Q28QD010C0xD – QSFP28 Dual Fibre

1310nm* / 10km / 100GBASE-LR4

***1310nm LAN-WDM 800GHz**

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

Q28QD010C0xD is a high performance QSFP28 transceiver module for 100 Gigabit Ethernet data links over a single mode fibre pair. The maximum reach is 10km. The four transmitters are cooled 1310nm LAN-WDM lasers generating four optical 25Gbps output signals, which are multiplexed together at the optical output port. The four receivers are PIN photodiodes which detect (after optical de-multiplexing) 4 25Gbps optical input signals.

This transceiver module is compliant with the QSFP28 Multisource Agreement (MSA) and hot pluggable. Always contact Skylane Optics® commercial agents for compatibility with different equipment platforms.

2. Features

- QSFP28 Multi-Source Agreement compliant
- Hot pluggable QSFP28 footprint
- Supports 103.125 Gbps Data Rate
- 4× 25.781Gbps Serial Electrical Interface (CEI-28G-VSR)
- Dual LC Connector
- 4× cooled 1310nm LAN-WDM Transmitters
- 4× PIN Receivers
- Up to 10km Point-to-Point Transmission on Single Mode Fibre
- Operating temperature range 0°C to 70°C
- Power Dissipation < 4.5W
- Single +3.3V Power Supply

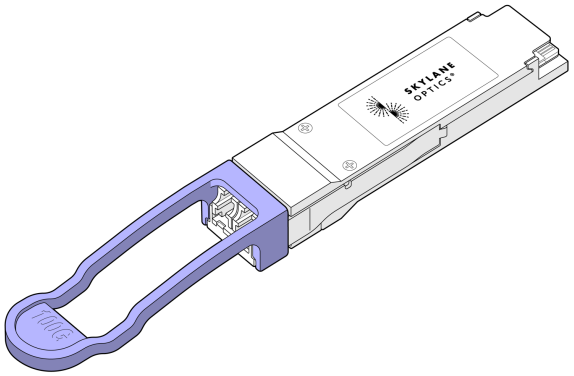

Figure 1. QSFP28 Dual Fibre
(non-binding illustration)

3. Applications

- 100GBASE-LR4

4. Optical Interface

P/N	Wavelength	Protocol	Optical Output Power[1] [dBm]	Stressed Receiver Sensitivity[2] (OMA) [dBm]	Optical Receiver Overload[3] [dBm]	Link Length[4] [km]
Q28QD010C0xD	1310nm LAN-WDM 800GHZ	100GBASE-LR4	1.7 to 10.5	≤ -6.8	4.5	≤ 10

1. EOL over operating temperature range
2. 25.78Gbps, BER≤ 10^{-12}, PRBS 2^{31}-1, 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 802.3-2012

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	5		85	%	Non-Condensing
Power Supply Voltage	3.135	3.3	3.465	V	
Power Supply Current			1.36	A	
Power Dissipation			4.5	W	

5.2. Transmitter Optical Specifications					
Parameter	**Min**	**Typ**	**Max**	**Unit**	**Notes**
Data Rate, each Lane		25.78125		Gbps	5
Aggregated Data Rate		103.125		Gbps	5
Total Average Output Power			10.5	dBm	6
Average Output Power, each Lane	-4.3		4.5	dBm	6, 7
Launched OMA, each Lane	-1.3		4.5	dBm	6, 8
Launched OMA minus TDP, each Lane	-2.3			dBm	6
Difference in launched Power between any two Lanes (Average and OMA)			5	dB	
Centre Wavelength, Optical Lanes 0 to 3	1294.53	1295.56	1296.59	nm	
	1299.02	1300.05	1301.09		
	1303.54	1304.58	1305.63		
	1308.09	1309.14	1310.19		
Transmitter and Dispersion Penalty (TDP), each Lane			2.2	dB	
Extinction Ratio, each Lane	4			dB	

5. IEEE 802.3-2012
6. Output power coupled into a 9/125 µm 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
8. Even if the TDP is <1 dB, the launched OMA must exceed -1.3dBm

5.3. Receiver Optical Specifications					
Parameter	**Min**	**Typ**	**Max**	**Unit**	**Notes**
Operating Wavelength, Optical Lanes 0 to 3	1294.53	1295.56	1296.59	nm	
	1299.02	1300.05	1301.09		
	1303.54	1304.58	1305.63		
	1308.09	1309.14	1310.19		
Average Receive Power, each Lane	-10.6		4.5	dBm	9
Receiver Sensitivity (OMA), each Lane			-8.6	dBm	10
Stressed Receiver Sensitivity (OMA), each Lane			-6.8	dBm	11
Difference in receive power between any two lanes (OMA)			5.5	dB	

9. 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
10. Receiver sensitivity (OMA), each lane (max) is informative
11. 25.78Gbps, BER≤10^{-12}, PRBS 2^{31}-1

