Abstracts

1.8 V RF AGC and mixer implemented with a novel four-terminal HBT (FHBT)

Sining Zhou, Pingxi Ma, Liyang Zhang, P. Zampardi, Jiang Li, Y.S. Chang and M.F. Chang. "1.8 V RF AGC and mixer implemented with a novel four-terminal HBT (FHBT)." 2001 Radio Frequency Integrated Circuits (RFIC) Symposium 01. (2001 [RFIC]): 241-244.

A recent discovery indicates that the current gain of AlGaAs/GaAs HBTs can be externally modulated by biasing an extra Schottky electrode that contacts the emitter passivation ledge directly. This discovery leads to the possibility of implementing complex RF AGC (automatic-gain-control) and signal mixing functions within a 4-terminal HBT (FHBT) at relatively low power supply voltages (dean to V/sub cc/=1.8 V). This low voltage operation has been extremely difficult for the conventional Gilbert-cell mixer design based on regular 3-terminal HBTs. The demonstrated FHBT AGC has 24 dB gain control up to 6 GHz and the mixer has 7 dB conversion gain and -12.5 dBm IIP3 without emitter or base degeneration.

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