

TSQM4-NAAJA1 Optical Transceiver

Multi-mode 100G QSFP28 SR4 Transceiver, With Diagnostic Monitoring

Features

- 4 channels full-duplex Transceiver
- Transmission data rate 25.78125Gbps per channel
- 4 channels 850nm VCSEL array
- 4 channels PIN photo detector array
- Hot-pluggable QSFP28 form factor
- Low power consumption < 2.5W
- Single 1X12 MPO connector receptacle
- Hot-pluggable electrical interface
- Operating case temperature: 0°C ~+70°C/-20°C ~+85°C/-40°C ~+85°C
- RoHS6 compliant (lead free) 

Applications

- IEEE 802.3bm 100GBASE SR4

Description

The TSQM4-NAAJA1 module is a highly integrated 4x25G transceiver focused on reach, bandwidth, density and cost for high port-count 100G systems, and client-side 100G interfaces. Each lane can operate at 25Gbps up to 70m using OM3 fiber or 100m using OM4 fiber. These modules are designed to operate over multimode fiber systems using a nominal wavelength of 850nm. The electrical interface uses a 38-contact edge type connector. The optical interface uses a 12-fiber MPO connector.

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	-0.5	+3.6	V
Storage Temperature	Tc	-40	+85	°C
Relative Humidity	RH	0	85	%

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	VCC	3.15	3.30	3.45	V
Operating Case Temperature	Tca	0	-	70	°C
	Tca	-20	-	85	°C
	Tca	-40	-	85	°C

Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max	Unit	Ref.
Transmitter						
Input differential impedance	Rin	-	100	-	Ω	-
Differential Input Voltage swing, per lane	Vin	300	-	1100	mV	-
Input Logic Level High	VIH	2.0	-	VCC+0.3	V	-
Input Logic Level Low	VIL	Vee	-	Vee+0.8	V	-
Receiver						
Output differential impedance	Rout	-	100	-	Ω	-
Differential Output Swing, per lane	Vout	500	-	800	mV	-
Output Logic Level High	VOH	2.0	-	VCC+0.3	V	-
Output Logic Level Low	VOL	0	-	+0.4	V	-

Transmitter Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit	-
Signaling Speed per Lane	-	25.78125 ± 100ppm			Gb/s	--
Center Wavelength	λ	840	850	860	nm	
RMS spectral width	Δλ	-	-	0.6	nm	-
Average Launch Power per Lane	Po	-6	-	2.4	dBm	-
Transmit OMA per Lane	OMA	-6.4	-	3	dBm	-
Launch Power [OMA] minus TDEC per Lane	P-TDEC	-7.3	-	-	dBm	-
Extinction Ratio	ER	3	-	-	dB	-
Optical Return Loss Tolerance	ORL	-	-	12	dB	-
Average launch power of OFF transmitter, each lane	-	-	-	-30	dBm	-

