TSSP-1325G-LR Optical Transceiver

1310nm SFP28 Single-Mode Transceiver, With DDM and Dual CDR

Duplex SFP28 10km Transceiver

Features

- Compliant with MSA SFP+ Specification SFF-8402
- Data Rate up to 25.78 Gb/s
- Operating Data Rate Support 24.33Gbps and 25.78Gbps with CDR Engaged mode
- Operating Data Rate Support 9.95Gbps and 10.31Gbps with CDR Bypassed mode
- 1310nm DFB-LD Transmitter
- Distance up to 10km over SMF
- Single 3.3V Power Supply and Power Dissipation < 1.5W
- Duplex LC Connector Interface, Hot Pluggable
- Built-in Dual CDR
- Case operation temperature range：Standard temperature: 0°C to 70°C

  Extended temperature: -20°C to 85°C
- RoHS6 compliant (lead free)

Applications

- 25GE LR
- eCPRI & CPRI

Description

The TSSP-1325G-LR single-mode transceiver is SFP28 module for duplex optical data communications support 24.33Gb/s and 25.78Gb/s with CDR engaged, while, 10G Ethernet optical data communication can be supported when CDR is bypassed.

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.

The transmitter section uses a 1310nm multiple quantum well DFB laser and is a 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.

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Absolute maximum ratings

Parameters	Symbol	Min.	Max.	Unit
Power Supply Voltage	VCC	0	+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	-	-	435	mA
Operating Case Temperature(standard)	Tca	0	-	70	°C
Operating Case Temperature(industrial)	Tca	-40	-	85	°C

Electrical characteristics

Parameter	Symbol	Min.	Typical	Max	Unit	Ref.
Power Consumption	-	-	-	1500	mW	-
Transmitter						
Input differential impedance	Rin	-	100	-	Ω	2
Differential Input Voltage swing	Vin	300	-	1100	mV	-
Transmit Disable Voltage	VD	VCC -1.3	-	VCC	V	-
Transmit Enable Voltage	VEN	Vee	-	Vee+0.8	V	3
Receiver						
Output differential impedance	Rout	-	100	-	Ω	2
Differential Output Swing	Vout	500	-	800	mV	4
Loss of Signal –Asserted	-	2.0	-	VCC+0.3	V	5
Loss of Signal –Negated	-	Vee	-	Vee+0.8	V	5

Notes:

1. Connected directly to TX data input pins. AC coupled thereafter.
2. Or open circuit.
3. Into 100 ohms differential termination.
4. Loss Of Signal is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

