

SFP28-25G-LR

Optical SFP Module

25Gbps SFP28 LR Transceiver, SM, 1310nm, 10km



Features

- Supports 25Gbps data rate
- 1310nm DFB laser and PIN photo-detector
- Maximum link length of 10km
- Duplex LC receptacle optical interface compliant
- Internal CDR on both Transmitter and Receiver channel
- Hot-pluggable SFP28 form factor
- Digital diagnostics functions are available via the I2C interface
- Single +3.3V power supply
- Power dissipation < 1.5W
- Compatible with RoHS
- Operating temperature range:
 - Commercial: 0°C to +70°C
 - Industrial: -40°C to +85°C

Application

- 25GBASE-LR Ethernet

Standard

- Compliant with MSA SFP+ specification(SFF-8431)
- Compliant with SFF-8472
- Compliant with IEEE 802.3ae

Description

The SFP28 LR transceivers are high performance, cost effective modules supporting data rate of 25Gbps and 10km transmission distance with SMF.

The SFP28 transceiver adopts LC connectors, reaching a link up to 10km over SMF. All modules satisfy class I laser safety requirements.

The transceivers are compatible with IEEE 802.3ae standard and SFF-8431 specification.

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	0	3.6	V
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	5	95	%

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature (Commercial)	Tc	0		+70	°C
Operating Case Temperature (Industrial)	Tc	-40		+85	°C
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Power Supply Current	Icc			450	mA
Data Rate		-	25.78	28.05	Gbps
Fiber Length on SMF				10	KM

Optical Characteristics

Optical transmitter Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Launched Power (avg.)	P _{out}	-5		2	dBm	
Operating Wavelength Range	λ_c	1290	1310	1330	nm	
Spectral Width (-20dB)	σ			1	nm	
Extinction Ratio	ER	3.5			dB	
Side Mode Suppression Ratio	SMSR	30			dB	
Differential data input swing	V _{IN,PP}	180		700	mV	
Input Differential Impedance	Z _{IN}	90	100	110	Ω	
TX Disable	Disable	2.0		V _{cc}	V	
	Enable	0		0.8	V	
TX Fault	Fault	2.0		V _{cc}	V	
	Normal	0		0.8	V	
Output Eye Diagram	Complies with IEEE802.3z eye masks when filtered					
Optical receiver Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Receiver Sensitivity	S			-13	dBm	1
Receiver Overload	P _{max}	0.5			dBm	
Wavelength Range	λ_c	1260	1310	1360	nm	
LOS	Optical De-assert	P _d		-13	dBm	
	Optical Assert	P _a	-30			
LOS	High	2.0		V _{cc}	V	
	Low			0.8	V	
LOS hysteresis		0.5			dB	
Differential data output swing	V _{out,PP}	300		900	mV	
Receiver Sensitivity	S			-13	dBm	1

Timing and Electrical

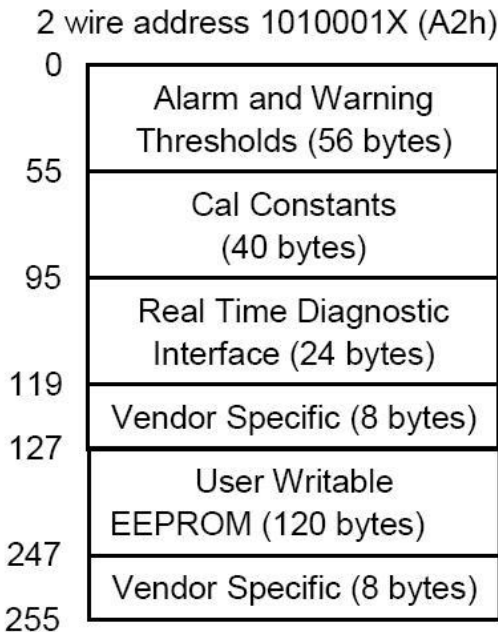
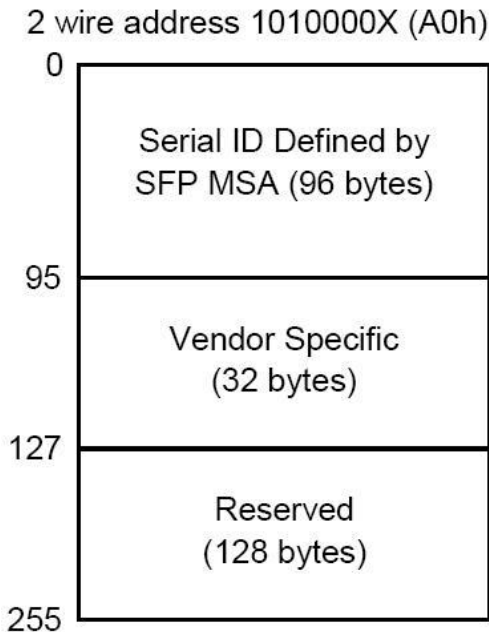
Parameter	Symbol	Min	Max	Unit	Conditions
Tx-Disable assert time	T_off		100	us	Rising edge of Tx_Disable to fall of output signal below 10% of nominal
Tx-Disable negate time	T_on		2	ms	Falling edge of Tx_Disable to rise of output signal above 90% of nominal,this is only applies in normal operation,ont 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
Time to initialize	T_start_up		300	ms	From power supplies meeting hot plug or Tx disable negated during power up ,or Tx_Fault recovery,unitl non-cooled power level I part is full 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 hot plug or Tx disable negated during power up ,or Tx_Fault recovery,unitl non-cooled power level I part is full operational.Also,from stoop 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 opertational.
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		us	Time Tx_Disable must be held high to reset Tx_Fault.
RSO,RSI rate select timing for FC	T_RSO_FC, T_RSI_FC		500	us	From assertion till stable output
RSO,RSI rate select timing non FC	T_RSO,T_RSI		24	ms	From assertion till stable output
Rx_LOS assert delay	T_los_on		100	us	From occurrence of loss of signal to assertion of Rx_LOS
Rx_LOS assert delay	T_los_off		100	us	From occurrence of loss of signal to negation of Rx_LOS

