

DATA SHEET

MODULETEK: QSFP28-LR4-C10

100G QSFP28 LR4 Optical Transceiver

QSFP28-LR4-C10 Overview

ModuleTek's QSFP28-LR4-C10 optical transceivers are based on 100G Ethernet IEEE 802.3ba standard. The QSFP28 transceiver converts 4 inputs channels of 25Gb/s electrical data to 4 LAN-WDM optical signals, and multiplexes them into a single channel for 100Gb/s optical transmission. Reversely, on the receiver side, the module optically de-multiplexes a 100Gb/s input into 4 LAN-WDM channels signals, and converts them to 4 channel output electrical data.

Product Features

4x25G LAN-WDM optical architecture up to 103.1Gbps

QSFP28 MSA compliant

Up to 10km transmission

Duplex LC connector

Power dissipation < 3.5W

Built-in digital diagnostic functions

RoHS compliant

Operating temperature range:0°C to 70°C

Applications

100GBASE-LR4 100G Ethernet

Ordering Information

Part Number	Description	Color on Clasp
QSFP28-LR4-C10	100G QSFP28 LC Connectors, Up to 10km on SMF, with DOM function.	blue
For More Information: ModuleTek Limited Web: www.moduletek.com Email: sales@moduletek.com		

General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Bit Error Rate	BER			10 ⁻¹²		
Operating Temperature	T _{OP}	0		70	°C	1
Storage Temperature	T _{STO}	-40		85	°C	2
Input Voltage	V _{CC}	3.14	3.3	3.46	V	
Maximum Voltage	V _{MAX}	-0.5		3.6	V	3
Module total power	P			3.5	W	

Notes:

1. Case temperature
2. Ambient temperature
3. For electrical power interface

Optical- Characteristics - Transmitter

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Signaling Speed per lane		25.78125±100ppm			Gb/s	
Total Output Optical Power	P_T			8.3	dBm	1
Average Launch Power (Each Lane)	P	-4.3		4.5	dBm	
Optical Center Wavelength	λ_C	1294.53	1295.56	1296.59	nm	2
		1299.02	1300.06	1301.09	nm	3
		1303.54	1304.59	1305.63	nm	4
		1308.09	1309.14	1310.19	nm	5
Optical Modulation Amplitude, Each Lane	OMA	-1.3		4.5	dB	
Extinction Ratio	ER	4			dB	
Side Mode Suppression Ratio	SMSR	30			dB	
Relative Intensity Noise	RIN			-130	dB/Hz	
Transmitter Dispersion Penalty	TDP			1.8	dB	
Optical Return Loss Tolerance				20	dB	
Transmitter Eye Mask		Compliant with IEEE 802.3ba				

Notes:

1. Average
2. L0 Lane
3. L1 Lane
4. L2 Lane
5. L3 Lane

Optical- Characteristics - Receiver

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		1299.02	1300.06	1301.09	nm	2
		1303.54	1304.59	1305.63	nm	3
		1308.09	1309.14	1310.19	nm	4
Optical Input Power, each lane	PIN	-10.6		-4.5	dBm	5
Receiver Sensitivity (OMA), each Lane	R_{X_SEN1}			-8.6	dBm	
LOS Assert	LOS_A	-24		-13.6	dBm	
LOS De-Assert	LOS_D			-11.6	dBm	
LOS Hysteresis	LOS_H		1.5		dB	

Notes:

1. L0 Lane
2. L1 Lane
3. L2 Lane
4. L3 Lane
5. Average, Informative

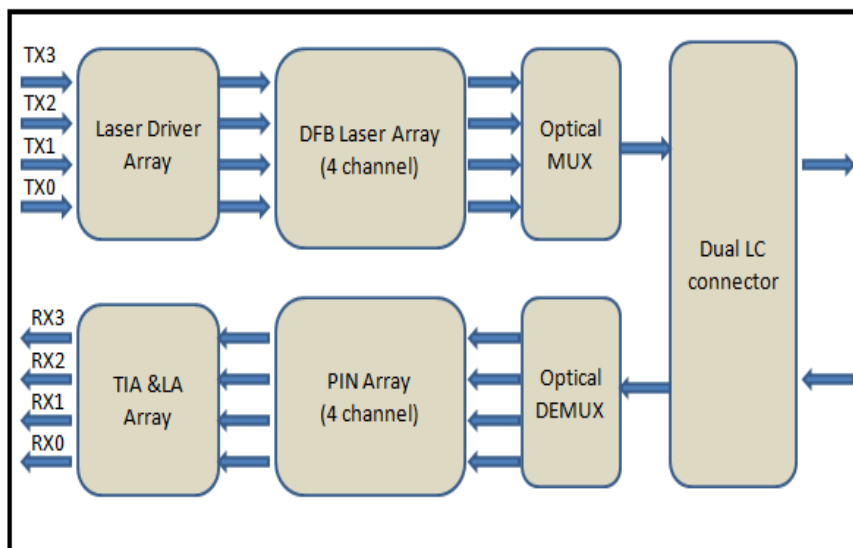
Electrical- Characteristics - Transmitter

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Signaling Rate per lane		25.78125±100ppm			Gb/s	
Differential data input swing	V_{IN_PP}			900	mV	
Transmit disable voltage	V_D	$V_{CC}-1.3$		V_{CC}	V	
Transmit enable voltage	V_{EN}	V_{EE}		$V_{EE}+0.8$	V	

