

## **Analysis and Design of a Dielectric Insular Image Guide**

### **Abstract**

In this article, a detailed theoretical analysis of the dielectric insular image guide (DIIG) is presented to provide a solution for low-loss millimeter-wave (mm-wave) transmission lines. The effective dielectric constant method is utilized to design a DIIG prototype in the Ka-band, which is then fabricated using a standard low temperature cofired ceramic technique. Results from measurements agree well with theoretical calculations and simulations. A loss of 0.012 dB/mm at 35 GHz is achieved, which indicates great potential for further development to realize highly integrated low-loss mm-wave components and systems.