MISCHQDD1000000

MSA and TAA 400GBase QSFP-DD Loopback Transceiver with 0dB Attenuation, -40 to 85C

Product Description

This MSA compliant QSFP-DD loopback provides a simple solution to loopback testing on individual ports with the use of a cable assembly. It has 0dB of attenuation and is compatible with existing 400G QSFP-DD ports. All of our transceivers are built to comply with Multi-Source Agreement (MSA) standards and are uniquely serialized and tested for data-traffic and application to ensure seamless network integration. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

Skylane's transceivers are RoHS compliant and lead-free.

Features:

- SFF-8024 Compliance
- Built-in surge current mitigation technology
- Built-in programmable power dissipation up to 7W
- Industrial temperature: -40 to 85 Celsius
- +3.3V power supply
- Supports 8*10G/25G/56G PAM4 data rates
- 2-wire interface for integrated Digital Diagnostic Monitoring
- Compliant with IEEE 802.3ba, 802.3bj, and 802.3cd standards
- Enhanced heat dissipation technology for high power testing
- A multi-color LED indicator for high/low power modes
- Hot Pluggable
- RoHS Compliant and Lead-Free

Applications:

- QSFP-DD port/system testing
- Ethernet IEEE 802.3 (Gigabit, 10 Gigabit and 25 Gigabit Ethernet)
- SONET, SDH, GBE, Fiber Channel Support

For your product safety, please read the following information carefully before any manipulation of the transceiver:

ESD
This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.

LASER SAFETY
This is a Class1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Maximum Supply Voltage	Vcc	2.97	3.3	+3.63	V	
Storage Temperature	Tstg	-40		+85	°C	
Operating Case Temperature	Tc	-40		+85	°C	
Storage Relative Humidity	RHs	0		95	%	
Operating Humidity	RHo	0		85	%	
Data Rate	BRate	0.1		400	Gbps	
Durability Cycles			2000	2250	Cycles	

High Speed Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Input/Output Impedance	Zd	90	100	110	Ohm	1
Return Loss	SDD11/22	IEEE 802.3bj CL92.10.3.			dB	2
Insertion Loss	SDD21	0.845		6.615	dB	3
Insertion Loss Deviation	ILD	-1		1		2
Skew Between Lanes	SKEW			200	ps	

Notes:
1. Differential impedance.
2. At Nyquist Frequency
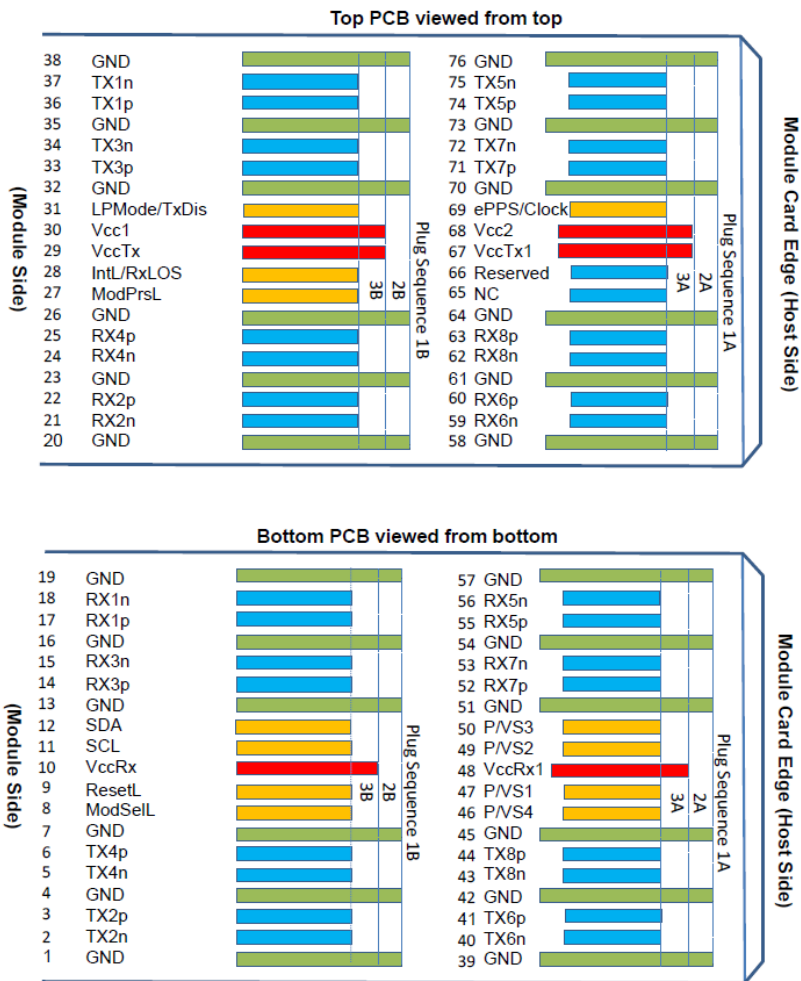3. Exclude the MCB insertion loss, at 13GHz.

