

ABSTRACT

The high speed and high-power circuits can be realized by combining the benefits of both bipolar and MOS (Metal Oxide Semiconductor) devices in BiCMOS technology. However, the absence of bipolar technology foundries in India is a major impediment to the indigenous development of such circuits. As part of this thesis work, for the first time in India, we have designed and developed single-poly and double-poly bipolar transistors for analog and RF applications. The baseline 180nm CMOS process of Semi-Conductor Laboratory (SCL), Mohali is used to develop the BiCMOS process flow. The device design is done using TCAD tools for $\beta > 120$, $f_t / f_{max} \sim 30/40$ GHz and breakdown voltage $> 15V$. Different advanced process modules are explored to reduce the process complexity and improve the transistor performance. Several DC and RF test structures are successfully designed and taped out.