

FPP-5000 4-POINT PROBE SOP

Revised April 2020

PURPOSE: To measure the resistive properties of semiconductor substrates and resist films.

PROCEDURE

1. The probes are stationary and the wafer is moved into the probe heads with constant force.
2. Automatic calculation and display of sheet and slice resistivity, V/I, metallization thickness, and P-N type.
3. Internal self-calibration at each measurement ensures instrument accuracy.
4. The probe tips remain below the stage until the cover is lowered, eliminating damage to wafer. Probe tips are not powered until after contact with wafer, eliminating arcing with probe tip erosion or wafer pitting.



SET UP AND SAMPLE LOADING

1. Turn **ON** power switch on the rear of the machine.
2. Press **CLEAR** after the display lights up.
3. Select desired measurement mode (see below for details).
4. Open lid and place wafer on platen (**spiral side**) face down.
5. Select the appropriate wafer carrier (ring) - 2 inch, 3 inch and 4 inch and place on the wafer.
6. Position wafer at desired measurement location using the lines as guides.
7. Close the lid and gently press down (~ 2 seconds) until the measurement is complete. Results will be shown on the display.
8. When finished open the lid, remove your wafer and close lid.



OPERATION PROCEDURE

Measure Resistance V/I (Ohms)

Measurement range: 0.25e-3 to 99.9e3

1. Press "V/I" button, light should illuminate.
2. Press "PRGM" button.
3. Enter a geometry correction factor.

NOTE: For samples with a diameter greater than 2.5 inches enter 1.

Measure Sheet Resistivity $R = \rho/T$ (Ω/sq)

Measurement range: 1.1e-3 to 4.50e5

1. Press "SHEET" button, light should illuminate.
2. Press "PRGM" button.
3. Enter a geometry correction factor.

NOTE: For samples with a diameter greater than 2.5 inches enter 1.

Measure Slice Resistivity $\rho = RT$ ($\Omega\text{-cm}$)

Measurement range: 4.19e-5 to 17.1e3

1. Press "SLICE" button, light should illuminate.
2. Press "PRGM" button.
3. Enter thickness in angstrom (\AA), micron (μm) or MIL.
4. Press "STORE" button
5. Press "PRGM" button and that is your answer.

Measure Thickness

Measurement range: metallized thickness up to 2.43e-5

1. Can do this measurement assuming know resistivity.
2. Press "THICK" button, light should illuminate.
3. Press "PRGM".
4. Enter the slice resistance in $\Omega\text{-cm}$.
4. Press "STORE" button
5. Press "PRGM" button and that is your answer.

OTHER OPTIONS

1. **P/N**; the measurement will also indicate whether the semiconductor is n-type or p-type.
2. **PEN**; a high voltage (penetration voltage) is applied to the wafer to break through a thin insulating layer prior to measurement.
3. **RETEST**; perform the same test again without opening the lid.
4. **SELF-TEST**; performs a self-test. If successful, all lights except FAIL should be lit, and indicator should display 888x108. The clear button must be pressed to continue.
5. **CONST**; display the programmed constant.

ERROR MESSAGES

Pressing "CLEAR" can clear most error codes.

Error Codes	Description
E 01	Retest attempted with probe interlock open
E 02	Probe interlock is opened while a measurement is in progress
E 03	Display exponent over flow or under flow
E 04	Store attempted without completing entry of the new constant in PRGM mode
E 05	Penetrate switch depressed while penetrate mode internally disabled
E 06	Normal and reverse V/I disagree by more than 10%
E 07	Arithmetic error produced as a result of a geometric correction measurement
E 21 thru E 40	Electronic failure while attempting to make a measurement
E 51 thru E 57	Self-test error