

# FPP-5000

## Automatic Resistivity Meter

The original, low cost, automatic four point probe



- Easy to operate, simply load the wafer and close the lid.
- Automatic calculation and display of sheet or slice resistivity, V/I, metallization thickness and P-N type.
- Ideal for epitaxial, diffused, ion implanted and metallized layers.
- Internal self-calibration at each measurement ensures instrument accuracy of 0.5%.
- Automatic geometric correction using two-probe configuration technique minimizes errors due to variation in probe tip spacing.
- Programmable constants allow automatic correction for small sample sizes.



Optional remote hand held probe available:

- New, improved design
- Ideal for measuring large substrates

**MILLER**  
DESIGN & EQUIPMENT



# FPP-5000

## Automatic Resistivity Meter

# SPECIFICATIONS

**MEASUREMENT FUNCTIONS AND RANGE:** Digital computation allows the direct, error free, display of sheet resistivity in ohm/square from 1.1m $\Omega$ /sq to 450K $\Omega$ /sq, slice resistivity in ohm-centimeters from 4.19 x 10<sup>-2</sup>m $\Omega$ -cm to 17.1K $\Omega$ -cm, V/I in ohms from 0.25m $\Omega$  to 99.9K $\Omega$  or metallization thickness in kiloangstroms from 20 Å to 243 KÅ Use of graphs, tables or mechanical calculations and other associated errors are totally eliminated.

**OPERATION:** Operator simply places wafer on molded wafer carrier, and closes cover to initiate test. Unit automatically ranges and displays correct reading including decimal point, multiplier and wafer type simultaneously. Reading is held to assist in data logging until next test is initiated.

**PROBE HEAD:** Convenient plug-in probe head/adaptor assembly permits changing or replacing of worn probe heads in minutes without special tools or alignment fixtures. Alessi probe heads are provided as standard equipment.

**CONSTANT FORCE MECHANISM:** The FPP-5000 utilizes a probe up configuration. This probe up technique assures repeatable probe pressure at every test independent of operator force and substrate thickness.

**PROBE TIP AND WAFER PROTECTION:** The probe tips remain below the stage of the FPP-5000 until the cover is lowered, eliminating damage to the wafer. Probe tips remain unpowered until after contact with wafer to eliminate arcing with consequent probe tip erosion and wafer pitting.

**RFI/LIGHT SHIELD:** Cast aluminum RFI/Light Shield eliminates problems due to radio frequency noise and photoelectric effects when measuring high resistivity layers.

**DIRECT DIGITAL DISPLAY:** Test results are displayed on direct five digit LED display.

**PENETRATION FUNCTION:** Built-in penetration function applies a 170V, 4 msec pulse to probes through a 10M resistance prior to test for low contact resistance. Penetrate function is front panel selected.

**AUTO TYPING:** Automatic type testing (P-N) is determined by either a Rectification or Thermoelectric test. The substrate type will be indicated by illumination of either the P or N indicator. Invalid or questionable tests are indicated by illumination of both indicators.

**FORWARD AND REVERSE CURRENT TEST:** Automatic forward and reverse current test for instant verification of proper probe tip contact.

**CYCLE TIME:** Total test time less than 2 secs. (typically 1 sec.)

**ELECTRONIC ACCURACY:**  $\pm 0.5\%$  on all but extreme ranges for contact resistances up to 5K $\Omega$ . Unique automatic zero circuit minimizes thermal and source impedance effects and eliminates need to manually readjust instrument zero. The self calibration and zero circuitry assures high accuracy.

**VOLTAGE DETECTOR:** Input impedance 10M $\Omega$ . Input bias current 50pA.

**MAINTENANCE & SERVICE:** The microprocessor based electronics employ state-of-the-art components for trouble-free operation and high reliability. All electronic components mounted on easily replaced printed boards.

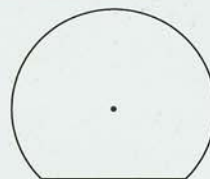
**OPERATING TEMPERATURE RANGE:** 15°C to 30°C

**POWER:** 115/230 volts $\pm 10\%$ , 50/60 Hz. Less than 12 Watts.

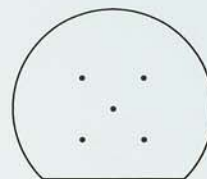
**DIMENSIONS:** 15" wide, 16" deep, 5" high (lid closed), 15" high (lid open)

**OPTIONS:** (a) RS232 Interface—allows printout of all measurement data, operator and wafer identification. Data can also be supplied to a host computer. (b) Remote Head—Ideal for resistivity and thickness measurements on large metallized surfaces. System includes an external probe head assembly (internal probe is removed) connected to the main unit through an 6ft cable.

### WAFER ROUTINES:



Single Point



5 point

### FPP-5000 ORDERING INFORMATION

FPP-5000 Four Point Probe System: Includes your choice of 50mm, 75mm, 100mm, 125mm, or 150mm wafer carriers; one Fragment carrier, and one Operation and Maintenance manual. Does not include probe head assembly (see below).

Application	Pressure gm/pin	Tip Radii in mils	Part No.
Standard Configuration FPP-5000 for silicon slices and ingots	70-180	2.0	8295-239-01
1. For epilayers <1 $\mu$ thick with polished & unpolished surfaces 2. For epilayers <1 $\mu$ thick with polished & unpolished and bulk resistance of 1 $\Omega$ cm	40-70	5.0	8295-239-05
For epilayers >1 $\mu$ thick polished & unpolished surface with bulk resistance of >1 $\Omega$ cm	40-70	2.0	8295-239-03
For metallization layers	40-70	10.0	8295-239-07
Spare head assembly mounted in probe holder (specify type)			8925-239-xx

#### Options

1. Hand held Remote Probe Head. Specify tip radius & pressure.
2. RS-232 Interface. Allows printout of all measurement data, along with operator and wafer identification. Data can also be sent to host computer.

#### WARRANTY

One year warranty, except probe head, which is a consumable item.

