Q2Cxx010C00F – QSFP28 Dual Fibre / PAM4

CWDM / 10km / 100 Gigabit Ethernet / Single Lambda

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

Q2Cxx010C00F is a high performance QSFP28 transceiver module for 100 Gigabit Ethernet data links over a single mode fibre pair. The maximum reach is 10km. An internal DSP-based gearbox converts the 4 electrical input channels (each 25Gbbps NRZ) into one 50GBd PAM4 signal. The transmitter is a CWDM laser generating the optical 50GBd output signal.

The receiver is a PIN photodiode which detect the 50GBd PAM4 optical input signal. This 50GBd data stream is converted into four 25Gbps electrical output signals by the DSP.

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 103.125Gbps Data Rate
- 4× 25.781Gbps Serial Electrical Interface (CEI-28G-VSR)
- 100G Lambda MSA compliant
- Dual LC Optical Interface
- CWDM Transmitter (channels 27 to 33)
- PIN Receiver
- 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 < 4.5W
- Single +3.3V Power Supply

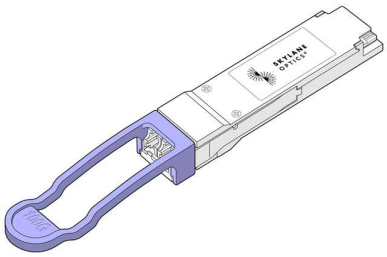

Figure 1. QSFP28 Dual Fibre
(non-binding illustration)

3. Applications

- 100 Gigabit Ethernet

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[1,4] [km]
Q2Cxx010C00F	ITU CWDM	100GBASE	2.4 to 4	≤ -2.5	4.5	≤ 10

1. EOL over operating temperature range
2. 53.125GBd, BER≤2.4×10^{-4}, PRBS31Q, pre-FEC
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 100G-FR and 100G-LR Technical Specifications Rev 2.0

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			1.36	A	
Power Dissipation			4.5	W	

5.2. Transmitter Optical Specifications

Parameter	Min	Typ	Max	Unit	Notes
Signalling Rate		53.125		GBd	
Aggregated Data Rate		103.125		Gbps	5
Average Output Power	-1.4		4.5	dBm	6, 7
Launched Outer OMA (OMA_{outer})	0.7		4.7	dBm	6, 8
Launched Outer OMA minus TDECQ	-0.7			dBm	6, 9
	-0.6				6, 10
Centre Wavelength Range	1264.5		1337.5	nm	
Wavelength	λ_c-6.5	λ_c	λ_c+6.5	nm	11
Transmitter and Dispersion Eye Closure (TDECQ)			3.4	dB	
Extinction Ratio	3.5			dB	

5. IEEE 802.3-2012
6. Output power coupled into a 9/125 µm single mode fibre
7. Average launch power (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 TDECQ < 1.4dB for an extinction ratio of ≥ 4.5dB or TDECQ < 1.3dB for an extinction ratio of < 4.5dB, the minimum OMA_{outer} must exceed 0.7dBm
9. Extinction ratio ≥ 4.5dB
10. Extinction ratio < 4.5dB
11. ITU-T G.694.2 CWDM. For available wavelengths, see section 9

5.3. Receiver Optical Specifications

Parameter	Min	Typ	Max	Unit	Notes
Signalling Rate		53.125		GBd	
Operating Wavelength	1264.5		1337.5	nm	
Average Receive Power	-7.7		4.5	dBm	12
Receive Power (OMA_{outer})			4.7		
Receiver Sensitivity (OMA_{outer})			-4.1	dBm	13
Stressed Receiver Sensitivity (OMA_{outer})			-4.1	dBm	14

12. Average receive power (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
13. Receiver sensitivity (OMA_{outer}) (max) is informativeand is defined for a transmitter with a value of SECQ up to 3.4 dB
14. 53.125GBd, BER≤2.4×10^{-4}, PRBS31Q, pre-FEC

