Abstracts

Electronically Cold Microwave Artificial Resistors

R.L. Forward and T.C. Cisco. "Electronically Cold Microwave Artificial Resistors." 1983 Transactions on Microwave Theory and Techniques 31.1 (Jan. 1983 [T-MTT] (Joint Special Issue on Monolithic Microwave IC's)): 45-50.

A Iarge percentage of microwave field-effect transistors (FET's) are shown to act as a broad-band artificial resistor with a resistance of about 25 Omega when their drain is connected to their gate. The resistance appears between the gate-drain lead and the source lead. This resistance can be raised to 50 Omega with its reactive components eliminated over a reasonable bandwidth by using a matching transmission line of the proper impedance and a length near a quarter-wave at midband. An HFET- 1000 constructed in this configuration showed an impedance of 18±3 Omega over an octave bandwidth, and when transformed with a 30-Omega quarter-wave transmission line produced a resistance of 51±1 Omega from 8 to 13 GHz. A noise analysis shows that, at some frequencies, some FET's in this configuration will produce artificial resistors with an effective noise temperature as low as 67 K.

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