Rev.00G3.20_20220531

400G QSFP-DD Electrical Passive Loopback
Hot Pluggable, 0~5dB Internal Attenuation, 0~5W Power Consumption

Part Number: FQDD-TX-XLB-xx-xx

Overview:

FQDD-TX-XLB QSFP-DD Loopback modules are compliant with the current QSFP-DD Multi-Source Agreement (MSA) specification. The Loopback modules provide an effective way of testing the QSFP-DD port in the host system by looping back the electrical signal (optics are excluded). It could be downgraded for 200G application and provides an economical way to mimic 400G/200G Ethernet in simulation testing environments.

Applications:

- Board and System Level Testing
- System Test and Measurement
- Switch / Router Chamber Test
- Power Consumption Validation

Features:

- Compliant with QSFP-DD MSA
- Compliant with IEEE 802.3bs 400GAUI-8 and 200GAUI-8 Interface
- Electrical Data Rate up to 56Gbps per Lane
- Hot Pluggable QSFP-DD footprint
- 2-wire interface for management
- Single 3.3V power supply
- Different Option for Internal Attenuation and Power Consumption
- RoHS compliant

Absolute Maximum Ratings:

Parameters	Symbol	Min.	Max.	Unit
Storage Temperature	T_{ST}	-40	+85	°C
Storage Relative Humidity	RH	0	85	%
Supply Voltage	V_{CC3}	-0.5	+3.6	V

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Recommended Operating Conditions:

Parameters	Symbol	Min.	Typ.	Max.	Unit
Case Operating Temperature	T_{OP}	0	-	+70	°C
Supply Voltage	V_{CC}	+3.00	+3.3	+3.60	V
Data Rate, per Lane	DR	1.25	-	56	Gb/s
Differential Impedance	Z	90	100	110	Ohm
Durability Cycles			100	200	Times

