WAVESPLITTER™ TECHNOLOGIES, INC.

Data Sheet

100G QSFP28 to 4x25G SFP28 Breakout AOC

P/N: WS-Q84S-AOCxCyyz

Features:

- Support 4 x 25GBASE-SR application
- Compliant to QSFP28 MSA SFF-8636 and SFP28 MSA SFF-8431 and SFF-8472
- Multi rate of up to 25.78125 Gb/s 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

- 4 x 25GBASE-SR
- Other optical links

Absolute Maximum Ratings

Exceeding the limits below may damage the active optical cable permanently.

Parameter	Symbol	Min.	Typ.	Max.	Unit.	Note.
Maximum Supply Voltage	V_{cc}	-0.5		3.6	V	
Storage Temperature	T_{sto}	-5		75	℃	
Relative Humidity	RH	0		85	%	1

Note: 1 No condensation

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit.	Note.
Operating Case Temperature	T_C	0	-	+70	°C	
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	

Power Dissipation per QSFP28	Pd	-	-	2.5	W	
Power Dissipation per SFP28	Pd	-	-	1.0	W	1
Bit Rate Bit Rate per Lane	BR	10.3125	25.78125	-	Gb/s	2

Note:

1. Per terminal
2. The module supports automatic data rate adaptation. Operation at reduced data rates (e.g., 10 Gb/s per lane) is system-dependent and may require re-initialization. This does not affect operation at the nominal data rate.

Electrical Characteristics for QSFP28

Transmitter							
Parameter		**Symbol**	**Min.**	**Typ.**	**Max.**	**Unit.**	**Ref.**
Differential Data Input Swing		V_{out}	200		1000	mV	
Input Differential Impedance		Z_D	90	100	110	Ω	
ModSelL	Module Select	V_{OL}	V_{EE}-0.3		0.4	V	
	Module Unselect	V_{OH}	2.0		V_{CC}+0.3	V	
LPMode	Low Power Mode	V_{IL}	V_{EE}-0.3		0.8	V	
	Normal Operation	V_{IH}	2.0		V_{CC}+0.3	V	
ResetL	Reset	V_{IL}	V_{EE}-0.3		0.8	V	
	Normal Operation	V_{IH}	2.0		V_{CC}+0.3	V	
Receiver							
Differential Data Output Swing		$V_{in,P-P}$	200		1000	mV_{PP}	
Output Differential Impedance		Z_D	90	100	110	Ω	
ModPrsL	Normal Operation	V_{OL}	V_{EE}-0.3		0.4	V	
IntL	Interrupt	V_{OL}	V_{EE}-0.3		0.4	V	
	Normal Operation	V_{OH}	2.0	-	V_{CC}+0.3	V	
Bit Error Rate		BER			1E-12		1

