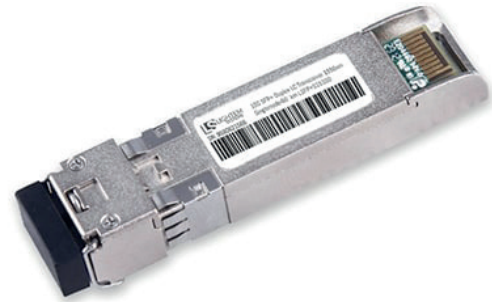


TELECOM/DATACOM SYSTEM

Lightem 10G SFP+ Duplex LC Transceiver 1550nm Singlemode 40km LSFP+S1540-ER

FEATURES

- Up to 11.3Gbps Data Links
- Maximum link length of 40km on SMF
- Power dissipation < 14W
- 1550nm EML transmitter, PIN photo-detector
- Metal enclosure, for lower EMI
- 2-wire interface with integrated Digital Diagnostic monitoring
- Hot-pluggable SFP+ footprint
- Specifications compliant with SFF 8472
- Compliant with SFP+ MSA with LC connector
- Single 3.3V power supply
- Standard Operating Range: 0°C to 70°C Operating temperature
- Optional Industrial grade: -40°C to 85°C Operating temperature



APPLICATIONS

- 10GBASE-ER/EW & 10G Ethernet
- 10G SONET/SDH, OTU2/2e

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	Ts	-40	-	85	°C	
Relative Humidity	RH	5	-	95	%	
Power Supply Voltage	VCC	-0.3	-	+4	V	
Signal Input Voltage	Vcc	0.3	-	+0.3	V	

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note	
Case Operating Temperature	Top	0		+70	°C	Commercial grade	
	Top	-40		+85	°C	Industrial grade	
Power Supply Voltage	VCC	3.14	3.3	3.47	V		
Data Rate	BR	-	10.3125	11.3	Gbps		
Transmission Distance	TD		40		km		
Coupled fiber							
			Single mode fiber				9/125um SMF

TELECOM/DATACOM SYSTEM

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit	Note
Supply Voltage	Vcc	3.14	3.3	3.46	V	
Supply Current	Icc			370 / 430 / 400 / 460	mA	
Transmitter						
Industrial differential impedance	RIN		100		Ω	2
Differential data input swing	Vin, pp	180		700	mV	
Transmit disable voltage	VDis	2		Vcc	V	3
Transmit enable voltage	Ven	Vee		Vee+0.8	V	
Transmit disable assert time				10	us	
Receiver						
Differential data output swing	Vout, pp	400		800	mV	4
Data output rise time	tr	28			ps	5
Data output fall time	tf	28			ps	5
LOS Fault	VLOS H	2		VccHost	V	6
LOS Normal	VLOS L	Vee		Vcc+0.8	V	6
Power supply rejection	PSR	100			mVpp	7

Notes:

1. Measured with receive Pin=Psen, Vcc=3.3V, operation temperature range, without air flow
2. Connected directly to TX data input pins. AC coupled or open circuit.
3. Into 100 ohms differential termination.
4. 20 – 80 % Loss Of Signal is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
5. Receiver sensitivity is compliant with power supply sinusoidal modulation of 20 Hz to 1.5 MHz up to specified value applied through the recommended power supply filtering network.

OPTICAL CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit	Note
Transmitter						
Average Launch Power	POUT	-1		3.0	dBm	1
Optical Wavelength	λ_c	1530	1550	1565	nm	
Optical Extinction Ratio	ER	8.2			dB	
Spectrum Band Width (-20dB)	σ			1	nm	
SMSR		30			dB	
Transmitter OFF Output Power	POff			-30	dBm	
Transmitter and Dispersion Penalty	TDP			2	dB	
Output Eye Mask		Compliant with IEEE 802.3aq				
Receiver						
Input Optical Wavelength	λ_c	1270		1610	nm	
Receiver Sensitivity	Psen			-16	dBm	
Input Saturation Power (Overload)	Psat	0			dBm	
LOS Assert	LOSA	-30			dBm	
LOS De -Assert	LOSD			-17	dBm	
LOS Hysteresis	Phys	0.5			dB	

