Abstracts

Three-dimensional millimeter-wave photonic integrated circuits on Si

T. Minotani, Y. Royter, H. Ishii, A. Hirata, K. Machida, A. Sasaki and T. Nagatsuma. "Three-dimensional millimeter-wave photonic integrated circuits on Si." 2001 MTT-S International Microwave Symposium Digest 01.1 (2001 Vol. I [MWSYM]): 57-60 vol.1.

We have demonstrated two millimeter-wave photonic integrated circuits: a coplanar waveguide (CPW) and a patch antenna, each of which is monolithically integrated with a high-speed InP/InGaAs photodiode on Si substrate. The passive elements are made on a thick low-k interlayer dielectric which makes the attenuation of the CPW much lower than that for a CPW on Si and constant from DC to 100 GHz. Furthermore, we optimized the via geometry to maintain signal waveform integrity. For the patch antenna, we demonstrated the radiation of millimeter-wave signal with power of over 0.1 mW at 120 GHz.

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