

QSFP28 100G Dual Rate LR4 10km LC Optical Transceiver

TQ13LGL-CN Product Specification

FEATURES

- Hot-pluggable QSFP28 form factor
- Transmission data rate up to 28Gbps per channel
- Low power dissipation <4.5W
- Commercial case temperature range of 0°C to 70°C
- Maximum link length of 10km on SMF
- 4 x 28Gb/s DFB-based LAN-WDM Cooling transmitter
- 4 channels PIN ROSA
- DDM function implemented
- Duplex LC receptacle
- Single 3.3V power supply
- RoHS compliant (lead free)

APPLICATIONS

- IEEE 802.3ba 100GBASE LR4
- OTN OTU4 and 100GE

ORDERING INFORMATION

Part Number	Form Factor	Data Rate (Gbps)	Media	Distance (km)	Wavelength (nm)	Temperature (°C)
TQ13LGL-CN	QSFP28	112	SMF	10	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	°C	
Operating Relative Humidity	RH	5	-	85	%	
Supply Voltage	VCC	-0.3	-	3.6	V	

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit.	Note
Operating Case Temperature	Tc	0	-	70	°C	
Supply Voltage	VCC3	3.13	3.3	3.47	V	
Supply Current	ICC3	-	-	1360	mA	+3.3V Supply

Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit.	Note
Transmitter						
Single-ended Input Voltage Tolerance		-0.3		4.0	V	
AC Common Mode Input Voltage Tolerance		15			mV	
Differential Input Voltage		50			mVpp	
Differential Input Voltage Swing	Vin			900	mVpp	
Differential Input Impedance	Zin	90	100	110	Ohm	
Receiver						
Single-ended Output Voltage		-0.3		4.0	V	
AC Common Mode Output Voltage				7.5	mV	
Differential Output Voltage Swing	Vout	300		850	mVpp	
Differential Output Impedance	Zout	90	100	110	Ohm	

Optical Characteristics 100BASE-LR4

Parameter	Symbol	Min	Typ	Max	Unit.	Note
Transmitter						
Lane Wavelength	L0	1294.53	1295.56	1296.59	nm	
	L1	1299.02	1300.05	1301.09	nm	
	L2	1303.54	1304.58	1305.63	nm	
	L3	1308.09	1309.14	1310.19	nm	
SMSR	SMSR	30			dB	
Total Average Launch	PT			10.5	dBm	
Average Launch Power, each Lane	PAVG	-4.3		4.5	dBm	
OMA, each Lane	POMA	-1.3		4.5	dBm	1
Difference in Launch	Ptx,diff			5	dB	
Launch Power in OMA		-2.3			dBm	
TDP, each Lane	TDP			2.2	dB	
Extinction Ratio	ER	4			dB	
RIN20OMA	RIN			-130	dB/H	
Optical Return Loss	TOL			20	dB	
Transmitter Reflectance	RT			-12	dB	
Average Launch Power	Poff			-30	dBm	
Receiver						
Lane Wavelength	L0	1294.53	1295.56	1296.59	nm	
	L1	1299.02	1300.05	1301.09	nm	
	L2	1303.54	1304.58	1305.63	nm	
	L3	1308.09	1309.14	1310.19	nm	
Damage Threshold, each Lane	THd	5.5			dBm	2
Total Average Receive				10.5	dBm	
Average Receive Power, each Lane		-10.6		4.5	dBm	
Receive Power (OMA), each Lane				4.5	dBm	
Receiver Sensitivity (OMA), each Lane	SEN			-8.6	dBm	
Stressed Receiver Sensitivity (OMA), each Lane				-6.8	dBm	3
Difference in Receive Power between any Two Lanes (OMA)	Prx,diff			5.5	dB	
LOS Assert	LOSA		-18		dBm	
LOS Deassert	LOSD		-15		dBm	
LOS Hysteresis	LOSH	0.5			dB	

Notes:

1. Even if the TDP < 1 dB, the OMA min must exceed the minimum value specified here.
2. The receiver shall be able to tolerate, without damage, continuous exposure to a modulated optical input signal having this power level on one lane. The receiver does not have to operate correctly at this input power.
3. Measured with conformance test signal at receiver input for BER = 1E- 12.

