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ABSTRACT

2nd order bandpass filter designs using ring-based filter topology are proposed in this paper. The first filter is designed at 20GHz on a single layer using microstrip technology. The microstrip substrate Rogers Duroid TMM10 is used to design this filter with the following characteristics; relative dielectric constant (ϵr) = 9.2, substrate thickness (h)= 1.270mm, dielectric loss tangent (tan δ) = 0.0023 and operating frequency at 20GHz. The result of the return loss is 15.547dB and the insertion loss is 3.43dB with two transmission zeros for high selectivity. The second filter is designed at 65GHz on multilayer using CMOS 0.18μm technology. This filter design is simulated with fluorinated silicon glass (FSG) with the relative dielectric constant (ϵr) = 3.7 and silicone rich oxide (SRO) with its relative dielectric constant (ϵr) = 4.2. The return loss is 6.213dB and the insertion loss is 1.187dB with center frequency at 65GHz. The response shows only one transmission zero and improved by introducing a single open stub on the ring line. This modified ring has created two transmission zeros with return loss at 7.924dB and insertion loss at 0.764dB. All the designs are simulated using fullwave EM simulator. Finally, these proposed filters can be applied for next generation of wireless communication and milliwave system.

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