6. Transceiver Electrical Pad Layout

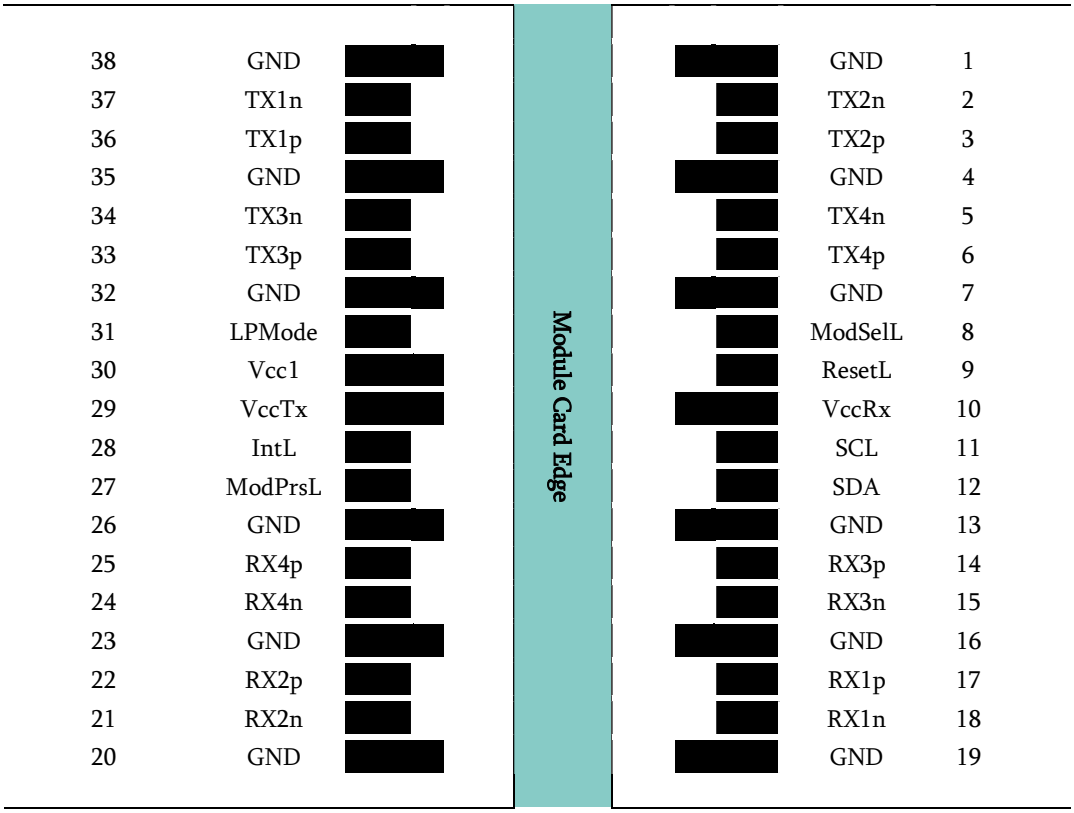

Figure 2. QSFP28 Electrical Pad Layout

7. Module Electrical Pin Definition

Pin	Symbol	Description	Pin	Symbol	Description
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	ModSelL	Module Select	27	ModPrsL	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

