https://doi.org/10.1007/s11467-023-1390-3

RESEARCH ARTICLE

Sub-5 nm bilayer GaSe MOSFETs towards ultrahigh on-state current

Xueping Li[1,2,3], Xiaojie Tang[1], Zhuojun Wang[1], Peize Yuan[3], Lin Li[3], Chenhai Shen[3], Congxin Xia[3,†]

[1]College of Electronic and Electrical Engineering, Henan Normal University, Xinxiang 453007, China

[2]Henan Key Laboratory of Optoelectronic Sensing Integrated Application, Xinxiang 453007, China

[3]School of Physics, Henan Normal University, Xinxiang 453007, China

Corresponding author. E-mail: †xiacongxin@htu.edu.cn

Received December 29, 2023; accepted January 30, 2024

Supplementary Information

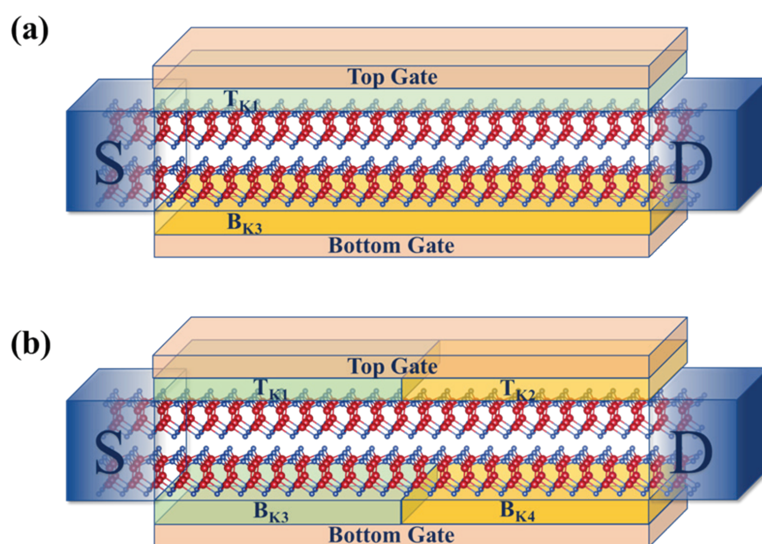

Fig. S1 The designed device of **(a)** type-A and **(b)** type-B.

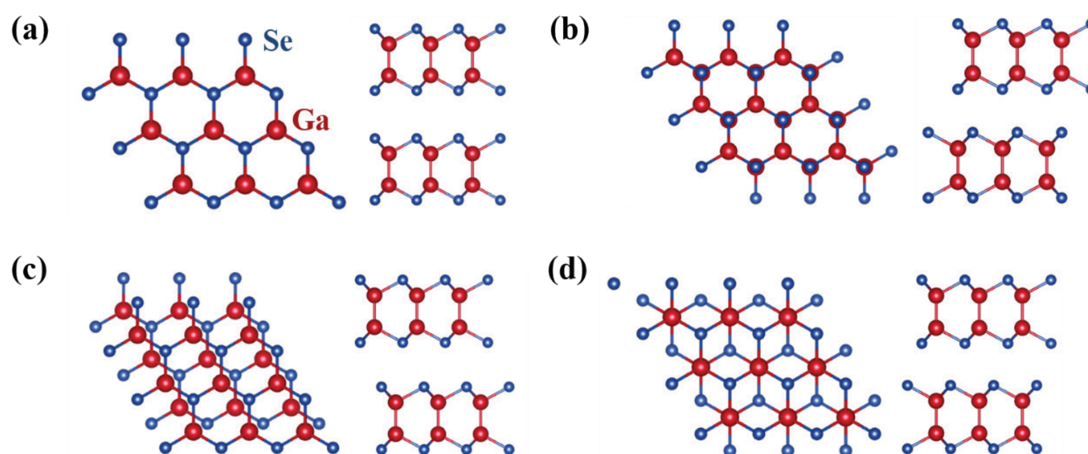

Fig. S2 The top and side views of bilayer GaSe **(a-d)** AA, AB, AC, and AD stackings. Red spheres represent Ga atoms, and blue spheres represent Se atoms.

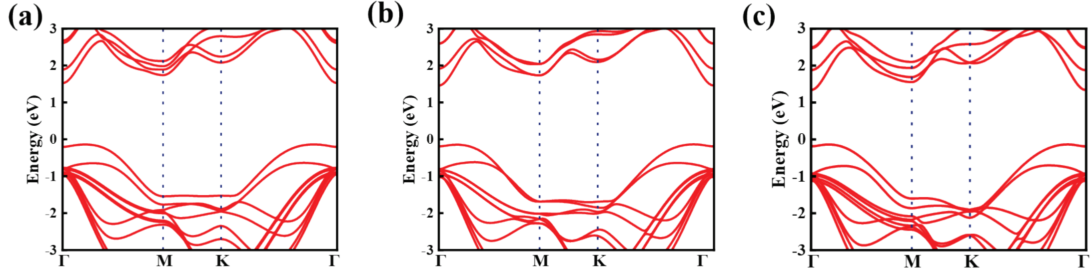

Fig. S3 The band structures of **(a)** AA, **(b)** AC, and **(c)** AD stacking.

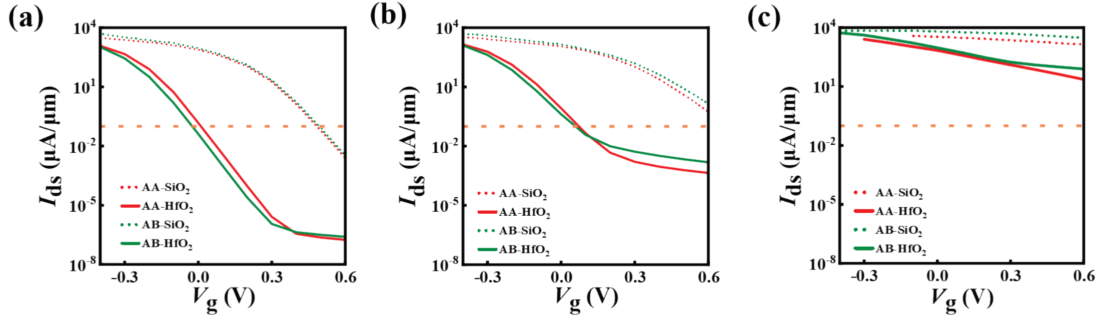

Fig. S4 Transfer characteristic curves of the devices with AA and AB stacking at **(b)** L_g = 5 nm, **(c)** L_g = 3 nm, and **(d)** L_g = 1 nm.

Table S1 The main parameters of four stackings.

	AA	AB	AC	AD
Formation energy (eV)	-1.94255	-2.01778	-1.99866	-2.02071
E_g **(eV)**	1.66	1.50	1.59	1.48
Distance (Å)	3.7387	3.1806	3.466	3.1775