A novel quarter-circle defected ground structure shape is introduced in this paper to design and implement an ultra-wide reject band low-pass filter (LPF). Moreover, an equivalent circuit model (ECM) is presented. The proposed LPF has small size and, a low insertion loss and a return loss less than -20 dB. Also, a round -20 dB suppression level ranging from 4 GHz to more than 20 GHz is achieved. The simulated results obtained by ECM and full-wave EM show good agreement with the measured ones.