QSFP28 100G Duplex ER4 40km LC Optical Transceiver

TQ13L2E-CN Product Specification

FEATURES

- Hot-pluggable QSFP28 form factor
- Supports 103.125Gb/s aggregate bit rates
- Low power dissipation <5W
- Commercial case temperature range of 0°C to 70°C
- Maximum link length of 40km on SMF
- 4 channels LAN-WDM arrays and 4 channels APD arrays
- DDM function implemented
- Duplex LC receptacle
- Single 3.3V power supply
- RoHS compliant (lead free)

APPLICATIONS

- 100GBASE-ER4 100G Ethernet

ORDERING INFORMATION

Part Number	From Factor	Data Rate（Gbps）	Media	Distance (km)	Wavelength (nm)	Temperature (℃)
TQ13L2E-CN	QSFP28	103.125	SMF	40	LWDM4	0~70

ABSOLUTE MAXIMUM RATINGS

Exceeding the limits below may damage the transceiver permanently.

Parameter	Symbol	Min	Typ	Max	Unit.	Note
Storage Temperature	TSTG	-40	-	85	ºC	
Operating Relative Humidity	RH	5	-	95	%	
Supply Voltage	VCC	-0.3	-	3.6	V	

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit.	Note
Operating Case Temperature	Tc	0	-	70	ºC	
Supply Voltage	VCC3	3.13	3.3	3.47	V	
Supply Current	ICC3	-	-	1500	mA	+3.3V Supply
Data Rate	DR	-	25.78125	-	Gbps	

ELECTRICAL and OPTICAL CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit.	Note
Transmitter						
Tx Differential Input Amplitude	Vin p-p	180	-	1000	mV	
Input Differential Impedance	Zin	90	100	110	Ω	
Center Wavelength Range	L0	1294.53	-	1296.59	nm	
	L1	1299.02	-	1301.09	nm	
	L2	1303.54	-	1305.63	nm	
	L3	1308.09	-	1310.19	nm	
Side-Mode Suppression Ratio	SMSR	30	-	-	dB	
Average Launch power, each lane	Pavg	-2.5	-	6.5	dBm	
Outer Optical Modulation Amplitude ,each lane	Poma	0.1	-	4.5	dBm	
Launch power in OMA minus TDP		-0.65	-	-	dBm	
Transmitter and Dispersion Penalty (TDP)	TDP	-	-	2.5	dB	
Extinction ratio, each lane	ER	4.5	-	-	dB	
Relative Intensity Noise	RIN	-	-	-130	dB/Hz	
Optical Return Loss Tolerance	Tol	-	-	20	dB	
Transmitter Reflectance	Rt	-	-	-12	dBm	
Average Launch Power of OFF transmitter each lane	Poff	-	-	-30	dBm	

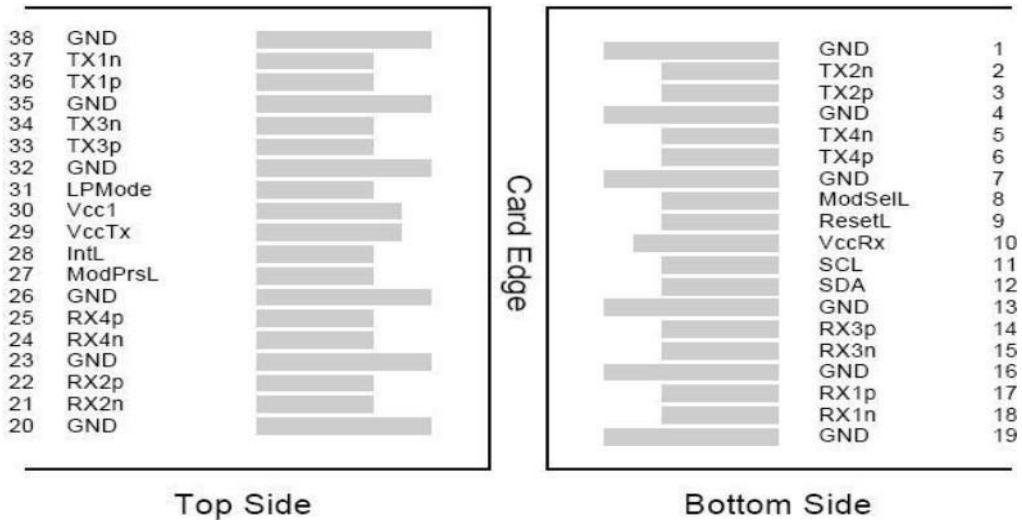
Parameter	Symbol	Min	Typ	Max	Unit.	Note
Receiver						
Rx Differential Output Amplitude	Vout p-p	350	-	900	mV	
Receiver Optical Wavelength	L0	1294.53	-	1296.59	nm	
	L1	1299.02	-	1301.09	nm	
	L2	1303.54	-	1305.63	nm	
	L3	1308.09	-	1310.19	nm	
Damage threshold	Rdam	5.5			dBm	
Average Receive Power, each lane	Pin	-20	-	-4.9	dBm	
Receiver Power, each lane		-	-	-4.9	dBm	
Receiver Sensitivity(OMA), each lane	Sen			-18.5	dBm	Note 1
LOS Assert Level	LOSA	-35	-	-	dBm	
LOS De-Assert Level	LOSD	-	-	-20	dBm	
LOS Hysteresis	LOSH	0.5			dB	

Notes:
1. Measured with a test pattern of PRBS 2^31-1 at Pre-fec BER 5E-5.

