Abstracts

High-Temperature Superconducting Microstrip Filters with High Power-Handling Capability

G.-C. Liang, D. Zhang, C.-F. Shih, M.E. Johansson, R. Withers, A.C. Anderson, D.E. Oates, P. Polakos, P. Mankiewich, E. De Obaldia and R.E. Miller. "High-Temperature Superconducting Microstrip Filters with High Power-Handling Capability." 1995 MTT-S International Microwave Symposium Digest 95.1 (1995 Vol. I [MWSYM]): 191-194.

The performance of narrowband microstrip filters with low insertion loss and high power-handling capabilities made from YBa/sub 2/Cu/sub 3/O/sub 7 (YBCO) high-temperature superconducting (HTS) films is presented. Results are shown for two different novel designs that were chosen to optimize the power-handling capabilities. Both have a 2-GHz center frequency and 5-poles that incorporate coupled resonators with 10-12 internal impedances on 50-mm-diameter LaA1O/sub 3/ substrates. Both designs use parallel-coupled feed fines to avoid current crowding. The first design includes backward- and forward-coupled filters, has 1% bandwidth, and has handled over 25 watts of input power at 10 K with less than 0.25 dB compression.The second design has 1.2 % bandwidth and use only forward-coupled resonators. The minimum insertion loss is less than 0.2 dB at 45 K, it has a third-order intercept of 62 dBm. Another similar filter handled 36 watts of power at 45 K with less than 0.15 dB compression across the passbarrd. We have developed a technique to visualize the power dissipation of the filter by observing the bubbles created by the filter when submerged in liquid helium, showing areas with local defects or where the current distribution is at its peak value.

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