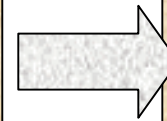


# TDK S-parameter Data Library

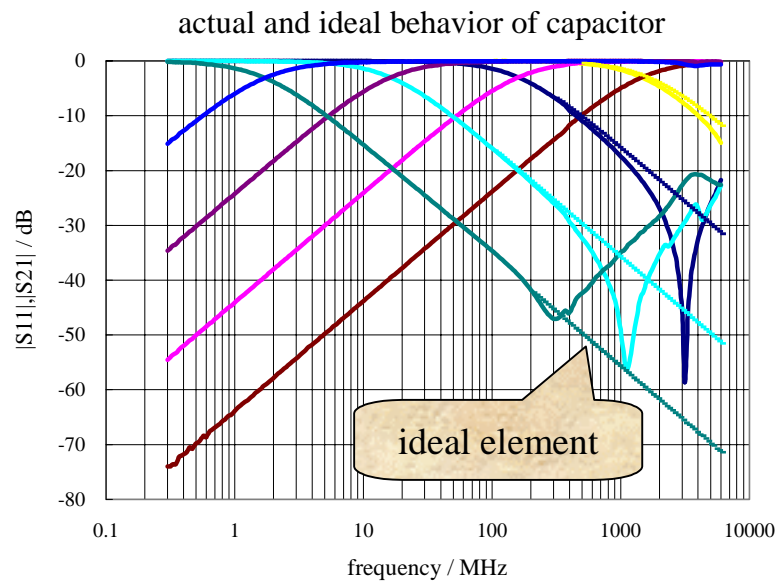
TDK Corporation

When simulating the behavior of a circuit at high frequencies using ideal elements, the result may differ significantly from the actual behavior. This is due to the high frequency contributions of parasitic components of real circuit devices.



