

100G QSFP28 to 4X 25G SFP28 Active Optical Cables HTOC-QPA5-xx01MB

Feature

- ◆ Electrical interface compliant to SFF-8436 and SFF-8431
- ◆ 850nm VCSEL laser and PIN photo-detector
- ◆ Maximum link length of 70m on OM3 MMF and 100m on OM4 MMF
- ◆ Digital diagnostics functions are available via the I2C interface
- ◆ RoHS compliant
- ◆ Hot Pluggable
- ◆ 0°C to +70°C case operating temperature

Applications

- ◆ IEEE 802.3bm 100GBASE-SR4
- ◆ IEEE 802.3by 25GBASE-SR
- ◆ InfiniBand SDR/DDR/QDR
- ◆ High-Performance Computing (HPC) clusters
- ◆ Servers, switches, storage and host card adapters

Standards

- ◆ IEEE 802.3by 25GBASE-SR
- ◆ IEEE 802.3bm 100GBASE-SR4
- ◆ SFF-8431 SFF-8436 SFF-8472
- ◆ ROHS

Description

The Hirundo's 100G QSFP28 to 4x 25G SFP28 breakout Active Optical Cables (AOCs) offer IT professionals a cost-effective interconnect solution for merging 100G QSFP28 and 25G SFP28 enabled host adapters, switches and servers. For typical applications, users can install this breakout or splitter cable between an available QSFP28 port on 100GE switch and feed up to 4 upstream SFP28 enabled 25GE switches. Each cable features a single SFF-8436 compliant QSFP28 connector rated for 103Gb/s on one end and 4 SFF-8431 compliant SFP28 connectors rated for 25.78Gb/s each on the other end.

1. Ordering Information

Table 1.1 Ordering Information

Part No.	Specifications							
	Package	Date rate (Gbps)	Wavelength (nm)	Optical Power (dBm)	Bit Error Rate	Temp (°C)	Reach (m)	Connector
HTOC-QPA5-xx01MB ^[1]	QSFP28 4*SFP28	103.12	850nm	-7.5~2.5	E-12	0~70	100	AOC
PN	HTOC-QPA5-xx01MB ^[1]							
Description	100G QSFP28 to 4*SFP28 Active Optical Cables, up to 100m, 0-70°C							
SAP No	-							
Customer PN	-							

Notes: 1、 Refer to Chapter 7 Ordering Information.

2. Revision History

Table 2.1 Revision History

Version	Initiated	Reviewed	Revision	Date
V1.0	Leo	Virgil	LiuSJ	2020.12.14

3. Absolute Maximum Ratings and Recommended Operating Conditions

Table 3.1 Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
Storage Temperature Range	Ts	°C	-40	+85
Relative Humidity	RH	%	5	85
Power Supply Voltage	Vcc	V	-0.5	+3.6
Signal Input Voltage		V	-0.3	Vcc+0.3

Table 3.2 Recommended Operating Conditions

Parameter	Symbol	Unit	Min	Typ	Max
Operating Case Temperature	Tc	°C	0	/	70
Power Supply Voltage	Vcc	V	3.135	3.3	3.465
Supply current (SFP28)	Icc	mA			300
Supply current (QSFP28)	Icc	mA			650
Bit Rate(Per channel)	BR	GB/S		25.78	
Bit Error Ratio	BER				10 ⁻¹²
Max Supported Link Length	L	m			100

4. Specification

4.1 QSFP28

Measured condition: Channel Data Rate 25.78125Gbps, VRCCR=3.3V, PRBS31, Case Operating Temperature 0~70°C

Table 4.1 QSFP28 Specification

Parameter	Symbol	Min	Typical	Max	Unit
Transmitter					
Centre Wavelength	λ_c	840	850	860	nm
RMS spectral width	σ			0.65	nm
Average launch power, each lane	PAVG	-7.5	-1	+2.5	dBm
Input differential swing	V _{in} PP	300		1100	mV
Input differential impedance	Z _{in}	90	100	110	Ω
Extinction Ratio	ER	2.0			dB
Receiver					
Center Wavelength	λ_c	840	850	860	nm
Bit Error Rate	BER			E-12	
Receiver Overload	PinMAX	2.5			dBm
Output Differential swing	V _{out} PP	500		800	mV
Output Differential Impedance	Z _{out}	90	100	110	Ω

4.2 SFP28

Measured condition: Channel Data Rate 25.78125Gbps, VRCCR=3.3V, PRBS31, Case Operating Temperature 0~70°C

Table 4.2 SFP28 Specification

Parameter	Symbol	Min	Typical	Max	Unit
Transmitter					
Centre Wavelength	λ_c	840	850	860	nm
RMS spectral width	σ			0.65	nm
Average launch power, each lane	PAVG	-7.5	-1	+2.5	dBm
Input differential swing	V _{in} PP	300		1100	mV
Input differential impedance	Z _{in}	90	100	110	Ω
Extinction Ratio	ER	2.0			dB
Receiver					
Center Wavelength	λ_c	840	850	860	nm
Bit Error Rate	BER			E-12	
Receiver Overload	PinMAX	2.5			dBm
Output Differential swing	V _{out} PP	500		800	mV
Output Differential Impedance	Z _{out}	90	100	110	Ω

