WTCFP4-27B4-10D

100 Gb/s CFP4 LR4 Transceiver / Product Overview 3



1. Product Overview

WincoTek 100G CFP4 LR4 optical Transceiver integrates receiver and transmitter path on one module. In the transmit side, four lanes of serial data streams are recovered, retimed, and passed to four laser drivers. The laser drivers control four EMLs (Electric-absorption Modulated Lasers) with center wavelength of 1296 nm, 1300nm, 1305nm and 1309 nm. The optical signals are multiplexed to a single –mode fiber through an industry standard LC connector. In the receive side, the four lanes of optical data streams are optically de-multiplexed by the integrated optical de-multiplexer. Each data stream is recovered by a PIN photo-detector and trans-impedance amplifier, retimed. This module features a hot-pluggable electrical interface, low power consumption and MDIO management interface.

The module provides an aggregated signaling rate from 103.125 Gbps to 111.81 Gbps. It is compliant with IEEE 802.3 ba 100GBASE-LR4 and ITU-T G.959.1 4I1-9D1F, and OIF CEI-28G-VSR. The MDIO management interface complies with IEEE 802.3 Clause 45 standard. The transceiver complies with CFP MSA CFP4 Hardware Specification, CFP MSA Management Interface Specification, and OIF CEI-28G-VSR standards.

Features

- Compliant with 100GBASE-LR4 and 4I1-9D1F
- Support line rates from 103.125 Gbps to 111.81 Gbps
- Integrated LAN WDM EML TOSA / ROSA for up to 10 km reach over SMF
- Digital Diagnostics Monitoring Interface
- Duplex LC optical receptacle
- No external reference clock
- Single 3.3 V power supply
- Case operating temperature range:0°C to 70°C
- Power dissipation < 6W
- STANDARD
- Compliant to IEEE 802.3ba and ITU-T G959.1
- Compliant to CFP MSA CFP4 Hardware Specification

Applications

- Data Center &100G Ethernet
- ITU-T OTU4

2. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	Ts	-40	-	85	ºC	
Relative Humidity	RH	5	-	95	%	
Power Supply Voltage	VCC	-0.3	-	4	V	
Signal Input Voltage		Vcc-0.3	-	Vcc+0.3	V	
Receive Input Optical Power (Damage threshold)	Pdmg			5.0	dBm	

3. Optical Parameters

Parameter	Symbol	Min	Typ	Max	Unit	NOTE
Transmitter	Transmitter	Transmitter	Transmitter	Transmitter	Transmitter	Transmitter
Signaling Speed per Lane			25.78125 ± 100 ppm		Gbps	
Wavelength Assignment	λ0	1294.53	1295.56	1296.59	nm	
Wavelength Assignment	λ1	1299.02	1300.05	1301.09	nm	
Wavelength Assignment	λ2	1303.54	1304.58	1305.63	nm	
Wavelength Assignment	λ3	1308.09	1309.14	1310.19	nm	
Total Output. Power	POUT			10.5	dBm	
Transmit OMA per Lane		-1.3		4.5	dBm	
Average Launch Power Per lane		-4.3		4.5	dBm	
SMSR		30			dB	
Optical Extinction Ratio	ER	4			dB	
Average launch Power off per lane	Poff			-30	dBm	
RIN	RIN			-130	dB/Hz	
Output Eye Mask definition {X1，X2，X3，Y1，Y2，Y3}	{0.25，0.4，0.45，0.25，0.28，0.4}	{0.25，0.4，0.45，0.25，0.28，0.4}	{0.25，0.4，0.45，0.25，0.28，0.4}	{0.25，0.4，0.45，0.25，0.28，0.4}	{0.25，0.4，0.45，0.25，0.28，0.4}	1
Receiver	Receiver	Receiver	Receiver	Receiver	Receiver	Receiver
Signaling Speed per Lane			25.78125 ± 100 ppm		Gbps	
Wavelength Assignment		1294.53	1295.56	1296.59	nm	
Wavelength Assignment		1299.02	1300.05	1301.09	nm	
Wavelength Assignment		1303.54	1304.58	1305.63	nm	
Wavelength Assignment		1308.09	1309.14	1310.19	nm	
Receive Power (OMA) per Lane	ROMA			4.5	dBm	
Average Input Power per Channel	RXPx	-10.6		4.5	dBm	2
Receiver Sensitivity (OMA) per Lane	Rxsens			-8.6	dBm	
LOS Assert	LOSA	-30			dBm	
LOS De-Assert	LOSD			-12	dBm	
Receiver Reflectance	Rr			-26	dB	