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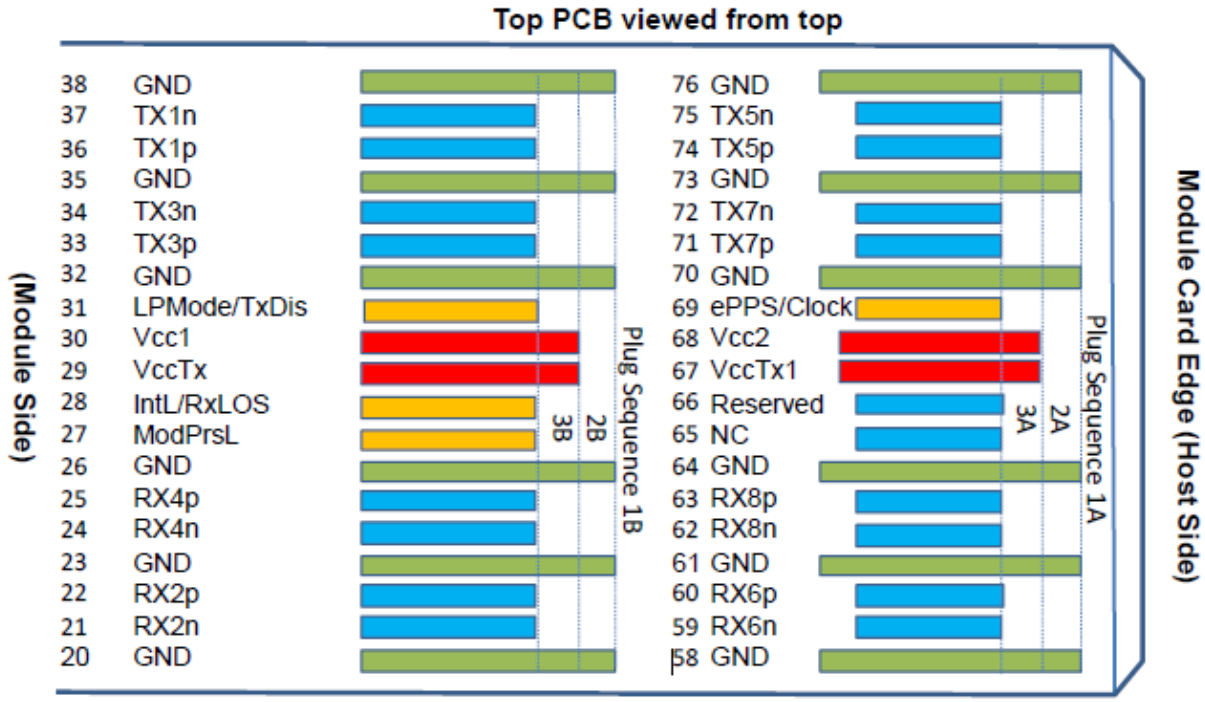
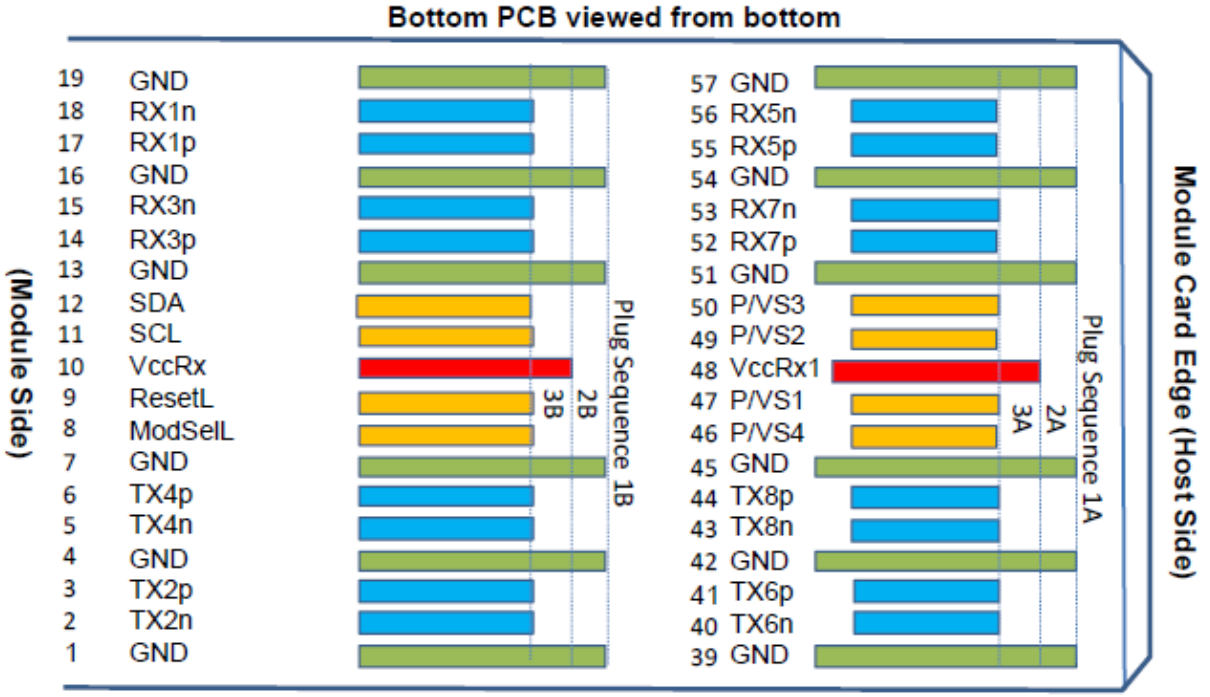
Pin Assignment:





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Pin Description:

