

# 100GBase-LR4 10km QSFP28 Optical Transceiver

## ESTRSCQ001

### Product Features

- 4 25Gb/s channels LAN WDM DFB TOSA
- 4 channel PIN photo detector
- Single +3.3V power supply
- Class I laser safety certified
- Power consumption less than 3.5W
- Up to 10km on SMF

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage temperature	T <sub>s</sub>	-40	85	°C
Supply voltage	V <sub>CC3</sub>	-0.5	4.0	V
Relative humidity	RH	5	95	%

### Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating case temperature	T <sub>c</sub>	0	25	70	°C	C
Operating case temperature	T <sub>c</sub>	-40	25	85	°C	I
Power supply voltage	V <sub>CC</sub>	3.135	3.3	3.465	V	
Data rate per channel			24.33	28	Gb/s	

### Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Module supply current	I <sub>CC</sub>			1100	mA	
Power dissipation	P <sub>D</sub>			3500	mW	
<b>Transmitter</b>						
Single-ended input voltage tolerance		-0.3		4.0	V	
Input differential impedance	Z <sub>IN</sub>		100		Ω	

Differential data input swing	$V_{IN,P-P}$	190		900	mV <sub>P-P</sub>	
AC common mode input voltage tolerance		15			mV	
Differential input voltage swing threshold		50			mV <sub>pp</sub>	
<b>Receiver</b>						
Single-ended output voltage		-0.3		4.0	V	
Output differential impedance	$Z_o$	90	100	110	$\Omega$	
Differential data output swing	$V_{OUT,P-P}$	300		850	mV <sub>P-P</sub>	
AC common mode output voltage				7.5	mV	

### Optical Characteristics

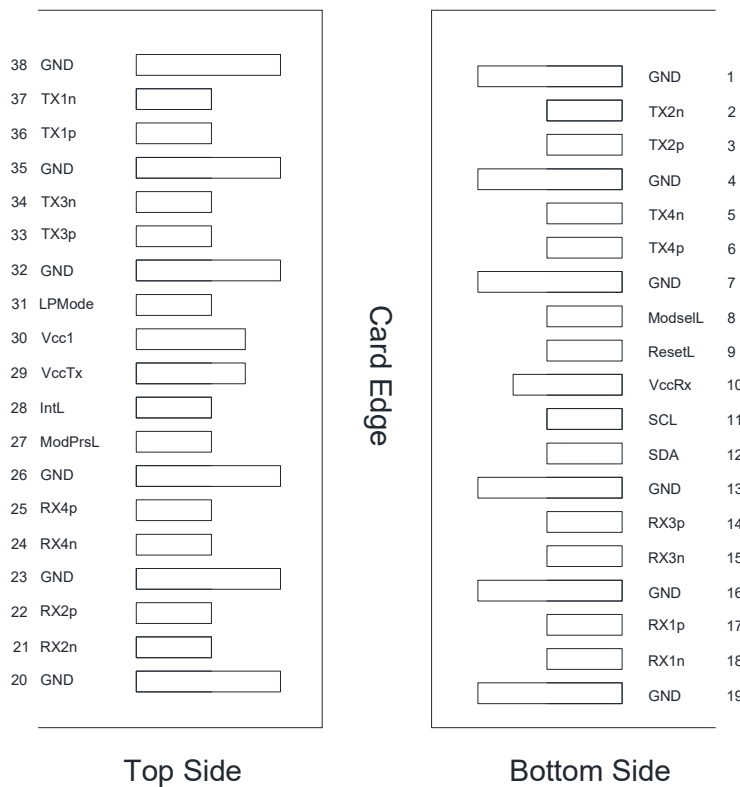
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
<b>Transmitter</b>						
Launch optical power per lane	$P_o$	-4.3		+4.5	dBm	1
Total launch optical power	$P_o$			+4.5	dBm	1
Center wavelength range	L1	1294.53	1295.56	1296.59	nm	
	L2	1299.02	1300.05	1301.09	nm	
	L3	1303.54	1304.58	1305.63	nm	
	L4	1308.09	1309.14	1310.19	nm	
Extinction ratio	EX				dB	2
Special width (-20dB)				1	nm	
Side mode suppression ratio	SMSR	30			dB	
Optical return loss tolerance	ORLT			20	dB	
Pout @TX-disable asserted	$P_{off}$			-30	dBm	1
Eye mask {X1, X2, X3, Y1, Y2, Y3}	{0.25, 0.40, 0.45, 0.25, 0.28, 0.40}					
<b>Receiver</b>						
Center wavelength	L1				nm	
	L2				nm	
	L3				nm	
	L4				nm	
Sensitivity per channel	S			-8.6	dBm	2
Damage threshold (each channel)	POL	4.5			dBm	
Optical return loss	ORL	26			dB	
LOS De-assert	LOSD			-11	dBm	

LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5			dB	

Note:

1. The optical power is launched into SMF
2. Measured with a PRBS 2<sup>31</sup>-1 test pattern @25.78125Gbps

## Pin Descriptions



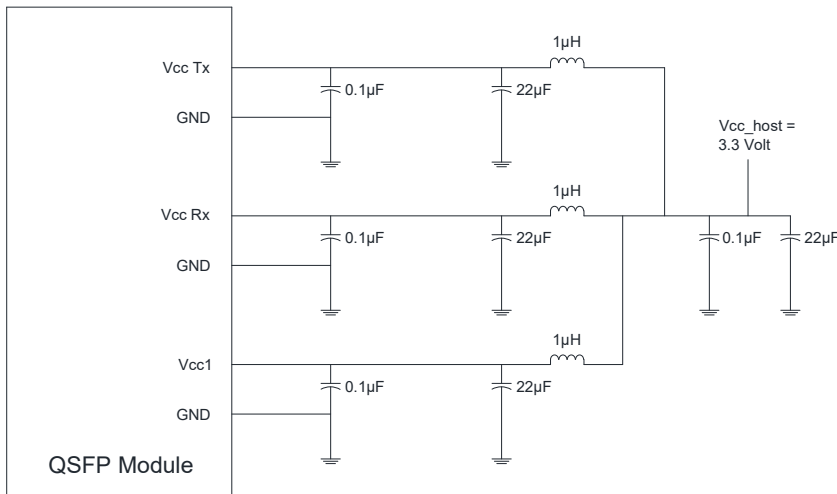
Pin	Symbol	Descriptions	Note
1	GND	Transmitter Ground (common with receiver ground)	1
2	Tx2-	Transmitter inverted data input	
3	Tx2+	Transmitter non-inverted data output	
4	GND	Transmitter Ground (common with receiver ground)	1
5	Tx4-	Transmitter inverted data input	
6	Tx4+	Transmitter non-inverted data output	
7	GND	Transmitter Ground (common with receiver ground)	1
8	ModSe1L	Module select	2

9	ResetL	Module reset	2
10	VccRx	3.3V power supply receiver	
11	SCL	2-wire serial interface clock	2
12	SDA	2-wire serial interface data	2
13	GND	Transmitter Ground (common with receiver ground)	1
14	Rx3+	Receiver non-inverted data output	
15	Rx3-	Receiver inverted data output	
16	GND	Transmitter Ground (common with receiver ground)	1
17	Rx1+	Receiver non-inverted data output	
18	Rx1-	Receiver inverted data output	
19	GND	Transmitter Ground (common with receiver ground)	1
20	GND	Transmitter Ground (common with receiver ground)	1
21	Rx2-	Receiver inverted data output	
22	Rx2+	Receiver non-inverted data output	
23	GND	Transmitter Ground (common with receiver ground)	1
24	Rx4-	Receiver inverted data output	1
25	Rx4+	Receiver non-inverted data output	
26	GND	Transmitter Ground (common with receiver ground)	1
27	ModPrsL	Module present	
28	IntL	Interrupt	2
29	VccTx	3.3V power supply transmitter	
30	Vcc1	3.3V power supply	
31	LPMODE	Low power mode	2
32	GND	Transmitter Ground (common with receiver ground)	1
33	Tx3+	Transmitter non-inverted data input	
34	Tx3-	Transmitter inverted data output	
35	GND	Transmitter Ground (common with receiver ground)	1
36	Tx1+	Transmitter non-inverted data input	
37	Tx1-	Transmitter inverted data output	
38	GND	Transmitter Ground (common with receiver ground)	1

Note:

1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that on the host board requires a 4.7KΩ to 10KΩ pull-up resistor to VccHost.

### Recommended Host Board Power Supply Filter Network



### Recommended Application Interface Block Diagram

