Abstracts

A K-band-frequency agile microstrip bandpass filter using a thin-film HTS/ferroelectric/dielectric multilayer configuration

G. Subramanyam, F.W. Van Keuls and F.A. Miranda. "A K-band-frequency agile microstrip bandpass filter using a thin-film HTS/ferroelectric/dielectric multilayer configuration." 2000 Transactions on Microwave Theory and Techniques 48.4 (Apr. 2000, Part I [T-MTT]): 525-530.

In this paper, we report on YBa/sub 2/Cu/sub 3/O/sub 7-/spl delta// (YBCO) thin-film/SrTiO/sub 3/ (STO) thin-film K-band tunable bandpass filters on LaAlO/sub 3/ (LAO) dielectric substrates. The two-pole filter has a center frequency of 19 GHz and a 4% bandwidth. Tunability is achieved through the nonlinear DC electric-field dependence of the relative dielectric constant of STO (/spl epsi//sub r STO/). A large tunability (/spl Delta/f/f/sub 0/=(f/sub V max/-f/sub 0/)/f/sub 0/, where f/sub 0/ is the center frequency of the filter at no bias and f/sub V max/ is the center frequency of the filter at the maximum applied bias) of greater than 10% was obtained in YBCO/STO/LAO microstrip bandpass filters operating below 77 K. A center frequency shift of 2.3 GHz (i.e., a tunability factor of approximately 15%) was obtained at a 400 V bipolar DC bias, and 30 K, with minimal degradation in the insertion loss of the filter. This paper addresses design, fabrication, and testing of tunable filters based on STO ferroelectric thin films. The performance of the YBCO/STO/LAO filters is compared to that of gold/STO/LAO counterparts.

❑ Return to main document.