Semiconductor Samples for Demonstrating the Hall Effect

n-type: Si-doped GaAs, 1-micron-thick layer on semi-insulating GaAs substrate

p-type: Unintentionally doped GaSb, 2-micron-thick layer on semi-insulating GaAs substrate

The n-type sample measures approximately 60 ohms across the diagonal, and the p-type measures about 5 k. They are wired in parallel, and for current to be introduced at the top left corner (+) and returned from the bottom right corner (-). A 4.9 k resistor in series with the n-type sample sets the current through each sample roughly equal to half the total current.

The probes for the Hall voltage go to the bottom left corner (+) and top right corner (-) of each sample. With a control current of about 3 mA (through each sample), and B of approximately 0.44 T, typical Hall voltages are:

n-type:

B	**V_H**	**Δ**
No field	0.86 mV	--
North up	-6.3 mV	-5.4 mV
South up	6.8 mV	5.9 mV

p-type:

B	**V_H**	**Δ**
No field	0.55 V	--
North up	0.75 V	0.20 V
South up	0.32 V	-0.23 V