



B2BQFP4SRXMC-XX0

200GBASE-SR4 QSFP56 100m Multi-Mode Fiber Transceiver

Description

APAC's B2BQFP4SRXMC-XX0, 200GBASE-SR4, hot pluggable optical transceiver is a high-performance solution for 200GbE links for up to 100m over multi-mode fiber (MMF). It combines 4 x 26.5625 GBd PAM4 electrical lanes into 4 x 26.5625 GBd PAM4 optical channels in compliance with IEEE 200GBASE-SR4. Superior performance and reliability is achieved through APAC's advanced transmitter and receiver design using 4 x VCSELs and 4 x PIN PDs.



Features

- Hot-pluggable QSFP form factor
- Compliant to SFF-8636
- Operating case temperature range of 0 °C to +70 °C
- Maximum link length of 100m on OM4 fiber with KP4 FEC
- +3.3V single power supply
- Power dissipation < 6W
- MPO-12 APC connector
- RoHS compliant

Applications

- 200GBASE-SR4 Ethernet
- Data Center 200GE 100m MMF links
- Switch/Router interconnections



850nm Multi-mode Transceiver

QSFP56 form factor with Diagnostic Monitoring

200GBASE QSFP56 SR4

1 FUNCTIONAL DESCRIPTION

APAC's B2BQFP4SRXMC-XX0, 200GBASE-SR4, hot pluggable optical transceiver is a high-performance solution for 200GbE links for up to 100m over multi-mode fiber (MMF). It combines 4 x 26.5625 GBd PAM4 electrical lanes into 4 x 26.5625 GBd PAM4 optical channels in compliance with IEEE 200GBASE-SR4. Superior performance and reliability is achieved through APAC's advanced transmitter and receiver design using 4 x VCSELs and 4 x PIN PDs.

2 PERFORMANCE SPECIFICATIONS

2.1 Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings will cause permanent damage and/or adversely affect device reliability.

Table 1 Absolute Maximum Ratings

No.	Parameter	Symbol	Min.	Max.	Unit	Remarks
1	Supply Voltage	Vcc	-0.5	+3.6	V	+3.3 V
2	Storage Temperature	Ts	-40	+85	°C	
3	Optical Receiver Input		-	+5.0	dBm	Average

2.2 Operating Environments

Electrical and optical characteristics below are defined under this operating environment, unless otherwise specified.

Table 2 Operating Environment

No	Parameter	Symbol	Min.	Typ.	Max.	Unit	Remarks
1	Supply Voltage	Vcc	3.135	3.3	3.465	V	
2	Module Power Supply Voltage Noise Tolerance	PSNR_Mod	-	-	66	mV	10 Hz –10 MHz
3	Power Consumption		-	-	5	W	



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4	Instantaneous peak current	lcc_ip_7			2000	mA	
5	Sustained peak current	lcc_sp_7			1650	mA	
6	Supply Current	lcc_7	--	-	1443	mA	Steady state
7	Case Temperature	TC	0	25	70	°C	



