TSQL4-F22JH8C Optical Transceiver

100G QSFP28 ER4 40km Transceiver, With Diagnostic Monitoring

Features

- Compliant to Ethernet 100GBASE-ER4
- Supports 103.1Gb/s aggregate bit rate
- Transmitter: cooled 4x25Gb/s LAN WDM TOSA (1295.56, 1300.05, 1304.58, 1309.14nm)
- Receiver: 4x25Gb/s APD ROSA
- Up to 40km reach for G.652 SMF with FEC
- Duplex LC optical receptacle
- 4x25G electrical interface (OIF CEI-28G-VSR)
- RoHS-6 compliant and lead-free
- Single +3.3V power supply
- Maximum power consumption 4.5W
- Case operating temperature: 0 ~ +70oC

Applications

- 100GBASE-ER4 Ethernet Links
- Infiniband QDR and DDR interconnects

Description

This product is a 100Gb/s transceiver module designed for optical communication applications compliant to Ethernet 100GBASE-ER4 standard. The module converts 4 input channels of 25Gb/s electrical data to 4 channels of LAN WDM optical signals and then multiplexes them into a single channel for 100Gb/s optical transmission. Reversely on the receiver side, the module de-multiplexes a 100Gb/s optical input into 4 channels of LAN WDM optical signals and then converts them to 4 output channels of electrical data.

The central wavelengths of the 4 LAN WDM channels are 1295.56, 1300.05, 1304.58 and 1309.14nm as members of the LAN WDM wavelength grid defined in IEEE 802.3ba. The high performance cooled LAN WDM DFB transmitters and high sensitivity APD receivers provide superior performance for 100Gigabit Ethernet applications up to 40km links.

The product is designed with form factor, optical/electrical connection and digital diagnostic interface according to the QSFP+ Multi-Source Agreement (MSA). It has been designed to meet the harshest external operating conditions including temperature, humidity and EMI interference.

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

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	V_{CC}	-0.5	+3.6	V
Storage Temperature	Tc	-20	+85	°C
Relative Humidity	RH	5	85	%

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Power Supply Voltage	VCC	3.13	3.3	3.47	V
Operating Case Temperature	Tca	0		70	°C
Data Rate Per Lane	fd	-	25.78125	-	Gb/s
Link Distance	D	-	-	40	km

Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max	Unit	Ref.
Transmitter						
Input differential impedance	Rin	90	100	110	Ω	1
Differential Input Voltage Amplitude	Vin	900	-	-	mVp-p	2
Receiver						
Output differential impedance	Rout	90	100	110	Ω	1
Differential Output Voltage Amplitude	Vout	-	-	900	mVp-p	3

Notes:

[1] AC coupled.

[2] Differential input voltage amplitude is measured between TxnP and TxnN.

[3] Differential output voltage amplitude is measured between RxnP and RxnN.