4. Optical Parameters

Parameter	Symbol	Min	Typ	Max	Unit	NOTE
Transmitter	Transmitter	Transmitter	Transmitter	Transmitter	Transmitter	Transmitter
Signaling Speed per Lane			27.9525± 20 ppm		Gbps	
Wavelength Assignment	λ0	1294.53	1295.56	1296.59	nm	
Wavelength Assignment	λ1	1299.02	1300.05	1301.09	nm	
Wavelength Assignment	λ2	1303.54	1304.58	1305.63	nm	
Wavelength Assignment	λ3	1308.09	1309.14	1310.19	nm	
Total Output. Power	POUT			8.9	dBm	
Average Launch Power Per lane		-2.5		2.9	dBm	
SMSR		30			dB	
Optical Extinction Ratio	ER	7			dB	
Average launch Power off per lane	Poff			-30	dBm	
Output Eye Mask definition {X1，X2，X3，Y1，Y2，Y3}	{0.25，0.4，0.45，0.25，0.28，0.4}	{0.25，0.4，0.45，0.25，0.28，0.4}	{0.25，0.4，0.45，0.25，0.28，0.4}	{0.25，0.4，0.45，0.25，0.28，0.4}	{0.25，0.4，0.45，0.25，0.28，0.4}	3
Receiver	Receiver	Receiver	Receiver	Receiver	Receiver	Receiver
Signaling Speed per Lane			27.9525± 20 ppm		Gbps	
Wavelength Assignment		1294.53	1295.56	1296.59	nm	
Wavelength Assignment		1299.02	1300.05	1301.09	nm	
Wavelength Assignment		1303.54	1304.58	1305.63	nm	
Wavelength Assignment		1308.09	1309.14	1310.19	nm	
Average Input Power per Channel	RXPx	-8.8		2.9	dBm	4
Equivalent Sensitivity per Channel	Rxsens			-10.3	dBm	
LOS Assert	LOSA	-30			dBm	
LOS De-Assert	LOSD			-12	dBm	
Receiver Reflectance	Rr			-26	dB	

5. Electrical Characteristics

Parameter	Symbol	Symbol	Symbol	Min	Min	Typ.	Typ.	Typ.	Max	Max	Max	Unit	Unit	Unit	Notes	Notes	Notes			
Supply currents and voltages	Supply currents and voltages	Supply currents and voltages	Supply currents and voltages	Supply currents and voltages	Supply currents and voltages	Supply currents and voltages	Supply currents and voltages	Supply currents and voltages	Supply currents and voltages	Supply currents and voltages	Supply currents and voltages	Supply currents and voltages	Supply currents and voltages	Supply currents and voltages	Supply currents and voltages	Supply currents and voltages	Supply currents and voltages			
Voltage	Vcc	Vcc	Vcc	3.2	3.2	3.3	3.3	3.3	3.4	3.4	3.4	V	V	V	With Respect to GND	With Respect to GND	With Respect to GND			
Supply current	Icc	Icc	Icc						1.8	1.8	1.8	A	A	A						
Power dissipation	Power dissipation	Pwr	Pwr	Pwr						6.0	6.0	6.0	W	W	W					
Power dissipation (low power mode)	Power dissipation (low power mode)	Plp	Plp	Plp						1.0	1.0	1.0	W	W	W					
Low speed control and sense signals, 3.3 V LVCMOS	Low speed control and sense signals, 3.3 V LVCMOS	Low speed control and sense signals, 3.3 V LVCMOS	Low speed control and sense signals, 3.3 V LVCMOS	Low speed control and sense signals, 3.3 V LVCMOS	Low speed control and sense signals, 3.3 V LVCMOS	Low speed control and sense signals, 3.3 V LVCMOS	Low speed control and sense signals, 3.3 V LVCMOS	Low speed control and sense signals, 3.3 V LVCMOS	Low speed control and sense signals, 3.3 V LVCMOS	Low speed control and sense signals, 3.3 V LVCMOS	Low speed control and sense signals, 3.3 V LVCMOS	Low speed control and sense signals, 3.3 V LVCMOS	Low speed control and sense signals, 3.3 V LVCMOS	Low speed control and sense signals, 3.3 V LVCMOS	Low speed control and sense signals, 3.3 V LVCMOS	Low speed control and sense signals, 3.3 V LVCMOS	Low speed control and sense signals, 3.3 V LVCMOS	Low speed control and sense signals, 3.3 V LVCMOS	Low speed control and sense signals, 3.3 V LVCMOS	
Outputs low voltage	Outputs low voltage	Outputs low voltage	VOL	VOL	-0.3	-0.3	-0.3				0.2	0.2	0.2	V	V	V	IOH =100 μA	IOH =100 μA	IOH =100 μA	IOH =100 μA
Output high voltage	Output high voltage	Output high voltage	VOH	VOH	Vcc-0.2	Vcc-0.2	Vcc-0.2				Vcc +0.3	Vcc +0.3	Vcc +0.3	V	V	V	IOH =-100 μA	IOH =-100 μA	IOH =-100 μA	IOH =-100 μA
Input low voltage	Input low voltage	Input low voltage	VIL	VIL	-0.3	-0.3	-0.3				0.8	0.8	0.8	V	V	V				
Input high voltage	Input high voltage	Input high voltage	VIH	VIH	2	2	2				Vcc 3+0.3	Vcc 3+0.3	Vcc 3+0.3	V	V	V				
Input leakage current	Input leakage current	Input leakage current	IIN	IIN	-10	-10	-10				10	10	10	μA	μA	μA				

