QSFPDD-400G-DR4-XXW

400GBase QSFP-DD
1310nm
500m Reach

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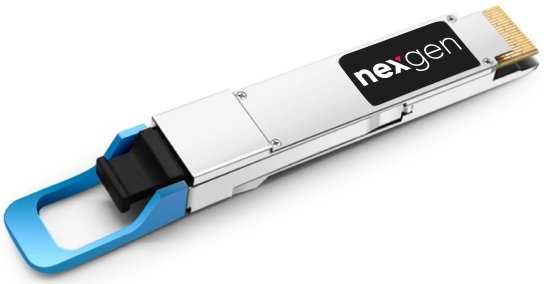
Features

- QSFP DD MSA compliantt
- IEEE 802.3-2018 400GBASE-DR4 compliant
- 400GE DR4 Specification compliant
- 8 x 53.125 Gb/s PAM4 electrical interface (400GAUI-8)
- Non-hermetic package design
- Power consumption 12 W (0~70°C)
- MPO connector
- 425 Gbps aggregate bit rate
- Up to 500m transmission on single mode fiber with FEC
- ingle 3.3 V power supply
- RoHS 2 compliant



Applications

- 400GBase DR4 Ethernet
- Data center interconnect

Part number	Product description
QSFPDD-400G-DR4-XXW	400GBase SMF QSFP-DD 1310nm 500m 0°C to 70°C MPO DDM (12W)

PIN Description

Pin		Function/Description	Notes
1	GND	Transmitter Ground (Common with Receiver Ground)	1
2	Tx2-	Transmitter Inverted Data Input	
3	Tx2+	Transmitter Non-Inverted Data output	
4	GND	Transmitter Ground (Common with Receiver Ground)	1
5	Tx4-	Transmitter Inverted Data Input	
6	Tx4+	Transmitter Non-Inverted Data output	
7	GND	Transmitter Ground (Common with Receiver Ground)	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	VccRx	3.3V Power Supply Receiver	2
11	SCL	2-Wire serial Interface Clock	
12	SDA	2-Wire serial Interface Data	
13	GND	Transmitter Ground (Common with Receiver Ground)	1
14	Rx3+	Receiver Non-Inverted Data Output	
15	Rx3-	Receiver Inverted Data Output	
16	GND	Transmitter Ground (Common with Receiver Ground)	1
17	Rx1+	Receiver Non-Inverted Data Output	
18	Rx1-	Receiver Inverted Data Output	
19	GND	Transmitter Ground (C ommon with Receiver Ground)	1
20	GND	Transmitter Ground (Common with Receiver Ground)	1
21	Rx2-	Receiver Inverted Data Output	
22	Rx2+	Receiver Non-Inverted Data Output	
23	GND	Transmitter Ground (Common with Receiver Ground)	1
24	Rx4-	Receiver Inverted Data Output	
25	Rx4+	Receiver Non-Inverted Data Output	
26	GND	Transmitter Ground (Common with Receiver Ground)	1
27	ModPrsl	Module Present	
28	IntL	Interrupt	
29	VccTx	3.3V power supply transmitter	2
30	Vcc1	3.3V power supply	2
31	LPMode	Low Power Mode	
32	GND	Transmitter Ground (Common with Receiver Ground)	1
33	Tx3+	Transmitter Non-Inverted Data Input	
34	Tx3-	Transmitter Inverted Data Output	
35	GND	Transmitter Ground (Common with Receiver Ground)	1
36	Tx1+	Transmitter Non-Inverted Data Input	
37	Tx1-	Transmitter Inverted Data Output	
38	GND	Transmitter Ground (Common with Receiver Ground)	1

