Abstracts

Tunable High Temperature Superconductor Microstrip Resonators

J.A. Beall, R.H. Ono, D. Galt and J.C. Price. "Tunable High Temperature Superconductor Microstrip Resonators." 1993 MTT-S International Microwave Symposium Digest 93.3 (1993 Vol. III [MWSYM]): 1421-1424.

We have fabricated and characterized electrically tunable high temperature superconductor microstrip resonators incorporating YBa/sub 2/Cu/sub 3/O/sub 7-x/ superconductor and SrTiO/sub 3/ ferroelectric films. Early versions of these and similar devices were described previously. The resonators consist of two co-linear microstrip line-sections separated by a 5 µm gap. The capacitance of the gap influences the frequencies of the odd-order coupled resonances. Inductively choked dc bias lines are attached to each line section so that a bias voltage can be applied to the gap. When the gap is filled with a ferroelectric material, the odd resonances can be tuned. Frequency shifts of 300 MHz have been observed with a bias voltage of 50 V for resonances at 5.6 GHz and 11.6 GHz. The tunability is independent of temperature from 4 K to 80 K. An upper bound for the loss tangent of the SrTiO/sub 3/ capacitor is extracted from the resonance Q, and we find tan(delta) <0.07 at 4 K. We believe that the Q values are limited by external loading, rather than by losses in the SrTiO/sub 3/, so the true value of tan(delta) is certainly less than our upper bound.

❑ Return to main document.