Pin	Logic	Name	Function / Description
1		GND	Module Ground (1)
2	CML-I	Tx2n	Transmitter Inverted Data Input
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input
4		GND	Module Ground (1)
5	CML-I	Tx4n	Transmitter Inverted Data Input
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input
7		GND	Module Ground (1)
8	LVTLL-I	ModSelL	Module Select
9	LVTLL-I	ResetL	Module Reset
10		VccRx	+3.3V Power Supply Receiver (2)
11	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock
12	LVCMOS-I/O	SDA	2-Wire Serial Interface Data
13		GND	Module Ground (1)
14	CML-O	Rx3p	Receiver Non-Inverted Data Output
15	CML-O	Rx3n	Receiver Inverted Data Output
16		GND	Module Ground (1)
17	CML-O	Rx1p	Receiver Non-Inverted Data Output
18	CML-O	Rx1n	Receiver Inverted Data Output
19		GND	Module Ground (1)
20		GND	Module Ground (1)
21	CML-O	Rx2n	Receiver Inverted Data Output
22	CML-O	Rx2p	Receiver Non-Inverted Data Output
23		GND	Module Ground (1)
24	CML-O	Rx4n	Receiver Inverted Data Output
25	CML-O	Rx4p	Receiver Non-Inverted Data Output
26		GND	Module Ground (1)
27	LVTLL-O	ModPrsL	Module Present
28	LVTLL-O	IntL	Interrupt
29		VccTx	+3.3V Power Supply Transmitter (2)
30		Vcc1	+3.3V Power Supply (2)

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31	LVTLL-I	LPMode	Low Power Mode
32		GND	Module Ground (1)
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input
34	CML-I	Tx3n	Transmitter Inverted Data Input
35		GND	Module Ground (1)
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input
37	CML-I	Tx1n	Transmitter Inverted Data Input
38		GND	Module Ground (1)
39		GND	Module Ground (1)
40	CML-I	Tx6n	Transmitter Inverted Data Input
41	CML-I	Tx6p	Transmitter Non-Inverted Data Input
42		GND	Module Ground (1)
43	CML-I	Tx8n	Transmitter Inverted Data Input
44	CML-I	Tx8p	Transmitter Non-Inverted Data Input
45		GND	Module Ground (1)
46	LVCMOS /CML-I	P/VS4	Programmable / Module Vendor Specific 4 (5)
47	LVCMOS /CML-I	P/VS1	Programmable / Module Vendor Specific 1 (5)
48		VccRx1	3.3V Power Supply (2)
49	LVCMOS /CML-O	P/VS2	Programmable / Module Vendor Specific 2 (5)
50	LVCMOS /CML-O	P/VS3	Programmable / Module Vendor Specific 3 (5)
51		GND	Module Ground (1)
52	CML-O	Rx7p	Receiver Non-Inverted Data Output
53	CML-O	Rx7n	Receiver Inverted Data Output
54		GND	Module Ground (1)
55	CML-O	Rx5p	Receiver Non-Inverted Data Output
56	CML-O	Rx5n	Receiver Inverted Data Output
57		GND	Module Ground (1)
58		GND	Module Ground (1)
59	CML-O	Rx6n	Receiver Inverted Data Output
60	CML-O	Rx6p	Receiver Non-Inverted Data Output

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61		GND	Module Ground (1)
62	CML-O	Rx8n	Receiver Inverted Data Output
63	CML-O	Rx8p	Receiver Non-Inverted Data Output
64		GND	Module Ground (1)
65		NC	No Connect (3)
66		Reserved	For Future Use (3)
67		VccTx1	3.3V Power Supply (2)
68		Vcc2	3.3V Power Supply (2)
69	LVCMOS-I	ePPS/Clock	1PPS PTP clock reference clock input (6)
70		GND	Module Ground (1)
71	CML-I	Tx7p	Transmitter Non-Inverted Data Input
72	CML-I	Tx7n	Transmitter Inverted Data Input
73		GND	Module Ground (1)
74	CML-I	Tx5p	Transmitter Non-Inverted Data Input
75	CML-I	Tx5n	Transmitter Inverted Data Input
76		GND	Module Ground (1)

Note1: QSFP-DD uses common ground (GND) for all signals and supply (power). All are common within 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. Each connector Gnd contact is rated for a steady state current of 500 mA.

Note2: VccRx, VccRx1, Vcc1, Vcc2, VccTx and VccTx1 shall be applied concurrently. For power classes 4 and above the module differential loading of input voltage pads must not result in exceeding contact current limits. Each connector Vcc contact is rated for a steady state current of 1500 mA.

Note3: Reserved and no Connect pads recommended to be terminated with 10k ohm to ground on the host. Pad 65 (No Connect) shall be left unconnected within the module.

