Q56QL002D00F – QSFP56 Dual Fibre / PAM4

ITU CWDM / 2km / 200GBASE-FR4

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

Q56QL002D00F is a high performance QSFP56 transceiver module for 200 Gigabit Ethernet data links over a single mode fibre pair. The maximum reach is 2km. The four transmitters are CWDM lasers generating four optical 25GBd PAM4 output signals, which are multiplexed together at the optical output port. The four receivers are PIN photodiodes which detect (after optical de-multiplexing) four 25GBd PAM4 optical input signals.

This transceiver module is compliant with the QSFP56 Multisource Agreement (MSA) and hot pluggable. Always contact Skylane Optics® commercial agents for compatibility with different equipment platforms.

2. Features

- QSFP56 Multi-Source Agreement compliant
- Hot pluggable QSFP56 footprint
- Supports 212.5Gbps Data Rate
- 4× 26.5625GBd PAM4 Serial Electrical Interface (200GAUI-4)
- Dual LC Optical Interface
- 4× CWDM Transmitters
- 4× PIN Receivers
- Built-in dual CDR
- Up to 2km Point-to-Point Transmission on Single Mode Fibre
- Operating temperature range 0°C to 70°C
- Power Dissipation < 5W
- Single +3.3V Power Supply

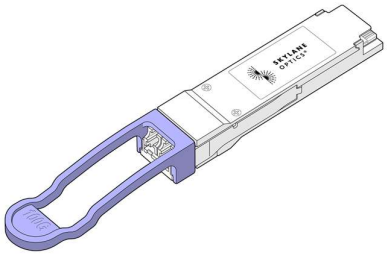

Figure 1. QSFP56 LC
(non-binding illustration)

3. Applications

- 200GBASE-FR4

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]
Q56QL002D00F	ITU CWDM	200GBASE-FR4	1.8 to 10.7	≤ -3.6	4.7	≤ 2

1. EOL over operating temperature range
2. 26.5625GBd, 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			1.52	A	
Power Dissipation			5	W	

5.2. Transmitter Optical Specifications

Parameter	Min	Typ	Max	Unit	Notes
Signalling Rate, each Lane		26.5625		GBd	5
Aggregated Data Rate		212.5		Gbps	5
Total Average Output Power	1.8		10.7	dBm	6
Average Output Power, each Lane	-4.2		4.7	dBm	6, 7
Launched Outer OMA (OMA_{outer}), each Lane	-1.2		4.5	dBm	6, 8
Difference in Launch Power between any two Lanes (OMA_{outer})			4	dB	
Launched Outer OMA minus TDECQ, each Lane	-2.6			dBm	6, 9
	-2.5				6, 10
Centre Wavelength, Optical Lanes 0 to 3	1264.5	1271	1277.5	nm	
	1284.5	1291	1297.5		
	1304.5	1311	1317.5		
	1324.5	1331	1337.5		
Transmitter and Dispersion Eye Closure (TDECQ), each Lane			3.3	dB	
Extinction Ratio, each Lane	3.5			dB	

5. IEEE 802.3bs-2017
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 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 -1.2dBm
9. Extinction ratio ≥ 4.5dB
10. Extinction ratio < 4.5dB

5.3. Receiver Optical Specifications

Parameter	Min	Typ	Max	Unit	Notes
Operating Wavelength, Optical Lanes 0 to 3	1264.5	1271	1277.5	nm	
	1284.5	1291	1297.5		
	1304.5	1311	1317.5		
	1324.5	1331	1337.5		
Average Receive Power, each Lane	-8.2		4.7	dBm	11
Receive Power (OMA_{outer}), each Lane			4.5		
Difference in Receive Power between any two Lanes (OMA_{outer})			4.1	dB	
Receiver Sensitivity (OMA_{outer}), each Lane			-6	dBm	12
Stressed Receiver Sensitivity (OMA_{outer}), each Lane			-3.6	dBm	13

11. 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
12. Receiver sensitivity (OMA), each lane (max) is informativeand is defined for a transmitter with SECQ of 0.9 dB
13. 26.5625GBd, BER≤2.4×10^{-4}, PRBS31Q, pre-FEC, each lane

