DATA SHEET

MODULETEK-AOC-QSFP10-4SFP10-OM3-aaa.aaM-C0C0C

40Gb/s QSFP+ to 4xSFP+ Active Optical Cable Transceiver

AOC-QSFP10-4SFP10-OM3-aaa.aaM-C0C0C Overview

ModuleTek’s AOC-QSFP10-4SFP10-OM3-aaa.aaM-C0C0C QSFP+ to 4xSFP+ active optical cable transceivers are suitable for 1 to 300 meters MMF OM3 distances to connect QSFP+ and SFP+ equipments. This interconnect system is fully compliant with QSFP+ MSA and SFP+ MSA.

Product Features

QSFP+ End: Compliant with QSFP+ MSA specifications
SFP+ End: Compliant with SFP+ MSA specifications
4 independent duplex channels operating at 10Gbps
Cable length up to 300 meters
RoHS Compliant
Operating temperature range: $0^{\circ}C$ to$70^{\circ}C$

Applications

4x10G Ethernet

Ordering Information

Part Number	Description	Color on Clasp
AOC-QSFP10-4SFP10-OM3-aaa.aaM-C0C0C	40G QSFP+ to 4xSFP+ Breakout Active Optical Cable up to 300m	Blue

For More Information:
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Email: sales@moduletek.com

General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Bit Error Rate	BER			10^{-12}		
Operating Temperature	T_{OP}	0		70	°C	1
Storage Temperature	T_{STO}	−10		75	°C	2
Input Voltage	V_{CC}	3.14	3.3	3.46	V	
Maximum Voltage	V_{MAX}	−0.5		3.6	V	3

Notes:
1. Case temperature
2. Ambient temperature
3. For electrical power interface

AOC Electrical Input Requirements

Parameter	Symbol	Conditions	Min	Typ	Max	Unit	Remarks
Data Rate Per Channel	DR			10.3125	10.5	Gb/s	
Differential Input Amplitude	V_{IN_PP}		180		1200(QSFP)	mV	
			180		700(SFP+)	mV	
Input AC Common Mode Voltage	V_{CM}				25	mV	1
Eye Mask Coordinates	X1, X2	0.29, 0.5				UI	2
	Y1, Y2	150, 425				mV	2

Notes:
1. RMS
2.Hit ratio $5x10^{-5}$.See Figure 1 for transmitter input eye mask definitions.

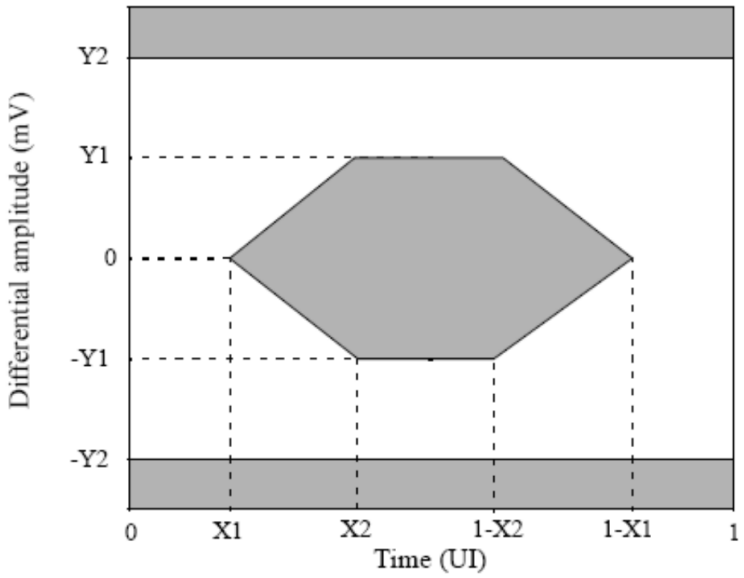


Figure 1

AOC Electrical Output Requirements

Parameter	Symbol	Conditions	Min	Typ	Max	Unit	Remarks
Data Rate Per Channel	DR			10.3125	10.5	Gb/s	
Differential Output Amplitude	V_{OUT_PP}		0		850	mV	
Output AC Common Mode Voltage	V_{CM}				15	mV	1
Data output Rise/Fall Time(20%-80%)	T_R/ T_F		24			ps	
Total Jitter (p-p)	TJ				0.7	UI	
Deterministic Jitter (p-p)	DJ				0.4	UI	
Eye Mask Coordinates	X1, X2	0.29, 0.5				UI	2
	Y1, Y2	150, 425				mV	2

Note:
1. RMS
2. Hit ratio 5x10^{-5}.See Figure 2 for receiver output eye mask definitions.