Pin		Function/Description	Notes
39	GND	Transmitter Ground (Common with Receiver Ground)	1
40	Tx6-	Transmitter Inverted Data Input	
41	Tx6+	Transmitter Non-Inverted Data output	
42	GND	Transmitter Ground (Common with Receiver Ground)	1
43	Tx8-	Transmitter Inverted Data Input	
44	Tx8+	Transmitter Non-Inverted Data output	
45	GND	Transmitter Ground (Common with Receiver Ground)	1
46	Reserved	For future use	3
47	VS1	Module Vendor Specific	3
48	VccRx1	3.3V Power Supply Receiver	2
49	VS2	Module Vendor Specific 2	3
50	VS3	Module Vendor Specific 3	3
51	GND	Transmitter Ground (Common with Receiver Ground)	1
52	Rx7+	Receiver Non-Inverted Data Output	
53	Rx7-	Receiver Inverted Data Output	
54	GND	Transmitter Ground (Common with Receiver Ground)	1
55	Rx5+	Receiver Non-Inverted Data Output	
56	Rx5-	Receiver Inverted Data Output	
57	GND	Transmitter Ground (C ommon with Receiver Ground)	1
58	GND	Transmitter Ground (Common with Receiver Ground)	1
59	Rx6-	Receiver Inverted Data Output	
60	Rx6+	Receiver Non-Inverted Data Output	
61	GND	Transmitter Ground (Common with Receiver Ground)	1
62	Rx8-	Receiver Inverted Data Output	
63	Rx8+	Receiver Non-Inverted Data Output	
64	GND	Transmitter Ground (Common with Receiver Ground)	1
65	NC	No Connect	
66	Reserved	For future use	
67	VccTx1	3.3V power supply transmitter	2
68	Vcc2	3.3V power supply	2
69	Reserved	For future use	3
70	GND	Transmitter Ground (Common with Receiver Ground)	1
71	Tx7+	Transmitter Non-Inverted Data Input	
72	Tx7-	Transmitter Inverted Data Output	
73	GND	Transmitter Ground (Common with Receiver Ground)	1
74	Tx5+	Transmitter Non-Inverted Data Input	
75	Tx5-	Transmitter Inverted Data Output	
76	GND	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. 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.
2. 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 the table. 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.
3. All Vendor Specific, Reserved and No Connect pins may be terminated with 50 Ω to ground 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 10 kΩ and less than 100 pF.
4. Plug Sequence specifies the mating sequence of the host connector and module.

Pin Assignment and Description

Top Side Viewed from Top

Bottom Side Viewed from Bottom

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	Ts	-40	85	℃	
Power Supply Voltage	Vcc	-0.5	3.6	V	
Relative Humidity (non-condensation)	RH	5	95	%	

Notes:
Exceeding any of these values may be harmful for the device

Recommend Operation Conditions

Parameter	Min	Typ	Max	Unit	Notes
Power Supply Voltage	3.13	3.3	3.47	V	-
Power Supply Current (com.)	-	-	3630	mA	-
Case Operating Temperature (com.)	0	-	+70	°C	-

