



## ZT-P55TG-ZR

**10Gbps SFP+ Optical Transceiver, 80km Reach**

### Features

- Compliant with SFF-8431, SFF-8432 and IEEE802.3ae
- 10GBASE-ZR, and 1G/2G/4G/ 8G/10G Fiber Channel applications.
- Cooled EML transmitter and APD receiver
- link length up to 80km
- Low Power Dissipation 1.4W Typical (Maximum:2W)
- 0 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
- RoHS6 compliant and lead free

### Applications

- 10G Ethernet
- 10G Fiber Channel (with/without FEC)

### Product Description

SOPTO SFP+ZR 1550nm transceiver is a “Limiting module” designed for 10G Ethernet, and 2G/4G/ 8G/10G Fiber- Channel applications.



The transceiver consists of two sections: The transmitter section incorporates a colded EML laser. And the receiver section consists of an APD 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, and received optical power and transceiver supply voltage.

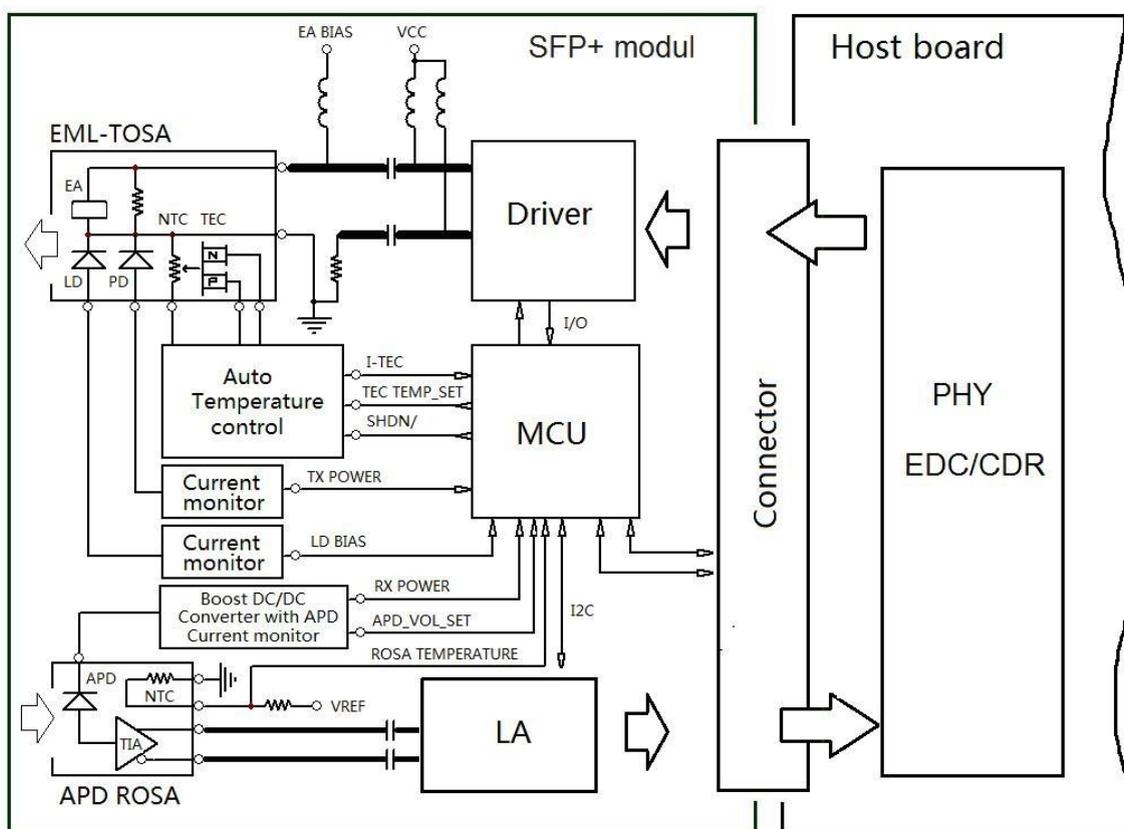


Figure 1. Module Block Diagram

### Absolute Maximum Ratings

Parameters	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	V <sub>cc</sub>	3.13	3.3	3.47	V
Supply current	I <sub>cc</sub>		420	610	mA
Operating Case temperature	T <sub>ca</sub>	-5	-	70	°C
Module Power Dissipation	P <sub>m</sub>	-	1.4	1.5	W

