

25Gb/s SFP28 LR 1310nm 10km Optical Transceiver

Features

- Up to 10KM transmission distance
- Support Multi Rate 9.8304~25.78125Gbps
- 1310nm DFB and PIN receiver
- SFI electrical interface
- 2-wire interface for integrated Digital Diagnostic monitoring
- SFP+ MSA package with duplex LC connectors
- Hot pluggable
- Very low EMI and excellent ESD protection
- +3.3V power supply
- Power consumption less than 1.0 W
- Operating case temperature: 0~70°C

Applications

- 25Gbps Ethernet
- CPRI

Compliance

- Compliant with IEEE 802.3cc
- Compliant with FCC 47 CFR Part 15, Class B
- Compliant with MSA SFF-8472
- Compliant with MSA SFF-8431

Description

The SFP-25G-LR is a high performance, cost effective modules, which is supporting Multi Rate 9.83~25.78Gbps, and transmission distance up to 10km on SM fiber. The transceiver consists of two sections: The transmitter section incorporates a 1310nm DFB Laser, a driver and a CDR. The receiver section consists of a PIN photodiode integrated with a trans-impedance preamplifier (TIA), a Limiting Amplifier and CDR. The module is hot pluggable with a 20-pin connector. The high-speed electrical interface is base on low voltage logic, with nominal 100 Ohms differential impedance and AC coupled in the module.

The optical output can be disabled by the LVTTTL logic high-level input on TX_DIS pin. Transmit Fault (Tx_Fault) is provided to indicate that the module transmitter has detected a fault condition related to laser operation or safety. Loss of signal (RX_LOS) output is provided to indicate the loss of an input optical signal in receiver.

A serial EEPROM in the transceiver allows the user to access transceiver monitoring and configuration data via the 2-wire SFP Management Interface. Digital diagnostics function are available via a 2-wire serial interface, as specified in SFF-8472.

Absolute Maximum Ratings

Table1-Absolute Maximum Ratings				
Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T _s	-40	85	°C
Supply Voltage (no damaged)	V _{CC3}	-0.5	3.63	V
Relative Humidity(non-condensing)	RH		85	%
RX Input OMA Power	P _{max}	3		dBm

Recommended Operating Conditions

Table2-Recommended Operating Conditions					
Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	T _c	0	25	70	°C
Power Supply Voltage	V _{CC3}	3.135	3.3	3.465	V
	I _{CC3}			300	mA
Maximum sustained peak Current(<500ms)				330	mA
Maximum Instantaneous peak current(<50us)				400	mA
Electro-Static discharge	ESD	1000			V
Power Dissipation	P _D			1	W
Data Rate(NRZ)		9.8304	24.33024	25.78125	Gbps
Transmission Distance				10	Km

Optical,Electrical Characteristic

SFP-25G-LR (1310nm DFB and PIN, 10Km)

Tested under recommended operating conditions, unless otherwise noted.

Table3-Transmitter Operating Characteristic-Optical, Electrical

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Optical Interface Parameters						
Centre Wavelength	λ_c	1295	1310	1325	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Spectral Width[20dB]	Pm			1	nm	
Laser Off Power	Poff			-30	dBm	
Average Optical Power	Pavg	-2		4	dBm	
OMA	P _{OMA}	-4		2.2	dBm	
Extinction Ratio	ER	3.5			dB	
Transmitter Dispersion Penalty				2.7	dB	
Relative Intensity Noise	Rin			-130	dB/Hz	
Optical Return Loss Tolerance				20	dB	
Operating Data Rate		9.8304	24.33024	25.78125	Gbps	Note1
Optical Eye Mask Margin		→5%				Note 2
Optical Eye Mask Definition {X1,X2,X3,Y1,Y2,Y3}, 25Gbase_LR		{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}				
Electrical Interface Parameters						
Tx Input Diff Voltage	VI	180	500	900	mV	
Eye Height @ BER=1e-15	EH15	95			mV	
Eye width @ BER=1e-15	EW15	0.46			UI	
Tx Fault	VOL			0.4	V	At 0.7mA
	VOH	VccT-0.4				Note3

Notes:

- [1] Under CDR bypass mode, 9.8304Gbps,10.1376Gbps,10.3125Gbps compatibility
- [2] 500 consecutive snapshots at typical rate and room temperature, PRBS31 NRZ,
- [3] 25GBase_LR mask and filter, Hit ratio meet the standard 5E-5 for 24.33024Gbps, 25.78125Gbps
- [4] 10GBase_LR mask and filter, Hit ratio meet the standard 1E-12 for 9.8304Gbps, 10.1376Gbps, 10.3125Gbps
- [5] Measured with a 4.7k Ohm load pulled up to V_{cc}.