Parameter	Symbol	Symbol	Symbol	Min	Min	Typ.	Typ.	Typ.	Max	Max	Max	Unit	Unit	Unit	Notes	Notes	Notes			
Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS	Low speed control and sense signals, 1.2 V LVCMOS
Outputs low voltage	Outputs low voltage	Outputs low voltage	VOL	VOL	-0.3	-0.3	-0.3				0.2	0.2	0.2	V	V	V				
Output high voltage	Output high voltage	Output high voltage	VOH	VOH	1.0	1.0	1.0				1.5	1.5	1.5	V	V	V				
Output low current	Output low current	Output low current	IOL	IOL	4	4	4							mA	mA	mA				
Output high current	Output high current	Output high current	IOH	IOH							-4	-4	-4	mA	mA	mA				
Input low voltage	Input low voltage	Input low voltage	VIL	VIL	-0.3	-0.3	-0.3				0.36	0.36	0.36	V	V	V				
Input high voltage	Input high voltage	Input high voltage	VIH	VIH	0.84	0.84	0.84				1.5	1.5	1.5	V	V	V				
Input leakage current	Input leakage current	Input leakage current	IIN	IIN	-100	-100	-100				100	100	100	μA	μA	μA				
Input capacitance	Input capacitance	Input capacitance	C	C							10	10	10	pF	pF	pF				
MDC clock rate	MDC clock rate	MDC clock rate			0.1	0.1	0.1				4	4	4	MHz	MHz	MHz				

6. Electrical Characteristics

Parameter	Symbol	Min	Min	Max	Unit	Notes
Transmitter electrical input from host	Transmitter electrical input from host	Transmitter electrical input from host	Transmitter electrical input from host	Transmitter electrical input from host	Transmitter electrical input from host	Transmitter electrical input from host
Differential voltage pk-pk		100	100	1200	mV	
Common mode noise (rms)				17.5	mV	
Differential termination mismatch				10	%	
Transition time		10	10		ps	20/80%

Parameter	Symbol	Min	Min	Max	Unit	Notes
Common mode voltage		-0.3	-0.3	2.8	V	
Receiver electrical output to host	Receiver electrical output to host	Receiver electrical output to host	Receiver electrical output to host	Receiver electrical output to host	Receiver electrical output to host	Receiver electrical output to host
Differential voltage pk-pk		100	100	1200	mV	
Common mode noise (rms)			17.5	17.5	mV	
Differential termination mismatch			10	10	%	
Transition time		9.5			ps	20/80%

