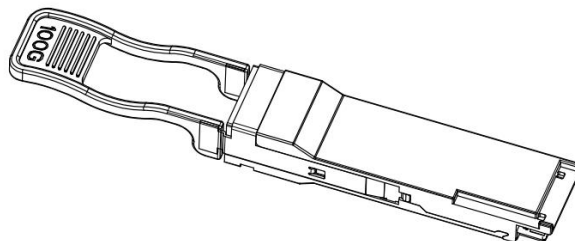


TS-Q8-P311H-10DC

100G QSFP28 10km PSM4 Transceivers

Features

- MPO12 optical interface
- Maximum link length up to 10km
- Up to 25.78125Gb/s data links per lane
- +3.3 V power supply
- QSFP MSA compliant package
- Hot Pluggable
- High performance singal mode DML transmitter
- High sensitivity PIN/TIA optical receiver
- Single Mode operation
- BER < 5E-5@-11.5dBm (OMA)
- Built-in CDR
- Case Operating temperature : 0 to 70°C
- Data and Control Interfaces
- Tx Data CML/AC Coupled
- Rx Data CML/AC Coupled
- ModSelL LVTTL
- ResetL LVTTL
- ModPrsL LVTTL
- LPMode LVTTL
- 2-wire I2C communication bus
- RoHS 6 compliance



Applications

- 100G BASE Ethernet
- Infiniband EDR interconnects
- Enterprise networking

Ordering Information

Part Number	Case Operating Temperature
TS-Q8-P311H-10DC	100G QSFP28 10km PSM4 0 to 70 °C

General Description

The TS-Q8-P311H-10DC QSFP28 optical transceiver is intended for up to 10km reach service with four-lane 25.78125G data rate. It is based on 3.3V DC power supply and operates in the commercial temperature range. It is compliant with QSFP MSA 、SFF-8436 、SFF-8636 and PSM4 MSA. Digital diagnostic functions are available via I2C interface, and the control functions can be achieved by LVTTTL interfaces on the host, mainly including Module Select(ModSelL)、Module Reset(ResetL)、Low Power Mode(LPMode). The transceiver incorporates a four-laser array which is usually DFB 、four-PIN diode array 、a high performance CDR integrated four drivers and TIAs IC separately. The differential AC coupled Tx and Rx data interfaces are CML compatible.

Absolute maximum parameters

Absolute Maximum Ratings (EXCEEDING THESE RATINGS MAY CAUSE IRREVERSIBLE DAMAGE TO THE DEVICE)					
Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	T _{stg}	-40	+95	°C	Exceeding the absolute maximum ratings may cause irreversible damage to the device. The device is not intended to be operated under the condition of simultaneous absolute maximum ratings, which may cause irreversible damage to the device.
Case Operating Temperature (Commercial)	T _O	0	+70	°C	
Relative Humidity - Storage	R _{HS}	0	95	%	
Relative Humidity - Operating	R _{HO}	0	85	%	
Supply Voltage	VCC	-0.3	3.6	V	

Operating conditions

Recommended Operating Conditions						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Case Operating Temperature	T _{case}	0	-	+70	°C	

DC Supply Voltage	VCC	3.135	-	3.465	V	
Module Supply Current	I _{IN}	-	-	1060	mA	

Electrical Characteristics

Transmitter Electrical Characteristics						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Differential Data input Swing	V _{IN}	180	-	900	mV	
Tx Differential Input Impedence	Z _{in}	90	100	110	Ω	
Tx Differential Output Impedence	Z _{out}	45	50	55	Ω	
ResetL Disable Voltage	V _r	2.0	-	V _{CC} +0.3	V	
ResetL Enable Voltage	V _{rEN}	0	-	0.8	V	
ModSelL Disable Voltage	V _m	2.0	-	V _{CC} +0.3	V	
ModSelL Enable Voltage	V _{mEN}	0	-	0.8	V	
Receiver Electrical Characteristics						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Differential Data Output Swing	V _{OUT}	180	-	900	mV	
Rx Differential Output Impedence	Z _{OUT}	90	100	110	Ω	
IntL Assert Voltage	V _{Int}	V _{CC} -0.5	-	V _{CC} +0.3	V	
IntL De-assert Voltage	VD _{Int}	0	-	+0.4	V	

