

TSQM4-NAAKA1 Optical Transceiver

128GFC Multi-mode QSFP28 SW4 Optical Transceiver, With Diagnostic Monitoring

Features

- 4 channels full-duplex Transceiver
- Transmission data rate 28.05 Gb/s per lane
- 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

- 128G Fiber Channel

Description

The TSQM4-NAAKA1 module is a highly integrated 4x28G transceiver focused on reach, bandwidth, density and cost for high port-count 128G Fiber Channel systems. Each lane can operate at 28.05Gbps 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

Information and specifications are subject to change without notice.
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Relative Humidity	RH	0	85	%
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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		28.05 ± 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	
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

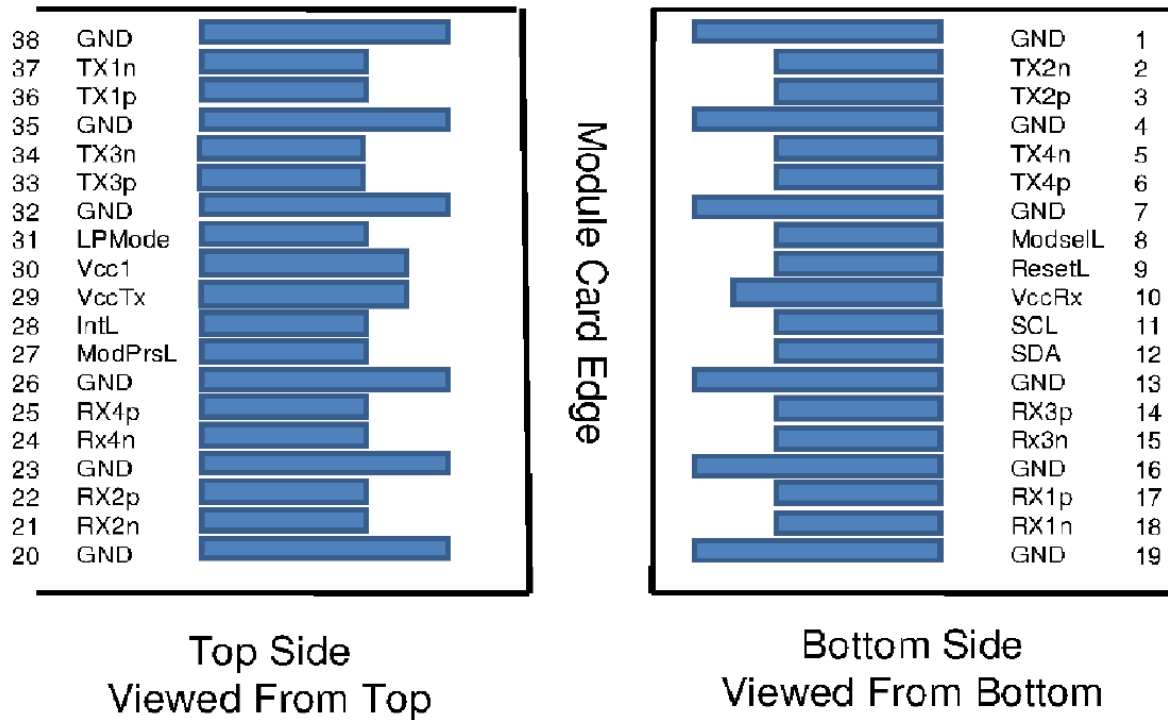
Parameter	Symbol	Min	Typical	Max	Unit	
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Bit Rate per Channel	DR	28.05 ± 100ppm			Gb/s	
Center Wavelength	λ	840	850	860	nm	
Damage Threshold	DT	3.4			dBm	
Receiver sensitivity in OMA		-5.2			dBm	
Maximum Average power at receiver , each lane input				2.4	dBm	

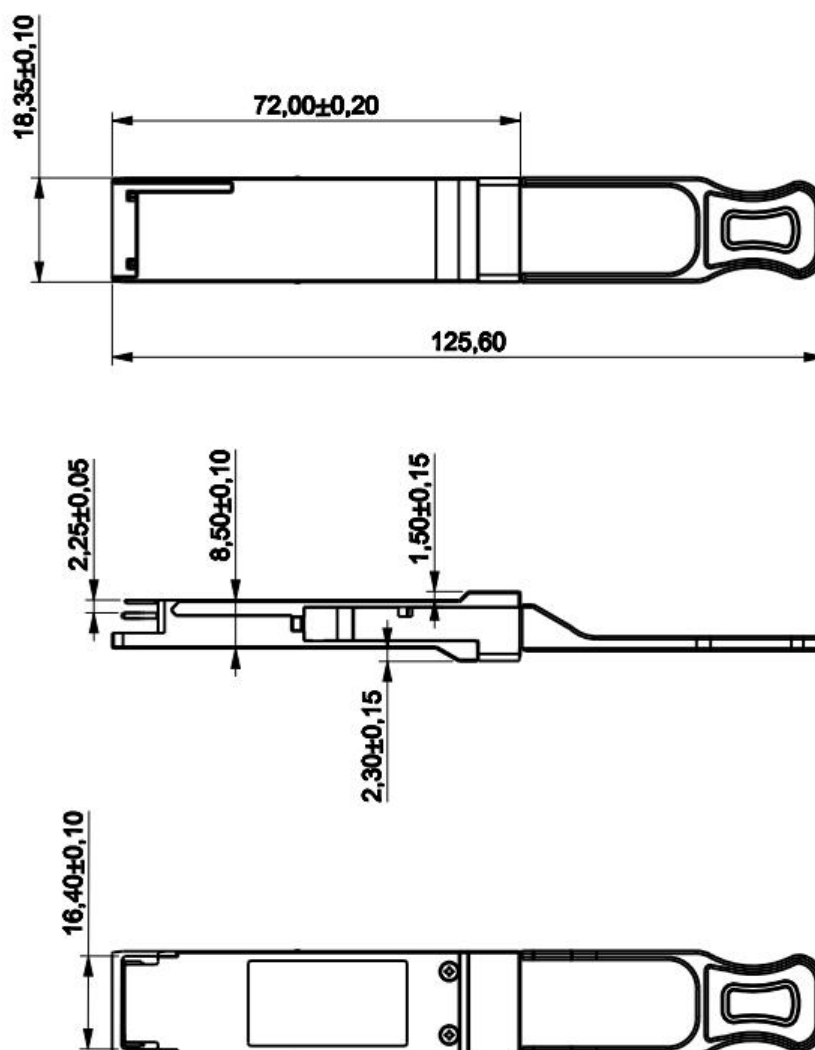
Note:[1] BER=5E-5; PRBS 2³¹-1@28.05Gbps.**Qsfp Transceiver Electrical Pad Layout****Pin Definition**

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
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

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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-NAAKA1C	128GFC QSFP28 SW4 Optical Transceiver OM3 MMF and 100m on OM4 MMF 0°C ~ +70°C
TSQM4-NAAKA1E	128GFC QSFP28 SW4 Optical Transceiver OM3 MMF and 100m on OM4 MMF -20°C ~ +85°C
TSQM4-NAAKA1T	128GFC QSFP28 SW4 Optical Transceiver OM3 MMF and 100m on OM4 MMF -40°C ~ +85°C

Important Notice

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