


TSBP-23192L-LR & TSBP-32192L-LR Series

Tx: 1270nm/Rx: 1330nm BIDI SFP+ 10km Transceiver for 10GbE

Tx: 1330nm/Rx: 1270nm BIDI SFP+ 10km Transceiver for 10GbE

Features

- Simplex LC Connector Bi-Directional SFP+ Optical Transceiver
- Compliant with SFF-8431, SFF-8432 and IEE802.3ae
- Hot Pluggable
- Data rate up to 11.3Gbps
- 1270nm/1330nm DFB transmitter, PIN photo-detector
- Low power consumption < 1.0W
- Distance up to 10km
- Two types:
 - A:1270nm DFB Laser transmitter,1330nm receiver
 - B:1330nm DFB Laser transmitter,1270nm receiver
- Specifications compliant with SFF 8472
- 2-wire interface with integrated Digital Diagnostic monitoring
- Operating case temperature:
 - Standard: 0°C~+70°C
 - Industrial: -40°C~+85°C
- RoHS6 compliant (lead free) 



Applications

- 10GBASE-LR at 10.3125Gbps
- 10GBASE-LW at 9.953Gbps

Product description

The TSBP-23192L-LR & TSBP-32192L-LR Series single mode transceiver is small form factor pluggable module for duplex optical data communications such as 10GBASE-LR/LW defined by IEEE 802.3ae. It is with the SFP+ 20-pin connector to allow hot plug capability.

The TSBP-23192L-LR module is designed for single mode fiber and operates at a nominal wavelength of 1270nm; TSBP-32192L-LR module is designed for single mode fiber and operates at a nominal wavelength of 1330nm. The transmitter section uses a multiple quantum well DFB, which is class 1 laser compliant according to International Safety Standard IEC-60825.

The receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

Absolute Maximum Ratings

These values represent the damage threshold of the module. Stress in excess of any of the individual Absolute Maximum Ratings can cause immediate catastrophic damage to the module even if all other parameters are within Recommended Operating Conditions.

Parameters	Symbol	Min.	Max.	Unit
Supply Voltage	VCC	-0.5	+3.6	V
Storage Temperature	Tc	-40	+85	°C
Relative Humidity	RH	0	85	%

Recommended Operating Conditions

Parameters	Symbol	Min.	Typical	Max.	Unit
Supply Voltage	VCC	3.15	3.3	3.45	V
Supply Current	Icc	-	-	290	mA
Operating Case Temperature (Standard)	Tca	0	-	70	°C
Operating Case Temperature (Industrial)	Tca	-40	-	85	°C

Notes:

- [1] Supply current is shared between VCCTX and VCCRX.
 [2] In-rush is defined as current level above steady state current requirements.

Electrical characteristics

Parameter	Symbol	Min.	Typical	Max	Unit
Transmitter					
Data Rate	Mra	1.0	10.3	11.3	Gbps
Input differential impedance ¹	Rin	-	100	-	Ω
Differential Input Voltage swing	Vin	150	-	1200	mVpp
Transmit Disable Voltage	VD	2.0	-	VCC+0.3	V
Transmit Enable Voltage ²	Ven	Vee	-	Vee+0.8	V
Transmit Disable Assert Time	Vn	-	-	100	us
Receiver					
Data Rate	Mra	-	10.3	11.3	Gbps
Output differential impedance ¹	Rout	-	100	-	Ω
Differential data output swing ³	Vout	300	-	700	mV
Loss of Signal –Asserted ⁴	-	2.0	-	VCC+0.3	V
Loss of Signal –Negated ⁴	-	Vee	-	Vee+0.8	V

Notes:

Information and specifications are subject to change without notice.
 Please visit www.china-tscom.com for more information

- [1] AC coupled.
 [2] Or open circuit.
 [3] Into 100 ohm differential termination.
 [4] LOS is LVTTTL.
 [5] Logic 0 indicates normal operation; logic 1 indicates no signal detected.

