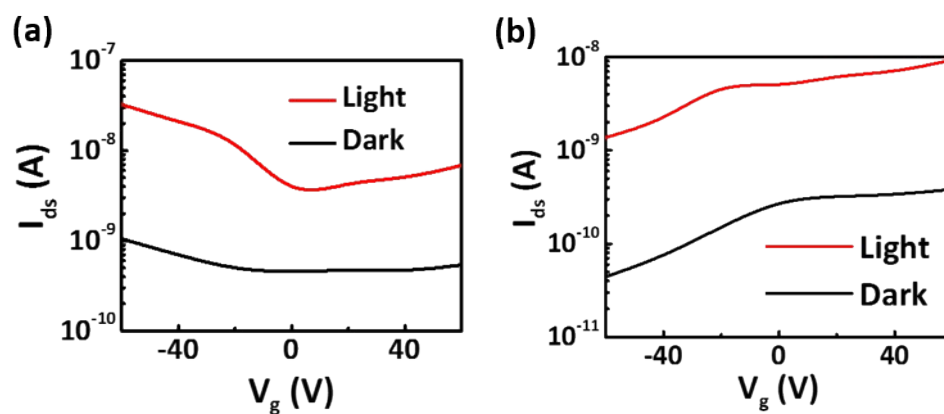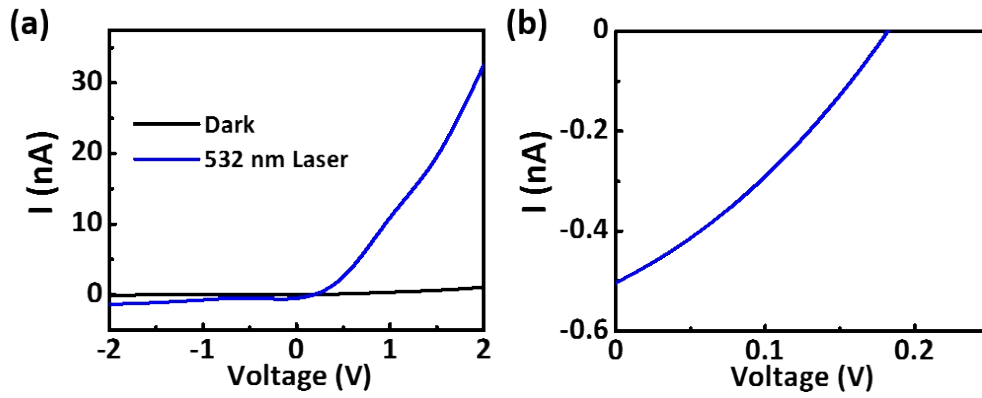# Supporting Information to

# High-Efficiency Omnidirectional Photoresponses Based on

Monolayer Lateral p-n Heterojunction

Fig. S1. I_{ds}-V_g characteristics. I_{ds}-V_g characteristics of the device under dark and 532 nm laser illumination at V_{ds} of (a) 2 V and (b) -2 V.

Fig. S2. Photoresponse of the WSe_2-MoS_2 monolayer device under V_g of -60 V. (a) I-V characteristics of the device in the dark and under 532 nm laser illumination from V_d = -2 V to 2 V. (b) Photovoltaic characteristics under 532 nm laser illumination.
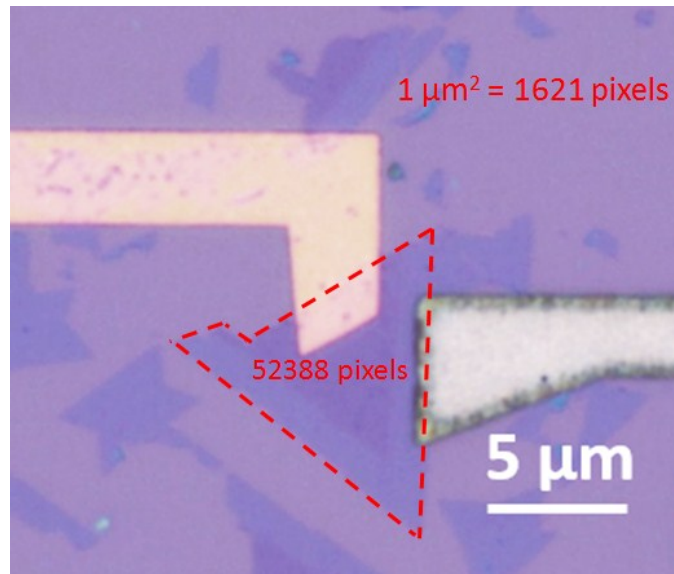
Fig. S3. Device actual area calculation from number of pixels in the optical microscopy image of the lateral structure.

Actual device area calculation

The device area is determined using Adobe Photoshop to calculate the pixel size of the device shown in the optical microscopy image. As indicated in Fig. S3, the size of a 1 μm^2 area is 1621 pixels. The triangular WSe_2-MoS_2 lateral heterostructure consists of 52388 pixels. Therefore, the actual device area is calculated to be ~32 μm^2.