Notes:

1. Launched power (avg.) is power coupled into a single mode fiber with master connector. (Before of Life)
2. Measured with conformance test signal for BER = 10^{-12} . @10.3125Gbps, PRBS=2³¹-1,NRZ : Optical source with worst ER · Wavelength between 1530nm and 1565nm : back to back

TELECOM/DATACOM SYSTEM

PIN DESCRIPTION

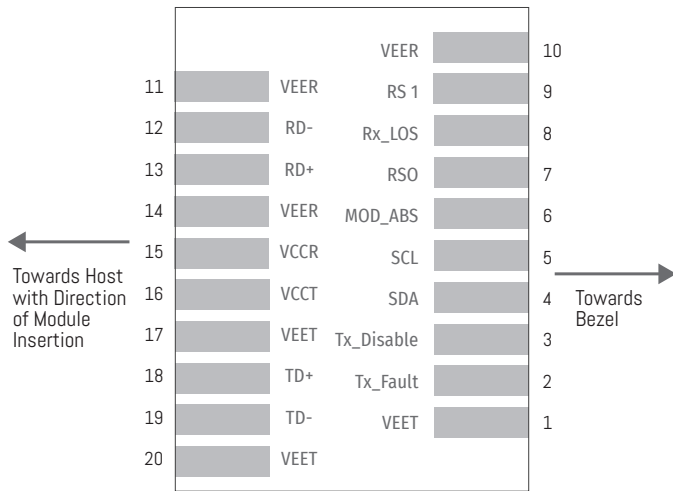
Pin	Symbol	Name /Description	NOTE
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	T FAULT	Transmitter Fault.	2
3	T DIS	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	no connection	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	5
9	RS1	Internally connect to circuit ground	
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	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	VEER	Receiver Ground (Common with Transmitter Ground)	1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	VEET	Transmitter Ground (Common with Receiver Ground)	1

Notes:

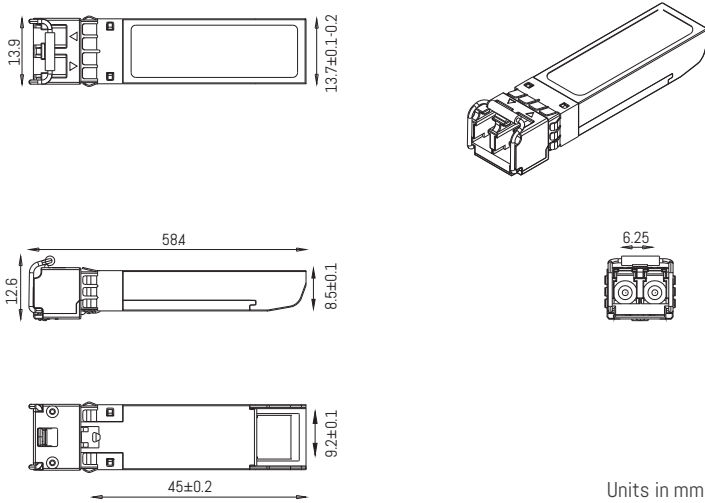
- 1.Circuit ground is internally isolated from chassis ground.
2. TFAULT is an LVTTTL output. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power or the laser temperature exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
3. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
4. Should be pulled up with 4.7kΩ- 10kΩ on host board to a typical 3.3V voltage. MOD_ABS pulls low to indicate module is plugged in.
5. LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a typical 3.3V voltage.
Logic 0 indicates normal operation; logic 1 indicates loss of signal.

TELECOM/DATACOM SYSTEM

PIN OUT OF CONNECTOR BLACK ON HOST BOARD



MECHANICAL DIMENSIONS



ORDERING INFORMATION

PN	Description
LSFP+S1540-ER-x	Lightem 10G SFP+ Duplex LC SM 1550nm 40km
x-	l: optional industrial grade
eg LSFP+S1540-ER-I	Lightem 10G SFP+ Duplex LC SM 1550nm 40km Industrial grade