Abstracts

Quasi-static design technique for MM-wave micromachined filters with lumped elements and series stubs

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This paper describes micromachined, membrane-supported low-pass and bandpass filters which are suitable for microwave and millimeter-wave (MM-wave) application. The designs are realized in coplanar-waveguide (CPW) form using short- and open-end series stubs with integrated metal-insulator-metal (MIM) capacitors, and are compact in lateral and longitudinal dimensions. A computationally efficient analysis has been developed for the design and characterization of the filters. The technique is based on a quasi-static coupled-line (CL) treatment of the series stubs, and uses normal mode impedance parameters, which are calculated with the spectral-domain approach (SDA). Due to the broad TEM-bandwidth of the membrane-supported transmission lines, the method can accurately predict filter responses well into the rejection band. To demonstrate the above claims, the measured and simulated S-parameters of a 0.3 mm /spl times/2.2 mm low-pass filter with a cutoff frequency at 17 GHz, and a second passband at 115 GHz, are presented. The new approach is also used in the design of bandpass filters which exhibit 1.5-2-dB insertion loss and bandwidths around 10%.

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