Note: 1 PRBS2^31-1 @ 25.78125 Gb/s

Electrical Characteristics for SFP28

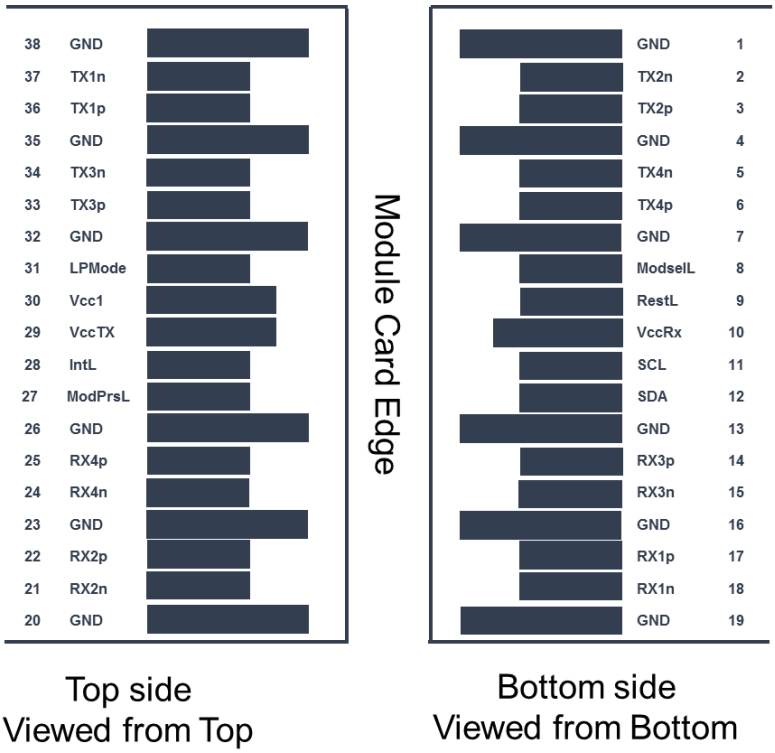
Transmitter							
Parameter		**Symbol**	**Min.**	**Typ.**	**Max.**	**Unit.**	**Ref.**
Differential Data Input Swing		V_{out}	200		1000	mV	
Input Differential Impedance		Z_D	90	100	110	Ω	
Tx_Fault	Normal Operation	V_{OL}	V_{EE}-0.3		0.4	V	
	Transmitter Fault	V_{OH}	2.0		V_{CC}+0.3	V	

Tx_Disable	Normal Operation	V_{IL}	V_{EE}-0.3		0.8	V	
	Laser Disable	V_{IH}	2.0		V_{CC}+0.3	V	
Receiver							
Differential Data Output Swing		$V_{in,P-P}$	200		1000	mV_{PP}	
Output Differential Impedance		Z_D	90	100	110	Ω	
Rx_LOS	Normal Operation	V_{OL}	V_{EE}-0.3		0.4	V	
	Lose Signal	V_{OH}	2.0	-	V_{CC}+0.3	V	
Bit Error Rate		BER			1E-12		1

