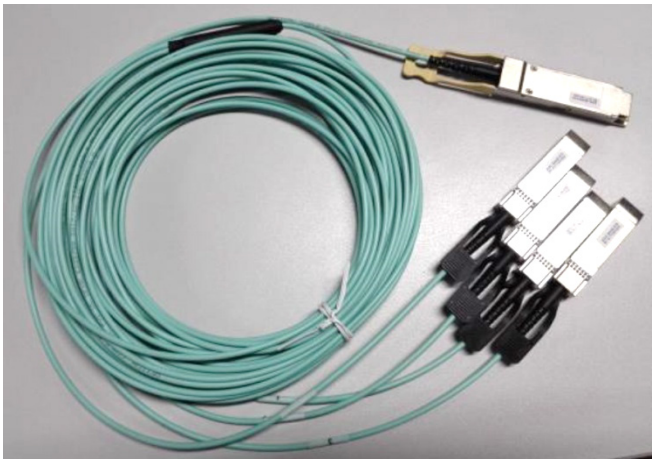


40G QSFP+ to 4×10G SFP+ Active Optical Cables

The Four-Channel, Pluggable, Parallel, Fibre-Optic QSFP+ Active Optical Cable (AOC) to 4× SFP+ Active Optical Cable break-out solution is intended for 40G to 4×10G applications. This AOC is a high-performance cable for short-range multi-lane data communication and interconnect applications. It integrates four data lanes in each direction with 40 Gbps aggregate bandwidth. Each lane can operate at 10.3125 Gbps. These cables also support 4 x 10G InfiniBand QDR applications. Optronics QSFP+ to 4x 10G SFP+ AOC cable is a 40GBase QSFP+ hybrid optical cable. A side is a QSFP+ optical connector, B side is 4 SFP+ optical connectors. It's an application for link with QSFP+ port on 40Gb/s rate switch or host and feed up to 4 upstream 10Gb/s switch or host.

Features

- Electrical interface compliant to SFF-8436 and SFF-8431
- 850nm VCSEL laser and PIN photo-detector
- Built-in digital diagnostic functions
- Operating case temperature 0℃ to 70℃
- Hot Pluggable
- RoHS compliant

Applications

- 40GbE and 10GbE break-out applications for Datacom switch and router connections
- 40G to 4×10G density applications for Datacom and Proprietary protocol applications
- Data centres

Specifications

Absolute Maximum Ratings

ELEMENT	VALUE	SYMBOL	MIN	MAX
Storage Temperature	°C	T_S	-20	85
Relative Humidity	%	R_H	0	85
Case Operating Temperature	°C	T_{Case}	0	70
Supply Voltage	V	V_{CC}	-0.5	3.6

Recommended Operating Conditions

ELEMENT	VALUE	SYMBOL	MIN	TYPICAL	MAX
Case Operating Temperature	°C	T_{Case}	0		70
Supply Voltage	V	V_{CC}	3.13	3.3	3.47
Supply Current (QSFP+)	mA	I_{CC}			300
Supply Current (SFP+)	mA	I_{CC}			100
Data Rate Per Lane	Gbit/s	DR		10.3125	

Transmitter Specifications

Measurement condition: Channel data rate 10.3125Gbps, VCC=3.3V, PRBS31 pattern, Case operating temperature 0-70°C

ELEMENT	VALUE	SYMBOL	MIN	TYPICAL	MAX
QSFP+					
Center wavelength	nm	λ_c	840	850	860
Differential Input Impedance	Ohm	Z_{in}	80	100	120
Differential Input Voltage	mVp-p	V_{in}	120		1600
Average Launch Power per Lane	dBm	P_{AVG}	-5	-1	+1
Extinct Ratio	dB	ER	3.0		
SFP+					
Center wavelength	nm	λ_c	840	850	860

