25G SFP28 CWDM Duplex LC 10km

HSFP28-LR

Product Features

- Supports up to 25.78Gbps bit rates
- Up to 10km on 9/125μm SMF
- Electrical interface specifications per SFF-8472
- Duplex LC connector
- Single +3.3V DC power supply
- Hot-pluggable SFP+ footprint
- Real Time Digital Diagnostic Monitoring
- Low EMI standard metal housing, featuring a latch to secure the connector
- Class 1 laser safety certified
- Operating temperature 0~+70℃
- RoHS Compliant

Applications

- 25GBASE-LR/LW
- CPRI/eCPRI

Descriptions

HSFP28-LR 25G SFP28 transceivers are designed for 24.33Gbps and 25.78Gbps data rate over SMF and support up to 10km link length. The transceiver consists of 25Gbit/s DFB optical transmitter and PIN receiver. The transceiver compliant to IEEE802.3by, IEEE802.3cc, SFF-8402, SFF-8432. Digital diagnostic monitoring interface compliant to SFF-8472 is available via an I2C interface.

Ordering Information

Part Number	Transmitter	Output Power	Sensitivity	Reach	Temp	DDM	RoHS
HSFP28-LR	1260-1380	0~7dBm	≤-13dBm(5E-5)	10km	0~70°C	Available	Compliant

Pin Description

Pin	Name	Function/Description	Engagement order (Insertion)	Notes
1	VeeT	Transmitter Ground	1	-
2	TX Fault	Transmitter Fault Indication	3	1
3	TX Disable	Transmitter Disable-Module disables on high or open	3	2
4	SDA	2-wire Serial Interface Data Line (Same as MOD-DEF2 as defined in the INF-8074i)	3	3
5	SCL	2-wire Serial Interface Clock (Same as MOD-DEF1 as defined in the INF-8074i)	3	3
6	MOD-ABS	Module Absent, connected to VeeT or VeeR in the module	3	3

7	RS0	Receiver Rate Select	3	-
8	LOS	Loss of Signal	3	4
9	RS1	Transmitter Rate Select (not used)	1	-
10	VeeR	Receiver Ground	1	-
11	Veer	Receiver Ground	1	-
12	RD-	Inverse Received Data out	3	5
13	RD+	Received Data out	3	5
14	VeeR	Receiver Ground	1	-
15	VccR	Receiver Power - +3.3V±5%	2	6
16	VccT	Transmitter Power - +3.3 V±5%	2	6
17	VeeT	Transmitter Ground	1	-
18	TD+	Transmitter Data In	3	7
19	TD-	Inverse Transmitter Data In	3	7
20	VeeT	Transmitter Ground	1	-

Notes:

1. TX Fault is open collector/drain output which should be pulled up externally with a 4.7KΩ-10KΩ resistor on the host board to supply < VccT +0.3V or VccR + 0.3V. When high, this 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. TX Disable input is used to shut down the laser output per the state table below. It is pulled up within the module with a 4.7KΩ-10KΩ resistor.

   Low (0 – 0.8V): Transmitter on
   Between (0.8V and 2V): Undefined
   High (2.0 – VccT): Transmitter Disabled
   Open : Transmitter Disabled

3. Mod-Def 0, 1, 2. These are the module definition pins. They should be pulled up with a 4.7KΩ-10KΩ resistor on the host board to supply less than VccT+0.3V or VccR+0.3V.
   Mod-Def 0 is grounded by the module to indicate that the module is present.
   Mod-Def 1 is clock line of two wire serial interface for optional serial ID.
   Mod-Def 2 is data line of two wire serial interface for optional serial ID.
4. LOS (Loss of signal) is an open collector/drain output which should be pulled up externally with a 4.7KΩ-10KΩ resistor on the host board to supply <VccT+0.3V or VccR+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. RD-/+: These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω differential at the user SERDES. The AC coupling is done inside the module and thus not required on the host board.

6. VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V±5% at the SFP connector pin. The in-rush current will typically be no more than 30mA above steady state supply current after 500ns.
7. TD-/+: These are the differential transmitter inputs. They are AC coupled differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on host board.