Optical Characteristics (TSBP-23192L-LR, 1270 DFB & PIN/TIA)

Parameter	Symbol	Min.	Typical	Max	Unit
Transmitter					
Center Wavelength	λ	1260	1270	1280	nm
Average Output Power ^{1&2}	Po	-5	-	0	dBm
Side Mode Suppress Ratio	SMSR	30	-	-	dB
Optical Modulation Amplitude	OMA	-5.2	-	-	dBm
Extinction Ratio	ER	3.5	-	-	dB
Optical Return Loss Tolerance	ORL	-	-	12	dB
Eye Mask	-	Compliant with IEEE 802.3			
Receiver					
Receiver sensitivity in OMA ^{2&3}	Rsen	-	-	-14.4	dBm
Receiver Overload	Pmax	0.5	-	-	dBm
Center Wavelength	λ	1320	-	1340	nm
Receiver Reflectance	Rrx	-	-	-12	dB
LOS De-Assert	Lsa	-	-	-15	dBm
LOS Assert	Lda	-30	-	-	dBm
LOS Hysteresis	Lh	0.5	-	-	dB

Optical Characteristics (TSBP-32192L-LR, 1330 DFB & PIN/TIA)

Parameter	Symbol	Min.	Typical	Max	Unit
Transmitter					
Optical Wavelength	λ	1320	1330	1340	nm
Side Mode Suppress Ratio	SMSR	30	-	-	dB
Average Output Power ^{1&2}	Po	-5	-	0	dBm
Optical Modulation Amplitude	OMA	-5.2	-	-	dBm
Extinction Ratio	ER	3.5	-	-	dB
Optical Return Loss Tolerance	ORL	-	-	12	dB
Eye Mask	-	Compliant with IEEE 802.3			
Receiver					
Receiver sensitivity in OMA ^{2&3}	Rsen	-	-	-14.4	dBm
Receiver Overload	Pmax	0.5	-	-	dBm
Center Wavelength	λ	1260	-	1270	nm
Receiver Reflectance	Rrx	-	-	-12	dB
LOS De-Assert	Lsa	-	-	-15	dBm

Information and specifications are subject to change without notice.
 Please visit www.china-tscom.com for more information

LOS Assert	Lda	-30	-	-	dBm
LOS Hysteresis	Lh	0.5	-	-	dB

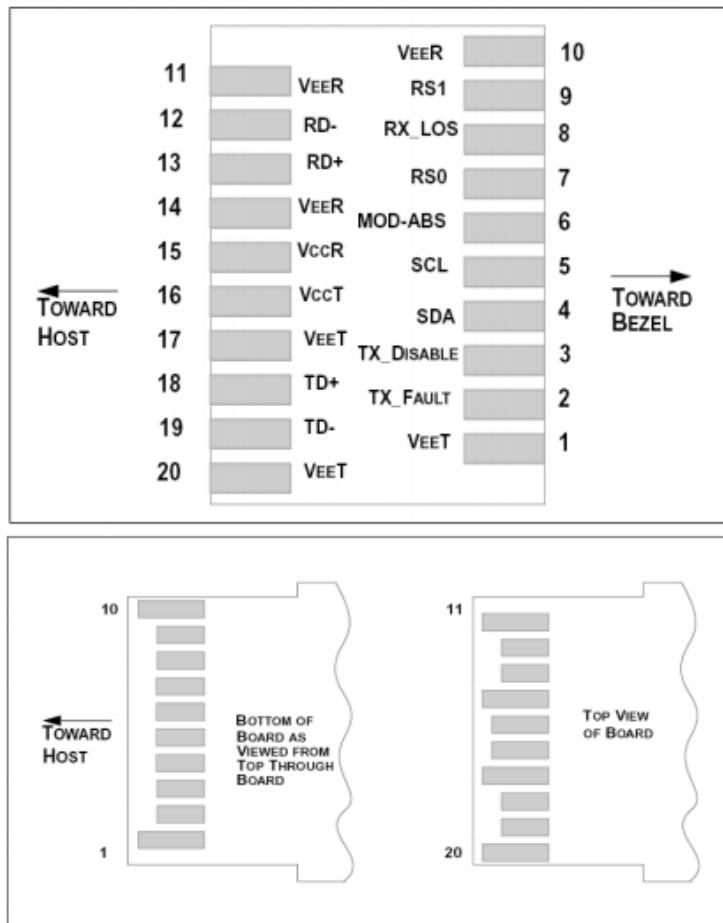
Notes:

