Abstracts

A technique for reducing the size of amplifiers using defected ground structure

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A defected ground structure (DGS) on the ground plane of transmission lines, such as microstrips and coplanar waveguides, provides slow-wave characteristics caused by its equivalent inductive and capacitive components. Due to this slow-wave effect, the electrical lengths of the microstrip lines, which are combined by DGS in matching networks, are longer than the original ones. Therefore, the physical length of microstrip line can be shortened by inserting a DGS in order to keep the original electrical length. The resultant lengths of the microstrip lines with DGS are only 54% and 56% of the original lines in input and output matching networks, respectively. Additionally, because the microstrip lines with DGS have rejection characteristics slightly at the harmonic band, while standard transmission lines have a very wide passband only, the magnitude of the second harmonic is less than that of the original amplifier. The technique for size reduction of amplifiers using DGS is also applied to a coplanar waveguide (CPW) amplifier. The resultant lengths of CPW lines combined by DGS in matching networks are only 50% of the original lengths.

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