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Title:Terahertz micromachined waveguide filter

Authors:Du, Yi-Jia (1); Bao, Jing-Fu (1); Zhao, Xing-Hai (2); Zheng, Ying-Bin (2)

Author affiliation:(1) University of Electronic Science and Technology of China, Chengdu 611731, China; (2) China Academy of Engineering Physics, Mianyang 621900, China

Corresponding author:Bao, J.-F.(baojingfu@uestc.edu.cn)

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Abstract:This paper presents the method of designing and fabricating 6-pole TeraHertz (THz) iris band-pass filter by adopting micromachining technology. Based on the existing process conditions, through analyzing the influence of process factors on electromagnetic property of filters, the process and designing parameters are mutually compromised to avoid sharp deterioration of device performance due to process factors so that the design can be optimized, and ultimately the integratable THz filter of small insertion loss and high reliability is obtained. By applying the processing methods including Inductively Coupled Plasma (ICP) etching, evaporating, electroplating gold and bonding, the single after-dicing micromachined filter with the volume of 24.0 mm × 5.0 mm × 1.66 mm is fabricated. The filter is fixed by applying tunable measurement clamp, and the power meter is adopted to test its power attenuation. Measurements results show that the center frequency of a 10.6% 3 dB fractional bandwidth is 141.5 GHz, and the power attenuation is less than 1 dB at 141.5 GHz, thus proving the effectiveness of the proposed processing method.

Number of references:13

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Uncontrolled terms:Band pass - Center frequency - Device performance - Electromagnetic properties - Fractional bandwidths - High reliability - Micromachined - Micromachined filters - Micromachining technologies - Power attenuation - Power meters - Process condition - Process factor - Processing method - Terahertz - Terahertz device - THz filters

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