10GBase-LR at 10.3125Gbps

10GBase-LW at 9.953Gbps

Other Optical Links

Description

T-10G-SFP+-T3-60KM is single-mode transceiver is SFP+ module for serial optical data communications such as 10GBASE-ER and 10GBASE-EW. It is with the SFP+ 20-pin connector to allow hot plug capability.

This module is designed for single mode fiber and operates at a nominal wavelength of 1270nm or 1310 nm. The Transmitter section uses a multiple quantum well DFB laser and is a class 1 laser compliant according to International Safety Standard IEC-60825.

The receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

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.

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T _c	-40	+85	°C
Operating Case Temperature	T _c	0	+70	°C
Supply Voltage	V _{in}	-0.5	+3.6	V
Relative Humidity	RH	0	85	%

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Supply Voltage	V _{cc}	3.0	3.3	3.6	V
Supply Current	I _{cc}		200	300	mA
Operating Case Temperature	T _c	0	25	70	°C
Module Power Dissipation	P _m		0.7	1.1	W

Electrical Characteristics(Top=0~70°C, V_{cc}=3.0 to 3.60 Volts)

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Supply Voltage	V _{cc}	3.00		3.60	V	1
Supply Current	I _{cc}		200	300	mV	1
Transmitter						
Input Impedance (Differential)	R _{in}		100		Ω	2
Single Ended Data Input Swing	V _{in,pp}	150		1200	mVpp	
Transmit Disable Voltage	V _D	2		V _{cc}	V	
Transmit Enable Voltage	V _{EN}	V _{ee}		V _{ee} +0.8	V	3

Receiver						
Output Impedance (Differential)	R_{out}		100		Ω	2
Single Ended Data Output Swing	$V_{out,pp}$	300		700	mV	4
LOS Fault	$V_{out,pp}$	2		$V_{CC_{HOST}}$	V	5
LOS Normal	$V_{LOS\ fault}$	0		$V_{ee}+0.8$	V	5

Notes:

1. Module power consumption never exceeds 1W.
2. AC coupled.
3. Or open circuit.
4. Into 100 ohm differential termination.
5. LOS is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

Optical and Electrical Characteristics(Top=0~70℃, Vcc=3.0 to3.60 Volts)TX1310/1270nm

Parameter	Symbol	Min.	Typical	Max.	Unit	Ref.
Transmitter						
Optical Wavelength	λ_c	1320	1330	1340	nm	
Side Mode Suppress Ratio	SMSR	30			dB	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Average Output Power	P_{out}	2		7	dBm	1
Extinction Ratio	ER	3.5			dB	
Eye Mask	Compliant with IEEE 802.3					
Transmitter Dispersion Penalty	TDP			3.2	dB	
Average Power of OFF Transmitter				-30	dBm	
Relative Intensity Noise	RIN			-128	Db/Hz	

Receiver						
Average Receiver Power	RSENS			-20	dBm	1,2
Receiver Overload	P _{max}			-7	dBm	
Centre Wavelength	λ_c	1260		1270	dBm	
LOS De-Assert	LOS _D			-25	dBm	
LOS Assert	LOS _A	-28			dB	
LOS Hysteresis		0.5			dB	

Notes:

1. Output is coupled into a 9/125um SMF.
2. Average Receiver Power (Min) is informative and not the principal indicator of signal strength. A received below this value cannot be compliant.
3. Measured with a PRBS231-1 test [pattern@10.3125Gbps](#).

TX1270/1330nm

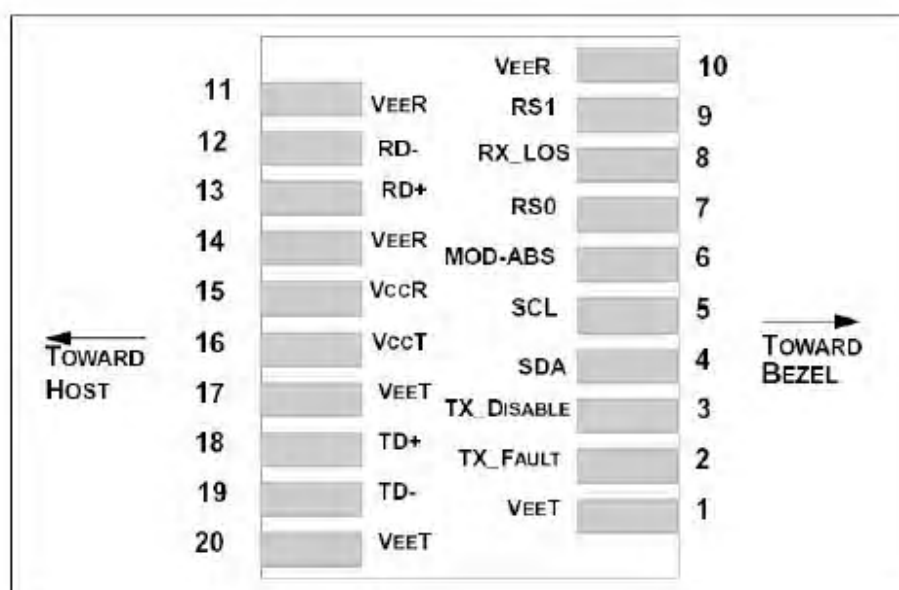
Parameter	Symbol	Min.	Typical	Max.	Unit	Ref.
Transmitter						
Optical Wavelength	λ_c	1260	1270	1280	nm	
Side Mode Suppress Ratio	SMSR	30			dB	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Average Output Power	P _{out}	2		7	dBm	1
Extinction Ratio	ER	3.5			dB	
Eye Mask	Compliant with IEEE 802.3					
Transmitter Dispersion Penalty	TDP			3.2	dB	
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Receiver						
Average Intensity Noise	RSENS			-20	dBm	1,2
Receiver Overload	P _{max}			-7	dBm	
Centre Wavelength	λ _c	1320		1340	dBm	
LOS De-Assert	LOS _D			-25	dBm	
LOS Assert	LOS _A	-28			dB	
LOS Hysteresis		0.5			dB	