Note: 1 PRBS2^31-1 @ 25.78125 Gb/s

Pin Function Definitions

a. QSFP28 end



Top side
Viewed from Top

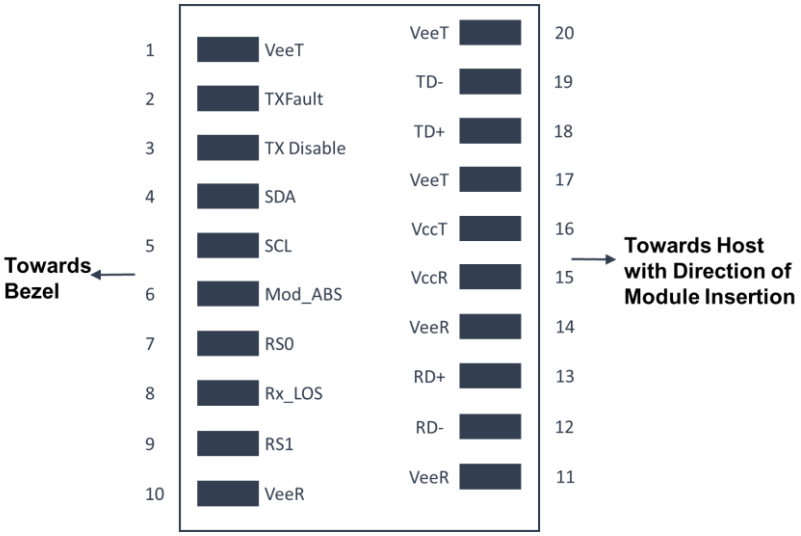
Bottom side
Viewed from Bottom

Pin descriptions

PIN	Symbol	Description	Note.
1	GND	Ground	
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	2
9	ResetL	Module Reset	2
10	V_{cc} RX	+3.3V Receiver Power Supply Receiver	
11	SCL	2-wire Serial Interface Clock	2
12	SDA	2-wire Serial Interface Data	2
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	2
24	RX4n	Receiver Inverted Data Output	
25	RX4p	Receiver Non-Inverted Data Output	
26	GND	Ground	2
27	ModPrsL	Module Present, internal pulled down to GND	
28	IntL	Interrupt output, should be pulled up on host board	
29	Vcc TX	+3.3V Transmitter Power Supply	
30	Vcc1	+3.3V Power Supply	
31	LPMode	Low Power Mode	2
32	GND	Ground	
33	TX3p	Transmitter Non-Inverted Data Input	
34	TX3n	Transmitter Inverted Data Input	
35	GND	Ground	
36	TX1p	Transmitter Non-Inverted Data Input	
37	TX1n	Transmitter Inverted Data Input	
38	GND	Ground	1.

b. SFP28 end



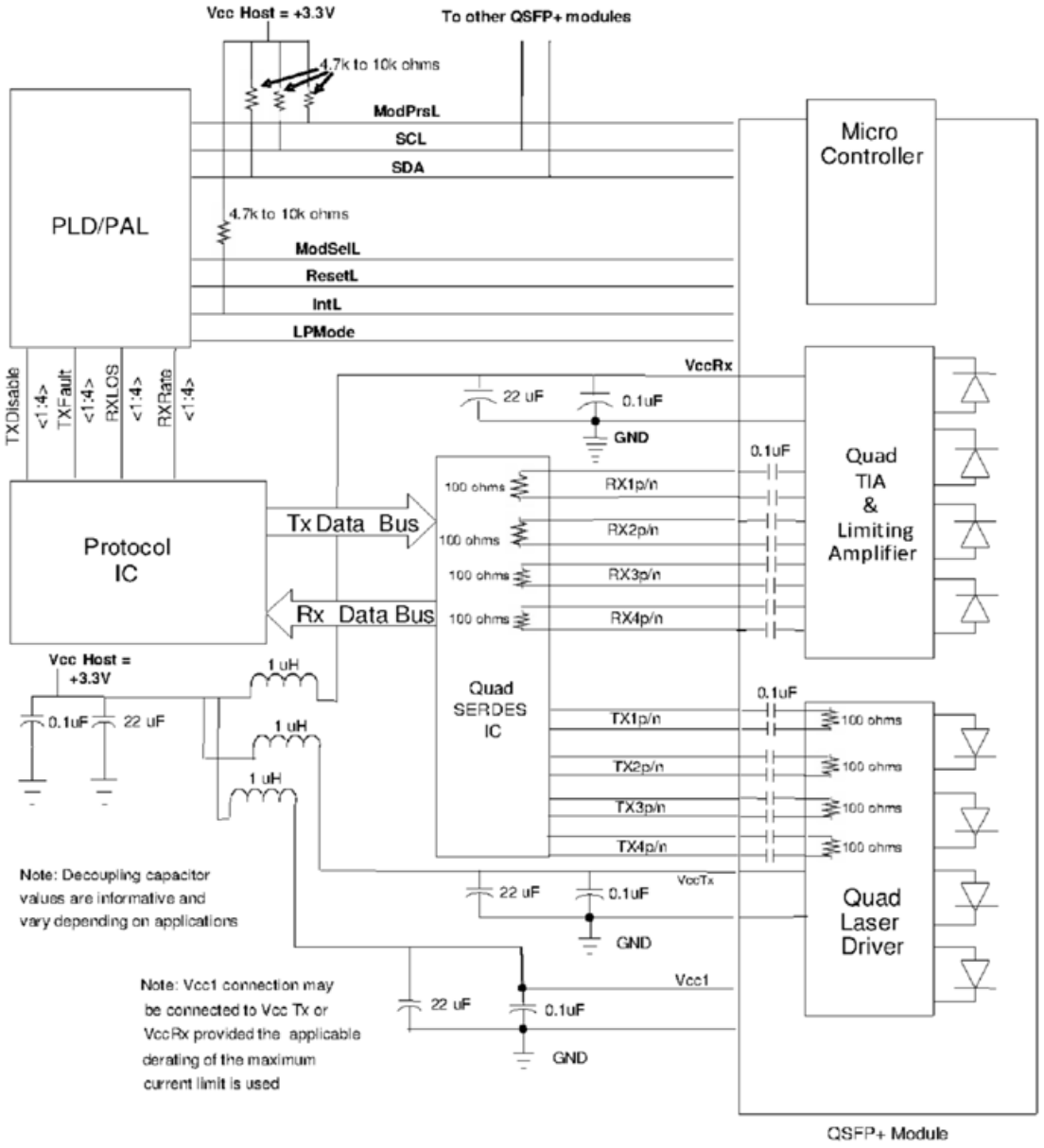
PIN	Symbol	Description	Note.
1	Veet	Module Transmitter Ground	1
2	TX_Fault	Module Transmitter Fault	2
3	TX_Disable	Transmitter Disable, turns off the laser output	
4	SDA	2-wire Serial Interface Data Lane	
5	SCL	2-wire Serial Interface Clock	
6	Mod_ABS	Module Absent, connected To VeeT or VeeR in the module	
7	RS0	Rate Select 0,optionally controls SFP+ module Receiver	
8	RX_LOS	Receiver Loss of Signal Indication	
9	RS1	Rate Select 1, optionally controls SFP+ module transmitter	
10	VeeR	module receiver ground	1
11	VeeR	module receiver ground	1
12	RD-	Receiver inverted Data Output	
13	RD+	Receiver Non-inverted Data Output	
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 Input	
19	TD-	Transmitter Inverted Data Input	
20	VeeT	Module Transmitter Ground	1

