

Rev	Date	Modified by	Description
A	2023/03/20		

Product Specifications

QSFP DD TO 8SFP56 Passive Copper Cable Assembly

PN: EQDDP40X-38S5CNxx

Features

- Compliant with QSFP DD MSA Specification Rev 3.0
- SFF - 8679 electrical interface compliant
- SFF - 8636 management interface support
- Compliant with SFF-8402
- Compliant with IEEE802.3cd Standard
- Support 50G (PAM4) electrical data rates/channel
- I2C for EEPROM communication
- Pull to Release latch design
- Excellent EMI/EMC performance 360degree cable shield termination
- Low loss, stronger mechanical features
- Operating Case Temperature: 0°C~70
- Compliant with RoHS
- In the event of conflict between the requirements of the specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

Applications

- Low EMI radiation Switches, servers and routers
- Data Center networks
- Storage area networks
- High performance computing
- Telecommunication and wireless infrastructure
- Medical diagnostics and networking
- Test and measurement equipment
- Multi-platform service systems
- This is not a definitive list of applications for this product. It represents some of the more common uses.

Product Description

passive copper cables provide robust connections for leading edge systems. Passive copper cables require no additional power to ensure quality connectivity. The passive copper cables are fully compliant with QSFP-DD Rev 3.0 specification and provide connectivity between devices using QSFP DD ports. passive copper cables fill the need for short, cost-effective connectivity in the data center.

high-quality solutions provide a power-efficient replacement for active power connectivity such as fiber optic cables for short distances. Optimizing systems to operate with passive copper cables significantly reduces power consumption and EMI emission.

Recommended Operation Condition

Parameter	Symbol	Min	Max	Unit
Operating Case Temperature	Topc	0	70	degC
Storage Temperature	Tst	-40	85	degC
Relative Humidity (non-condensation)	RS	35	60	%
Supply Voltage	VCC3	3.135	3.465	V
Voltage on LVTTTL Input	Vilvttl	-0.3	VCC3 +0.2	V
Power Supply Current	ICC3		30	mA
Total Power Consumption	Pd	-	0.1	W

Notes:

1. Stress or conditions exceed the above range may cause permanent damage to the device.
2. This is a stress rating only and functional operation of the device at these or any other conditions above those listed in the operational sections of this specification is not applied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

MECHANICAL Specifications

Parameter	Procedure	Requirement
IPF Module Insertion Force	Measure without the force from any cage kick-out springs. Module to be inserted into nominal cage Max. rate of 12.7mm/min.	18 Newtons SFP Module 90 Newtons QSFP-DD Module
	Per QSFP-DD	
IPF Module Extraction Force	Measure without the aid of any cage kick-out springs. Module to be inserted into a nominal cage. Max. rate of 12.7mm/min.	12.5 Newtons SFP Module 50 Newtons QSFP-DD Module
Insertion/removal cycles into cage/connector	EIA 364-09 50 Min module Cycles 100 min Cage/connector Cycles Per QSFP-DD	No functional damage to modulecage or connector

IPF Module retention in cage Card	125 Newtons Min Per QSFP-DD	No functional damage to module below 90N
Latch axial pull table strength	70 N min	No functional damage
Competitor Compatibility	Insertion and withdrawal	No functional damage

ENVIRONMENTAL PERFORMANCE

Parameter	Procedure	Requirement
Physical shock	EIA 364-27 Subject mated connectors to 30 g's half- sine shock pulses of 11 msec duration. Three shocks in each direction applied along three mutually perpendicular planes for a total of 18 shocks.	Meets SI on differential pairs, side band and Eprom continuity checked. No physical damage.
Vibration	EIA 364-28 Condition VII Test Letter D Subject mated connectors to 3.10 g's RMS. 30 minutes in each of three mutually perpendicular planes.	Meets SI on differential pairs, side band and Eprom continuity checked. No physical damage
Humidity	EIA 364-31 Method III Test Condition A. Subject mated connectors to 96 hours at 40°C with 90% RH to 95% RH. and dwell should be 1.0 hour	Meets SI on differential pairs, side band and Eprom continuity checked. No physical damage.
Temperature life	EIA-364-17 Test Condition III Method A. Subject mated connectors to temperature life at +115°C for 432 hours.	Meets SI on differential pairs, side band and Eprom continuity checked. No physical damage.
Thermal shock	EIA 364-32 Test Condition 1. Subject mated connectors to 10 cycles between -55°C and +85°C	Meets SI on differential pairs, side band and Eprom continuity checked. No physical damage.
Mixed Flowing Gas	EIA-364-65 Class II 7 Days Mated 7 days with dust cap	Meets SI on differential pairs, side band and Eprom continuity checked. No physical damage.

Note:

1. Shall meet EIA 364-18 Visual Examination requirements, show no physical damage, and shall meet requirements of additional tests as specified in the test sequence.
2. Vibration test fixture is to be determined by each user with connector vendors.

