WTB59(95)Y-40D

100Gb/s QSFP28 BIDI ER1 40km DDM Transceiver / PRODUCT FEATURES

Part Number	Temperature
WTB59Y-40D	0~70℃



1. Product Overview

Features

- Supports 100GBASE-ER1 BIDI
- Lane signaling rate 106.25Gb/s with PAM4
- Up to 40km transmission on SMF
- EML Laser and APD 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 <4W
- Operating case temperature: 0 to +70 °C

Applications

- Data Center
- 100 Gigabit Ethernet
- DESCRIPTIONS
- The 100G QSFP28 ER1 BIDI is designed for 40km 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.
- Module Block Diagram

2. Ordering Information

Part No.	Data Rate(optical)	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI	Latch Color
WTB59Y-40D	106.25Gbps	Tx1305/Rx1309	SMF	40km	LC	0~70℃	Yes	Green
WTB95Y-40D	106.25Gbps	Tx1309/Rx1305	SMF	40km	LC	0~70℃	Yes	Blue

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	

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
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	
Power consumption	ICC			4	W	
Transmission Distance	TD	-	-	40	km	Over SMF

5. 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	

6. Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter	Transmitter	Transmitter	Transmitter	Transmitter	Transmitter	Transmitter
Center Wavelength	CW	1303.54	1304.58	1305.63	nm	
Center Wavelength	CW	1308.09	1309.14	1310.19	nm	
Signaling Rate	SR			53.125	GBd	
Frequency Offset	Foffset	-100		100	ppm	
Average Launch Power	PTX	1.7	-	7.1	dBm	1
Transmitter and dispersion eye closure for PAM4 (TDECQ) (max)	TDECQ	-	-	3.9	dB	
Average Output Power (Laser Turn off)	Poff	-	-	-30	dBm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Extinction Ratio	ER	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	1303.54	1304.58	1305.63	nm	
Center Wavelength	CW	1308.09	1309.14	1310.19	nm	
Damage threshold	Pdamage	-2.4	-	-	dBm	2
Average Rx Power	PRx	-16	-	-3.4	dBm	3
Receive power _OMAouter	POMA	-	-	-2.6	dBm	
Receiver sensitivity _OMAouter for TDECQ < 1.4 dB for 1.4 dB TDECQ 3.4 dB	SEN _OMA	-	-	-13.8 -15.2+TECQ	dBm	4
Reflectance	Ref	-	-	-26	dB	
Los Assert	LosA	-30	-		dBm	
Los De-Assert	LosDA	-	-	-13	dBm	
Los Hysteresis	LosH	0.5	-	-	dB	

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

Parameter	Range	Accuracy	Unit	Calibration
Tx Output Power	1.7 to 7.1	±3	dB	Internal
Rx Input Power	-16 to -3.4	±3	dB	Internal

8. Digital Diagnostics

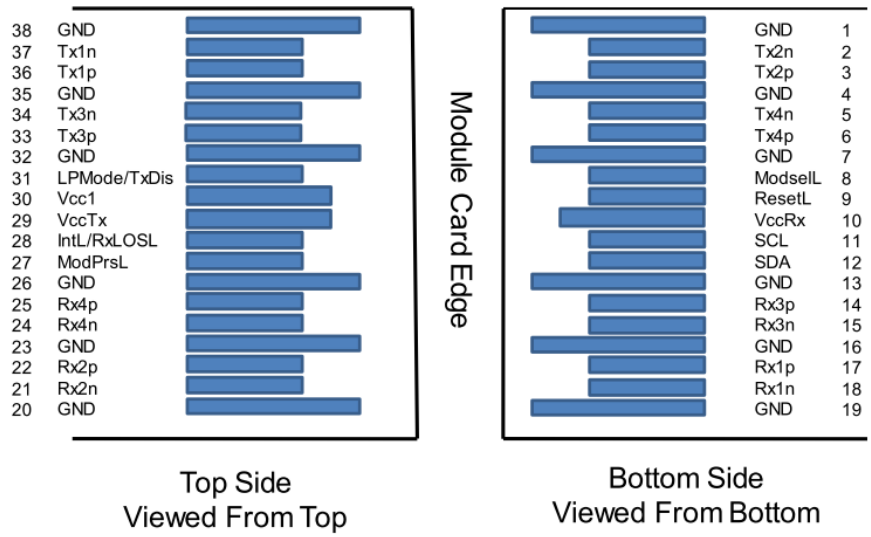
PIN	Logic	Symbol	Description	Plug Seq.	Notes
1		GND	Ground	1	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	3	
4		GND	Ground	1	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3	
6	CML-I	Tx4p	Transmitter Non-Inverted Data output	3	
7		GND	Ground	1	1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

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

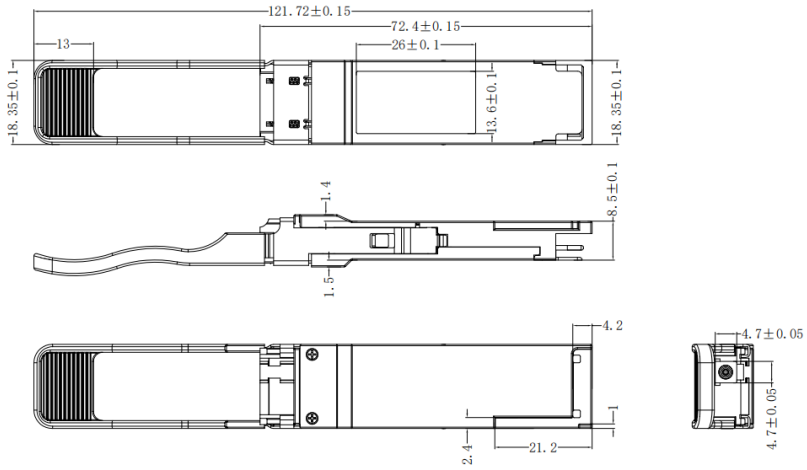
9. Revision History

Version No.	Date	Description
1.0	November 4, 2022	Preliminary datasheet
1.1	Nov 17, 2023	New solution version
1.2	Aug 20,2024	Format change

10. Technical Figure 1



11. Technical Figure 2



12. Revision History

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