

LSP-Dxx-10D LSP-DHxx-10D

SFP28 25Gb/s DWDM 10km DDM Transceiver

PRODUCT 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
- 0°C to 70°C operating wide temperature range
- Single +3.3V \pm 5% power supply
- Digital Monitoring SFF-8472 Rev 10.2 compliant



APPLICATIONS

- 25G Ethernet
- CPRI Option 10

PRODUCT DESCRIPTION

The laser based 25Gigabit SFP28 Transceiver is designed to transmit and receive serial optical data over single mode optical fiber with 10Km.

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.

Ordering information

Package	Part NO.	Data rate	Laser	Optical Power	Detector	Reach	Temperature Range
SFP28	LSP-Dxx-10D	25.78G	DWDM EML	-3~5dBm	PIN	10km	0~70°C
SFP28	LSP-DHxx-10D	25.78G	DWDM EML	-3~5dBm	PIN	10km	0~70°C

Dxx:

Channel	Frequency(THz)	Center Wavelength(nm)
LSP-D18-10D	191.80	1563.05
LSP-D19-10D	191.90	1562.23
LSP-D20-10D	192.00	1561.42
LSP-D21-10D	192.10	1560.61
LSP-D22-10D	192.20	1559.79
LSP-D23-10D	192.30	1558.98
LSP-D24-10D	192.40	1558.17
LSP-D25-10D	192.50	1557.36
LSP-D26-10D	192.60	1556.55
LSP-D27-10D	192.70	1555.75
LSP-D28-10D	192.80	1554.94
LSP-D29-10D	192.90	1554.13
LSP-D30-10D	193.00	1553.33
LSP-D31-10D	193.10	1552.52
LSP-D32-10D	193.20	1551.72
LSP-D33-10D	193.30	1550.92
LSP-D34-10D	193.40	1550.12
LSP-D35-10D	193.50	1549.32
LSP-D36-10D	193.60	1548.51
LSP-D37-10D	193.70	1547.72
LSP-D38-10D	193.80	1546.92
LSP-D39-10D	193.90	1546.12
LSP-D40-10D	194.00	1545.32
LSP-D41-10D	194.10	1544.53
LSP-D42-10D	194.20	1543.73
LSP-D43-10D	194.30	1542.94
LSP-D44-10D	194.40	1542.14
LSP-D45-10D	194.50	1541.35
LSP-D46-10D	194.60	1540.56
LSP-D47-10D	194.70	1539.77

LSP-D48-10D	194.80	1538.98
LSP-D49-10D	194.90	1538.19
LSP-D50-10D	195.00	1537.40
LSP-D51-10D	195.10	1536.61
LSP-D52-10D	195.20	1535.82
LSP-D53-10D	195.30	1535.04
LSP-D54-10D	195.40	1534.25
LSP-D55-10D	195.50	1533.47
LSP-D56-10D	195.60	1532.68
LSP-D57-10D	195.70	1531.90
LSP-D58-10D	195.80	1531.12
LSP-D59-10D	195.90	1530.33
LSP-D60-10D	196.00	1529.55
LSP-D61-10D	196.10	1528.77

DHxx:

Channel	Frequency(THz)	Center Wavelength(nm)
LSP-DH18-10D	191.85	1562.64
LSP-DH19-10D	191.95	1651.83
LSP-DH20-10D	192.05	1561.01
LSP-DH21-10D	192.15	1560.21
LSP-DH22-10D	192.25	1559.39
LSP-DH23-10D	192.35	1558.57
LSP-DH24-10D	192.45	1557.77
LSP-DH25-10D	192.55	1556.96
LSP-DH26-10D	192.65	1556.15
LSP-DH27-10D	192.75	1555.34
LSP-DH28-10D	192.85	1554.54
LSP-DH29-10D	192.95	1553.73
LSP-DH30-10D	193.05	1553.93
LSP-DH31-10D	193.15	1552.12
LSP-DH32-10D	193.25	1551.32
LSP-DH33-10D	193.35	1550.52
LSP-DH34-10D	193.45	1549.72
LSP-DH35-10D	193.55	1548.91
LSP-DH36-10D	193.65	1548.11
LSP-DH37-10D	193.75	1547.32
LSP-DH38-10D	193.85	1546.52
LSP-DH39-10D	193.95	1545.72
LSP-DH40-10D	194.05	1544.92
LSP-DH41-10D	194.15	1544.13
LSP-DH42-10D	194.25	1543.33
LSP-DH43-10D	194.35	1542.54
LSP-DH44-10D	194.45	1541.75
LSP-DH45-10D	194.55	1540.95
LSP-DH46-10D	194.65	1540.16
LSP-DH47-10D	194.75	1539.37
LSP-DH48-10D	194.85	1538.58
LSP-DH49-10D	194.95	1537.79
LSP-DH50-10D	195.05	1537.00