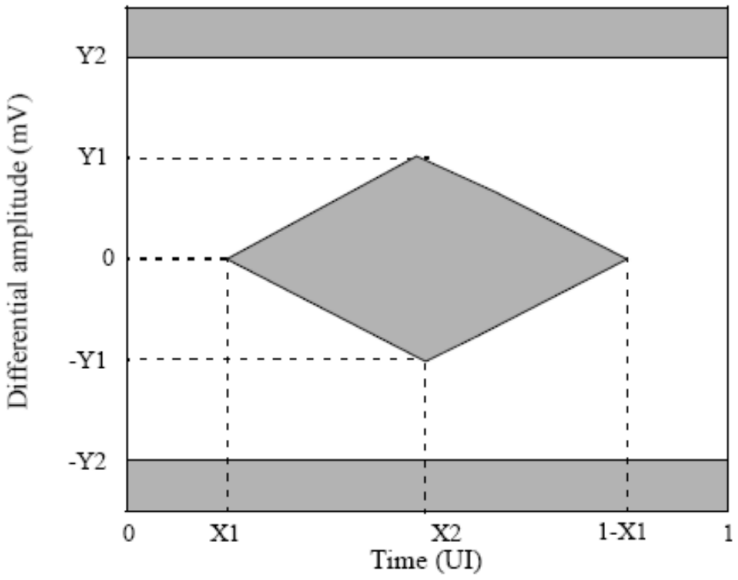
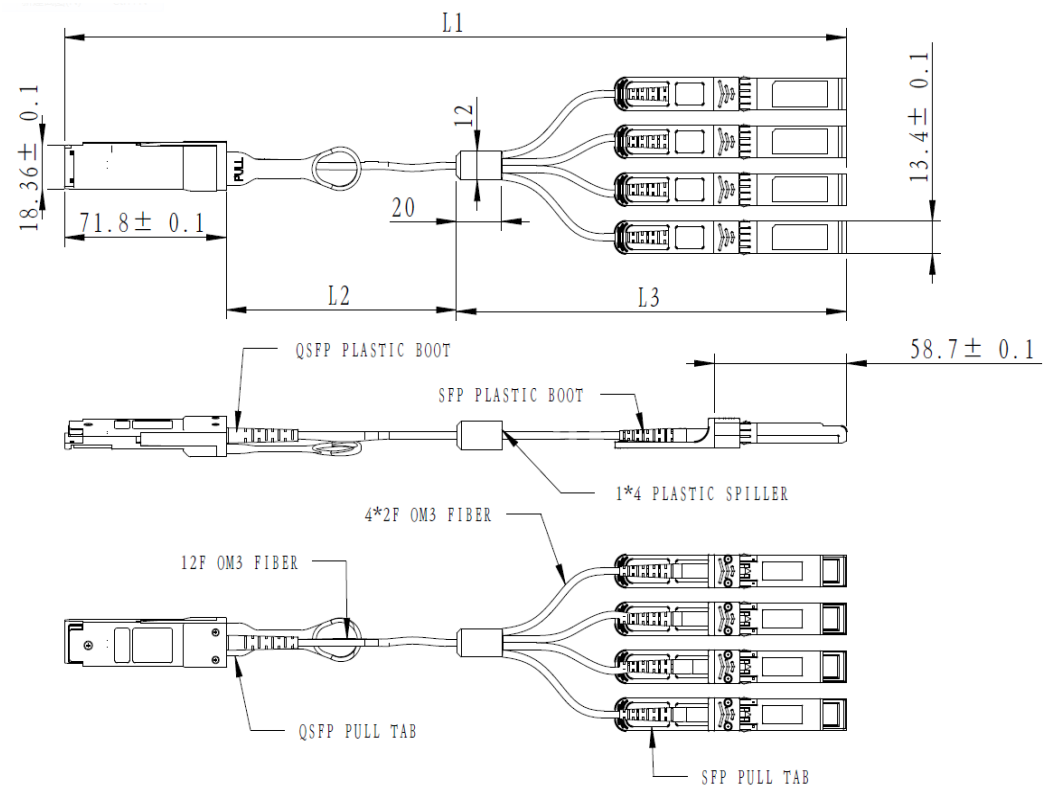


