

Optical Modulation Amplitude	OMA	-2			dBm	
Receiver						
Center Wavelength	λ_r	1260		1350	nm	
Sensitivity (Average power)	P _{sens}	-13.3		2	dBm	BER = 1×10^{-12}
Unstressed receiver sensitivity(OMA)	P _{sens}			-13	dBm	BER = 1×10^{-6}
LOS Assert	LOSA			-13	dBm	
LOS De-assert	LOSD			-12	dBm	
LOS Hysteresis	LOSH	0.5			dB	
Return loss of receiver		26			dB	
Average received power (overload)				2	dBm	Note2

Notes:

[1]. Average optical power shall be measured using the methods specified in TIA/EIA-455-95.

[2]. Maximum average received power is compatible with FC-PI-6-32G while typical BER is less than 1×10^{-12} .

Electrical Characteristics

The following electrical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Data Rate		-	25.78	-	Gbps	
Power Consumption impedance		-	900	1000	mW	
Transmitter						
Single Ended Input Voltage Tolerance		-0.3			V	
AC Common mode voltage tolerance Voltage		15			mV	RMS
Differential Input Voltage Swing	V _{in}	180		700	mV	
Differential Input Impedance	Z _{in}	90	100	110	Ohm	
Receiver						

Single-ended Output Voltage		-0.3	-	4	V	
Differential Output Voltage Swing	Vo	300		850	Mv	
AC Common Mode Output Voltage				7.5	mV	RMS
Differential Output Impedance	Zout	90	100	110	Ohm	

Pin Assignment

The SFP28 modules are hot-pluggable. Hot pluggable refers to plugging in or unplugging a module while the host board is powered. The SFP28 host connector is a 0.8 mm pitch 20 position right angle improved connector specified by SFF-8083, or stacked connector with equivalent with equivalent electrical performance. Host PCB contact assignment is shown in Figure 3 and contact definitions are given in the PIN description table. SFP28 module contacts mates with the host in the order of ground, power, followed by signal as illustrated by Figure 4 and the contact sequence order listed in the PIN description table.

