277 Lakeshore Road
Pointe-Claire, Quebec, H9S-4L2, Canada
Tel 514-630-6067 Fax 514-630-7466
E-mail 74224.160@compuserve.com

Product Note 36

WinPLOT, Cartesian and Polar Plot Generation Software for Windows®

WinPLOT processes CCMT [1] and ALPS [2] saturation, S-parameter, and IV-curve data files to cartesian or polar plots (including Smith Chart plots). WinPLOT processes up to 8 contours at a time and has user defined configuration capability for axis, view and combinations of cartesian and polar plots. The IV-curve plots can be read-out by a marker and the DC-bias values can be send to CCMT and ALPS in order to set the bias of the DUT automatically via a GPIB power supply.

Description of WinPLOT

WinPLOT can be invoked as a stand-alone Windows® application or can be called from WinPOWER or WinALP, the system software of CCMT and ALPS correspondingly.
WinPLOT allows various views of the data and has automatic and manual scaling capability. Cartesian data of s-parameters can be plotted in linear or logarithmic scales.
WinPLOT can plot all data included in combination or independently in overlapped or tile form.
All plots can be drawn either with measurement markers shown or not.
The DC (IV-curve) plots can be read-out by the mouse pointer. This includes interpolated values of the control parameter (Base Current or Gate Voltage). If the right button of the mouse is clicked the actual bias data are saved in an intermediate file and drive an attached GPIB DC power supply to polarize the device under test to the required values. The actual values set are read back by WinALP or WinPOWER and displayed for confirmation.

All plots can be printed out using Windows® Print capability and extensive printer driver support.
The user can define comments and axis labels from a special configuration dialogue.

Figures 1 to 7 on the following pages illustrate the basic graphic display capability of WinPLOT.

Note 1: CCMT: Computer Controlled Microwave Tuner, passive Load Pull and Noise Measurement System [1].
Note 2: ALPS: Active Load Pull System [2].

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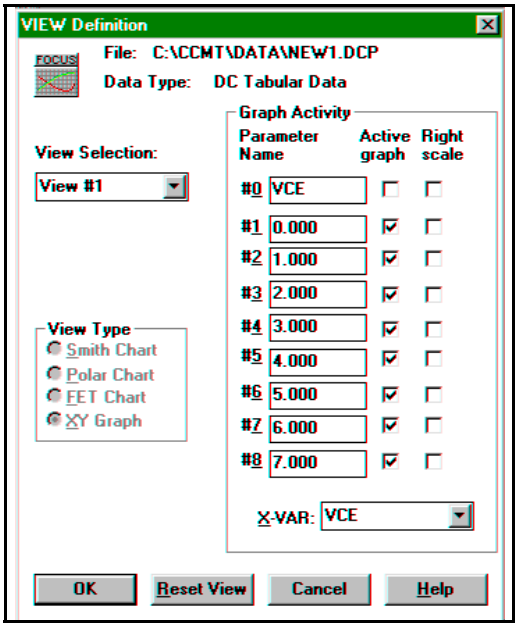
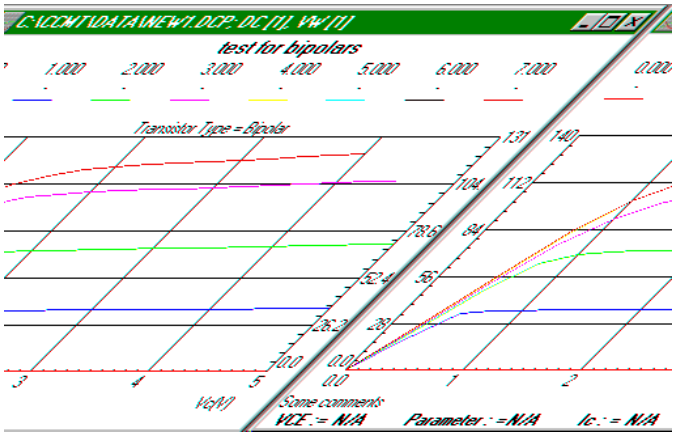
DC (IV-curve) Plots



