

A full automated compact and accurate measurement solution

MC2-Technologies has developed a full automated pulsed IV/RF measurement setup.

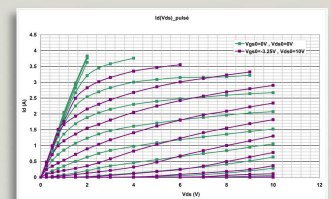
Nowadays Pulsed IV measurement is the preferred method for capturing current-voltage characteristics of active devices like field effect and bipolar transistors for nonlinear modeling and/or physical analysis. The pulsed IV characteristics allow thermal and trap effects studying making this method suitable for power microwave transistors or amplifiers based on new semiconductor technologies (wide bandgap). This measurement setup has been developed by experts in modeling and microwave characterization. Thanks to the approach developed by MC2-Technologies experts, this setup allows to carry out an accurate modeling of nonlinear devices reducing development time and marketing.

MC2-Technologies has developed its new generation pulsed IV/RF measurement system, called APMS2010RA, to reach requirement for the most challenging problems usually faced with new generation of microwave devices.

This new measurement system is based on two standalone pulser heads embedding its own AD converters and pulse generators and placed as close as possible to the device under test. This criterion is the key point to reach fast rise and fall time pulse generation and to reduce the overshoots amplitude of the current impulse. One head type is dedicated for generating and measuring $\pm 12V$ range. This head also measures the current with high accuracy. On the other hand the second heads type has been designed for $\pm 200V$ range pulse generation and measurement. Despite the high current and voltage measurable value, this head enables high accuracy.

Pulsed IV measurement system

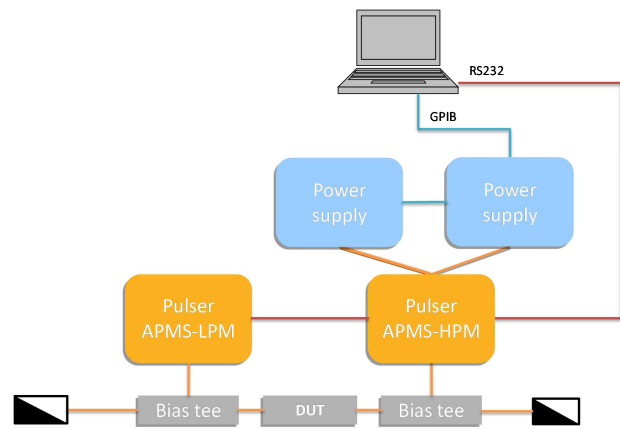
The APMS2010RA is supplied with two pulser heads, one dedicated for high voltage and high current suitable for the drain/collector (APMS-HPM) and the second one designed to reach high accuracy in lower voltage and current suitable for gate/base (APMS-LPM). Two external



Key Features

- Up to 200V, 4A
- Highly customized pulse generation
- Minimum pulse width 200ns
- Duty cycle non limits
- Optional S-Parameter capabilities.
- Minimum duty cycle with S parameter 1% with 500ns pulse width (with Agilent PNAX).

power supplies are needed. Therefore if you already have GIPB compatible ones you can use it which allows money savings. Otherwise MC2-Technologies can provide these power supplies as optional modules. Furthermore bias Tees are the key point for accurate pulsed measurement. MC2-technologies has developed its own bias Tees for this measurement setup. These ones are optionally supplied. The measurement setup is also provided with user friendly software allowing



