

Q2B91040500F – QSFP28 Single Fibre / PAM4

Tx 1294nm Rx 1308nm / 40km / 50 Gigabit Ethernet

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

Q2B91040500F is a high performance QSFP28 transceiver module for 50 Gigabit Ethernet data links over a single mode fibre. The maximum reach is 40km. An internal DSP-based gearbox converts the 2 electrical input channels (each 25Gbps NRZ) into one 25GBd PAM4 signal. The transmitter is a 1294nm laser generating the optical 25GBd output signal.

The receiver is a 1308nm Avalanche Photodiode (APD) which detect the 25GBd PAM4 optical input signal. This 25GBd data stream is converted into two 25Gbps electrical output signals by the DSP. Consequently, a module with a 1308nm transmitter and a 1294nm receiver is required at the opposite side of the link. The recommended counterpart is Q2B19040500F.

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 53.125Gbps Data Rate
- 2x 26.5625Gbps Serial Electrical Interface (50GAUI-2)
- Single LC Optical Interface
- 1294nm Transmitter
- 1308nm APD Receiver
- Built-in DSP / dual CDR
- Up to 40km 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

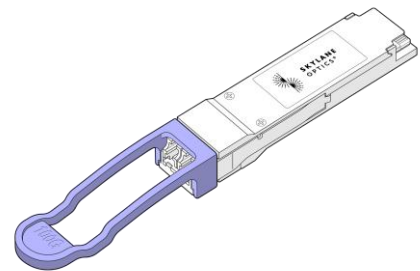


Figure 1. QSFP28 Single Fibre (non-binding illustration)

3. Applications

- 50 Gigabit Ethernet

4. Optical Interface

P/N	Wavelength	Protocol	Optical Output Power ¹ [dBm]	Receiver Sensitivity ² (OMA) [dBm]	Optical Receiver Overload ³ [dBm]	Link Length ^{1,4} [km]
Q2B91040500F	Tx 1294nm Rx 1308nm	50GBASE	1.5 to 8	≤ -13.5	-3	≤ 40

1. EOL over operating temperature range
 2. 26.5625GBd, 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 IEEE 802.3cd-2018

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			1.3	A	
Power Dissipation			4.5	W	

5.2. Transmitter Optical Specifications					
Parameter	Min	Typ	Max	Unit	Notes
Signalling Rate		26.5625		GBd	
Aggregated Data Rate		53.125		Gbps	5
Average Output Power	1.5		8.0	dBm	6
Launched Outer OMA (OMA _{outer})	4.5		9.0	dBm	6
Launched Outer OMA minus TDECQ	2			dBm	6
Centre Wavelength	1292.21		1296.59	nm	
Transmitter and Dispersion Eye Closure (TDECQ)			3.2	dB	
Extinction Ratio	6			dB	

5. IEEE 802.3cd-2018

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

5.3. Receiver Optical Specifications					
Parameter	Min	Typ	Max	Unit	Notes
Signalling Rate		26.5625		GBd	
Operating Wavelength	1306.29		1310.19	nm	
Average Receive Power	-15		-3	dBm	
Receive Power (OMA _{outer})			-2.6		
Receiver Sensitivity (OMA _{outer})			-13.5	dBm	7

7. 26.5625GBd, BER≤2.4×10⁻⁴, PRBS31Q, pre-FEC

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	Not Used	24	RX4n	Not Used
6	TX4p	Not Used	25	RX4p	Not Used
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	Not Used	33	TX3p	Not Used
15	RX3n	Not Used	34	TX3n	Not Used
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

