

Data Sheet

40Gb/S QSFP+ to 4xSFP+ Break-out AOC

P/N: WS-QP4S+AOCxCxxx



Features:

- Support 4x10GBASE-SR application
- Compliant to QSFP MSA SFF-8436 and SFP+ MSA SFF-8431 and SF-8472
- Multi rate of up to 10.3125Gbps per lane
- +3.3V single power supply
- Low power consumption
- UL certification cables (optional)
- Operating case temp Commercial: 0°C to +70°C
- RoHS compliant

Applications:

- 4x10Gbe-SR
- Other optical links

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Supply Voltage	V _{CC3}	-0.5	-	+3.6	V	
Storage Temperature	T _s	-10	-	+70	°C	
Operating Humidity	RH	+5	-	+85	%	1

Notes:

1. No-condensing.

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	T _C	0	-	+70	°C	
Power Supply Voltage	V _{CC}	3.14	3.3	3.47	V	
Power Dissipation per QSFP+	P _d	-	-	1.5	W	
Power Dissipation per SFP+	P _d	-	-	0.6	W	1
Bit Rate per Lane	BR	-	10.3125	-	Gbps	

Notes:

1. No-condensing.

Electrical Characteristics

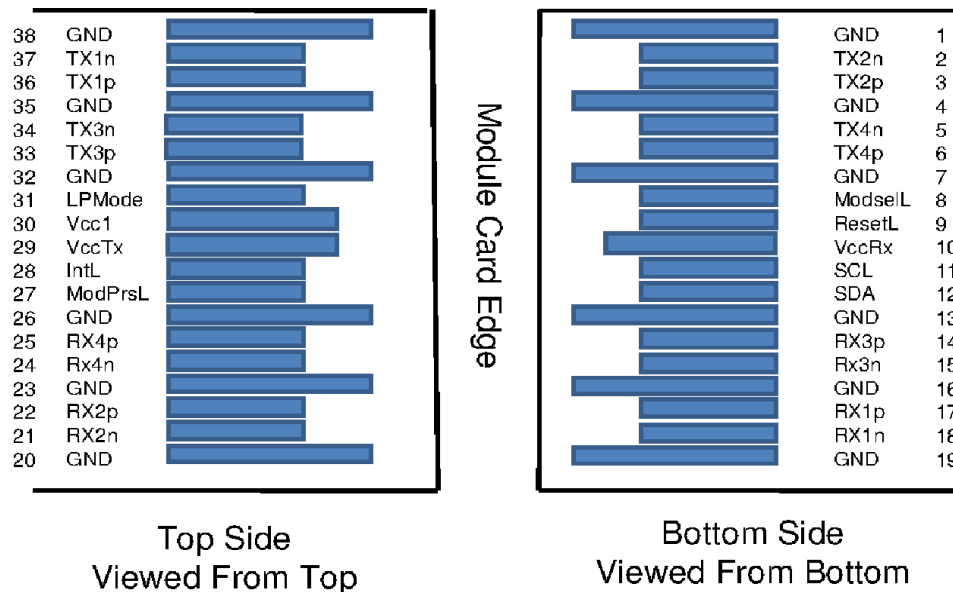
Parameter		Symbol	Min.	Typ.	Max.	Units	Notes
ModSelL	Module Select	V _{OL}	0	-	0.8	V	
	Module Unselect	V _{OH}	2.5	-	V _{CC}	V	
LPMode	Low Power Mode	V _{IL}	0	-	0.8	V	
	Normal Operation	V _{IH}	2.5	-	V _{CC} +0.3	V	
ResetL	Reset	V _{IL}	0	-	0.8	V	
	Normal Operation	V _{IH}	2.5	-	V _{CC} +0.3	V	
ModPrsL	Normal Operation	V _{OL}	0	-	0.4	V	
IntL	Interrupt	V _{OL}	0	-	0.4	V	
	Normal Operation	V _{OH}	2.4	-	V _{CC}	V	
Electrical Transmitter Characteristics							
Differential Data Input Swing		V _{out}	200	-	1600	mV	
Output Differential Impedance		Z _D	90	100	110	Ω	
Electrical Receiver Characteristics							
Differential Data Output Swing		V _{in,P-P}	350	-	800	mV _{PP}	
Bit Error Rate		BER			E-12		1
Input Differential Impedance		Z _{IN}	90	100	110	Ω	