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2.3 Electrical Interface

Table 3 Electrical Characteristics

No.	Parameter	Min.	Typ.	Max.	Unit	Remarks
Module output (each lane, at TP4) [Note 1]						
1	Signaling rate per lane (range)	-100ppm	26.5625	+100ppm	GBd	
2	AC Common-mode output voltage (RMS)	-	-	17.5	mV	
3	Differential peak-to-peak output voltage	-	-	900	mV	
4	Near-end ESMW (Eye symmetry mask width)	0.265	-	-	UI	
5	Near-end Eye height, differential	70			mV	
6	Far-end ESMW (Eye symmetry mask width)	0.2	-	-	UI	
7	Far-end Eye height, differential	30	-	-	mV	
8	Far-end pre-cursor ISI ratio	-4.5	-	2.5	%	
9	Differential output return loss	Equation (83E-2)	-	-	dB	Note 2
10	Common to differential mode conversion return loss	Equation (83E-3)	-	-	dB	Note 2
11	Differential termination mismatch	-	-	10	%	
12	Transition time (20% to 80%)	9.5	-	-	ps	
13	DC common mode voltage	-350	-	2850	mV	
Module input (each lane)						
1	Signaling rate per lane (range)	-100ppm	26.5625	+100ppm	GBd	
2	Differential pk-pk input voltage tolerance	900	-	-	mV	at TP1a
3	Differential input return loss	Equation (83E-5)	-	-	dB	at TP1, Note 2
4	Differential to common mode input return loss	Equation (83E-6)	-	-	dB	at TP1, Note 2
5	Differential termination mismatch	-	-	10	%	at TP1
6	ESMW (Eye symmetry mask width)	0.22	-	-	UI	at TP1a
7	Eye width	0.22	-	-	UI	at TP1a
8	Applied pk-pk sinusoidal jitter	Table 120E-6			MHz, UI	at TP1a
9	Eye height	32	-	-	mV	at TP1a
10	Single-ended input voltage tolerance	-0.4	-	3.3	V	at TP1a



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	range					
11	DC common mode voltage	-350	-	2850	mV	at TP1

Note 1: Electrical module output is squelched for loss of optical input signal.

Note2: IEEE 802.3-2018 Section 6

2.4 Optical Interface

Table 4 Optical Characteristics

No.	Parameter	Symbol	Min.	Typ.	Max.	Unit	Remarks
1	Channel data rate	f _{DC}		53.125		Gb/s	
2	Signaling rate	f _{SG}		26.5625		GBd	Per lane
3	Signal speed variation from nominal	Δf _{SG}	-100		+100	ppm	
4	Lane wavelength (range)	λ _c	840		860	nm	
5	RMS Spectral Width				0.6	dB	
7	Average launch power		-6.5		4.0	dBm	Note 1
8	Outer Optical Modulation Amplitude (OMA _{outer})		-4.5		3	dBm	Note 2 Per lane
10	Launch power in OMA _{outer} minus TDECQ		-5.9			dBm	Per Lane
11	Transmitter and dispersion eye closure for PAM4	TDECQ			4.5	dB	Per lane
12	TDECQ – 10log ₁₀ (C _{eq})				4.5	dB	Per lane
13	Average Optical Output Power of Off Transmitter	P _{off}			-30	dBm	Per lane
14	Extinction Ratio	ER	3.0			dB	Per lane
16	RIN _{21.4OMA}				-128	dB/H z	
17	Optical return loss tolerance				12	dB	
18	Encircled Flux				≥ 86% at 19um ≤ 30% at 4.5um		
19	Average receive power		-8.4		4.0	dBm	Note 4
20	Receive power (OMA _{outer})				3	dBm	Per lane
21							
22	Receiver reflectance				-12	dB	



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23	Receiver sensitivity (OMA _{outer})		Max (- 6.5, SECQ – 7.9) , Figure 3		Note 5, 6
24	Stressed receiver sensitivity (OMA _{outer})			-3.4	dBm Note 5, 7 Per lane
Conditions of stressed receiver sensitivity test [Note 8]					
25	Stressed eye closure for PAM4 (SECQ), lane under test	SECQ	4.5	dB	Per Lane
26	SECQ – 10log10(Ceq), lane under test (max)		4.5	dB	Per Lane
27	OMA _{outer} of each aggressor lane		3.0	dBm	

- Note 1: Average launch power, each lane (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.
- Note 2: Even if the TDECQ < 1.4 dB, the OMA_{outer} (min) must exceed these values.
- Note 3: Transmitter reflectance is defined looking into the transmitter.
- Note 4: Average receive power, each lane (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.
- Note 5: For when Pre-FEC BER is 2.4 x 10⁻⁴.
- Note 6: Receiver sensitivity (OMA_{outer}), each lane (max) is informative and is defined for a transmitter with a value of SECQ up to 3.4 dB.
- Note 7: Measured with conformance test signal at TP3 (see 124.8.9) for the BER specified in 124.1.1.
- Note 8: These test conditions are for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