pulse configuration, hardware management, batch measurement setup and so on. This software is installed on a laptop supplied with the solution. The software has been implemented by MC2-Technologies experts to provide a wide range of pulsed IV characterization and to perfectly answer the needs of nonlinear modeling or physical analysis. The user can observe all the voltage and current pulse shapes versus time without additional scope. The minimum time step available is 10ns, offering the right time resolution. The user can easily define the measurement window position for each voltage and current pulse. The software offers the opportunity to carry out a maximum of 32000 averages on each signal (voltages and currents) to increase the accuracy. Thanks to the pulser’s architecture, the measurement time is very fast even if the average number is high. The user can define various pulse’s configurations (duty cycles, pulse widths, measurement window positions, voltage ranges, power and current compliances, quiescent biasing points...) to characterize devices. All the configurations can be saved in a file in order to be reused later or imported into other software. The user can define a complete batch of measurements with different configurations. The system is fully autonomous, no external contribution is needed. The setup does not require standards for calibration and takes into account the voltage drops between the measurement reference planes and the DUT. The user can choose two different modes of measurement approach. If only IV pulse measurements are requested, the “no convergence” mode can be used. In this frame, the drain/collector step voltage won’t be constant and the measurement time will be very fast. On the other hand, if the user needs S parameters measurements with pulsed condition, one can choose the “convergence” mode to obtain a constant step of the drain/collector voltage.

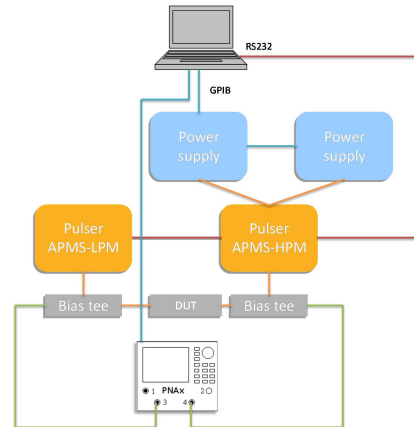
Voltage and Current Measurements

Specifications	APMS-HPM Drain Pulsers Head specifications	APMS-LPM Gate Pulsers Head specifications
Max Voltage	±200V ±3mV	±12V ±700µV
Max Current Pulsed	4A	40mA
Max Current DC	4A	40mA
Max Error (Range)	5% ±1mA	5% ±20µA
Typical Error	1% ±0.2mA	1% ±10µA
Max Power	800W	400mW
Min Pulse Width	200ns	200ns
Max Pulse Width	No limits	No limits
Min Duty Cycle	0%	0%
Max Duty Cycle	100%	100%
Test Port Connector	BNC(f)	BNC(f)
ADC resolution	16 Bits	16 Bits
Rise Time (DUT depending)	20-50ns	20-50ns

Fall Time (DUT depending)	20-50ns	20-50ns
Output impedance	4.7Ω	70Ω

Optional RF S_{ij} measurement subsystem

- Agilent PNA-X 2 or 4 Ports Vector Network Analyzer allowing S_{ij} measurement
- PNA-X setup and calibration is performed by the user friendly software developed by MC2-Technologies. No specific knowledge is required.
- Measurement timing and triggering of the PNA-X is handled by the supplied software
- Pulse IV measurement are stored in any usual format MDF, CITI or CSV and S parameters are saved in MDF, tabular files or S2P.
- Synchronization between the pulsed DC and pulsed RF is carried out by hardware and software supplied within our solution.



General Specifications

External DC power supplies:

Typical power supply 200V, 500mA with 10% duty cycle. The measurement setup is able to carry out pulsed measurement up to 4A the power supply needed depend on the duty cycle used during measurement. For more information please contact MC2-Technologies.

Environmental:		Dimensions:	
Operating Temperature range: 5°C to 35°C Operating Humidity range: 5% to 70% Storage temperature range: -20°C to 50°C Note: Temperature changes after calibration must be less than 5°C.		32x19x9cm	
Weight:		Data Storage:	
6Kg (3Kg per pulser)		HDD laptop	
Operating system:		Ports:	
Windows XP, Vista, 7.		Serial Port (supplied with the laptop) and USB / GPIB adapter (optional).	

Options available

Options	Description
Option 1	Tee Bias
Option 2	Power supply
Option 3	S_{ij} measurement (Hardware and/or software)



MC2-technologies 5 rue du Colibri
59650 Villeneuve d'Ascq
www.mc2-technologies.com
Phone : +33(0)320 045 567