

## Applications

- PCIe Gen3, USB3.1 & 10Gbps Ethernet in ATE



## Features

- Small footprint and integrated loopback circuit with 4 inductors & 2 capacitors
  - > Inductor is manufactured by MEMS (Micro Electro Mechanical Systems)
  - > Inductor is designed specifically for broadband applications : up to 5.68GHz
- Surface mounted component with high reliability
- Package size : 3.45 x 4.55 x 2.30mm (W x L x H mm)
- Package cap is hermetically sealed and protects MEMS inductors
- The capacitance of 2 capacitors can be determined by user requirement

Electrical Specification		Environmental Specification	
<b>Inductance*1</b> (Tolerance : ±5%)	132nH @ 5MHz 138nH @ 100MHz	<b>Thermal Shock</b>	200 cycles, -65°C ~ +150°C
<b>SRF*2 (Typ.)</b>	5.14GHz	<b>Pressure Cooker Test</b>	+130°C, 85% RH, 96Hrs
<b>Idc (Max)</b>	200mA	<b>Operating Temperature Range</b>	-55°C ~ +85°C
<b>DCR *4</b>	3.75±0.1Ω		

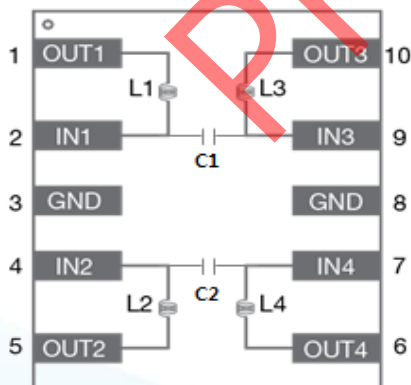
\*1. Measurement Instrument : Impedance Analyzer Agilent 4294 & 42941A(Probe Kit)

\*2. Measurement Instrument : VNA Keysight N5224A

\*3. Idc Measurement Condition : The DC resistance changes were observed by supplying 5V and maintaining 200mA current for 30 minutes at room temperature

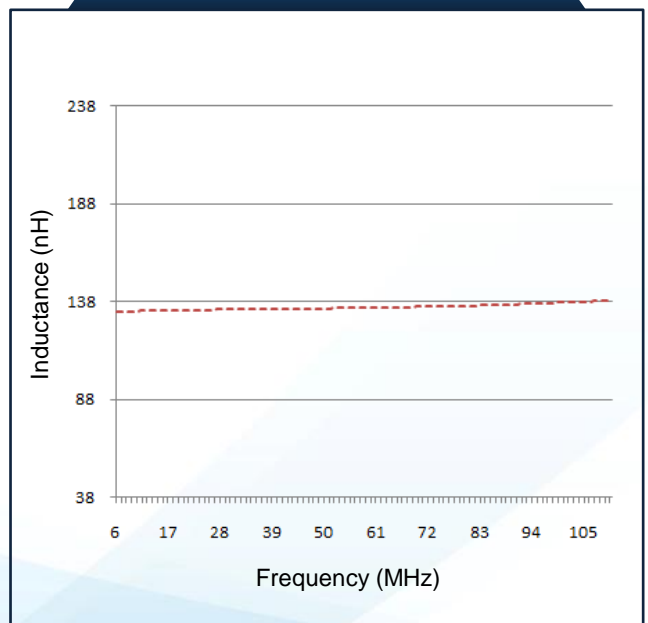
\*4. Measurement Instrument : Keithley 2000

