Abstracts

RF performance tradeoffs of SiGe HBT fabricated by reduced pressure chemical vapor deposition

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In this paper, we developed high cutoff frequency and low noise SiGe HBT devices using a low-cost high-throughput reduced pressure chemical vapor deposition (RPCVD) process. In addition, RPCVD can alleviate large thermal variations even on a single wafer, such as occurs in ultra-high vacuum chemical vapor deposition. We also adopted the cheap localized oxidation of silicon (LOCOS) instead of the shallow trench for isolation of terminals to reduce the parasitic from linkage at the RF arena. The cutoff frequency and maximum oscillation frequency of SiGe HBTs with emitter size of 1/spl times/2.5 /spl mu/m/sup 2/ were 48 and 62 GHz, respectively. With the tradeoff of base profile and by adopting a finger-type base structure, the measured minimum noise figure of 1.5 dB and associated gain of 16 dB at 1.5 GHz with collector current of 3.1 mA were also observed in the low noise device. Limitation of noise performance related with this process was also discussed.

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