Abstracts

A monolithic single-crystal yttrium iron garnet/silicon X-band circulator

S.A. Oliver, P.M. Zavracky, N.E. McGruer and R. Schmidt. "A monolithic single-crystal yttrium iron garnet/silicon X-band circulator." 1997 Microwave and Guided Wave Letters 7.8 (Aug. 1997 [MGWL]): 239-241.

Production of truly monolithic microwave integrated circuits that incorporate ferrite passive control elements has been hindered by the material property mismatches between ferrites and semiconductors. In this work, monolithic Y-junction circulators were fabricated by bonding 100-/spl mu/m-thick single-crystal yttrium iron garnet films to silicon at 195/spl deg/C, and then removing the gadolinium gallium garnet substrate. S-parameter measurements on the circulator and matching microstrip circuit yield an isolation of 20 dB over a 1 GHz bandwidth at 9 GHz, with a minimum insertion loss near 1 dB. Improvements in circuit design and fabrication techniques may yield monolithic circulators that are fully compatible with large-scale semiconductor manufacturing methods.

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