WTQP100-FR1

100Gb/s QSFP28 FR1 2km DDM Transceiver / PRODUCT FEATURES

Part Number WTQP100-FR1	Temperature 0~70C



1. Product Overview

Features

- Supports 100GBASE-FR1
- Lane signaling rate 106.25Gb/s with PAM4
- Up to 2km transmission on SMF
- EML Laser and PIN receiver
- 4x25.78Gb/s with NRZ electrical interface (CAUI-4)
- Support KP4 FEC inside the module
- High speed I/O electrical interface
- I2C interface with integrated Digital Diagnostic monitoring
- QSFP28 MSA package with simplex LC connector
- Single +3.3V power supply
- Power consumption <3.5 W
- Operating case temperature: 0 to +70 °C

Applications

- Data Center
- DESCRIPTIONS
- The 100G QSFP28 FR1 is designed for 2km optical communication applications. It is intended for the service with single mode fiber in 100Gb/s high speed data communications. The optical signals are multiplexed to a single-mode fiber through commercial standard LC connector.

2. Ordering Information

Part No.	Data Rate(optical)	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI
WTQP100-FR1	106.25Gbps	EML	SMF	2km	LC	0~70C	Y

3. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Storage Temperature	TS	-40	-	+85	°C	
Supply Voltage	VCC	-0.5	-	+4.0	V	
Operating Relative Humidity	RH	-	-	+85	%	

4. Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	TC	0	-	+70	°C	
Power Supply Voltage	VCC	3.13	3.3	3.47	V	
Transmission Distance	TD	-	-	2	km	Over SMF

5. Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter	Transmitter	Transmitter	Transmitter	Transmitter	Transmitter	Transmitter
Center Wavelength	λC	1304.5	1311	1317.5	nm	
Signaling Rate	SR			53.125	GBd	
Frequency Offset	Foffset	-100		100	ppm	
Average Launch Power	PTX	-2.9	-	4	dBm	1
Transmitter and dispersion eye closure for PAM4 (TDECQ) (max)	TDECQ	-	-	3.4	dB	
Average Output Power (Laser Turn off)	Poff	-	-	-30	dBm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Extinction Ratio	ER	3.5	-	-	dB	
RIN_OMA	RIN	-	-	-136	dB/Hz	
Transmitter reflectance	Tref	-	-	-26	dB	
Optical Return Loss Tolerance	ORLT	-	-	15.6	dB	
Receiver	Receiver	Receiver	Receiver	Receiver	Receiver	Receiver
Center Wavelength	CW	1304.5	1311	1317.5	nm	
Damage threshold	Pdamage	5	-	-	dBm	2
Average Rx Power	PRx	-7.1	-	4	dBm	3
Receive power _OMAouter	POMA	-	-	4.2	dBm	
Receiver Sensitivity (OMAouter) (max) for TDECQ < 1.4 for 1.4 dB ≤ TDECQ ≤ 3.4dB	SEN _OMA	-	-	-4.5 –5.9+ TDECQ	dBm	4
Reflectance	Ref	-	-	-26	dB	
Los Assert	LosA	-26	-		dBm	
Los De-Assert	LosDA	-	-	-10	dBm	
Los Hysteresis	LosH	0.5	-	-	dB	

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Conditions of stressed receiver sensitivity teste :	Conditions of stressed receiver sensitivity teste :	Conditions of stressed receiver sensitivity teste :	Conditions of stressed receiver sensitivity teste :	Conditions of stressed receiver sensitivity teste :	Conditions of stressed receiver sensitivity teste :	Conditions of stressed receiver sensitivity teste :
Stressed eye closure for PAM4 (SECQ)				3.4	dB	6
SECQ – 10*log10(Ceq)				3.4	dB	6

6. Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter (Module Input)	Transmitter (Module Input)	Transmitter (Module Input)	Transmitter (Module Input)	Transmitter (Module Input)	Transmitter (Module Input)	Transmitter (Module Input)
Input Differential Impedance	Rin	-	100	-	Ohm	
Differential Data Input Amplitude	VIN,P-P		-	900	mVpp	
Differential termination mismatch (max)	D-mismatch		-	10	%	
DC common-mode input voltage		-0.3	-	2.8	V	
Transition time(20%~80%)	Tr Tf	10	-	-	ps	
LPMode, Reset and ModSelL / Tx dis	VIL	-0.3	-	0.8	V	
LPMode, Reset and ModSelL / Tx dis	VIH	2.0	-	VCC+0.3	V	
Receiver (Module Output)	Receiver (Module Output)	Receiver (Module Output)	Receiver (Module Output)	Receiver (Module Output)	Receiver (Module Output)	Receiver (Module Output)
Output Differential Impedance	Rout	-	100	-	Ohm	
Differential Data Output Amplitude	VOUTP-P	-	-	900	mVpp	
Differential termination mismatch (max)	D-mismatch	-	-	10	%	
Transition time, 20% to 80%	Tr Tf	12	-		ps	
ModPrsL and IntL/ Rx los	VOL	0	-	0.4	V	
ModPrsL and IntL/ Rx los	VOH	VCC-0.5	-	VCC+0.3	V	

7. Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Temperature	0 to 70	±3	ºC	Internal
Voltage	0 to Vcc	±3%	V	Internal
Tx Bias Current	0 to 100	±10%	mA	Internal
Tx Output Power	-1.4 to 4.5	±3	dB	Internal

Parameter	Range	Accuracy	Unit	Calibration
Rx Input Power	-7.7 to 4.5	±3	dB	Internal

8. Digital Diagnostics

Parameter	Symbol	Min	Max	Unit	Calibration	Notes
Initialization time	t_init		10	s	Time from power on or hot plug until the module is fully functional. This time applies to Power Class 2 or higher modules when LPMode is pulled low by the host, and to all Power Class 1 modules.	Room Temperature
LPMode Assert Time	ton_LPMode		100	ms	Time from when the host releases LPMode to high until module power consumption reaches Power Class 1.	
Rx LOS Assert Time	ton_LOS		100	ms	Time from Rx optical signal loss to Rx LOS bit set to 1 and IntL pulled low by the module.	
Tx Fault Assert Time	ton_Txfault		200	ms	Time from Tx Fault state to Tx Fault bit set to 1 and IntL pulled low by the module.	
Tx Disable Deassert Time	toff_TxDis		400	ms	Time from Tx Disable bit cleared to 0 until optical output rises above 90% of nominal.	
Tx Disable Assert Time	ton_TxDis		100	ms	Time from Tx Disable bit set to 1 until optical output falls below 10% of nominal.	

9. Digital Diagnostics

PIN	Logic	Symbol	Description	Plug Seq.	Notes
1		GND	Ground	1	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	3	
4		GND	Ground	1	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3	
6	CML-I	Tx4p	Transmitter Non-Inverted Data output	3	
7		GND	Ground	1	1

PIN	Logic	Symbol	Description	Plug Seq.	Notes
8	LVTLL-I	ModSelL	Module Select	3	
9	LVTLL-I	ResetL	Module Reset	3	
10		VccRx	+ 3.3V Power Supply Receiver	2	2
11	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock	3	
12	LVCMOS-I/O	SDA	2-Wire Serial Interface Data	3	
13		GND	Ground	1	
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	3	
15	CML-O	Rx3n	Receiver Inverted Data Output	3	
16		GND	Ground	1	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3	
18	CML-O	Rx1n	Receiver Inverted Data Output	3	
19		GND	Ground	1	1
20		GND	Ground	1	1
21	CML-O	Rx2n	Receiver Inverted Data Output	3	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	3	
23		GND	Ground	1	1
24	CML-O	Rx4n	Receiver Inverted Data Output	3	1
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	3	
26		GND	Ground	1	1
27	LVTTL-O	ModPrsL	Module Present	3	
28	LVTTL-O	IntL/Rx_LOS	Interrupt/Rx_LOS	3	3
29		VccTx	+3.3 V Power Supply transmitter	2	2
30		Vcc1	+3.3 V Power Supply	2	2
31	LVTTL-I	LPMode/TxDIS	Low Power Mode/Tx_Disable	3	3
32		GND	Ground	1	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	3	
34	CML-I	Tx3n	Transmitter Inverted Data Output	3	
35		GND	Ground	1	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3	