Figure 2

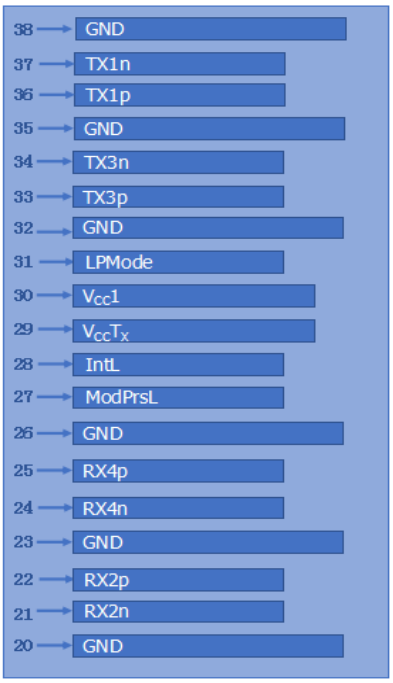
Dimensions



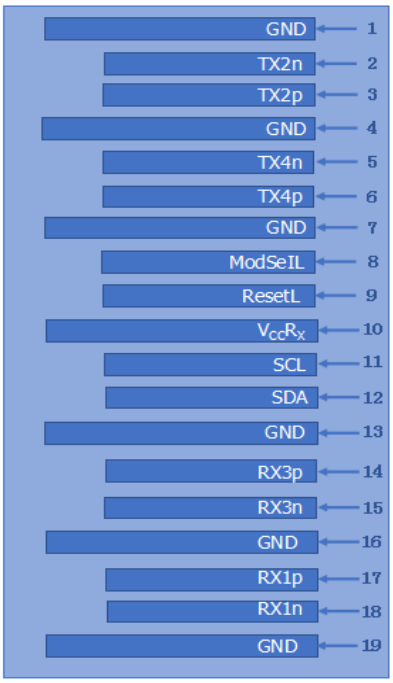
Length(L1)	Length(L2)	Length(L3)
1M	0.33M	0.67M
2M	0.67M	1.33M
3M	1M	2M
5M	2M	3M
≧ 5M	L1−L3	3M

ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED
UNIT: mm

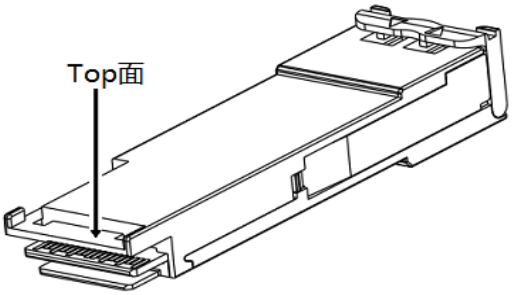
Electrical Pad Layout for QSFP+

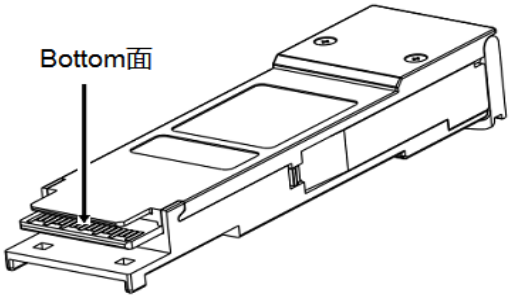


Top of Board

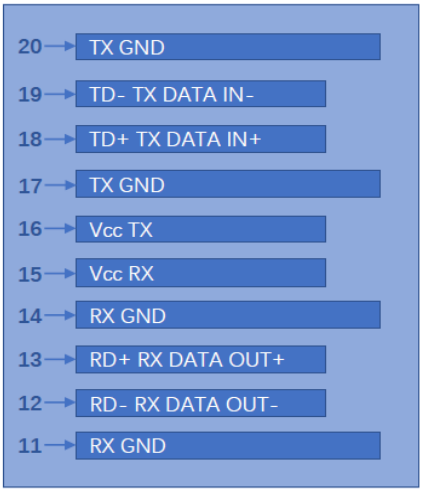


Bottom of Board

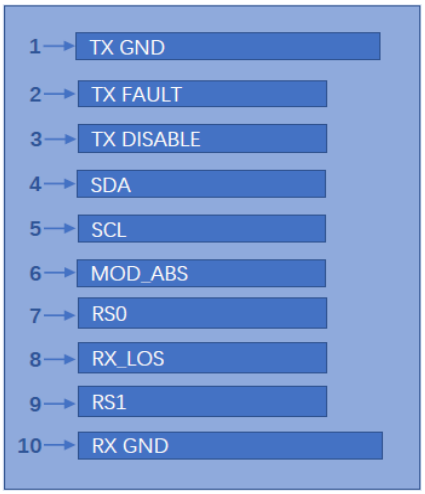




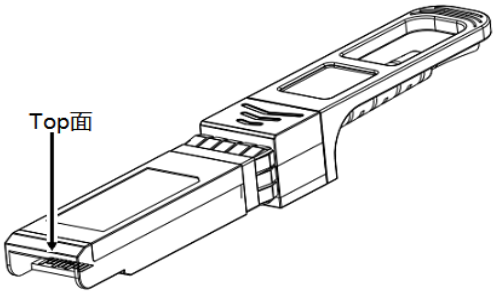
Electrical Pad Layout for SFP+

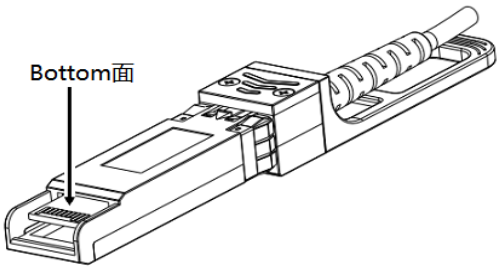


Top of Board



Bottom of Board





Pin Assignment for QSFP+

PIN #	Symbol	Description	Remarks
1	GND	Ground	
2	TX2n	Transmitter Inverted Data Input	
3	TX2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	
5	TX4n	Transmitter Inverted Data Input	
6	TX4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	$V_{CC}R_X$	+3.3V Power Supply Receiver	
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	
14	RX3P	Ground	
15	RX3n	Receiver Inverted Data Output	
16	GND	Ground	
17	RX1P	Receiver Non-Inverted Data Output	
18	RX1n	Receiver Inverted Data Output	
19	GND	Ground	
20	GND	Ground	
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	$V_{CC}T_X$	+ +3.3V Power Supply transmitter	
30	V_{CC1}	+ +3.3V Power Supply	
31	LPMode	Low Power Mode	
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	

Pin Assignment for SFP+

PIN #	Symbol	Description	Remarks
1	V_{EET}	Transmitter ground (common with receiver ground)	1
2	T_{FAULT}	Transmitter Fault	
3	T_{DIS}	Transmitter Disable. Laser output disable on high or open	2
4	SDA	Data line for serial ID	3
5	SCL	Clock line for serial ID	3
6	MOD_ABS	Module Absent. Grounded within the module	3
7	RS0	No connection required	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation	4
9	RS1	No connection required	1
10	V_{EER}	Receiver ground (common with transmitter ground)	1
11	V_{EER}	Receiver ground (common with transmitter ground)	1
12	RD–	Receiver Inverted DATA out. AC coupled	
13	RD+	Receiver Non-inverted DATA out. AC coupled	
14	V_{EER}	Receiver ground (common with transmitter ground)	1
15	V_{CCR}	Receiver power supply	
16	V_{CCT}	Transmitter power supply	
17	V_{EET}	Transmitter ground (common with receiver ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC coupled	
19	TD–	Transmitter Inverted DATA in. AC coupled	
20	V_{EET}	Transmitter ground (common with receiver ground)	1

Notes:
1. Circuit ground is isolated from chassis ground
2. Disabled: T_{DIS}>2Vor open,Enabled: T_{DIS}<0.8V
3. Should Be pulled up with 4.7k –10k ohm on host board to a voltage between 2V and 3.6V
4. LOS is open collector output

References

1. IEEE standard 802.3ba. IEEE Standard Department, 2010.
2. QSFP+ 10Gbs 4X PLUGGABLE TRANSCEIVER –SFF-8436
3. Enhanced 8.5 and 10 Gigabit Small Form Factor Pluggable Module "SFP+"–SFF-8431
4. Digital Diagnostics Monitoring Interface for Optical Transceivers –SFF-8472.