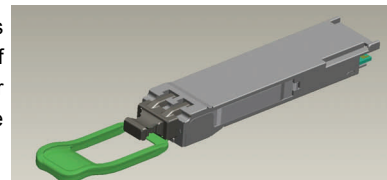


The LTA1304 QSFP28 Optical transceiver is intended for the service with single mode fiber in 103.125Gb/s high speed data communications and computing applications. It meets the requirements of QSFP28 MSA, 100G-CLR4, CWDM4 MSA, operates from a 3.3V DC power supply and is offered in the commercial temperature range. The module has an aggregate link bandwidth in excess of 100Gb/s by multiplexing of 4 CWDM optical lanes, each lane capable of transmitting 25.78125Gb/s over 2km on SMF optical fiber. It is fabricated with a rugged die cast metal housing and cage assembly. The device is Class I laser safety compliant and meets the EU Directive 2002/95/EC for RoHS compliance.



### Applications

- High performance computing, data com and sever data links
- High speed access

### Features

- 4 independent optical lanes
- Lane data rate of 25.78125Gb/s
- Aggregate data rate in excess of 103.125Gb/s (over 4 lanes)
- Hot Pluggable
- 2km link on SMF single-mode Fiber
- CWDM Laser/ Pin PD Array Technology
- QSFP28 MSA Compatible electrical I/O
- Case Operating Temperature:
  - Commercial: 0 to 70°C
- +3.3V power supply
- RoHS compliance

Ordering Information	
Part Number	Case Operating Temperature
LTA1304-PC+	0 to 70 °C

Absolute Maximum Ratings					
Parameter	Symbol	Min	Max	Units	Notes
Storage Ambient Temperature	T <sub>stg</sub>	-40	85	°C	Exceeding the Absolute Maximum Ratings may cause irreversible damage to the device. The device is not intended to be operated under the condition of simultaneous Absolute Maximum Ratings, a condition which may cause irreversible damage to the device.
Relative Humidity (non-condensing)	RH	10	85	%	
Module Supply Voltage	V <sub>cc</sub>	0	3.6	V	



## LTA1304-PC+ QSFP28 Optical Transceiver

## CWDM 4X25Gb/s 2km

Recommended Operating Conditions						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Case Operating Temperature	$T_{case}$	0	+25	+70	°C	Temperature Range = C
Module Supply Voltage	$V_{CC}$	3.14	3.3	3.46	V	
Power Consumption	$P_{CON}$	-	-	3.5	W	
Data Rate Per Channel		-	25.78125	-	Gb/s	

Transmitter Electrical Interfaces						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Tx_Data Differential Input Voltage	$V_{IN}$	100	-	900	mV	
Tx_Data Differential Input Impedance	$Z_{IN}$	-	100	-	$\Omega$	

Receiver Electrical Interfaces						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Rx_Data Differential Output Voltage	$V_{OUT}$	300	-	1100	mV	
Rx_Data Differential Output Impedance	$Z_{OUT}$	90	100	110	$\Omega$	
Differential Output Return Loss		Per 100G-CLR4			dB	
Common Mode Output Return Loss		Per 100G-CLR4			dB	
Tx Input Data Rising Time (20% to 80%)	$T_r$	-	-	50	ps	
Tx Input Data Falling Time (20% to 80%)	$T_f$	-	-	50	ps	



