QSFPDD-400G-SR8-XXS

400GBase QSFP-DD
850nm
100m Reach

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Features

- QSFP-DD MSA compliant
- 8 parallel lanes on 850nm center wavelength
- Compliant to IEEE 802.3bs Specification
- Up to 100m transmission on multi-mode fiber (MMF) OM3 with FEC
- Operating case temperature: 0 to 70℃
- 8x53.125Gb/s electrical interface (400GAUI-8)
- 26.5625GBd PAM4x8 Transmitter
- Supports 425 Gb/s aggregate bit rate
- Maximum power consumption 10W
- MPO-16 connector
- RoHS compliant
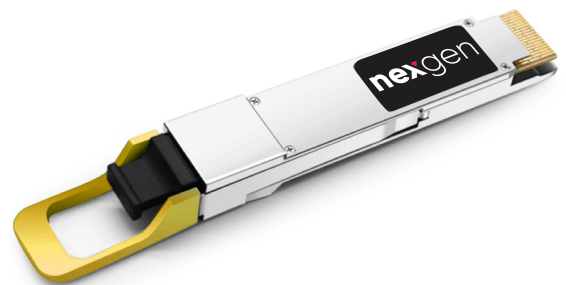
Applications

- 400G Ethernet
- Data Center

Part number	Product description
QSFPDD-400G-SR8-XXS	400GBase MMF QSFP-DD 850nm 100m 0℃ to 70℃ MTP/MPO-16 DDM (10W)

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

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

Card Edge

Top Side Viewed from Top

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

Card Edge

Bottom Side Viewed from Bottom

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	Ts	-40	85	°C	
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

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Units
Operating Case Temperature	Tc	0	-	70	°C
Supply Voltage	Vcc	3.13	3.3	3.47	V
Data Rate each Lane	-	-	53.125	-	Gbit/s
Data Rate Accuracy	-	-100	-	100	ppm
Link Distance	-	-	-	2000	m

Transceiver Electrical Characteristics

Parameter	Min	Typical	Max	Units	Notes
Power Dissipation	-	-	12	W	-
Supply Current	-	-	3.64	A	-
Transmitter					
Input Differential Impedance	-	100	-	Ω	-
Differential Data Input Swing	180	-	900	mVp-p	-
Receiver					
Output Differential Impedance	-	100	-	Ω	-
Differential Data Output Swing	300	-	850	mVp-p	1

Notes:
1. Internally AC coupled, but requires a external 100Ω differential load termination.

Transceiver Optical Characteristics

Parameter	Min	Typical	Max	Units	Notes
Transmitter					
Wavelength	840	850	860	nm	1
Average launch power per lane	-6.5	-	4	dBm	-
OMA outer per lane	-4.5	-	3	dBm	-
Launch power in OMA minus TDECQ,	-5.9	-	-	dBm	-
Transmitter and dispersion eye closure for PAM4 (TDECQ) per lane	-	-	4.5	dB	2
Exctinction Ratio per lane	3	-	-	dB	2
Average launch power of OFF transmitter per lane	-	-	-30	dBm	-
Optical Return Loss Tolerance	-	-	12	dB	-
Transmitter transition time per lane	-	-	34	ps	-
Receiver					
Wavelengths	1264.5	-	1277.7	nm	-
Average Receiver Power, per lane	-8.4	-	4	dBm	-
Damage Threshold, per lane	5	-	-	dBm	-
Receive power, per lane (OMA outer)	-	-	3	dBm	-
Receiver Sensitivity per lane (OMA outer)	-	-	max(-6.5, SECQ-7.9)	dBm	3
Stressed receiver Sensitivity (OMA outer)	-	-	-3.4	dBm	-
LOS Assert	-24.6	-	-	dBm	-
LOS De-Assert	-	-	-8	dBm	-
LOS Hysteresis	0.5	-	-	dB	-

Notes:
1. The optical power is launched into OM3 MMF.
2. Measured with a SSPRQ test pattern @ 53.125Gb/s PAM4 format.
3. Measured with PRBS31Q test pattern @ 53.125GBd/s, PAM4, BER < 2.4×10^{-4}.

Mechanical specifications
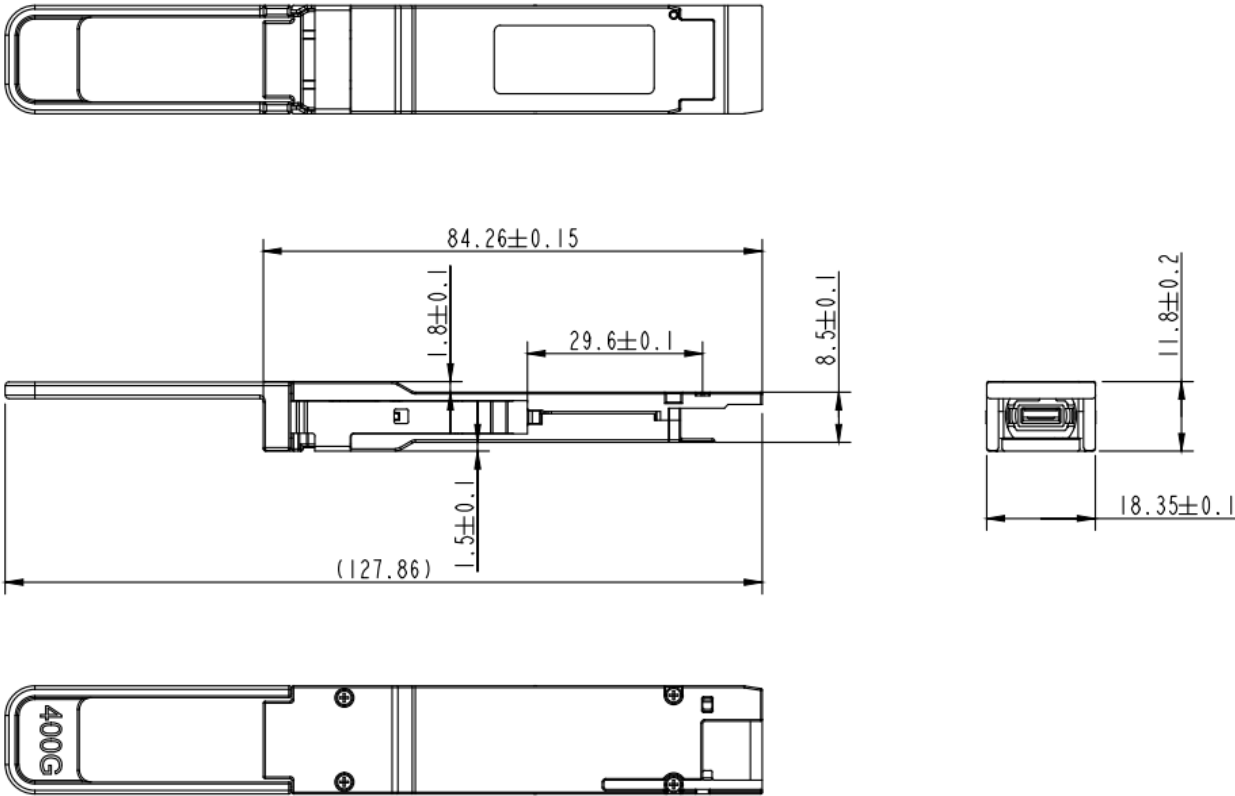
Revision history

Revision	Date	Author	Description
V1.0	31-04-2021	JGN	Initial Document

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