Pin Descriptions

Pin	Logic	Symbol	Name/Description	Notes
1		GND	Module Ground (Logic and Power Return Path).	1
2	CML-I	Tx2-	Transmit Differential Pairs from Host to Module.	
3	CML-I	Tx2+	Transmit Differential Pairs from Host to Module.	
4		GND	Module Ground (Logic and Power Return Path).	1
5	CML-I	Tx4-	Transmit Differential Pairs from Host to Module.	
6	CML-I	Tx4+	Transmit Differential Pairs from Host to Module.	
7		GND	Module Ground (Logic and Power Return Path).	1
8	LVTTL-I	ModSelL	Module Select.	
9	LVTTL-I	ResetL	Module Reset.	
10		VccRx	+3.3V Receiver Power Supply.	2
11	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock.	3
12	LVCMOS-I/O	SDA	2-Wire Serial Interface Data.	3
13		GND	Module Ground (Logic and Power Return Path).	1
14	CML-O	Rx3+	Receive Differential Pairs from Module to Host.	
15	CML-O	Rx3-	Receive Differential Pairs from Module to Host.	
16		GND	Module Ground (Logic and Power Return Path).	1
17	CML-O	Rx1+	Receive Differential Pairs from Module to Host.	
18	CML-O	Rx1-	Receive Differential Pairs from Module to Host.	
19		GND	Module Ground (Logic and Power Return Path).	1
20		GND	Module Ground (Logic and Power Return Path).	1
21	CML-O	Rx2-	Receive Differential Pairs from Module to Host.	
22	CML-O	Rx2+	Receive Differential Pairs from Module to Host.	
23		GND	Module Ground (Logic and Power Return Path).	1
24	CML-O	Rx4-	Receive Differential Pairs from Module to Host.	
25	CML-O	Rx4+	Receive Differential Pairs from Module to Host.	
26		GND	Module Ground (Logic and Power Return Path).	1
27	LVTTL-O	ModPrsL	Module Present.	4
28		IntL	Interrupt.	5
29		VccTx	+3.3V Transmitter Power Supply.	2
30		Vcc1	+3.3V Power Supply.	2
31	LVTTL-I	LPMode	Low-Power Mode.	
32		GND	Module Ground (Logic and Power Return Path).	1
33	CML-I	Tx3+	Transmit Differential Pairs from Host to Module.	
34	CML-I	Tx3-	Transmit Differential Pairs from Host to Module.	
35		GND	Module Ground (Logic and Power Return Path).	1
36	CML-I	Tx1+	Transmit Differential Pairs from Host to Module.	
37	CML-I	Tx1-	Transmit Differential Pairs from Host to Module.	