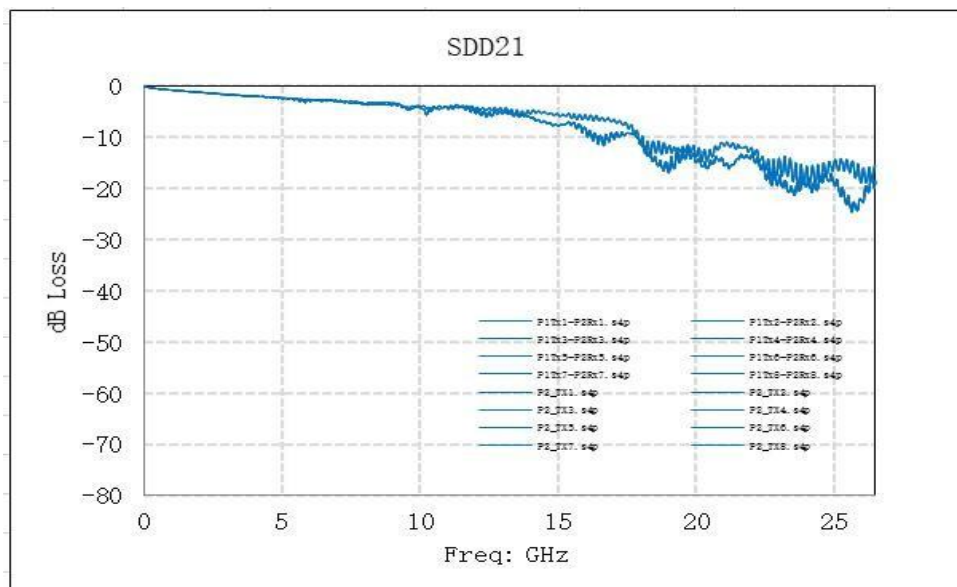
Frequency Domain

Item	Test Parameter	IEEE802.3cd Specification
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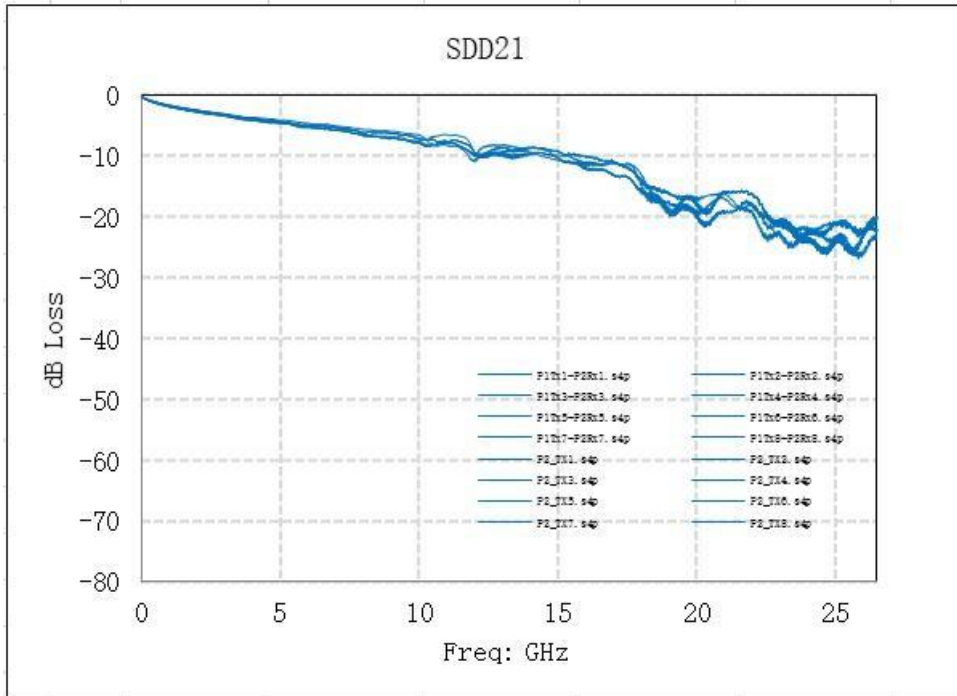
1	Differential Insertion Loss (SDD21)	Maximum insertion loss at 13.28GHz -17.16dB Minimum insertion loss at 13.28GHz -8dB
2	Differential Insertion Loss (SDD21)	Maximum insertion loss at 13.28GHz -17.16dB Minimum insertion loss at 13.28GHz -8dB
3	Differential Return Loss (SDD22)	-16.5+2xSQRT(f) @ 0.01 to 4.1GHz -10.66+14xLog10(f/5.5) @4.1 to 19GHz
4	Differential Return Loss (SDD11)	-16.5+2xSQRT(f) @ 0.01 to 4.1GHz -10.66+14xLog10(f/5.5) @4.1 to 19GHz
5	Common Mode Reflection (SCC22)	-2dB @ 0.01 to 19GHz
6	Common Mode Reflection (SCC11)	-2dB @ 0.01 to 19GHz
7	Common Mode Conversion (SCD22)	-22+(20/25.78)*(f) @ 0.01 to 12.89GHz -15+(6/25.78)*(f) @ 12.9 to 19GHz
8	Common Mode Conversion (SCD11)	-22+(20/25.78)*(f) @ 0.01 to 12.89GHz -15+(6/25.78)*(f) @ 12.9 to 19GHz
9	Differential to Common Mode Conversion Loss (SCD12)	-10dB @ 0.01 to 12.89GHz -27+(29/22)*(f) @ 12.9 to 15.7GHz -6.3dB @ 15.71 to 19GHz
10	Differential to Common Mode Conversion Loss (SCD21)	-10dB @ 0.01 to 12.89GHz -27+(29/22)*(f) @ 12.9 to 15.7GHz -6.3dB @ 15.71 to 19GHz

