Abstracts

Design of a High-Power CW Y-Junction Waveguide Circulator

F. Okada and K. Ohwi. "Design of a High-Power CW Y-Junction Waveguide Circulator." 1978 Transactions on Microwave Theory and Techniques 26.5 (May 1978 [T-MTT] (Special Issue on High-Power Microwaves)): 364-369.

A junction circulator appears inferior in average power-handling capability, although it is compact and light-weight and has good performance. A new type of 100-kW CW waveguide Y-junction circulator is realized by dividing the junction of the circulator into four equal unit junctions in a so-called "multilayer structure," which is water-cooled easily. This circulator has an insertion loss of 0.18 dB and an isolation of 20 dB, and it is compact and economical to build. The design of 30- and 100-kW CW waveguide Y-junction circulators is presented in this paper, which discusses determination of ferrite dimensions and air gap, considers heat generation in the ferrite, and the influence of dc magnetic-field distribution on its performance. The ferrite dimensions and air gap are determined very easily by using this design method, and these have been confirmed by experiment. It was found that a uniform distribution of internal dc magnetic field, obtained by considering the demagnetizing dc magnetic field, gives optimum performance. This is a significant design factor for high-power circulators which require minimum insertion loss.

❑ Return to main document.