

Supporting Information for

High-performance III-VI monolayer transistors for flexible devices

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Table S1. Benchmark of transfer characteristics of DG InSe monolayer MOSFET at different length of L_g and different electron doping level

L_g (nm)	N_e (cm ⁻³)	SS_{\min} (mV/dec)	I_{on} ($\mu\text{A}/\mu\text{m}$)	$I_{\text{on}}/I_{\text{off}}$
3nm	10^{20}	540	-	-
	5×10^{20}	936	-	-
	10^{21}	1199	-	-
5nm	10^{20}	195	283	2.83×10^3
	5×10^{20}	256	0.75	7.5
	10^{21}	318	-	-
7nm	10^{20}	104	1641	1.64×10^4
	5×10^{20}	121	2318	2.32×10^4
	10^{21}	153	327	3.27×10^3
9nm	10^{20}	86	1591	1.59×10^4
	5×10^{20}	88	4093	4.09×10^4
	10^{21}	165	3836	3.87×10^4

Table S2. The I_{on} and SS_{min} of DG InSe monolayer MOSFET with different length of L_g and UL structure

L_g (nm)	L_{UL} (nm)	I_{on} ($\mu\text{A}/\mu\text{m}$)	SS_{min} (mV/dec)
	0	-	936
3	1	-	243
	2	86.58	187
	3	1016.13	157
	0	-	246
5	1	1675.72	157
	2	3059.28	117
	3	2497.19	95
	0	2200.19	139
7	1	3996.17	102
	2	4662.79	83
	3	2578.72	72
	0	4093.18	88
9	1	5682.29	77
	2	5124.35	63
	3	2606.26	45

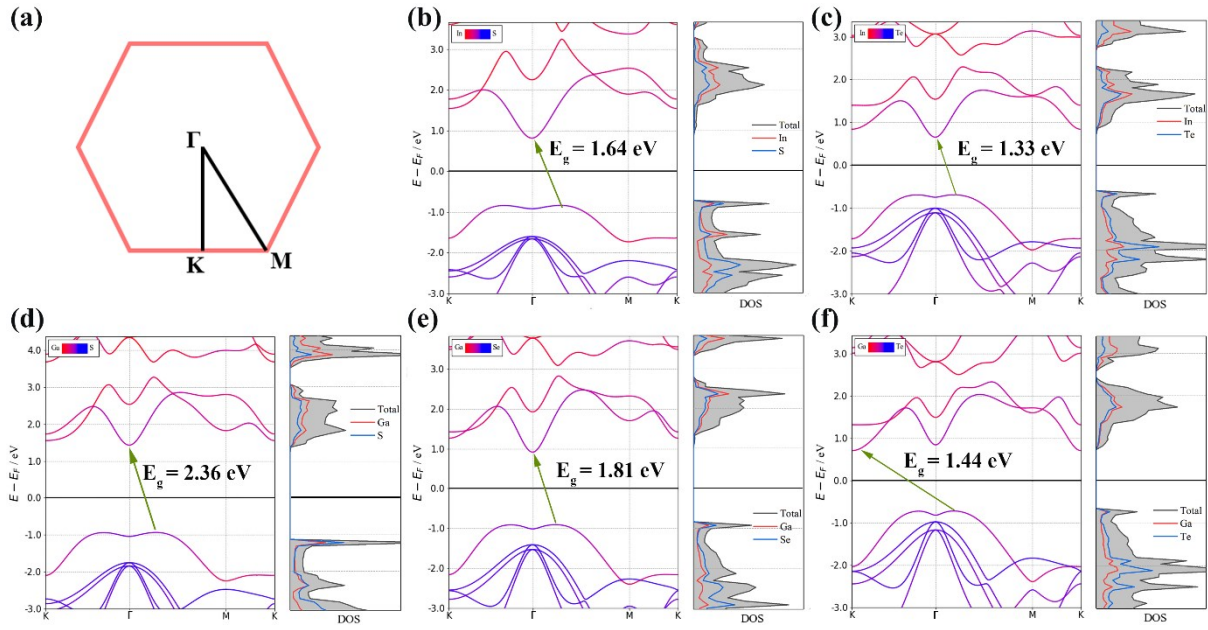


Fig. S1. (a) First Brillouin zone with labeled high-symmetry points of MX monolayers. The projected band structure and partial density of states of (b) InS, (c) InTe, (d) GaS, (e) GaSe, and (f) GaTe monolayers, respectively.