Notes:

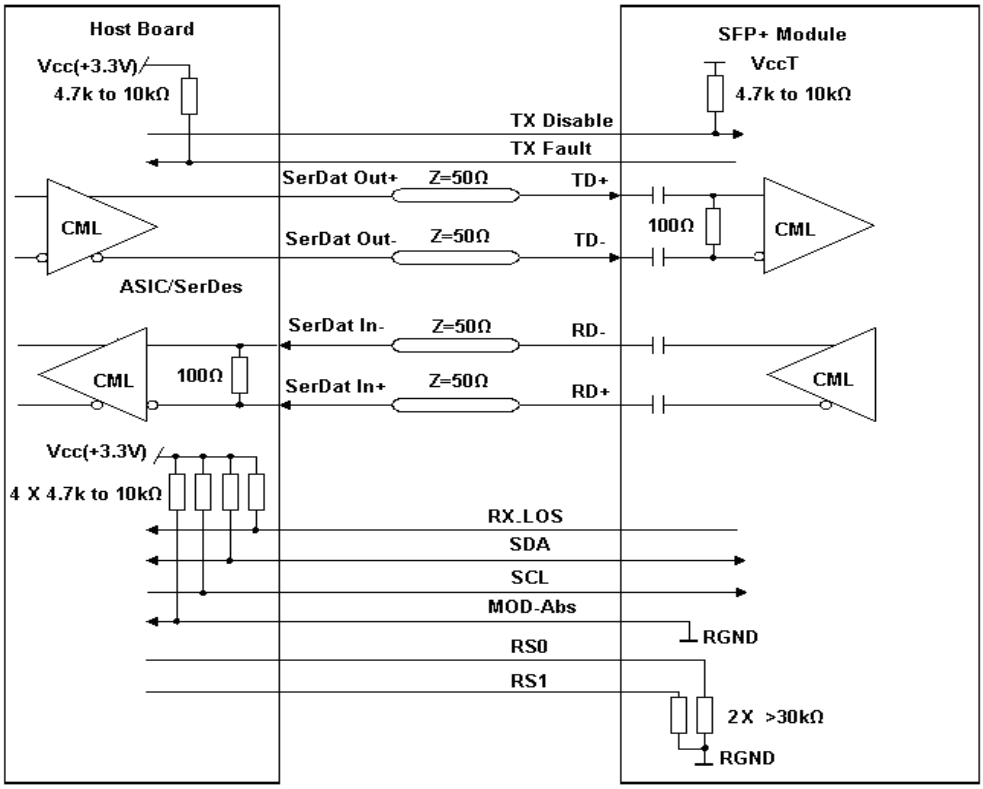
1 GND is the symbol for signal and supply (power) common for the module. All are common within the module and all module voltages are reference to this potential unless otherwise noted. Module circuit ground is isolated from module chassis ground within the module.

