Abstracts

Very low loss wideband isolators for mm-wavelengths

N.R. Erickson. "Very low loss wideband isolators for mm-wavelengths." 2001 MTT-S International Microwave Symposium Digest 01.2 (2001 Vol. II [MWSYM]): 1175-1178 vol.2.

Isolators based on Faraday rotation in a cylindrical dielectric waveguide have long been used for full waveguide band coverage, but the typical loss has been significantly higher than for Y junction designs. A modification of the Faraday rotation design using better mode conversion and a greatly reduced ferrite length has resulted in much lower loss and better VSWR while maintaining high isolation. The performance is now comparable to the best narrow band Y junction designs but with nearly full waveguide bandwidth, and with even smaller size. The best WR10 units have a loss of 0.5-0.8 dB across the 75-110 GHz band, and a WR5 design has 1.0-1.2 dB loss from 160-180 GHz, increasing to 2 dB at 220 GHz. A further modification to the design using a diamond heat sink to dissipate high power has also been developed. These isolators work at cryogenic temperatures with somewhat lower loss.

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