Memory map as per SFF-8436

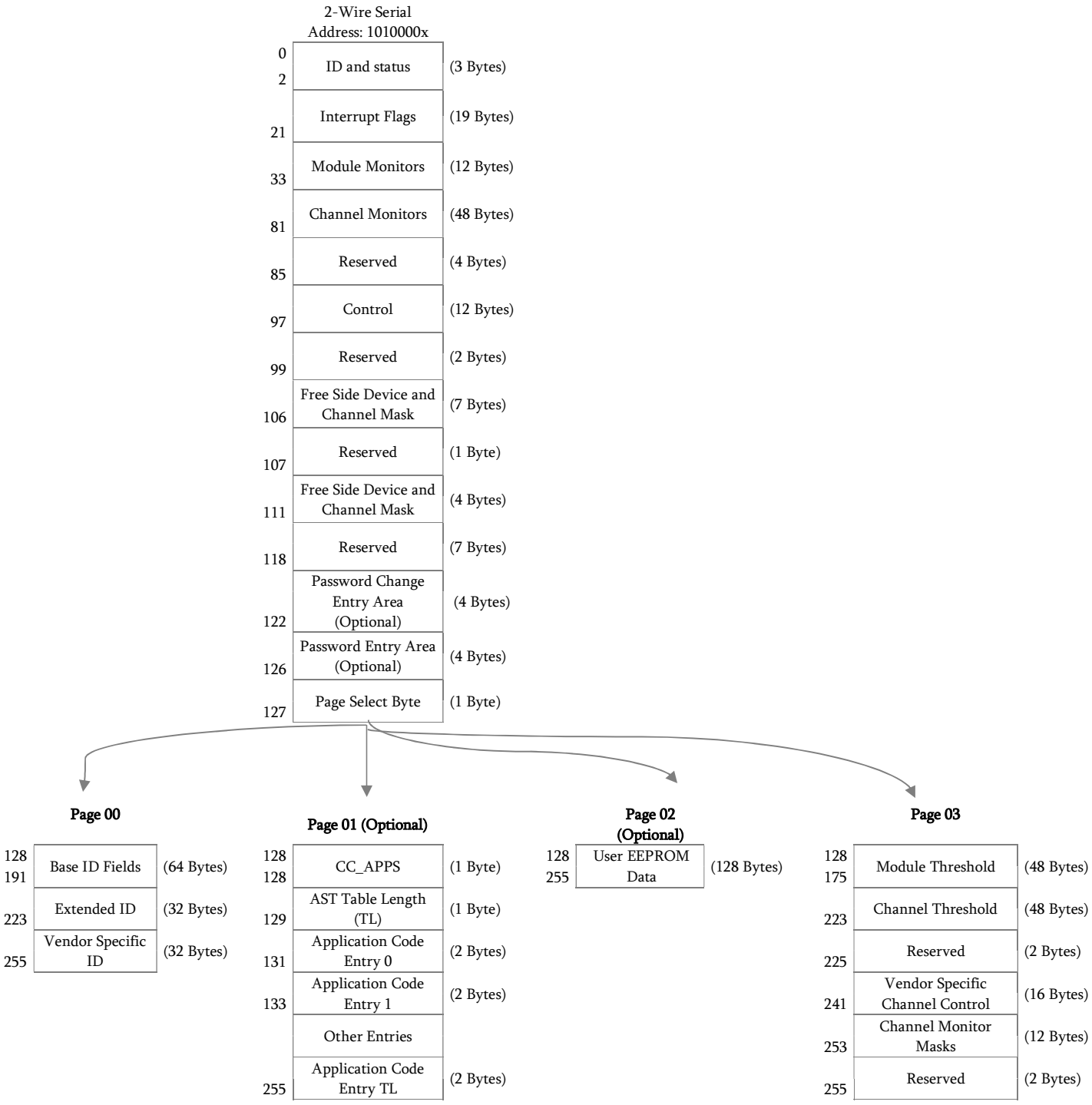

Figure 3. QSFP28 Memory Map

9. Ordering Information

Part Number	Description
Q2C27010C00F	QSFP28 LR, PAM4, 1271nm, Tx (CWDM), Rx (PIN), maximum distance 10km on SMF, 100 Gigabit Ethernet, dual LC connector, Pull-Tab, 0°C to 70°C, DDM
Q2C29010C00F	QSFP28 LR, PAM4, 1291nm, Tx (CWDM), Rx (PIN), maximum distance 10km on SMF, 100 Gigabit Ethernet, dual LC connector, Pull-Tab, 0°C to 70°C, DDM
Q2C31010C00F	QSFP28 LR, PAM4, 1311nm, Tx (CWDM), Rx (PIN), maximum distance 10km on SMF, 100 Gigabit Ethernet, dual LC connector, Pull-Tab, 0°C to 70°C, DDM
Q2C33010C00F	QSFP28 LR, PAM4, 1331nm, Tx (CWDM), 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	Channels 27, 29 and 33 variants added

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