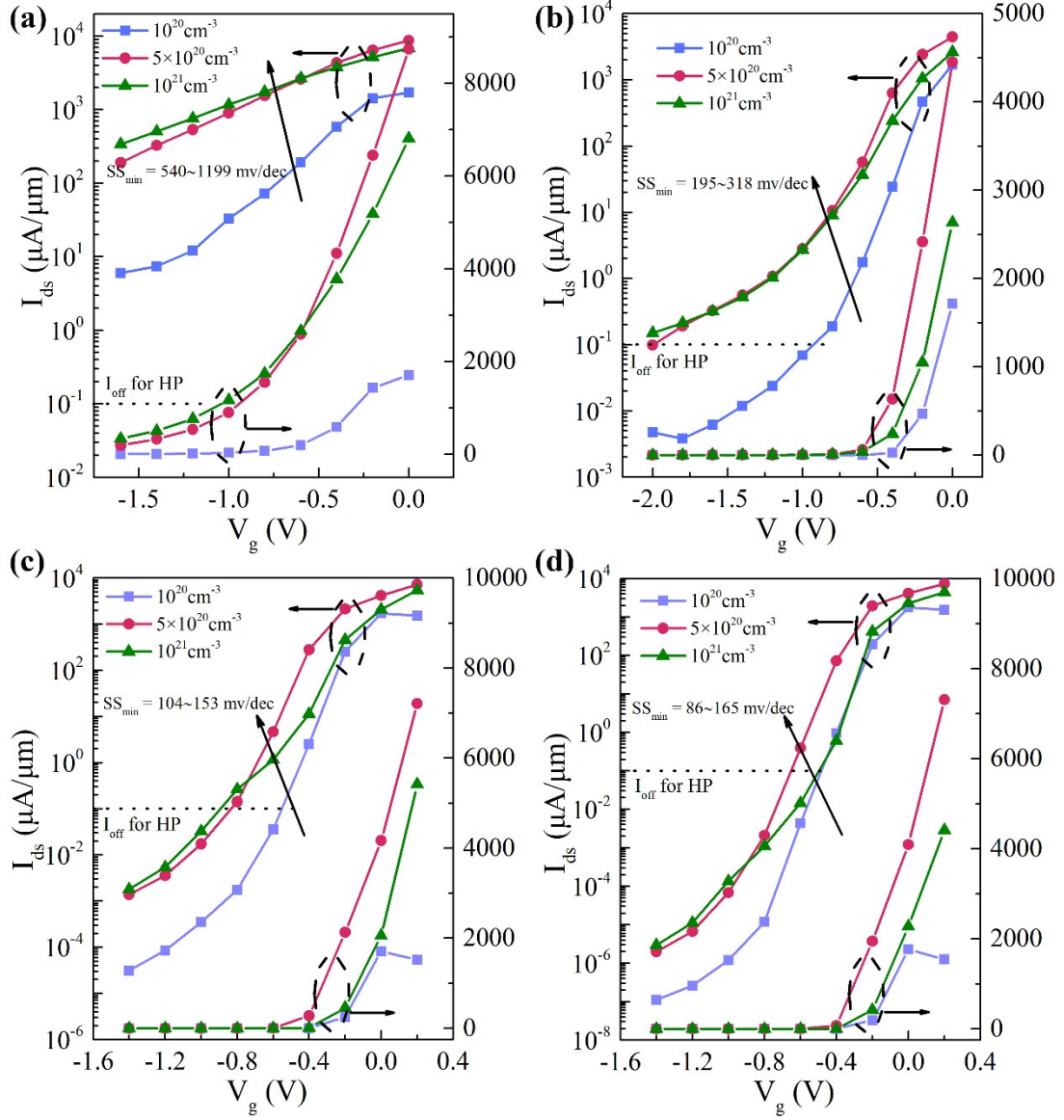


Fig. S2. The doping dependent test of InSe monolayer MOSFETs transfer characteristics at $N_e = 10^{20}$, 5×10^{20} , and 10^{21} e/cm³ for $L_g =$ (a) 3, (b) 5, (c) 7, and (d) 9 nm without UL structure, respectively.