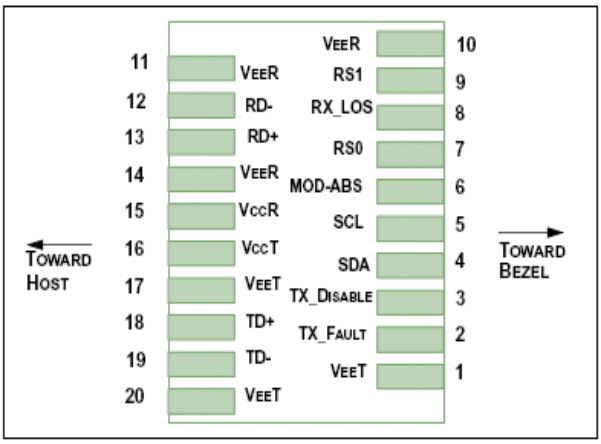


Figure 1. Diagram of Host Board Connector Block Pin Numbers and Names

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Parameter	Symbol	Minimum	Maximum	Unit
Storage Temperature	T_S	-40	85	°C
Relative Humidity	RH	5	95	%
Supply Voltage	V_{CC}	-0.5	4.0	V

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T_C	0	25	70	°C
Supply Voltage	V_{CC}	3.135	3.3	3.465	V
Total power Consumption	Pd			1.5	W
Data Rate	-		25.78125		Gbps

Transceiver Electrical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Module Supply Current	Icc	-	-	450	mA	-
Transmitter Differential Input Voltage (TD +/-)	-	300	-	1100	mV_{P-P}	1
Receiver Differential Output Voltage (RD +/-)	-	500	-	800	mV_{P-P}	2
Low speed output: Transmitter Fault(TX_FAULT) / Loss of Signal (LOS)	VOH	2.0	-	Vcc	V	3
	VOL	0	-	0.8	V	-
Low speed iutput: Transmitter Disable (TX_DISABLE), MOD_DEF 1, MOD_DEF 2	VIH	2.0	-	Vcc	V	4
	VIL	0	-	0.8	V	-

Notes:

1. Internally AC coupled and terminated to 100Ω differential load.
2. Internally AC coupled, but requires a 100Ω differential termination or internal to Serializer/Deserializer.
3. Pulled up externally with a 4.7KΩ-10KΩ resistor on the host board to $V_{CCT,R}$.
4. Mod_Def1 and Mod_Def2 must be pulled up externally with a 4.7KΩ-10KΩ resistor on the host board to $V_{CCT,R}$.

Transmitter Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Launch Optical Power	Po	0	-	7	dBm	-
Center Wavelength Range	λc	1260	-	1380	nm	-
Extinction Ratio	ER	3.5	-	-	dB	-
Side Mode Suppression Rati	SMSR	30			nm	
Spectral Width (-20dB)	Δλ	-	-	1	nm	
Optical Rise/Fall Time	T_{rise}/T_{fall}	-	-	50	ps	-
Pout @TX-Disable Asserted	P_{off}	-	-	-30	dBm	-
Eye Diagram	{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}					

Receiver Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Wavelength Range	λc	1260	-	1620	nm	-
Receiver Sensitivity	Sen	-	-	-13	dBm	-
Receiver Overload	P_{OL}	2.5	-	-	dBm	-
LOS De-Assert	LOS_D		-	-17	dBm	-
LOS Assert	LOS_A	-30	-	-	dBm	-
LOS Hysteresis	-	0.5	-	-	dB	-

Digital Diagnostic Memory Map

The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).The diagnostic information with internal calibration or external calibration all are implemented, including received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring. The digital diagnostic memory map specific data field defines as following.