Typical Operation Characteristics

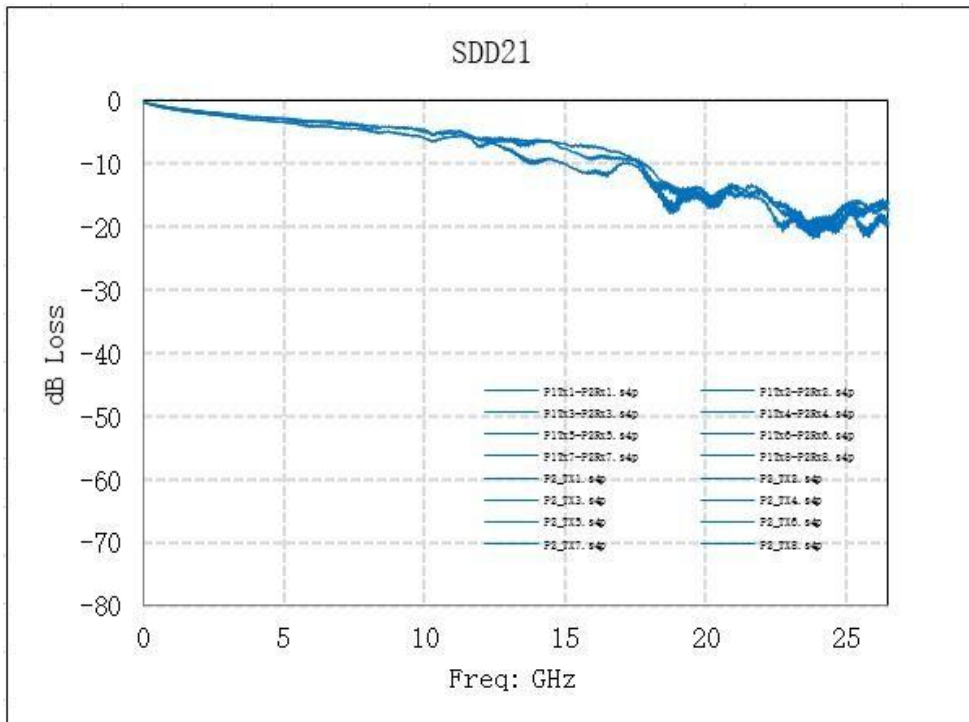
30AWG 0.5M



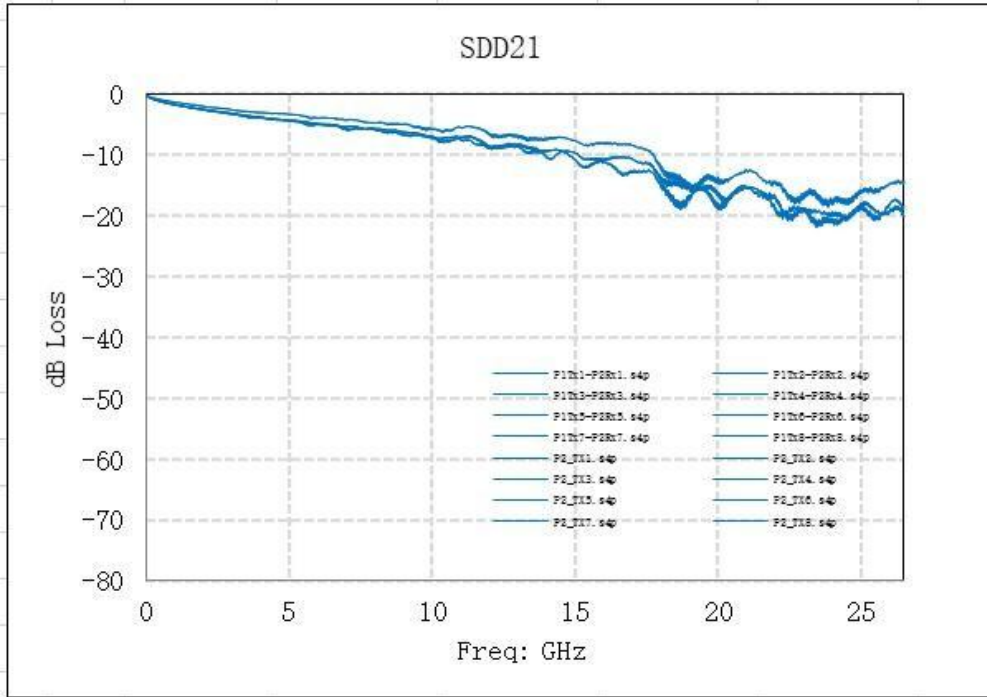
30AWG 1M



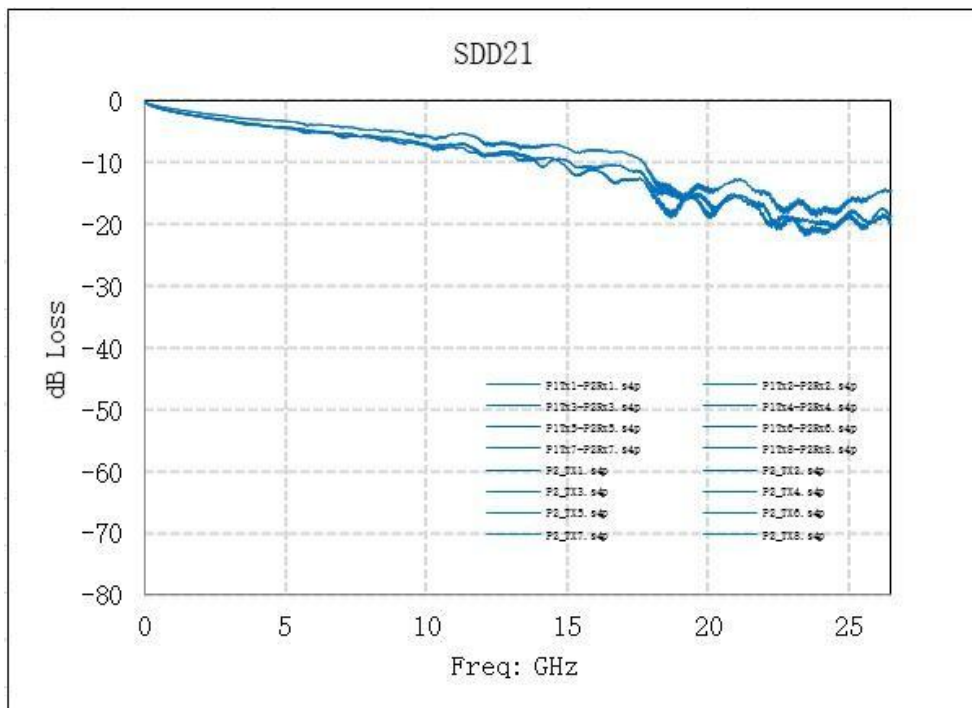
30AWG 1.5M



26AWG 2M

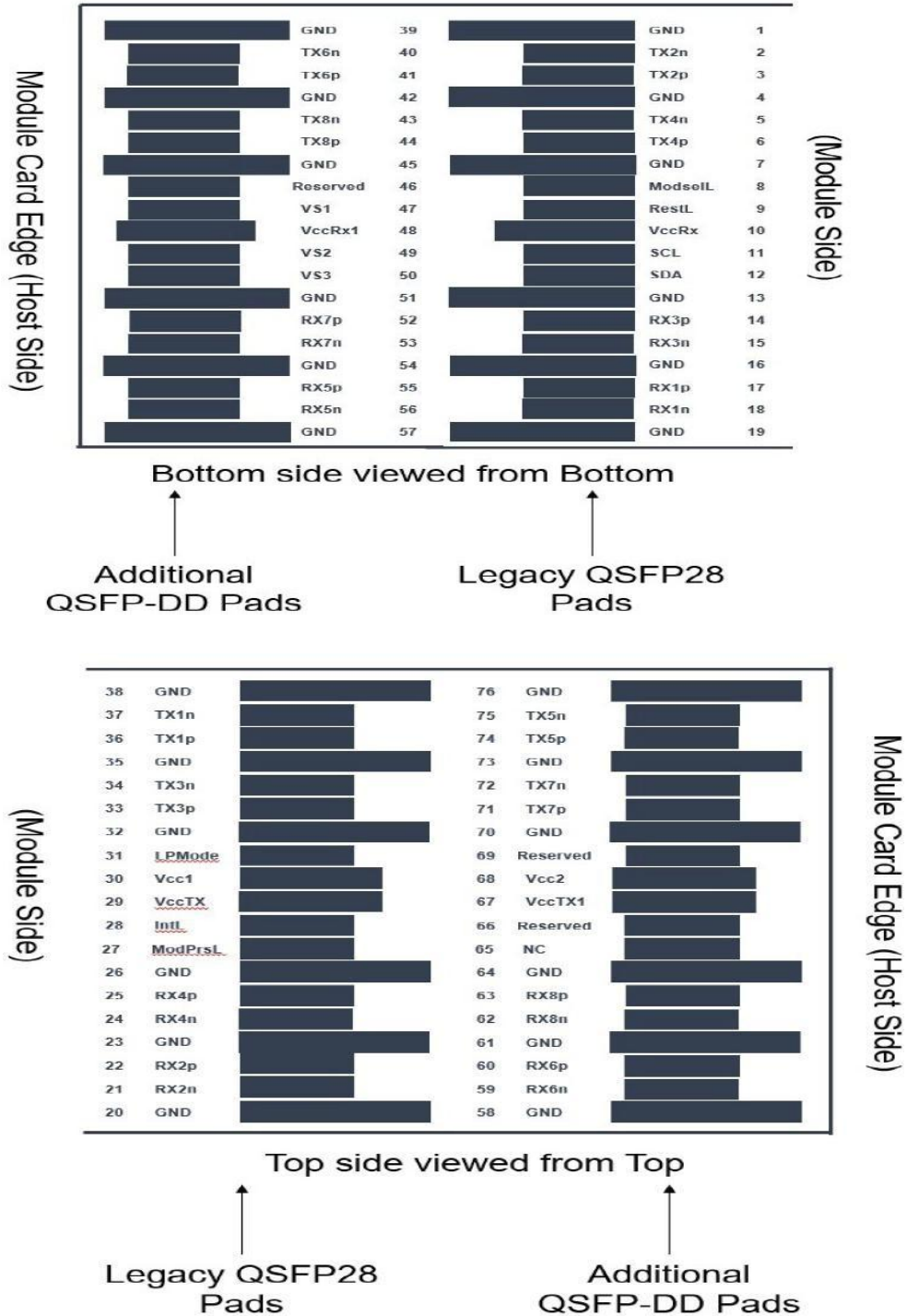


26AWG 2.5M



Host board Connector Pinout

Figure 1: MSA compliant Connector



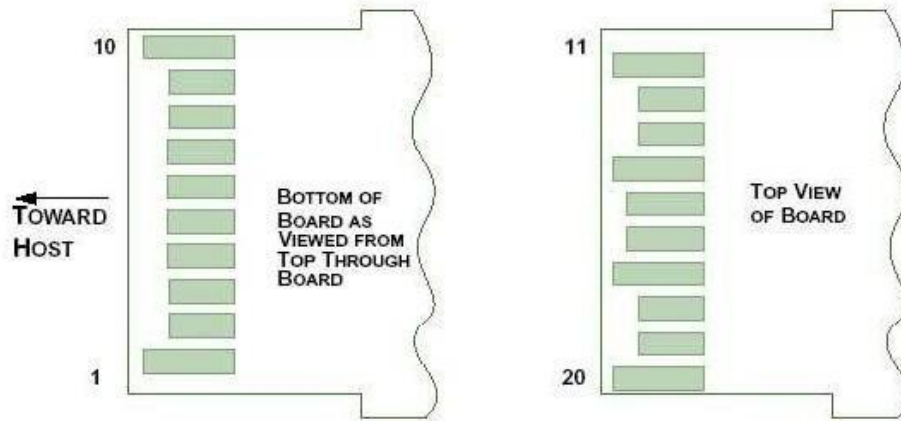


Figure 2: Pin Definitions compliant

QSFP-DD

PIN	Symbol	Description	Ref.
1	GND	Ground	1
2	TX2n	Transmitter Inverted Data Input	
3	TX2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	1
5	TX4n	Transmitter Inverted Data Input	
6	TX4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	Vcc RX	+3.3V Power Supply Receiver	2
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	1
14	RX3p	Receiver Non-Inverted Data Output	
15	RX3n	Receiver Inverted Data Output	
16	GND	Ground	1
17	RX1p	Receiver Non-Inverted Data Output	
18	RX1n	Receiver Inverted Data Output	
19	GND	Ground	1
20	GND	Ground	1
21	RX2n	Receiver Inverted Data Output	