Notes:

1. Average Receiver Power (Min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant.
2. Measured with a PRBS231-1 test pattern @10.3125Gbps, BER ≤ 10⁻¹²

SFP+ Transceiver Electrical Pad Layout



Pin Function Definitions

Pin Num.	Symbol	Name/Description
1	VeeT (1)	Transmitter Ground
2	TX Fault (2)	Transmitter Fault Indication
3	TX Disable (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 Clock Line
6	MOD-ABS (4)	Module Absent. Ground within the module
7	RSo (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+	Transmit Data In. AC Coupled
19	TD-	Transmit Inverted DATA in. AC Coupled
20	VeeT (1)	Transmitter Ground

Notes:

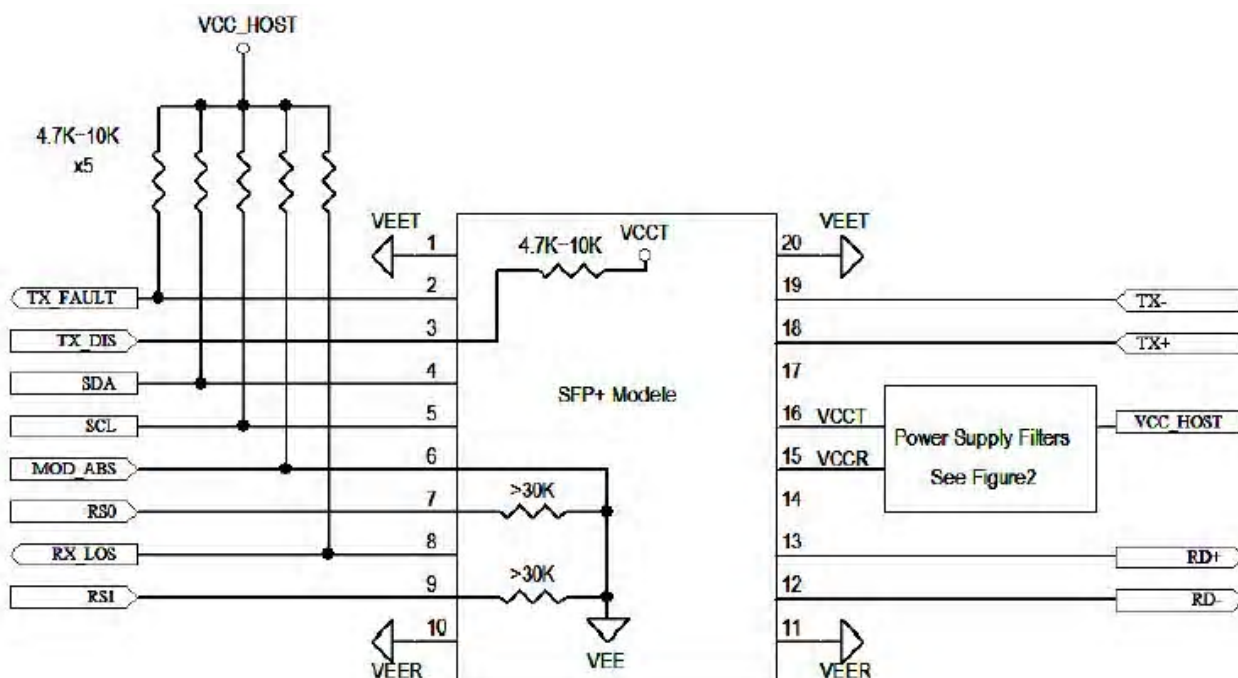
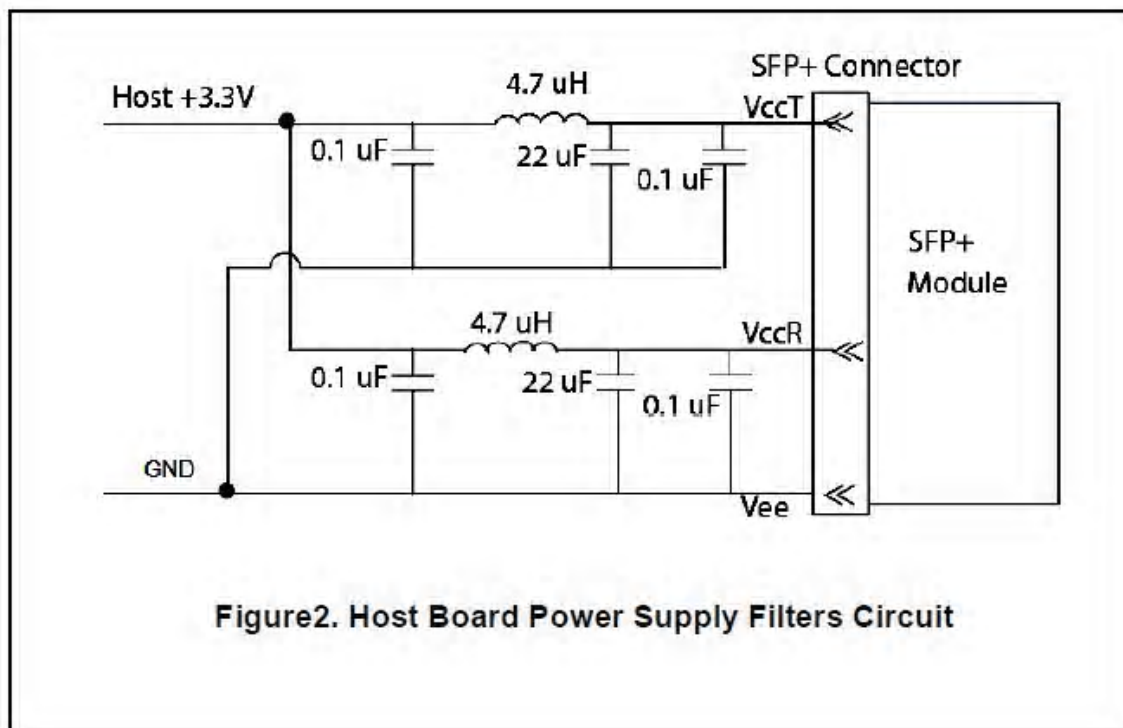
[1] Module circuit ground is isolated from module chassis ground within the module.

