TSQP4-NAAGA1DXX/TSQP4-NAAGA1UXX Optical Pigtail Transceiver

Multi-mode 850nm 40G BASE-SR4 QSFP+ Optical Pigtail Transceiver, With Diagnostic Monitoring

Features

- Hot-pluggable QSFP+ form factor
- Multi rate up to 10.3125 Gb/s
- 4 channels 850nm VCSEL laser array
- 4 channels 850nm PIN photo detector array
- Digital diagnostics functions are available via the I2C interface
- Single 3.3V Power Supply and Power Dissipation < 1.4W
- LC/PC pigtail connector

Applications

- 40GBASE SR4 Ethernet

Product Description

The TSQP4-NAAGA1DXX/TSQP4-NAAGA1UXX is a four Channels, Fiber-Optic QSFP+ for 40Gbps SR Applications. It is a high performance module for short-range data communication and interconnect applications which operate at 10.3125Gbps up to 100m using OM3 fiber and 150m using OM4 fiber each lane. The optical interface uses 8 LC/PC pigtails（contains 4 Tx LC/PC pigtails and 4 Rx LC/PC pigtails）.

This module is designed to operate over multimode fiber systems using a nominal wavelength of 850nm. The electrical interface uses a 38 contact edge type 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.

Parameter	Symbol	Min	Max	Unit
Power Supply Voltage	VCC	-0.5	+3.6	V
Storage Temperature	Tc	-40	+85	°C
Relative Humidity	RH	0	85	%

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Recommended Operating Conditions

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 (Standard)	Tca	0	-	70	℃
Operating Case Temperature (Industrial)	Tca	-40	-	85	℃

Electrical characteristics

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

Parameter	Symbol	Min	Typical	Max	Unit
Data Rate per lane	DR	-	10.3125	-	Gbps

Transmitter Specifications

Parameter	Symbol	Min	Typical	Max	Unit
Input differential impedance	Rin	-	100	-	Ω
Differential Input Voltage swing, per lane	Vin	200	-	1000	mV
Transmit Disable Voltage	VD	2.0	-	VCC+0.3	V
Transmit Enable Voltage	Ven	Vee	-	Vee+0.8	V

Receiver Specifications

Parameter	Symbol	Min	Typical	Max	Unit
Output Differential Impedance	Rout	-	100	-	Ω
Differential Data Output Swing	Vout	200	-	1000	mV
Bit Error Rate	BER	-	-	10^{-12}	-
Loss of Signal –Asserted	-	2.0	-	VCC+0.3	V
Loss of Signal –Negated	-	Vee	-	Vee+0.8	V

Optical characteristics

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

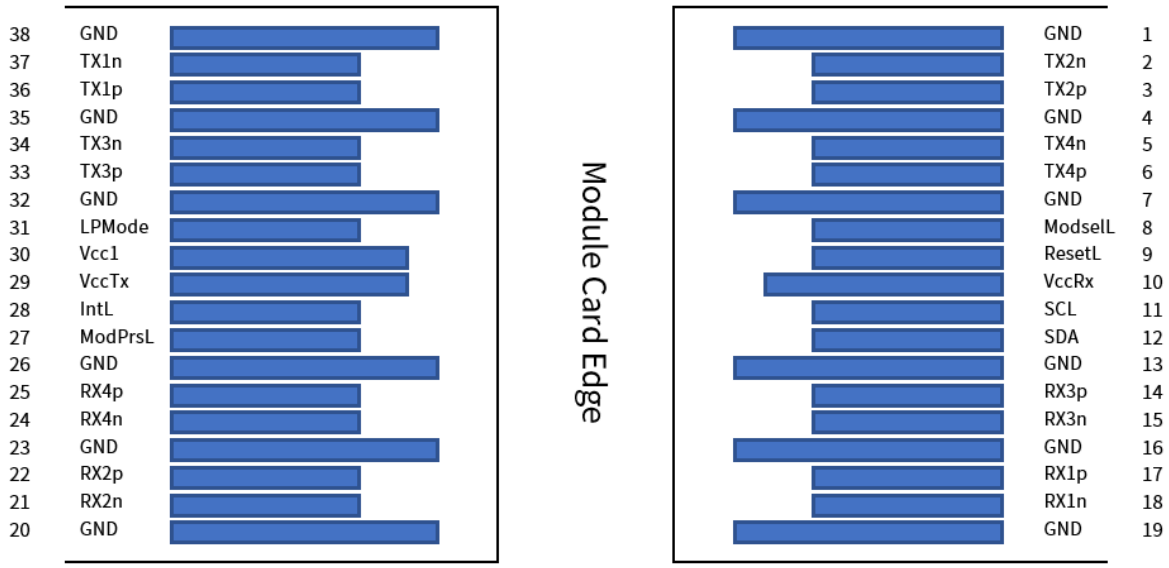
Parameter	Symbol	Min	Typical	Max	Unit
Transmitter					
Center Wavelength	λ	840	850	860	nm
Average Optical Power[1]	Po	-7.6	-	2.4	dBm
Extinction Ratio[2]	ER	3	-	-	dB

