Supporting information

Figure S1 Time-dependent photoresponse of the fabricated photodetector different applied bias of 0 V (a) and −30 V (b). (c) Time-dependent photoresponse of the fabricated photodetector under various illumination conditions (254, 365, 532 and 650 nm light exposure)
**Figure S2** Optical properties of freestanding $\beta$-Ga$_2$O$_3$ sample (a) absorbance spectrum (b) absorption coefficient (c) optical band-gap
Figure S3 Current-voltage characteristics between the Cr/Au electrodes deposited on β-Ga$_2$O$_3$ microbelt
Figure S4 XRD result from large $\beta$-Ga$_2$O$_3$ micro-belt on SiO$_2$/Si substrate