HMS3000

MANUAL HALL EFFECT MEASUREMENT SYSTEM

Hall Effect Measurement System is very useful for measuring Carrier Concentration, Mobility, Resistivity and Hall Coefficient that should be pre-checked in order to grasp the electrical specifications of semiconductor device. Therefore, it is essentially required system to understand the electrical characteristics of semiconductor device.

HMS series consist of constant current source , terminal conversion system by Van der Pauw technique, cold or hot temperature test system and magnetic flux density input system. So, it is well-established system that has all the things needed to Hall Effect Measurement System.

Hall effect Measurement Systems allow the ultra-fast characterization of several intrinsic parameters of conductive, semi-conductive materials. They use the Van Der Pauw method which is perfectly suited to thin film measurements and the Lorentz force in order to monitor around ten characteristics simultaneously under different environmental constraints.

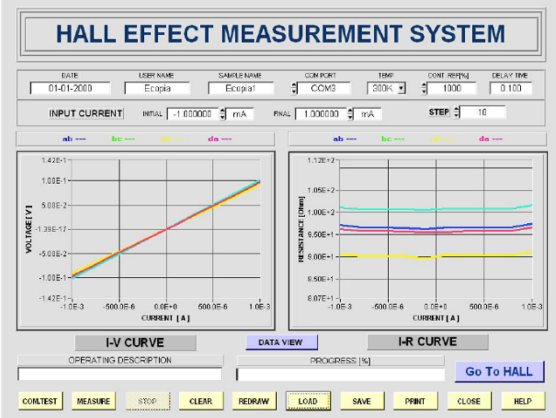
Thanks to several module, the equipment permit to monitor the internal electrical parameters of a layer under different environmental constraints (variable temperature or variable magnetic field).

microworld®
Grenoble -FRANCE
Tel. +33 (0)4 76 56 16 17
Contact@microworld.eu
www.microworld.eu

A central unit controls the measurements. It integrates an internal SMU with a switch matrix to perform measurements using the Van der Pauw method. It has a communication boardthat will be connected to an external computer on which software will manage the parameters.

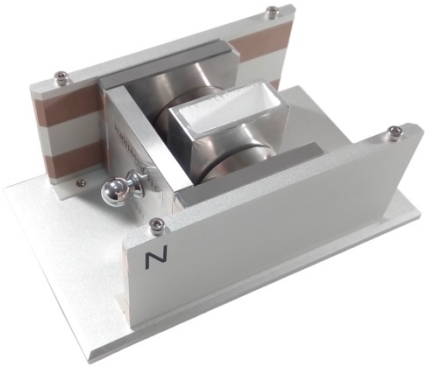
The software is the system's user interface. It consists of a measurement window and a contact test window. This "contact check" module verifies that all four contacts are ohmic and free of defects.

The measurement window allows users to enter measurement parameters and initiate the test. The software integrates all the necessary formulas and displays the calculated results of the sample parameters directly on an exportable table.



The sample is mounted on a PCB equipped with four gold-plated pogo pins for reliable electrical contact. These pogo pins are spring-loaded for easy positioning on the sample (no soldering required). Metallization (indium, silver, etc.) can further optimize contact depending on the material.
Several PCB board are available to suit the thickness and size of the sample.

A magnet module is the final component of the system. It allows the sample holder to be inserted between the magnet to perform the Hall effect measurement. The magnet is positioned manually. A reservoir allows the sample to be immersed in liquid nitrogen for cold measurements (no temperature regulation, no temperature reading). This reservoir is not available for high magnetic fields (1T).



Specifications:

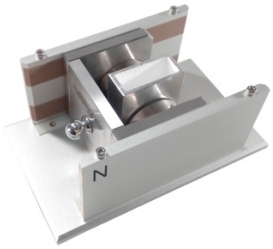
Sample size	5 x 5mm to 20 x 20mm (other on request)
Sample thickness	Max 2mm (other on request)
Probe	4 x gold plated pogo-pin
Mouvement	Manual
Sample material	SI, SiGe, SiC, GaAs, InGaAs, InPGaN, AlZnO, FeCdTe, ZnO…
Magnetic field	From 0.25T to 1T (according magnet module)
Magnet type	Neodym permanent
Temperature	Ambient or 77K (according magnet module)
Temperature management	No
SMU	Internal
Current range	1nA to 20mA
Max voltage	10V
Voltage accuracy	+/- 2µV (0.02%) @ 10mV , +/- 2µV (0.2%) @ 1mV
Sheet resistance range	10^{-4} to 10^{7} Ω.cm
Concentration range	10^{7} to 10^{21} cm^{-3}
Mobility range	1 to 10^{7} cm^{2}/Vs
Software	Included (measurement, contact check, calculation)
Data export	Yes (.csv)
Computer	Not included (Win10/11 compatible)
Communication	USB
Power	230V mono – 1A – 50Hz
Dimensions (w x l x h)	Mainbody: 390 x 300 x 110mm MS51R: 200 x 120 x 110mm
Weight	Mainbody: 4.5kg MS51R: 3.5kg

SPCB sample holders:

SPCB-00	0 – 1.5mm thickness for 1T magnets
SPCB-01	0 – 2mm tickness
SPCB-02	2 – 4.5mm tickness
SPCB-03	3 – 5.5mm tickness

Magnet modules:

MS module
Single magnet



MP module
Double inverted magnets
mounted on a sliding rail

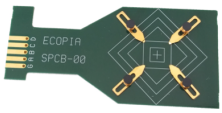
EVM module
Mechanical variable field

EVM-N2 module
Mechanical variable field
with LN2 tank

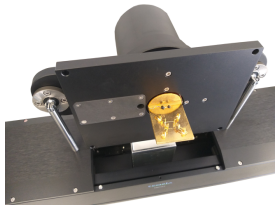
Module	Magnetic field power	Temperature	Diameter	Pole gap
MS37R	0.37T	350K or 77K	30mm	26mm
MS51R	0.51T	350K or 77K	50mm	26mm
MS100T	1T	350K only	50mm	6.5mm
MP37R	Double 0.37T	350K or 77K	30mm	26mm
MP51R	Double 0.51T	350K or 77K	50mm	26mm
MP100T	Double 1T	350K only	50mm	6.5mm
EVM-100R	0.25T to 0.97T	350K only	50mm	NA
EVM-100N2R	0.25T to 0.97T @ 350K 0.25T to 0.55T @ 77K	350K or 77K	50mm	NA

Related products

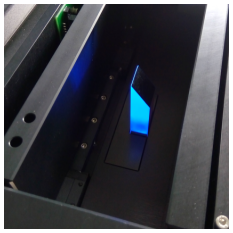
SPCB holder



Thermal hall



Photonic hall



Vacuum hall