Abstracts

Large Signal GaAs MESFET Oscillator Design

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Techniques for large signal GaAs MESFET oscillator design are described which do not require repeated large signal measurement. In the first technique, small signal S-parameter measurements are used with a computer program to compute the packaged and mounted device equivalent circuit. Large signal measurements are made to determine a mathematical relationship between only those parameters which vary under large signal conditions. These relationships are included in the computer program. Then, once the equivalent circuit has been computed from the small signal S-parameter measurements, those parameters varying under large signals are incrementally altered until large signal S parameters are obtained which correspond to maximum oscillator output power. These values are used to calculate embedding element values for six oscillator topologies. A coaxial cavity FET oscillator was built and tested using the large signal design theory, and it substantially verified the design technique. The second design technique is based on the fact that S/sub 21/ varied more than other S parameters under large signals. By making design calculations based on S/sub 21/ reduced to the point corresponding to maximum oscillator power, it was possible to get usable design information for an FET oscillator.

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