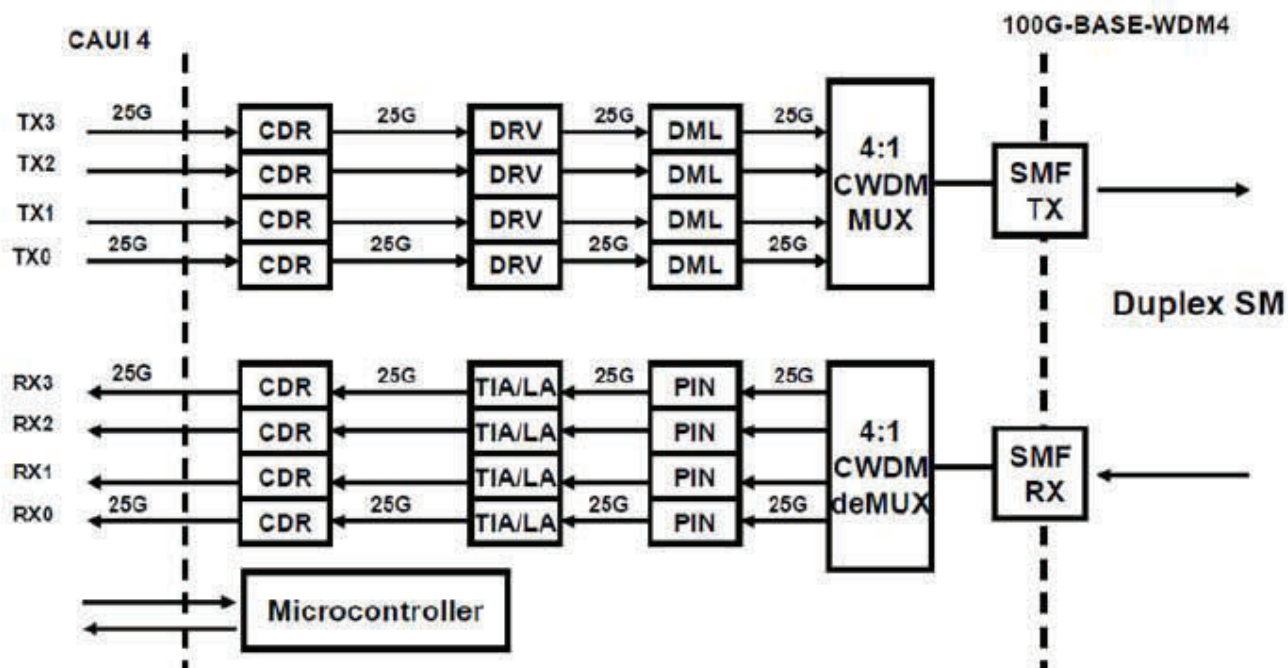
## LTA1304-PC+ QSFP28 Optical Transceiver

### CWDM 4X25Gb/s 2km

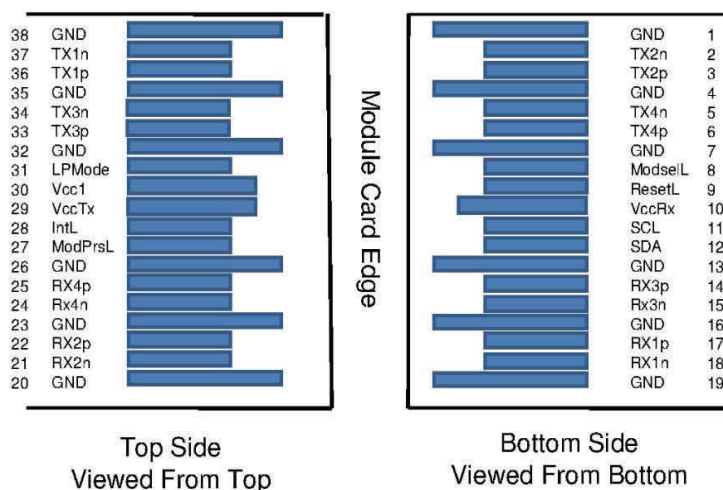
Transmitter Optical Characteristics						
Parameter	Symbol	LTA1304			Units	Notes
		Min	Typ	Max		
Transmitter Type		CWDM DFB				
Average Total Optical Power	$P_{TOTAL}$	-	-	8.5	dBm	
Average Launch Power, each lane	$P_{OUT}$	-6.5	-	2.5	dBm	Average Optical Output
Optical Modulation Amplitude(OMA), each lane	$P_{OMA}$	-4		2.5	dBm	
Tx Power in OMA minus TDP, each lane		-5	-	-	dBm	
Optical Output with Tx OFF	$P_{OFF}$	-	-	-30	dBm	
Center Wavelength, each Lane	$\lambda$	1264.5-1277.5			nm	
		1284.5-1297.5				
		1304.5-1317.5				
		1324.5-1337.5				
Extinction Ratio	ER	3.5	-	-	dB	
Optical RL Tolerance	ORL	-	-	20	dB	
Transmit Reflectance	RFL	-	-	-12	dB	
Transmit Eye Mask		Per 100G-CLR4				

