

TSBSQ-85R-XXXD Active Optical Cable

Multi-mode 850nm 400G OSFP TO QSFP112 Active Optical Cable, With Diagnostic Monitoring

Features

- Hot-pluggable OSFP/QSFP112 form factor
- Data Rate 106.25 Gb/s PAM4 per lane
- 4x106Gbps PAM4 transmitter and PAM4 receiver
- 4 channels 850nm VCSEL array
- 4 channels PIN photo detector array
- Power consumption < 10W per end
- CMIS V5.1 compliant
- Operating case temperature: 0°C~+70°C
- RoHS6 compliant (lead free)

Applications

- 400GBASE SR4 Ethernet

Description

The TSBSQ-85R-XXXD is a 4-Channel, Pluggable, Parallel, Fiber-Optic OSFP for Ethernet Applications. This AOC is a high performances module for short-range multi-lane data communication and interconnect applications. It integrates four data lanes in each direction with 4x53.125GBd. Each lane can operate at 106.25Gbps up to 60 m using OM3 fiber or 100 m using OM4 fiber with FEC. These modules are designed to operate over multimode fiber systems using a nominal wavelength of 850nm. The electrical interface uses a 60@OSFP and 38@QSFP112 contacts edge type connector.

Absolute Maximum Ratings

These values represent the damage threshold of the module. Stress in excess of any of the individual Absolute Maximum Ratings can cause immediate catastrophic damage to the module even if all other parameters are within Recommended Operating Conditions.

Parameters	Symbol	Min.	Max.	Unit
Power Supply Voltage	VCC	-0.5	+3.6	V
Storage Temperature	Tc	-40	+85	°C
Relative Humidity ¹	RH	15	85	%

Notes:

1. Non-condensing.

Recommended Operating Environment

Recommended Operating Environment specifies parameters for which the electrical and optical characteristics hold unless otherwise noted.

Parameter	Symbol	Min	Typical	Max	Unit
Power Supply Voltage	VCC	3.15	3.30	3.45	V
Operating Case Temperature	Tca	0	-	70	°C

Electrical Characteristics

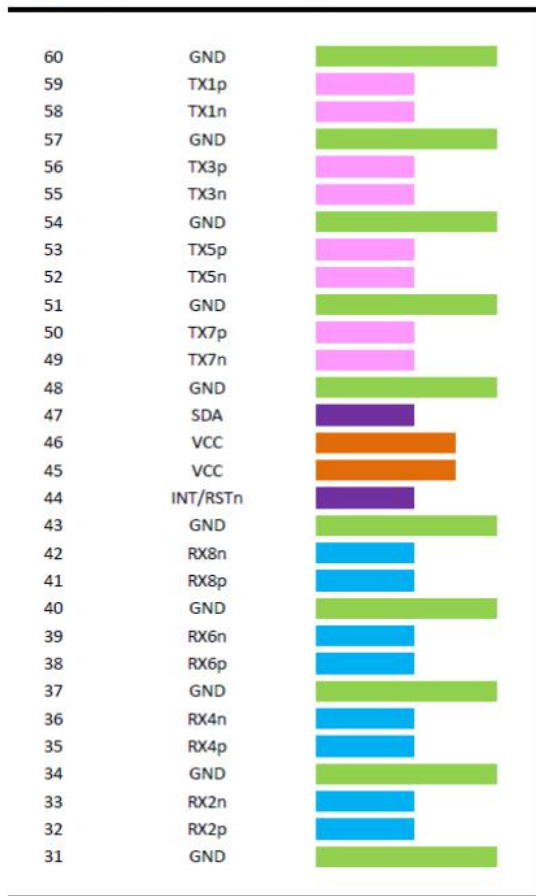
Parameter	Symbol	Min.	Typical	Max	Unit
Differential Input Voltage Amplitude ¹	Vin	300	-	1100	mV
Differential Output Voltage Amplitude ²	Vout	300	-	900	mV
Signaling rate per lane	DR	53.1255± 100 ppm			GBps
Differential termination mismatch	-	-	-	10	%
Skew	-	-	-	300	ps
Bit Error Rate ³	BER	-	-	2.4E-4	-
Input Logic Level High	VIH	2.0	-	VCC	V
Input Logic Level Low	VIL	0	-	0.8	V
Output Logic Level High	VOH	VCC-0.5	-	VCC	V
Output Logic Level Low	VOL	0	-	0.4	V