Optical Specification

Transmitter Optical Specification						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Signal Rate Each Lane			25.78125± 100ppm		Gbps	
Lane Wavelength	L0	1295	1310	1325	nm	
	L1	1295	1310	1325	nm	
	L2	1295	1310	1325	nm	
	L3	1295	1310	1325	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Total Average Launch Power	P _{tol}			8.5	dBm	
Average Launch Power Each Lane	P _{avg}	-6.5		2.5	dBm	
Optical Modulation Amplitude Each Lane	OMA			2.5	dBm	

Transmitter and dispersion penalty Each Lane	TDP			2.2	dB	
Eye Mask coordinates: X1, X2, X3, Y1, Y2, Y3		{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}				1
Average launch power of OFF transmitter Each Lane				-30	dBm	
Extinction Ratio	ER	3.5			dB	
Spectral Width _{20dB}				1	nm	
Transmitter Reflectance				-12	dB	
Optical return loss tolerance				20	dB	

Note:

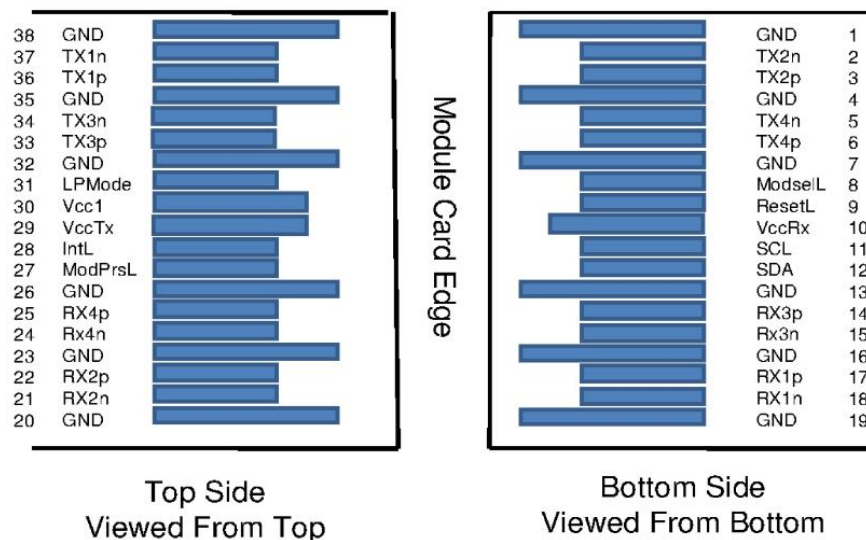
1. Hit ratio of 5e-5, per IEEE.

Receiver Optical Specification						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Signal Speed Per Lane			25.78125 ±100ppm		Gbps	
Lane Wavelength	L0	1295	1310	1325	nm	
	L1	1295	1310	1325	nm	
	L2	1295	1310	1325	nm	
	L3	1295	1310	1325	nm	
Damage threshold Each Lane	THd			3.0	dBm	1
Average Receive Power Each Lane		-12		2.5	dBm	2
Sensitivity OMA Each Lane	Sen			-11.5	dBm	2
Receiver reflectance				-26	dB	
LOS Assert	LOSA	-24				
LOS Deassert	LOSD			-11.6		
LOS Hysteresis	LOSH	0.5		6		

Note:

1. The receiver shall be able to tolerate, without damage, continuous exposure to a modulated optical input signal having this power level on one lane. The receiver does not have to operate correctly at this input power.
2. Measured with conformance test signal at receiver input for BER = 5e-5 BER.