Digital Diagnostic Functions

Parameter	Symbol	Min.	Max.	Unit	Notes
Temperature	DDMI_Temp	-3	3	℃	1LSB=1/256℃
Supply Voltage	DDMI_V_{CC}	-3%	3%	V	1LSB=0.1mV
Bias Current	DDMI_I_{bias}	-10%	10%	mA	1LSB=2uA
TX Optical Power	DDMI_TX	-3	+3	dB	1LSB=0.1uW
RX Optical Power	DDMI_RX	-3	+3	dB	1LSB=0.1uW

PIN DIAGRAM



PIN DESCRIPTIONS

Pin	Logic	Symbol	Name/Description	Notes
1		GND	Transmitter Ground (Common with Receiver Ground)	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	
4		GND	Transmitter Ground (Common with Receiver Ground)	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data output	
7		GND	Transmitter Ground (Common with Receiver Ground)	1
8	LVTTL-I	ModSelL	Module Select	2
9	LVTTL-I	ResetL	Module Reset	2
10		VccRx	3.3V Power Supply Receiver	
11	LVCMOS-I/O	SCL	2-Wire serial Interface Clock	2
12	LVCMOS-I/O	SDA	2-Wire serial Interface Data	2
13		GND	Transmitter Ground (Common with Receiver Ground)	1
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	
15	CML-O	Rx3n	Receiver Inverted Data Output	
16		GND	Transmitter Ground (Common with Receiver Ground)	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	
18	CML-O	Rx1n	Receiver Inverted Data Output	
19		GND	Transmitter Ground (Common with Receiver Ground)	1
20		GND	Transmitter Ground (Common with Receiver Ground)	1
21	CML-O	Rx2n	Receiver Inverted Data Output	

22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Transmitter Ground (Common with Receiver Ground)	1
24	CML-O	Rx4n	Receiver Inverted Data Output	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Transmitter Ground (Common with Receiver Ground)	1
27	LVTTL-O	ModPrsl	Module Present	
28	LVTTL-O	IntL	Interrupt	
29		VccTx	3.3V power supply transmitter	
30		Vcc1	3.3V power supply	
31	LVTTL-I	LPMode	Low Power Mode	2
32		GND	Transmitter Ground (Common with Receiver Ground)	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	
34	CML-I	Tx3n	Transmitter Inverted Data Output	
35		GND	Transmitter Ground (Common with Receiver Ground)	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Output	
38		GND	Transmitter Ground (Common with Receiver Ground)	1

Notes:
1. Module circuit ground is isolated from module chassis ground within the module.
2. Open collector should be pulled up with 4.7K to 10K ohms on host board to a voltage between 3.15V and 3.6V.

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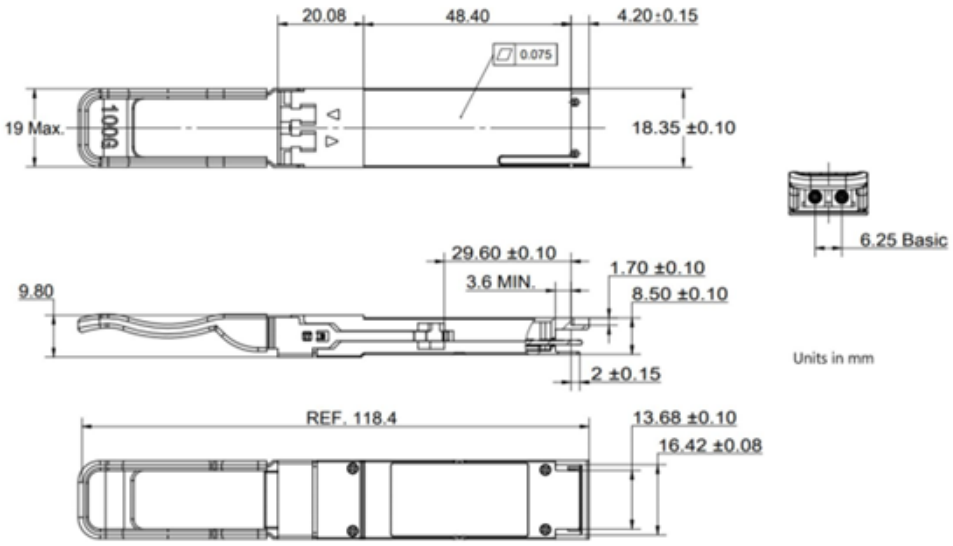
MECHANICAL SPECIFICATION



LABEL DIAGRAM

Optowire

TQ13L2E-CN

QSFP28 100G Duplex ER4 40km LC

Class 1 Laser

MADE IN CHINA

S/N: ?????????

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