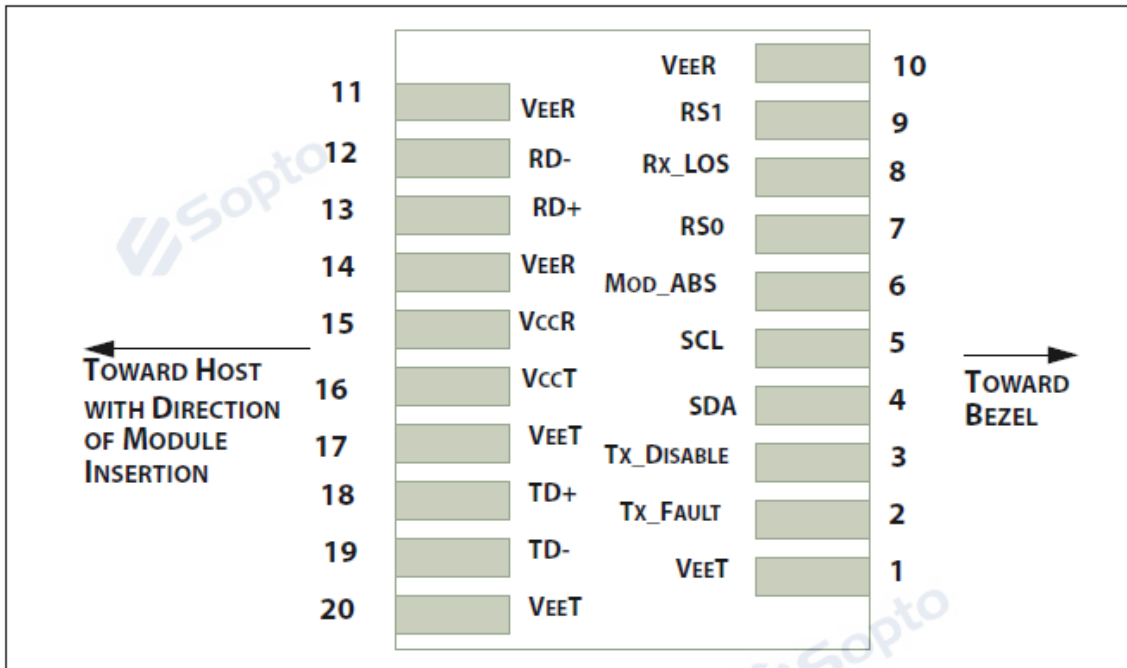


Figure 3: Module Contact Assignment

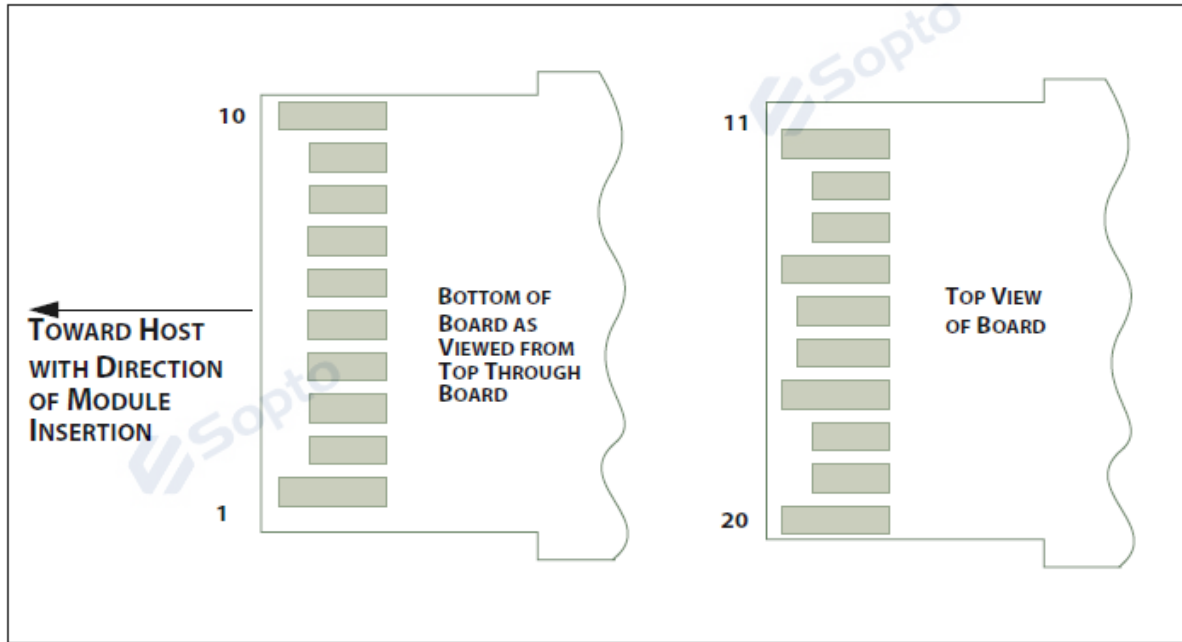


Figure 4: Module Contact Assignment

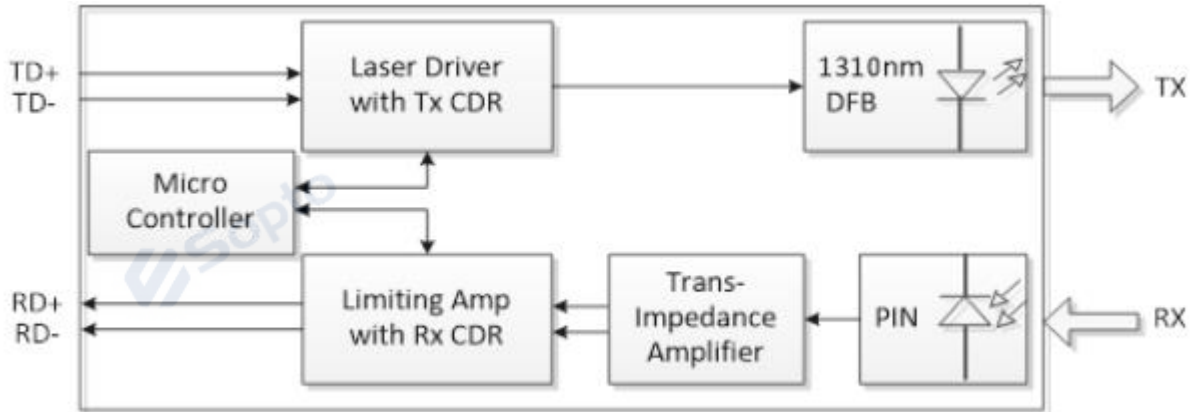
PIN description

PIN	Logic	Symbol	Name / Description	Note
1		VeeT	Module Transmitter Ground	1
2	LVTTL-O	TX_Fault	Module Transmitter Fault	
3	LVTTL-I	TX_Dis	Transmitter Disable; Turns off transmitter laser output	
4	LVTTL-I/O	SDA	2-Wire Serial Interface Data Line	2
5	LVTTL-I	SCL	2-Wire Serial Interface Clock	2
6		MOD_DEF0	Module Definition, Grounded in the module	
7	LVTTL-I	RS0	Receiver Rate Select	
8	LVTTL-O	RX_LOS	Receiver Loss of Signal Indication Active LOW	
9	LVTTL-I	RS1	Transmitter Rate Select (not used)	
10		VeeR	Module Receiver Ground	1
11		VeeR	Module Receiver Ground	1
12	CML-O	RD-	Receiver Inverted Data Output	
13	CML-O	RD+	Receiver Data Output	
14		VeeR	Module Receiver Ground	1
15		VccR	Module Receiver 3.3 V Supply	
16		VccT	Module Receiver 3.3 V Supply	
17		VeeT	Module Transmitter Ground	1
