40Gb/s QSFP+ SR4 Optical Transceiver

APQPSR43CDM01

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ATOP's APQPSR43CDM01 transceiver modules are designed for use in 40 Gigabit per second links over parallel multimode fiber, including breakout to four 10 Gigabit per second links. They are compliant with the QSFP+ MSA and IEEE 802.3ba 40GBASE-SR4 and compatible with IEEE 802.3ae 10GBASE-SR. They are RoHS compliant and lead-free.

Product Features

- ✓ 4 independent full-duplex channels Up to 10.5Gbps data rate per channel
- ✓ MTP/MPO optical connector
- ✓ Capable of over 100m transmission on OM3 multi-mode ribbon fiber and 150m on OM4 MMF
- ✓ Single +3.3V power supply
- ✓ QSFP+ MSA compliant
- ✓ Operating case temperature: 0~70℃
- ✓ RoHS compliant
- ✓ Compliant with IEEE802.3ba
- ✓ Compliant with QSFP+ MSA: SFF-8436

Applications

- ✓ 40G Ethernet
- ✓ Infiniband 4X SDR DDR QDR
- ✓ 40G Telecom connections

Product Selection

Part Number	Operating Case temperature	DDMI
APQPSR43CM01	Commercial(0~70℃)	Yes

Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883 Method 3015
- Immunity compatible with EN 61000-4-3
- EMI compatible with FCC Part 15 Class B
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 IEC 60950, IEC60825-1,2
- RoHS compliant with RoHS 2.0(2015/863/EU)-amending

Pin Descriptions

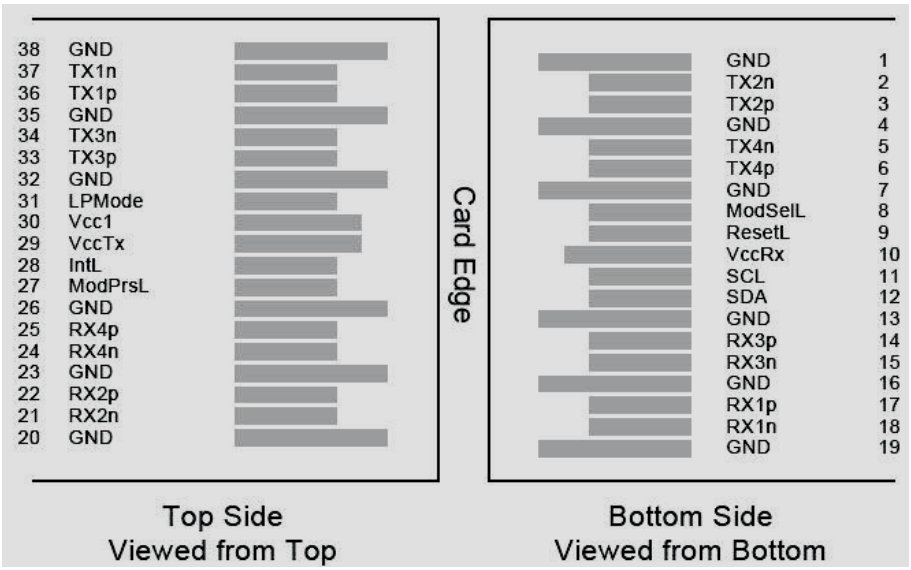
Pin	Symbol	Name	Ref.
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data output	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data output	
7	GND	Ground	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	VccRx	+3.3V Power Supply Receiver	2
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	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	1
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	1
27	ModPrsL	Module Present	

28	IntL	Interrupt	
29	VccTx	+3.3 V Power Supply transmitter	2
30	Vcc1	+3.3 V Power Supply	2
31	LPMode	Low Power Mode	
32	GND	Ground	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Output	
35	GND	Ground	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Output	
38	GND	Ground	1

Notes:

