Abstracts

Line-loss and size reduction techniques for millimeter-wave RF front-end boards by using a polyimide/alumina-ceramic multilayer configuration

M. Nakatsugawa, A. Kanda, H. Okazaki, K. Nishikawa and M. Muraguchi. "Line-loss and size reduction techniques for millimeter-wave RF front-end boards by using a polyimide/alumina-ceramic multilayer configuration." 1997 Transactions on Microwave Theory and Techniques 45.12 (Dec. 1997, Part II [T-MTT] (1997 Symposium Issue)): 2308-2315.

This paper proposes a concept for constructing low-loss and small-size millimeter-wave RF front-end boards by using a polyimide/alumina-ceramic multilayer configuration. The thick polyimide layer enables us to design low-loss wide microstrip lines (MS's). Moreover, the board size can be reduced by compactly arranging all RF and dc lines in the intermediate layers of the polyimide/alumina-ceramic substrate. The size of a prototype board designed for the quasi-millimeter-wave region is 30 mm/spl times/30 mm. In experiments, it showed 23.2-dB linear gain and 7.4-dBm P/sub -1/ RF output power in transmitter (TX) mode, and 3.1-dB linear gain and -20.1-dBm P/sub -1/ IF output power in receiver (RX) mode. These performance levels agree well with predicted values. This paper further discusses applications to the integration of passive circuits fabricated in the substrate. The proposed configuration has enough potential to integrate all monolithic microwave integrated circuit (MMIC) chips, dc-bias integrated circuits (IC's), and passive circuits, and can improve the total performance in terms of the RF characteristics, board size, and fabrication cost.

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