

QBP13010EoPF – QSFP-DD Parallel Fibre / PAM4

1310nm / 10km / 4× 100GBASE-LR1

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.

1. Overview

QBP13010EoPF is a high performance QSFP-DD transceiver module for 400 Gigabit Ethernet data links over four single mode fibre pairs (ribbon fibre). The maximum reach is 10km. An internal DSP-based gearbox converts the 8 electrical input channels (each 25GBd PAM4) into four 50GBd PAM4 signals. The four transmitters are CWDM lasers generating four optical 50GBd output signals.

The four receivers are PIN photodiodes which detect four 50GBd PAM4 optical input signals. These 50GBd data streams are converted into eight 25GBd electrical output signals by the DSP.

This transceiver module is compliant with the QSFP-DD Multisource Agreement (MSA) and hot pluggable. Always contact SkyLane Optics® commercial agents for compatibility with different equipment platforms.

2. Features

- QSFP-DD Multi-Source Agreement compliant
- Hot pluggable QSFP-DD footprint
- Supports 425Gbps Data Rate
- 8× 26.5625GBd PAM4 Serial Electrical Interface (400GAUI-8)
- MPO/MTP-12 Optical Connector (8-degree angled)
- 4× CWDM Transmitters
- 4× PIN Receivers
- Built-in DSP / dual CDR
- Up to 10km Point-to-Point Transmission on Single Mode Fibre
- Operating temperature range 0°C to 70°C
- Power Dissipation < 12W
- Single +3.3V Power Supply

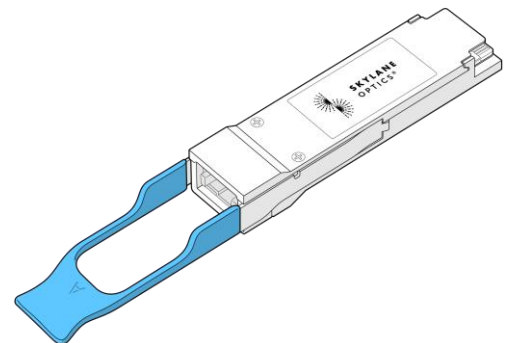


Figure 1. QSFP-DD MPO
(non-binding illustration)

3. Applications

- 400 Gigabit Ethernet

4. Optical Interface

P/N	Wavelength	Protocol	Optical Output Power ¹ , each Lane [dBm]	Stressed Receiver Sensitivity ² (OMA) [dBm]	Optical Receiver Overload ³ [dBm]	Link Length ^{3,4} [km]
QBP13010EoPF	1310nm	400GBASE	-2.7 to 5.1	≤ -4.1	4.8	≤ 10

1. EOL over operating temperature range

2. 53.125GBd, BER≤2.4×10⁻⁴, PRBS31Q, pre-FEC, each lane

3. The optical input to the receiver should not exceed this value. Transmitters must never be directly connected to receivers before ensuring that proper optical attenuation is used

4. Cabled optical fibre as per IEEE 802.3bs-2017

5. Technical Parameters

5.1. Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit	Notes
Storage temperature	-40		85	°C	
Operating Case Temperature	0		70	°C	
Relative Humidity			85	%	Non-Condensing
Power Supply Voltage	3.135	3.3	3.465	V	
Power Supply Current			3.83	A	
Power Dissipation			12	W	

5.2. Transmitter Optical Specifications

Parameter	Min	Typ	Max	Unit	Notes
Signalling Rate, each Lane		53.125		GBd	5
Aggregated Data Rate		425		Gbps	5
Average Output Power, each Lane	-2.7		5.1	dBm	6, 7
Launched Outer OMA (OMA_{outer}), each Lane	0.3		5	dBm	6
Centre Wavelength, Optical Lanes 0 to 3	1304.5		1317.5	nm	
Transmitter and Dispersion Eye Closure (TDECQ), each Lane			3.9	dB	
Extinction Ratio, each Lane	3.5			dB	

5. IEEE 802.3bs-2017

6. Output power coupled into a 9/125 μ m single mode fibre

7. Average launch power, each lane (min) is informative and not the principal indicator of signal strength. A transmitter with launch power below this value cannot be compliant; however, a value above this does not ensure compliance