2 Open collector, should be pulled up with 4.7~10K ohms on the host board to a voltage between 3.15V and 3.6V.

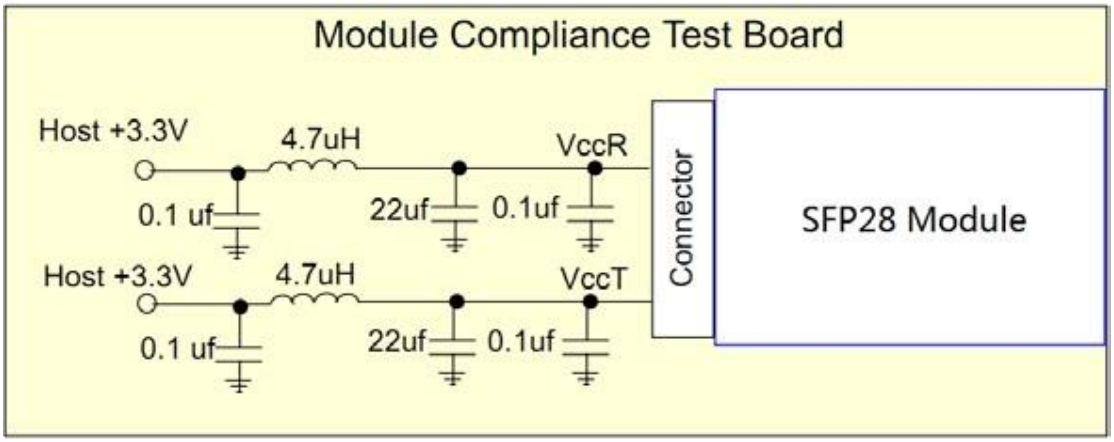
Recommended Interface Circuit for QSFP28