- [1] Output is coupled into a 9/125um SMF.
- [2] A received power below this value cannot be compliant.
- [3] Measured with a PRBS2³¹-1 test pattern @10.3125Gbps, BER≤10⁻¹²

Low Speed Characteristics

Parameter	Symbol	Min	Typical	Max	Unit
Power Consumption	-	-	-	1	W
TX_Fault,RX_LOS	VOL	0	-	0.4	V
	VOH	Host_VCC-	-	Host_VCC+	V
TX_DIS	VIL	-0.3	-	0.8	V
	VIH	2.0	-	VCCT+0.3	V
RS0,RS1	VIL	-0.3	-	0.8	V
	VIH	2.0	-	VCCT+0.3	V

SFP+ Transceiver Electrical Pad Layout



Information and specifications are subject to change without notice. Please visit www.china-tscom.com for more information

Pin Definition

Pin	Symbol	Name/Description
1	VEET [1]	Transmitter Ground
2	Tx_FAULT [2]	Transmitter Fault
3	Tx_DIS [3]	Transmitter Disable. Laser output disabled on high or open
4	SDA [2]	2-wire Serial Interface Data Line
5	SCL [2]	2-wire Serial Interface Clock Line
6	MOD_ABS [4]	Module Absent. Grounded within the module
7	RS0 [5]	No Function Implement
8	RX_LOS [2]	Loss of Signal indication. Logic 0 indicates normal operation
9	RS1 [5]	No Function Implement
10	VEER [1]	Receiver Ground
11	VEER [1]	Receiver Ground
12	RD-	Receiver Inverted DATA out. AC Coupled
13	RD+	Receiver DATA out. AC Coupled
14	VEER [1]	Receiver Ground
15	VCCR	Receiver Power Supply
16	VCCT	Transmitter Power Supply
17	VEET [1]	Transmitter Ground
18	TD+	Transmitter DATA in. AC Coupled
19	TD-	Transmitter Inverted DATA in. AC Coupled
20	VEET [1]	Transmitter Ground

Notes:

- [1] Module circuit ground is isolated from module chassis ground within the module.
- [2] Should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15V and 3.6V.
- [3] Tx_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VCCT inside the module.
- [4] Mod_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to VCC_Host with a resistor in the range 4.7 kΩ to 10 kΩ. Mod_ABS is asserted “High” when the SFP+ module is physically absent from a host slot.
- [5] RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.

Ordering information

Part Number	Product Description
TSBP-23192L-LRC	10Gbps, SFP+ BIDI TX1270nm/RX1330nm 10km, 0°C ~ +70°C
TSBP-32192L-LRC	10Gbps, SFP+ BIDI TX1330nm/RX1270nm, 10km, 0°C ~ +70°C
TSBP-23192L-LRT	10Gbps, SFP+ BIDI TX1270nm/RX1330nm 10km, -40°C ~ +85°C
TSBP-32192L-LRT	10Gbps, SFP+ BIDI TX1330nm/RX1270nm, 10km, -40°C ~ +85°C

References

1. “Specifications for Enhanced Small Form Factor Pluggable Module SFP+” , SFF-8431, Rev 4.1, July 6, 2009.
2. “Improved Pluggable Form factor” , SFF-8432, Rev 4.2, Apr 18,2007
3. IEEE802.3ae – 2002
4. “Diagnostic Monitoring Interface for Optical Transceivers” SFF-8472, Rev 10.3, Dec 1,2007

Important Notice

Performance figures, data and any illustrative material provided in this data sheet are typical and must be specifically confirmed in writing by T&S before they become applicable to any particular order or contract. In accordance with the T&S policy of continuous improvement specifications may change without notice. The publication of information in this data sheet does not imply freedom from patent or other protective rights of T&S or others. Further details are available from any T&S sales representative.