18	CML-I	TD+	Transmitter Non-Inverted Data Input	
19	CML-I	TD-	Transmitter Inverted Data Input	
20		VeeT	Module Transmitter Ground	1

Notes:

1. Module ground pins GND are isolated from the module case.
2. Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.45V on the host board.

Transceiver Block Diagram



Digital Diagnostic Functions

The following digital diagnostic characteristics are defined over the Recommended Operating Environment unless otherwise specified. It is compliant to SFF8472 Rev11 with internal calibration mode. For external calibration mode please contact our sales

Parameter	Symbol	Min	Max	Unit	Notes
Temperature monitor absolute error	DMI_Temp	-3	3	DegC	Over operating temp
Laser power monitor absolute error	DMI_TX	-3	3	dB	
RX power monitor absolute error	DMI_RX	-3	3	dB	3.5dBm to -10.4dBm range
Supply voltage monitor absolute error	DMI_VCC	-0.1	3	V	Full operating range
Bias current monitor	DMI_Ibias	-10%	0.1	mA	

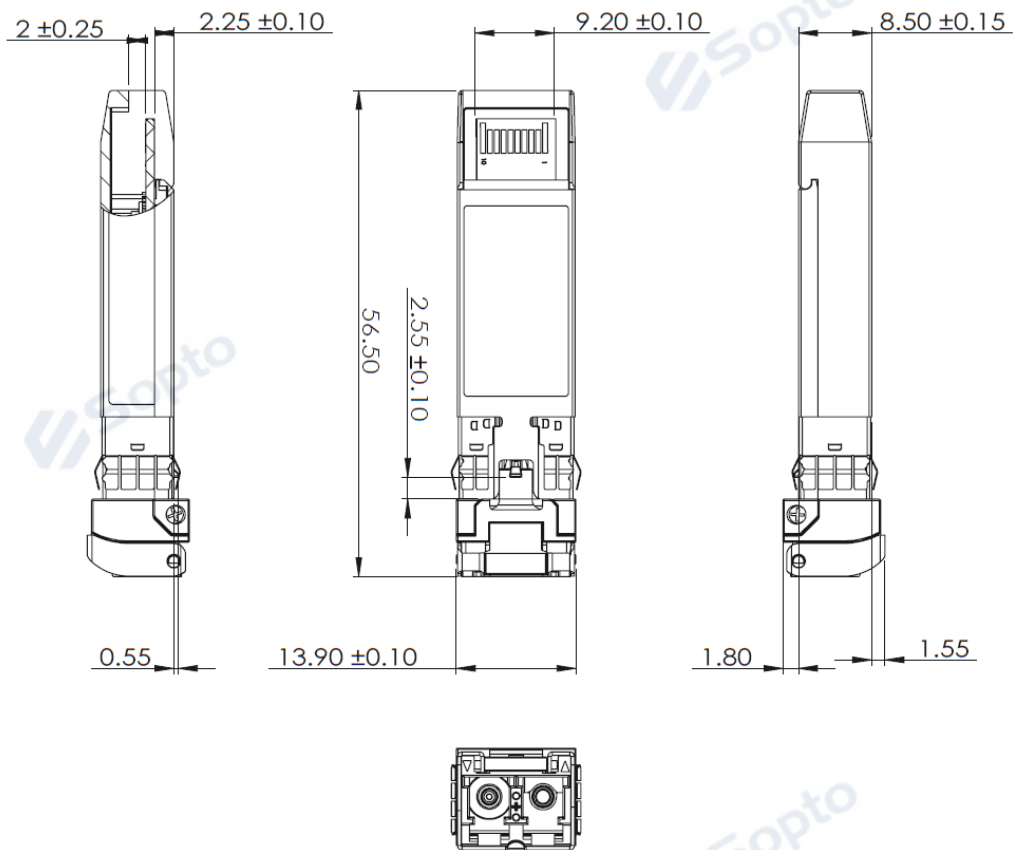
Control and Status I/O Timing Characteristics