Receiver Optical Characteristics						
Parameter	Symbol	LTA1304			Units	Notes
		Min	Typ	Max		
Receiver Type		CWDM and PIN/TIA				
Rx sensitivity (OMA)	$P_{IN}$	-	-	-8.1	dBm	Each Lane (Note1)
Rx Stressed Sensitivity (OMA)	$P_S$	-	-	-5.6	dBm	Each Lane
Rx Power OMA		-	-	2.5	dBm	Each Lane
Average receive power	$p$	-10		2.5	dBm	Each Lane
Receive Reflectance	RFL	-	-	-26	dB	
Center Wavelength	$\lambda$	1264.5-1277.5			nm	
		1284.5-1297.5				
		1304.5-1317.5				
		1324.5-1337.5				
Rx_LOS of Signal - Assert	$P_A$	-30	-	-	dBm	
Rx_LOS of Signal - Deassert	$P_D$	-	-	-13	dBm	
Rx_LOS of Signal - Hysteresis	$P_{Hy}$	0.5	-	5	dBm	
Note 1: BER $1 \times 10^{-12}$						

Block Diagram



#### Pin Assignment



Pin Description			
Pin	Symbol	Description	Notes
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 (Low active, pull-up in module)	
9	RetsetL	Module Reset (Pull-up in module)	
10	V <sub>CC</sub> Rx	+3.3V DC Power Supply	
11	SCL	I <sup>2</sup> C Serial Clock	
12	SDA	I <sup>2</sup> C Serial Data	
13	GND	Ground	
14	Rx3p	Receiver Non Inverted Differential Output (AC-coupled)	
15	Rx3n	Receiver Non Inverted Differential Output	
16	GND	Ground	
17	Rx1p	Receiver Non Inverted Differential Output	
18	Rx1n	Receiver Inverted Differential Output	
19	GND	Ground	
20	GND	Ground	
21	Rx2n	Receiver Inverted Differential Output	
22	Rx2p	Receiver Non Inverted Differential Output	
23	GND	Ground	

