

25G SFP28 Active optical cable

Features:

- Electrical interface compliant to SFF-8431
- 850nm VCSEL laser and PIN photo-detector
- Maximum link length of 70m on OM3 MMF and 100m on OM4 MMF
- Digital diagnostics functions are available via the I2C interface
- Operating case temperature
Commercial: 0°C to +70 °C
+3.3V single power supply
- Power consumption less than 1W
- RoHS compliant
- Password protection for A0h and A2h



Applications

- 25GBASE-SR Ethernet
- Servers, switches, storage and host card adapters

Absolute Maximum Ratings

Table1- Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Supply Voltage	V _{CC3}	-0.5	-	+3.6	V	
Storage Temperature	T _s	-10	-	+70	°C	
Operating Humidity	RH	+5	-	+85	%	1

Note: 1 No condensation

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	T _C	0	-	+70	°C	
Power Supply Voltage	V _{CC}	3.14	3.3	3.47	V	
Power Supply Current	I _{CC}	-	-	300	mA	
Power Dissipation	P _d	-	-	1.0	W	
Bit Rate	BR	8.5	25.78125	-	Gbps	
Fiber Bend Radius	R _b	3	-	-	cm	

Electrical Characteristics

Table 3- Electrical Characteristics

Parameter	Symbol	Min.	Typ	Max.	Units	Notes
Transmitter						
Differential Data Input Swing	V _{in,P-P}	200	-	1600	mV _P _P	
Input Differential Impedance	Z _{IN}	90	100	110	Ω	
Normal Operation	V _{OL}	0	-	0.8	V	

Tx_Fault	Transmitter Fault	V_{OH}	2.0	-	V_{CC}	V	
Tx_Disable	Normal Operation	V_{IL}	0	-	0.8	V	
	Laser Disable	V_{IH}	2.0	-	$V_{CC}+0.3$	V	
Receiver							
Differential Data Output		V_{out}	400	-	800	mV	
Output Differential Impedance		Z_D	90	100	110	Ω	
Rx_LOS	Normal Operation	V_{OL}	0	-	0.8	V	
	Lose Signal	V_{oH}	2.0	-	V_{CC}	V	

Optical Characteristics

Table 4-Optical Characteristics

Parameter	Symbol	Unit	Min	Typ	Max	Notes
Optical transmitter Characteristics						
Bit Rate	BR	Gbps	8.5	25.78125	-	
Center Wavelength Range	λ_c	nm	820	850	880	
Average Launch power Tx_off	P _{off}	dBm	-	-	-45	
Launch Optical Power	P ₀	dBm	-6.0		2.4	1
Extinction Ratio	ER	dB	2	-	-	
Spectral Width(RMS)	RMS	nm	-	-	0.65	
Optical Receiver Characteristics						
Bit Rate	BR	Gbps	8.5	25.78125		
Bit Error Rate	BER		-	-	E-12	
Damage threshold	DT	dBm	3.4	-	-	
Overload Input Optical Power	P _{IN}	dBm	2.4	-	-	2

Center Wavelength Range	λ_c	nm	820	-	880	
Receiver Sensitivity in Average Power	Sen	dBm	-	-	-5.2	3
Los Assert	Los A	dBm	-30	-	-	
Los De-Assert	Los D	dBm	-	-	-13	
Los Hysteresis	Los H	dB	0.5			

Note:

1. Coupled into 50/125 MMF.
2. Measured with PRBS $2^{31}-1$ test pattern @25.78125Gbps.BER=E-12
3. BER= 1×10^{-12} ; PRBS $2^{31}-1$ @25.78125Gbps.

