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# S-parameter Data Library

**TDK Corporation**  
**Application Marketing Group**

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## < Applicable condition >

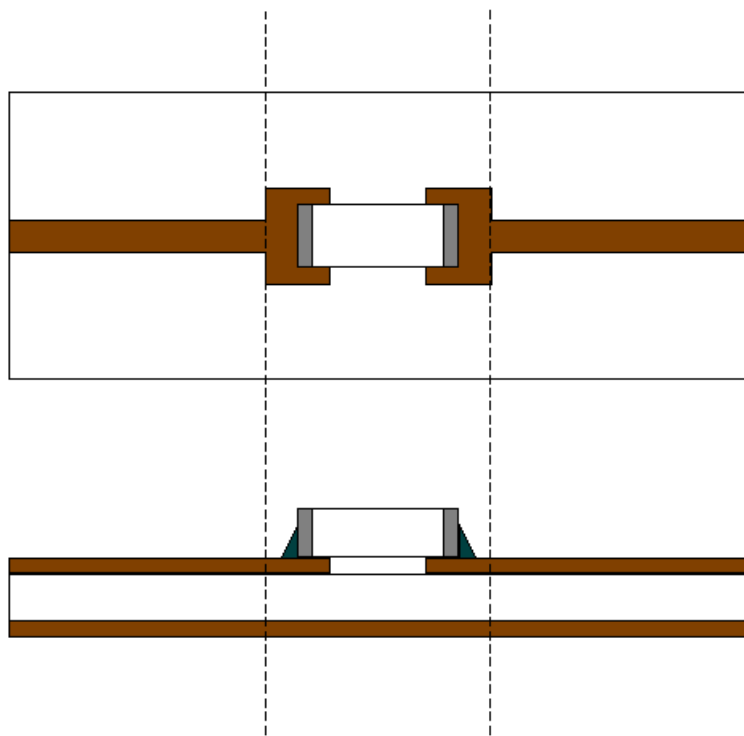
The data in this library is obtained under the condition of 25°C, no DC bias, and small signal operation. Proper result might not be obtained if your condition is different from the above one.

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## S-parameter is measured by using Network Analyzer.

- Test Board : Micro-strip line with 50 ohm characteristic impedance (FR4 0.4mm thick)
- Temperature : 25 degree Cel.



Reference Plane

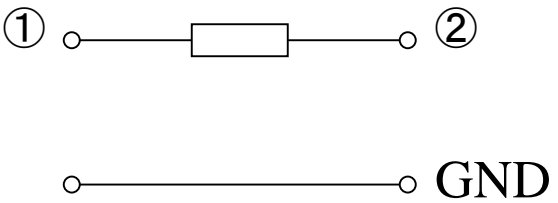
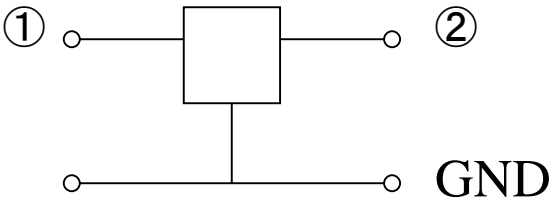
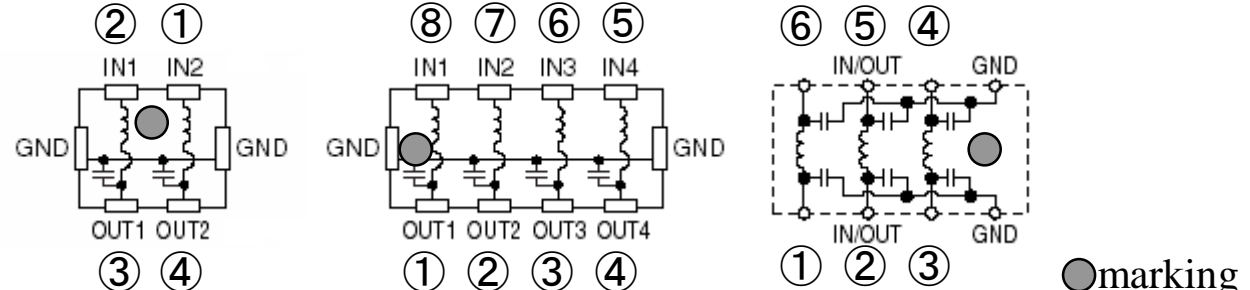
An example of test board for 2-port device

- DUT is put on a micro-strip line.
- TDK's recommended land pattern is formed around the DUT.
- Reference plane is set at the edge of the land pattern by calibration.
- So measurement data include the characteristics of land pattern.
- To satisfy passivity, measured S-parameter is corrected a little.

