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"Hybrid tunable microwave devices based on Schottky-diode varactors", pp.109-116

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Abstract - In this paper, tunable RF/microwave devices are demonstrated. First, a phase shifter is carried out, based on a modified classical topology. This modified topology is smaller than already published ones for a 20 dB return loss and exhibits lower insertion losses (2.4 dB for a 360° tunable phase shift). Second, two original topologies of tunable impedance transformers are carried out. 16.5 Wto 280 Wloads can be matched to 50 W with very compact transformers (30° electrical length) and small insertion losses (less than 1 dB). Then, tunable filters based on periodic structures showing interesting performances, especially in terms of compactness, selectivity and tuning, are demonstrated. A lowpass and a bandpass filter have been realized and measured. For the lowpass filter, a 16 dB return loss is obtained over a ± 17 % tunable bandwidth for a 130° filter electrical length. The attenuation slope is more than 300 dB/decade and the attenuation band is nine times the mean frequency with more than 25 dB of attenuation. For the bandpass filter, the –3 dB bandwidth can be tuned between ~50 MHz and ~78 MHz for a ±18%- center-frequency tuning around 0.7 GHz, an insertion loss smaller than 5 dB and a return loss higher than 13 dB, at the center frequency. For a ~50 MHz fixed bandwidth, the center frequency can be tuned between 0.51 GHz and 0.81 GHz, leading to a relative ± 24%-center-frequency tuning. Finally, the total physical length of the prototype filter is about 0.27lc at 0.7 GHz.