Product Specification

25Gb/s SFP28 LAN-WDM APD Transceivers

LWDM-SFP28-ER-XX

Features

- Compliant to SFP28 MSA
- Fully RoHS Compliant
- All metal housing for superior EMI performance
- Operating data rate up to 25.78Gbps
- High sensitivity Pin photodiode and TIA
- LC duplex connector
- Hot pluggable 20pin connector
- Low power consumption <2 W
- -40℃ to 85℃ operating wide temperature range
- Single +3.3V±5% power supply
- Digital Monitoring SFF-8472 Rev 12.2 compliant

Applications

- 25G Ethernet
- CPRI Option 10

The laser based 25Gigabit SFP28 Transceiver is designed to transmit and receive serial optical data over single mode optical fiber with 40Km.

They are compliant with SFF-8431,SFF-8432. The transmitter converts serial CML electrical data into serial optical data. The receiver converts serial optical data into serial CML electrical data.Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472.

Part No.	Specifications								Application
	Package	Data rate	Laser	Optical Power	Detector	Sensitivity	Temp	Reach	
LWDM-SFP28-ER-XX	SFP28	25.78G	LWDM DML	0~6dBm	APD	<-19dBm	-40~85℃	40km	25GE Ethernet /CPRI Option 10

Pin function definitions

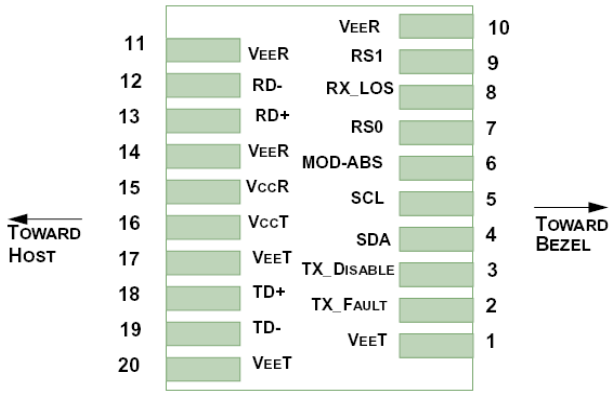

Figure 1.Pin function definitions

Table 1: Transceiver pin descriptions

Pin Number	Symbol	Name	Description
1,17,20	VeeT	Transmitter Signal Ground	These pins should be connected to signal ground on the host board.
2	TX Fault	Transmitter Fault Out (OC)	Logic "1" Output = Laser Fault (Laser off before t_fault) Logic "0" Output = Normal Operation This pin is open collector compatible, and should be pulled up to Host Vcc with a 10kΩ resistor.
3	TX Disable	Transmitter Disable In (LVTTL)	Logic "1" Input (or no connection) = Laser off Logic "0" Input = Laser on This pin is internally pulled up to VccT with a 10 kΩ resistor.
4	SDA	Module Definition Identifiers	Serial ID with SFF 8472 Diagnostics Module Definition pins should be pulled up to Host Vcc with 10 kΩ resistors.
5	SCL		
6	MOD-ABS		
7	RS0	Receiver Rate Select (LVTTL) Transmitter Rate Select (LVTTL)	These pins have an internal 30kΩ pull-down to ground. A signal on either of these pins will not affect module performance.
9	RS1		
8	LOS	Loss of Signal Out (OC)	Sufficient optical signal for potential BER < $1x10^{-12}$ = Logic "0" Insufficient optical signal for potential BER < $1x10^{-12}$ = Logic "1" This pin is open collector compatible, and should be pulled up to Host Vcc with a 10kΩ resistor.
10,11,14	VeeR	Receiver Signal Ground	These pins should be connected to signal ground on the host board.
12	RD-	Receiver Negative DATA Out (CML)	Light on = Logic "0" Output Receiver DATA output is internally AC coupled and series terminated with a 50Ω resistor.

13	RD+	Receiver Positive DATA Out (CML)	Light on = Logic "1" Output Receiver DATA output is internally AC coupled and series terminated with a 50Ω resistor.
15	VccR	Receiver Power Supply	This pin should be connected to a filtered +3.3V power supply on the host board. See Figure 3.Recommended power supply filter
16	VccT	Transmitter Power Supply	This pin should be connected to a filtered +3.3V power supply on the host board. See Figure 3.Recommended power supply filter
18	TD+	Transmitter Positive DATA In (CML)	Logic "1" Input = Light on Transmitter DATA inputs are internally AC coupled and terminated with a differential 100Ω resistor.
19	TD-	Transmitter Negative DATA In (CML)	Logic "0" Input = Light on Transmitter DATA inputs are internally AC coupled and terminated with a differential 100Ω resistor.

Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
Storage Temperature Range	Ts	°C	-40	85
Relative Humidity	RH	%	0	95
Maximum Supply Voltage	Vcc3	V	-0.5	3.6

Recommended Operating Conditions

Parameter	Symbol	Unit	Min	Typ	Max	Note
Operating Case Temperature Range	Tc	°C	-40		85	
Power Supply Voltage	Vcc	V	3.14	3.3	3.46	
Bit Rate	BR	Gb/s		25.78		
Bit Error Ratio	BER				$5*10^{-5}$	
Max Supported Link Length	L	Km			40	1

Note1: Measured without DCM.

Electric Ports Definition

Parameter	Symbol	Unit	Min	Typ	Max	Note
Supply Voltage	V_{CC}	V	3.14	3.3	3.46	
Module Power	Icc	mA			600	
Transmitter						
Input Differential Impedance	R_{IN}	Ω	90	100	110	
Differential Data Input	V_{IN}	mVp-p	190		1200	
Transmit Disable Voltage	V_{DIS}	V	2		V_{CCHOST}	

Transmit Enable Voltage	V_{EN}	V	V_{EE}		V_{EE}+0.8	
Transmit Fault Assert Voltage	V_{FA}	V	2		V_{CCHOST}	
Transmit Fault De-Assert Voltage	V_{FDA}	V	V_{EE}		V_{EE}+0.4	
Receiver						
Differential Data Output	V_{OD}	mVp-p	450		750	
Output Differential Impedance	R_{OUT}	Ω	90	100	110	
Output Rise Time	t_{RISE}	pS	25			
Output Fall Time	t_{FALL}	pS	25			
LOS Fault	V_{LOSFT}	V	2		V_{CCHOST}	
LOS Normal	V_{LOSNR}	V	V_{EE}		V_{EE}+0.4	

Optical Characteristics *(Tc=-40˚C to 85˚C and Vcc= 3.14 to 3.46)*

Parameter	Symbol	Min	Typ	Max	Note	Unit
Transmitter						
Nominal Wavelength	λ	Wavelength Table				nm
Wavelength Drift	Δλ	-1		1		nm
Averaged Optical Output Power	Pav	0		6		dBm
OMA Optical Output Power	Poma	0.5				dBm
Extinction Ratio	ER	3.5	4			dB
Average Launch Power of OFF Transmitter	POFF			-30		dBm
SMSR		30				dB
-20dB Spectral Width				1		nm
Transmitter Dispersion Penalty	TDP			1.5		dBm
Relative Intensity Noise	RIN			-130		dB/Hz
Return Loss	RL	26				dB
Receiver						
Center Wavelength	λC	1260		1620		nm
Receiver Sensitivity(Averaged)	RSEN_AVE			-19	1	dBm
Receiver Overload	Pmax	-5				dBm
Optical Return Loss				-26		dB
LOS Assert	LOSA	-30				dBm
LOS De-Assert LOS	LOSD			-20		dBm
LOS Hysteresis		0.5		5		dB

Note1: Measured at ER>3.5dBm, PRBS 2^{31}-1 and BER better than or equal to 5E-5;