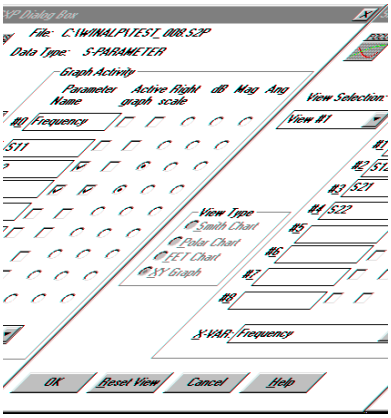
WinPOWER and WinALP have the capability of measuring IV-curves of transistors using GPIB programmable power supplies. The data are saved in ASCII files with the extension .DCP. These files can then be processed to plots by WinPLOT including or not the measurement markers (figures 2 and 3).
The configuration dialogue of figure 1 allows to define the parameter values (up to 8) to be displayed.
The same dialogue is used also to configure any other plot of WinPLOT, including S-parameter plots in cartesian, polar or Smith Chart layout.

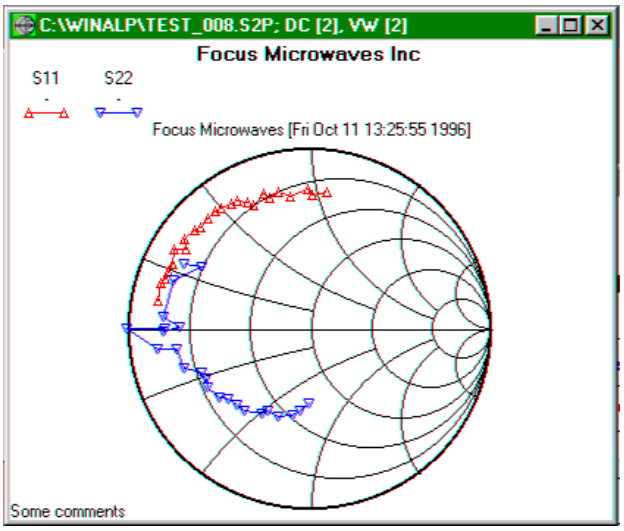


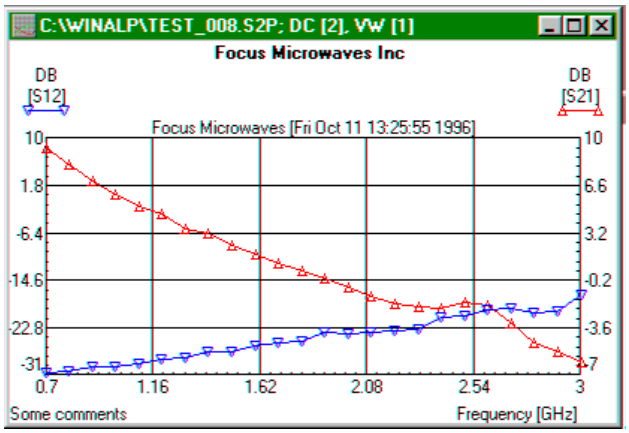
The DC plots can be read out by the mouse. A click on the right button at any given bias point allows to automatically set the DC bias of the transistor to this point through control of an attached GPIB power supply through the load pull measurement software of CCMT or ALPS.