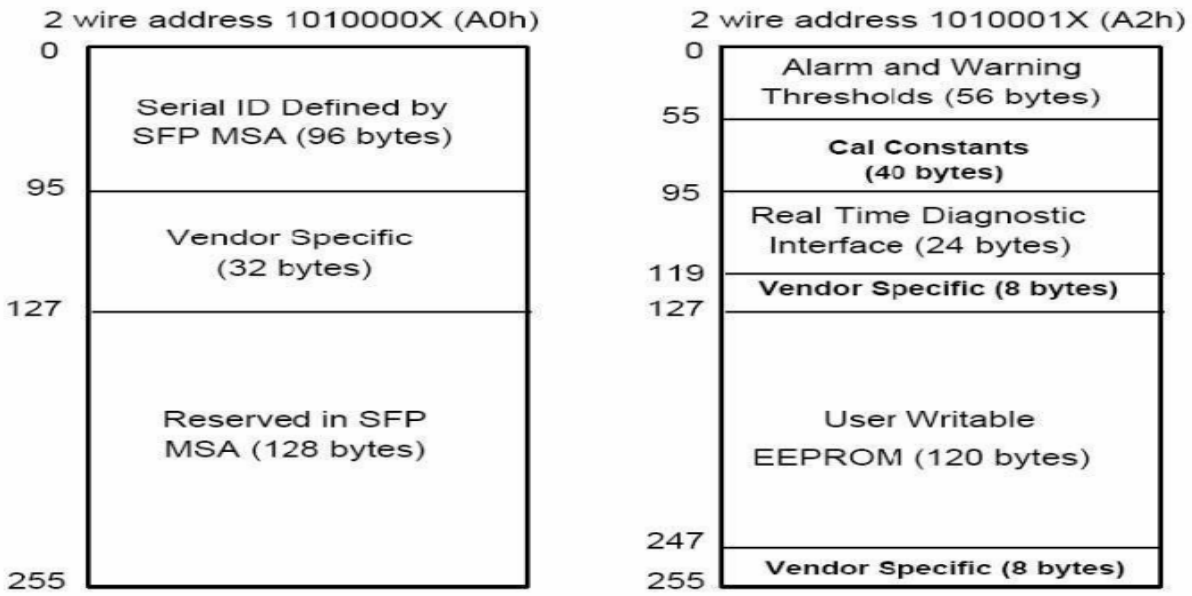
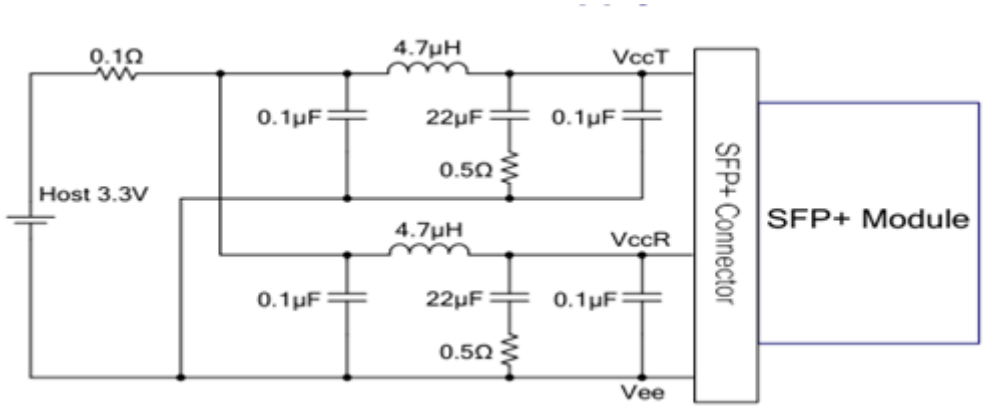


Figure 2. Digital Diagnostic Memory Map Specific Data Field Descriptions

- ## Host Board Power Supply Filter Network



Mechanical specifications

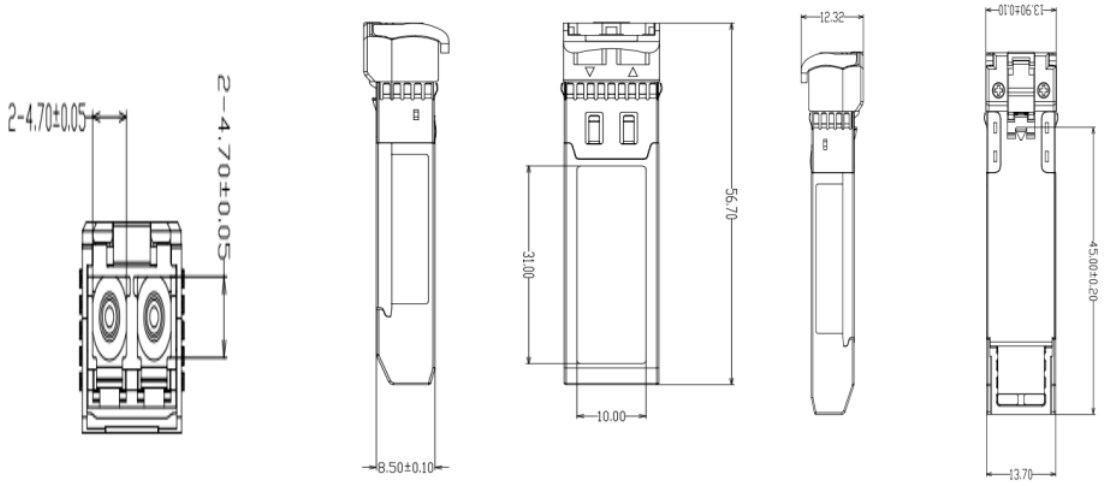


Figure 3. Outline Drawing