

# Alpha Bridge AQSF28-T-02-PEL Datasheet



### Features

- Compliant with SFF-8665/SFF-8679
- Compliant with IEEE 802.3bj
- 4 independent full-duplex channels
- Up to 25.78125 Gbps data rate per channel
- Up to 5m transmission
- Single 3.3V power supply
- Low insertion loss
- BER better than 10<sup>-15</sup>
- Operating temperature: -5 to +70°C
- RoHS compliant

### Application

- 40G/100G Ethernet
- Infiniband QDR/EDR

### General Product Characteristics

QSFP28 Copper Specifications	
Number of Lanes	4 Tx & Rx
Channel Data Rate	25.78125 Gbps/channel
Operating Case Temperature	-5 to +70°C
Storage Temperature	-40 to +85°C
Supply Voltage	3.3V nominal
Electrical Interface	20 pin edge connector
Management Interface	Serial,I <sup>2</sup> C

### High Speed Characteristics

Parameter	Symbol	Min.	Max.	Units	Note
Differential Impedance	RIN,P-P	90	110	Ω	
Insertion loss	SDD21		22.48	dB	At 12.8906 GHz
Differential Return Loss	SDD11		See 1	dB	At 0.05 to 4.1 GHz
	SDD22		See 2	dB	At 4.1 to 19 GHz
Common-mode to common- mode output return loss	SCC11 S2CC2	2		dB	At 0.2 to 19 GHz

Differential to common-mode return loss	SCD11				
	SCD22		See 3 See 4		At 0.01 to 12.89 GHz At 12.89 to 19 GHz
Differential to common Mode Conversion Loss	SCD21		10		At 0.01 to 12.89 GHz
			See 5	dB	At 12.89 to 15.7 GHz
			6.3		At 15.7 to 19 GHz
Channel Operating Margin	COM	3		dB	

**Note:**

1. Reflection Coefficient given by equation  $SDD11(dB) < 16.5 - 2 \times \text{SQRT}(f)$ , with f in GHz
2. Reflection Coefficient given by equation  $SDD11(dB) < 10.66 - 14 \times \log_{10}(f/5.5)$ , with f in GHz
3. Reflection Coefficient given by equation  $SCD11(dB) < 22 - (20/25.78)*f$ , with f in GHz
4. Reflection Coefficient given by equation  $SCD11(dB) < 15 - (6/25.78)*f$ , with f in GHz
5. Reflection Coefficient given by equation  $SCD21(dB) < 27 - (29/22)*f$ , with f in GHz

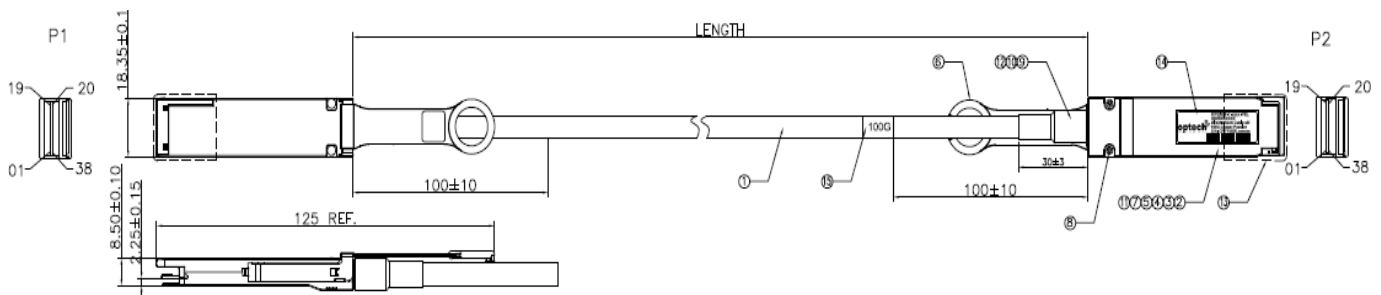
### Pin Description

Pin	Logic	Symbol	Description	Plug Sequenc	Notes
1		GND	Ground	1	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	
3	CML-I	Tx2p	Transmitter Non-Inverted DataInput	3	
4		GND	Ground	1	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3	
6	CML-I	Tx4p	Transmitter Non-Inverted DataInput	3	
7		GND	Ground	1	1
8	LVTTTL-I	ModSelL	Module Select	3	
9	LVTTTL-I	ResetL	Module Reset	3	
10		Vcc Rx	+3.3V Power Supply Receiver	2	
11	LVC MOSI/O	SCL	2-wire serial interface clock	3	2
12	LVC MOSI/O	SDA	2-wire serial interface data	3	2
13		GND	Ground	1	1
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	3	
15	CML-O	Rx3n	Receiver Inverted Data Output	3	
16			Ground	1	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3	
18	CML-O	Rx1n	Receiver Inverted Data Output	3	
19		GND	Ground	1	1
20		GND	Ground	1	1
21	CML-O	Rx2n	Receiver Inverted Data Output	3	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	3	
23		GND	Ground	1	1
24	CML-O	Rx4n	Receiver Inverted Data Output	3	

25	CML-O	Rx4p	Receiver Non-Inverted Data Output	3	
26		GND	Ground	1	1
27	LVTTL-O	ModPrsL	Module Present	3	2
28	LVTTL-O	IntL	Interrupt	3	2
29		Vcc Tx	+3.3V Power Supply transmitter	2	
30		Vcc1	+3.3V Power Supply	2	
31	LVTTL-I	LPMODE	Low Power Mode	3	
32		GND	Ground	1	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	3	
34	CML-I	Tx3n	Transmitter Inverted Data Input	3	
35		GND	Ground	1	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3	
37	CML-I	Tx1n	Transmitter Inverted Data Input	3	
38		GND	Ground	1	1

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 referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.
2. Vcc Rx, Vcc1 and Vcc Tx shall be applied concurrently. Requirements defined for the host side of the Host Edge Card Connector are listed in SFF-8679 Table5-6. Vcc Rx Vcc1 and Vcc Tx may be internally connected within the module in any combination. The connector pins are each rated for a maximum current of 1000 mA.

## Dimensions



## Ordering Information

Part Number	Length (M)	AWG	Voltage	Temperature
AQSF28-T-02-PEL	2	30	3.3V	0 °C to 70 °C

Note: All information contained in this document is subject to change without notice.

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