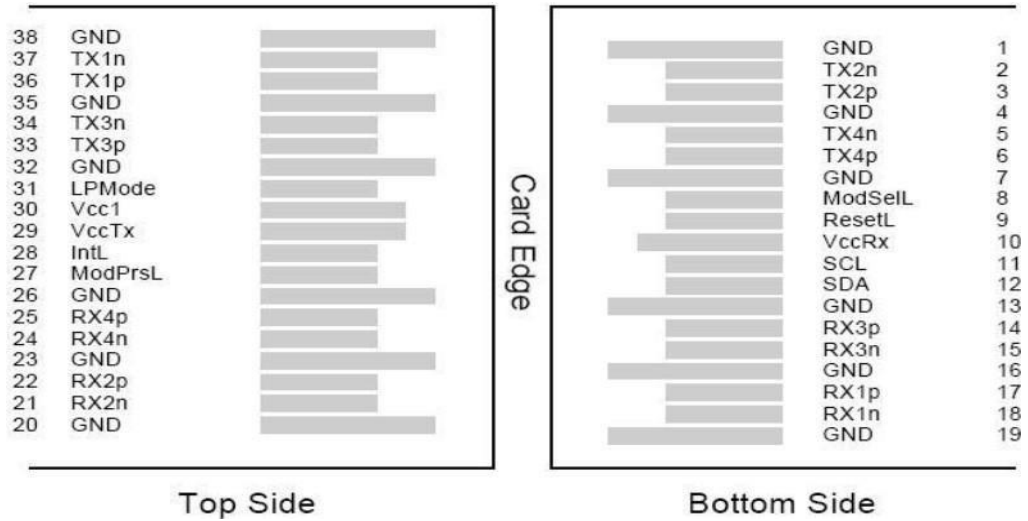
Optical Characteristics OTU4

Parameter	Symbol	Min	Typ	Max	Unit.	Note
Transmitter						
Signaling Speed per Channel			27.9525		GBd	
Lane Wavelength	L0	1294.53	1295.56	1296.59	nm	
	L1	1299.02	1300.05	1301.09	nm	
	L2	1303.54	1304.58	1305.63	nm	
	L3	1308.09	1309.14	1310.19	nm	
Total Average Launch	PT			10	dBm	
Average Launch Power, each Lane	PAVG	-0.6		4.0	dBm	
Difference in Launch	Ptx,diff			5	dB	
Extinction Ratio	ER	4		6.5	dB	
Optical Return Loss	TOL			20	dB	
Transmitter Reflectance	RT			- 12	dB	
Average Launch Power	Poff			-30	dBm	
Receiver						
Signaling Speed per Channel			27.9525		GBd	
Lane Wavelength	L0	1294.53	1295.56	1296.59	nm	
	L1	1299.02	1300.05	1301.09	nm	
	L2	1303.54	1304.58	1305.63	nm	
	L3	1308.09	1309.14	1310.19	nm	
Total Average Receive				10	dBm	
Average Receive Power, each Lane		-6.9		4.0	dBm	
Optical Path Penalty	OPP			1.5	dBm	
Equivalent Sensitivity, each Lane	SEN			-8.4	dBm	
LOS Assert	LOSA			- 11.6	dBm	
LOS Deassert	LOSD			- 13.6	dBm	
LOS Hysteresis	LOSH	0.5			dB	

Digital Diagnostic Functions

Parameter	Symbol	Min.	Max.	Unit	Notes
Temperature	DDMI_Temp	-3	3	°C	1LSB=1/256°C
Supply Voltage	DDMI_Vcc	-3%	3%	v	1LSB=0.1mV
Bias Current	DDMI_Ibias	-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

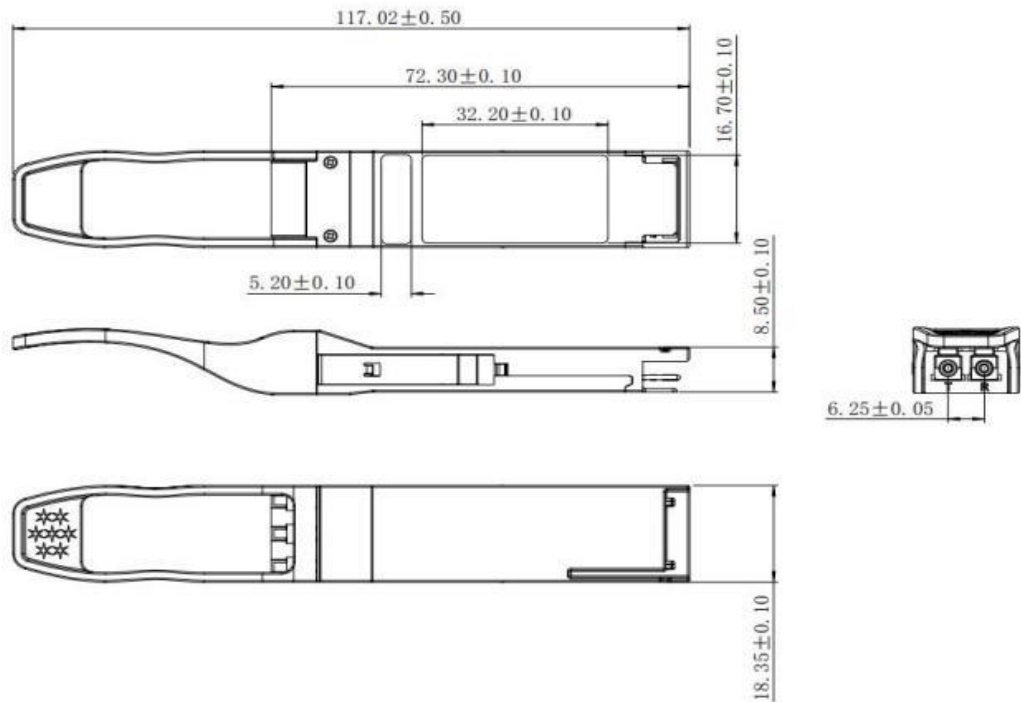
Pin	Logic	Symbol	Name/Description	Notes
1		GND	Transmitter Ground (Common with Receiver Ground)	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	
4		GND	Transmitter Ground (Common with Receiver Ground)	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	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	LVC MOS-I/O	SCL	2-Wire serial Interface Clock	2
12	LVC MOS-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.

MECHANICAL SPECIFICATION



LABEL DIAGRAM



TQ13LGL-CN

QSFP28 100G Dual Rate LR4 10km LC

Class 1 Laser
MADE IN CHINA

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



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