

10Gbps SFP+ Optical Transceiver 40Km LC DDM

Features:

- 1550nm EML Transmitter Distance up to 40km over SMF
- Single 3.3V Power supply and LVTTTL Logic Interface Duplex LC Connector Interface Hot Plughole
- Power Dissipation < 1.5 W Dispersion Tolerance 800ps/nm Operating Case Temperature Standard: 0°C~+70°C
- Compliant with SFF-8431 MSA Compliant with SFF-8432 MSA Compliant with SFF-8472 MSA

Applications:

- 10GBASE-ER/EW
- 8G/10G FC
- Other optical links

Absolute Maximum Ratings:

- Table 1- Absolute Maximum Ratings

Parameter	Symbol	Min	Typica	Max	Uni	Note
Storage Temperature	Ts	-40	-	85	°C	
Supply Voltage	Vcc5	-0.5	-	4.0	V	
Operating Humidity	RH	-	-	+85	%	

Recommended Operating Conditions:

- Table 2- Recommended operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Case Temperature	TOP	0		70	°C	
Power Supply Voltage	VCC	3.14	3.3	3.46	V	
Power Supply Current	ICC	-	-	450	mA	
Power Dissipation	PD	-	-	1.5	W	
Data Rate	BR	9.95		11.3	Gbps	

Electrical Characteristics:

- Table 3- Electrical Characteristics

Transmitter						
Parameter	Symbol	Uni	Min.	Ty	Max.	Note
Differential Data Input swing	V _{in,p-}	mV	180	-	700	
Input Differential impedance	Z _{in}	Ω	85	10	115	
Tx Disable Down/RST	V _{IL}	V	-0.3		0.8	
	V _{IH}	V	2.0	-	V _{cc+}	
Receiver						
Differential Data Output	V _{out}	mV	300		850	
Output Differential impedance	Z _{in}	Ω	80	10	120	
Output Rise Time,20%-80%	Tr	Ps	28			
Output Fall Time,20%-80%	Tf	Ps	28			
Rx_Los,Mod_NR,Interrupt	VoL	V	0		0.4	
	VoH	V	V _{cc-}		V _{cc+}	



Transmitter Performance :

- Table 4- optical TX Characteristics

Parameter	Symb	Mi	Typi	Max.	Uni	No
Average Launch Optical Power	Pout	-4	-	+4	dB	1
Extinction Ratio	ER	8.2	-	-	dB	2
Average Launch power of OFF	Poff	-	-	-30	dB	1
Optical Wavelength	λ	153	-	1565	nm	
Dispersion penalty@9.95/10.7Gpbs	DP1	-	-	2	dB	2
Dispersion penalty@11.1/11.3Gpbs	DP2	-	-	3	dB	3
Side Mode Suppression Ratio	SMS	30	-	-	dB	

Receiver Performance :

- Table 5- optical RX Characteristics

Parameter	Symbol	Mi	Typi	Max	Un	No
Receiver Sensitivity @9.95Gpbs/10.7Gpbs	PIN_SE	-	-	-16	dB	2
Receiver Sensitivity @11.1Gpbs/11.3Gpbs	PIN_SE	-	-	-14	dB	3
Overload	PIN_OL	-	-		dB	3
Optical Center Wavelength	λ_C	126	-	1600	nm	
LOS	LOSA	-30	-	-	dB	
	LOSD	-	-	-18	dB	
Los hysteresis	LOSH	0.5	-		dB	
Rx_LOS	High	2.0		Vcc	V	
	Low	0		0.8	V	

Note:

- The optical power is launched into SMF.
- Measured with a PRBS 231-1 test pattern @9.95Gbps.
- Measured with a PRBS 231-1 test pattern , @11.1Gbps. BER≤10-12.

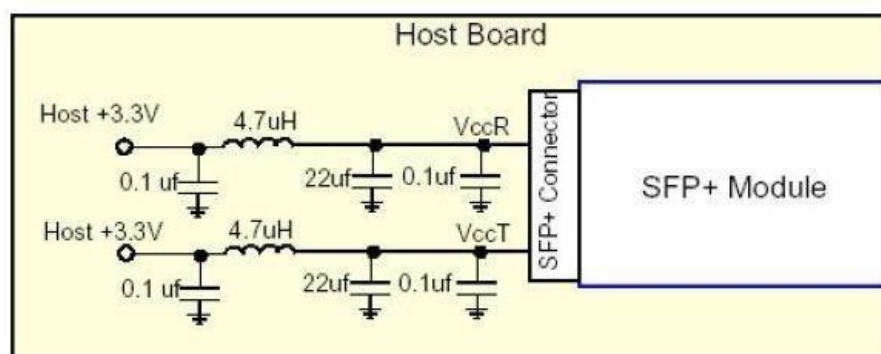
Recommended Host Board Power Supply Circuit:

Figure 1, Recommended Host Board Power Supply Circuit



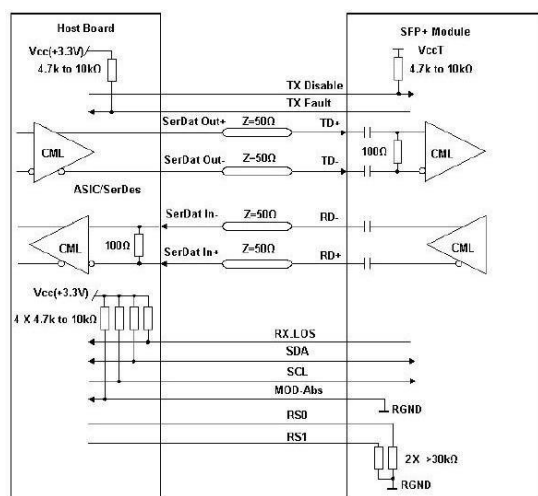
Recommended Interface**Circuit Pin arrangement:**