Notes:

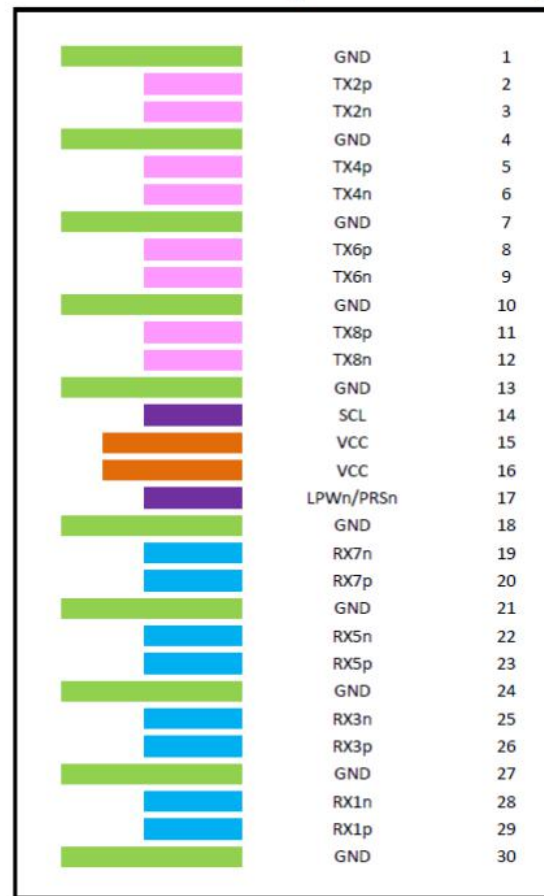
1. Differential input voltage amplitude is measured between TxnP and TxnN
2. Differential output voltage amplitude is measured between RxnP and RxnN.
3. BER=2.4E-4; PRBS31@53.125Gbps. Pre-FEC

Electrical Pad Layout (OSFP end)

Top Side (viewed from top)



Bottom Side (viewed from bottom)



----- Module Card Edge -----

Pin Definition (OSFP end)

Pin	Symbol	Name/Description
1	GND	Ground
2	TX2p	Transmitter Data Non-Inverted
3	TX2n	Transmitter Data Inverted
4	GND	Ground
5	Tx4p	Transmitter Data Non-Inverted
6	TX4n	Transmitter Data Inverted
7	GND	Ground
8	TX6p	Transmitter Data Non-Inverted
9	TX6n	Transmitter Data Inverted
10	GND	Ground
11	TX8p	Transmitter Data Non-Inverted
12	TX8n	Transmitter Data Inverted

13	GND	Ground
14	SCL	2-wire Serial interface clock
15	VCC	+3.3V Power
16	VCC	+3.3V Power
17	LPWn/PRSn	Low-Power Mode / Module Present
18	GND	Ground
19	RX7n	Receiver Data Inverted
20	RX7p	Receiver Data Non-Inverted
21	GND	Ground
22	RX5n	Receiver Data Inverted
23	RX5p	Receiver Data Non-Inverted
24	GND	Ground
25	RX3n	Receiver Data Inverted
26	RX3p	Receiver Data Non-Inverted
27	GND	Ground
28	RX1n	Receiver Data Inverted
29	RX1p	Receiver Data Non-Inverted
30	GND	Ground
31	GND	Ground
32	RX2p	Receiver Data Non-Inverted
33	RX2n	Receiver Data Inverted
34	GND	Ground
35	RX4p	Receiver Data Non-Inverted
36	RX4n	Receiver Data Inverted
37	GND	Ground
38	RX6p	Receiver Data Non-Inverted
39	RX6n	Receiver Data Inverted
40	GND	Ground
41	RX8p	Receiver Data Non-Inverted
42	RX8n	Receiver Data Inverted
43	GND	Ground
44	INT/RSTn	Module Interrupt / Module Reset
45	VCC	+3.3V Power
46	VCC	+3.3V Power
47	SDA	2-wire Serial interface data
48	GND	Ground
49	TX7n	Transmitter Data Inverted
50	TX7p	Transmitter Data Non-Inverted
51	GND	Ground
52	TX5n	Transmitter Data Inverted
53	TX5p	Transmitter Data Non-Inverted