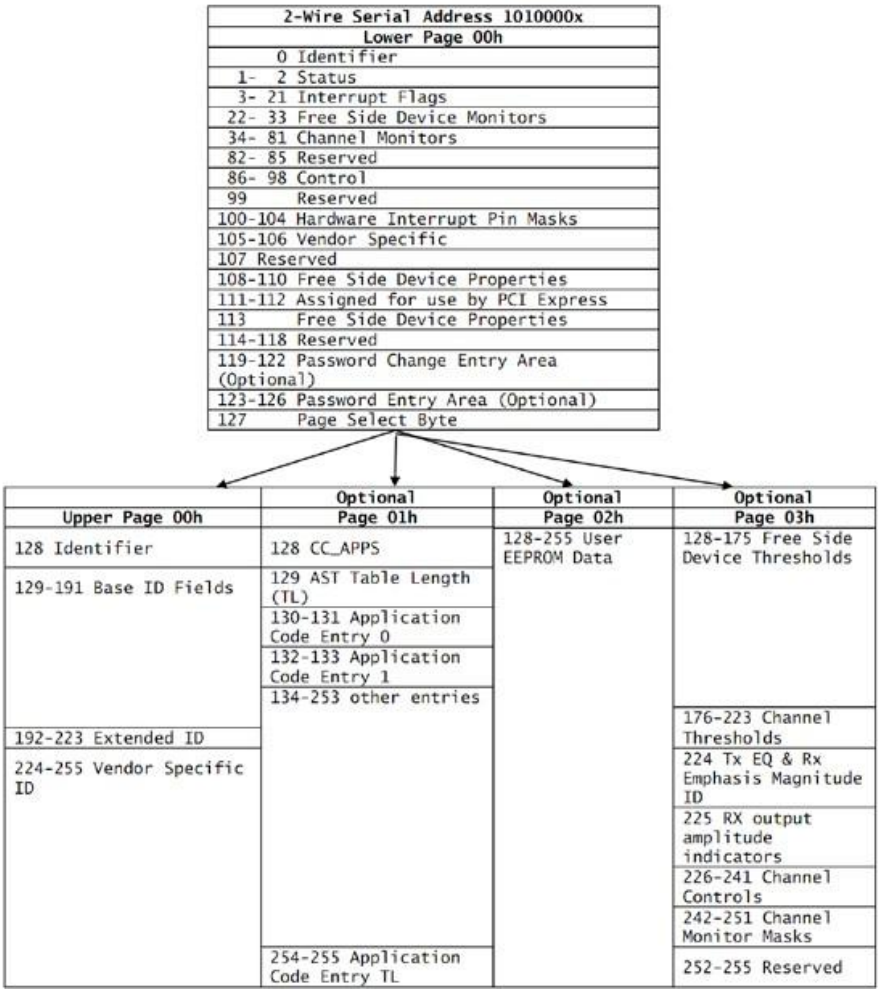
Recommended Interface Circuit for SFP28

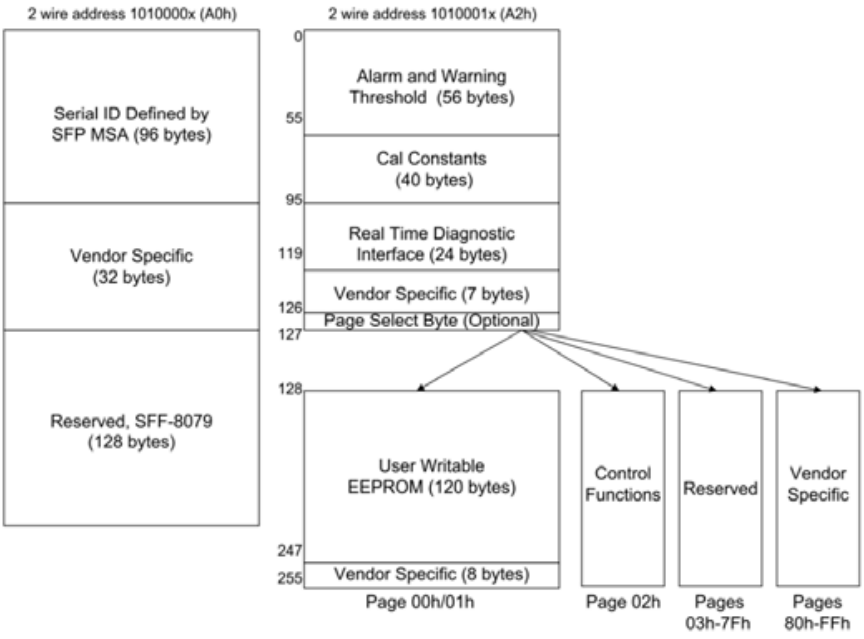


Recommended Host Board Power Supply Circuit for SFP28



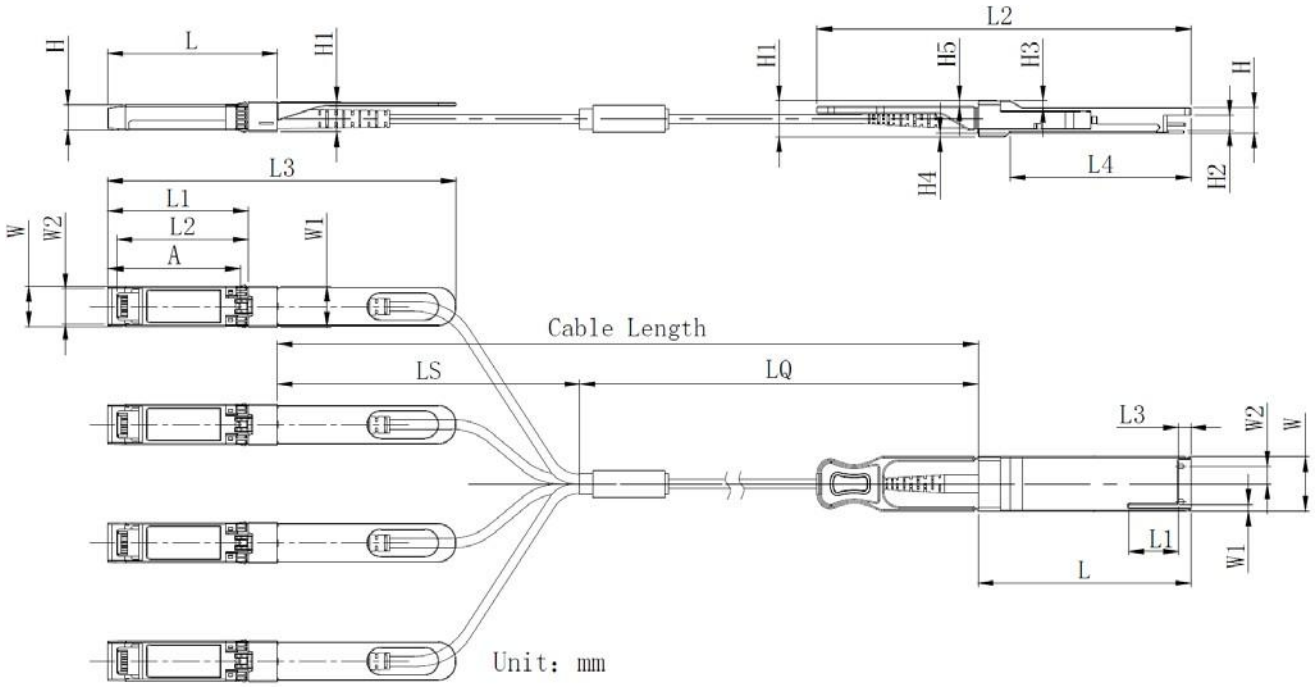
Memory Map





Mechanical Drawing

Product shall be of design, construction and physical dimensions specified on applicable product drawing.



Unit: mm

QSFP28	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	-

SFP28	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

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

Parameter	Value	Units
Diameter	3	mm
Minimum bend radius	30	mm
Length tolerance	Length < 1 m: +5 /-0	cm
	1 m ≤length ≤ 4.5 m: +15 / -0	cm
	5 m ≤length ≤ 14.5 m: +30 / -0	cm
	Length≥15.0 m +2% / -0	m
Cable color	Orange(OM2), Aqua(OM3), Magenta(OM4)	

Ordering Information

Part No	Specification						
	Package	Data Rate per lane	Fiber	Cable Type	Cable Length	Temp.	Application
WS-Q84S-AOCxC033	QSFP28 to SFP28	25 Gb/s	OM3	Round LSZH, OFNP, or OFNR	3 m	0 ~ 70°C	100GbE Infiniband EDR
WS-Q84S-AOCxC053	QSFP28 to SFP28	25 Gb/s	OM3	Round LSZH, OFNP, or OFNR	5 m	0 ~ 70°C	100GbE Infiniband EDR
WS-Q84S-AOCxCyyz	QSFP28 to SFP28	25 Gb/s	OM2, OM3, or OM4	Round LSZH, OFNP, or OFNR	yy m	0 ~ 70°C	100GbE Infiniband EDR

Note:

Cable jacket type: x= L for LSZH, P for OFNP, and R for OFNR, X for any of the above (OFNR, OFNP, or LSZH)

Length: yy meters

Fiber: z= 3 for OM3(up to 70m), 4 for OM4(up to 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	07-May-2021	New Issue	Shao-Yu Lee	Wayne Liao	Wayne Liao
V1.1	16-Jul-2021	Update typos and layout	Shao-Yu Lee	Wayne Liao	Wayne Liao

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