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Title:InP/GaAsSb DHBTs Fabricated in a Low-Temperature Teflon Planarization Process

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Abstract:We demonstrate InP/GaAsSb/InP double heterojunction bipolar transistors (HBTs) fabricated in a low-temperature planarization process based on a spin-on Teflon amorphous fluoropolymer interlevel dielectric with epsilon(r) = 1.9 and a low dissipation factor. Devices with 0.3-mu m-wide emitters show excellent junction characteristics, cutoff frequencies f(T) = 362 GHz and f(MAX) = 450 GHz, a peak current gain beta = 28, and a common-emitter breakdown voltage BVCEO = 5.1 V. Teflon is seen to be an advantageous alternative to common benzocyclobutene and polyimide planarization dielectrics. A side-by-side comparison of devices fabricated in Teflon and airbridge processes shows nearly identical performances. The present approach is equally applicable to GaAs- and GaInAs-based HEMT and HBT technologies.

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