Abstracts

Commutation quality factor of two-state switchable devices

A unified way to characterize a two-state one-port switchable network is discussed in this paper. A figure-of-merit of the two-state one-port, called the commutation quality factor (CQF), is introduced. It can be applied to different types of switching devices (semiconductor, ferroelectric, superconductor, etc.) and used for a design of two-state components with optimal characteristics. The CQF is defined as the ratio of the input impedances of a lossless reciprocal two-port terminated in the impedance pair Z_1 and Z_2, provided the imaginary parts of both input impedances are zero. A simple formula is derived for a calculation of the CQF. The invariance of the CQF with respect to lossless reciprocal transformation is shown. The applicability of the CQF does not depend on the physical nature of the device. The CQF is a working tool for a selection of switching devices while designing electronically controlled microwave components and subsystems. The CQF is recommended to be used for determining the available minimum of insertion loss of a switching microwave component. Thus, the introduced CQF can be used for optimization of the switching microwave component designed.

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