In this paper, a new voltage-mode (VM) first-order phase shifter (all-pass filter) employing only four NMOS transistors and minimum number of passive elements (i.e. one resistor and one capacitor) is proposed. The proposed VM phase shifter has high input impedance and does not require passive element matching constraints. Moreover, since only two NMOS transistors are stacked between positive and negative supply voltages, the proposed circuit is suitable for low-voltage operation. Electronic tunability can be provided easily by replacing the employed resistor with an NMOS transistor operating in triode region. Simulation results based on 0.18 μm TSMC CMOS parameters with ±0.9 V supply voltages are given to demonstrate the performance of the proposed phase shifter. © Springer Science+Business Media, LLC 2011.