Transmitter Specifications – Optical

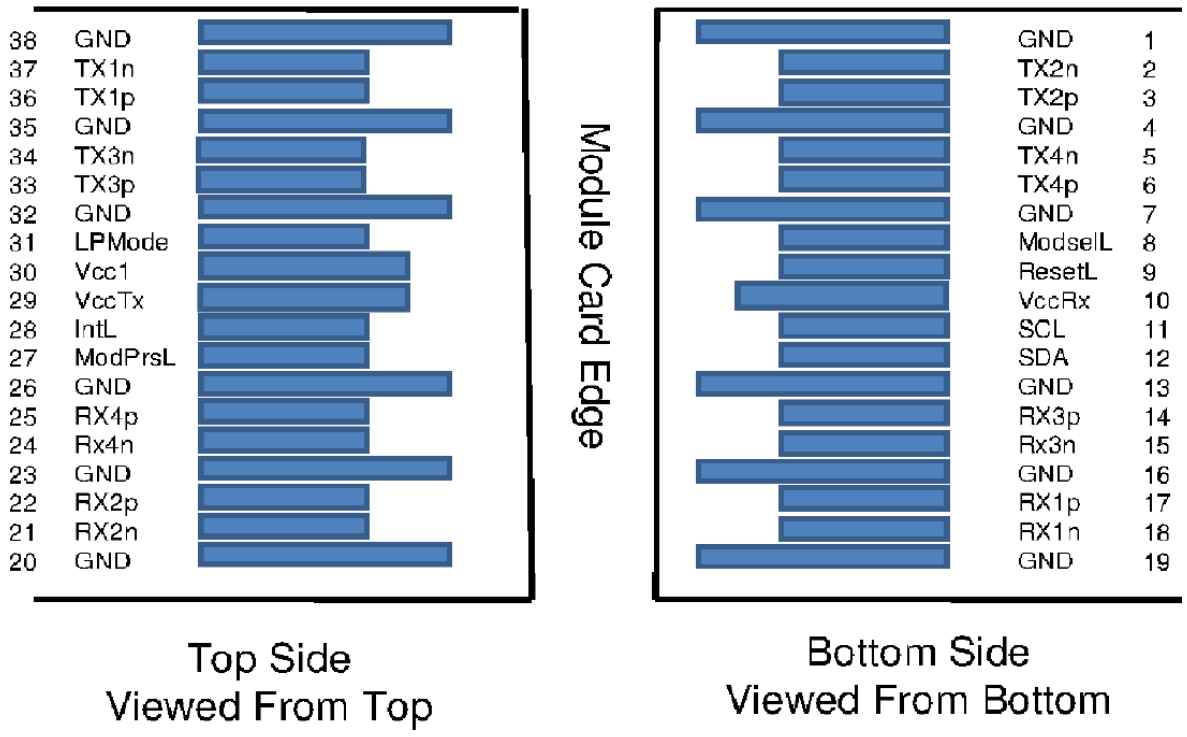
Parameter		Symbol	Min	Typical	Max	Unit
Center Wavelength	Ch0	λ0	1294.53	1295.56	1296.59	nm
	Ch1	λ1	1299.02	1300.05	1301.09	nm
	Ch2	λ2	1303.54	1304.58	1305.63	nm
	Ch3	λ3	1308.09	1309.14	1310.09	nm
Bit Rate per Channel		BR	25.78125±100ppm			Gb/s
Side Mode Suppression Ratio		SMSR	30	-	-	dB
Average launch power, each lane			-2.9		4.5	dBm
Launch power in OMA minus TDP, each lane		OMA-TDP	-0.65			dBm
Transmission & dispersion penalty, each lane		TDP			2.5	dB
Relative Intensity Noise		RIN			-130	dB/Hz
Transmitter Reflectance		RT			-12	dB
Extinction Ratio		ER	7			dB
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}				
Average launch power of OFF transmitter, each lane					-30	dBm
Optical return loss tolerance					20	dB

Receiver Specifications – Optical

Parameter		Symbol	Min	Typical	Max	Unit
Center Wavelength	Ch0	λ0	1294.53	1295.56	1296.59	nm
	Ch1	λ1	1299.02	1300.05	1301.09	nm
	Ch2	λ2	1303.54	1304.58	1305.63	nm
	Ch3	λ3	1308.09	1309.14	1310.09	nm
Bit Rate per Channel		BR	25.78125±100ppm			Gb/s
Damage threshold, each lane					-3.0	dBm
Average receive power, each lane			-20.9		-4.9	dbm
Unstressed Sensitivity (OMA) at 5 x 10^{-5} BER		OMA	-	-	-18.6	dBm
LOS Assert		LOSA	-30			dBm
LOS De-assert		LOSD			-24	dBm

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

Pin Descriptions



Pin Definition

Pin	Symbol	Name/Description
1	GND	Ground
2	Tx2n	Transmitter Inverted Data Input
3	Tx2p	Transmitter Non-Inverted Data Input
4	GND	Ground
5	Tx4n	Transmitter Inverted Data Input
6	Tx4p	Transmitter Non-Inverted Data Input
7	GND	Ground
8	ModSelL	Module Select
9	ResetL	Module Reset
10	Vcc Rx	+3.3 V Power supply receiver
11	SCL	2-wire serial interface clock
12	SDA	2-wire serial interface data
13	GND	Ground
14	Rx3p	Receiver Non-Inverted Data Output
15	Rx3n	Receiver Inverted Data Output
16	GND	Ground
17	Rx1p	Receiver Non-Inverted Data Output
18	Rx1n	Receiver Inverted Data Output

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

Ordering Information

Part Number	Product Description
TSQL4-F22JH8C	100Gbps QSFP28 ER4 40km, 0°C ~ +70°C

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.

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