Table4-Receiver Operating Characteristic-Optical, Electrical

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Optical Interface Parameters						
Center Wavelength	λ_r	1295	1310	1325	nm	
Receiver Stress Sensitivity, OMA				-8.8	dBm	
Receiver Sensitivity, Average Power				-14	dBm	Note 1

Receiver Sensitivity, OMA				-12	dBm	Note 1
LOS Assert	LosA	-30			dBm	
LOS Dessert	LosD			-16	dBm	
LOS Hysteresis	LosH	0.5			dB	
Saturation Input Power	Pin	2			dBm	
Receiver Reflectance				-26	dB	
Electrical Interface Parameters						
Operating Data Rate		9.8304	24.33024	25.78125	Gbps	Note 2
Rx Output Diff Voltage	Vo	450	600	750	mV	Note 3
Rx Output Rise and Fall Time	Tr/Tf	9.5			ps	20% to 80%
Eye Height @ BER=1e-15	EH15	228			mV	Note 3
Eye Width @ BER=1e-15	EW15	0.57			UI	Note 3
Vertical Eye Closure	Vc			5.5	dB	Note 3
RX LOS enable/disable				Enable		Note4
LOS Criterion				Average power		

Notes:

- [1] Measured with 25.78125Gb/s, 24.33024Gb/s, PRBS-31 NRZ, ER > 3.5dB, 1295~1325nm, BER < 5E-5 Measured with 9.8304Gb/s, 10.1376Gb/s, 10.3125Gb/s, PRBS-31 NRZ, ER > 3.5dB, 1295~1325nm, BER < 1E-12
- [2] Under CDR bypass mode, 9.8304Gb/s, 10.1376Gb/s, 10.3125Gb/s compatibility
- [3] PRBS31 Pattern with Default Emphasis 1dB at 24.33024Gbps and 25.78125Gbps; when data rate turns to 9.8304Gbps, 10.1376Gbps, 10.3125Gbps application, the output emphasis automatically change to 0 dB.
- [4] Rx Output Squelched on LOS.