RMS spectral width	Δλ	-	-	0.65	nm
Optical Return Loss Tolerance	ORL	-	-	12	dB
Receiver					
Sensitivity[3]	Rsens	-	-	-9.5	dBm
Receiver Overload[3]	Pmax	2.4	-	-	dBm
Los function	Los	-30	-	-12	dBm
Receiver Reflectance	-	-	-	-12	dB

Note:

1. The optical power is launched into MMF
2. Measured with a PRBS 2^{31}-1 test pattern @10.3125Gbps
3. Measured with a PRBS 2^{31}-1 test pattern @10.3125Gbps,BER≤10^{-12}

QSFP+ Transceiver Electrical Pad Layout



Top Side Viewed From Top **Bottom Side Viewed From Bottom**

Pin Definitions

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

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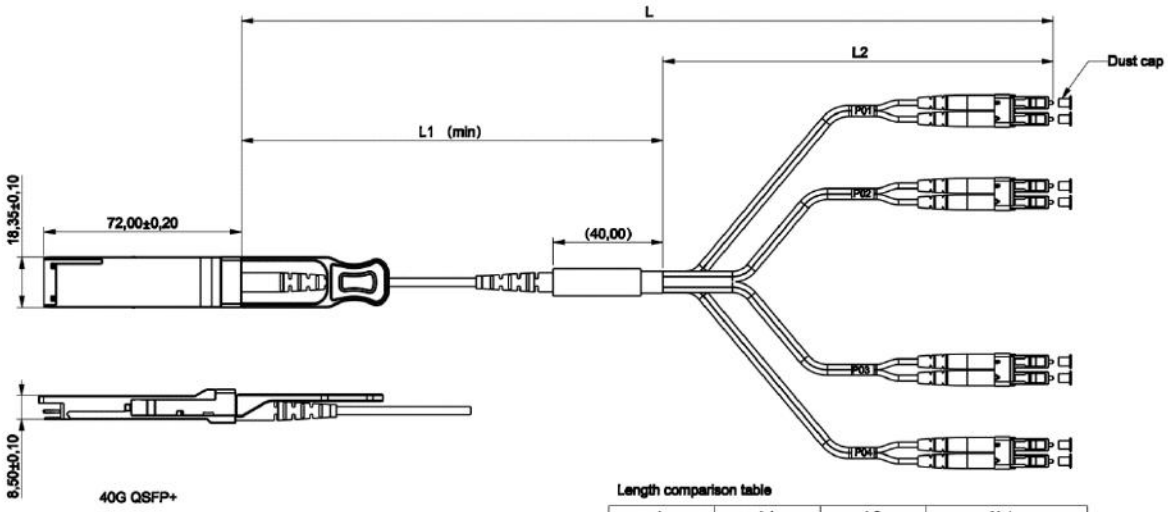
Mechanical Specifications



Length comparison table

L	L1	L2	Notes
1m	30cm	70cm	The tolerance for branches is +7/-0cm; The length between different branches is +1/-0cm;
2m	60cm	1.4m	
3m	1m	2m	
≥5m	L-3m	3m	