5. Pin Assignment and Pin Description

5.1 QSFP28 Pin Assignment

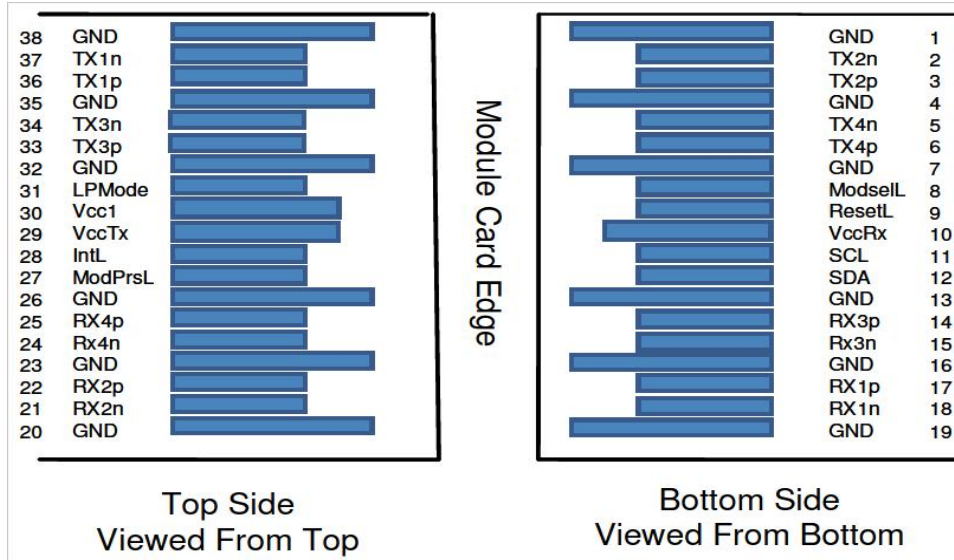


Figure 1 Electrical Pin-out Details

5.2 QSFP28 Pin Description

Table 5.1 Pin Description

Pin	Symbol	Name/Description	Note
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	ModSe1L	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	VccTx	+3.3V Power supply transmitter	
30	Vcc1	+3.3V Power Supply	
31	LPMMode	Low Power Mode	

32	GND	Ground	1
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

Notes:

1.GND is the symbol for signal and supply (power) common for the QSFP28 module. All are common within the module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.Circuit ground is internally isolated from chassis ground.

5.3 SFP28 Pin Assignment

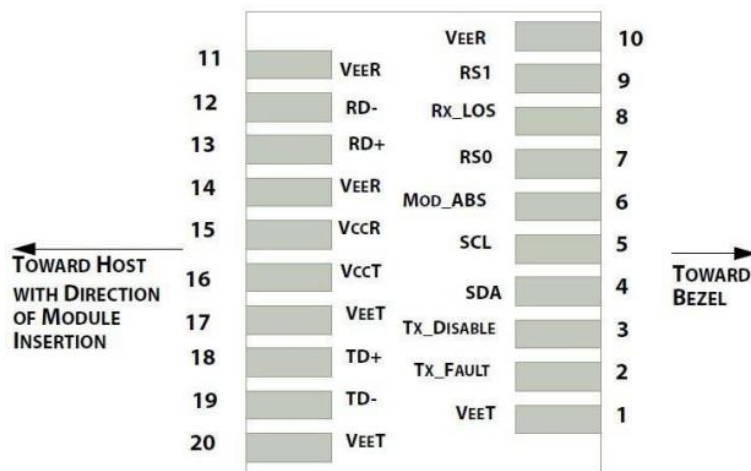


Figure 2 Electrical Pin-out Details

5.4 SFP28 Pin Description

Table 5.2 Pin Description

PIN #	Name	Function	Notes
1	VeeT	Module transmitter ground	1
2	Tx Fault	Module transmitter fault	2
3	Tx Disable	Transmitter Disable; Turns off transmitter laser output	3
4	SDL	2 wire serial interface data input/output (SDA)	4
5	SCL	2 wire serial interface clock input (SCL)	4
6	MOD-ABS	Module Absent, connect to VeeR or VeeT in the module	2
7	RS0	Rate select0: module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module	
8	LOS	Receiver Loss of Signal Indication	
9	RS1	Rate select1: module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.	
10	VeeR	Module receiver ground	1
11	VeeR	Module receiver ground	1
12	RD-	Receiver inverted data out put	
13	RD+	Receiver non-inverted data out put	
14	VeeR	Module receiver ground	1
15	VccR	Module receiver 3.3V supply	
16	VccT	Module transmitter 3.3V supply	

17	VeeT	Module transmitter ground	1
18	TD+	Transmitter non-inverted data out put	
19	TD-	Transmitter inverted data out put	
20	VeeT	Module transmitter ground	1

Notes:

- 1.The module ground pins shall be isolated from the module case.
- 2.This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host_Vcc on the host board.
- 3.This pin shall be pulled up with 4.7K-10Kohms to VccT in the module.
- 4.This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host_Vcc on the host board.