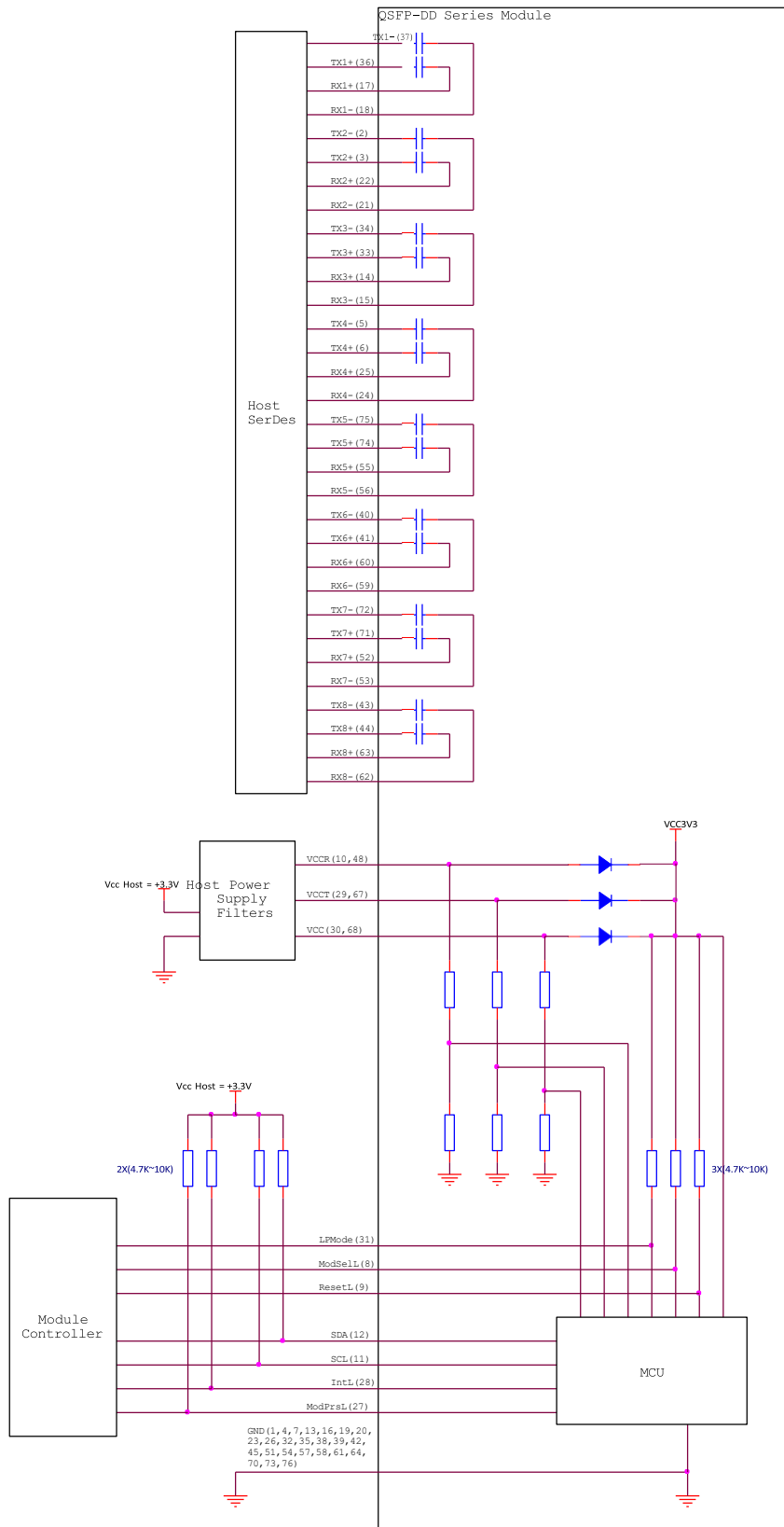| 38		GND	Module Ground (Logic and Power Return Path).	1
39		GND	Module Ground (Logic and Power Return Path).	1
40	CML-I	Tx6-	Transmit Differential Pairs from Host to Module.	
41	CML-I	Tx6+	Transmit Differential Pairs from Host to Module.	
42		GND	Module Ground (Logic and Power Return Path).	1
43	CML-I	Tx8-	Transmit Differential Pairs from Host to Module.	
44	CML-I	Tx8+	Transmit Differential Pairs from Host to Module.	
45		GND	Module Ground (Logic and Power Return Path).	1
46		Reserved	For Future Use. Not Connected.	6
47	LVCMOS-O	VS1	Module Vendor-Specific 1.	6
48		VccRx1	+3.3V Receiver Power Supply.	2
49	LVCMOS-I	VS2	Module Vendor-Specific 2.	6
50	LVCMOS-I/O	VS3	Module Vendor-Specific 3.	6
51		GND	Module Ground (Logic and Power Return Path).	1
52	CML-O	Rx7+	Receive Differential Pairs from Module to Host.	
53	CML-O	Rx7-	Receive Differential Pairs from Module to Host.	
54		GND	Module Ground (Logic and Power Return Path).	1
55	CML-O	Rx5+	Receive Differential Pairs from Module to Host.	
56	CML-O	Rx5-	Receive Differential Pairs from Module to Host.	
57		GND	Module Ground (Logic and Power Return Path).	1
58		GND	Module Ground (Logic and Power Return Path).	1
59	CML-O	Rx6-	Receive Differential Pairs from Module to Host.	
60	CML-O	Rx6+	Receive Differential Pairs from Module to Host.	
61		GND	Module Ground (Logic and Power Return Path).	1
62	CML-O	Rx8-	Receive Differential Pairs from Module to Host.	
63	CML-O	Rx8+	Receive Differential Pairs from Module to Host.	
64		GND	Module Ground (Logic and Power Return Path).	1
65		NC	Not Connected.	6
66		Reserved	For Future Use. Not Connected.	6
67		VccTx1	+3.3V Transmitter Power Supply.	2
68		Vcc2	+3.3V Power Supply.	2
69	LVTTL-I	ePPS	Precision Time Protocol (PTP) Reference Clock Input.	
70		GND	Module Ground (Logic and Power Return Path).	1
71	CML-I	Tx7+	Transmit Differential Pairs from Host to Module.	
72	CML-I	Tx7-	Transmit Differential Pairs from Host to Module.	
73		GND	Module Ground (Logic and Power Return Path).	1
74	CML-I	Tx5+	Transmit Differential Pairs from Host to Module.	
75	CML-I	Tx5-	Transmit Differential Pairs from Host to Module.	
76		GND	Module Ground (Logic and Power Return Path).	1

