Use of nonpolar BaHfO$_3$ gate oxide for field effect on the high mobility BaSnO$_3$ CHULKWON PARK, USEONG KIM, YOUNG MO KIM, CHAN-JONG JU, KOOKRIN CHAR, Department of Physics & Astronomy, Seoul National University — Recently, BaSnO$_3$ (BSO) has attracted attentions as a transparent conducting oxide and/or a transparent oxide semiconductor due to its novel properties: the excellent oxygen stability even at high temperature and the high electrical mobility at room temperature. We fabricated field effect transistors using La-doped BSO as the semiconducting channel on undoped BSO buffer layers on SrTiO$_3$ substrates. A non-polar perovskite BaHfO$_3$ was used as the gate insulator, and 4% La-doped BSO as the source, the drain, and the gate electrodes grown by pulsed laser deposition. We have measured the optical and the dielectric properties of the epitaxial BaHfO$_3$ gate oxide layer, namely the optical band gap, the dielectric constant, and the breakdown field. Using such BaHfO$_3$ gate oxide, we observed carrier modulation in the active layer by field effect. In this presentation, we will report on the performance of such field effect transistors: the output and the transfer characteristics, the field effect mobility, the $I_{on}/I_{off}$ ratio, and the subthreshold swing.