

A Dual-Mode Microstrip Ring, Resonator Filter with Active Devices for Loss Compensation

U. Karacaoglu, I.D. Robertson and M. Guglielmi. "A Dual-Mode Microstrip Ring, Resonator Filter with Active Devices for Loss Compensation." 1993 MTT-S International Microwave Symposium Digest 93.1 (1993 Vol. 1 [MWSYM]): 189-192.

A new bandpass filter design is presented which uses a dual-mode microstrip ring resonator with a pair of FETs which provide negative resistance to compensate for the losses in the ring. The measured results show excellent performance, with a 32 MHz 3-dB bandwidth centred at 1.48 GHz. The technique used in this paper is particularly attractive because of its ability to implement two transmission poles and two transmission zeros with only one ring if a suitable mode-coupling structure is designed. The advantage of the combined passive resonator and active device technique is that the poles and zeros of the filter are accurately defined by the ring dimensions, and the FETs only provide negative resistance to compensate for the ring losses. Hence, the filter is less sensitive to environmental changes than a filter based on entirely active techniques.

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