

## Supporting Information

### **An Enhanced Ultrasensitive Solar-blind UV Photodetector Based on an Asymmetric Schottky Junction Designed with Graphene/ $\beta$ -Ga<sub>2</sub>O<sub>3</sub>/Ag**

Song Qi<sup>a</sup>, Jiahang Liu<sup>a</sup>, Jianying Yue<sup>a</sup>, Xueqiang Ji<sup>a</sup>, Jiaying Shen<sup>a</sup>, Yongtao Yang<sup>a</sup>, Jinjin Wang<sup>a</sup>,  
Shan Li<sup>b\*</sup>, Zhenping Wu<sup>a\*</sup> and Weihua Tang<sup>b\*</sup>

<sup>a</sup> *State Key Laboratory of Information Photonics and Optical Communications & School of Science, Beijing University of Posts and Telecommunications, Beijing 100876, China.*

<sup>b</sup> *Innovation Center for Gallium Oxide Semiconductor (IC-GAO), College of Integrated Circuit Science and Engineering, Nanjing University of Posts and Telecommunications, Nanjing 210023, China.*

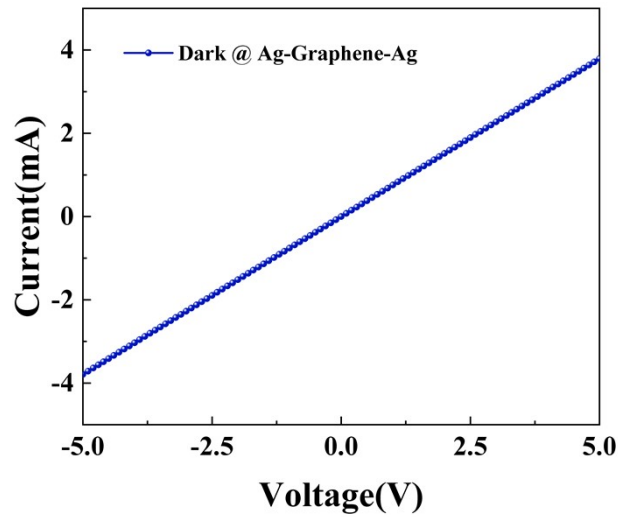


Figure S1 I-V curve of graphene with Ag electrode in the dark.

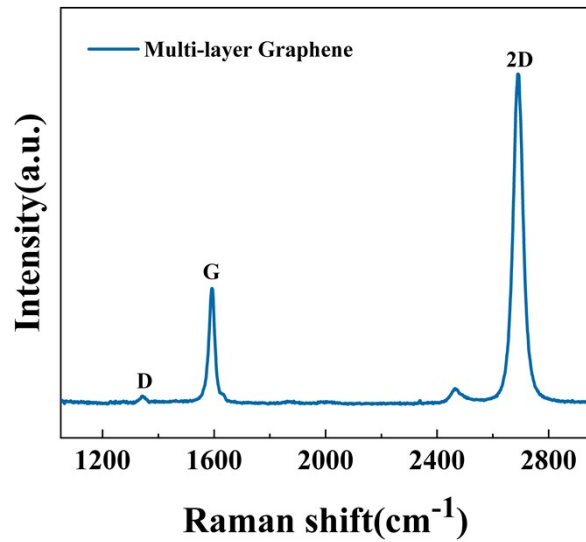


Figure S2 The Raman spectra of the multilayer graphene

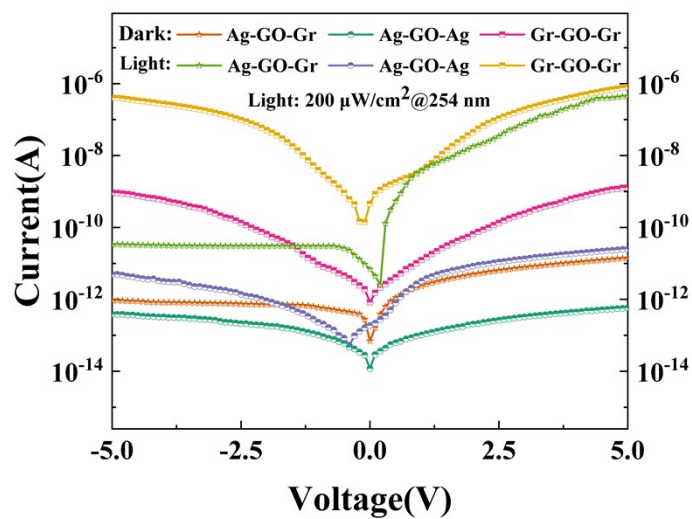


Figure S3 The I-V curves of three contacts in dark and under 254 nm UV light at a light intensity of  $200\mu\text{W}/\text{cm}^2$ .