Figure 2, Recommended Interface Circuit

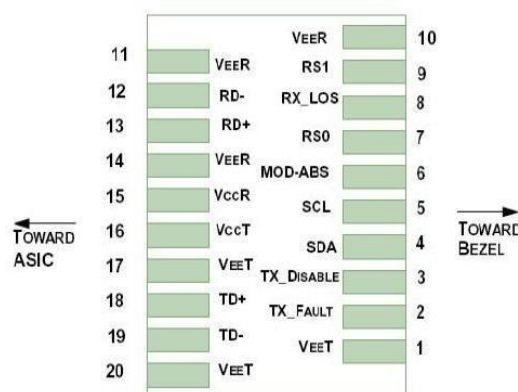


Figure 3, Pin View

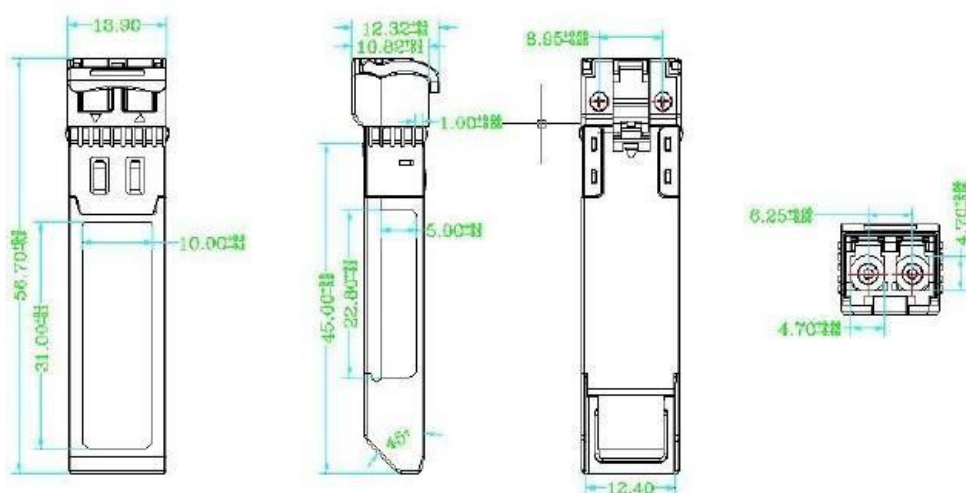
Table 6-Pin Function Definitions:

Ti	Name	FUNCTION	Plug	Notes
1	VeeT	Transmitter Ground	1	Note 5
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disab	Transmitter Disable	3	Note 2, Module disables on high
4	SDA	Module Definition 2	3	2-wire Serial Interface Data Line.
5	SCL	Module Definition 1	3	2-wire Serial Interface Clock.
6	MOD_A	Module Definition 0	3	Note 3
7	RS0	RX Rate Select (LVTTL).	3	Rate Select 0, optionally controls SFP+module receiver. This pin is pulled low to VeeT with a >30K resistor
8	LOS	Loss of Signal	3	Note 4
9	RS1	TX Rate Select (LVTTL).	1	Rate Select 1, optionally controls SFP+module transmitter. This pin is pulled low to VeeT with a >30K
10	VeeR	Receiver Ground	1	Note 5
11	VeeR	Receiver Ground	1	Note 5
12	RD-	Inv. Received Data Out	3	Note 6
13	RD+	Received Data Out	3	Note 6
14	VeeR	Receiver Ground	1	Note 5
15	VccR	Receiver Power	2	3.3 ± 5%, Note 7
16	VccT	Transmitter Power	2	3.3 ± 5%, Note 7
17	VeeT	Transmitter Ground	1	Note 5
18	TD+	Transmit Data In	3	Note 8
19	TD-	Inv. Transmit Data In	3	Note 8
20	VeeT	Transmitter Ground	1	Note 5



Note:

1. TXFault is an open collector/drain output, which should be pulled up with a 4.7K – 10K Ω resistor on the host board. Pull up voltage between 2.0V and VccT/R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.
2. TXDisable is an input that is used to shut down the transmitter optical output. It is pulled up with the module with a 4.7K – 10K Ω resistor. Its states are: Low (0 – 0.8V): Transmitter on (>0.8, <2.0V Undefined High (2.0 – 3.465V): Transmitter Disabled Open: Transmitter Disabled 3. Module Absent, connected to VeeT or VeeR in the module.
3. LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K – 10K Ω resistor. Pull up voltage between 2.0V and VccT/R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.
5. The module signal ground contacts, VeeR and VeeT, should be isolated from the module case. 6. RD-/+ : These are the differential receiver outputs. They are AC coupled 100 Ω differential lines which should be terminated with 100 Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 350 and 700 mV differential (175 – 350 mV single ended) when properly terminated.
7. VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V $\pm$ 5% at the SFP+ connector pin. Maximum supply current is 725mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1 ohm should be used in order to maintain the required voltage at the SFP+ input pin with 3.3V supply voltage. When the recommended supply-filtering network is used, hot plugging of the SFP+ transceiver module will result in an inrush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP+ transceiver module.
8. TD-/+ : These are the differential transmitter inputs. They are AC-coupled, differential lines with 100 Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 150 – 1200 mV (75 – 600 mV single-ended).

Mechanical Dimension:**Order Information:**

Part Number	Product Description
10GDF1310-40LAT	SFP+ 1550nm 40km LC DDM