(Note)

S-parameters of a part of chip beads, inductors and multi-layer ceramic capacitors are converted from the impedance data measured by impedance analyzer.  
S-parameters of high frequency inductors are converted from the equivalent circuit model.

# Port Assignment (1/3)

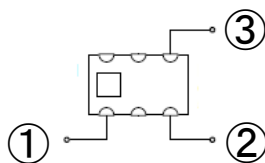
<p>2-terminal Components(*)</p>	 <p style="text-align: right;">Series-thru</p>
<p>3-terminal filter Feed-through capacitor</p>	
<p>3-terminal filter array</p>	 <p style="text-align: right;">● marking</p>

(\*)Chip Beads, Inductors, Multilayer Ceramic Chip Capacitors, Chip Varistors

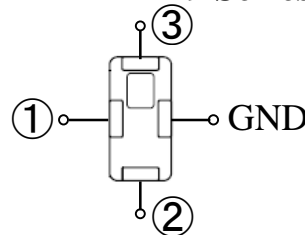
<p>Common mode filter (CMF)</p>	
<p>CMF array</p>	
<p>Multi-line CMF</p>	

Balun

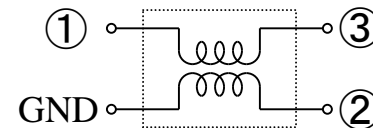
**HHM15,17 Series**



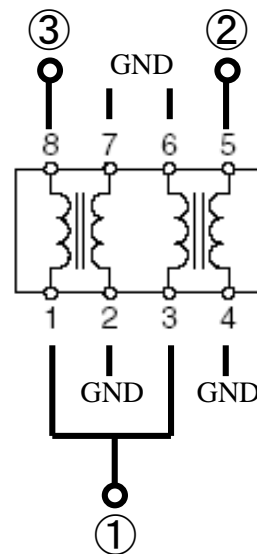
**HHM19 Series**

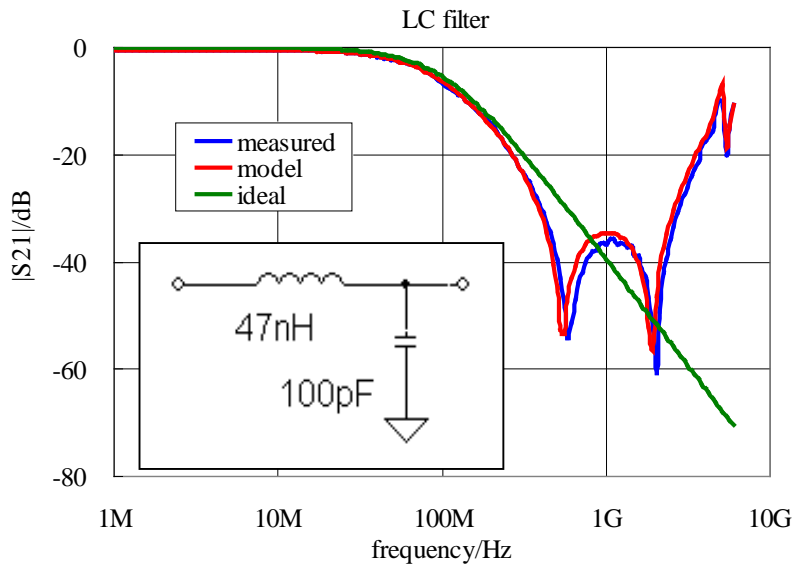


