

TSQM4-NAAMA1C Optical Transceiver

Multi-mode 850nm 400G QSFP112 SR4 Transceiver, With Diagnostic Monitoring

Features

- Hot-pluggable QSFP112 form factor
- Data Rate 106.25 Gb/s PAM4 per lane
- 4x106Gbps PAM4 transmitter and PAM4 receiver
- 4 channels 850nm VCSEL laser array and 4 channels PIN photo-detector array
- Maximum link length of 30m on OM3 MMF and 50m on OM4 MMF
- Digital diagnostics functions are available via the I2C interface
- Single 3.3V Power Supply and Power Dissipation < 14W
- MPO-12 APC connector
- Operating Case Temperature: 0°C~+70°C
- RoHS compliant 

Applications

- 400G BASE-SR4 Ethernet

Production Description

The TSQM4-NAAMA1C is a 4-Channel, Pluggable, Fiber-Optic QSFP112 for 400Gbps SR4 Applications. It is a high performance module for short-range data communication and interconnect applications which operate at 106.25Gbps per lane up to 30m using OM3 fiber and 50m using OM4 fiber. The optical interface uses MPO receptacles.

This module is designed to operate over multimode fiber systems using a nominal wavelength of 850nm. The electrical interface uses a 60 contact edge type connector.

Absolute Maximum Rating

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	%

Information and specifications are subject to change without notice.
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8 Jinxiu Middle Road, Pingshan, Shenzhen, Guangdong, 518118, P. R. China
+86 755 32983688 | info@china-tscom.com | www.china-tscom.com



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	T _{Ca}	0	-	70	°C

Electrical Characteristics

The following electrical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Data Rate per lane	DR	-	106.25	-	Gbps	-
Transmitter						
Single Ended Output Voltage Tolerance	-	-0.3	-	4.0	V	-
Common mode voltage tolerance	-	15	-	-	mV	-
Input differential impedance	R _{in}	-	100	-	Ω	-
Differential Input Voltage swing	V _{in}	300	-	1100	mV	-
Tx Fault	VoL	-0.3	-	0.4	V	At 0.7mA
Receiver						
Single Ended Output Voltage Tolerance	-	-0.3	-	4.0	V	-
Differential Output Swing	V _{out}	300	-	900	mV	-
Output differential impedance	R _{out}	-	100	-	Ω	-

Optical Characteristics

The following optical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Transmitter						
Center Wavelength	λ	844	850	863	nm	-
RMS spectral width	Pm	-	-	0.6	nm	1
Average Optical Power	Po	-4.6	-	4	dBm	2
Extinction Ratio	ER	2.5	-	-	dBm	-
Optical Modulation Amplitude(OM _{Aouter}) (max)	OM _A	3.5			dBm	-
Optical Modulation Amplitude (OM _{Aouter}) (min)		-2.6				-
Max (TECQ, TDECQ) ≤1.8dB 1.8<max(TECQ, TDECQ) ≤4.4dB		-4.4+max(TECQ, TDECQ)				

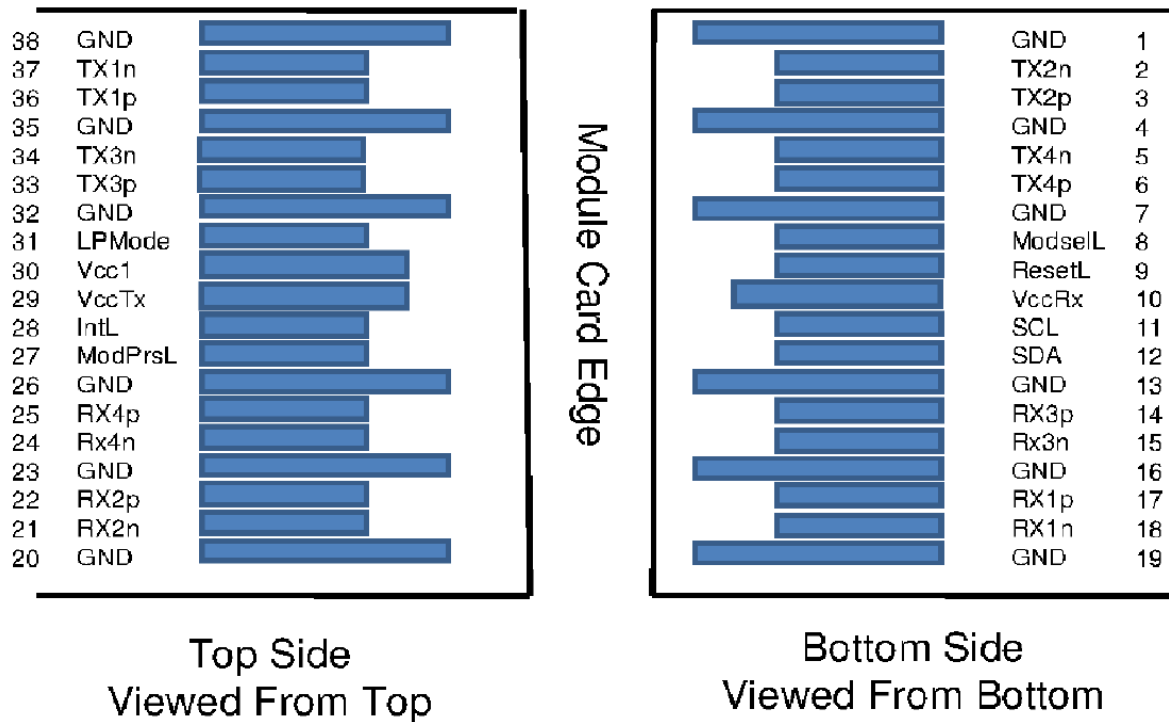
Transmitter and Dispersion Eye Closure	TDECQ	-	-	4.4	dB	-
Transmitter Eye Closure	TECQ	-	-	4.4	dB	-
Optical Return Loss Tolerance	ORL	-	-	14	dB	-
Receiver						
Center Wavelength	λ	842	850	948	nm	-
Average Receive power ,each lane	-	-6.4	-	4	dBm	-
Receive power (OMAUouter), each lane	-	-	-	3.5	dBm	-
Receiver Sensitivity (OMAUouter) Max (TECQ, TDECQ) ≤ 1.8 dB $1.8 < \max(\text{TECQ, TDECQ}) \leq 4.4$ dB	Psens	-4.6 -6.4+TECQ			dBm	3
LOS Asserted	Lsa	-15	-	-	dBm	-
LOS De-Asserted	Lda	-	-	-6.6	dBm	-
LOS Hysteresis	Lh	0.5	-	-	dB	-