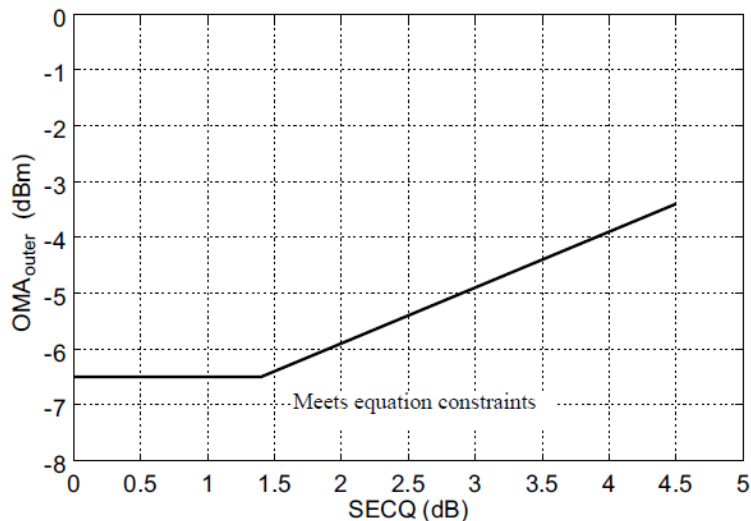


Figure 1 Receiver Sensitivity



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Table 5 RX_LOS Characteristics

No.	Parameter	Symbol	Min.	Typ.	Max.	Unit	Remarks
1	Receiver Loss of Signal Indicator Assert Level	RX_LOS	-30	-	-10	dBm	Average power
2	Receiver Loss of Signal Indicator De-assert Level	RX_LOS	-	-	-9	dBm	Average power
3	Hysteresis		0.5			dB	

3 PIN ASSIGNMENT

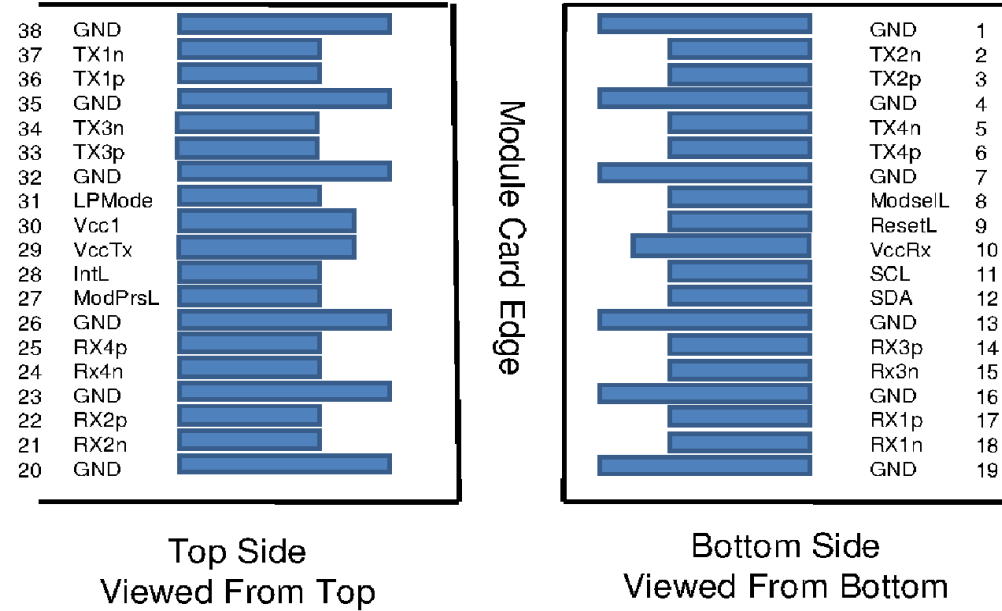


Figure 2 Module Pads



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Table 6 Pin Description

Pin	Symbol	Name/Description	Notes
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	Vcc Rx	+3.3V Power Supply Receiver	
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	1
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	1
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	1
20	GND	Ground	1
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	1
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	Vcc Tx	+3.3V Power supply transmitter	
30	Vcc1	+3.3V Power supply	
31	LPMODE	Low Power Mode	
32	GND	Ground	1



