We report for the first time electrical characterization of HfO$_2$ p- and n-MOSFETs with CVD TiN and PVD TaSiN gates respectively. Their performance is compared to PVD TiN-gated HfO$_2$ and SiO$_2$ n- and p-MOSFETs. To understand the issues with metal gates on high K gate dielectrics, PVD TiN MOSFETs were extensively characterized. At 10nA/$\mu$m leakage, 0.375mA/$\mu$m drive current was obtained from PVD TiN/HfO$_2$ p-MOSFETs. HfO$_2$ n-MOSFETs with metal gates show about $10^4$ times reduction in gate leakage compared to poly/SiO$_2$ devices.