Low conversion loss 94 GHz and 188 GHz doublers in InP DHBT technology

An Indium Phosphide (InP) Double Heterojunction Bipolar Transistor (DHBT) process has been utilized to design two doublers to cover the 94 GHz and 188 GHz bands. The 94 GHz doubler employs 4-finger DHBTs and provides conversion loss of 2 dB. A maximum output power of nearly 3 dBm is measured while the doubler is not entirely saturated. The DC power consumption is 132 mW. The 188 GHz doubler utilizes a 1-finger DHBT. Conversion loss of 2 dB and a maximum output power of ~1 dBm are achieved at 188 GHz with on-wafer measurements. The DC power consumption is 24 mW under saturated conditions. Both doublers operate over a broad bandwidth. The total circuit area of each chip is 1.41 mm².

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