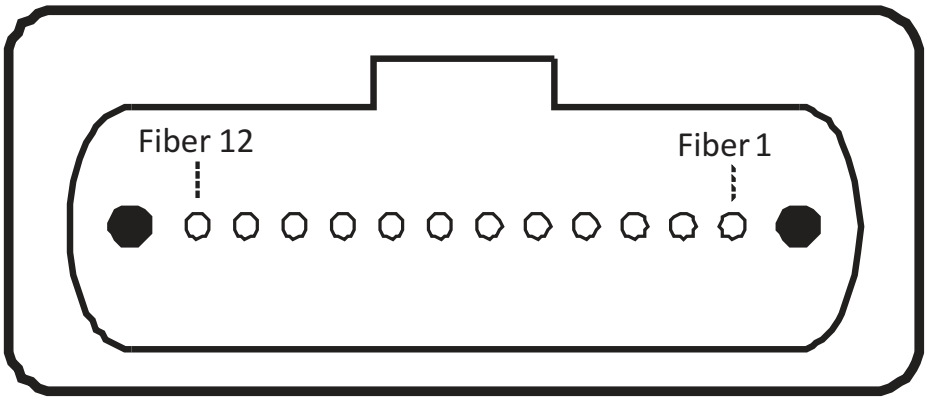
1.GND is the symbol for signal and supply (power), Connect these directly to the host board signal common ground plane

2.VccRx, Vcc1 and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP+, The connector pins are each rated for a maximum current of 500mA.



QSFP+ Transceiver Electrical Pad Layout

Optical Interface Lanes and Assignment

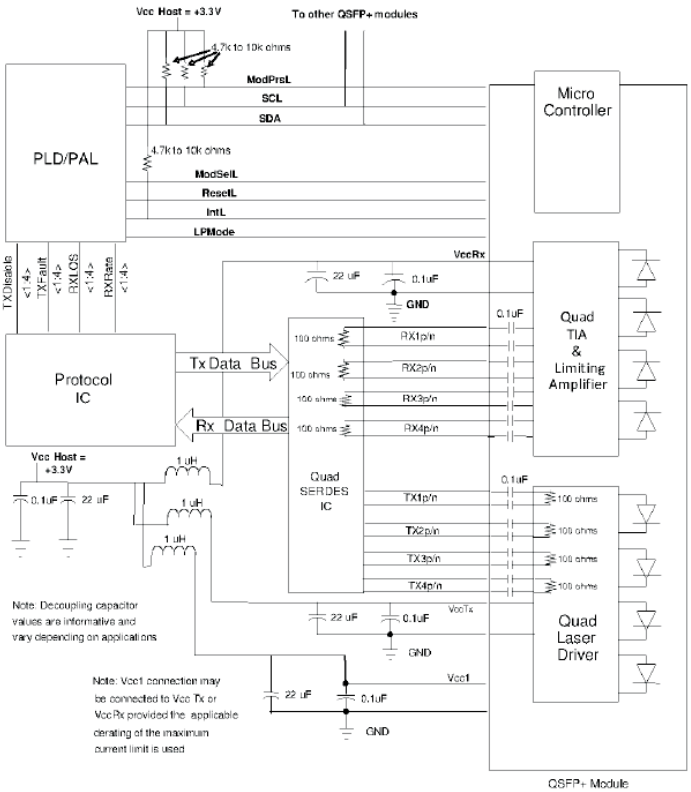


Outside view of the QSFP+ module MPO

Lane Assignment

Fiber #	Lane Assignment
1	RX0
2	RX1
3	RX2
4	RX3
5	Not used
6	Not used
7	Not used
8	Not used
9	TX3
10	TX2
11	TX1
12	Tx0

Recommend Circuit Schematic



Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	-0.5	+3.3	+3.6	V	
Storage Temperature	TS	-40		+85	℃	
Operating Humidity	RH	0		85	%	

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Power Supply Voltage	Vcc	3.15	3.30	3.45	V	
Case Operating Temperature	Tc	0		+70	℃	
Bit Rate per Lane	BR		10.3125		Gbps	

Notes:

1. AC coupled.
2. Into 100 ohm differential termination.

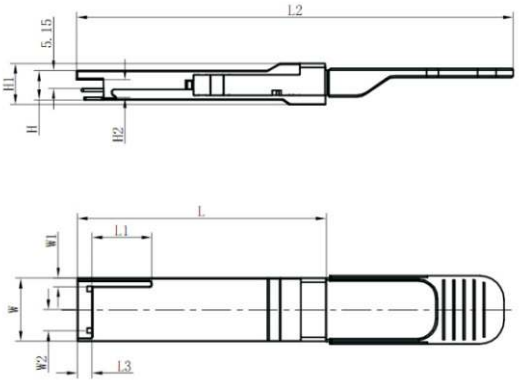
Transmitter Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Center Wavelength	λt	840	850	860	nm	
RMS Spectral Width	Pm			0.6	nm	
Average Optical Power, each Lane	Pavg	-8.2	-1	+2.4	dBm	
Extinction Ratio	ER	3	4		dB	
Total Jitter	T_{JTX}			120	ps	
Transition Time(20% to 80%)	TR ,TF			100	ps	
Differential data input voltage per lane	VIN_{PP}	120		1600	mV	