Notes:

1. PRBS2³¹-1@10.3125Gbps.

Optical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Units	Notes
Electrical Transmitter Characteristics							
Differential Data Input Swing		$V_{in,P-P}$	200	-	1600	mV _{PP}	
Input Differential Impedance		Z_{IN}	90	100	110	Ω	
Tx_Fault	Normal Operation	V_{OL}	0	-	0.8	V	
	Transmitter Fault	V_{OH}	2.0	-	V_{CC}	V	
Tx_Disable	Normal Operation	V_{IL}	0	-	0.8	V	
	Laser Disable	V_{IH}	2.0	-	$V_{CC}+0.3$	V	
Electrical Receiver Characteristics							
Differential Date Output		V_{out}	370	-	1600	mV	
Output Differential Impedance		Z_D	90	100	110	Ω	
Rx_LOS	Normal Operation	V_{OL}	0	-	0.8	V	
	Lose Signal	V_{oH}	2.0	-	V_{CC}	V	

Pin Assignment**Figure 1 Pin View for QSFP+**

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	ModSel	Module Select	
9	Reset	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
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. Circuit ground is internally isolated from chassis ground.

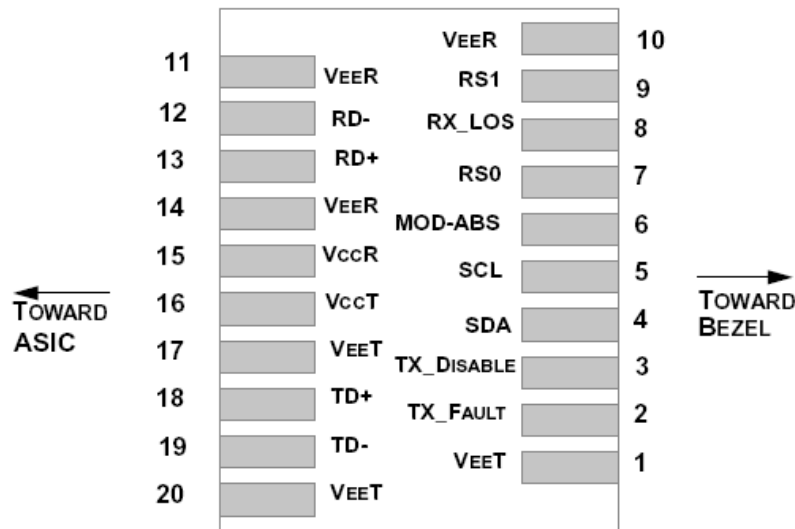


Figure 2, Pin View for SFP+

Pin	Symbol	Name/Description	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	SDA	2-Wire Serial Interface Data Line (MOD-DEF2)	
5	SCL	2-Wire Serial Interface Clock (MOD-DEF1)	
6	MOD_ABS	Module Absent, connected to VEE T or VEE R in the module	2
7	RS0	Rate Select 0, optionally controls SFP+ module receiver	4
8	RX_LOS	Receiver Loss of Signal Indication (In FC designated as Rx_LOS and in Ethernet designated as NOT Signal Detect)	2
9	RS1	Rate Select 1, optionally controls SFP+ module transmitter	4
10	VEE R	Module Receiver Ground	1
11	VEE R	Module Receiver Ground	1
12	RD-	Receiver Inverted Data Output	
13	RD+	Receiver Non-Inverted Data Output	
14	VEE R	Module Receiver Ground	1
15	VccR	Module Receiver 3.3 V Supply	
16	VccT	Module Transmitter 3.3 V Supply	
17	VEET	Module Transmitter Ground	1
18	TD+	Transmitter Non-Inverted Data Input	
19	TD-	Transmitter Inverted Data Input	

20	V _{EE} T	Module Transmitter Ground	1
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Notes:

1. The module ground pins are isolated from the module case.
2. The pins shall be pulled up with 4.7K-10Kohms to a voltage between 3.14V and 3.46V on host board.
3. The pin is pulled up to VCCT with a 4.7K-10KΩ resistor in the module.
4. See SFF-8472 Rev12.2 Table 10-2.