PIN	Logic	Symbol	Description	Plug Seq.	Notes
37	CML-I	Tx1n	Transmitter Inverted Data Output	3	
38		GND	Ground	1	1

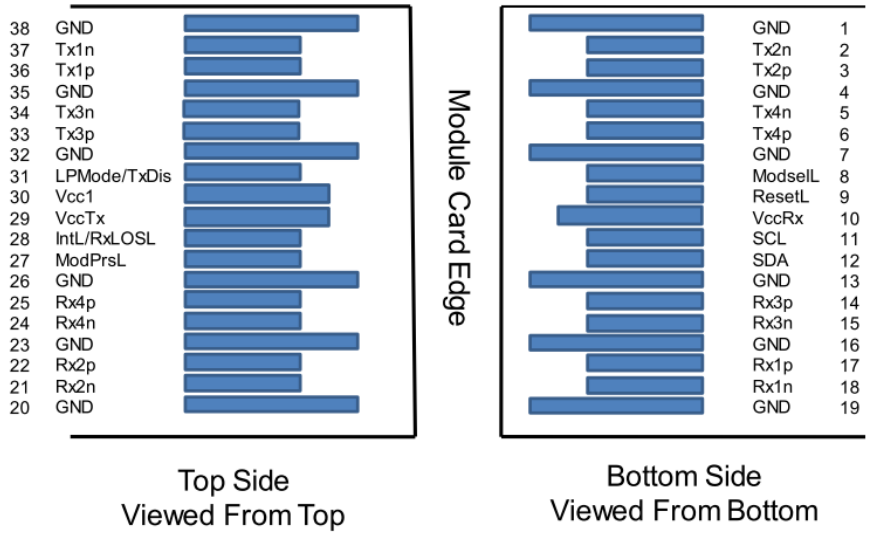
10. Additional Specifications

Page	Byte	Bit	Name	Description
00h	99	1	LP/TxDis ctrl	LPMode/TxDis input signal control. See SFF8679 for a complete description. 0b = LPMode 1b = TxDIS
00h	99	0	IntL/LOSL ctrl	IntL/LOSL output signal control. See SFF-8679 for a complete description. 0b = IntL 1b = LOSL

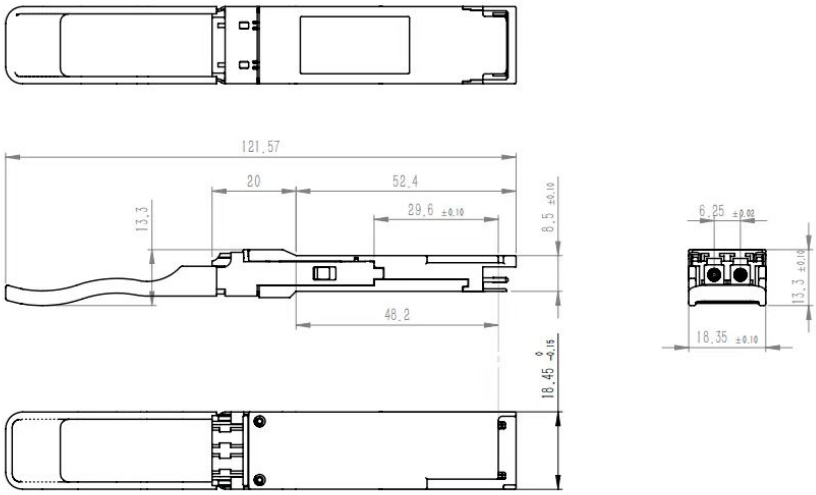
11. Revision History

Version No.	Date	Description
1.0	May 10, 2023	Preliminary datasheet

12. Technical Figure 1



13. Technical Figure 2



14. Revision History

Version	Date	Description	Prepared by
V6	2025	Unified WincoTek datasheet format	WincoTek
V6.1	2026-10-23	Engineering and format review	WincoTek