22	RX2p	Receiver Non-Inverted Data Output	
23	GND	Ground	1
24	RX4n	Receiver Inverted Data Output	
25	RX4p	Receiver Non-Inverted Data Output	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	Vcc TX	+3.3V Power supply transmitter	2
30	Vcc1	+3.3V Power supply	2
31	LPMode	Initialization mode; In legacy QSFP applications, the InitMode pad is called LPMODE	
32	GND	Ground	1
33	TX3p	Transmitter Non-Inverted Data Input	
34	TX3n	Transmitter Inverted Data Input	
35	GND	Ground	1
36	TX1p	Transmitter Non-Inverted Data Input	
37	TX1n	Transmitter Inverted Data Input	
38	GND	Ground	1
39	GND	Ground	1
40	Tx6n	Transmitter Inverted Data Input	
41	Tx6p	Transmitter Non-Inverted Data Input	
42	GND	Ground	1
43	Tx8n	Transmitter Inverted Data Input	
44	Tx8p	Transmitter Non-Inverted Data Input	
45	GND	Ground	1
46	Reserved	For future use	3
47	VS1	Module Vendor Specific 1	3
48	3.3V Power	2A	2
49	VS2	Module Vendor Specific 2	3
50	VS3	Module Vendor Specific 3	3
51	GND	Ground	1
52	Rx7p	Receiver Non-Inverted Data Output	
53	Rx7n	Receiver Inverted Data Output	
54	GND	Ground	1
55	Rx5p	Receiver Non-Inverted Data Output	
56	Rx5n	Receiver Inverted Data Output	
57	GND	Ground	1
58	GND	Ground	1
59	Rx6n	Receiver Inverted Data Output	
60	Rx6p	Receiver Non-Inverted Data Output	
61	GND	Ground	1

62	Rx8n	Receiver Inverted Data Output	
63	Rx8p	Receiver Non-Inverted Data Output	
64	GND	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	Reserved	For Future Use	3
70	GND	Ground	1
71	Tx7p	Transmitter Non-Inverted Data Input	
72	Tx7n	Transmitter Inverted Data Input	
73	GND	Ground	1
74	Tx5p	Transmitter Non-Inverted Data Input	
75	Tx5n	Transmitter Inverted Data Input	
76	GND	Ground	

Note:

- 400G 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.
- VccRx, VccRx1, Vcc1, Vcc2, VccTx and VccTx1 shall be applied concurrently. Requirements defined for the host side of the Host Card Edge Connector are listed in Table 4. VccRx, VccRx1, Vcc1, Vcc2, VccTx and VccTx1 may be internally connected within the module in any combination. The connector Vcc pins are each rated for a maximum current of 1000 mA.
- All Vendor Specific, Reserved and No Connect pins may be terminated with 50ohms to grounds on the host. Pad 65 (No connect) shall be left unconnected within the module. Vendor specific and Reserved pads shall have an impedance to GND that is greater than 10k ohms and less than 100 pF.
- Plug Sequence specifies the mating sequence of the host connector and module. The sequence is 1A, 2A, 3A, 1B, 2B, 3B. Contact sequence A will make, the break contact with additional QSFP- DD pads. Sequence 1A, 1B will then occur simultaneously, followed by 2A, 2B, followed by 3A,3B.

SFP56

Pin	Logic	Symbol	Name/Description	Note
1		VeeT	Module Transmitter Ground	1
2	LVTTL-O	Tx_Fault	Transmitter Fault	2
3	LVTTL-I	Tx_Disable	Transmitter Disable	3
4	LVTTL-I/O	SDA	MOD-DEF2 2-wire serial interface data line	4
5	LVTTL-I/O	SCL	MOD-DEF1 2-wire serial interface clock line	4
6		Mod_Abs	Module Absent	
7	LVTTL-I	RS0	Rate Select Zero	
8	LVTTL- O	Rx_LOS	Module Receiver Loss of Signal	2
9	LVTTL-I	RS1	Rate Select One	
10		VeeR	Module Receiver Ground	1