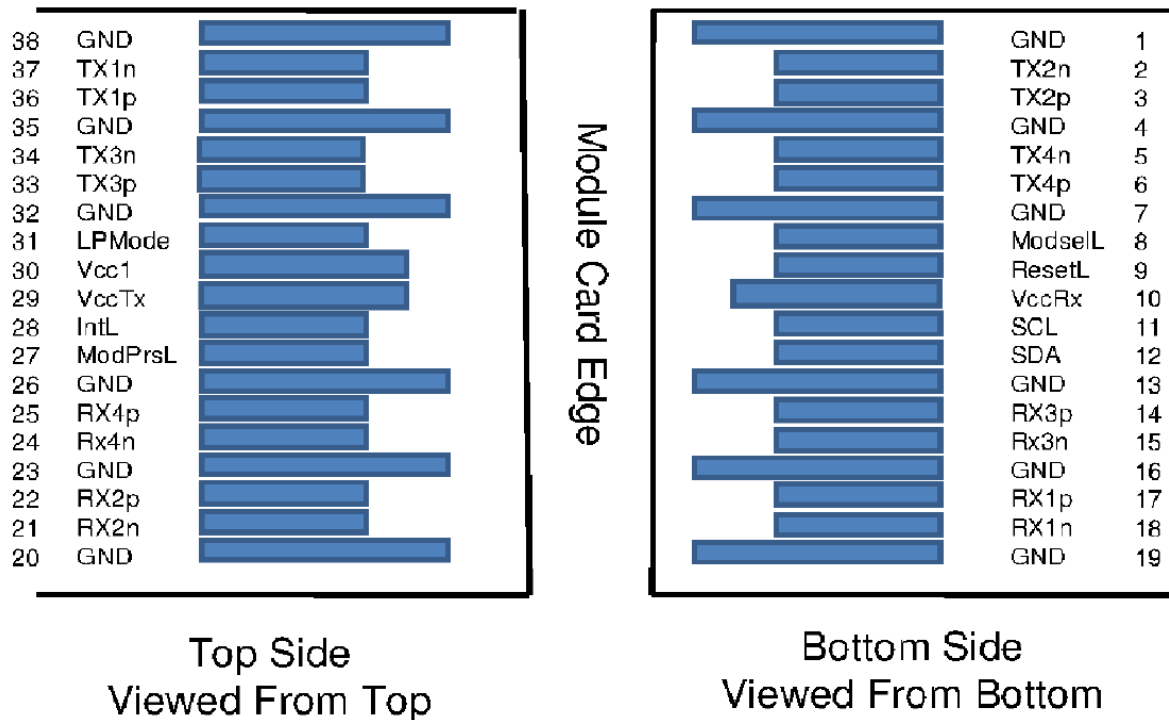
Receiver Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit	-
Bit Rate per Channel	DR	25.78125 ± 100ppm			Gb/s	-
Center Wavelength	λ	840	850	860	nm	-
Damage Threshold	DT	3.4	-	-	dBm	-
Average receive power, each lane	RXPOW	-10.3	-	2.4	dbm	-

Note:

[1] BER=5E-5; PRBS 2^31-1@25.78125Gbps.

Qsfp28 Transceiver 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

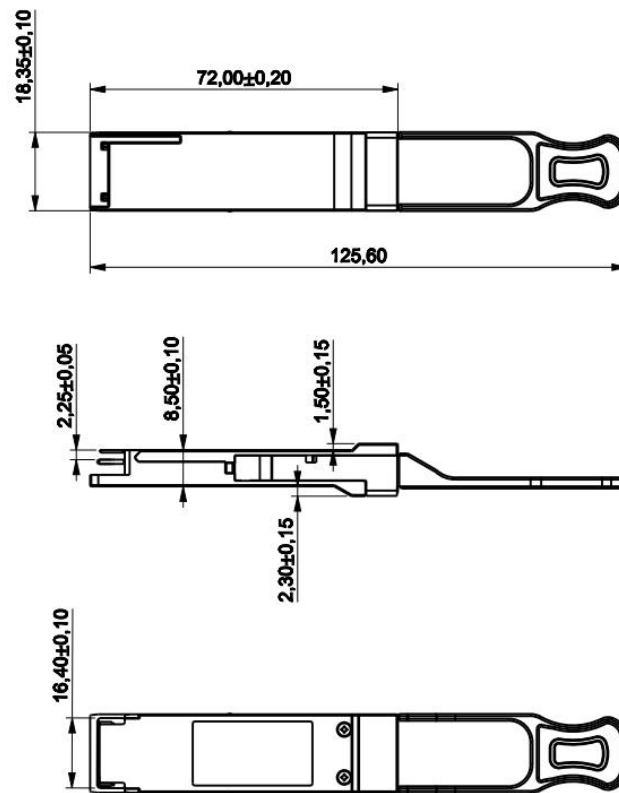
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Please visit www.china-tscom.com for more information

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



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	VCC 1	+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

Mechanical



Unit: mm

Ordering Information

Part Number	Product Description
TSQM4-NAAJA1C	100G QSFP28 SR4 OM3 MMF and 100m on OM4 MMF 0°C ~ +70°C
TSQM4-NAAJA1E	100G QSFP28 SR4 OM3 MMF and 100m on OM4 MMF -20°C ~ +85°C
TSQM4-NAAJA1T	100G QSFP28 SR4 OM3 MMF and 100m on OM4 MMF -40°C ~ +85°C

References

1. SFF-8636 Specification for QSFP28.
2. Ethernet 100GBASE-SR4 IEEE802.3bm

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