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

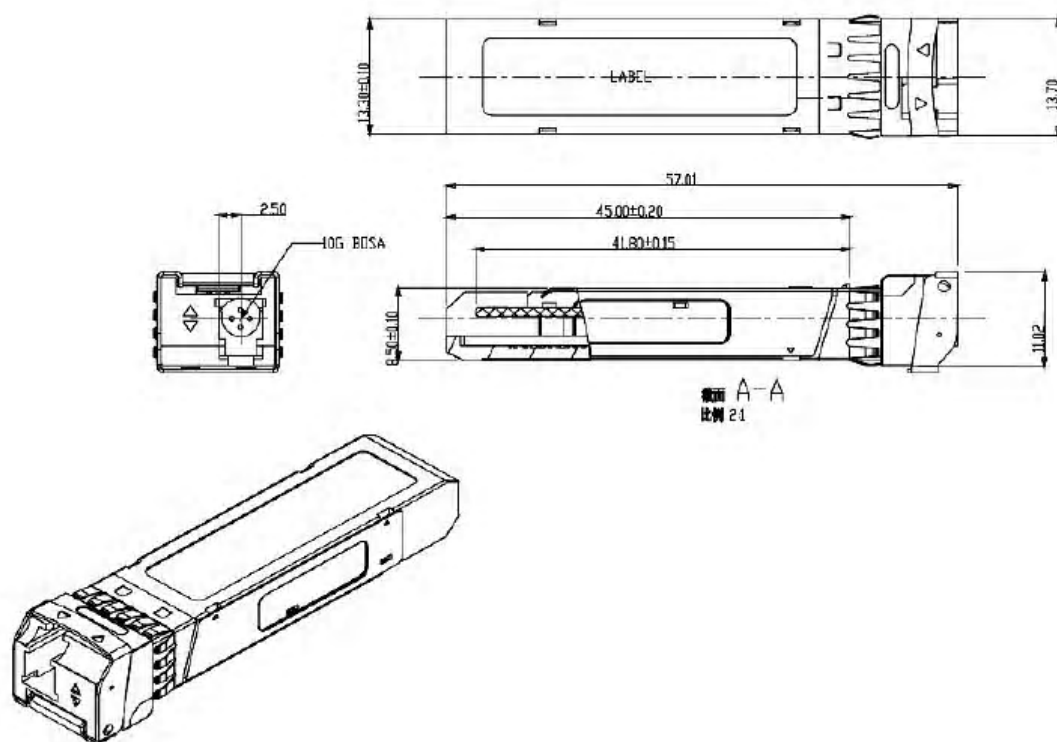
[3]Tx_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VccT inside the module.

[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 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 Specifications



Ordering information

Part Number	Product Description
T-10G-SFP+-T3-60KM	9.95~10.3Gbps Tx:1330nm / Rx:1270nm 60KM 0℃~+70℃
T-10G-SFP+-T2-60KM	9.95~10.3Gbps Tx:1270nm / Rx:1330nm 60KM 0℃~+70℃

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