Notes:

1. QSFP-DD uses common ground (GND) for all signals and supply (power). All are common with the QSFP-DD 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. VccRx, VccRx1, Vcc1, Vcc2, VccTx, and VccTx1 shall be applied concurrently. VccRx, VccRx1, Vcc1, Vcc2, VccTx, and VccTx1 are internally connected within the module. The connector Vcc pins are each rated for a maximum current of 1.0A.
3. Open drain. Requires 1.0k to 3.3k pull-up resistor to 3.3V on the host.
4. Indication from module to host. Requires 4.7k to 10k pull-up resistor to 3.3V on the host.
5. Open collector. Interrupt request from module to host. Requires 4.7k pull-up resistor to 3.3V on the host.
6. Reserved and NC pins may be terminated with 50Ω to ground on the host. Vendor-Specific and Reserved pads shall have an impedance to the GND that is greater than 10kΩ and is less than 100pF.

Electrical Pad Layout

Top PCB viewed from top

(Module Side) — Plug Sequence 1B — 3B — 2B — Plug Sequence 1A — 3A — 2A — Module Card Edge (Host Side)

38	GND		76	GND
37	TX1n		75	TX5n
36	TX1p		74	TX5p
35	GND		73	GND
34	TX3n		72	TX7n
33	TX3p		71	TX7p
32	GND		70	GND
31	LPMode/TxDis		69	ePPS/Clock
30	Vcc1		68	Vcc2
29	VccTx		67	VccTx1
28	IntL/RxLOS		66	Reserved
27	ModPrsL		65	NC
26	GND		64	GND
25	RX4p		63	RX8p
24	RX4n		62	RX8n
23	GND		61	GND
22	RX2p		60	RX6p
21	RX2n		59	RX6n
20	GND		58	GND

Bottom PCB viewed from bottom

(Module Side) — Plug Sequence 1B — 3B — 2B — Plug Sequence 1A — 3A — 2A — Module Card Edge (Host Side)

19	GND		57	GND
18	RX1n		56	RX5n
17	RX1p		55	RX5p
16	GND		54	GND
15	RX3n		53	RX7n
14	RX3p		52	RX7p
13	GND		51	GND
12	SDA		50	P/VS3
11	SCL		49	P/VS2
10	VccRx		48	VccRx1
9	ResetL		47	P/VS1
8	ModSelL		46	P/VS4
7	GND		45	GND
6	TX4p		44	TX8p
5	TX4n		43	TX8n
4	GND		42	GND
3	TX2p		41	TX6p
2	TX2n		40	TX6n
1	GND		39	GND

Pin-Out of Connector Block on the Host Board

Typical Application Circuit

QSFP-DD Series Module

TX1-(37)
TX1+(36)
RX1+(17)
RX1-(18)

TX2-(2)
TX2+(3)
RX2+(22)
RX2-(21)

TX3-(34)
TX3+(33)
RX3+(14)
RX3-(15)

TX4-(5)
TX4+(6)
RX4+(25)
RX4-(24)

Host
SerDes

TX5-(75)
TX5+(74)
RX5+(55)
RX5-(56)

TX6-(40)
TX6+(41)
RX6+(60)
RX6-(59)

TX7-(72)
TX7+(71)
RX7+(52)
RX7-(53)

TX8-(43)
TX8+(44)
RX8+(63)
RX8-(62)

VCC3V3

Vcc Host = +3.3V Host Power Supply Filters

VCCR(10,48)
VCCT(29,67)
VCC(30,68)

Vcc Host = +3.3V

2X(4.7K~10K)

3X(4.7K~10K)