Recommended Circuit

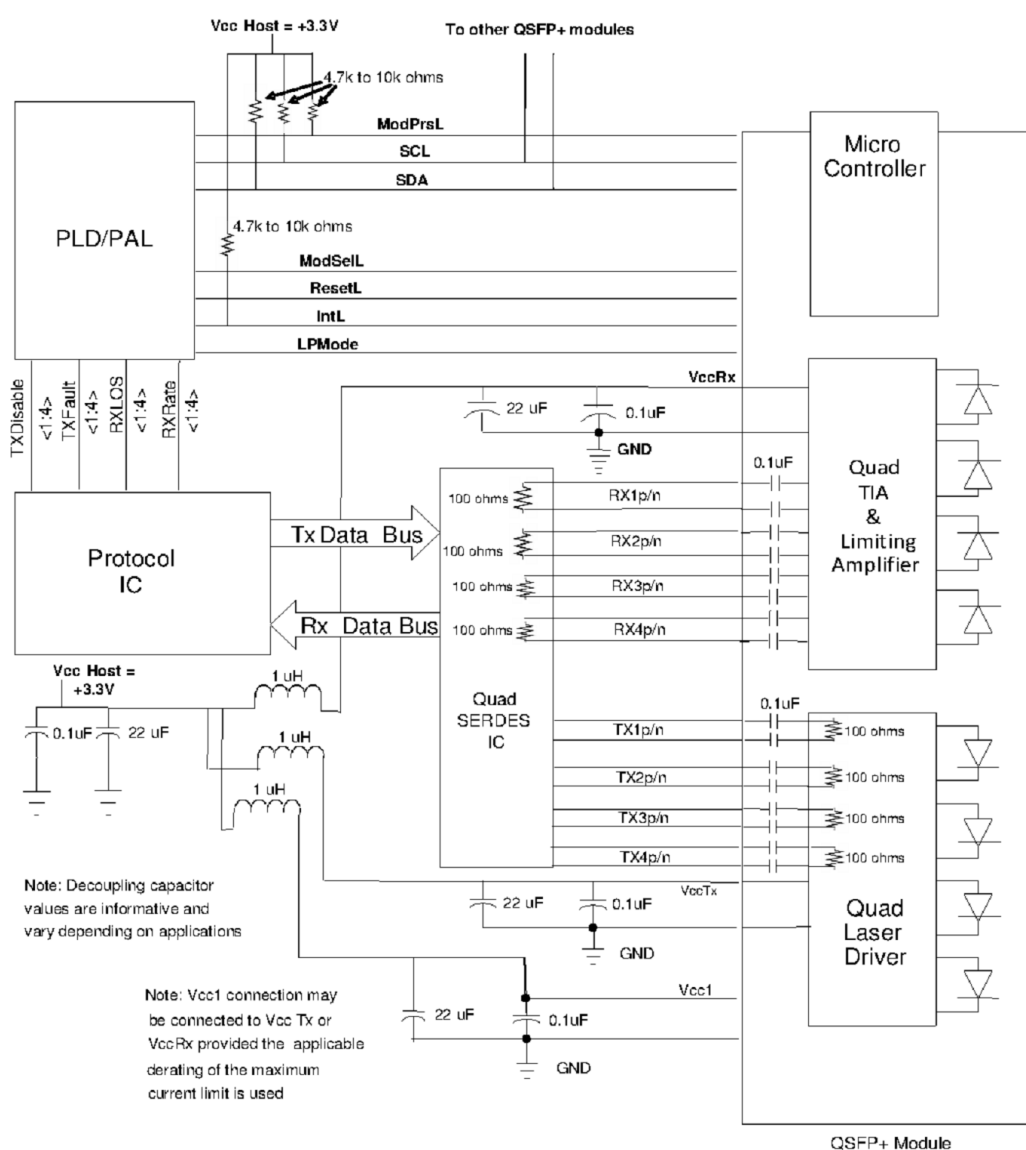


Figure 3, Recommended Interface Circuit for QSFP+

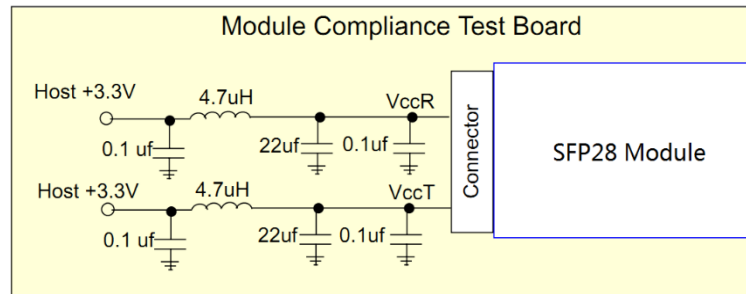