Recommended Host Board Power Supply Circuit

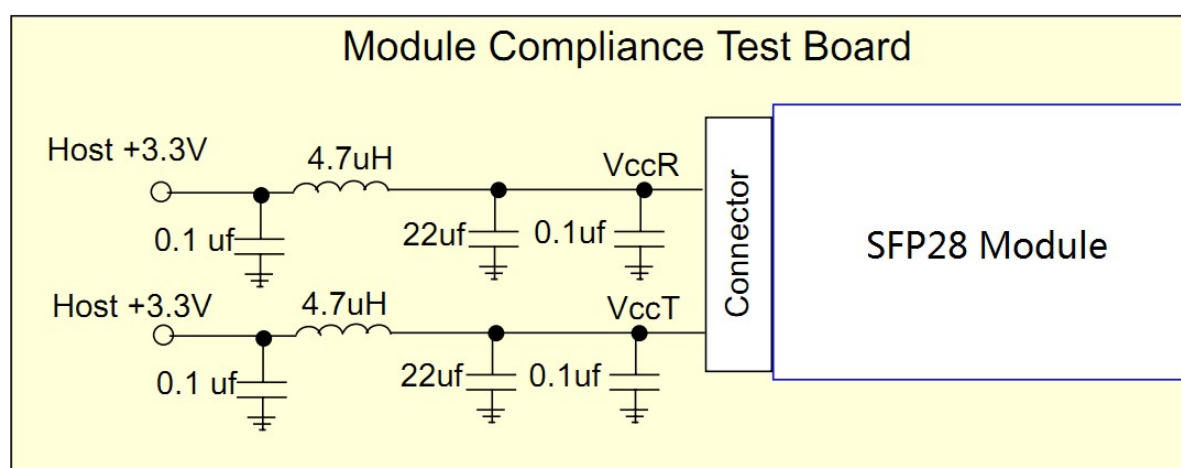


Figure 1, Recommended Host Board Power Supply Circuit

Recommended Interface Circuit

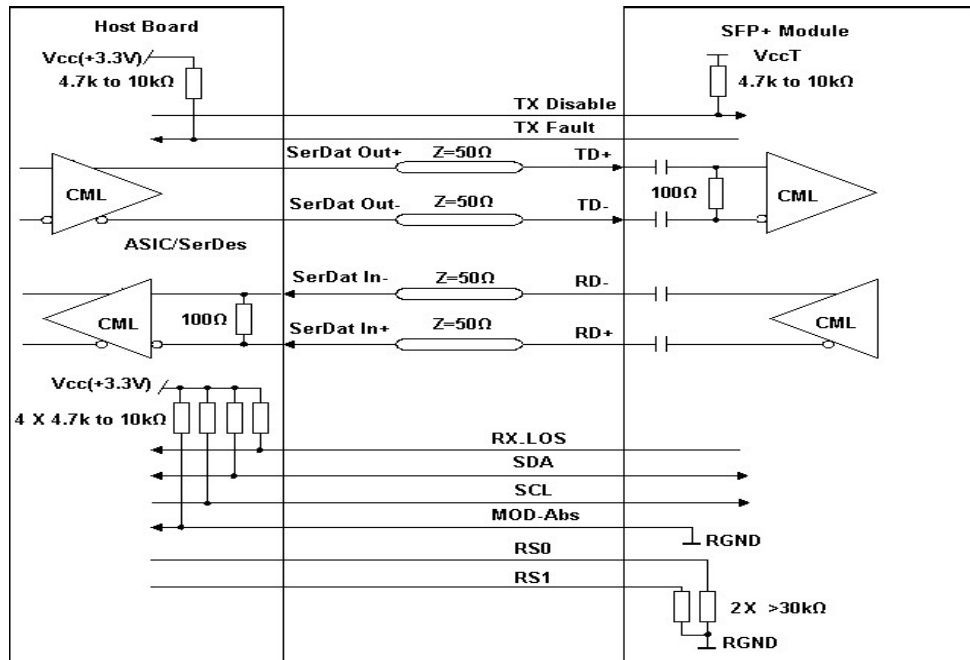


Figure 2, Recommended Interface Circuit

Pin arrangement

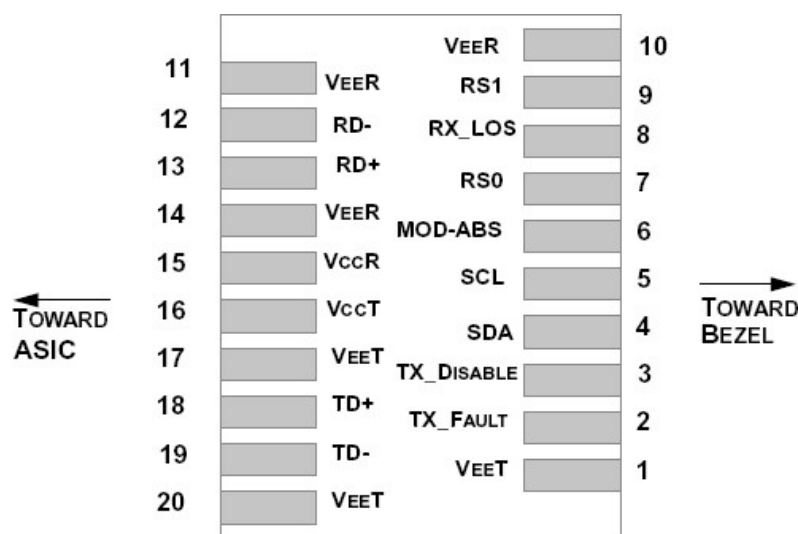


Figure 3, Pin View

Table 5-Pin Function Definitions

Pin	Symbol	Name/Description	Notes
1	VEET	Module Transmitter Ground	1
2	TX_FAULT	Module Transmitter Fault	2
3	TX_DISABLE	Transmitter Disable; Turns off transmitter laser output	3
4	SDA	2-Wire Serial Interface Data Line (MOD-DEF2)	
5	SCL	2-Wire Serial Interface Clock (MOD-DEF1)	
6	MOD_ABS	Module Absent, connected to V _{EE} T or V _{EE} R in the module	2
7	RS0	Rate Select 0, optionally controls SFP+ module receiver	4
8	RX_LOS	Receiver Loss of Signal Indication (In FC designated as Rx_LOS and in Ethernet designated as NOT Signal Detect)	2
9	RS1	Rate Select 1, optionally controls SFP+ module transmitter	4
10	V _{EE} R	Module Receiver Ground	1
11	V _{EE} R	Module Receiver Ground	1
12	RD-	Receiver Inverted Data Output	
13	RD+	Receiver Non-Inverted Data Output	
14	V _{EE} R	Module Receiver Ground	1
15	V _{CC} R	Module Receiver 3.3 V Supply	
16	V _{CC} T	Module Transmitter 3.3 V Supply	
17	V _{EE} T	Module Transmitter Ground	1
18	TD+	Transmitter Non-Inverted Data Input	
19	TD-	Transmitter Inverted Data Input	
20	V _{EE} T	Module Transmitter Ground	1