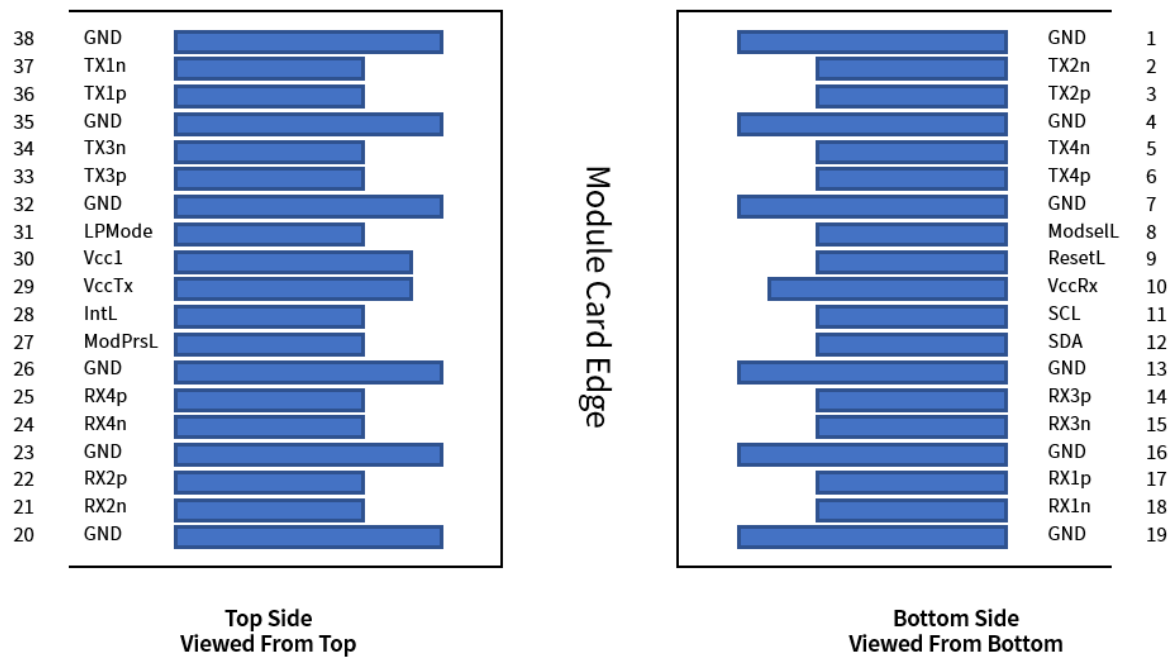
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8 Jinxiu Middle Road, Pingshan, Shenzhen, Guangdong, 518118, P. R. China
+86 755 32983688 | info@china-tscom.com | www.china-tscom.com



54	GND	Ground
55	TX3n	Transmitter Data Inverted
56	TX3p	Transmitter Data Non-Inverted
57	GND	Ground
58	TX1n	Transmitter Data Inverted
59	TX1p	Transmitter Data Non-Inverted
60	GND	Ground

Electrical Pad Layout (QSFP112 end)

