Abstracts

Interdigitated Stripline Quadrature Hybrid (Correspondence)

J. Lange. "Interdigitated Stripline Quadrature Hybrid (Correspondence)." 1969 Transactions on Microwave Theory and Techniques 17.12 (Dec. 1969 [T-MTT]): 1150-1151.

Interdigitated microstrip couplers consist of three or more parallel striplines with alternate lines tied together. A single ground plane, a single dielectric, and a single layer of metallization are used. Thus the approach is eminently suited for monolithic or hybrid thin-film microwave integrated circuitry. Tight coupling is achieved much more easily than with noninterdigitated edge-coupled lines. Fabrication and tolerance problems make it almost impossible to build noninterdigitated 3-dB edge couplers. Also, current crowding at the edges, which can result in high loss, is much less severe for the interdigitated coupler. Previously, tight coupling in directional couplers for microwave integrated circuits has been achieved by broadside coupling, reentrant sections, tandem sections, or branch-line couplers. Some of the disadvantages of these approaches are narrow bandwidth, large substrate area, and the need for multilayer circuitry. A 3dB directional coupler (quadrature hybrid) for S band has been fabricated in microstrip on 40-mil alumina. A single quarter-wave section was used. The hybrid showed a directivity of over 27 dB, a return loss of over 25 dB, an insertion loss of less than 0.13 dB, and an imbalance of less than 0.25 dB over a 40 percent bandwidth.

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