Note4: Plug Sequence specifies the mating sequence of the host connector and module. The sequence is 1A, 2A, 3A, 1B, 2B, 3B. (see Figure 2 for pad locations) Contact sequence A will make, then break contact with additional QSFP-DD pads. Sequence 1A and 1B will then occur simultaneously, followed by 2A and 2B, followed by 3A and 3B.

Note5: if not used, recommended to be terminated on the host with 10k ohm.

Note6: if not used, recommended to be terminated with 50 ohm to ground on the host.

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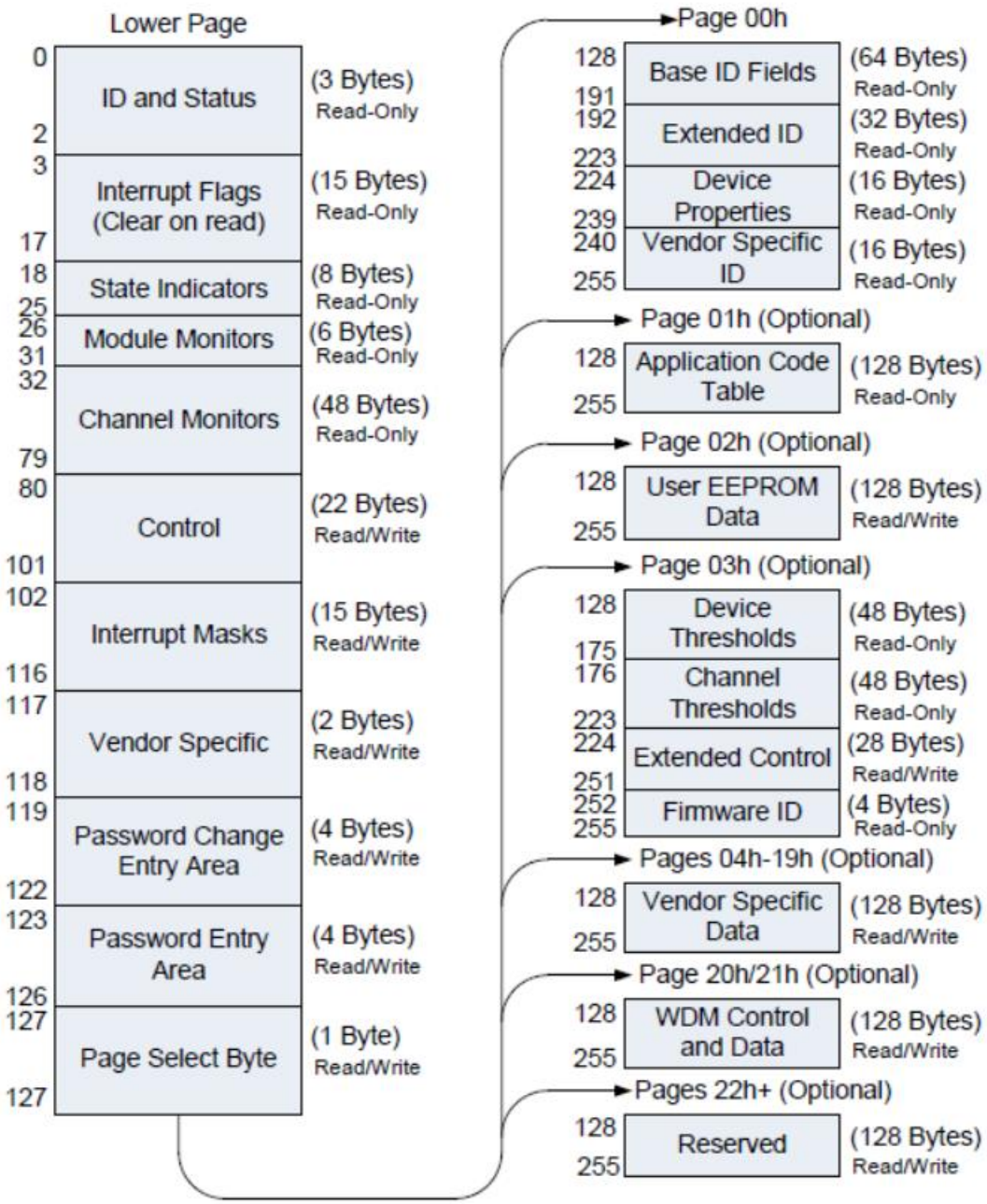
Memory Map:



