Abstracts

High-Efficiency InP-Based DHBT Active Frequency Multipliers for Wireless Communications (Short Papers)

H.J. De Los Santos, D.D. Nardi, K.L. Hargrove, M. Hafizi and W.E. Stanchina. "High-Efficiency InP-Based DHBT Active Frequency Multipliers for Wireless Communications (Short Papers)." 1996 Transactions on Microwave Theory and Techniques 44.7 (Jul. 1996, Part I [T-MTT]): 1165-1167.

We present, for the first time, the performance of AIInAs/GaInAs/InP double heterostructure bipolar transistors (DHBT's) as active frequency multipliers at frequencies of relevance to Wireless Communications applications. In particular, we present results comparing the performance of X6 (127 --> 762 MHz) and X4 (762.5 --> 3050.0 MHz) InP- and Si-based (NEC2107) multiplier circuits. A well-known multiplier circuit topology has been chusen as a vehicle, so that we can focus on active device comparison. The X6 InP-based multiplier exhibits output power and efficiency of +6 dBm and 11%, respectively, compared to +7.2 dBm and 4.8% of the Si-based circuit. The X4 InP-based multiplier exhibits output power and efficiency of +3.74 dBm and 8%, respectively, compared to -6.1 dBm and 0.4% of the Si-based circuit. The superior electronic properties of InP-DHBT's enable high-conversion gain/highly DC-efficient multipliers, however, their nonexponential I/sub C/-V/sub BE/ characteristic limits the maximum obtainable conversion gain at high-order frequency multiplication.

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