

## HONEY MILLIMETER WAVE GUNN DIODES

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One of the difficult problems in millimeter wave Gunn diodes application in their low impedance because of small thickness of active layer and high electron concentration, which are necessary for transit-time mode operation. The cross section decreasing is also limited, if the conventional "mesa" Technology is used.

We proposed to prepare Gunn diodes much like millimeter wave Schottky diodes in the honey-comb form [1]. As the longitudinal (parallel to the current) size, i.e. active layer thickness, is much less than the contact diameter, current spread effect is negligible. For diode array preparation the semiconductor epitaxial structure was covered with the thin silicon oxide film at the active layer side. Then in photolithography process the 8+20  $\mu\text{m}$  windows were opened and both sides of the structure were covered with Au+Ge layer. During the heating, necessary for ohmic contacts formation, the contacts in the windows became separated.

The following operations of the diode preparations and mounting it into the waveguide section were analogous to the same operations, adopted for Schottky barrier diode detectors and mixers.

The construction of Gunn diode, which is described here, is more simple and reliable, than constructions, known as "mesa".

It was used for GaAs, InP and InGaAsP Gunn diodes preparation, CW operating generators were made. They were used as 1+4 mW power local oscillators and self-oscillating mixers at frequencies of 50+140 GHz.

### REFERENCES

1. Averin, S.V., Borisov V.I., Gulyaev Yu.V., Liubchenko V.E. Nonlinear properties of Gunn diodes in millimeter wave range. Doklady of Academy of Sciences of the URSS, 1983 v. 269, n.2, p.354.