Timing characteristics of control and status I/O are compatible with SFF-8431-MSA.

Parameter	Symbol	Min.	Max.	Unit	Conditions
Tx_Disable assert time	t _{off}		100	μs	Rising edge of Tx_Disable to fall of output signal below 10% of nominal
Tx_Disable negate time	t _{on}		2	ms	Falling edge of Tx_Disable to rise of output signal above 90% of nominal. This only applies in normal operation, not during start up or fault recovery.
Time to initialize 2-wire interface	t _{2w_start_up}		300	ms	From power on or hot plug after the supply meeting SFF8431
Time to initialize	t _{start_up}		300	ms	From power supplies meeting SFF8431 or hot plug or Tx disable negated during power up, or Tx_Fault recovery, until non-cooled power level I part (or non-cooled power level II part already enabled at power level II for Tx_Fault recovery) is fully operational.
Time to initialize cooled module and time to power up a cooled module to Power Level II	t _{start_up_cooled}		90	s	From power supplies meeting SFF8431 or hot plug, or Tx disable negated during power up or Tx_Fault recovery, until cooled power level I part (or cooled power level II part during fault recovery) is fully operational. Also, from stop bit low-to-high SDA transition enabling Power Level II until cooled module is fully operational
Time to Power Up to Level II	t _{power_level2}		300	ms	From stop bit low-to-high SDA transition enabling power level II until non-cooled module is fully operational
Time to Power Down from Level II	t _{power_down}		300	ms	From stop bit low-to-high SDA transition disabling power level II until module is within power level I requirements
Tx_Fault assert	Tx_Fault_on		1	ms	From occurrence of fault to assertion of Tx_Fault
Tx_Fault assert for cooled module	Tx_Fault_on_cooled		50	ms	From occurrence of fault to assertion of Tx_Fault
Tx_Fault Reset	t _{reset}	10		μs	Time Tx_Disable must be held high to reset Tx_Fault
RS0, RS1 rate select timing for PC	t _{RS0_PC} , t _{RS1_PC}		500	μs	From assertion till stable output
RS0, RS1 rate select timing non PC	t _{RS0} , t _{RS1}		24	ms	From assertion till stable output
Rx_LOS assert delay	t _{los_on}		100	μs	From occurrence of loss of signal to assertion of Rx_LOS
Rx_LOS negate delay	t _{los_off}		100	μs	From occurrence of presence of signal to negation of Rx_LOS

Mechanical Dimensions

Comply with SFF-8432 rev. 5.0, the improved Pluggable form factor specification.



Unit:mm

ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kv for all others electrical input pins, tested per MIL-STD-883, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

Laser Safety

This is a Class 1 Laser Product according to IEC 60825-1:2007.This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007)

Ordering information

Part Number	Product Description
SPT-SFP28-LR	25.78Gbps, 1310nm SFP28 LR 10km, 0°C ~ +70°C

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