5.3. Receiver Optical Specifications

Parameter	Min	Typ	Max	Unit	Notes
Operating Wavelength, Optical Lanes 0 to 3	1304.5		1317.5	nm	
Average Receive Power, each Lane	-8.2		4.8	dBm	8
Receive Power (OMA_{outer}), each Lane			4.4	dBm	
Receiver Sensitivity (OMA_{outer}), each Lane			-6.1	dBm	
Stressed Receiver Sensitivity (OMA_{outer}), each Lane			-4.1	dBm	9

8. Average receive power, each lane (min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance

9. 53.125GBd, BER $\leq 2.4 \times 10^{-4}$, PRBS_{31Q}, pre-FEC, each lane

6. Transceiver Electrical Pad Layout

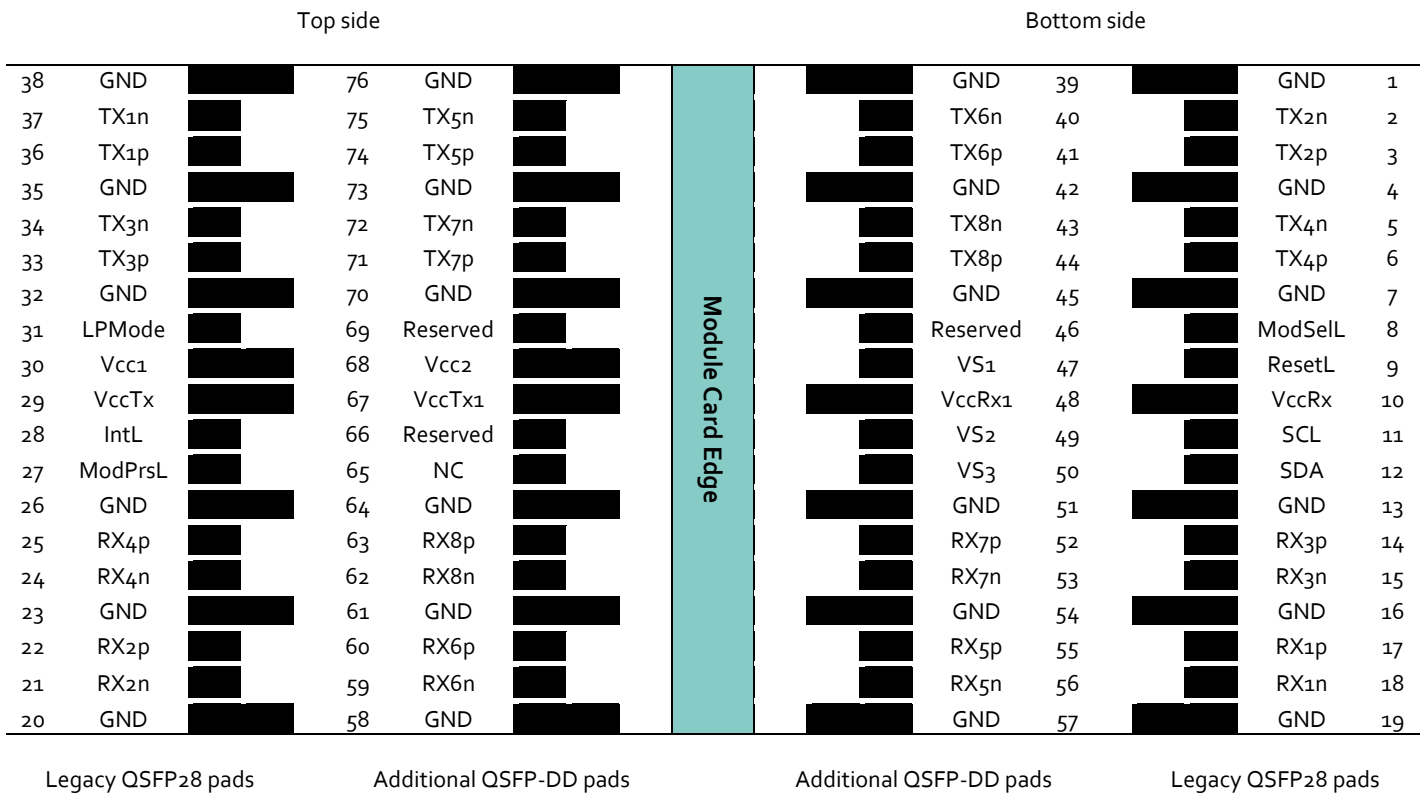


Figure 2. QSFP-DD Electrical Pad Layout

7. Module Electrical Pin Definition

Pin Number	Name	Function	Pin Number	Name	Function
1	GND	Ground	39	GND	Ground
2	TX2n	Transmitter Inverted Data Input	40	TX6n	Transmitter Inverted Data Input
3	TX2p	Transmitter Non-Inverted Data Input	41	TX6p	Transmitter Non-Inverted Data Input
4	GND	Ground	42	GND	Ground
5	TX4n	Transmitter Inverted Data Input	43	TX8n	Transmitter Inverted Data Input
6	TX4p	Transmitter Non-Inverted Data Input	44	TX8p	Transmitter Non-Inverted Data Input
7	GND	Ground	45	GND	Ground
8	ModSelL	Module Select	46	Reserved	For future use
9	ResetL	Module Reset	47	VS1	Module Vendor Specific 1
10	VccRx	+3.3V Power Supply Receiver	48	VccRx1	3.3V Power Supply
11	SCL	2-wire serial interface clock	49	VS2	Module Vendor Specific 2
12	SDA	2-wire serial interface data	50	VS3	Module Vendor Specific 3