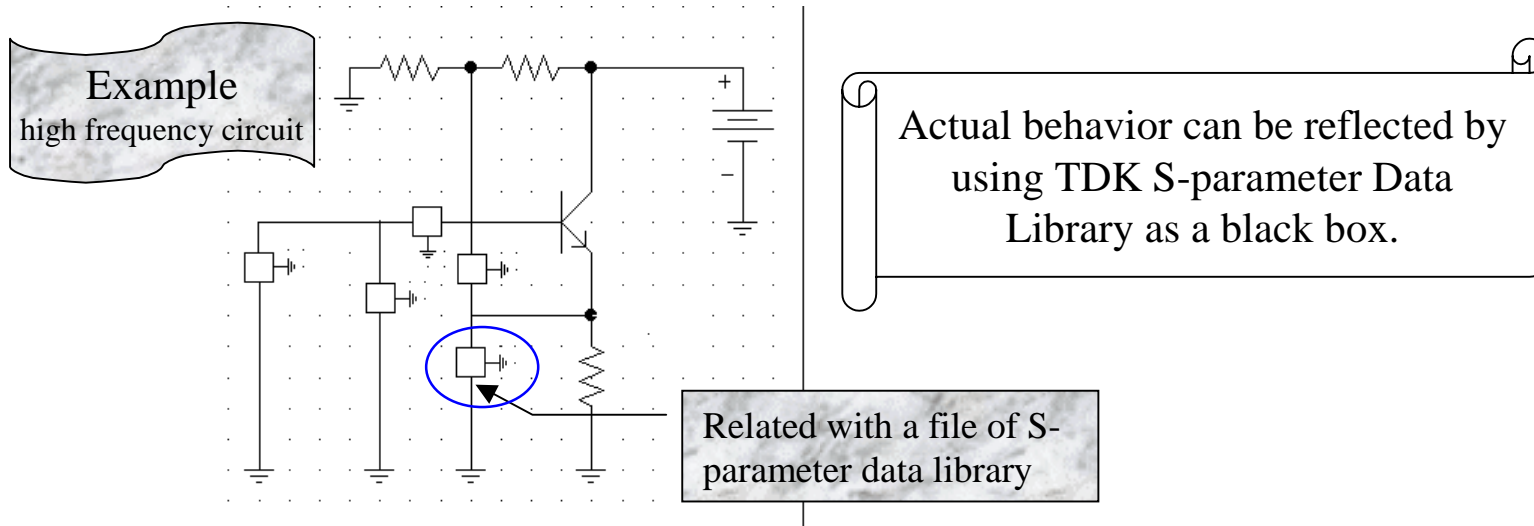
High frequency characteristics

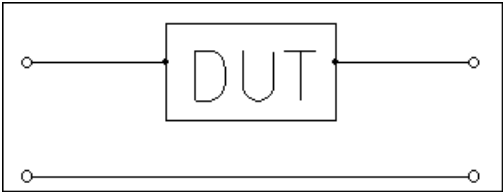
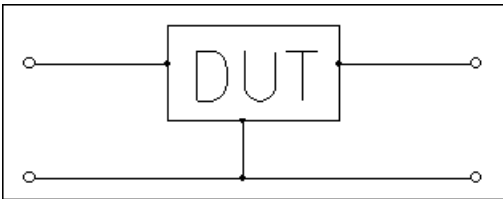
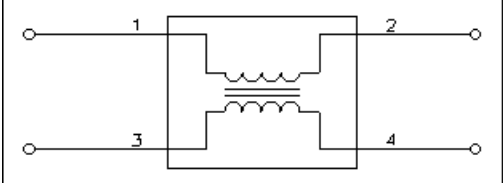
↓  
Electronic Device Library

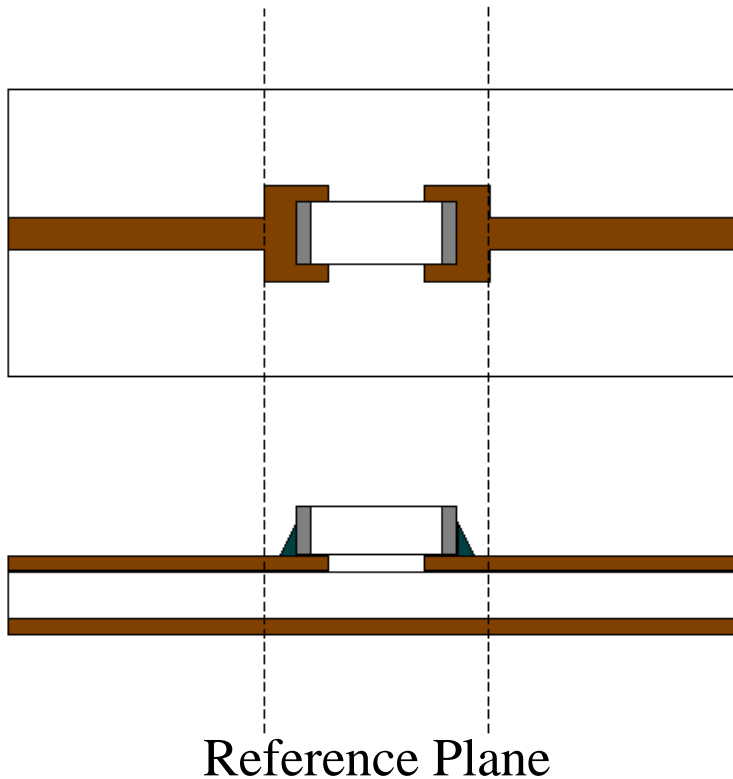


Using the S-parameter data library, these parasitics are accounted for, resulting in a better simulation result.

- This library consists of three types of file. They are an explanatory file (readme.txt), an instruction file (slibe.pdf) and data files (\*.zip).
- Data files (\*.zip) are compressed by zip. Zip file consists of a number of S-parameter data files (\*.s2p and \*.s4p).

