

Lightem LSFP28S1310LR 25Gbps 1310nm SFP28 Optical Transceiver, 10Km

Lightem LSFP28S1310LR is SFP 28 module for duplex optical data communications support up to 25.78Gb/s . It is with the SFP+ 20-pin connector to allow hot plug capability. Digital diagnostic functions are available via an I²C . It has built-in clock and data recovery (CDR). This module is designed for single-mode fiber and operates at a nominal wavelength of 1310nm.

FEATURES

- Duplex LC connector
- Hot-pluggable SFP28 footprint
- Operating data rate up to 25.78Gbps
- Uncooled 1310nm DFB laser
- RoHS compliant and Lead Free
- Distance up to 10km on 9/125um SMF
- Metal enclosure for lower EMI
- Power dissipation <1.2W(0~+70°C)/ <1.5W(-40~+85°C)
- Commercial / Industrial operating temperature optional



APPLICATIONS

- 10G & 25GBASE Ethernet
- eCPRI & CPRI

REGULATORY COMPLIANCE

- ESD to the Electrical PINs: compatible with MIL-STD-883 Method 3015
- ESD to the Duplex LC Receptacle: compatible with EN 61000-4-2
- Immunity compatible with EN 61000-4-3
- EMI compatible with FCC Part 15 Class B
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 IEC 60950, IEC60825-1,2
- RoHS compliant with RoHS 2.0(2015/863/EU)-amending.

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Maximum Supply Voltage	Vcc	-0.5	-	+4.0	V	
Storage Temperature	TS	-40	-	+85	°C	
Operating Humidity	RH	0	-	85	%	

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Unit
Power Supply Voltage	Vcc	3.13	3.3	3.47	V	
Power Supply Current	Icc			360 / 450	mA	Commercial Industrial
Case Operating Temperature	TC	0 / -40		70 / - 85	°C	Commercial Industrial
Data Rate	BR		25.78		Gbps	
9/125um G.652 SMF	Lmax			10	km	

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ELECTRICAL CHARACTERISTICS

Transmitter	Symbol	Min	Typ	Max	Unit	Note
Input differential impedance	Rin	90	100	110	Ω	1
Differential data input swing	Vin, pp	120		850	mV	
TX Disable-High		Vcc - 1.3		Vcc+ 0.3	V	
TX Disable-Low		Vee		Vee+ 0.8	V	
TX Fault-High		Vcc-1.3		Vcc+ 0.3	V	
TX Fault-Low		Vee		Vee+0.8	V	

Receiver	Symbol	Min	Typ	Max	Unit	Ref
Differential data Input swing	Vout,PP	300		860	mV	2
LOS High		Vcc-.9		Vcc+0.3	V	
LOS Low		Vee		Vcc+0.4	V	

Notes: 1. AC coupled. ; 2. Into 100 ohm differential termination.

OPTICAL CHARACTERISTICS

Transmitter	Symbol	Min	Typ	Max	Unit
Output Opt. Power	PO	-7		+2	dBm
Optical Wavelength	λ	1295	1310	1325	nm
Side-Mode Suppression Ratio	SMSR	30			nm
Spectral Width(-20dB)	Δλ			1	dB
Optical Extinction Ratio	ER	3.5			

Receiver	Symbol	Min	Typ	Max	Unit	Ref
RX Sensitivity @25.78Gb/s	SEN			-13.5	dBm	1
RX Sensitivity OMA@25.78Gb/s	SEN			-12.0	dBm	2
Receiver Overload		2			dBm	
Optical Center Wavelength	λC	1260		1610	nm	
LOS De-Assert	LOSD			-15	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresi		0.5		6	dB	

Notes:

1. Measured with data rate at 25.78Gb/s, BER less than 5E-5 with PRBS 231-1. This value is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.

31.2. Measured with data rate at 25.78Gb/s, BER less than 5E-5 with PRBS 2 -1.

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DIGITAL DIAGNOSTIC MONITORING INTERFACE

Five transceiver parameter values are monitored. The following table defines the monitored parameter's accuracy.

Parameter	Range	Accuracy	Calibration	Unit
Temperature	0~+70 (C) / -40 ~ 85 (I)	±3	Internal	°C
Voltage	3 to 3.6V	±3%	Internal	V
Bias Current	0 to 20	±10%	Internal	mA
TX Power	-8 to 3	±3dB	Internal	dBm
RX Power	-14 to 0	±3dB	Internal	dBm

Digital Diagnostic Memory Map

EEPROM memory map specific data field description is as below:

2 wire address 1010000X (A0h)		2 wire address 1010001X (A2h)	
0	Serial ID Defined by SFP MSA (96 bytes)	0	Alarm and warning thresholds (56 bytes)
95	Vendor Specific (32 bytes)	55	Cal constants (40 bytes)
127	Reserved (128 bytes)	95	Real Time Diagnostic Interface (24 bytes)
255		119	Vendor Specific (8 bytes)
		127	User Writable EEPROM (120 bytes)
		247	Vendor Specific (8 bytes)
		255	