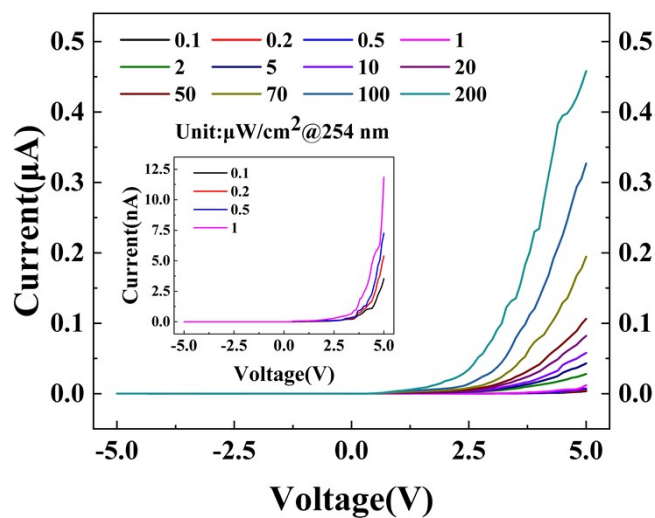


Figure S4 I-V curves of the device under various light illumination.

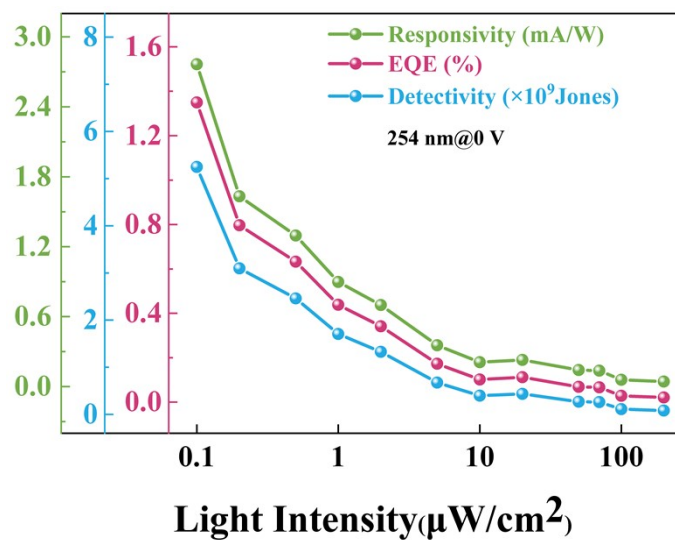


Figure S5 Responsivity, Detectivity and EQE of the device under different light intensities of 254 nm UV light illumination at 0V bias.

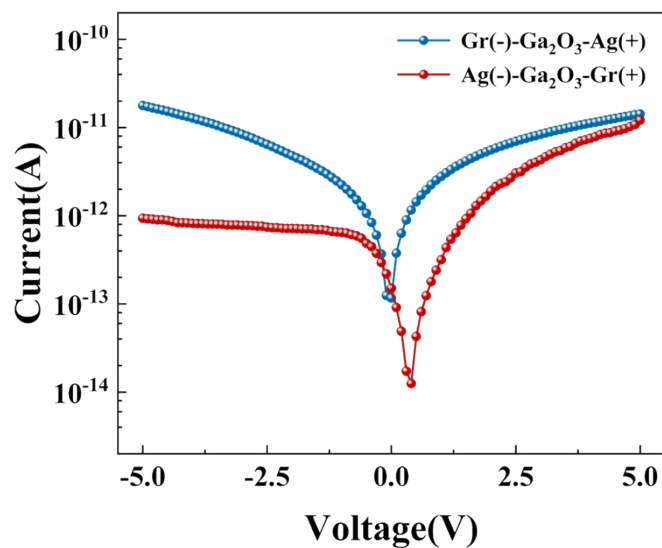


Figure S6 Dark current of the device when applying forward and reverse voltages.