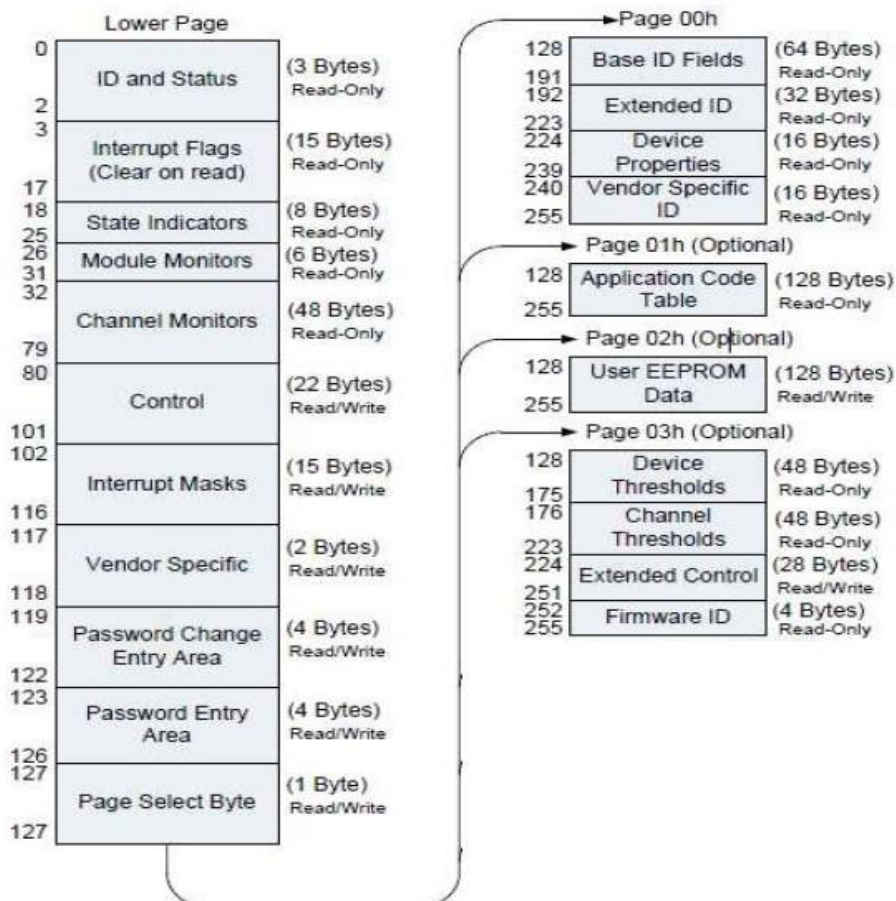
11		VeeR	Module Receiver Ground	1
12	CML-O	RD-	Receiver Inverted Data Output	
13	CML-O	RD+	Receiver Non-Inverted Data Output	
14		VeeR	Module Receiver Ground	1
15		VccR	Module Receiver 3.3V Supply	
16		VccT	Module Transmitter 3.3V Supply	
17		VeeT	Module Transmitter Ground	1
18	CML-I	TD+	Transmitter Non-Inverted Data Input	
19	CML-I	TD-	Transmitter Inverted Data Input	
20		VeeT	Module Transmitter Ground	1

Note:

1. The module signal grounds, VeeR and VeeT, shall be isolated from the module case.
2. This is an open collector/drain output and shall be pulled up with 4.7-10k to Vcc_Host on the host board. Pull ups can be connected to multiple power supplies, however the host board design shall ensure that no module has voltage exceeding module VccT/R + 0.5 V.
3. This is an open collector/drain input and shall be pulled up with 4.7-10k to VccT in the module.
4. This shall be pulled up with 4.7-10k to Vcc_Host on the host board.

2 - wire Management Interface

The transceivers provide management two wire interface and the management memory map is specified by QSFP-DD Rev.3.0



EEPROM Serial ID Memory Contents (Page00)

Part Number					
Device 0xPage00					
DATA Address (DEC)	DATA Address (HEX)	Name of Field		Value (HEX)	Description
128	80	Identifier		0x18	QSFP-DD Double Density 8X Pluggable Transceiver (INF-8628)
129	81	Vendor name		0x31	
130	82			0x30	
131	83			0x47	
132	84			0x74	
133	85			0x65	
134	86			0x6B	
135	87			0x20	
136	88			0x20	
137	89			0x20	
138	8A			0x20	
139	8B			0x20	
140	8C			0x20	
141	8D			0x20	
142	8E			0x20	
143	8F			0x20	
144	90		0x20		
145	91	Vendor OUI		0x00	
146	92			0x00	
147	93			0x00	
148	94	Vendor PN		0x51	
149	95			0x34	
150	96			0x30	
151	97			0x30	
152	98			0x2F	
153	99			0x38	
154	9A			0x53	
155	9B			0x35	
156	9C			0x36	
157	9D			0x2D	
158	9E			0x50	
159	9F			0x78	
160	A0			0x4D	
161	A1		0x20		

162	A2		0x20	
163	A3		0x20	
164	A4	Vendor rev	0x30	01
165	A5		0x31	
166	A6		0x4E	
167	A7		0x51	
168	A8		0x50	
169	A9		0x32	
170	AA		0x30	
171	AB		0x31	
172	AC		0x39	
173	AD		0x30	
174	AE	Vendor SN	0x35	SN
175	AF		0x30	
176	B0		0x31	
177	B1		0x30	
178	B2		0x30	
179	B3		0x30	
180	B4		0x31	
181	B5		0x20	
182	B6		0x31	
183	B7		0x39	
184	B8		0x30	
185	B9		0x35	
186	BA	Date Code	0x30	Date Code
187	BB		0x31	
188	BC		0x20	
189	BD		0x20	
190	BE		0x00	
191	BF		0x00	
192	C0		0x00	
193	C1		0x00	
194	C2		0x00	
195	C3	CLEI CODE (options)	0x00	
196	C4		0x00	
197	C5		0x00	
198	C6		0x00	
199	C7		0x00	
200	C8	MODULE POWER	0x00	Power class 1 max 1.5W
201	C9	CHARACTERISTICS	0x06	1.5W
202	CA	Cable assembly length (Multiplier for value in bits 5-0.)	0x41	Length
203	CB	Media connector	0x23	No separable connector

204	CC	Copper Cable attenuation	0x05	5 GHz attenuation
205	CD		0x05	7 GHz attenuation
206	CE		0x08	12.9 GHz attenuation
207	CF		0x00	25.8 GHz attenuation
208	D0		0x00	reserved
209	D1		0x00	reserved
210	D2	Cable Assembly Lane	0x00	
211	D3	Information	0x00	
212	D4	Media Interface Technology	0x0A	Copper cable unequalized
213	D5	Reserved	0x00	Reserved
214	D6		0x00	
215	D7		0x00	
216	D8		0x00	
217	D9		0x00	
218	DA		0x00	
219	DB		0x00	
220	DC	0x00		
221	DD	Custom	0x00	Custom
222	DE	Checksum (128-221)	0x00	
223	DF	Custom Info nv	0x00	Custom Info nv
224	E0		0x00	
225	E1		0x00	
226	E2		0x00	
227	E3		0x00	
228	E4		0x00	
229	E5		0x00	
230	E6		0x00	
231	E7		0x00	
232	E8		0x00	
233	E9		0x00	
234	EA		0x00	
235	EB		0x00	
236	EC		0x00	
237	ED	0x00		
238	EE	0x00		
239	EF	0x00		
240	F0	0x00		
241	F1	0x00		
242	F2	0x00		
243	F3	0x00		
244	F4	0x00		
245	F5	0x00		
246	F6	0x00		

247	F7		0x00
248	F8		0x00
249	F9		0x00
250	FA		0x00
251	FB		0x00
252	FC		0x00
253	FD		0x00
254	FE		0x00
255	FF		0x00

The SFP56 connector provides an MSA standard 2-wire serial communication interface to 256kB EEPROM memory maps; both standard and custom memory maps are available.