6. Transceiver Electrical Pad Layout

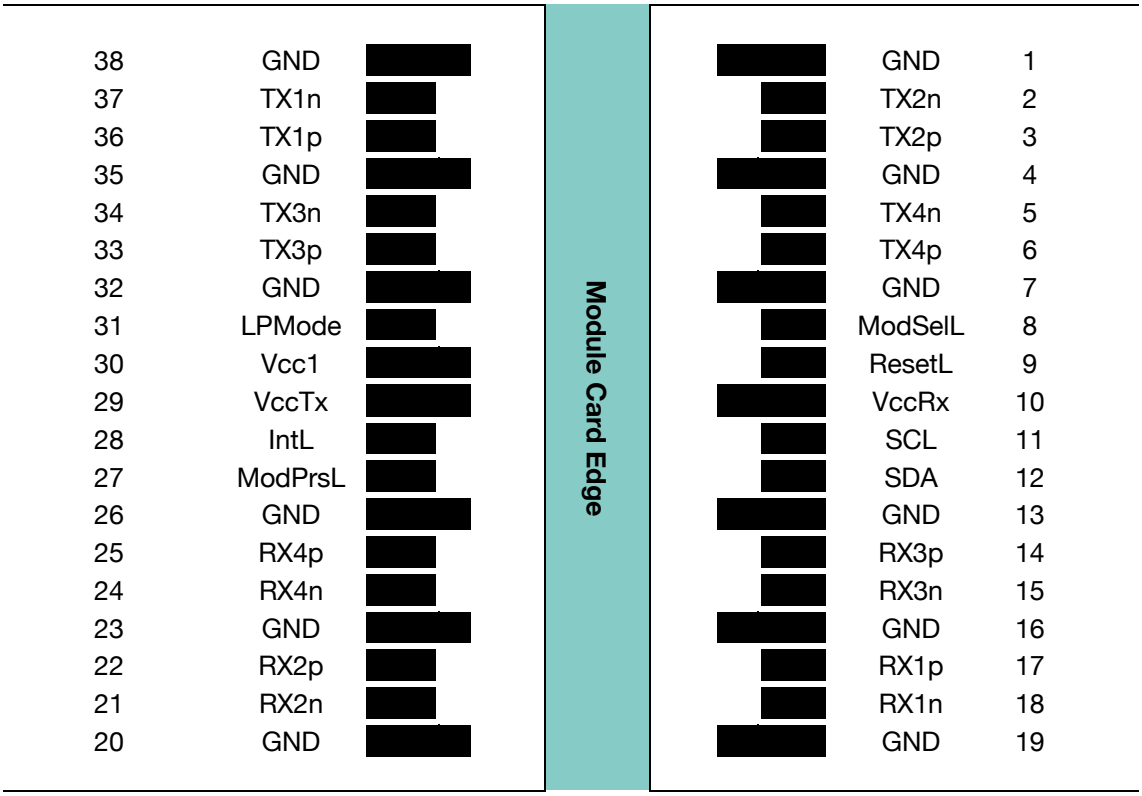

Figure 2. QSFP28 Electrical Pad Layout

7. Module Electrical Pin Definition

Pin Number	Name	Function	Pin Number	Name	Function
1	GND	Ground	20	GND	Ground
2	TX2n	Transmitter Inverted Data Input	21	RX2n	Receiver Inverted Data Output
3	TX2p	Transmitter Non-Inverted Data Input	22	RX2p	Receiver Non-Inverted Data Output
4	GND	Ground	23	GND	Ground
5	TX4n	Transmitter Inverted Data Input	24	RX4n	Receiver Inverted Data Output
6	TX4p	Transmitter Non-Inverted Data Input	25	RX4p	Receiver Non-Inverted Data Output
7	GND	Ground	26	GND	Ground
8	ModSel L	Module Select	27	ModPrs L	Module Present
9	ResetL	Module Reset	28	IntL	Interrupt
10	VccRx	+3.3V Power Supply Receiver	29	VccTx	+3.3V Power supply transmitter
11	SCL	2-wire serial interface clock	30	Vcc1	+3.3V Power supply
12	SDA	2-wire serial interface data	31	LPMode	Low Power Mode
13	GND	Ground	32	GND	Ground
14	RX3p	Receiver Non-Inverted Data Output	33	TX3p	Transmitter Non-Inverted Data Input
15	RX3n	Receiver Inverted Data Output	34	TX3n	Transmitter Inverted Data Input
16	GND	Ground	35	GND	Ground
17	RX1p	Receiver Non-Inverted Data Output	36	TX1p	Transmitter Non-Inverted Data Input
18	RX1n	Receiver Inverted Data Output	37	TX1n	Transmitter Inverted Data Input
19	GND	Ground	38	GND	Ground

8. EEPROM

QSFP+ MSA (SFF-8436)