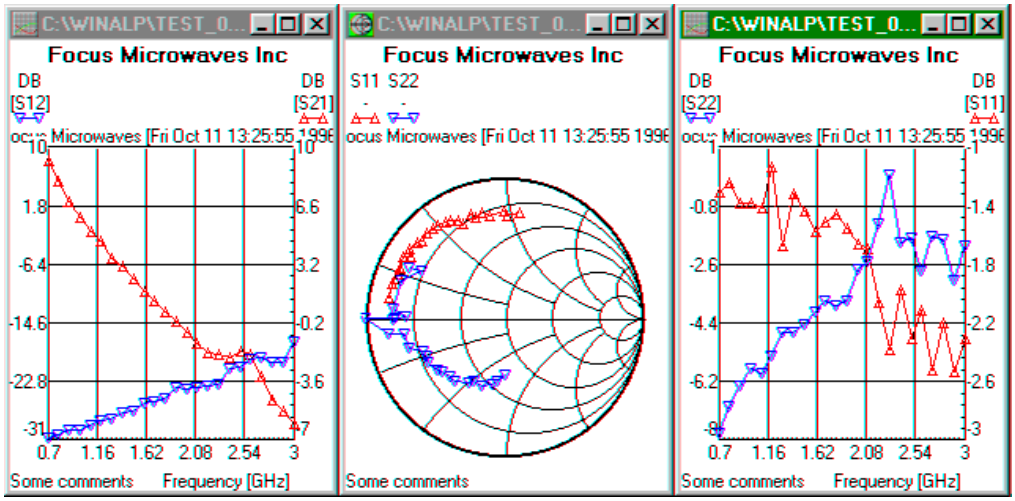
S-Parameter Plots

S-parameter plots may be generated from normal S2P files using WinPLOT. WinPLOT handles a selection of cartesian, polar and Smith Chart plots. As shown in the configuration dialogue of figure 4, WinPLOT handles also a FET chart, which is combined Smith chart (for S11 and S22) and polar chart (for S12 and S21). Several "views" can be defined, saved and recalled in a scroll-box. They hold the configurations and display different parameters with a choice of axis scaling and comments.



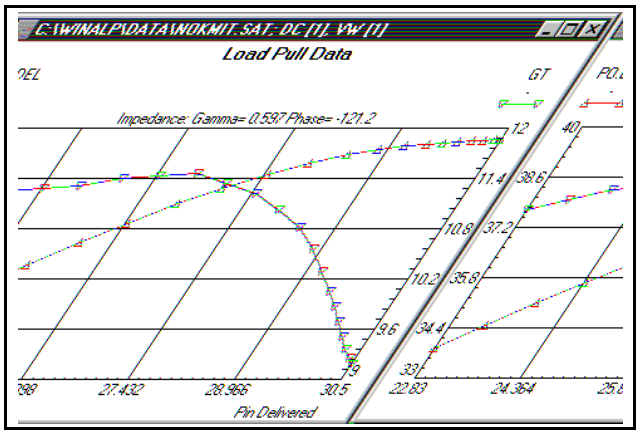


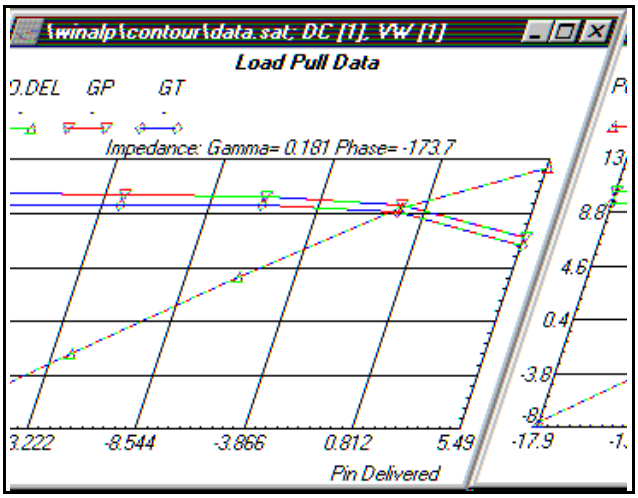



C:\WINALP\TEST_0...
Focus Microwaves Inc
DB
[S12]
DB
[S21]
10
1.8
-6.4
-14.6
-22.8
-31
10
6.6
3.2
-0.2
-3.6
-7
0.7 1.16 1.62 2.08 2.54 3
Some comments
Frequency [GHz]
C:\WINALP\TEST_0...
Focus Microwaves Inc
S11 S22
Some comments
C:\WINALP\TEST_0...
Focus Microwaves Inc
DB
[S22]
DB
[S11]
-0.8
-2.6
-4.4
-6.2
-8
-1
-1.4
-1.8
-2.2
-2.6
-3
0.7 1.16 1.62 2.08 2.54 3
Some comments
Frequency [GHz]

Saturation Plots

WinPLOT is used to generate plots of power sweep (saturation) measurements. If these measurements are made using the passive system CCMT and WinPOWER then these plots are saved in ASCII files with the extension .SAT (figure 8).
But WinPLOT may generate the same plots from data of the Active Load Pull System (ALPS). This data include both power sweep and load impedance information (load pull data) in the same file. Every time the user clicks on a load inside a contour plot, WinPLOT is invoked automatically (as a "child" process) and generates such a plot (figure 9). This provides valuable information about the saturation behaviour of the transistor as a function of load impedance and the source matching conditions (if the difference between Power Gain "GP" and Transducer Gain "GT" in figure 9 is zero then the DUT is perfectly matched at the input port) .





Literature

[1] Measurement and Software Capability of the CCMT Load Pull System, Product Note 12A, Focus Microwaves, 1996.

[2] ALPS, Active Load Pull System for PCN Applications, Product Note 33, Focus Microwaves, 1996.