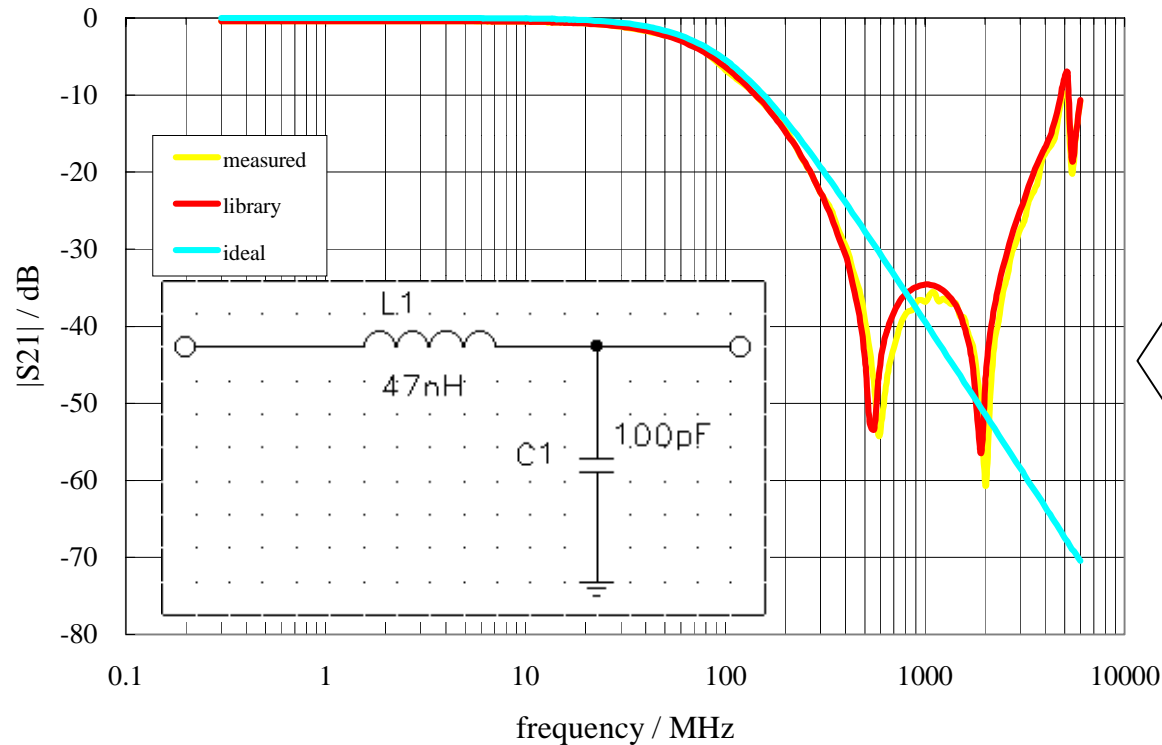


	Layout	Port	Frequency	Others
2 terminals (include array type) < capacitor, inductor chip beads >		2-port	300 kHz   6 GHz	Meas. Board FR4 (0.4mm <sup>t</sup> )  Meas. Temp. 25 degree C
3 terminals < 3-terminal filter >				
4 terminals < common mode filter >		4-port		



- DUT is put on a microstrip 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.

## Low Pass Filter



- 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 (blue line). But the actual behavior is different. There are two poles in the attenuation band (yellow line).
- By using the TDK S-parameter Data Library, the two poles can be realized (red line).

This chart shows the simulation tools and special instructions that should be followed to effectively use the library.  
(an example of \*.s2p)

Simulation Software		How to use TDK S-parameter Data Library with this simulation tool
ADS	Agilent	1.S-parameter file (.s2p file) is to be copied into an appropriate directory. 2.The file is specified by S2P element in the simulator
Series IV	Hewlett Packard	1.S-parameter file (.s2p file) is to be copied into *_prj/data directory. 2.The file is specified by S2P element in the simulator
MDS	Hewlett Packard	1. S-parameter file (.s2p file) is to be copied into an appropriate directory. 2. Make a dataset icon and do "Perform/Read/TOUCHSTONE" on it. The file will be transferred into the dataset icon. 3. The dataset icon is specified by TWOPORT element in the simulator (MDS components/Linear devices/Nportdata/Two port).
=SuperStar=	Eagleware	1. S-parameter file (.s2p file) is to be copied into an appropriate directory. 2. The file is specified by TWO element in the simulator. (two n1 n2 0 O=SP Z=50 FILE=filename)
MMICAD	OPTOTEK	1. S-parameter file (.s2p file) is to be copied into an appropriate directory. 2. The file is specified in the FILES BLOCK of circuit file. (filename networkname 2P) 3. Networkname is described in the CKT BLOCK of circuit file. (networkname node1 node2)
PUFF	S.W.Wedge R.Compton D.Rutledge	1. S-parameter file (.s2p file) is to be copied into PUFF directory. 2. The file is specified by device element in the parts window. (device filename) 3. In the board window, it is necessary to define that the units of design frequency:fd is MHz and the reference impedance:zd is 50 ohm.
S.NAP	MEL	1.It is necessary to rewrite the header. 2. S-parameter file (.s2p file) is to be copied into an appropriate directory. 3. The file is specified by D2P element in the simulator. (D2P name n1 0 n2 0 DATA=filename V=0 I=0)
PSPICE	OrCAD	Applicable, but need to translate the S-parameter Data to ABM EFREQ form. PSPICE Application Notes:"Creates S-parameter Subcircuit for Microwave and RF Applications"

The Conversion program translates S-parameter to SPICE netlist.

Conversion program		simulator
SPAR	Apsim	ApsimSPICE/HSPICE
SPICE Model Generator	Agilent	HSPICE/MDIF
Broadband SPICE	Sigrity	HSPICE/PSPICE/Speed2000
Fullwave SPICE (Mode2Node)	Ansoft	HSPICE/PSPICE/Maxwell SPICE