Typical Application

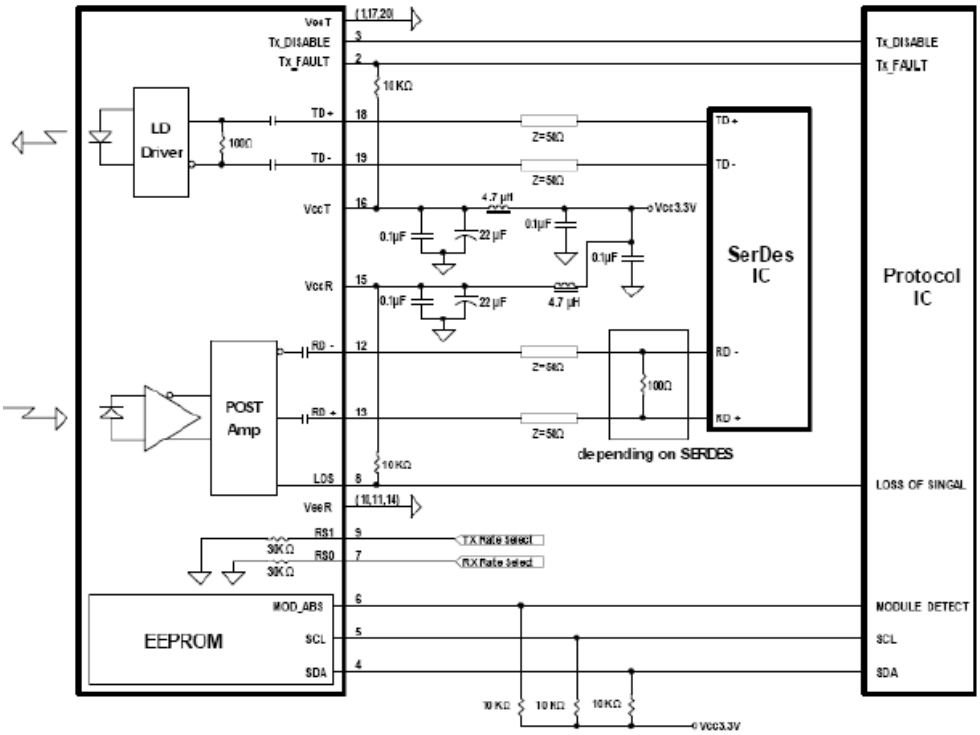

Figure 2. Typical application circuit

Mechanical Dimensions

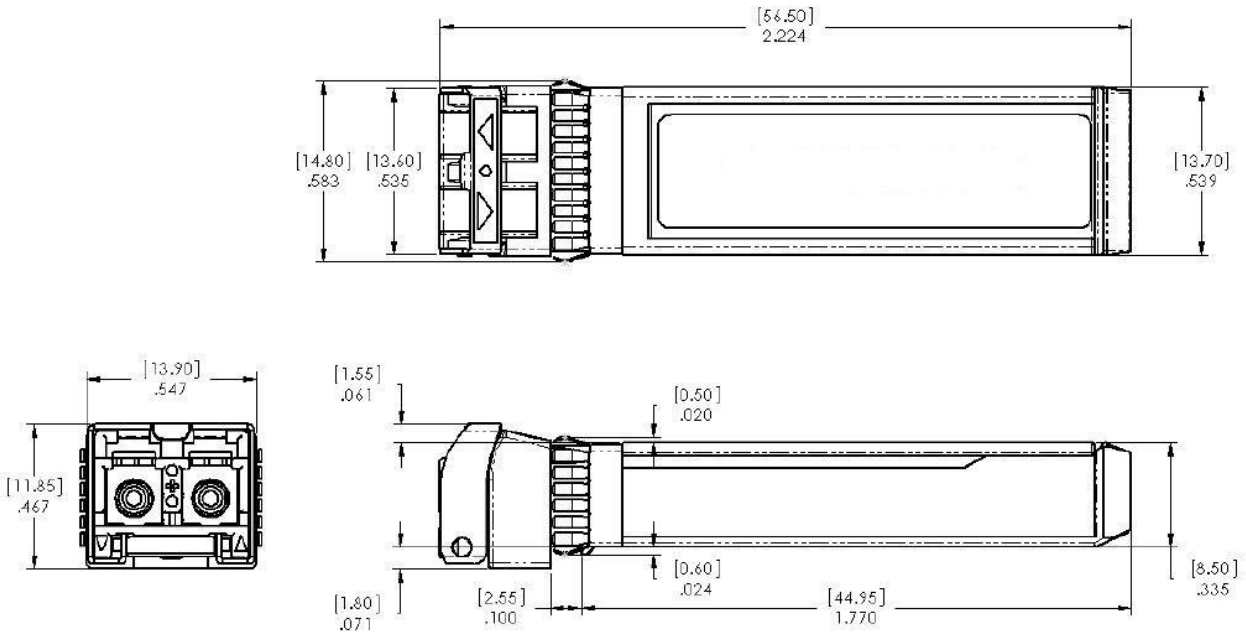

Figure 3. Module Mechanical Dimensions

Digital Diagnostics Functions

As defined by the SFF-8472, Our SFP28 transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- Transceiver temperature
- Laser bias current
- Transmitted optical power
- Received optical power
- Transceiver supply voltage

It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory-set normal range. The operating and diagnostics information is monitored and reported by a DigitalDiagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessedthrough the 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL pin) is generated by the host. The positive edge clocks data into the SFP+ transceiver into those segments of its memory map that are not write-protected. The negative edge clocks data from the SFP+ transceiver. The serial data signal (SDA pin) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial

protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially. The 2-wire serial interface provides sequential or random access to the 8 bit parameters, addressed from 000h to the maximum address of the memory.For more detailed information, including memory map definitions, please see the SFF-8472 documentation1.

Part Number	Wavelength/nm			Bail Latch Color
	Min	Type	Max	
LWDM-SFP28-ER-L01	1268.24	1269.23	1270.22	Orange red
LWDM-SFP28-ER-L02	1272.55	1273.54	1274.54	Orange red
LWDM-SFP28-ER-L03	1276.89	1277.89	1278.89	Orange red
LWDM-SFP28-ER-L04	1281.25	1282.26	1283.27	Orange red
LWDM-SFP28-ER-L05	1285.65	1286.66	1287.68	Orange red
LWDM-SFP28-ER-L06	1290.07	1291.10	1292.12	Orange red
LWDM-SFP28-ER-L07	1294.53	1295.56	1296.59	Ocean blue
LWDM-SFP28-ER-L08	1299.02	1300.05	1301.09	Ocean blue
LWDM-SFP28-ER-L09	1303.54	1304.58	1305.63	Ocean blue
LWDM-SFP28-ER-L10	1308.09	1309.14	1310.19	Ocean blue
LWDM-SFP28-ER-L11	1312.67	1313.73	1314.79	Ocean blue
LWDM-SFP28-ER-L12	1317.28	1318.35	1319.42	Ocean blue

Note: Tc=50° c