PIN DESCRIPTION

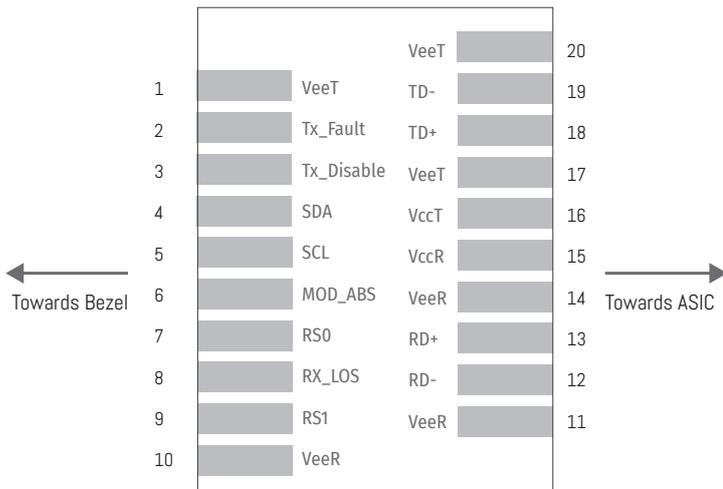
Pin	Symbol	Name /Description	NOTE
1	VeeT	Transmitter Ground (Common with Receiver Ground)	1
2	TX_FAULT	Transmitter Fault. LVTTTL-O	2
3	TX Disable	Transmitter Disable. Laser output disabled on high or open. LVTTTL-I	3
4	SDA	2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i). LVTTTL-I/O	2
5	SCL	2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i). LVTTTL-I	2
6	MOD_ABS	Module Absent, Connect to VeeT or VeeR in Module.	2
7	RS0	Rate Select 0, optionally controls SFP+ module receiver. LVTTTL-I	4
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation. LVTTTL-O	5
9	RS1	Rate Select 1, optionally controls SFP+ module transmitter. LVTTTL-I	4
10	VEER	Receiver Ground (Common with Transmitter Ground)	1
11	VEER	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled. CML-O	
13	RD+	Receiver Non-inverted DATA out. AC Coupled. CML-O	
14	VEER	Receiver Ground (Common with Transmitter Ground)	1
15	VCCR	Receiver Power Supply	6
16	VCCT	Transmitter Power Supply	6
17	VEET	Transmitter Ground (Common with Receiver Ground)	14
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled. CML- I	
19	TD-	Transmitter Inverted DATA in. AC Coupled. CML- I	
20	VEET	Transmitter Ground (Common with Receiver Ground)	1

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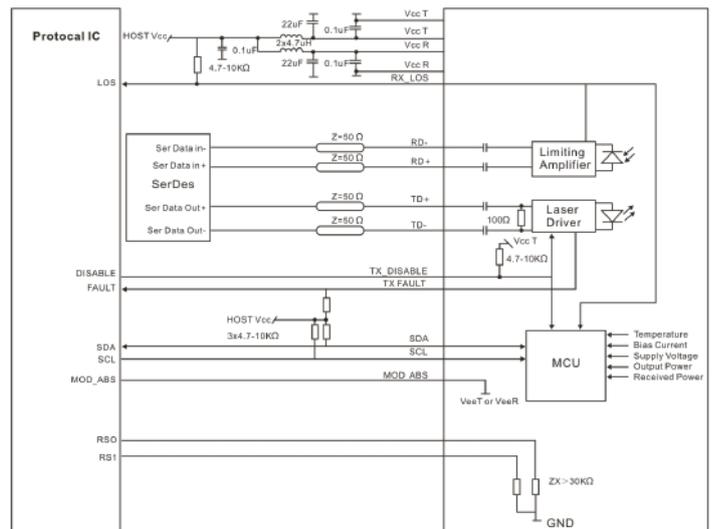
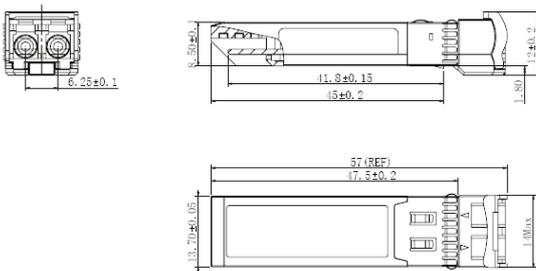
Notes:

1. Circuit ground is internally isolated from chassis ground.
2. TX Fault is an open collector/drain output .Which should be pulled up with a 4.7K – 10K Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc+0.3V.A high output indicates a transmitter fault caused by either the tx bias current or the tx output power exceeding the preset alarm thresholds. A low output indicates normal operation .In the low state, the output is pulled to <0.8V.
3. Laser output disabled on TX Disable >2.0V or open, enabled on TX Disable<0.8V.
4. Internally pulled down per SFF-8431 Rev4.1.
5. LOS is open collector output. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
6. Internally connected.

PIN-OUT OF CONNECTOR BLOCK ON HOST BOARD



MECHANICAL DIMENSIONS



ORDERING INFORMATION

PN	LSFP28S1310LR	Lightem 25Gbps 1310nm SFP28 Optical Transceiver, 10Km
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