Receiver Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Center Wavelength	λc	840	850	860	nm	
Sensivity	Psen			-10	nm	
Bit Error Ratio	BER			10^{-12}		
Optical Return Loss Tolerance	RL			12	dB	
Differential data output voltage per lane	$VOUT_{PP}$	320	450		mV	
Differential Termination Resisitance	Zout	80	100	120	Ω	
Transition Time(20% to 80%)	TR ,TF			100	ps	
Differential Termination Resisitance	Zout	80	100	120	Ω	
Los De-Assert	LosD			-15	dBm	
Los Assert	LosA	-30			dBm	
Los Hysteresis	LosH	0.5		2	dB	

Mechanical Specifications



	L	L1	L2	L3	W	W1	W2	H	H1	H2
Max	72.2	–	122	4.35	18.5	–	6.2	8.6	12.1	5.35
Type	–	–	–		–	–	–	–	–	–
Min	68.8	16.5	118	4.05	18.1	2.2	5.8	8.4	11.7	5.05

Unit: mm

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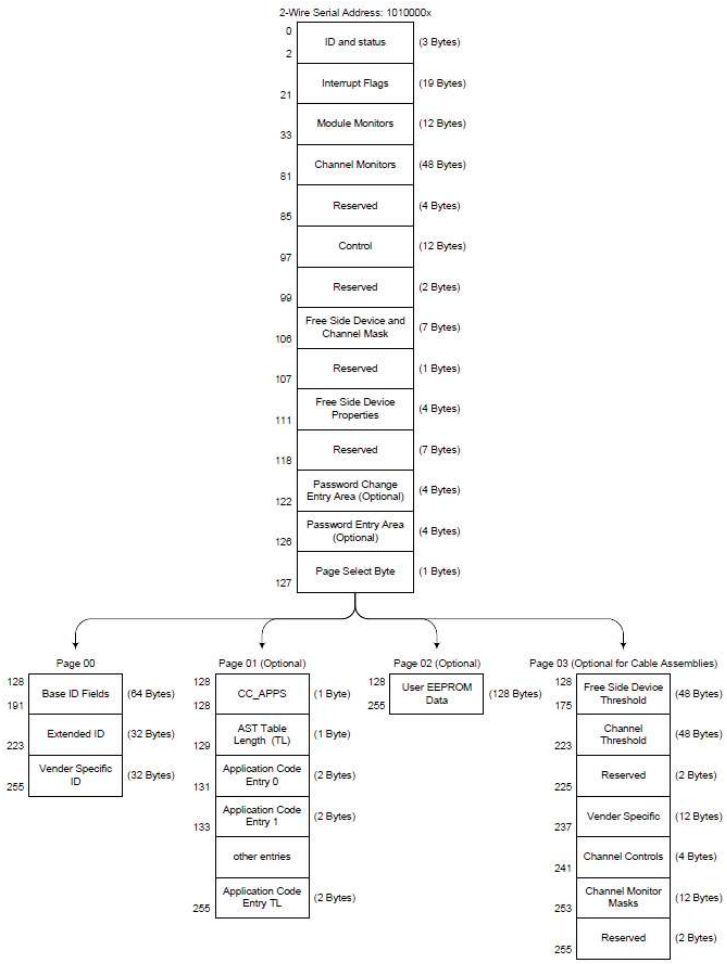
EEPROM Information

- EEPROM memory map specific data field description is as below:



Digital Diagnostic Monitoring Interface

Four transceiver parameter values are monitored. The following table defines th monitory parameter's accuracy.e

Parameter	Range	Accuracy	Calibration
Temperature	0 to +70°C	±3°C	Internal
Voltage	2.97 to 3.63V	±3%	Internal
Bias Current	0 to 100mA	±10%	Internal
RX Power	-10 to 2.5dBm	±2dB	Internal

Revision History

Revision	Initiated	Reviewed	Approved	DCN	Release Date
Version1.0	Chen.Shi	Tang zhiqiang	Ding zheng	New Released.	Aug 9, 2016
Version1.1	Tang zhiqiang	Huang Zhengyin	Ding zheng	Update the new template	Dec 19, 2019

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