### Notes:

[1] Supply current is shared between VCCTX and VCCR<sub>X</sub>.

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

## Optical Characteristics (TOP = 0 to 70 °C, VCC = 3.135 to 3.465 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
<b>Transmitter Section:</b>						
Center Wavelength	$\lambda_t$	1530	1550	1565	nm	
spectral width	$\Delta\lambda$			0.3	nm	
Average Optical Power	P <sub>avg</sub>	0		4	dBm	1
Optical Power OMA	P <sub>oma</sub>	-2.1			dBm	
Laser Off Power	P <sub>off</sub>			-30	dBm	
Extinction Ratio	ER	8.2			dB	
Transmitter Dispersion Penalty	TDP			3.0	dB	2
Relative Intensity Noise	R <sub>in</sub>			-128	dB/Hz	3
Optical Return Loss Tolerance		21			dB	



<b>Receiver Section:</b>						
Center Wavelength	$\lambda_r$	1260		1600	nm	
Receiver Sensitivity	Sen			-23	dBm	4
Stressed Sensitivity (OMA)	Sen <sub>ST</sub>			-21	dBm	4
Los Assert	LOS <sub>A</sub>	-34		-	dBm	
Los Dessert	LOS <sub>D</sub>			-24	dBm	
Los Hysteresis	LOS <sub>H</sub>	0.5			dB	
Overload	Sat	0			dBm	5
Receiver Reflectance	R <sub>Rx</sub>			-26	dB	

Note:

1. Average power figures are informative only, per IEEE802.3ae.
2. TWDP figure requires the host board to be SFF-8431 compliant. TWDP is calculated using the Matlab code provided in clause 68.6.6.2 of IEEE802.3ae.
3. 12dB reflection.
4. Conditions of stressed receiver tests per IEEE802.3ae. CSRS testing requires the host board to be SFF-8431 compliant.
5. Receiver overload specified in OMA and under the worst comprehensive stressed condition.

### Electrical Characteristics (TOP = 0 to 70 °C, VCC = 3.135 to 3.465 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Supply Voltage	V <sub>cc</sub>	3.135		3.465	V	
Supply Current	I <sub>cc</sub>			500	mA	
Power Consumption	P			1.8	W	
<b>Transmitter Section:</b>						
Input differential impedance	R <sub>in</sub>		100		Ω	1
Tx Input Single Ended DC Voltage Tolerance (Ref VeeT)	V	-0.3		4	V	



Differential input voltage swing	$V_{in,pp}$	180		700	mV	2
Transmit Disable Voltage	$V_D$	2		$V_{cc}$	V	3
Transmit Enable Voltage	$V_{EN}$	$V_{ee}$		$V_{ee}+0.8$	V	
<b>Receiver Section:</b>						
Single Ended Output Voltage Tolerance	V	-0.3		4	V	
Rx Output Diff Voltage	$V_o$	300		850	mV	
Rx Output Rise and Fall Time	Tr/Tf	30			ps	4
LOS Fault	$V_{LOS\ fault}$	2		$V_{CC_{HOS\ T}}$	V	5
LOS Normal	$V_{LOS\ norm}$	$V_{ee}$		$V_{ee}+0.8$	V	5

