# Abstracts

## Design considerations of engraved NRD guide for millimeter-wave integrated circuits

*Y. Cassivi, D. Deslandes and K. Wu. "Design considerations of engraved NRD guide for millimeter-wave integrated circuits." 2002 Transactions on Microwave Theory and Techniques 50.1 (Jan. 2002, Part I [T-MTT] (Mini-Special Issue on 1999 International Microwave and Optoelectronics Conference (IMOC'99))): 165-171.*

Practical construction of nonradiative dielectric (NRD) guide components such as filters, junctions, or hybrid planar NRD-guide circuits is rather difficult because of the tedious alignment and tolerance requirement of various separate NRD-guide elements. To overcome this hurdle, we present a new scheme called the engraved NRD guide (ENRD). This ENRD guide is an NRD guide whose outline is machined out of a single dielectric block, thereby eliminating the alignment constraint, and allowing a better precision for physical design, realization, and integrity of the overall circuit. Design considerations and procedures of the ENRD guide are studied and discussed in this paper, which suggest the predominance of gap dimension in obtaining a quasi-nonradiative condition with similar propagation properties as a normal NRD guide. It also shows that the amount of dielectric material left in support of the whole structure alignment could greatly affect the leakage level of the guide. An ENRD-guide 90/spl deg/ bend and filter were designed and measured. Investigation of the ENRD-guide filter leads to the characterization of an evanescent LSM/sub 10/ mode in the air gap region between the resonators necessary for reducing its insertion loss.

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