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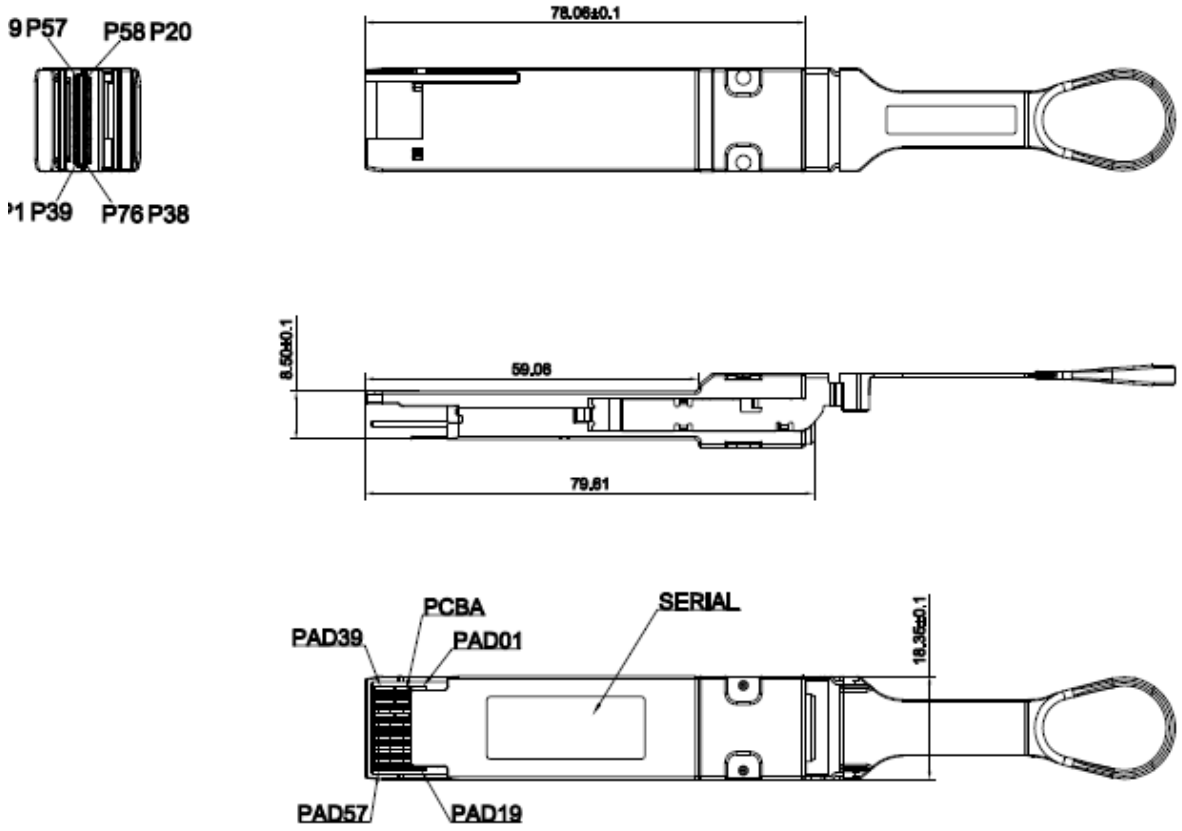
Mechanical Dimensions:



(All Dimensions are ±0.20mm Unless Otherwise Specified, Unit: mm)

Ordering Information:

FQDD-TX-XLB-□□-□□

Internal Attenuation

00: 0dB	35: 3.5dB
50: 5dB	xx: Customized Value

Power Consumption

00: 0W	10: 1W
15: 1.5W	20: 2W
30: 3W	50: 5W
xx: Customized Value	

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