LSP-DH51-10D	195.15	1536.22
LSP-DH52-10D	195.25	1535.43
LSP-DH53-10D	195.35	1534.64
LSP-DH54-10D	195.45	1533.86
LSP-DH55-10D	195.55	1533.07
LSP-DH56-10D	195.65	1532.29
LSP-DH57-10D	195.75	1531.51
LSP-DH58-10D	195.85	1530.72
LSP-DH59-10D	195.95	1529.94
LSP-DH60-10D	196.05	1529.16
LSP-DH61-10D	196.15	1528.38

I. Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
Storage Temperature Range	Ts	oC	-40	85
Relative Humidity	RH	%	0	95
Maximum Supply Voltage	Vcc3	V	-0.5	4.0

II. Recommended Operating Conditions

Parameter	Symbol	Unit	Min	Typ	Max	Note
Operating Case Temperature Range	Tc	oC	0		70	
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			10	1
Max Supported Link Length	L	Km			80	2

Note1: Measured without DCM.

Note2: Measured with 80km DCM.

III. Electric Ports Definition

Parameter	Symbol	Unit	Min	Typ	Max	Note
Supply Voltage	V _{CC}	V	3.14	3.3	3.46	
Module Power	I _{CC}	mW			2000	
Transmitter						
Input Differential Impedance	R _{IN}	Ω	80	100	120	
Differential Data Input	V _{IN}	mVp-p	150		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	350		700	

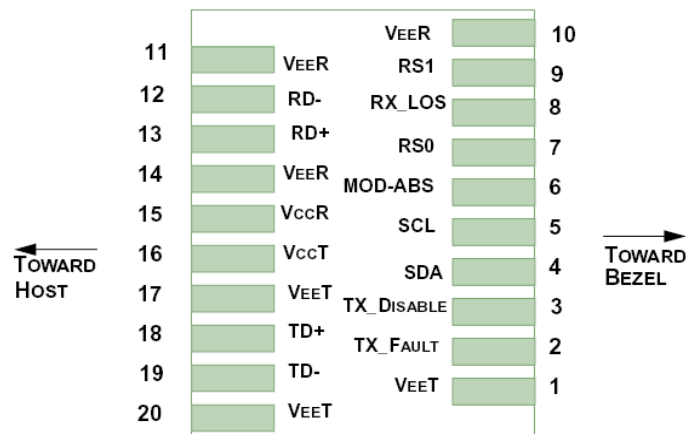
Output Rise Time	t_{RISE}	pS	25			
Output Fall Time	t_{FALL}	pS	25			
LOS Fault	V_{LOSFT}	V	2		V_{CCHOST}	
LOS Normal	V_{LOSNR}	V	VEE		$V_{EE}+0.4$	

IV. Optical Characteristics (Tc=0 oC to 70 oC and Vcc= 3.14 to 3.46)

Parameter	Symbol	Min	Typ	Max	Note	Unit
Transmitter						
Nominal Wavelength	λ	1528		1565		nm
Center wavelength Spacing	GHz	-	50	-		
Optical Output Power	Pav	-3		5		dBm
Extinction Ratio	ER	4				dB
Average Launch Power of OFF Transmitter	POFF			-35		dBm
Relative Intensity Noise	RIN					
Receiver						
Center Wavelength	λ_C	1260		1620		nm
Receiver Sensitivity(OMA)	RSENSE			-11.3	1	dBm
Receiver Overload	Pmax	2.2				dBm
Optical Return Loss				-26		dB
LOS Assert	LOSA	-25		-13.6		dBm
LOS De-Assert LOS	LOSD			-12		dBm
LOS Hysteresis		0.5		5		dB

Note1: Measured at ER>4dBm, PRBS 231-1 and BER better than or equal to 5E-5;