Unit：mm

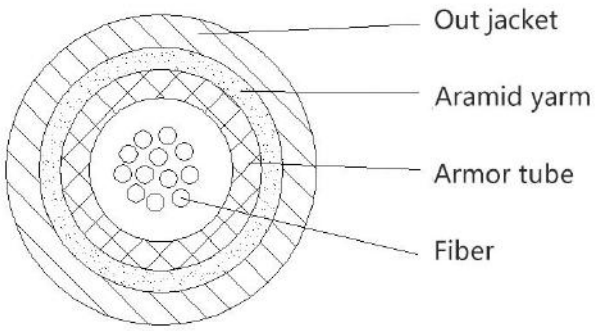
AOC product bagging circle size:

L	Disc fiber diameter（mm）
1m≦L≦5m	110≦Inner diameter，outer diameter≦160
5m<L≦7m	110≦Inner diameter，outer diameter≦170
7m<L≦30m	110≦Inner diameter，outer diameter≦180
30m<L≦50m	110≦Inner diameter，outer diameter≦210
50m<L≦100m	110≦Inner diameter，outer diameter≦250

Length tolerance table:

L	Tolerance（mm）
L≦1 M	+70/-0
1 M<L<7 M	+100/-0
L≧7 M	+2%L/-0

Cable Structure (QSFP+ end)

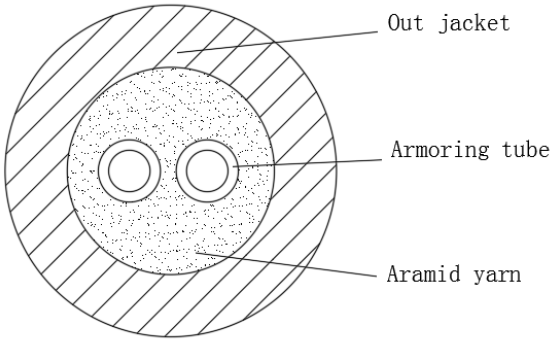


Cable Technical Parameters (QSFP+ end)

Parameter	Symbol	Typical
Model		GJFKV

Fiber	Count	2~12
	Color	Blue, orange, green, blown, gray, white, red, black, yellow, purple, pink, aqua
Cable	OD (mm)	3.0±0.1
	Material	PVC-OFNP
Armored tube	OD (mm)	1.8±0.1
	ID (mm)	1.2±0.1
Max.tensile Strength(N)	Short-term	150
	Long-term	80
Min.Bending Radius(mm)	Dynamic	20D
	Static	10D
Max.Crush Resistance(N/100mm)	Short-term	3000
	Long-term	1000
Strength Members		Aramid yarn
Temperature range	Storage or transportation	-20~70℃
	Operation	-20~60℃
	Installation	-20~60℃

Cable Structure (LC end)



Cable Technical Parameters (LC end)

Parameter	Symbol	Typical
Armored tube	OD(mm)	0.9±0.1
	ID(mm)	0.5±0.1
	Material	Stainless steel spiral armor
Out jacket	OD(mm)	3.0±0.1
	Material	PVC/LSZH
Nominal weight(kg/km)		13
Max.tensile Strength(N)	Short-term	100

	Long-term	50
Max.Crush Resistance(N/100mm)	Short-term	3000
	Long-term	1000
Color		According to contract
Strength Members		Aramid yarn
Environmental Protection		RoHS COMPLIANT
Temperature range	Storage or transportation	-20~70°C
	Operation	-20~60°C
	Installation	-20~60°C

Ordering Information

Part Number	Product Description
TSQP4-NAAGA1DXX	40Gbps QSFP+ MMF Armored Optical Pigtail Transceiver 0°C ~ +70°C
TSQP4-NAAGA1UXX	40Gbps QSFP+ MMF Armored Optical Pigtail Transceiver -40°C ~ +85°C
XX : 01~82,1~82 pigtail Length in meters on OM2 MMF	

Important Notice

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