Abstracts

Characterization and applications of on-wafer diode noise sources

L.P. Dunleavy, J. Randa, D.K. Walker, R. Billinger and J. Rice. "Characterization and applications of on-wafer diode noise sources." 1998 Transactions on Microwave Theory and Techniques 46.12 (Dec. 1998, Part II [T-MTT] (1998 Symposium Issue)): 2620-2628.

A set of wafer-probable diode noise source transfer standards are characterized using on-wafer noise-temperature methods developed at the National Institute of Standards and Technology (NIST), Boulder, CO. We review the methods for accurate measurement and prediction of on-wafer noise temperature of off-wafer and on-wafer noise source standards. In analogy with the excess noise ratio (ENR) for hot noise temperatures, we introduce a representation for cold noise temperatures called the cold noise ratio (CNR), which is expressed in decibels. The ENR and CNR noise source representations share the property that the difference between off-wafer and on-wafer values may be approximated by the probe loss. We present measurements of the on-wafer ENR and reflection-coefficient information for a preliminary set of on-wafer diode transfer standards at frequencies from 8 to 12 GHz. Such transfer standards could be used in interlaboratory comparisons, as a noise calibration verification tool, as direct calibration artifacts, or as the basis for a new "noise-source probe" conceptualized here.

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