V. Pin Diagram

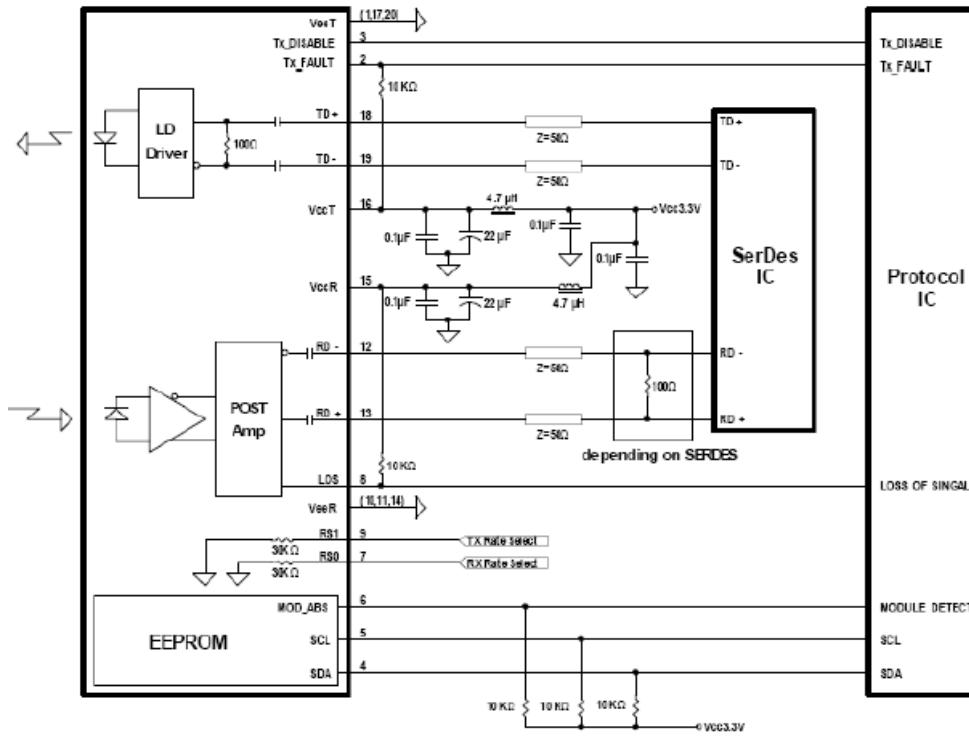


VI. Pin Descriptions

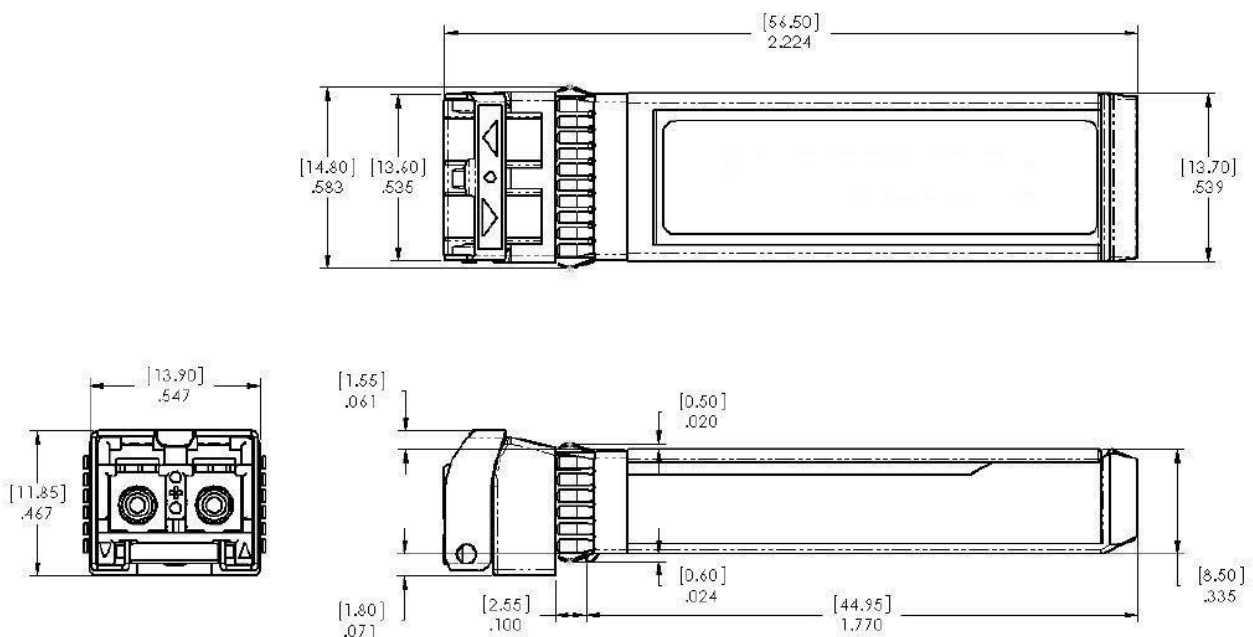
PIN	Symbol	Name	Description
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1,17,20	VeeT	Transmitter Signal Ground	These pins should be connected to signal ground on the host board.
2	TX Fault	Transmitter Fault Out (OC)	Logic "1" Output = Laser Fault (Laser off before t_fault) Logic "0" Output = 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
4	SDA	Module Definition Identifiers	Serial ID with SFF 8472 Diagnostics
5	SCL		Module Definition pins should be pulled up to Host Vcc with 10 kΩ resistors.
6	MOD-ABS		
7	RS0	Receiver 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	Transmitter Rate Select (LVTTL)	
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.

VII. Recommended Interface Circuit



VIII. Mechanical Dimensions(Unit: mm)



IX. 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 accessed through 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.

Revision History

Version No.	Date	Description
1.0	Dec.12, 2020	Preliminary datasheet