

APTICOM | AQC-704XX

QSFP28 100G nWDM 30km 0-70°C Optical Transceivers

Features

- Management Interface per SFF-8636
- Hot pluggable QSFP28 form factor
- Supports 106.25Gbps bit rate
- Supports 4x 25.78125Gbps (CAUI-4) or 4x 26.5625Gbps Serial Electrical Interface (100GAUI-4)
- LWDM Transmitter
- APD Receiver
- Built-in DSP/CDR
- Up to 30km on Single Mode Fiber (SMF)
- Operating Temperature 0 to 70°C
- Power Dissipation $\leq 5.5W$
- Single 3.3V Power Supply



Application

- 100 Gigabit Ethernet LWDM Links

Description

The AQC-704xx series are high-performance transceivers for 100 Gigabit Ethernet 8-channel LWDM links up to 30km over a single mode fibre pair. It's compliant with the QSFP28 Multisource Agreement (MSA) and hot pluggable. The module converts 4x 25Gbps NRZ electrical data input signals to one 50Gb/s PAM4 optical output signal. Reversely, on the receiver side, the optical input signal is converted to 4x 25Gbps NRZ electrical output data streams.

The transceiver is RoHS-6 compliant per Directive 2011/65/EU.

CAUTION! Optical input power in excess of the maximum recommended value could cause irreparable damage to the APD receiver.

CAUTION! The transceiver module is a static-sensitive device. Always use an ESD wrist strap or similar individual grounding device when handling transceiver modules or coming into contact with modules.

Order Information

Part Number	Wavelength	Protocol	Tx Output Power	Rx Sensitivity [1]	Reach [2]	Temp.
AQC-704xx	LWDM	100GBASE	1.7 to 7.1dBm	≤ -11 dBm	≤ 30 km	0-70°C

1. Measured with 53.125Gb/s PRBS31Q, BER $\leq 2.4 \times 10^{-4}$ **2.** On standard single-mode fibre (SMF, G.652)

Channel Guide (400GHz LWDM)

Part Number	Wavelength [nm]	Part Number	Wavelength [nm]
AQC-70474	1311.43	AQC-70478	1302.31
AQC-70475	1309.14	AQC-70479	1300.05
AQC-70476	1306.85	AQC-70480	1297.80
AQC-70477	1304.58	AQC-70481	1295.56

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Parameter	Min	Typ	Max	Unit
Storage Case Temperature	-40		85	°C
Supply Voltage	0		3.6	V
Receiver Damage Threshold	-2.4			dBm

Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit
Operating Case Temperature	0		70	°C
Supply Voltage	3.135	3.3	3.465	
Data Rate, Optical Lane [1]		53.125		GBd
Link Dispersion	-65		35	ps/nm

1. Modulation format PAM4

Transceiver Electrical Parameters

EOL, over the full temperature range, Vcc = 3.135 to 3.465V.

Parameter	Min	Typ	Max	Unit
Supply Current			1.66	A
Power Dissipation			5.5	W
Transmitter				
Input Differential Impedance		100		Ω
Differential Data Input Swing	180		900	mVpp
Receiver				
Output Differential Impedance		100		Ω
Rise/Fall Time (20/80%)	9.5			ps
Eye Width [1]	0.57			UI
Eye Height [1]	228			mVpp

1. At 10^{-15} probability

Transmitter Optical Specification

EOL, over the full temperature range, Vcc = 3.135 to 3.465V.

Parameter	Min	Typ	Max	Unit
Centre Wavelength Range	1296.16		1311.83	nm
Centre Wavelength [1]	$\lambda - 0.4$	λ	$\lambda + 0.4$	nm
Launched Optical Power[2][3]	1.7		7.1	dBm
Launched outer OMA (TDECQ > 1.4dB)	3.5		7.9	dBm
Launched outer OMA (TDECQ \leq 1.4dB)	2.1 + TDECQ		7.9	dBm
Transmitter and Dispersion Eye Closure (TDECQ)			3.9	dB
Extinction Ratio	5			dB

1. λ according to LWDM 400GHz grid 2. Coupled into 9/125um SMF 3. Average launch power (min) is informative and not the principal indicator of signal strength. A transmitter with launch power below this value cannot be compliant; however, a value above this does not ensure compliance

Receiver Optical Specification

EOL, over the full temperature range, Vcc = 3.135 to 3.465V.

