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Title:A new generation of high frequency SiGe HBTs

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Abstract:A three-and-a-half-year European DOTFIVE project, February 2008 to July 2011, which included a consortium of 15 partners from industry and academia, addressed the task of pushing the HF performance limits of SiGe heterojunction bipolar transistor (HBT). The project focused on the demonstration of a half Terahertz SiGe HBT or a ring-oscillator gate-delay of 2.5 ps. The approach taken by the project comprised the non-selective epitaxial growth (NSEG) of the SiGe base layer, completed by a self-aligned (SA) arrangement of the emitter window and the highly-doped, elevated external base region. The results a higher Ge content produces higher base currents due to an increased neutral base recombination, whereas the elimination of SIC implantation through the base lowers it. In the output characteristics, it can be seen that the collector-emitter breakdown voltage is reduced from 1.7 to 1.6 V, which is attributed to the increased doping concentration of the SIC.
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