Figure 4, Recommended Host Board Power Supply Circuit for SFP+

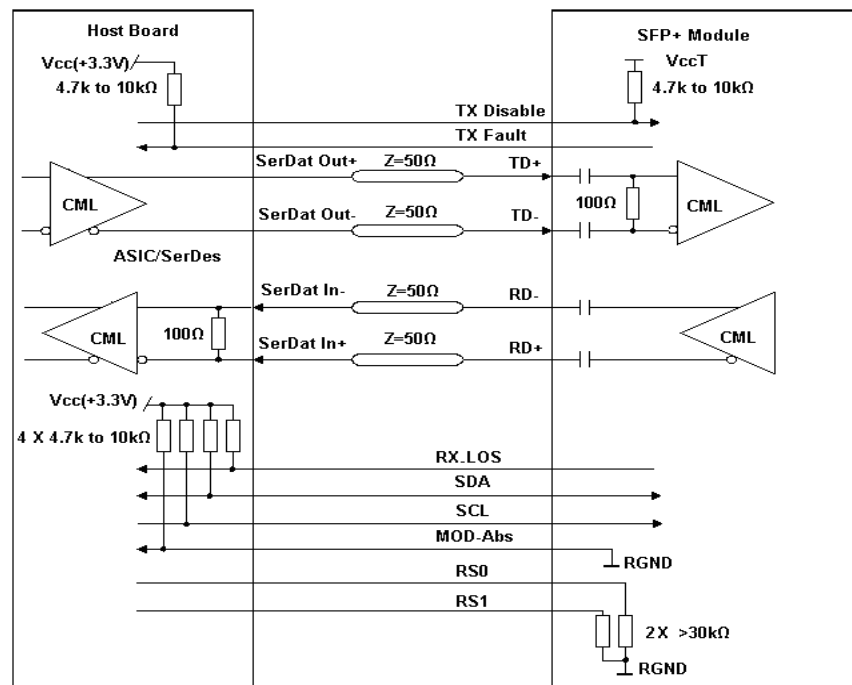


Figure 5, Recommended Interface Circuit for SFP+

