

# Abstract

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## **A MINIATURIZED LOWPASS/BANDPASS FILTER USING DOUBLE ARROW HEAD DEFECTED GROUND STRUCTURE WITH CENTERED ETCHED ELLIPSE**

A new double arrow head defected ground structure (DGS) with centered etched ellipse is proposed for designing a multilayer low pass filter (LPF) with wide rejection band; low ion loss in the stop-band. The prototype LPF consists of three double arrow head DGS with centered etched ellipse in the ground plane; compensated capacitor on the top layer of a 30×40 mm<sup>2</sup> Roger RT/Duroid5880 substrate having relative permittivity ( $\epsilon_r$ ) of 2.2; thickness of 0.78 mm. The cutoff frequency is equal to 1.07 GHz. The prototype LPF is then realized as multilayer structure to enhance the filter response; reduce its size. The size reduction of the proposed multi-layer LPF is about 26% more than the conventional one. The proposed filter has been fabricated; measured. Good agreement is achieved between the simulated; measured results. The filter presents the advantages of compact size low ion loss; high out-band suppression. Finally, the multilayer LPF is transformed to band pass filter (BPF) using J-inverter method.