## Pin Assignment

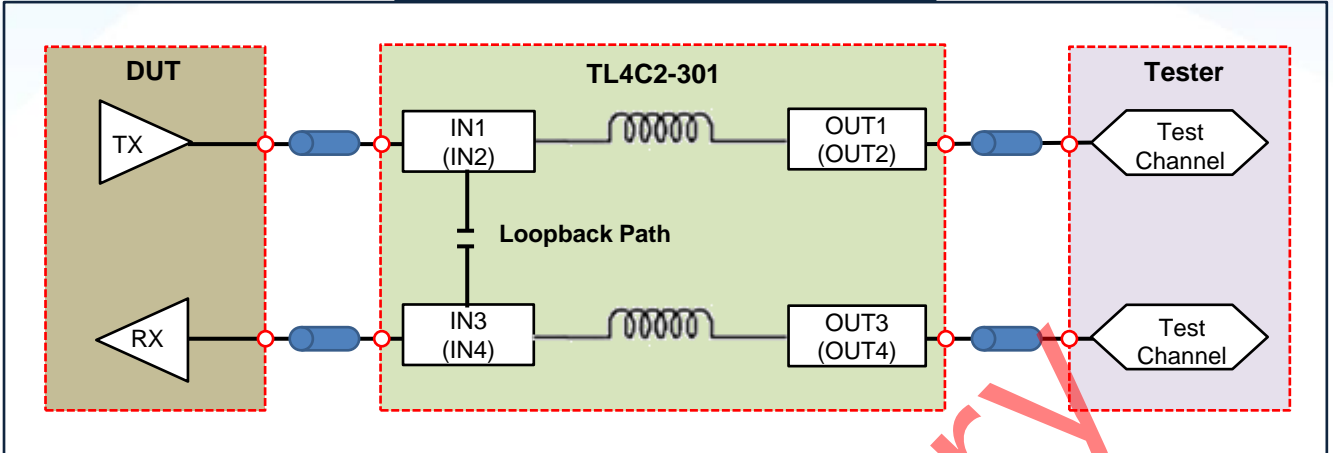


- L1~L4 : MEMS Inductor
- C1,C2 : AC Coupling Capacitor
- AC Coupling Capacitor Specification : 220nF (±10%), 6.3V rated voltage

## Inductance vs Frequency

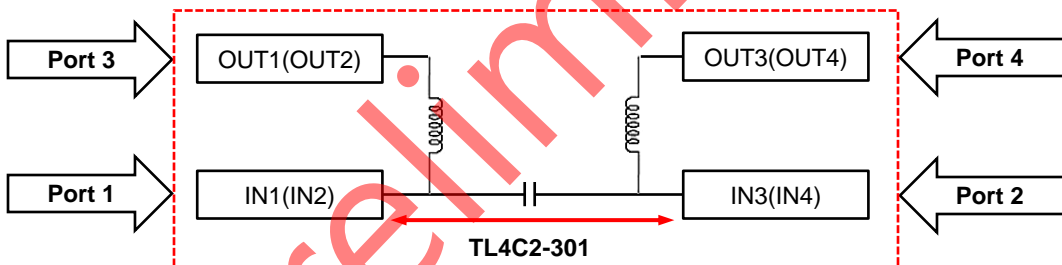


## Typical Application

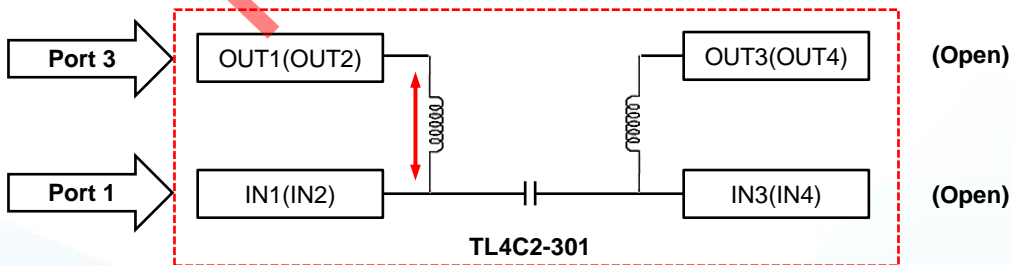


## S-Parameter Measurement Set up

- Loopback Path



- Inductor Path (Test Channel Connection)



[Note] Other pads are open except probing pads

## S-Parameter

- Loopback Path S-Parameter



- Inductor Path S-Parameter (Test Channel Connection)