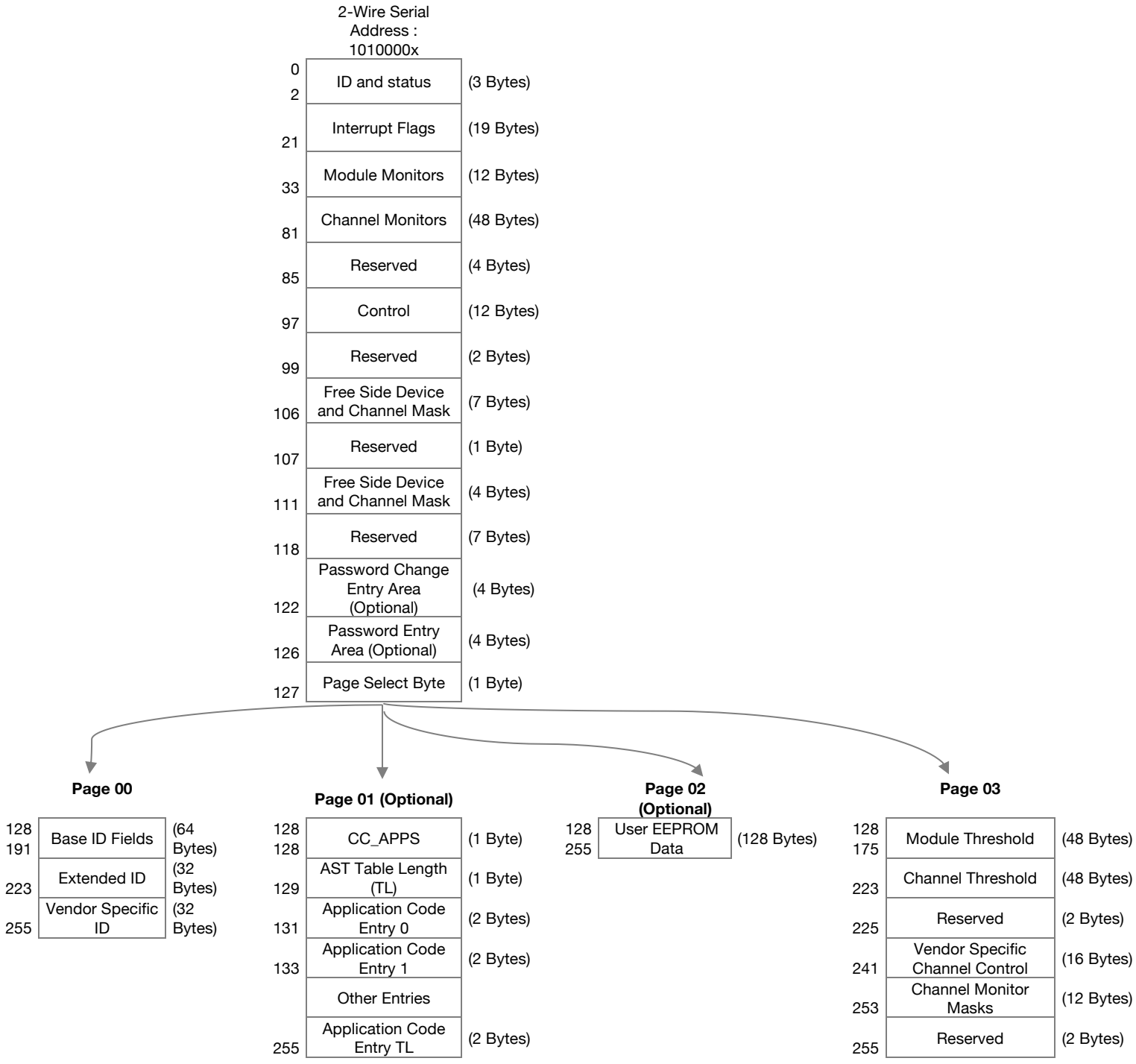

Figure 3. QSFP28 Memory Map

9. Ordering Information

Part Number	Description
Q28QD010C00D	QSFP28 LR4, 1310nm LAN-WDM, Tx (1310 LAN-WDM), Rx (PIN), maximum distance 10km on SMF, 100 Gigabit Ethernet, dual LC connector, Pull-Tab, 0°C to 70°C, DDM
Q28QD010C07D	QSFP28 LR4, 1310nm LAN-WDM, Tx (1310 LAN-WDM DML), Rx (PIN), maximum distance 10km on SMF, 100 Gigabit Ethernet, dual LC connector, Pull-Tab, 0°C to 70°C, DDM

10. Document Revision Information

Revision	Description
A	Initial release
B	References to optical power budget and average power receiver sensitivity removed
C	Typo corrected
D	Product variant Q28QD010C07D added. Power consumption updated
E	Q28QD010C07D temperature range and product description updated
F	Pull-Tab as added as default latch and release mechanism. Q28QD010C07D product description updated

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