

RIGEL

Setup Details

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Standard Operating Procedure (SOP)

RIGEL system is used for room temperature/high temperature (upto 250 °C) IV and pulse/dynamic I-V measurements. It has following instruments.

1. Keysight Model B1500A semiconductor device analyser – 2 SMUs, 1 GNDU
2. Keysight Model B1500A semiconductor device analyser – 1 WGFMU, 2 SMUs, 1 GNDU
3. Keysight 81110A Pulse Pattern Generator, 165/330 MHz
4. Keithley K708a switch matrix
5. Keysight DSO9104a oscilloscope – 1GHz, 4 analog channels
6. Thermo chuck for high temperature measurement (upto 250°C)
7. 2 probe holders and manipulators (2 more can be added if required)

Following Measurement can be done:

1. I-V measurement (at temp. upto 250°C)
2. Pulsed IV/Fast IV/Transient IV measurement.
3. Memory performance characterization – Endurance, retention

Part A: Hardware Setup Usage Instruction

Step1:

Switch on the vacuum pump. This creates a suction force to the DUT (Device under test). The vacuum hold firmly the device on the chuck.

Step 2:

Switch on the light source. The intensity of light is controllable using knob.

Step 3:

The chuck is movable in X-Y plane by pressing both X-Y button. X and Y button moves chuck in X and Y direction respectively. Pull the chuck out. Move chuck down by using lever. Place the DUT exactly at the center of the chuck. Then move chuck up by using a lever.

(Caution: Before making the chuck up, make sure that probe needle is sufficiently up so that chuck does not hit the probe tip.)

Step 4:

Focus the lens of microscope properly till contacts of sample are clearly visible. Probe the DUT with probe needle. Switch off the light source after probing is done

There are three knobs associated with each manipulator. These are used for moving the probe needle in X, Y and Z direction. Once the probe tip makes contact with DUT, it will slide over DUT indicating contact is done. Now Z- direction knob should not be rotated further otherwise it will damage the DUT or the probe needle can break.

Part B: Software Setup Usage Instruction

EasyEXPERT software is used for running the required measured. Many in-built models for DC sweep, fast measurements, MOSFET measurements etc are available here. User can directly use these models.

The measurements requiring multiple instruments to be used repeatedly for several hundreds of times can be performed by using the matlab codes developed by us (Pankaj Kumbhare and Neeraj Panwar).

Contact system owner (SO) to get trained on using EasyEXPERT/matlab codes.

Post Measurement Steps:

1. Move probe needle up by rotating the knob.
2. Move chuck down by using lever.
3. Safely remove the sample.
4. Switch off vacuum pump.
5. Switch off the light.
5. Close the EasyEXPERT application.