- Loopback Path S-Parameter

Frequency	Insertion Loss(dB)	Return Loss(dB)
0.5 GHz		
1.0 GHz		
2.0 GHz		
3.0 GHz		
4.0 GHz		
5.0 GHz		
6.0 GHz		
7.0 GHz		

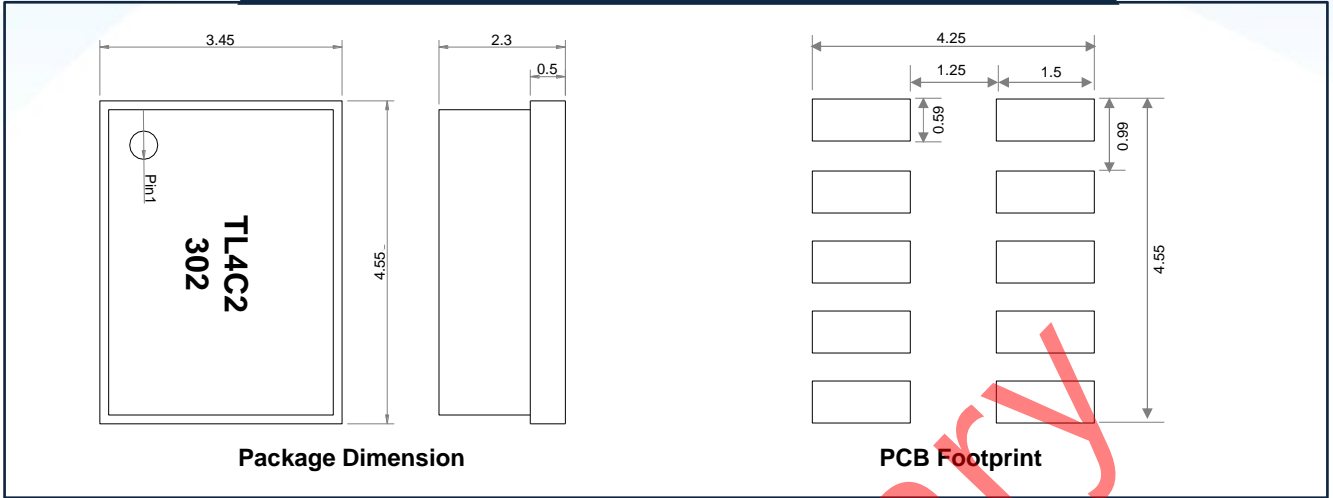


- Inductor Path (Test Channel Connection) S-Parameter

Frequency	Insertion Loss(dB)
100 MHz	-2.53
200 MHz	-6.00
300 MHz	-8.98
400 MHz	-11.50

# TL4C2-302

## PKG Dimension & PCB Footprint (Unit : mm)



## SMT Reflow Profile (for Lead Free)

Parameter	Specification
Preheat and Soak [ Temperature min (T <sub>smin</sub> ) Temperature max (T <sub>smax</sub> ) Time (T <sub>smin</sub> to T <sub>smax</sub> )	150 °C 200 °C 60~120 seconds
Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )	3 °C/second maximum
Liquidous temperature (T <sub>L</sub> ) Time at liquidous (t <sub>L</sub> )	217 °C 60~150 seconds
Peak temperature in reflow (T <sub>p</sub> )	260 °C (+0/-5 °C)
Time(t <sub>p</sub> ) within 5 °C of the specified classification temperature (T <sub>c</sub> )	20 seconds
Average ramp-down rate (T <sub>p</sub> to T <sub>smax</sub> )	6 °C/second max
Time 25 °C to peak temperature	8 minutes max

[Note] Prior to SMT, bake TL4C2-302 for 1.5hour at 120 °C if it was stored over 3days at room temperature after unpacking.  
A one year warranty before opening vacuum pack from the date of delivery of the components & 3 months warranty after opening vacuum pack.

