

TSSP-85192L-SR Optical Transceiver

850nm SFP+ Multi-mode Transceiver, With Diagnostic Monitoring
Duplex SFP+ SR 300m Transceiver

Features

- Optical interface compliant to IEEE 802.3ae
- Electrical interface compliant to SFF-8431
- 2-wire interface with integrated Digital Diagnostic monitoring
- Hot Pluggable
- Data rate up to 11.3Gbps
- 850nm VCSEL transmitter, PIN photo-detector
- Maximum link length of 300m on 2000MHz/km MMF
- Power Dissipation < 1.0W
- Case operation temperature range :
Standard: temperature: 0°C to 70°C
Industrial temperature: -40°C to 85°C
- RoHS6 compliant (lead free)



Applications

- 10GBASE-SR at 10.3125Gbps
- 10GBASE-SW at 9.95Gbps

Description

The TSSP-85192L-SR series multi-mode transceiver is SFP+ module for duplex optical data communications such as 10GBASE-SR and 10GBASE-SW. It is with the SFP+ 20-pin connector to allow hot plug capability. Digital diagnostic functions are available via an I2C.

This module is designed for multi-mode fiber and operates at a nominal wavelength of 850 nm. The transmitter section uses a Vertical Cavity Surface Emitted Laser (VCSEL) and is a Class 1 laser compliant according to International Safety Standard IEC 60825. The receiver section uses an integrated GaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

Absolute Maximum Ratings

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

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Power Supply Voltage	VCC	3.15	3.30	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 VCCR. X.
 [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	mV
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 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:

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

Optical Characteristics

Parameter	Symbol	Min.	Typical	Max	Unit
Transmitter					
Center Wavelength	λ	840	850	860	nm
Average Optical Power ¹	Po	-6.0	-	-1	dBm
Extinction Ratio ²	ER	3.5	-	-	dB
Transmitter Dispersion Penalty	TDP	-	-	3.9	dB
Optical Return Loss Tolerance	ORL	-	-	12	dB
Receiver					
Receiver Sensitivity in OMA ³	Rsens	-	-	-11.1	dBm
Stressed Sensitivity in OMA ³	-	-	-	-7.5	dBm
Los function	Los	-30	-	-12	dBm
Receiver Overload ³	Pmax	-1.0	-	-	dBm
Receiver Reflectance	-	-	-	-12	dB

Notes:

[1] The optical power is launched into MMF

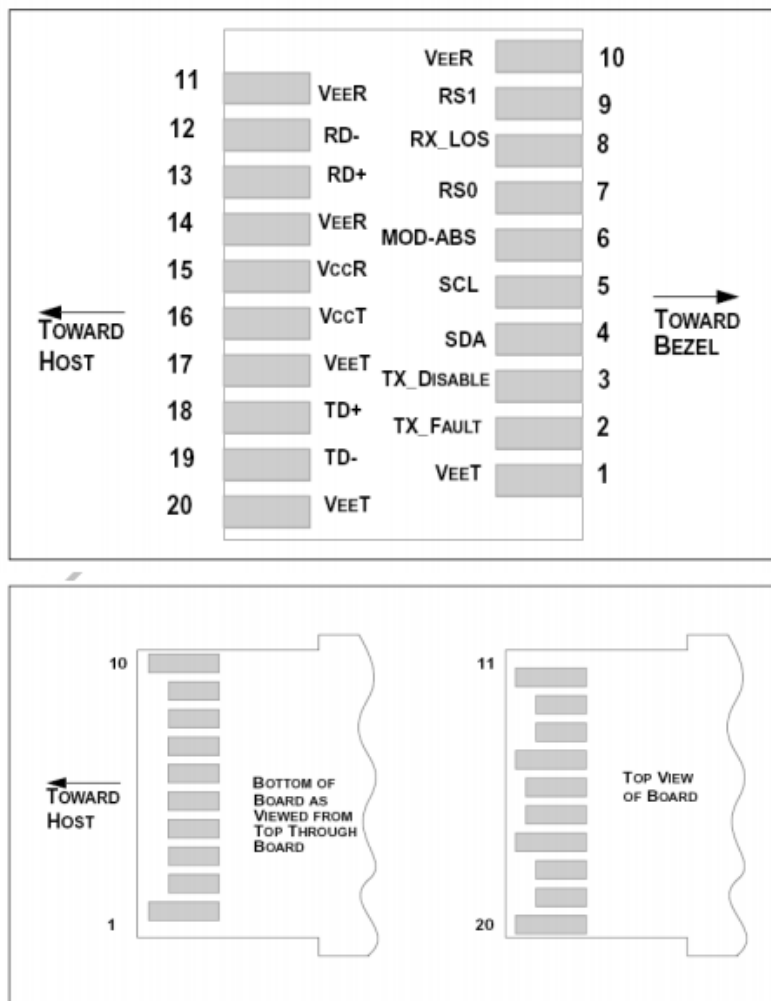
[2] Measured with a PRBS 2³¹-1 test pattern @10.3125Gbps

[3] Measured with a PRBS 2³¹-1 test pattern @10.3125Gbps, BER ≤ 10⁻¹².

Electrical Pad Layout

Parameter	Symbol	Min	Typical	Max	Unit
TX_Fault,RX_LOS	VOL	0	-	0.4	V
	VOH	Host_VCC-	-	Host_VCC+0	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

Electrical Pad Layout



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]	Rate Select 0
8	RX_LOS [2]	Loss of Signal indication. Logic 0 indicates normal operation
9	RS1 [5]	Rate Select 1
10	VEER [1]	Receiver Ground

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Please visit www.china-tscom.com for more information

8 Jinxiu Middle Road, Pingshan, Shenzhen, Guangdong, 518118, P. R. China
+86 755 32983688 | info@china-tscom.com | www.china-tscom.com



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
TSSP-85192L-SRC	10Gbps SFP+ 850nm 300m 0°C ~ +70°C
TSSP-85192L-SRT	10Gbps SFP+ 850nm 300m -40°C ~ +85°C

Important Notice

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

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