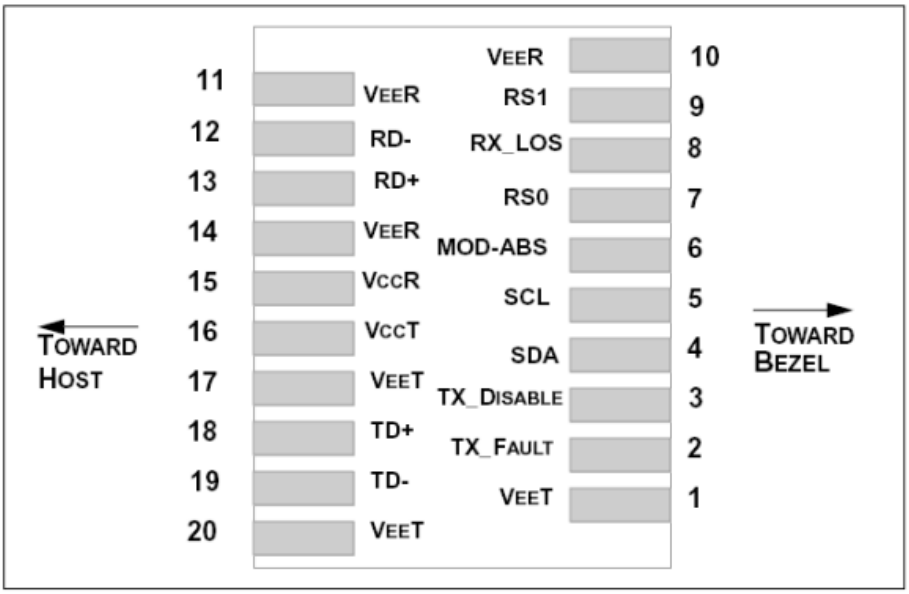
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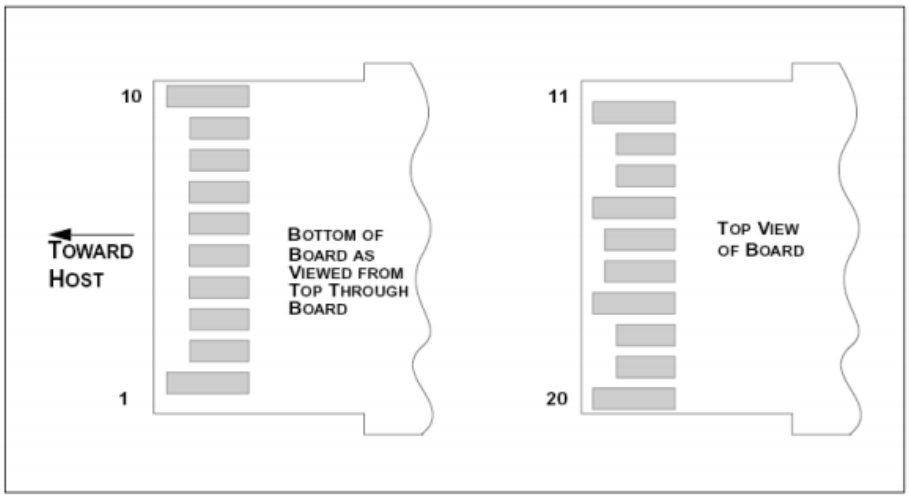
Optical characteristics

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Transmitter						
Center Wavelength	λ	1295	1310	1325	nm	-
Side Mode Suppression Ratio	SMSR	30	-	-	dB	-
Average Optical Power	Po	-7.0	-	2	dBm	2
Launch Power in OMA minus Transmitter and Dispersion Penalty (TDP)	-	-5	-	-	dBm	-
Extinction Ratio	ER	3.5	-	-	dB	3
Transmitter Dispersion Penalty	TDP	-	-	2.7	dB	-
Optical Return Loss Tolerance	ORL	-	-	12	dB	-
Eye Mask {X1, X2, X3, Y1, Y2, Y3}	-	{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}				-
Receiver						
Center Wavelength	λ	1260	-	1350	nm	-
Damage Threshold	DT	3.5	-	-	dBm	-
Receiver Sensitivity (OMA)	Rsen	-	-	-11.3	dBm	3
Receiver Overload	Pmax	2.2	-	-	dBm	-
Stressed Receiver Sensitivity (OMA)	RXSRS	-	-	-8.8	dBm	-
Vertical Eye Closure Penalty, each Lane	VECP	-	1.9	-	dB	-
Stressed Eye J2 Jitter	J2	-	0.27	-	UI	-
Stressed Eye J4 Jitter	J4	-	0.39	-	UI	-
SRS Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3} Hit ratio 5x10-5 per sample	-	{0.24, 0.5, 0.5, 0.24, 0.24, 0.4}				-

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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
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 3.15Vand 3.6V.

[3] Tx_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VCC T inside the module.

[4] Mod_ABS is connected to VeeT or VeeR in the SFP28 module. The host may pull this contact up to VCC _Host with a resistor in the range 4.7 kΩ to10 kΩ.Mod_ABS is asserted “High” when the SFP28 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-1325G-LRC	25.78125Gbps SFP28 10km 0ºC ~ +70ºC
TSSP-1325G-LRT	25.78125Gbps SFP28 10km -40ºC ~ +85ºC

References

1. SFP28 MSA
2. Directive 2011/65/EU of the European Parliament and of the Council, “on the restriction of the use of certain hazardous substances in electrical and electronic equipment,” July 1, 2011.

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