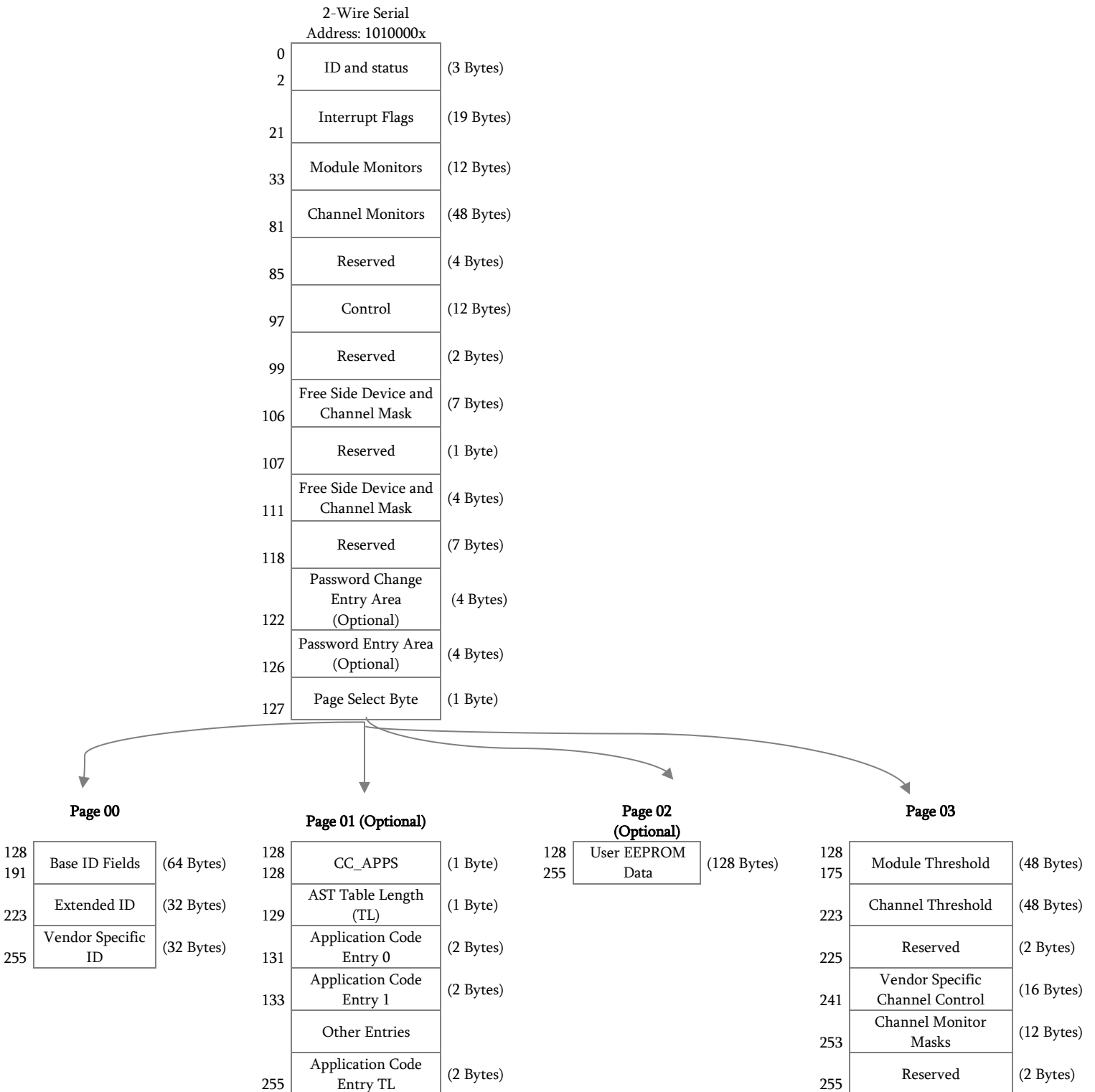


Figure 3. QSF28 Memory Map

9. Ordering Information

Part Number	Description
Q2B91040500F	QSFP28 Single Fibre, PAM4, Tx 1294nm, Rx 1308nm (APD), maximum distance 40km on SMF, 50 Gigabit Ethernet, LC 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**