Parameter	Min	Typ	Max	Unit
Operating Wavelength	1295.04		1311.96	nm
Average Receive Power [1]	-15.7		-3	dBm
Receive Power (outer OMA)			-2.6	dBm
Receiver Sensitivity (outer OMA, TECQ≤1.4dB) [2]			-13.5	dBm
Receiver Sensitivity (outer OMA, TECQ>1.4dB) [2]			TECQ-14.9	dBm
Stressed Receiver Sensitivity (outer OMA) [2]			-11.3	dBm

1. Average receive power (min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance **2.** Measured with 53.125GBd PRBS31Q, BER≤2.4x10⁻⁴

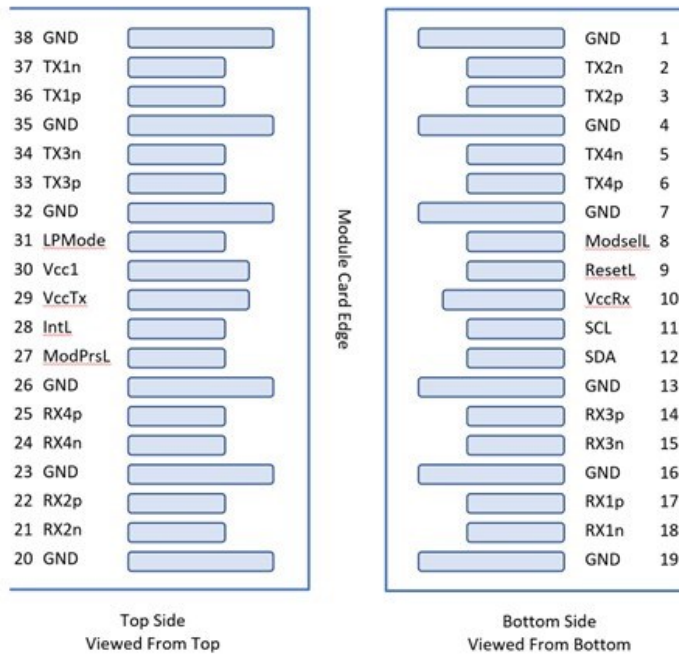
Transceiver Pins

Pin #	Name	Description	Pin #	Name	Description
1	GND	Ground	20	GND	Ground
2	TX2n	Transmitter Inverted Data Input	21	RX2n	Receiver inverted data output
3	TX2p	Transmitter non-Inverted Data Input	22	RX2p	Receiver non-inverted data output
4	GND	Ground	23	GND	Ground
5	TX4n	Transmitter Inverted Data Input	24	RX4n	Receiver Inverted Data Output
6	TX4p	Transmitter non-Inverted Data Input	25	RX4p	Receiver non-Inverted Data Output
7	GND	Ground	26	GND	Ground
8	ModSelL	Module Select [1]	27	ModPrsL	Module Present
9	ResetL	Module Reset [1]	28	IntL	Interrupt [1]
10	VccRx	+3.3V Power Supply Receiver	29	VccTx	+3.3V Power Supply Transmitter
11	SCL	2-wire Serial Interface Clock [1]	30	Vcc1	+3.3V Power Supply
12	SDA	2-wire Serial Interface Data [1]	31	LPMode	Low Power Mode [1]
13	GND	Ground	32	GND	Ground
14	RX3p	Receiver non-Inverted Data Output	33	TX3p	Transmitter non-Inverted Data Input
15	RX3n	Receiver Inverted Data Output	34	TX3n	Transmitter Inverted Data Input
16	GND	Ground	35	GND	Ground
17	RX1p	Receiver non-Inverted Data Output	36	TX1p	Transmitter non-Inverted Data Input
18	RX1n	Receiver Inverted Data Output	37	TX1n	Transmitter Inverted Data Input
19	GND	Ground	38	GND	Ground

1. Open collector, to be pulled up with 4.7kohm

Transceiver Pad Layout

QSFP28-compliant 38-pin connector as per SFF-8679.



Regulatory Compliance

The Apticom AQC-704xx series are Class 1 Laser Products and certified per the following standards:

Item	Agency	Standard
Laser Eye Safety	TÜV	EN 60825-1:2014 EN 60825-2:2004+A1+A2
Electrical Safety	TÜV	EN 60950-1:2006+A11+A1+A12+A2

Revision Information

Revision	Date	Description
A	2023-05-08	Initial release
B	2023-05-29	Maximun reach changed from 20km to 30km.

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