6. Transceiver Electrical Pad Layout

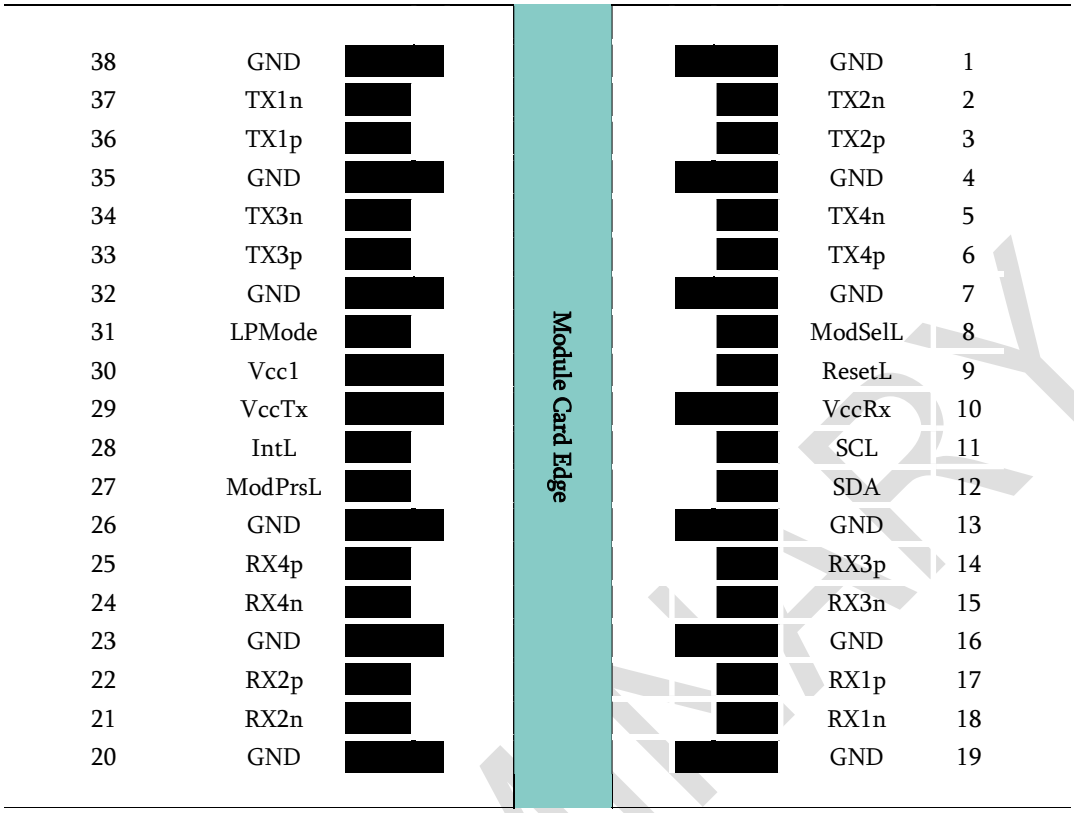

Figure 2. QSFP56 Electrical Pad Layout

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	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

QSFP+ MSA (SFF-8436)

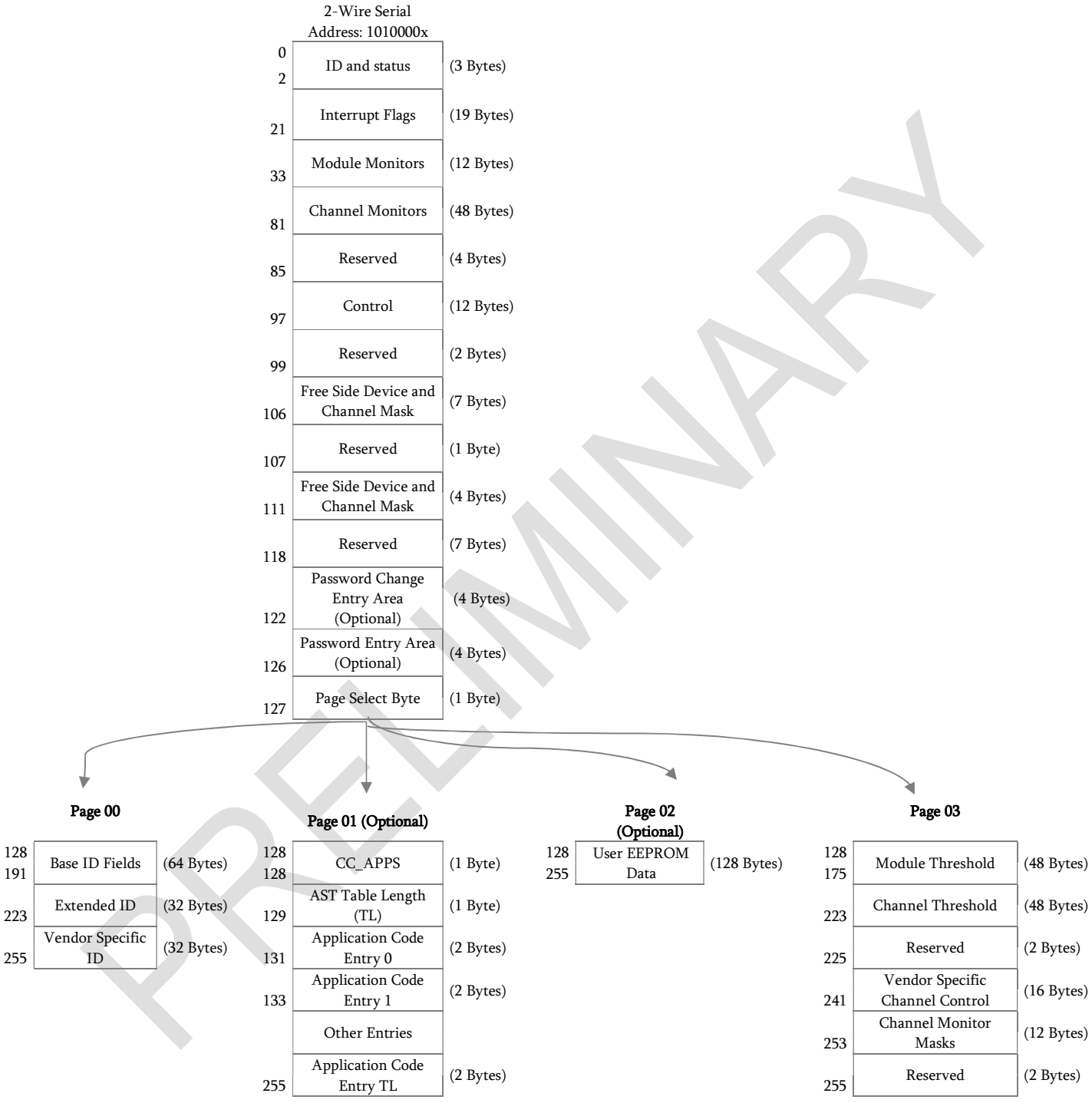

Figure 3. QSFP56 Memory Map

9. Ordering Information

Part Number	Description
Q56QL002D00F	QSFP56 FR4, PAM4, CWDM, Tx (CWDM), Rx (PIN), maximum distance 2km on SMF, 200 Gigabit Ethernet, dual LC, 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