Monitoring Specification

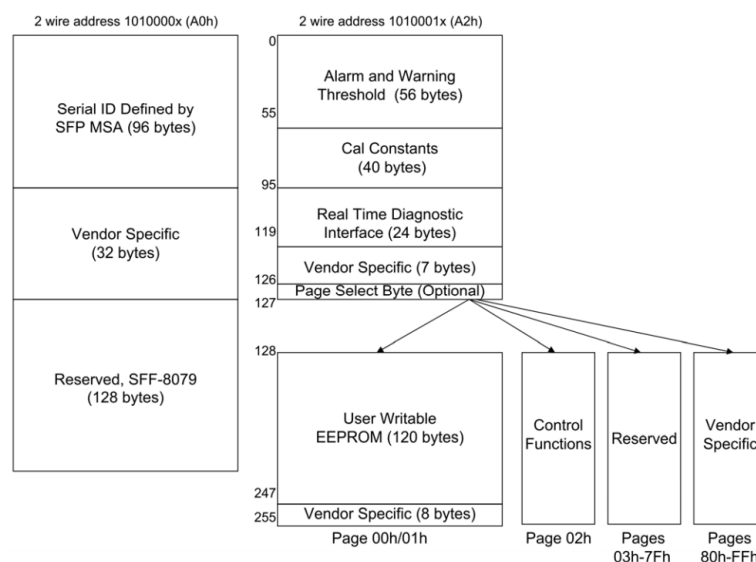
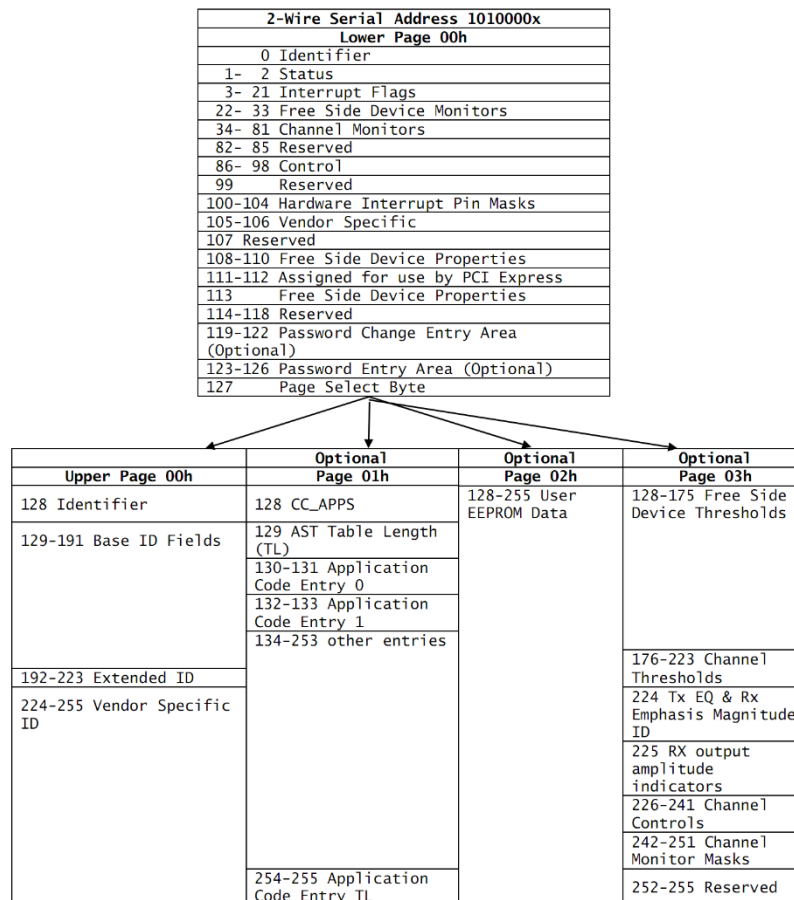
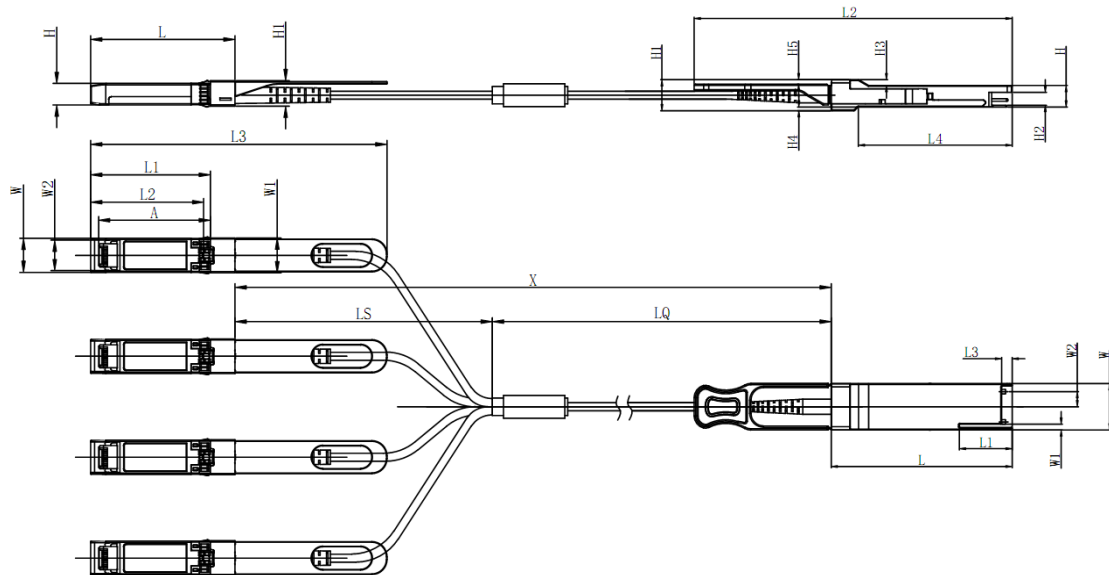