Electrical-Characteristics - Receiver

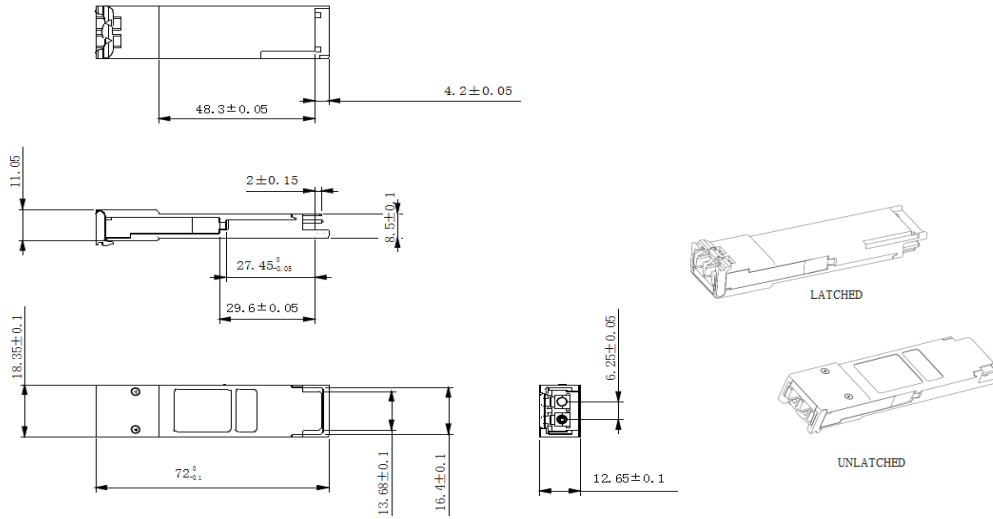
Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Signaling Rate per lane		25.78125±100ppm			Gb/s	
Differential data output swing	V_{IN_PP}	400		800	mV	
Data output rise time (20%–80%)	T_R		12		ps	
Data output fall time (20%–80%)	T_F		12		ps	
LOS Fault	V_{LOS_Fault}	$V_{CC}-1.3$		V_{CC_HOST}	V	
LOS Normal	V_{LOS_Normal}	V_{EE}		$V_{EE}+0.5$	V	

Block-Diagram-of-Transceiver



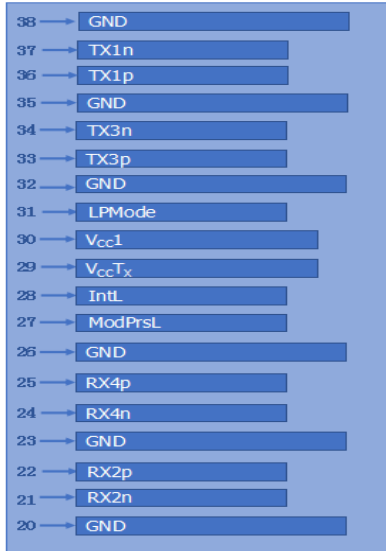
This product converts the 4-channel 25Gb/s electrical input data into LAN WDM optical signals (light), by a driven 4-wavelength Distributed Feedback Laser (DFB) array. The light is combined by the MUX parts as a 100Gb/s data, propagating out of the transmitter module from the SMF. The receiver module accepts the 100Gb/s LAN WDM optical signals input, and de-multiplexes it into 4 individual 25Gb/s channels with different wavelength. Each wavelength light is collected by a discrete photo diode, and then outputted as electric data after amplified by a TIA.

Dimensions

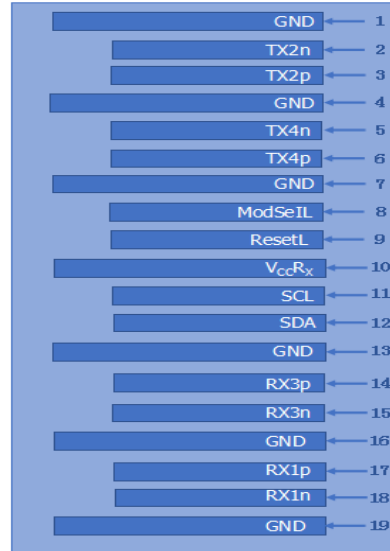


ALL DIMENSIONS ARE $\pm 0.2\text{mm}$ UNLESS OTHERWISE SPECIFIED
UNIT: mm

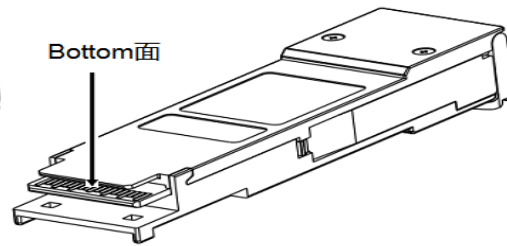
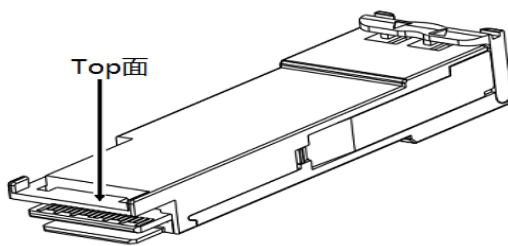
Electrical Pad Layout



Top of Board



Bottom of Board



Pin Assignment

PIN #	Symbol	Description	Remarks
1	GND	Ground	
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	V _{cc} R _X	+3.3V Power Supply Receiver	
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	
20	GND	Ground	
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	V _{cc} T _X	+3.3V Power Supply transmitter	
30	V _{cc} 1	+3.3V Power Supply	
31	LPMMode	Low Power Mode	
32	GND	Ground	
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	

35	GND	Ground	
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	

References

1. IEEE standard 802.3ba. IEEE Standard Department.
2. QSFP28 4X PLUGGABLE TRANSCEIVER –SFF-8665