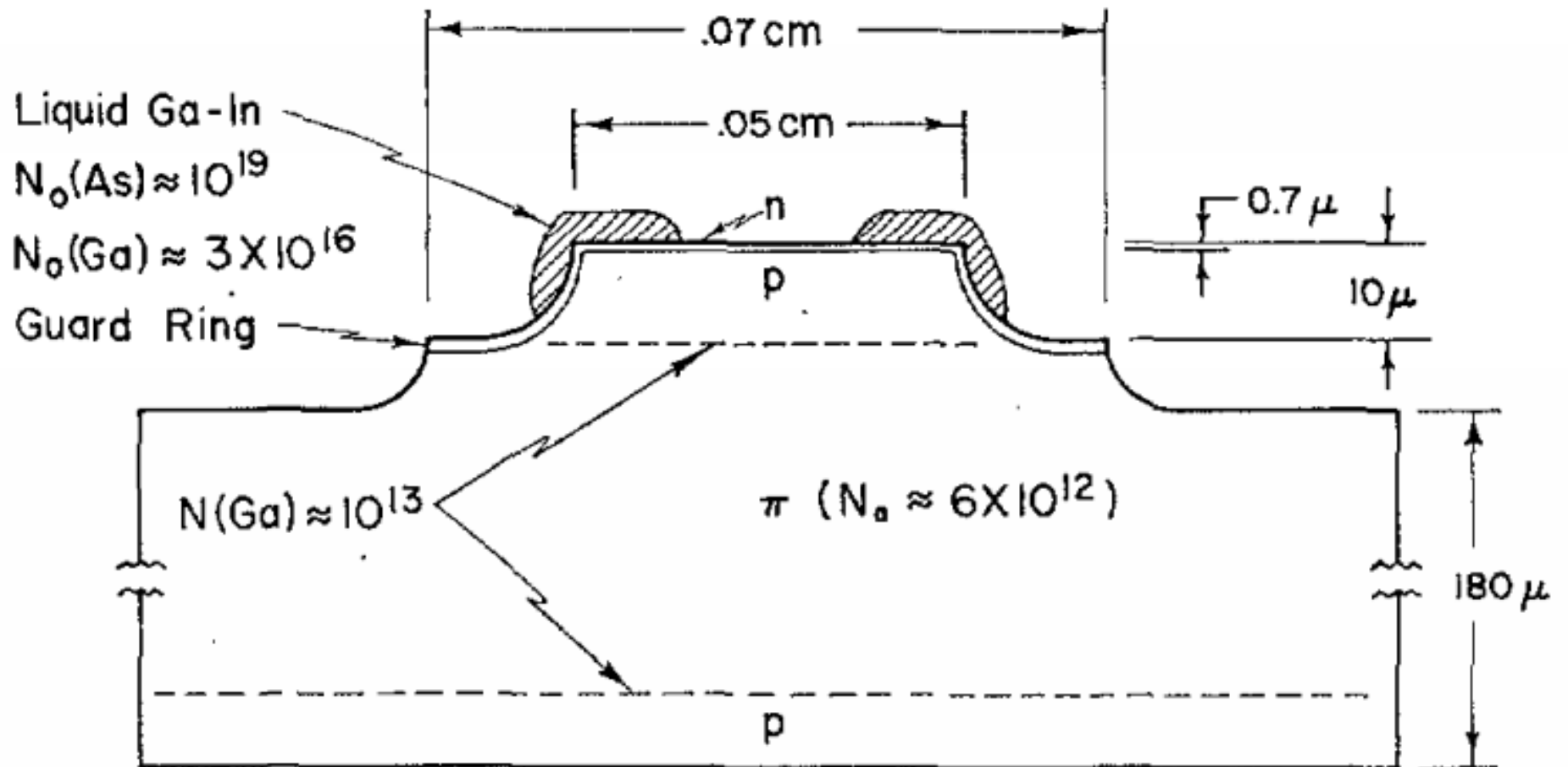


FIRST PRACTICAL AVALANCHE DIODE OSCILLATOR

ISSCC 1965



The Read Diode - An Avalanching, Transit-Time, Negative-Resistance Oscillator

IN 1958, READ proposed another way to obtain gain from a diode by operating it in avalanche breakdown. By exploiting the carrier drift time delay along a relatively long drift region, it is possible to produce enough phase shift (between the applied voltage and the current that flows in response) to generate a negative resistance. That negative resistance in turn may be used to build amplifiers and oscillators. Read's analysis attracted considerable attention because it predicted large power output (20W at 5Gc) at high conversion efficiencies (30%). This 1965 ISSCC paper presents the first practical embodiment of this invention, as well as the first comprehensive comparisons of experimental measurements with theoretical predictions.