TSQM4-NCNGD3C Optical Transceiver

Single-Mode 40GBASE Transceiver, With Diagnostic Monitoring Duplex QSFP+ PSM4 2km Transceiver

Features

- Four-channel full-duplex transceiver modules
- Transmission data rate up to 11.2Gbit/s per channel
- Up to 2km transmission of single mode fiber
- Low power consumption <2.5W，meet class 3
- Operating case temperature: 0 to 70°C
- 3.3V power supply voltage
- Hot Pluggable QSFP form factor
- RoHS 6 compliant
- Single MPO connector receptacle
- Built-in digital diagnostic function

Applications

- Infiniband QDR and DDR interconnects
- 40G Ethernet
- Proprietary High Speed Interconnections
- Data center

Description

This product is a Four-Channel, Pluggable, Parallel, Fiber-Optic QSFP+ Transceiver for InfiniBand QDR/DDR/SDR, 10G/8G/4G/2G fiber channel, PCIe and SAS Applications.

The QSFP full-duplex optical module offers 4 independent transmit and receive channels, each capable of 10.3Gbps operation for an aggregate data rate of 40Gbps 2km using single mode fiber. These modules are designed to operate over single mode fiber systems using 1310nm DFB laser array. An optical fiber ribbon cable with an MPO/MTPTM connector can be plugged into the QSFP module receptacle. QSFP+ PSM IR4 is one kind of parallel transceiver which provides increased port density and total system cost savings.

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
Power Supply Voltage	VCC	-0.3	+3.6	V
Storage Temperature	Tc	-40	+85	℃
Relative Humidity	RH	0	85	%

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Power Supply Voltage	VCC	3.135	3.30	3.465	V
Operating Case Temperature	Tca	0		70	℃

Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max	Unit	Ref.
Transmitter						
Input differential impedance	Rin	-	100	-	Ω	1
Differential input voltage amplitude	ΔVin	300		1100	mVp-p	
Input Logic Level High	VIH	2.0		VCC	V	
Input Logic Level Low	VIL	0		0.8	V	
Receiver						
Output differential impedance	Rout		100		Ω	1
Differential Output Swing, per lane	Vout	500		800	mVp-p	2
Output Logic Level High	VOH	VCC-0.5		VCC	V	
Output Logic Level Low	VOL	0		0.4	V	

Notes:

[1] AC coupled.

[2] Into 100 ohm differential termination.

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Transmitter Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit	
Center Wavelength	λC	1270	1310	1350	nm	1
RMS Spectral Width	λrms			3.5	nm	1
Average Launch Power, each lane	PAVG	-5.5	-0.5	+2.3	dBm	
Optical Modulation Amplitude (OMA)	POMA	-4.5	-0.5	+3.5	dBm	1
Difference in Launch Power between any two lanes	Ptx,diff			5.0	dB	
Launch Power in OMA minus Transmitter and Dispersion Penalty (TDP), each Lane	OMA-TDP	-9.7			dBm	1
Rise/Fall Time	Tr/Tf			50	ps	
Extinction Ratio	ER	3.5			dB	
Relative Intensity Noise	Rin			-128	dB/Hz	
Optical Return Loss Tolerance	TOL			12	dB	
Transmitter Reflectance	RT			-12	dB	
Transmitter Eye Mask Margin	EMM	10			%	2
Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}			dB	
Average Launch Power OFF Transmitter, each Lane	Poff			-30	dBm	

Receiver Specifications – Optical

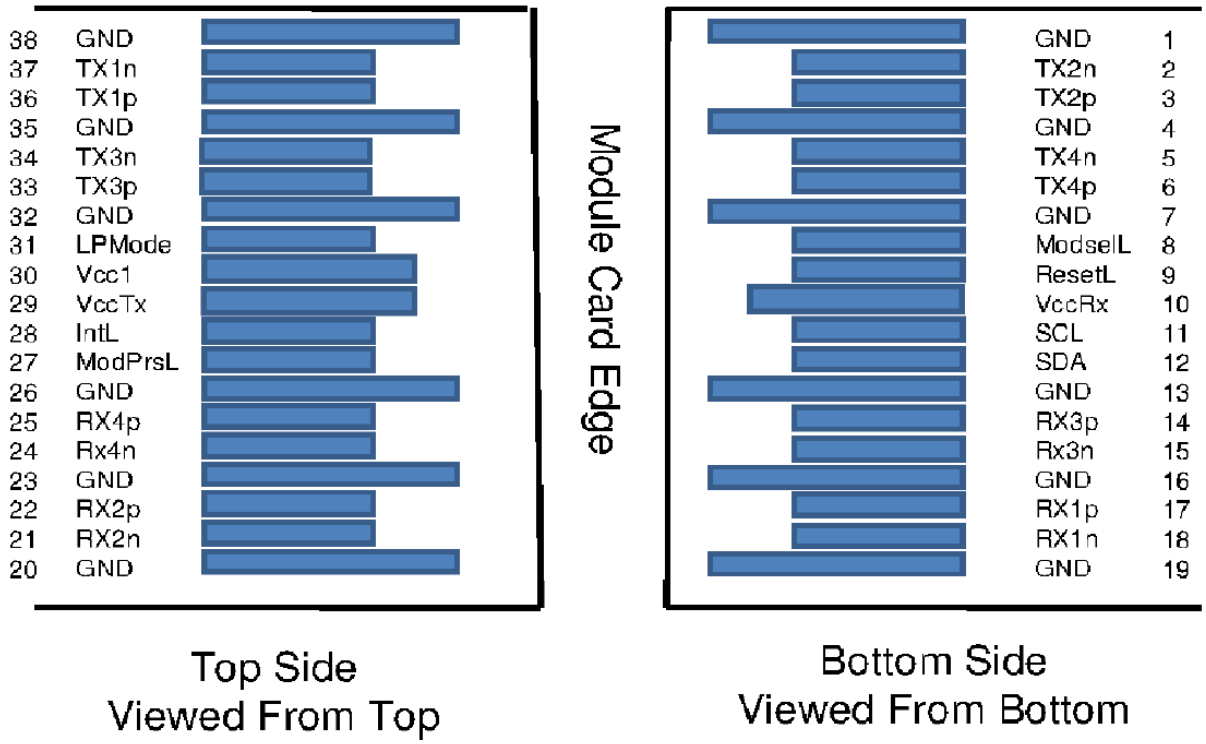
Parameter	Symbol	Min	Typical	Max	Unit	
Center Wavelength	λ_C	1270	1310	1350	nm	
Damage Threshold	THd	+3			dBm	
Overload, each lane	OVL	+2.3			dBm	
Receiver Sensitivity in OMA, each Lane	SEN			-11.5	dBm	
Difference in Receive Power between any two Lanes (OMA)	Prx,diff			5.0	dB	
Signal Loss Assert Threshold	LOSA	-30			dBm	
Signal Loss Deassert Threshold	LOSD			-15	dBm	
LOS Hysteresis	LOSH	0.5		6	dB	
Optical Return Loss	ORL			-12	dBm	
Receive Electrical 3 dB upper Cutoff Frequency, each Lane	Fc			12	GHz	

Notes:

[1] Transmitter wavelength, RMS spectral width and power need to meet the OMA minus TDP specs to guarantee link performance.

[2] The eye diagram is tested with 1000 waveform.

Electrical Pad Layout



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
TSQM4-NCNGD3C	40Gbps QSFP+ PSM4 2km, 0°C ~ +70°C

Important Notice

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