13	GND	Ground	51	GND	Ground
14	RX3p	Receiver Non-Inverted Data Output	52	RX7p	Receiver Non-Inverted Data Output
15	RX3n	Receiver Inverted Data Output	53	RX7n	Receiver Inverted Data Output
16	GND	Ground	54	GND	Ground
17	RX1p	Receiver Non-Inverted Data Output	55	RX5p	Receiver Non-Inverted Data Output
18	RX1n	Receiver Inverted Data Output	56	RX5n	Receiver Inverted Data Output
19	GND	Ground	57	GND	Ground
20	GND	Ground	58	GND	Ground
21	RX2n	Receiver Inverted Data Output	59	RX6n	Receiver Inverted Data Output
22	RX2p	Receiver Non-Inverted Data Output	60	RX6p	Receiver Non-Inverted Data Output
23	GND	Ground	61	GND	Ground
24	RX4n	Receiver Inverted Data Output	62	RX8n	Receiver Inverted Data Output
25	RX4p	Receiver Non-Inverted Data Output	63	RX8p	Receiver Non-Inverted Data Output
26	GND	Ground	64	GND	Ground
27	ModPrsL	Module Present	65	NC	No Connect
28	IntL	Interrupt	66	Reserved	For future use
29	VccTx	+3.3V Power supply transmitter	67	VccTx1	3.3V Power Supply
30	Vcc1	+3.3V Power supply	68	Vcc2	3.3V Power Supply
31	LPMoDe	Low Power Mode	69	Reserved	For future use
32	GND	Ground	70	GND	Ground
33	TX3p	Transmitter Non-Inverted Data Input	71	TX7p	Transmitter Non-Inverted Data Input
34	TX3n	Transmitter Inverted Data Input	72	TX7n	Transmitter Inverted Data Input
35	GND	Ground	73	GND	Ground
36	TX1p	Transmitter Non-Inverted Data Input	74	TX5p	Transmitter Non-Inverted Data Input
37	TX1n	Transmitter Inverted Data Input	75	TX5n	Transmitter Inverted Data Input
38	GND	Ground	76	GND	Ground

