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Silicon Nanomembrane Bipolar Junction Transistors for Microwave Frequency Applications JOHN BAVIER, University of Maryland, VINCE BALLAROTTO, Laboratory for Physical Sciences, JOHN CUMINGS, University of Maryland — Silicon nanomembranes (SiNMs) are a promising material for flexible semiconductor devices due to their high carrier mobility and compatibility with standard CMOS processing. Previous studies have reported SiNM fieldeffect transistors with operating frequencies as high as 12 GHz. In order to expand the utility of SiNM devices, a method for the fabrication of monocrystalline microwave frequency silicon bipolar junction transistors (BJTs) will be presented. High-temperature processing of SiNM BJT devices is performed on a Silicon-on-Insulator (SOI) wafer. Using angled ion implantation, conformal chemical vapor deposition and anisotropic reactive ion etching, a poly-silicon sidewall spacer is formed. This spacer defines a base region approximately 200nm wide without the use of electron beam lithography. Devices are then released using selective wet etching in HF and transferred to alternate flexible substrates. Microwave frequency data will be presented, and the effects of the transfer process on device performance will be discussed.

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