### Digital Diagnostic Functions

Parameter	Symbol	Min.	Max	Unit	Notes
<b>Accuracy</b>					
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
Bias current monitor	DMI_Ibias	-10%	10%	mA	
<b>Dynamic Range Accuracy</b>					
Transceiver Temperature	DMI_Temp	0	70	degC	
TX Output optical power	DMI_TX	0	4	dBm	
RX Input optical power	DMI_RX	-26	0	dBm	
Transceiver Supply voltage	DMI_VCC	3.0	3.6	V	
Bias current monitor	DMI_Ibias	0	100	mA	

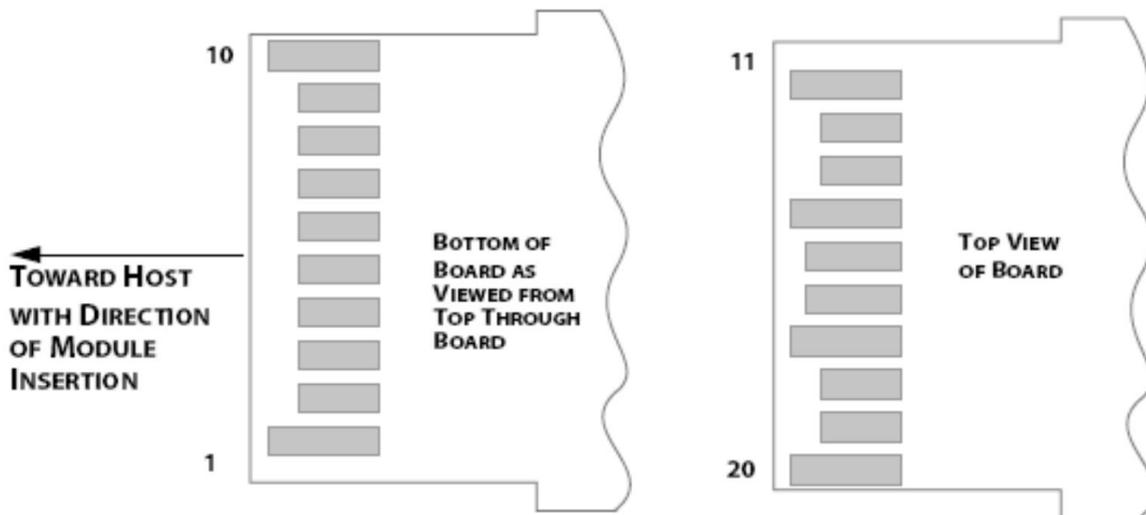
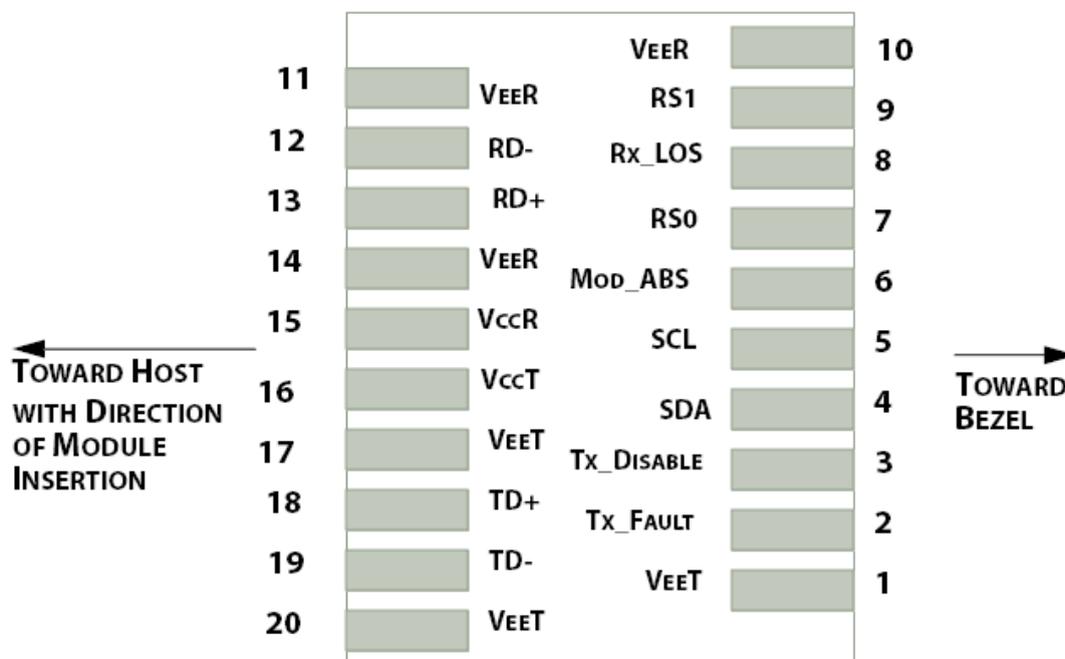