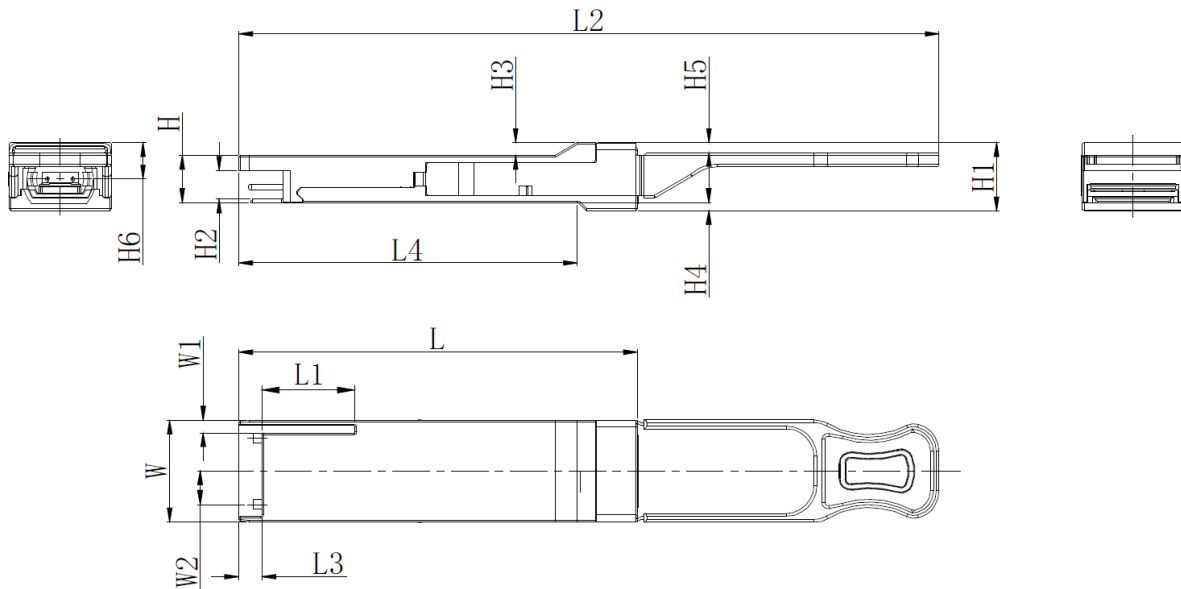
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33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	1

Note: 1. Circuit ground is internally isolated from chassis ground.

4 MECHANICAL DIMENSIONS

B2BQFP4SRXMC-XX0 SR4 QSFP56 transceivers are compatible with SFF-8661 for pluggable form factor module.

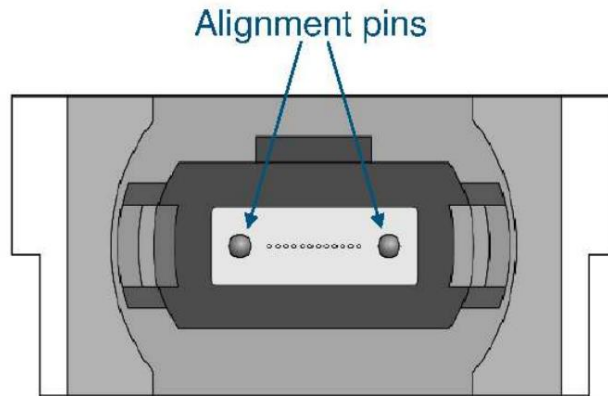


Unit: mm

	L	L1	L2	L3	L4	W	W1	W2	H	H1	H2	H3	H4	H5	H6
Max	72.2	-	128	4.35	61.4	18.45	-	6.2	8.6	12.4	5.35	2.5	1.6	2.0	-
Type	72.0	-	-	4.20	61.2	18.35	-	-	8.5	12.2	5.2	2.3	1.5	1.8	6.55
Min	68.8	16.5	124	4.05	61.0	18.25	2.2	5.8	8.4	12.0	5.05	2.1	1.3	1.6	-