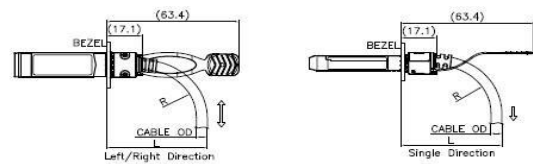
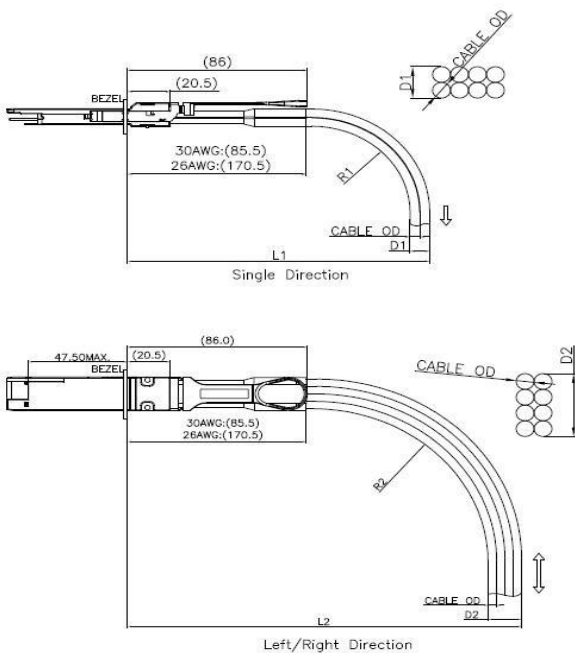
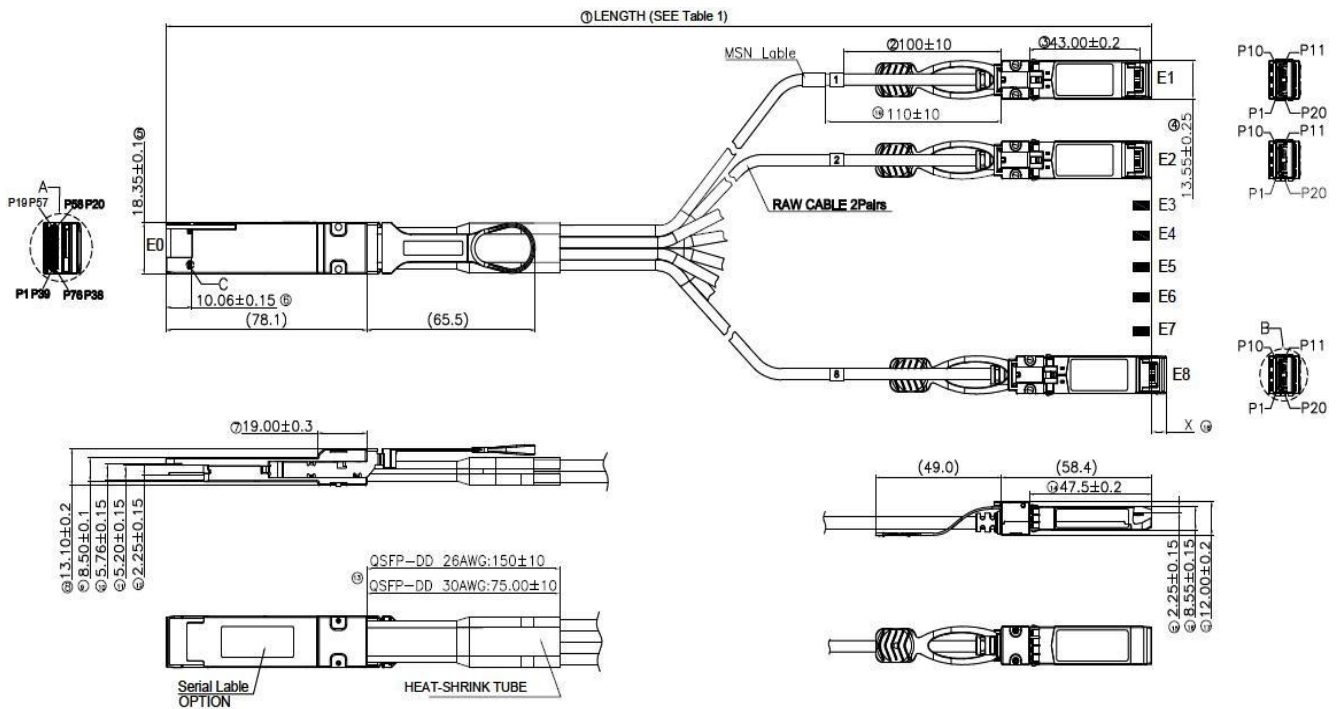
Part Number				
SFP28 Device 0xA0				
DATA Address (DEC)	DATA Address (HEX)	Value (HEX)	Name of Field	Description
0	0	0X03	Identifier	SFP/SFP+/SFP28
1	1	0X04	Ext. Identifier	GBIC/SFP function is defined by two-wire interface ID only
2	2	0X21	Connector	Copper pigtail
3	3	0X00	Transceiver	Unspecified
4	4	0X00		Unspecified
5	5	0X00		Unspecified
6	6	0X00		Unspecified
7	7	0X00		Unspecified
8	8	0X04		Passive Cable *8
9	9	0X80		Twin Axial Pair (TW)
10	A	0XFD		1200 MBps (per channel) 800 MBps 1600 MBps (per channel) 400 MBps 3200 MBps (per channel) 200 MBps 100 MBps
11	B	0X00	Encoding	Unspecified
12	C	0XFF	BR, Nominal	25500Mb
13	D	0X00	Rate Identifier	Unspecified
14	E	0X00	Length (SMF,km)	Unsupported
15	F	0X00	Length (SMF)	Unsupported
16	10	0X00	Length (50um)	Unsupported
17	11	0X00	Length (62.5um)	Unsupported
18	12	0X02	Length (cable)	xM
19	13	0X00	Length (OM3)	Unsupported