Electrical Characteristics

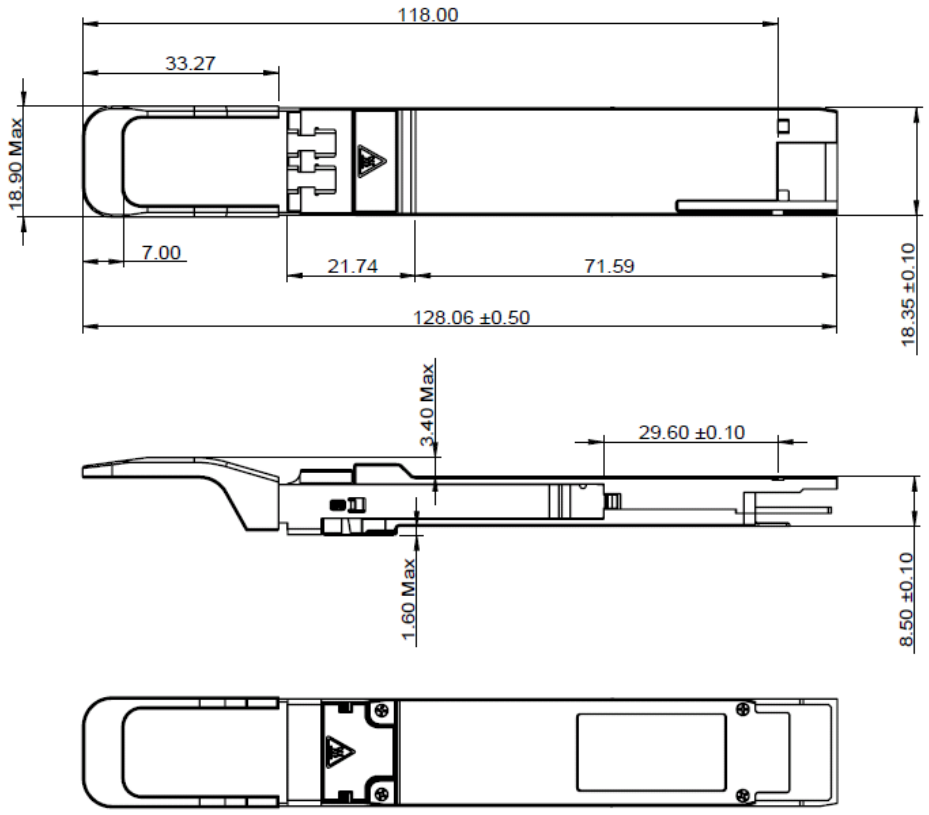
Parameter	Min	Typ	Max	Unit	Notes
Transmitter					
Differential input Voltage pk-pk	900	-	-	mV	-
Common Mode Voltage	-350	-	2850	mV	-
Single-ended Voltage Tolerance Range	-0.4	-	3.3	V	-
Differential Input Return Loss	-	-	Equation (16-1)	dB	1
Differential to Common Mode Input Return Loss	-	-	Equation (16-3)	dB	1
Module Stressed Input Test	See OIF-CEI-56G-VSR-PAM4 Section 16.3.10.3			-	-
Receiver					
Differential output Voltage pk-pk	-	-	900	mV	-
Common Mode Voltage	-350	-	2850	mV	-
Common Mode Noise, RMS	-	-	17.5	mV	-
Differential Return Loss	-	-	Equation (16-1)	dB	-
Common Mode to Differential Mode Conversion	-	-	Equation (16-3)	dB	-
Common Mode Return Loss	-	-	-2	dB	2
Transition Time	9.5	-	-	ps	-
Near-end Eye Width at 10-6 probability	0.265	-	-	UI	-
Near-end Eye Height at 10-6 probability	70	-	-	mV	-
Far-end Eye Width at 10-6 probability	0.2	-	-	UI	-
Far-end Eye Height at 10-6 probability	30	-	-	mV	-
Near-end Eye Linearity	0.85	-	-	-	-

Notes:
1. OIF-CEI-56G-VSR-PAM4.
2. From 250MHz to fbGHz.

Optical Characteristics

Parameter	Min	Typ	Max	Unit	Notes
Transmitter					
Average launch power per lane	-2.9	-	4.0	dBm	-
Extinction ratio per lane	3.5	-	-	dB	-
Line wavelengths	1304.50	1311.00	1317.50	nm	-
Optical Modulation Ampliude per lane	-0.8	-	4.2	dBm	-
Side-mode Suppression Ratio	30		-	dB	-
Launch power OMA - TDECQ per lane	-2.2	-	-	dBm	
TDECQ for PAM4 per lane	-	-	3.4	dB	-
Optical return loss tolerance	-		21.4	dB	-
Transmitter Reflectance	-	-	-26	dB	
Data Rate per lane	-	-53.125	-	GBd/s	-
Receiver					
Optical Center Wavelength	1304.50	-	1317.50	nm	-
Damage Threshold, each lane	5.0	-	-	dBm	-
Average receiver power, each lane	-5.9	-	4.0	dBm	-
Receiver power, each lane(OMA)	-	-	4.2	dBm	-
Receiver Sensitivity (OMAouter) per lane	-	-	-5.3	dBm	-
Stressed receiver Sensitivity (OMA) per lane	-	-	-1.9	dBm	-
LOS Assert	-15	-	-	dBm	-
LOS De-Assert	-	-	-8.4	dBm	-
LOS Hysteresis	0.5	-	-	dB	-

Mechanical specifications



Unit : mm

Revision history

Revision	Date	Author	Description
V1.1	13-03-2023	JGN	Initial Document

Note : Nexgen A/S reserves the right to change this document without notice.