8. EEPROM

QSFP-DD CMIS Rev 4.0

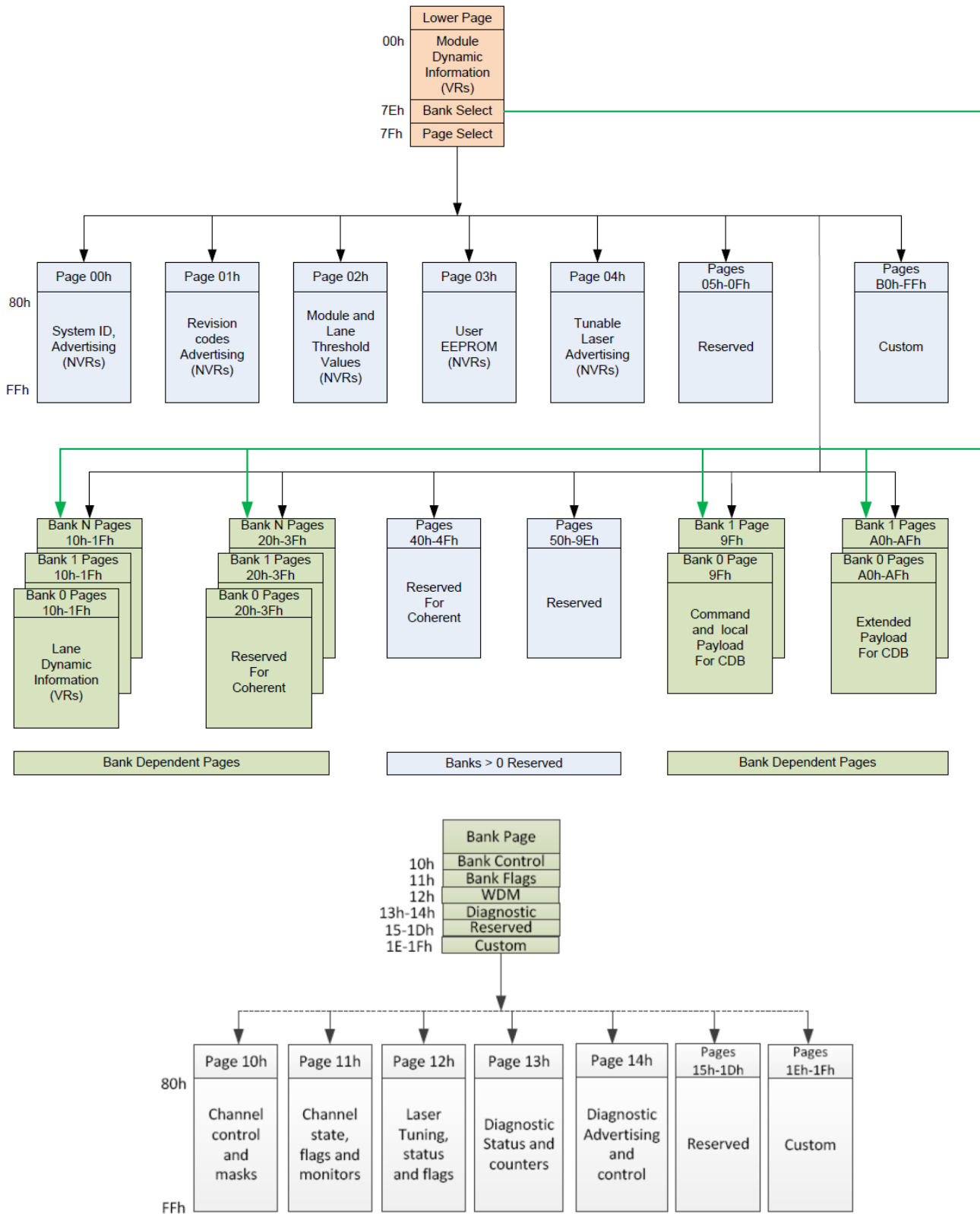


Figure 3. QSFP-DD Memory Map

9. Ordering Information

Part Number	Description
QBP13010EoPF	QSFP-DD 4x LR1, PAM4, 1310nm, Tx (CWDM), Rx (PIN), maximum distance 10km on SMF, 400 Gigabit Ethernet, MPO-12 connector, Pull-Tab, 0°C to 70°C, DDM

10. Document Revision Information

Revision	Description
A	Initial release

Skylane Optics® supplies a broad range of optical transceivers. Our engineers work closely with our customers to find the best solutions for every application. We are committed to provide high quality products and services to our customers.

For questions on this product please contact:
support@skylaneoptics.com

Beyond
Quality

Reliable
Alliance

Performing
Smartly