Figure 7, Memory Map for SFP+

Mechanical Drawing

Unit: mm

QSFP	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	-

SFP+	L	L1	L2	L3	W	W1	W2	H	H1	A
Max	57.6	47.7	44.55	119.9	13.8	14.0	12.3	8.7	10.3	45.25
Type	57.4	47.5	44.35	117.9	13.55	13.8	12.1	8.5	10.1	45
Min	57.2	47.3	44.15	115.9	13.3	13.6	11.9	8.4	9.9	44.65

Figure 8, Mechanical Diagram**Table 8- Cable Length**

Cable Length (Unit: m)	Tolerant (Unit: cm)
<1.0	+5/-0
1.0~4.5	+15/-0
5.0~14.5	+30/-0
≥15.0	+2%/-0

Table 9- Breakout Cable Nominal Length

Total Length X (Unit: m)	Breakout Point Measured from QSFP LQ (Unit: m)	Breakout Point Measured from SFP LS(Unit: m)
1	0.3	0.7
2	0.6	1.4
3	1	2
5	2	3
7	4	3
10	7	3
15	12	3
20	17	3
25	22	3
30	27	3
40	37	3
50	47	3

Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

Ordering Information

Part No	Specification						
	Package	Data rate	Fiber type	Cable Type	Cable Length*	Temp.	Application
WS-QP4S+AOCCLC013	QSFP+ to SFP+	40G 4x10Gbps	OM3	Ribbon LSZH	1m	0~70°C	4x10Gbe-SR
WS-QP4S+AOCCLC033	QSFP+ to SFP+	40G 4x10Gbps	OM3	Ribbon LSZH	3m	0~70°C	4x10Gbe-SR
WS-QP4S+AOCCLC053	QSFP+ to SFP+	40G 4x10Gbps	OM3	Ribbon LSZH	5m	0~70°C	4x10Gbe-SR
WS-QP4S+AOCCLC073	QSFP+ to SFP+	40G 4x10Gbps	OM3	Ribbon LSZH	7m	0~70°C	4x10Gbe-SR
WS-QP4S+AOCCLC103	QSFP+ to SFP+	40G 4x10Gbps	OM3	Ribbon LSZH	10m	0~70°C	4x10Gbe-SR
WS-QP4S+AOCCLC153	QSFP+ to SFP+	40G 4x10Gbps	OM3	Ribbon LSZH	15m	0~70°C	4x10Gbe-SR
WS-QP4S+AOCxCyym	QSFP+ to SFP+	40G 4x10Gbps	OMm	Ribbon LSZH or OFPN or OFNR	xxm	0~70°C	4x10Gbe-SR

Note: WS-QP4S+AOCxCyym

Cable type: x= L for LSZH, P for OFNP, and R for OFNR

Length: yy

Fiber: m=3 for OM3 (≤70m), 4 for OM4 (<100m)

Variant Length and Cable Types can be customized. Please contact our sales for detail information.

Modification History

Revision	Date	Description	Originator	Review	Approved
V1.0	21-Jun-2019	New Issue	Ivy Chen	Wayne Liao	Wayne Liao
V2.0	25-Jun-2021	Update PN	ShaoYu Lee	Wayne Liao	Wayne Liao



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