20	14	0X4F	Vendor Name	
21	15	0X45		
22	16	0X4D		
23	17	0X20		
24	18	0X20		
25	19	0X20		
26	1A	0X20		
27	1B	0X20		
28	1C	0X20		
29	1D	0X20		
30	1E	0X20		
31	1F	0X20		
32	20	0X20		
33	21	0X20		
34	22	0X20		
35	23	0X20		
36	24	0X40		
37	25	0X00	Vendor OUI	
38	26	0X00		
39	27	0X00		
40	28	0X51	Vendor PN	
41	29	0X34		
42	2A	0X30		
43	2B	0X30		
44	2C	0X2F		
45	2D	0X38		
46	2E	0X53		
47	2F	0X35		
48	30	0X36		
49	31	0X2D		
50	32	0X50		
51	33	0X78		
52	34	0X4D		
53	35	0X20		
54	36	0X20		
55	37	0X20		
56	38	0X30	Vendor Rev	01
57	39	0X31		
58	3A	0X20		
59	3B	0X20	Wavelength or cable Specification Compliance	
60	3C	0X01		
61	3D	0X00		

62	3E	0X00	Unallocated	
63	3F	0XBC	CC_BASE	
64	40	0X00	Options	Unspecified
65	41	0X00		Unspecified
66	42	0X67	BR, max	25750Mb
67	43	0X00	BR, min	Unspecified
68	44	0X31	Vendor SN	SN
69	45	0X36		
70	46	0X34		
71	47	0X37		
72	48	0X39		
73	49	0X30		
74	4A	0X35		
75	4B	0X30		
76	4C	0X20		
77	4D	0X20		
78	4E	0X20		
79	4F	0X20		
80	50	0X20		
81	51	0X20		
82	52	0X20		
83	53	0X20		
84	54	0X31	Date Code	DATE
85	55	0X36		
86	56	0X31		
87	57	0X31		
88	58	0X32		
89	59	0X39		
90	5A	0X30		
91	5B	0X30		
92	5C	0X00	Diagnostic Monitoring Type	Unspecified
93	5D	0X00	Enhanced Options	Unspecified
94	5E	0X08	SFF-8472 Compliance	Includes functionality described in Rev 12.0 of SFF-8472.
95	5F	0XA3	CC_EXT	
96	60	0X00		
97	61	0X00		
98	62	0X11		
99	63	0X1B		
100	64	0XA0		
101	65	0XD4		
102	66	0X48		
103	67	0X54		

104	68	0X23	Vendor Specific			
105	69	0XC8				
106	6A	0XA2				
107	6B	0XCE				
108	6C	0X47				
109	6D	0X57				
110	6E	0X5F				
111	6F	0XF4				
112	70	0X99				
113	71	0XE6				
114	72	0X0D				
115	73	0X00				
116	74	0X00				
117	75	0X00				
118	76	0X00				
119	77	0X00				
120	78	0X00				
121	79	0X00				
122	7A	0X00				
123	7B	0X00				
124	7C	0XE6				
125	7D	0X75				
126	7E	0X75				
127	7F	0X73				

Mechanical Dimensions



ASSEMBLY BEND RADIUS & INSTALL RADIUS(SFP56 PORT)
(组装弯曲半径和安装半径, SFP56 端)

CABLE GAUGE (线径)	DIAMETER OD (直径)	MIN. BEND RADIUS R ¹ (最小弯曲半径)	MIN. BEND SPACE L ¹ (最小弯曲空间)
30AWG	4.25mm	21.25mm	42.6mm
30AWG	5.30mm	26.60mm	48.9mm

ASSEMBLY BEND RADIUS & INSTALL RADIUS(QSFP-DD PORT)
(组装弯曲半径和安装半径, QSFP-DD 端)

CABLE GAUGE (线径)	DIAMETER OD ¹ (直径)	DIAMETER D1 ¹ (直径)	MIN. BEND RADIUS R1 ¹ (最小弯曲半径)	MIN. BEND SPACE L1 ¹ (最小弯曲空间)	DIAMETER OD ² (直径)	MIN. BEND RADIUS R2 ² (最小弯曲半径)	MIN. BEND SPACE L2 ² (最小弯曲空间)
30AWG	4.25mm	8.5mm	42.5mm	138.5mm	17.0mm	85.0mm	187.5mm
30AWG	5.30mm	10.6mm	53.0mm	234.1mm	21.2mm	108.0mm	287.7mm

Ordering Information

QSFP DD Copper Cable Assemblies, Passive

P/N	Length	Data Rate	AWG	Length Tolerance
EQDDP40X-38S5CN0	0.5M	400G	30	+50/-20mm
EQDDP40X-38S5CN1	1M	400G	30	+70/-25mm
EQDDP40X-38S5CN1.5	1.5M	400G	30	+70/-30mm
EQDDP40X-38S5CN2	2M	400G	26	+70/-30mm
EQDDP40X-38S5CN2.5	2.5M	400G	26	+70/-30mm