

TSEM4-NAAMA1C Optical Transceiver

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

Features

- Hot-pluggable OSFP 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 SR4 Ethernet

Production Description

The TSEM4-NAAMA1C is a 4-Channel, Pluggable, Fiber-Optic OSFP 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	%

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	-6.5	-	4	dBm	2
Extinction Ratio	ER	2.5	-	-	dBm	-
Optical Modulation Amplitude (OMA _{outer}) (max)	OMA	3.5			dBm	-
Optical Modulation Amplitude (OMA _{outer}) (min)		-2.6				-
max(TECQ, TDECQ) ≤1.8dB		-4.4+max(TECQ, TDECQ)				
1.8<max(TECQ, TDECQ) ≤4.4dB						
Transmitter and Dispersion Eye Closure	TDECQ	-	-	4.4	dB	-

Information and specifications are subject to change without notice.
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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 (OMAouter), each lane	-	-	-	3.5	dBm	-
Receiver Sensitivity (OMAouter) Max(TECQ, TDECQ) ≤ 1.8 dB 1.8<max(TECQ, TDECQ) ≤ 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**Top Side (viewed from top)**

60	GND	
59	TX1p	
58	TX1n	
57	GND	
56	TX3p	
55	TX3n	
54	GND	
53	TX5p	
52	TX5n	
51	GND	
50	TX7p	
49	TX7n	
48	GND	
47	SDA	
46	VCC	
45	VCC	
44	INT/RSTn	
43	GND	
42	RX8n	
41	RX8p	
40	GND	
39	RX6n	
38	RX6p	
37	GND	
36	RX4n	
35	RX4p	
34	GND	
33	RX2n	
32	RX2p	
31	GND	

----- Module Card Edge -----

Bottom Side (viewed from bottom)

	GND	1
	TX2p	2
	TX2n	3
	GND	4
	TX4p	5
	TX4n	6
	GND	7
	TX6p	8
	TX6n	9
	GND	10
	TX8p	11
	TX8n	12
	GND	13
	SCL	14
	VCC	15
	VCC	16
	LPWn/PRSn	17
	GND	18
	RX7n	19
	RX7p	20
	GND	21
	RX5n	22
	RX5p	23
	GND	24
	RX3n	25
	RX3p	26
	GND	27
	RX1n	28
	RX1p	29
	GND	30

Pin Definition

Pin	Symbol	Name/Description
1	GND	Ground
2	TX2p	Transmitter Data Non-Inverted
3	TX2n	Transmitter Data Inverted
4	GND	Ground
5	Tx4p	Transmitter Data Non-Inverted
6	TX4n	Transmitter Data Inverted
7	GND	Ground
8	TX6p	Transmitter Data Non-Inverted
9	TX6n	Transmitter Data Inverted
10	GND	Ground
11	TX8p	Transmitter Data Non-Inverted
12	TX8n	Transmitter Data Inverted
13	GND	Ground
14	SCL	2-wire Serial interface clock
15	VCC	+3.3V Power
16	VCC	+3.3V Power
17	LPWn/PRSn	Low-Power Mode / Module Present
18	GND	Ground
19	RX7n	Receiver Data Inverted
20	RX7p	Receiver Data Non-Inverted
21	GND	Ground
22	RX5n	Receiver Data Inverted
23	RX5p	Receiver Data Non-Inverted
24	GND	Ground
25	RX3n	Receiver Data Inverted
26	RX3p	Receiver Data Non-Inverted
27	GND	Ground
28	RX1n	Receiver Data Inverted
29	RX1p	Receiver Data Non-Inverted
30	GND	Ground
31	GND	Ground
32	RX2p	Receiver Data Non-Inverted
33	RX2n	Receiver Data Inverted
34	GND	Ground
35	RX4p	Receiver Data Non-Inverted
36	RX4n	Receiver Data Inverted
37	GND	Ground
38	RX6p	Receiver Data Non-Inverted
39	RX6n	Receiver Data Inverted
40	GND	Ground
41	RX8p	Receiver Data Non-Inverted

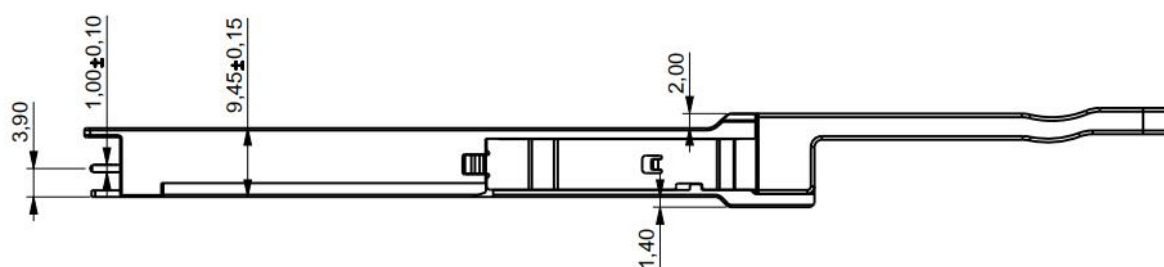
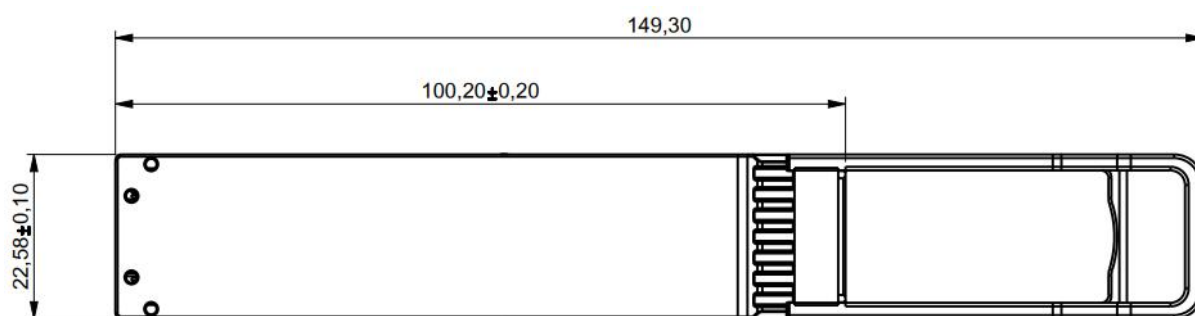
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42	RX8n	Receiver Data Inverted
43	GND	Ground
44	INT/RSTn	Module Interrupt / Module Reset
45	VCC	+3.3V Power
46	VCC	+3.3V Power
47	SDA	2-wire Serial interface data
48	GND	Ground
49	TX7n	Transmitter Data Inverted
50	TX7p	Transmitter Data Non-Inverted
51	GND	Ground
52	TX5n	Transmitter Data Inverted
53	TX5p	Transmitter Data Non-Inverted
54	GND	Ground
55	TX3n	Transmitter Data Inverted
56	TX3p	Transmitter Data Non-Inverted
57	GND	Ground
58	TX1n	Transmitter Data Inverted
59	TX1p	Transmitter Data Non-Inverted
60	GND	Ground

Ordering Information



Unit: mm

Ordering Information

Part Number	Product Description
TSEM4-NAAMA1C	400G OSFP-RHS SR4 Optical Transceiver 30m on OM3 MMF and 50m on OM4 MMF 0°C ~ +70°C

Important Notice

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