Module Controller

LPMode(31)
ModSelL(8)
ResetL(9)
SDA(12)
SCL(11)
IntL(28)
ModPrsL(27)

MCU

GND(1,4,7,13,16,19,20,
23,26,32,35,38,39,42,
45,51,54,57,58,61,64,
70,73,76)

Status LED

A multi-color LED must be viewed from the front of the module in order to signify high/low power modes, as well as interrupts:

- Solid green: low-power mode
- Solid red: high-power mode
- Blinking green: low-power mode with any of the interrupt flag is set
- Blinking red: high-power mode with any of the interrupt flag is set

Mechanical Specifications

Dimensions are in millimeters. (Unit: mm)
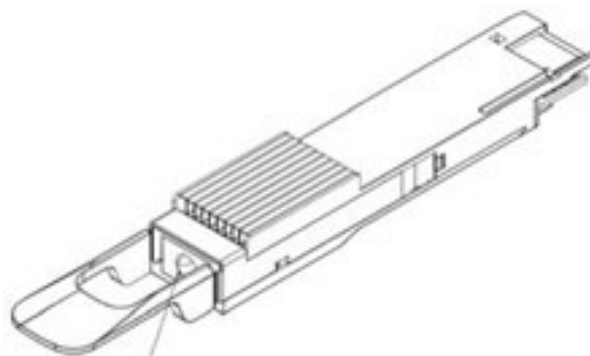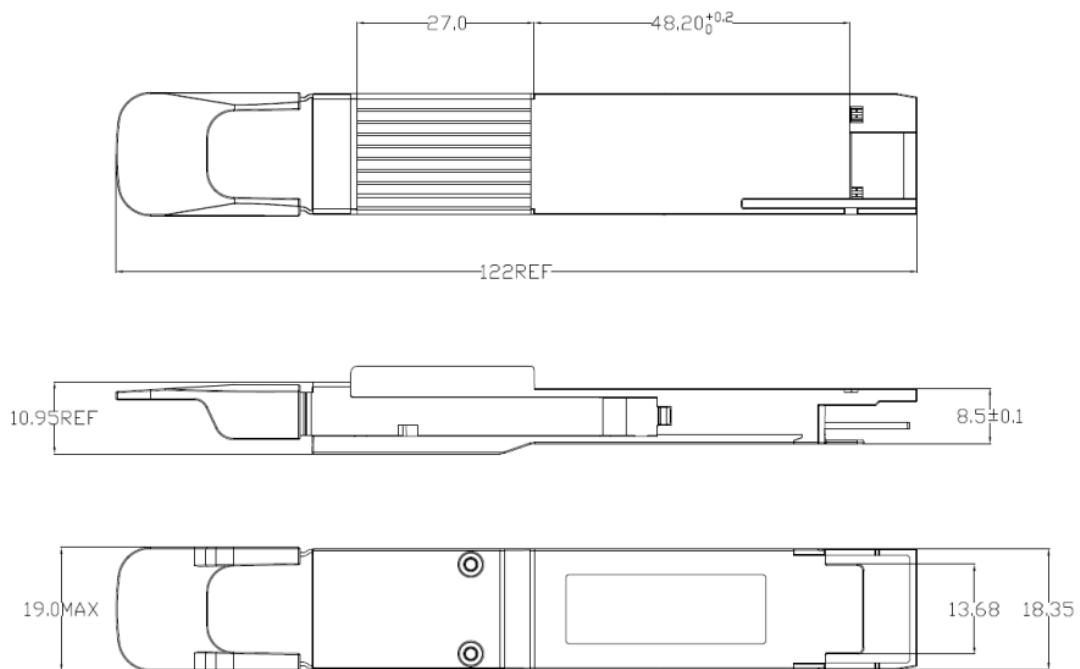
LED:
Solid green: low-power mode
Solid red: high-power mode
Blinking green: low-power mode with any of the interrupt flag is set
Blinking red: high-power mode with any of the interrupt flag is set

About Skylane Optics

Skylane is a leading provider of transceivers for optical communication.

We offer an extensive portfolio for the enterprise, access, datacenter and metropolitan fiber optical market as well as for smart home applications and home networks.

We cover the European, South American and North American market with a strong partner network and have offices in Belgium, Brazil, Sweden and USA.

Our offerings are characterized by high quality and performance. In combination with our strong technical support, we enable our customers to build cost optimized network solutions.

We offer an extensive range of high-quality products including transceivers (Optical and copper), Active Optical Cable (AOC), Direct Attach Cable (DAC), Mux/Demux, Coding Box (SKYGATE).