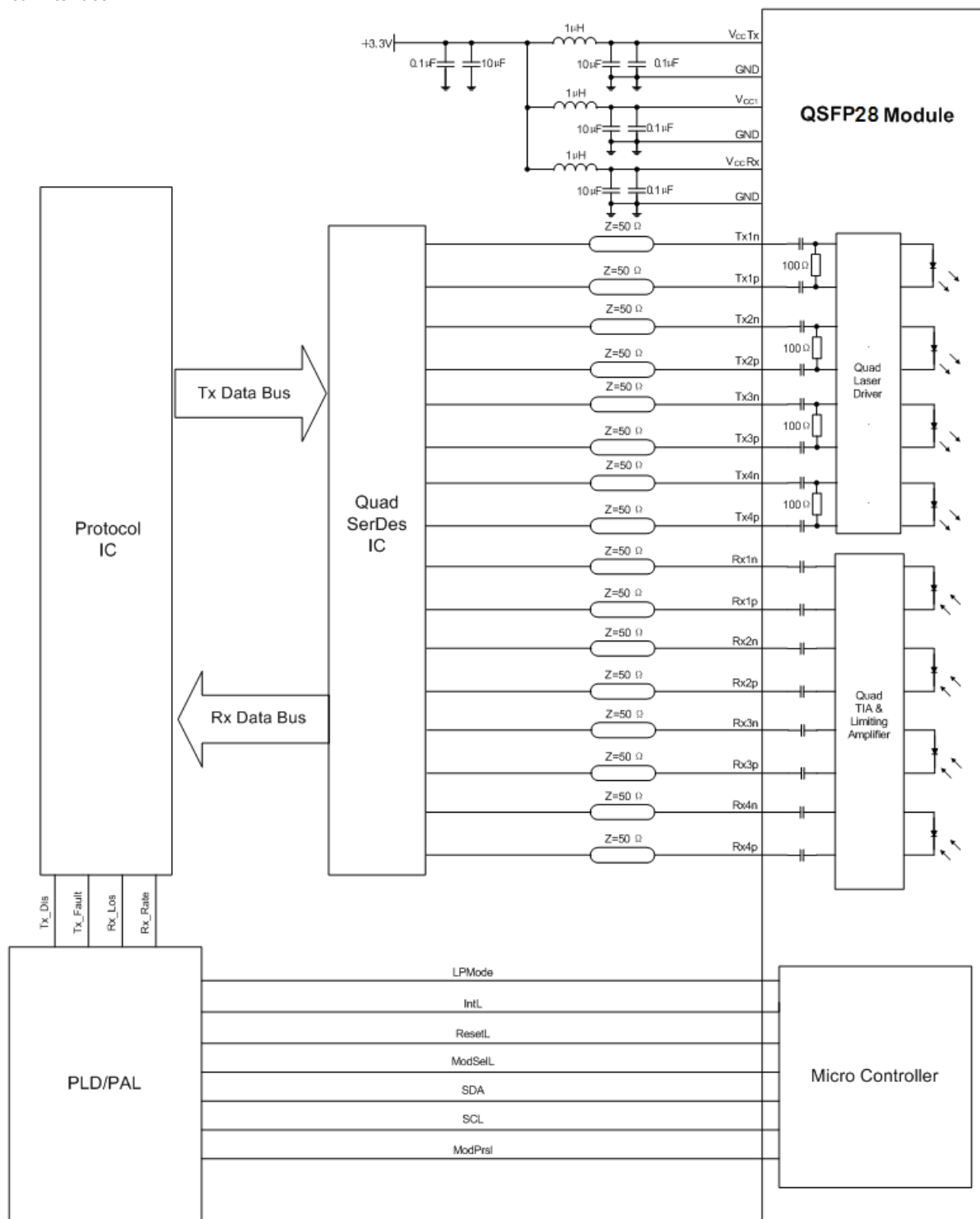


## LTA1304-PC+ QSFP28 Optical Transceiver

### CWDM 4X25Gb/s 2km

24	Rx4n	Receiver Inverted Differential Output	
25	Rx4p	Receiver Non Inverted Differential Output	
26	GND	Ground	
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	V <sub>CC</sub> Tx	+3.3V DC Power Supply	
30	V <sub>CC1</sub>	+3.3V DC Power Supply	
31	LPMod	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	