**ATB2012, TTB12G Series**



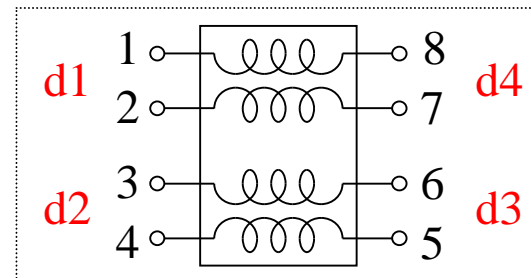
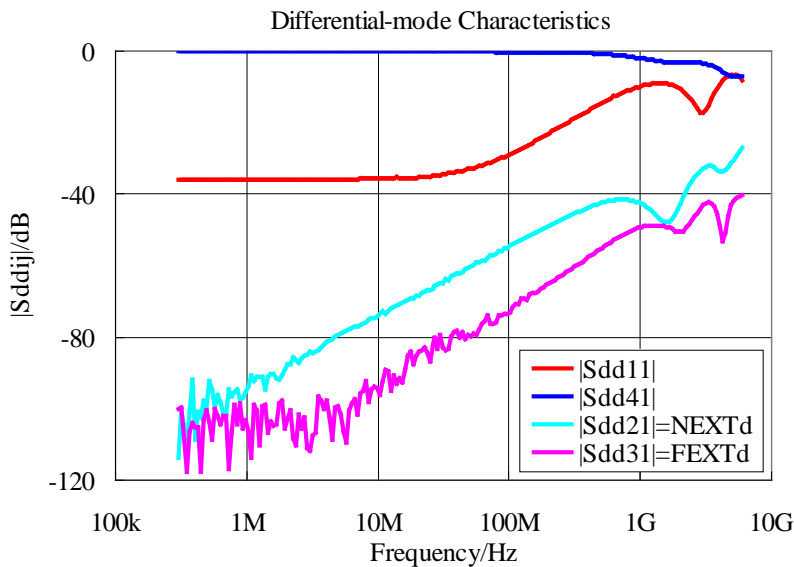
**TTB16G Series**





This example is of a filter composed of one inductor and one capacitor. If these elements are ideal, it is a simple low pass filter with cut-off frequency about 50MHz (green line). But the actual behavior is different. There are two poles in the attenuation band (blue line).

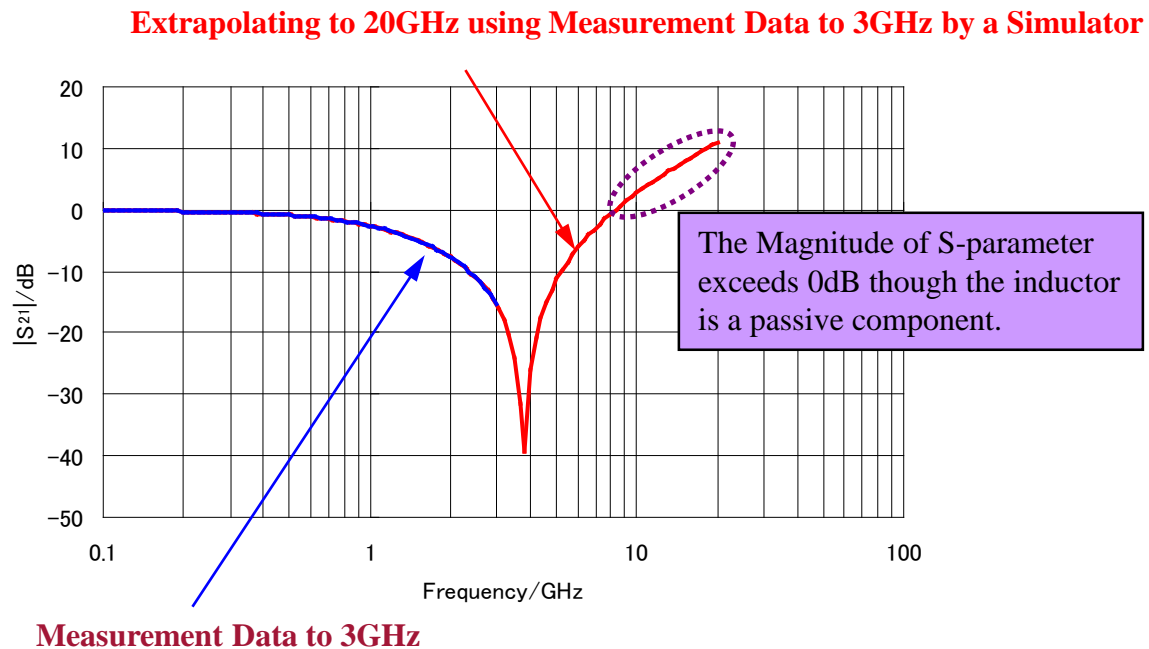
By using the TDK S-parameter Data Library, the two poles can be realized (red line).



- Near end crosstalk (NEXT) of differential mode  $|S_{dd31}|$  is -55dB, and far end crosstalk (FEXT)  $|S_{dd41}|$  is -73dB at 100MHz.

S-parameter consists of a finite frequency range. So, please do NOT use it beyond the range.

Ex.  $|S_{21}|$  of a Inductor





- There is no difference in S-parameter by the tolerance because TDK S-parameter Data Library uses typical data of the product.