Pull tab color: Beige

Figure 3 Mechanical Dimensions



Transmit Channels: 1 2 3 4

Unused positions: x x x x

Receive Channels: 4 3 2 1

8° angled end face

Looking into the connector, transmitter is on the left.

Figure 4 Optical Interface



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5 COMPONENT LABEL DESIGN

26.7 mm x 14.7 mm

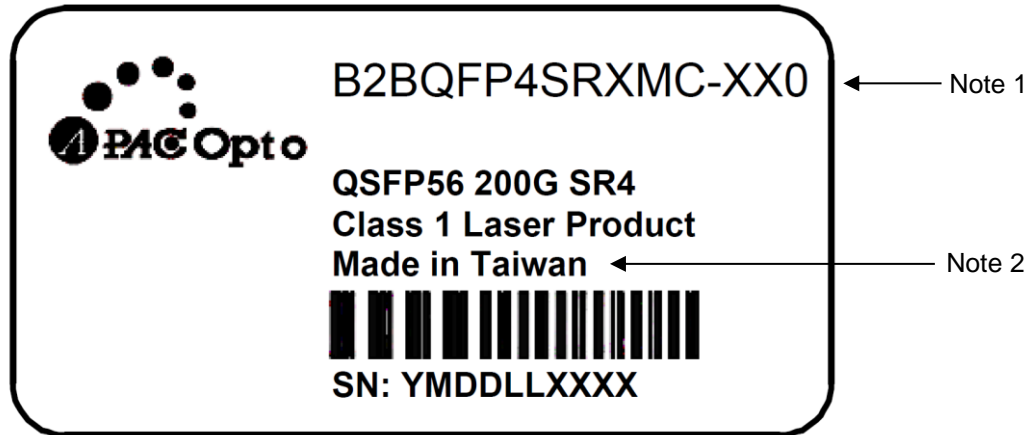


Figure 5 Component Label

Table 7 Label Description

Note 1	Serial Number	YMDDLXXXX (ex. NB13012345) Y: year of manufactured (ex. 9 = 2009, A = 2010, ..., N = 2023, ...) M: Month of manufactured (1~9 for Jan.~Sep., A for Oct., B for Nov., C for Dec.) DD: Day of manufactured LL: Last 2 codes of APAC working order XXXX: Running number (4 digits sequential number from 0001 to 9999)
Note 2	Manufacture Location	Made in Taiwan



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6 REGULATORY COMPLIANCE

Certification	Standard
EMC/EMI	FCC Part 15, Subpart B (Class B) EN55032 (Class B)
ESD	EN61000-4-2, criterion B JEDEC JESD22-A114-B Human Body Model
Laser Safety	21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3. described in Laser Notice No. 56, dated May 8, 2019.
Environmental	RoHS 10 (2011/65/EU + 2015/863) ISA S71.04 G2

CAUTION: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

7 REFERENCES

1. IEEE “802.3cd/D3.5 September 18, 2018”
2. IEEE “802.3-2018 Section 8 August 31, 2018”
3. SNIA - “SFF-8665 Rev 1.9 June 29, 2015”
4. SNIA - “SFF-8679 Rev1.8 October 04, 2018”
5. SNIA - “SFF-8661 Rev 2.5 June 22, 2018”
6. QSFP-DD Management Interface Specification Rev 4.0



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8 REVISION HISTORY

Rev.	Date	Note
1.0	2023/11/12	New released
1.1	2024/04/08	Change label dimension

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