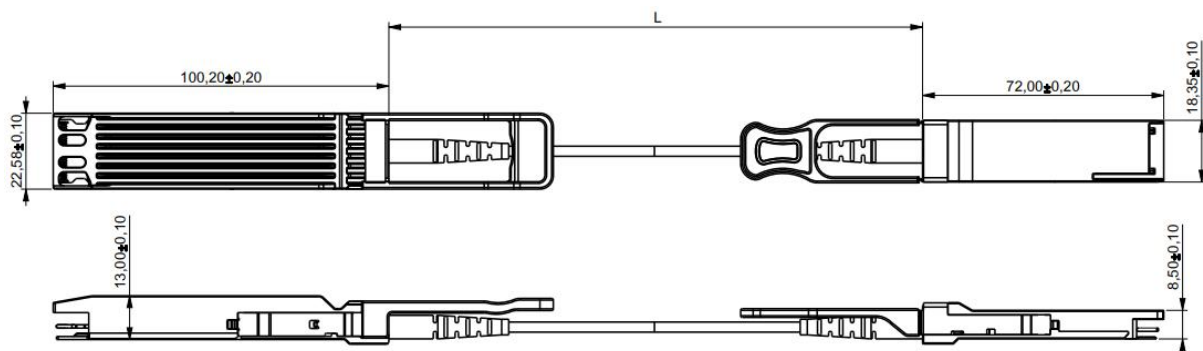


Pin Definition (QSFP112 end)

Pin	Symbol	Name/Description
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	Vcc Rx	+3.3 V Power supply receiver
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
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	VCC Tx	+3.3 V Power supply transmitter
30	VCC1	+3.3 V 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

Mechanical



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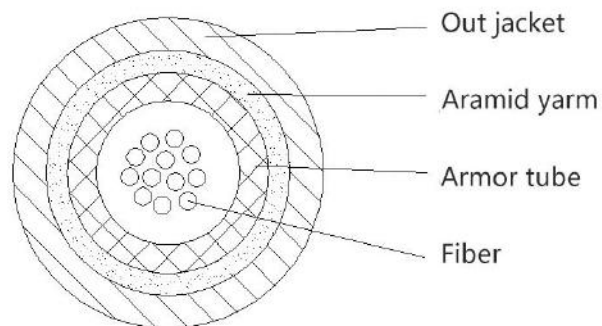
AOC product bagging circle size:

L	Disc fiber diameter (mm)	number of circle
0.5m	Based on actual circling	1.5
1m		3.5
1.5m	90± Inner diameter, outer diameter±110	4.5
2m	100± Inner diameter, outer diameter±120	5.5
2.5m	110± Inner diameter, outer diameter±130	6.5
3m	100± Inner diameter, outer diameter±120	8.5
3m<L≤5m	110± Inner diameter, outer diameter±160	Not required
5m<L≤7m	110± Inner diameter, outer diameter±170	
7m<L≤30m	110± Inner diameter, outer diameter±180	
30m<L≤50m	110± Inner diameter, outer diameter±210	
50m<L≤100m	110± Inner diameter, outer diameter±250	

Length tolerance table:

L	Tolerance (mm)
L≤1 M	+70/-0
1 M<L<7 M	+100/-0
L≥7 M	+2%L/-0

Cable Structure



Cable Technical Parameters

Parameter	Symbol	Typical
Model		GJFKV
Fiber	Count	2~12
	Color	Blue, orange, green, brown, gray, white, red, black, yellow, purple, pink, aqua
Cable	OD (mm)	3.0±0.1
	Material	PVC-OFNP
Armored tube	OD (mm)	1.8±0.1
	ID (mm)	1.2±0.1
Max.tensile Strength(N)	Short-term	150
	Long-term	80
Min.Bending Radius(mm)	Dynamic	20D
	Static	10D
Max.Crush Resistance(N/100mm)	Short-term	3000
	Long-term	1000
Strength Members		Aramid yarn
Temperature range	Storage or transportation	-20~70°C

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	Operation	-20~60°C
	Installation	-20~60°C

Ordering Information

Part Number	Product Description
TSBSQ-85R-XXXD	400G OSFP to QSFP112 Armored AOC 0°C ~ +70°C
XXX :001~030,1~30 Length in meters on OM3 MMF	

Important Notice

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