Abstracts

A Broad-Band Hybrid Junction and Application to the Star Modulator

R.B. Mouw. "A Broad-Band Hybrid Junction and Application to the Star Modulator." 1968 Transactions on Microwave Theory and Techniques 16.11 (Nov. 1968 [T-MTT]): 911-918.

A class I hybrid junction, S/sub 13/= S/sub 23/; S/sub l4/= -S/sub 24/ is described consisting of two separate pairs of parallel transmission lines or transformers connected to conjugate ports 1 and 2 meeting at two central terminal pairs which are conjuate ports 3 and 4. An analysis is made in terms of the admittance and scattering parameters which reveals the "magic tee" matrix. Conjugate port isolation is infinite and equality of coupling is perfect in principle for all frequencies. The potentials at the central terminals of the hybrid junction are suitable for driving elements connected as a four-branch star. The four-diode star mixer/modulator is described and realizations in lumped elements, coaxial line, stripline, and waveguide are discussed. Data are reported for coaxial line models covering the frequency range of 1 to 8 GHz in octave bandwidths. Other applications are discussed.

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