

## **Novel Selective Feeding Scheme Integrated with SPDT Switches for a Reconfigurable Bandpass-to-Bandstop Filter**

### **ABSTRACT**

This paper demonstrates a new technique for designing high performance reconfigurable bandpass-to-bandstop filters by employing a ring resonator and a selective feeding scheme integrated with single-pole double-throw switches (SPDT). The transformation from bandpass-to-bandstop mode and viceversa is achieved by connecting or disconnecting two  $\lambda/4$  open-circuited stubs on the ring using PIN diodes. SPDT switches are employed for electronic switching between two different feeding line sections. In the bandpass state the resonator presents two transmission zeros near the edges of the passband and four attenuation poles inside the passband, enhancing the filter's performance, thus achieving excellent sharp rejection with high roll-off-rate (ROR20dB). On the other hand, high stopband rejection with wide bandwidth, good return loss and good skirt-band attenuation rates are achieved in the bandstop state. Even- and oddmode analysis is adopted and closed-form expressions are derived to describe the filter's behaviour. To verify the validity of the proposed design, a prototype filter was fabricated and measured. In measurement, a 65% 3-dB bandwidth bandpass filter (BPF) with an insertion loss of 0.86 dB was switched to a 70% 20- dB bandwidth bandstop filter (BSF) with more than 40 dB stopband rejection.