

## EXPERIMENTAL STUDY OF HIGH POWER GAAS PCSS WITH BULK STRUCTURE\*

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Photoconductive semiconductor switches (PCSSs) are considered as a promising device for high-power applications. GaAs PCSS with lateral structure always suffered from surface flashover, and withstand voltage of the PCSS was limited. So the PCSS with bulk structure is a better choice.

In this paper, photoconductive semiconductor switches with bulk structure were studied experimentally. The switch was fabricated from semi-insulating GaAs. The length and the width of the switch were 10 and 10 mm, respectively, whereas the depth was 600  $\mu\text{m}$ . The electrodes were 6mm in diameter on the opposite of the chip. As the gap between the electrodes was 600  $\mu\text{m}$ , a small on-state resistance can be achieved. The withstand voltage of the PCSS has been tested under pulse voltages with different Full-Width-at-Half-Maximum (FWHM), which was 0.8 $\mu\text{s}$ , 90 $\mu\text{s}$ , 10ms and DC. A maximum withstand voltage of 7.6kV has been achieved under a pulse voltage with the FWHM of 90 $\mu\text{s}$ , which means the breakdown electric field is 127kV/cm. It is about 42% of the theoretic breakdown electric field (300kV/cm) of the GaAs. Illuminated by a laser pulse at a wavelength of 1064 nm, photoconductivity tests were performed under different bias voltages. The on-state resistance of the switch was calculated by the current and the voltage that has been tested.

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