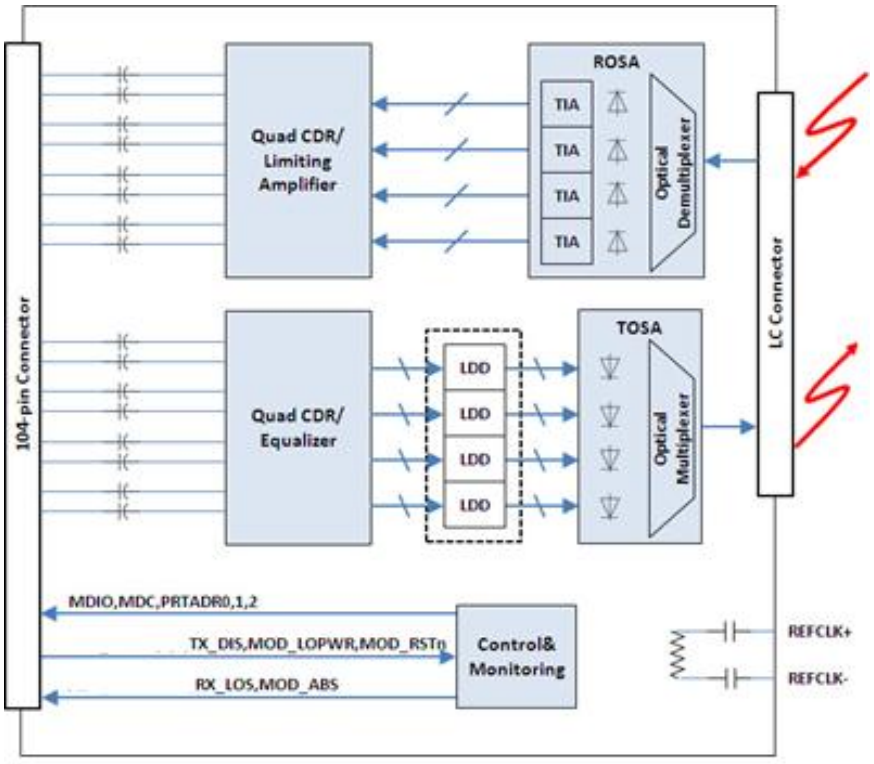
7. Pin Descriptions

Pin no.	Type	Description
1	3.3V_GND	3.3V Module Supply Voltage Return Ground, can be separate or tied together with Signal Ground
2	3.3V_GND	3.3V Module Supply Voltage Return Ground, can be separate or tied together with Signal Ground
3	3.3V	3.3V Module Supply Voltage
4	3.3V	3.3V Module Supply Voltage
5	3.3V	3.3V Module Supply Voltage
6	3.3V	3.3V Module Supply Voltage
7	3.3V_GND	3.3V Module Supply Voltage Return Ground, can be separate or tied together with Signal Ground
8	3.3V_GND	3.3V Module Supply Voltage Return Ground, can be separate or tied together with Signal Ground
9	NUC	Module Vendor I/O. Must No Connect at host board
10	NUC	Module Vendor I/O. Must No Connect at host board
11	TX_DIS	Transmitter Disable for all lanes, "1" or NC = transmitter disabled, "0" = transmitter enabled
12	RX_LOS	Receiver Loss of Optical Signal, "1": low optical signal, "0": normal condition
13	GLB_ALRMn	Global Alarm. “0": alarm condition in any MDIO Alarm register, "1": no alarm condition, Open Drain, Pull Up Resistor on Host
14	MOD_LOPWR	Module Low Power Mode. "1" or NC: module in low power (safe) mode, "0": power-on enabled
15	MOD_ABS	Module Absent. "1" or NC: module absent, "0": module present, Pull Up Resistor on Host
16	MOD_RSTn	Module Reset. "0" resets the module, "1" or NC = module enabled, Pull Down Resistor in Module
17	MDC	Management Data Clock (electrical specs as per 802.3ae and ba)

Pin no.	Type	Description
18	MDIO	Management Data I/O bi-directional data (electrical specs as per 802.3ae and ba)
19	PRTADR0	MDIO Physical Port address bit 0
20	PRTADR1	MDIO Physical Port address bit 1
21	PRTADR2	MDIO Physical Port address bit 2
22	NUC	Module Vendor I/O. Must No Connect at host board
23	NUC	Module Vendor I/O. Must No Connect at host board
24	NUC	Module Vendor I/O. Must No Connect at host board
25	GND	
26	TX_MCLKn	TX Monitor Clock Output (Positive)
27	TX_MCLKp	TX Monitor Clock Output (Negative)
28	GND	
29	GND	
30	RX0p	Lane 0 Receiver Output (Positive)
31	RX0n	Lane 0 Receiver Output (Negative)
32	GND	
33	RX1p	Lane 1 Receiver Output (Positive)
34	RX1n	Lane 1 Receiver Output (Negative)
35	GND	
36	RX2p	Lane 2 Receiver Output (Positive)
37	RX2n	Lane 2 Receiver Output (Negative)
38	GND	
39	RX3p	Lane 3 Receiver Output (Positive)
40	RX3n	Lane 3 Receiver Output (Negative)
41	GND	
42	REFCLKp(NUC)	Reference Clock Input (Positive) (Optional)
43	REFCLKn(NUC)	Reference Clock Input (Negative) (Optional)
44	GND	
45	TX0p	Lane 0 Transmitter Input (Positive)
46	TX0n	Lane 0 Transmitter Input (Negative)
47	GND	
48	TX1p	Lane 1 Transmitter Input (Positive)
49	TX1n	Lane 1 Transmitter Input (Negative)
50	GND	
51	TX2p	Lane 2 Transmitter Input (Positive)
52	TX2n	Lane 2 Transmitter Input (Negative)
53	GND	
54	TX3p	Lane 3 Transmitter Input (Positive)

Pin no.	Type	Description
55	TX3n	Lane 3 Transmitter Input (Negative)
56	GND	

8. Technical Figure 1



9. Revision History

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