Abstracts

Three-Dimensional Passive Circuit Technology for Ultra-Compact MMIC's (Dec. 1995, Part II [T-MTT])

M. Hirano, K. Nishikawa, I. Toyoda, S. Aoyama, S. Sugitani and K. Yamasaki. "Three-Dimensional Passive Circuit Technology for Ultra-Compact MMIC's (Dec. 1995, Part II [T-MTT])." 1995 Transactions on Microwave Theory and Techniques 43.12 (Dec. 1995, Part II [T-MTT] (1995 Symposium Issue)): 2844-2849.

A novel passive circuit technology of a three-dimensional (3-D) metal-insulator structure is developed for ultra-compact MMIC's. By combining vertical passive elements, such as a wall-like microwire for shielding or coupling, and a pillar-like via connection with multilayer passive circuits, a 3-D passive circuit structure is formed to implement highly dense and more functional MMIC's. O/sub 2//He RIE for forming trenches and holes in a thick polyimide insulator, low-current electroplating for foming gold metal sidewalls in the trenches or holes, and ion-milling with a WSiN stopper layer for patterning the gold metal are used to produce such a structure. The complete 3-D structure provides miniature microstrip lines effectively shielded with a vertical metal-wall, a miniature balun with low-loss vertical wall-like microwires, and inverted microstrip lines jointed with pillar-like vias through a thick polyimide layer. This technology stages next-generation ultra-compact MMIC's by producing various functional passive circuits in a very small area.

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