

Abstract Submitted  
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**The Microwave Hall Effect Measured Using a Waveguide Tee**

WILLIAM JOHNSON, JOYCE COPPOCK, J. ROBERT ANDERSON, Univ of Maryland-College Park — We describe a simple microwave apparatus to measure the Hall effect in semiconductor wafers. This technique does not require contacts on the sample or the use of a resonant cavity. Our method consists of placing a semiconductor wafer into a slot in an X-band (8 - 12 GHz) waveguide series tee, injecting microwave power into the two opposite arms of the tee, and measuring the microwave output at the third arm. A magnetic field is applied perpendicular to the wafer and produces a microwave Hall signal that is linear in the magnetic field and which reverses phase when the magnetic field is reversed. The microwave Hall signal is proportional to the semiconductor mobility, which we compare for calibration purposes with d. c. mobility measurements obtained using the van der Pauw method. We obtain the resistivity by measuring the microwave reflection coefficient of the sample. We determine a calibration constant as a function of the ratio of thickness to skin depth for two and three inch silicon and germanium samples doped with boron or phosphorus. The measured mobilities ranged from 270 to 3000  $\text{cm}^2 / (\text{Vsec})$

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