Digital Diagnostic Memory Map

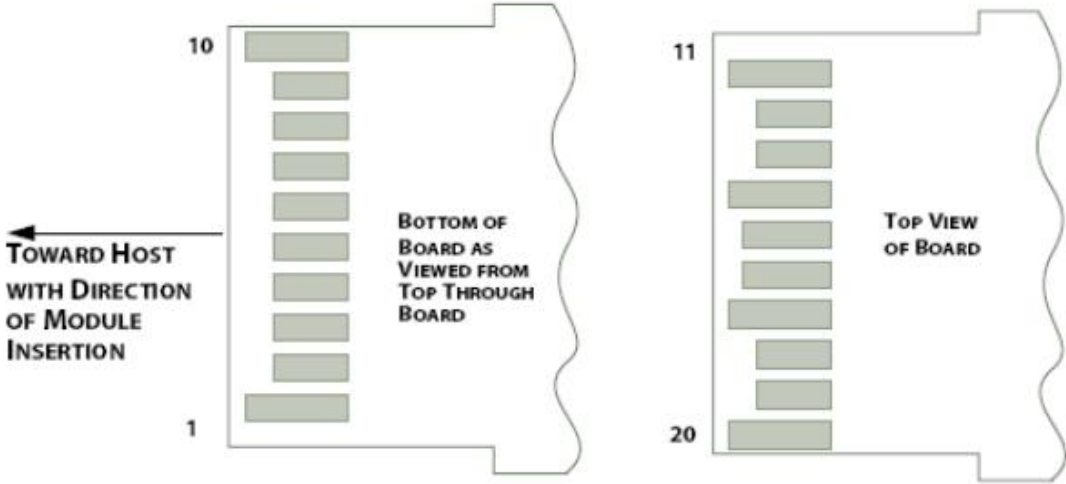
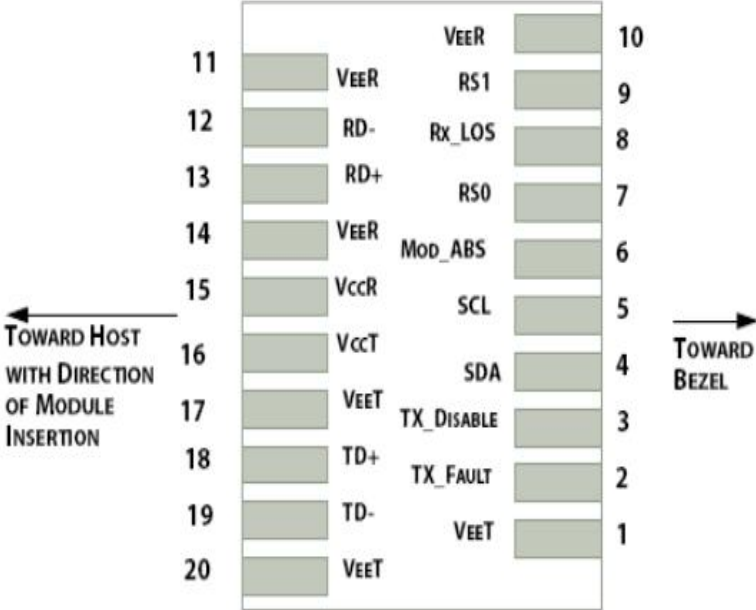
The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

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.