PIN ASSIGNMENT

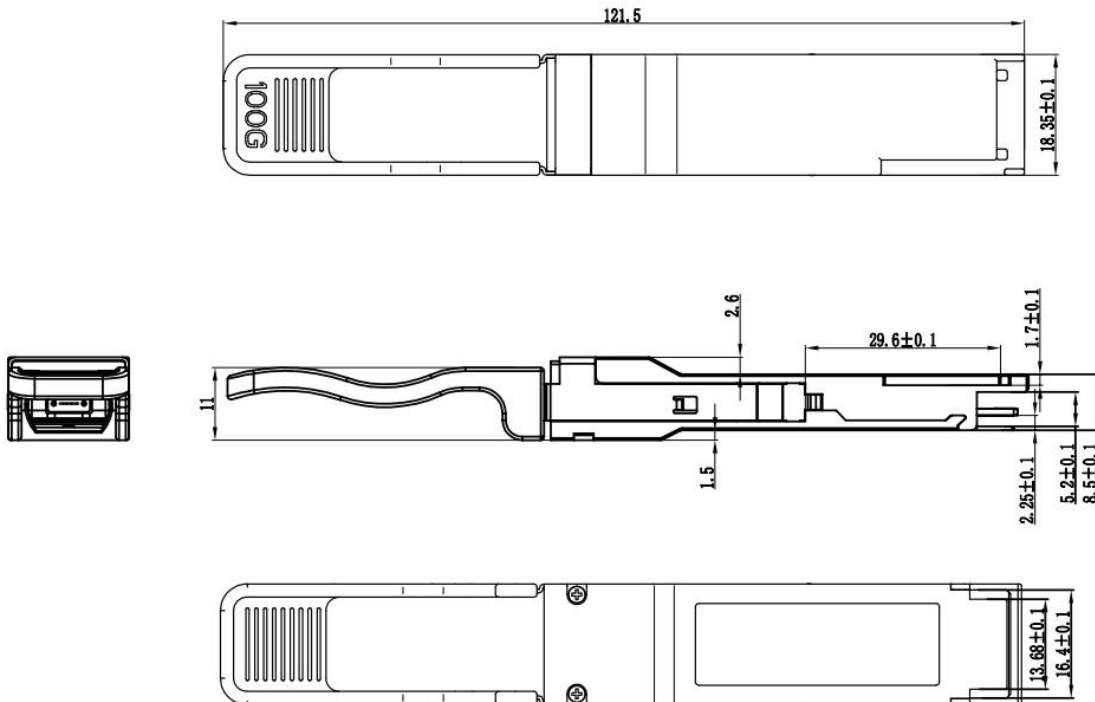


PIN DESCRIPTION

PIN	Logic	Symbol	Name/Description	Note
1		GND	Ground	
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	
4		GND	Ground	
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data output	
7		GND	Ground	
8	LVTTL-I	ModSelL	Module Select	
9	LVTTL-I	ResetL	Module Reset	
10		VccRx	+ 3.3V Power Supply Receiver	
11	LVC MOS-I/ O	SCL	2-Wire Serial Interface Clock	
12	LVC MOS-I/ O	SDA	2-Wire Serial Interface Data	
13		GND	Ground	
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	
15	CML-O	Rx3n	Receiver Inverted Data Output	
16		GND	Ground	
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	
18	CML-O	Rx1n	Receiver Inverted Data Output	
19		GND	Ground	

20		GND	Ground	
21	CML-O	Rx2n	Receiver Inverted Data Output	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Ground	
24	CML-O	Rx4n	Receiver Inverted Data Output	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Ground	
27	LVTTL-O	ModPrsL	Module Present	
28	LVTTL-O	IntL	Interrupt	
29		VccTx	+3.3 V Power Supply transmitter	
30		Vcc1	+3.3 V Power Supply	
31	LVTTL-I	LPMODE	Low Power Mode	
32		GND	Ground	
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	
34	CML-I	Tx3n	Transmitter Inverted Data Output	
35		GND	Ground	
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Output	
38		GND	Ground	

OUTLINE DIMENSIONS



Digital Diagnostic Monitor Accuracy

The following characteristics are defined over recommended operating conditions

Parameter	Accuracy	Unit
Internally measured transceiver temperature	+/-3	deg.C
Internally measured transceiver supply voltage	+/-3	%
Measured Tx bias current	+/-10	%
Measured Tx output power	+/-3	dB
Measured Rx received average optical power	+/-3	dB