Note:

[1] Trade-offs are available between spectral width, center wavelength and minimum OMA.

[2] The optical power is launched into MMF

[3] BER=2.4E-4; PRBS31Q@53.125GBd.

Osfp 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

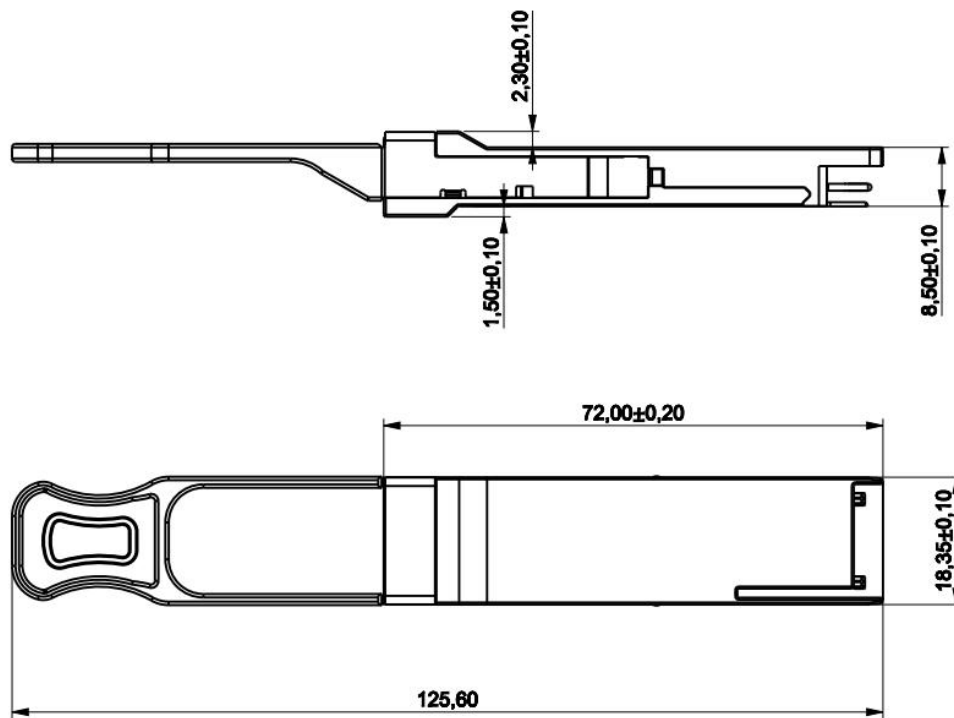
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4	GND	Ground
5	Tx4n	Transmitter Inverted Data Input
6	Tx4p	Transmitter Non-Inverted Data Input
7	GND	Ground
8	ModSelL	Module Select
9	ResetL	Module Reset
10	Vcc Rx	+3.3 V Power supply receiver
11	SCL	2-wire serial interface clock
12	SDA	2-wire serial 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

Mechanical



Unit : mm

Ordering Information

Part Number	Product Description
TSQM4-NAAMA1C	400G QSFP112 SR4 Optical Transceiver 30m on OM3 MMF and 50m on OM4 MMF 0°C ~ +70°C

Important Notice

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