Note:

1. The module ground pins are isolated from the module case.
2. The pins shall be pulled up with 4.7K-10Kohms to a voltage between 3.14V and 3.46V on host board.
3. The pin is pulled up to VCCT with a 4.7K-10KΩ resistor in the module.

4. See SFF-8472 Rev12.2 Table 10-2.

Monitoring Specification

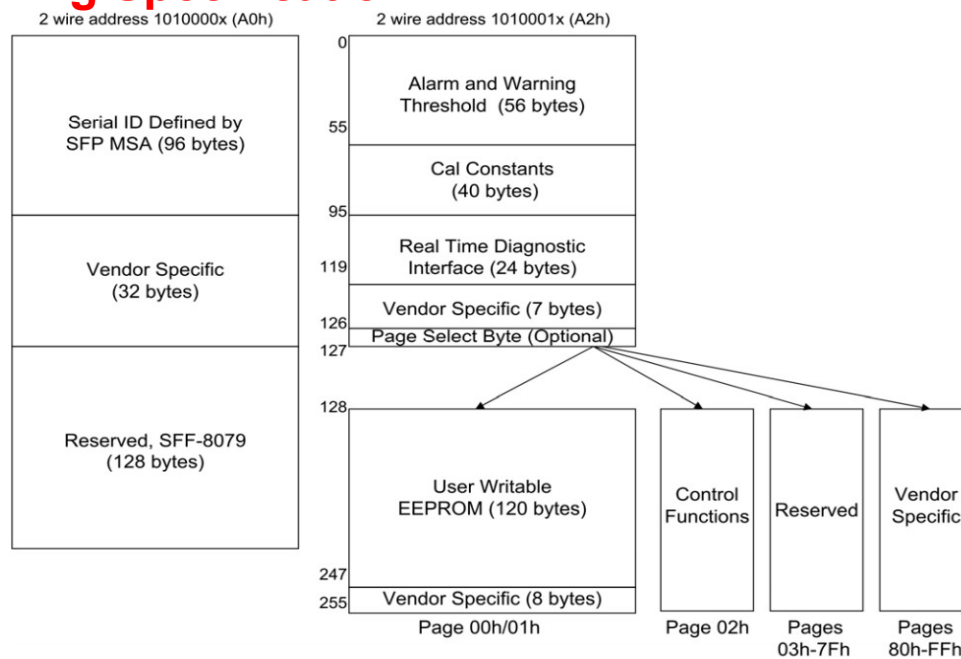


Figure 4, Memory Map

Mechanical Design Diagram

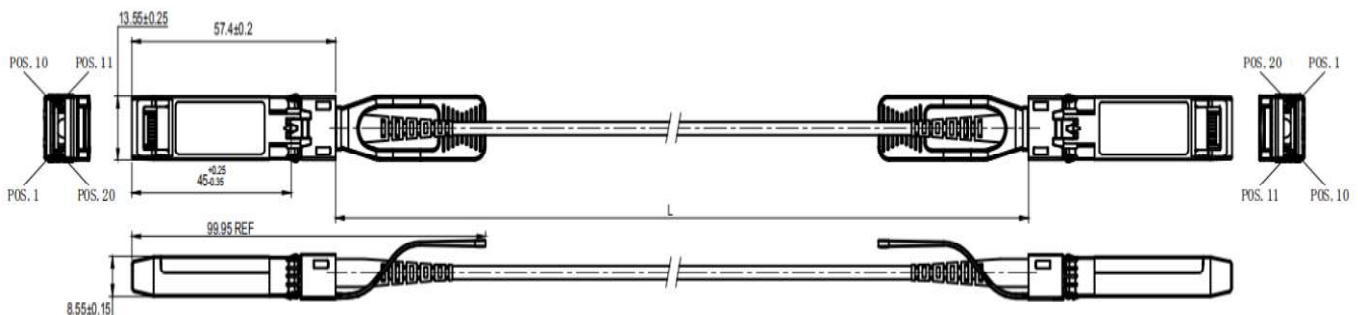


Table 5- Cable Length

Cable Length L (Unit: m)	Tolerant (Unit: cm)
≤ 1.0	+5/-0
$1.0 < L \leq 4.5$	+15/-0
$4.5 < L \leq 14.5$	+30/-0
> 14.5	+2%/-0

Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD).

A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation