Abstracts

Porosity effects on coplanar waveguide porous silicon interconnects

I.K. Itotia and R.F. Drayton. "Porosity effects on coplanar waveguide porous silicon interconnects." 2002 MTT-S International Microwave Symposium Digest 02.2 (2002 Vol. II [MWSYM]): 681-684 vol.2.

Oxidized porous silicon (OPS) has the potential to produce low loss designs for high-density RF passive and CMOS integrated circuits. Herein are findings on porosity effects on finite ground coplanar waveguide (FGCPW) lines printed on OPS material up to 50 GHz. At 51% porosity, measured effective dielectric constant data (/spl epsi//sub r,eff/) is approximately 2.8 and is consistent with Bruggeman models. For similar low (low-rho) and high (high-rho) resistivity silicon designs, OPS attenuation (dB/cm) exhibits 78% less loss than low-rho designs with 1.5 and 9.5% less than and greater than, the high-rho design at 10 and 20 GHz, respectively. Furthermore, wideband 50-ohm impedance matching is achieved. These findings, therefore, support consideration of oxidized porous silicon for RFIC design.

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