Pin Description

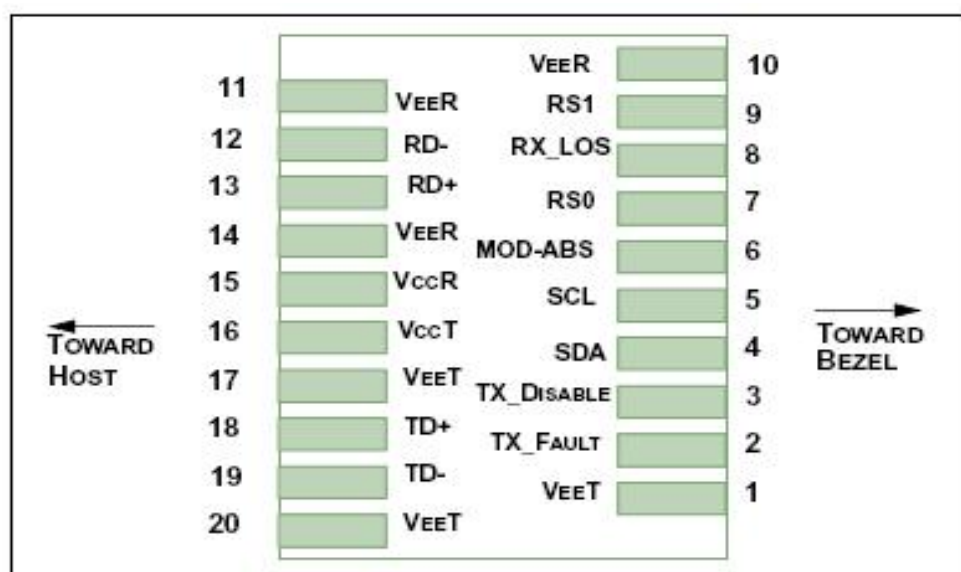


Figure1 Pin view

Pin Function Definitions

Table5-Pin Function Definitions

Pin	Logic	Symbol	Name/Description	Note
1		VeeT	Module Transmitter Ground	1
2	LVTTL-O	TX_Fault	Module Transmitter Fault	2
3	LVTTL-I	TX_Disable	Transmitter Disable; Turns off transmitter laser output	3
4	LVTTL-I/O	SDA	2-wire Serial Interface Data Line (Same as MOD-DEF2 as defined in the INF-8074i)	4
5	LVTTL-I/O	SCL	2-wire Serial Interface Clock (Same as MOD-DEF1 as defined in the INF-8074i)	4
6		MOD_ABS	Module Absent, connected to VeeT or VeeR in the module	5
7	LVTTL-I	RS0	Rate Select 0, optionally controls SFP+ module receiver.	6
8	LVTTL-O	RX_LOS	Receiver Loss of Signal Indication (In FC designated as RX_LOS, in SONET designated as LOS, and in Ethernet designated at Signal Detect)	2
9	LVTTL-I	RS1	Rate Select 1, optionally controls SFP+ module transmitter	6
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 Non-Inverted Data Output	
14		VeeR	Module Receiver Ground	1
15		VccR	Module Receiver 3.3 V Supply	
16		VccT	Module Transmitter 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

[1] The module signal ground pins, VeeR and VeeT, shall be isolated from the module case.

[2] This pin is an open collector/drain output pin and shall be pulled up with 4.7k-10kohms to Host_Vcc on the host board. Pull ups can be connected to multiple power supplies, however the host board design shall ensure that no module pin has voltage exceeding module VccT/R + 0.5 V.

[3] This pin is an open collector/drain input pin and shall be pulled up with 4.7k-10kohms to VccT in the module.

[4] See SFF-8431 4.2 2-wire Electrical Specifications .

[5] This pin shall be pulled up with 4.7k-10kohms to Host_Vcc on the host board.

[6] RS0 and RS1 are module inputs and are pulled low to VeeT with 30 kΩ resis-tors in the module.

Monitoring Specification

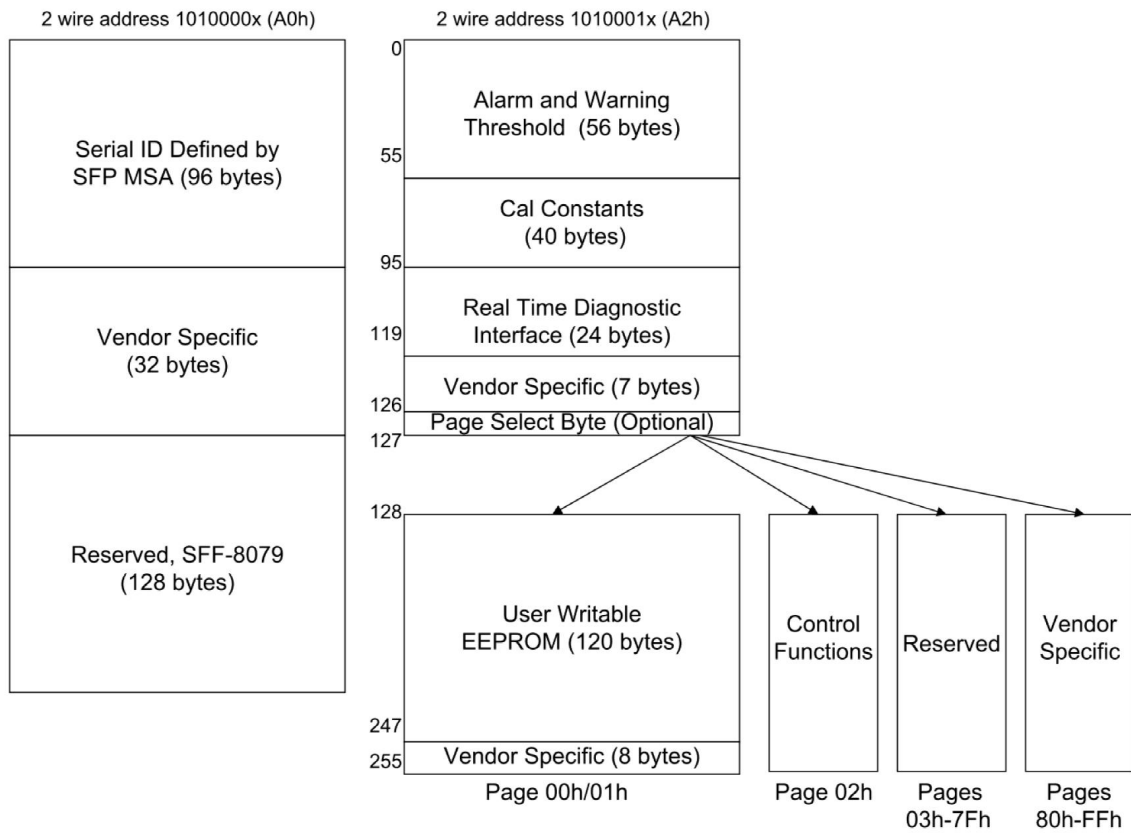


Figure2 Memory map