

Corrugated SIW Based Bandpass Filter for Microwave Interferometer and ISM Band Application

Corrugated substrate integrated waveguide (CSIW) based bandpass filter is designed and developed for the microwave interferometer (7.0 GHz) and ISM band (5.7 GHz-5.9 GHz) application. CSIW structure provides a cost-effective solution counter to substrate integrated waveguide (SIW). Initially, the CSIW structure is designed from the design methodology of SIW. Vias are replaced with a quarter wavelength open stub. A metallic inductive post is used for the realization of the bandpass filter from the CSIW structure. Computer simulation technology (CST) software is used for design and simulation of the proposed model. Two structures are implemented for the microwave interferometer and ISM band frequency application. The first structure resonates at the center frequency of 7.023 GHz with the fractional bandwidth of 5.26%. It provides an insertion loss value of less than 1.5 dB and a return loss better than 14 dB. Similarly, the second structure provides passband frequency, from 5.6 GHz to 6.0 GHz, with the insertion loss value less than 1.5 dB and return loss better than 18 dB at the center frequency. It can be used for the ISM band frequency application. The frequency tuning approach is also shown to change the resonance frequency for different applications. For the proof of concept, the proposed filter is fabricated and tested. The measured results are quite similar to the simulation results.

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