

# TSSP-3125G-LR Optical Transceiver

1310nm SFP+ Single-mode Transceiver, With Diagnostic Monitoring  
Duplex SFP+ 10km Transceiver, RoHS 6 Compliant

## Features

- Up to 25.78 Gb/s bi-directional data links
- Hot-pluggable SFP+ footprint
- Built-in digital diagnostic functions
- 1310nm DFB laser transmitter
- Duplex LC connector
- RoHS compliant
- Up to 10 km on 9/125µm SMF
- Metal enclosure, for lower EMI
- 1.5W maximum power consumption with established link
- Single 3.3V power supply
- Operating case temperature
- Commercial: 0°C to +70 °C
- +3.3V single power supply
- RoHS compliant

## Applications

- 25GE LR
- eCPRI & CPRI

## Absolute Maximum Rating

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
Power Supply Voltage	V <sub>CC</sub>	0	+3.6	V
Storage Temperature	T <sub>c</sub>	-40	+85	°C
Operating Case Temperature	T <sub>c</sub>	0	+70	°C

Relative Humidity	RH	5	95	%
RX Input Average Power	Pmax	-	0	dBm

### Recommended Operating Environment

Recommended Operating Environment specifies parameters for which the electrical and optical characteristics hold unless otherwise noted.

Parameter	Symbol	Min.	Typical	Max	Unit
Power Supply Voltage	V <sub>CC</sub>	3.135	3.300	3.465	V
Operating Case Temperature	T <sub>C</sub>	0	25	70	°C

### Optical Characteristics

The following optical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
<b>Transmitter</b>						
Center Wavelength	$\lambda_t$	1295		1325	nm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Average Optical Power	P <sub>avg</sub>	-7.0	-	2	dBm	2
Launch Power in OMA minus Transmitter and Dispersion Penalty (TDP)		-5			dBm	
Extinction Ratio	ER	2.0	-	-	dB	3
Transmitter Dispersion Penalty	TDP	-	-	2.7	dB	
Optical Return Loss Tolerance		-	-	12	dB	
Eye Mask{X1, X2, X3, Y1, Y2, Y3}		{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}				
<b>Receiver</b>						
Center Wavelength	$\lambda_r$	1260	-	1350	nm	-
Damage Threshold	THd	3.5	-	-	dBm	-
Average Receive Power	-	-13.3	-	-	dBm	-
Receive Power (OMA)	-	-	-	2.2	dBm	-
Receiver Sensitivity (OMA)	SEN	-	-	-11.3	dBm	3
Stressed Receiver Sensitivity (OMA)	-	-	-	-8.8	dBm	-
Vertical Eye Closure Penalty, each Lane	-	-	1.9	-	dB	-
Stressed Eye J2 Jitter	-	-	0.27	-	UI	-
Stressed Eye J4 Jitter	-	-	0.39	-	UI	-

SRS Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3} Hit ratio 5x10 <sup>-5</sup> per sample	-	{0.24, 0.5, 0.5, 0.24, 0.24, 0.4}	-
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**Note:**

1. Trade-offs are available between spectral width, center wavelength and minimum OMA, as shown in table 6.
2. The optical power is launched into MMF
3. Measured with a PRBS 2<sup>31</sup>-1 test pattern @25.78125Gbps; BER=5x10<sup>-5</sup>

**Electrical Characteristics**

The following electrical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Data Rate	-	-	25.78125	-	Gbps	
Power Consumption	-	-	1200	1500	mW	
<b>Transmitter</b>						
Single Ended Output Voltage Tolerance	-	-0.3	-	4.0	V	-
C common mode voltage tolerance		15	-	-	mV	-
Tx Input Diff Voltage	VI	400	-	1600	mV	-
Tx Fault	VoL	-0.3	-	0.4	V	At 0.7mA
<b>Receiver</b>						
Single Ended Output Voltage Tolerance	-	-0.3	-	4.0	V	-
Rx Output Diff Voltage	Vo	300	-	850	mV	-

**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
11	VEER [1]	Receiver Ground
12	RD-	Receiver Inverted DATA out. AC Coupled
13	RD+	Receiver DATA out. AC Coupled

Information and specifications are subject to change without notice.  
Please visit [www.china-tscom.com](http://www.china-tscom.com) for more information.

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.

**Regulatory Compliance**

T&S SFP+ transceiver is designed to be Class I Laser safety compliant and is certified per the following standards:

Feature	Agency	Standard	Certificate / Comments
Laser Safety	FDA	CDRH 21 CFR 1040 and Laser Notice No. 50	1120292-000
Product Safety	UL	UL and CUL EN60950-2:2007	E347511
Environmental protection	SGS	RoHS Directive 2002/95/EC	GZ1001008918/CHEM
EMC	WALTEK	EN 55022:2006+A1:2007 EN 55024:1998+A1+A2:2003	WT10093759-D-E-E

**Ordering Information**

Part Number	Product Description
TSSP-3125G-LR	25.78125Gbps SFP28 10km 0°C ~ +70°C

**Important Notice**

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