

Design and analysis of compact MMIC switches utilising GaAs pHEMTs in 3D multilayer technology

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Abstract

In this paper, we demonstrate for the first time the implementation of three-dimensional multilayer technology on GaAs-based pseudomorphic high electron mobility transistor (pHEMT) switches. Two types of pHEMT switches are considered, namely single-pole single-throw (SPST) and single-pole double-throw (SPDT). The design and analysis of the devices are demonstrated first through a simulation of the industry-recognised standard model, TriQuint's Own Model - Level 3, developed by TriQuint Semiconductor, Inc. From the simulation analysis, three optimised SPST and SPDT pHEMT switches which can address applications ranging from L to X bands, are fabricated and tested. The performance of the pHEMT switches using multilayer technology are comparable to those of the current state-of-the-art pHEMT switches, while simultaneously offering compact circuits with the advantages of integration with other MMIC components. © 2017 IOP Publishing Ltd.

Author keywords

GaAs MMIC pHEMT SPDT SPST switch