#### Electrical Interface

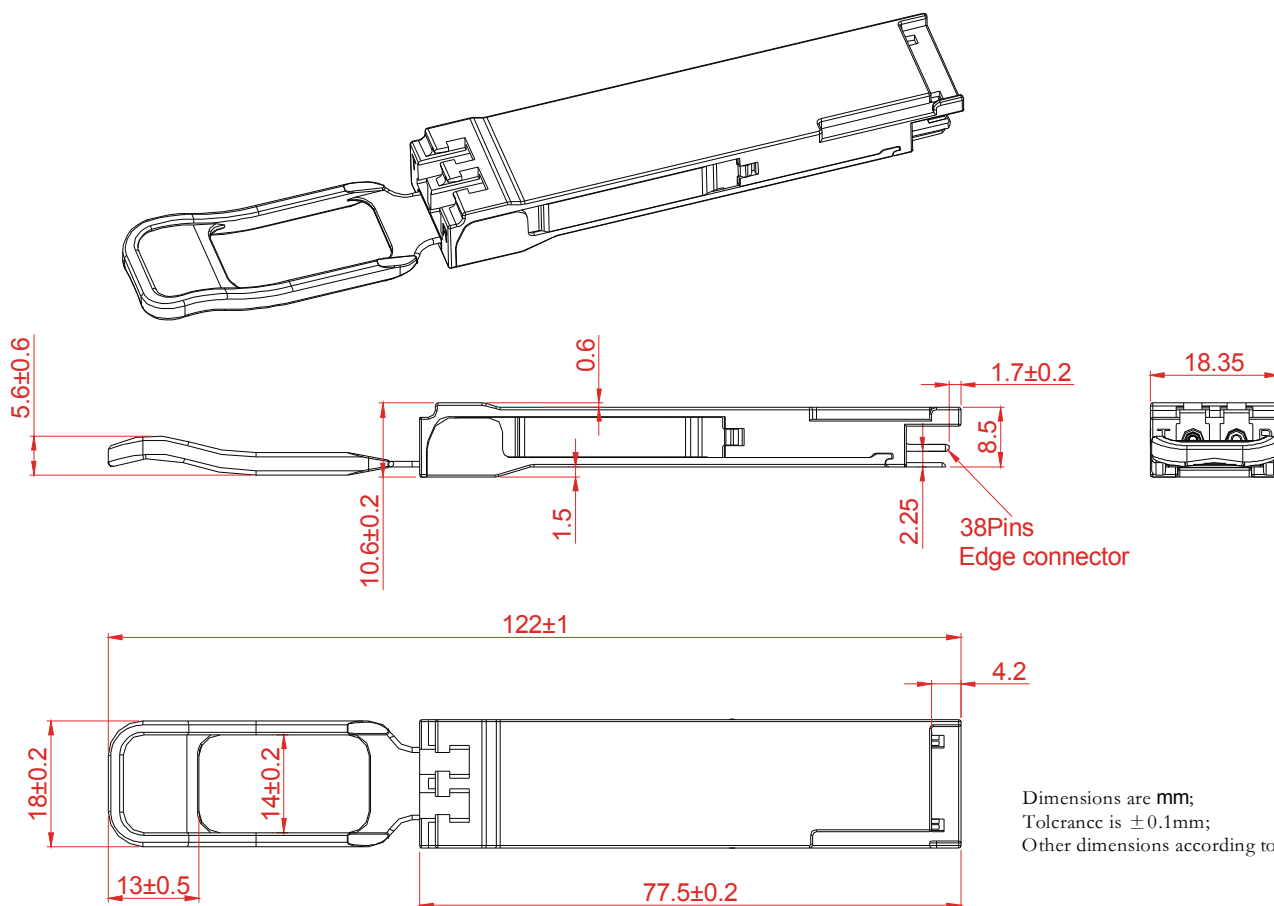




# LTA1304-PC+ QSFP28 Optical Transceiver

CWDM 4X25Gb/s 2km

## Mechanical Dimensions



Dimensions are mm;  
Tolerance is  $\pm 0.1$ mm;  
Other dimensions according to MSA drawing.



### EYE SAFETY

The transceiver is a Class 1 eye-safe device according to FDA 21CFR1040.10 and 1040.11, IEC 60825-1 and IEC 60825-2.

### ELECTROMAGNETIC INTERFERENCE (EMI), IMMUNITY AND PRODUCT SAFETY

The transceiver is ESD safe (electrical pins) when tested according to MIL-STD-883, Method 3015.4 and ESD safe (optical connector) when tested according to IEC 61000-4-2. The device is immune to strong RF fields when tested in accordance with IEC 61004-3. The device complies with (US) FCC, Part 15, Subpart J; (Europe) CENELEC EN 55022; (Canada) Class B (CISPR22A); and (Japan) VCCI Class 1. The device has been designed to conform to product safety requirements including UL1950, CSA 22.2, and IEC 60950, and has been designed to meet the flammability requirements of UL94.

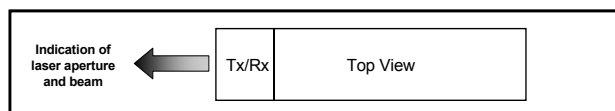
### NOTICE

The factory has made all adjustments to this device prior to shipment. No adjustments or modifications to the device are required or permitted. Any adjustment, modification or tampering of the device voids the product warranty. The US Food and Drug Administration may consider that any adjustment or modification to this device is an act of manufacturing and therefore will require that the device be recertified in accordance with 21 CFR 1040.10 .

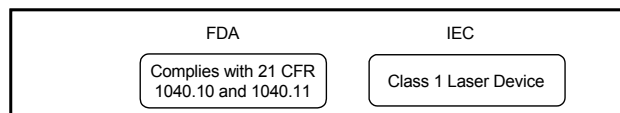
### REQUIRED LABEL AND LASER EMISSION

This device is labeled in accordance with FDA and IEC requirements for laser safety.

### REQUIRED LABEL



### LASER EMISSION



LASER RADIATION INFORMATION	
Wavelength	1310nm
FDA Total Pout: 7mm aperture at 20cm distance	< 790μwatts
IEC Total Pout: 7mm aperture at 14cm distance	< 10,000μwatts
Beam Divergence	17.25°



## LTA1304-PC+ QSFP28 Optical Transceiver

CWDM 4X25Gb/s 2km

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