Pin Definitions



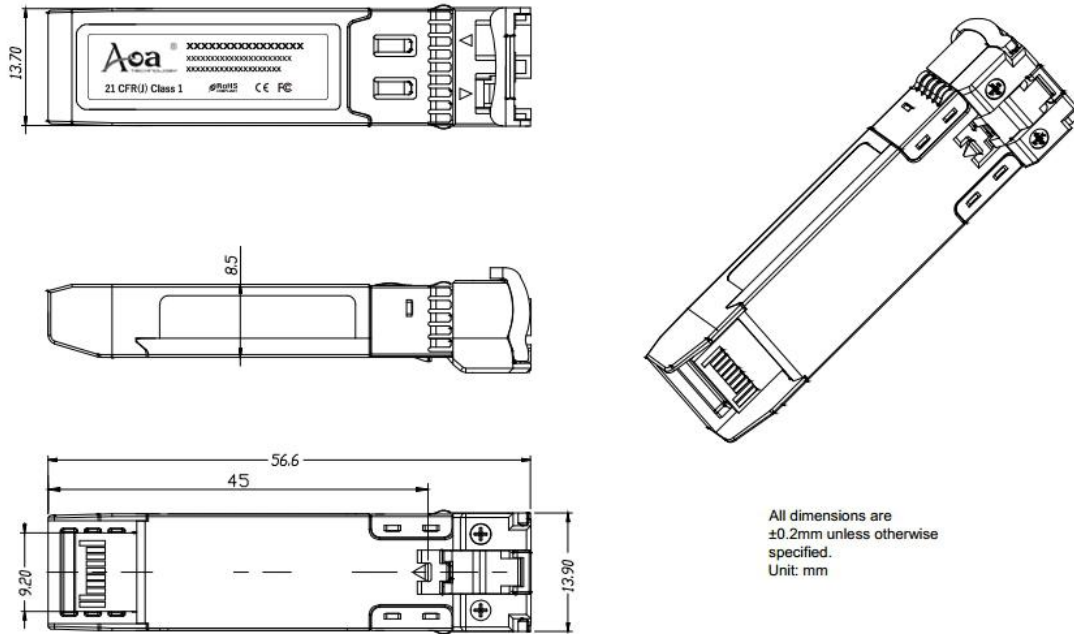
Pin	Name	Function/Description	Logic	Note
1	VeeT	Transmitter Ground		1
2	TX_Fault	Transmitter Fault	LVTTL-O	2
3	TX_Disable	Transmitter Disable. High: Transmitter off; Low: Transmitter on	LVTTL-I	
4	SDA	2-Wire Serial Interface Data Line	LVTTL-O/I	2
5	SCL	2-Wire Serial Interface Clock	LVTTL-I	2
6	Mod_ABS	Module Absent, Connect to VeeT or VeeR in Module		
7	RS0	Rate Select 0, optionally controls SFP module receiver	LVTTL-I	
8	RX_LOS	Receiver Loss of Signal indication. High: loss of signal; Low: signal detected	LVTTL-O	
9	RS1	Rate Select 1, optionally controls SFP module transmitter	LVTTL-I	
10	VeeR	Receiver Ground		1
11	VeeR	Receiver Ground		1
12	RD-	Receiver Inverted Data Output	CML-O	
13	RD+	Receiver Data Output	CML-O	
14	VeeR	Module Receiver Ground		1
15	VccR	Receiver Power 3.3V Supply		
16	VccT	Transmitter Power 3.3V Supply		
17	VeeT	Module Transmitter Ground		1
18	TD+	Transmitter Non-Inverted Data Input	CML-I	
19	TD-	Transmitter Inverted Data Input	CML-I	
20	VeeT	Module Transmitter Ground		1

Notes:

Module ground pins GND are isolated from the module case.

Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.45V on the host board.

Mechanical Dimensions



Ordering information

Part. No	Specifications								
	Pack	Rate (Gbps)	Tx (nm)	Po (dBm)	RX	Sen (dBm)	Temp (°C)	Reach (km)	DDM
SFP28-25G-LR	SFP	25.78	1310	-5~2	PIN	<-13	0~70	10	Y
SFP28-25G-LRI	SFP	25.78	1310	-5~2	PIN	<-13	-40~85	10	Y



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