

Abstracts

Uniplanar hybrid couplers using asymmetrical coplanar striplines

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This paper presents four new uniplanar 3-dB hybrid couplers using asymmetrical coplanar strips (ACPSs) for microwave integrated circuit (MIC) and monolithic MIC (MMIC) applications. Experimental results show that the standard (1.5 /spl lambda//sub g/ circumference) uniplanar 180/spl deg/ hybrid-ring coupler has 3.5/spl plusmn/ 0.4 dB coupling, greater than 21-dB isolation, and greater than 23.4-dB return loss over a 25% bandwidth centered at 3 GHz. The 180/spl deg/ reverse-phase hybrid-ring coupler (1.0 /spl lambda//sub g/ circumference) provides better performance as compared to conventional microstrip hybrid couplers. This circuit has a bandwidth of more than one octave from 2 to 4 GHz with /spl plusmn/0.4-dB power dividing imbalance and /spl plusmn/4/spl deg/ phase imbalance. The 180/spl deg/ reduced-size reverse-phase hybrid-ring coupler (0.8 /spl lambda//sub g/ circumference) maintains the performance of the 180/spl deg/ reverse-phase hybrid coupler with the advantage of smaller size. This circuit also has a bandwidth of more than one octave from 2 to 4 GHz with /spl plusmn/0.3-dB power dividing imbalance and /spl plusmn/3.1/spl deg/ phase imbalance. A new 90/spl deg/ 3-dB branch-line hybrid coupler is also introduced. Experimental results show the insertion loss of this component to be 0.5 dB at 3 GHz, and also greater than 15.3-dB isolation and 17.1-dB return loss over a 10% bandwidth centered at 3 GHz. The circuits were designed and simulated with Sonnet electromagnetic-circuit solver software. The measured results agree well with the simulations.

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