6. Mechanical Design Dimensions

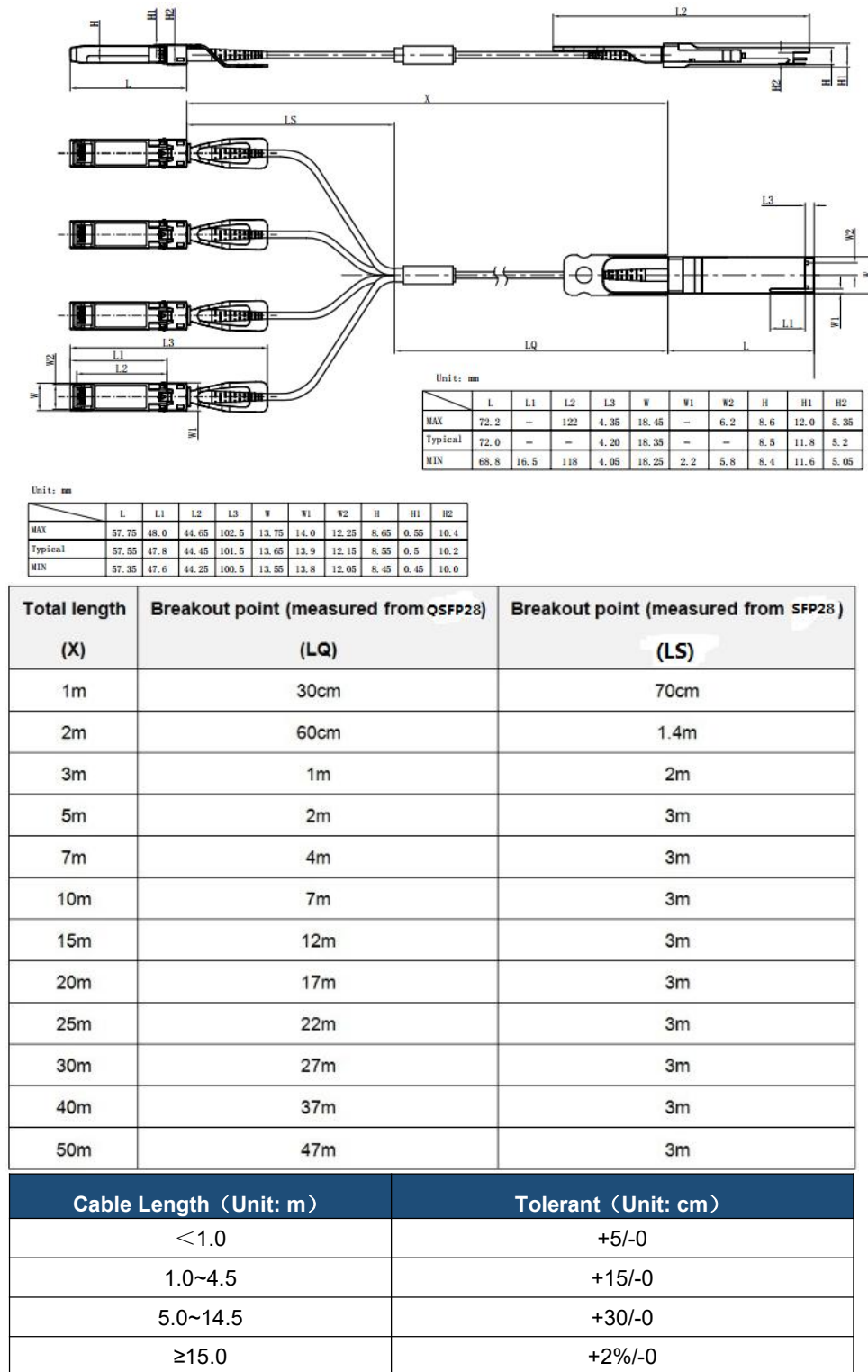


Figure 3 Mechanical Design Dimensions

7. Ordering Information:

Table 7.1 Ordering Information

Part Number	Description
HTOC-QPA5-xx01MB	100G QSFP28-4*SFP28 AOC
<u>xx</u> :Represents: wire type, type has: O2/O3/O4/O5=OM2/OM3/OM4/OM5 01~070,1~70 Length in meters OM3 MMF 071~100,71~100 Length in meters OM4 MMF	

8. For More Information

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