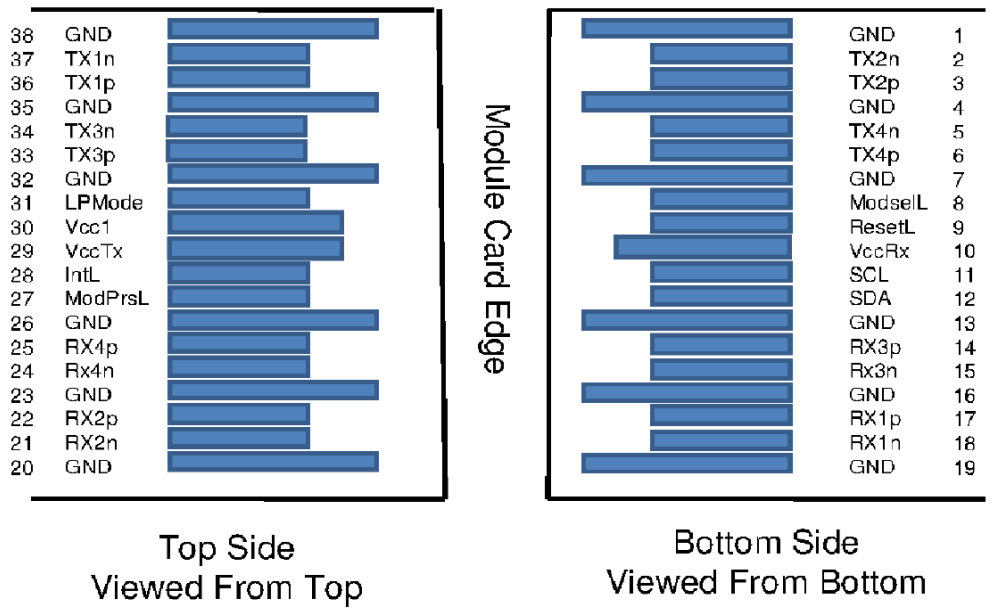
Differential Input Impedance	Ohm	Z_{in}	90	100	110
Differential Input Voltage	mVp-p	V_{in}	200		1600
Average Launch Power per Lane	dBm	P_{AVG}	-6.5	0	
Extinct Ratio	dB	ER	3.0		

Receiver Specifications

Measurement condition: Channel data rate 10.3125Gbps, V_{CC}=3.3V, PRBS31 pattern, Case operating temperature 0-70°C

ELEMENT	VALUE	SYMBOL	MIN	TYPICAL	MAX
QSFP+					
Center wavelength	nm	λ_c	840	850	860
Differential Output Impedance	Ohm	Z_{out}	80	100	120
Differential Output Voltage	mVp-p	V_{out}	320	450	
Receiver Sensitivity	dBm	S_{EN}		-12	-10
Bit Error Rate		BER			10^{-12}
SFP+					
Center wavelength	nm	λ_c	840	850	860
Differential Output Impedance	Ohm	Z_{out}	90	100	110
Differential Output Voltage	mVp-p	V_{out}	370		1600
Receiver Sensitivity	dBm	S_{EN}			-10
Bit Error Rate		BER			10^{-12}

