Hall Effect

Appendix E

Ge Crystal Properties

Source: “UNILAB Thermionic and Solid State Devices”

Ge crystal: Manufacturer Specifications

Hall Effect Experiment

The semi-conductor material Germanium with its high carrier mobility makes it possible to demonstrate the important Hall Effect with very simple equipment.

In the Unilab Hall experiment the Germanium wafer can be either P or N type material and if a direct comparison is required, two different types may be readily connected in series to a common current source.

The wafers measure 20 x 10 x 1mm and are mounted on stout printed circuit panels which allow a magnet to be brought to the wafer surface.

A 10k ohm zero balancing control is fitted and the unit measures 110 x 80 x 23mm overall.

A 3 volt "cycle battery" will provide a convenient source of current and one small Ticonal magnet (List No. 011.122) will produce a Hv of approximately 30mV. This may be read directly on a millivoltmeter, alternatively a clear indication can be obtained on the .5–0–.5mA 100 ohms meter, 081.112.

Typical wafer characteristics.

Resistivity 3.8 ohm cm. both P and N types.

Maximum Drive Current 50mA.

Hall Coefficient P 1.47 x 10^4 cm^3/coulomb

Hall Coefficient N 1.47 x 10^4 cm^3/coulomb

Carrier Concentration P 5 x 10^{14} atoms/cm^3.

Carrier Concentration N 5 x 10^{14} atoms/cm^3.

Ticonal Bar magnet approx. 1,250 Oersted at 2.5mm. from end.

091.603 P type Hall effect

091.604 N type Hall effect.