

Abstract Submitted
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Reconfigurable WSe₂ device: three fundamental devices in one.
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UNG LEE, State Univ of NY - Polytechnic Institute — Moore’s law has, for several
decades, governed the transistor scaling and has brought about the technological
revolution for better, faster and more efficient devices. However, with the advent of
7nm node, scaling is fast reaching the fundamental material limits, and the need for
alternative technologies has never been more pressing. Until recently, most of the
efforts have focused on finding alternative channel materials as a direct replacement
for Si. Here, we propose an alternative to scaling by completely redesigning the
way logic functions are implemented. We report a single multifunctional device
fabricated in two-dimensional WSe₂ using electrostatic doping that can reconfigure
into the three fundamental building blocks of modern electronics: the p-n diode, the
metal-oxide-semiconductor field effect transistor, and the bipolar junction transistor.
To characterize their properties, we use a single material parameter, the interface
density of states, to describe the key figure-of-merit of all three devices.

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