Figure 2. Electrical Pin-out Details

## Pin Descriptions





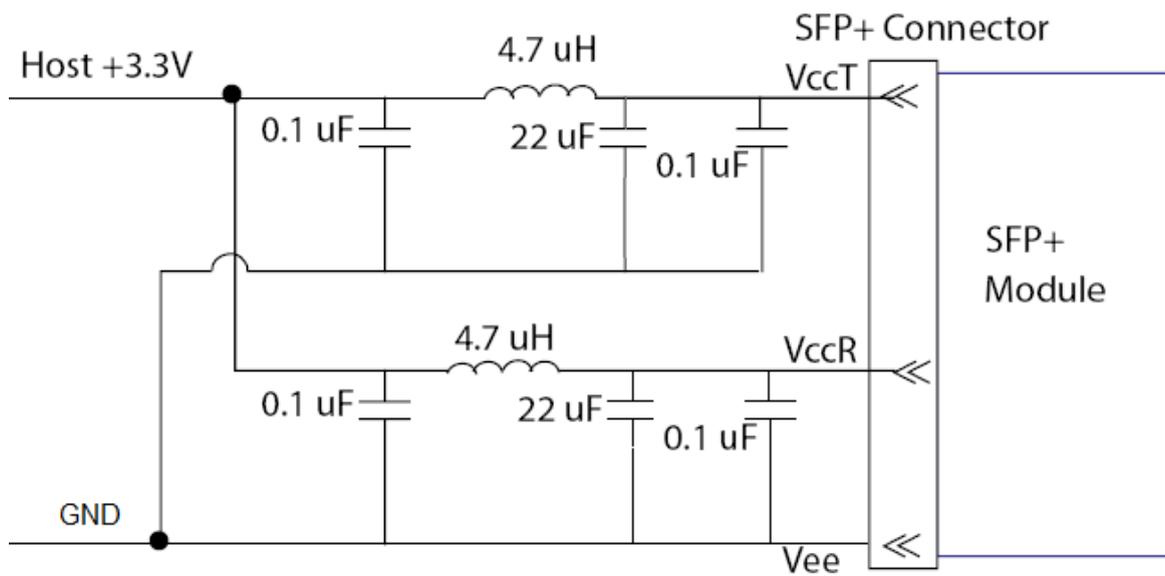
Pin	Symbol	Name/Description
1	VEET [1]	Transmitter Ground
2	Tx_FAULT [2]	Transmitter Fault
3	Tx_DIS [3]	Transmitter Disable. Laser output disabled on high or open
4	SDA [2]	2-wire Serial Interface Data Line
5	SCL [2]	2-wire Serial Interface Clock Line
6	MOD_ABS [4]	Module Absent. Grounded within the module
7	RS0 [5]	RS0 for Rate Select: Open or Low = Module supports $\leq 4.25$ Gbps 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 from a host slot.
- [5] RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.

**Recommended Circuitended Interface**



**Figure3. Host Board Power Supply Filters Circuit**