QSFP+ Pin Descriptions

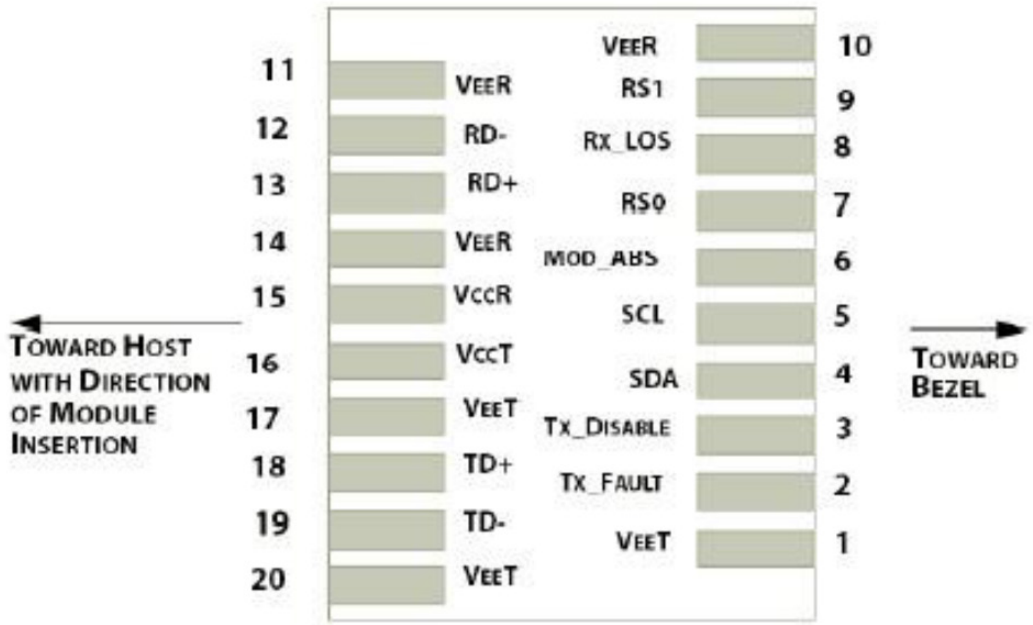


Pin Definitions

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

SFP+ Pin Descriptions

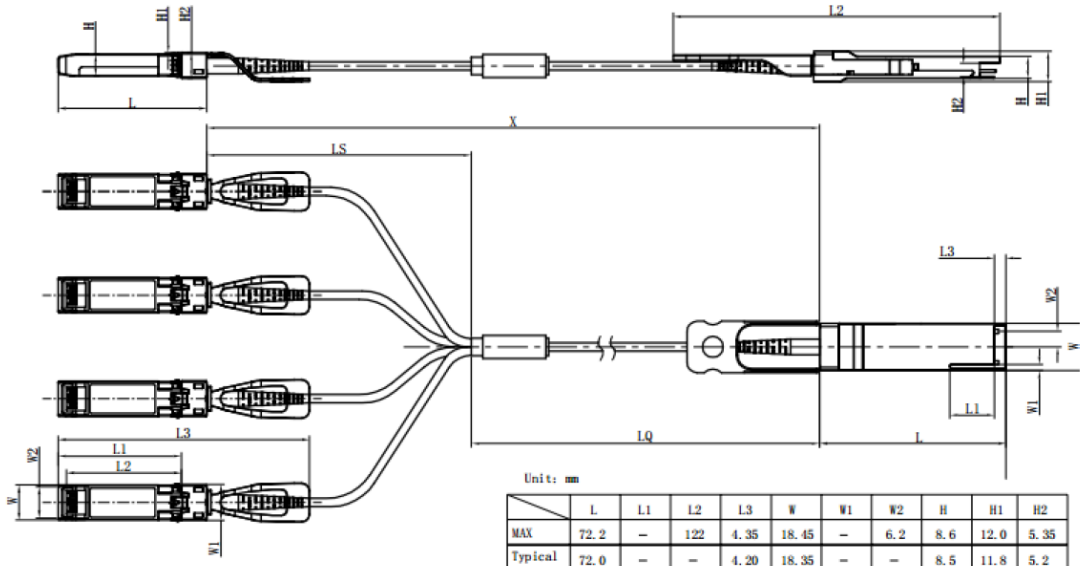


Pin Definitions

PIN	SYMBOL	NAME/DESCRIPTION
1	VeeT	Transmitter Signal Ground
2	TX_FAULT	Transmitter Fault (LVTTL-O) – Not used. Grounded inside the module
3	TX_DISABLE	Transmitter Disable (LVTTL-I) – High or open disables the transmitter
4	SDA	Two Wire Serial Interface Data Line (LVCMOS – I/O) (same as MOD-DEF2 in INF-8074)
5	SCL	Two Wire Serial Interface Clock Line (LVCMOS – I/O) (same as MOD-DEF1 in INF-8074)
6	MOD_ABS	Module Absent (Output), connected to VeeT or VeeR in the module
7	RS0	Rate Select 0 - Not used, Presents high input impedance.
8	RX_LOS	Receiver Loss of Signal (LVTTL-O)
9	RS1	Rate Select 1 - Not used, Presents high input impedance.
10	VeeR	Receiver Signal Ground
11	VeeR	Receiver Signal Ground
12	RD-	Receiver Data Out Inverted (CML-O)
13	RD+	Receiver Data Out (CML-O)
14	VeeR	Receiver Signal Ground
15	VccR	Receiver Power + 3.3 V

16	VccT	Transmitter Power + 3.3 V
17	VeeT	Transmitter Signal Ground
18	TD+	Transmitter Data In (CML-I)
19	TD-	Transmitter Data In Inverted (CML-I)
20	VeeT	Transmitter Signal Ground

Mechanical Specifications



Unit: mm

	L	L1	L2	L3	W	W1	W2	H	H1	H2
MAX	72.2	–	122	4.35	18.45	–	6.2	8.6	12.0	5.35
Typical	72.0	–	–	4.20	18.35	–	–	8.5	11.8	5.2
MIN	68.8	16.5	118	4.05	18.25	2.2	5.8	8.4	11.6	5.05

Unit: mm

	L	L1	L2	L3	W	W1	W2	H	H1	H2
MAX	57.75	48.0	44.65	102.5	13.75	14.0	12.25	8.65	0.55	10.4
Typical	57.55	47.8	44.45	101.5	13.65	13.9	12.15	8.55	0.5	10.2
MIN	57.35	47.6	44.25	100.5	13.55	13.8	12.05	8.45	0.45	10.0

Ordering Information

DESCRIPTION	PART NUMBER
Optronics 40G QSFP+ to 4×10G SFP+ Active Optical Cable	OQSFP-SFP-AOC-40410-XXX-YYY

**where XXX is trunk cable length in metres & YYY is branch cable length in metres*
Total cable length = Trunk length + Branch length