Abstracts

High performance RF passive integration on Si smart substrate

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To achieve cost and size reduction, we developed low cost manufacturing technology for RF substrate and high performance passive process technology for RF IPDs (Integrated Passive Devices). The fabricated substrate is conventional 6" Si wafer with SiO/sub 2/ thickness of 25 /spl mu/m on the surface. This substrate showed the very good insertion loss of 0.03 dB/mm at 4 GHz, including conductive metal loss, in case of 50/spl Omega/ coplanar transmission line (W = 50 /spl mu/m, G = 20 /spl mu/m). Using BCB (Benzo Cyclo Butene) interlayer and 10 /spl mu/m Cu plating process, we made a high Q circular spiral inductor on Si that had the record maximum quality factor of more than 120. The fabricated inductor library showed the maximum quality factor range of 30/spl sim/120 or more, depending on geometrical parameters and inductance values of 0.35/spl sim/31.5 nH. The small-size RF IPDs were fabricated on thick oxide Si substrate for the applications such as FEMs (Front End Modules) and high-speed wireless LANs and they showed very good performances. These substrate and passive process technologies will be widely utilized in hand-held RF module and system requiring low cost solution and strict volumetric efficiency.

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