

Modeling and Characterization Approaches for Crossing Transmission Line on CMOS

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Device modeling and characterization is the most important phase for millimeter-wave circuit and system design. These devices may be active or passive, and having two-port or more number of ports. Aside from the difficulties for two-port device characterization or modeling, four-port device characterization has more issues such as decreased dynamic ranges of Vector Network Analyzers, unwanted effects in the de-embedding procedures. In [1], these issues are addressed and lumped equivalent circuit for a Crossing Transmission Line (CTL), which is mainly used for RF signal routing (Fig. 1), is obtained from two-port measurements. Addition to this, in here, a new full four-port characterization method of CTL from two-port measurements using four different structures is given with its theory. The effects of modeled, characterized, and EM simulated results of CTL are investigated on a passive balanced mixer (Fig. 2) in terms of LO leakage.

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[1] Korkut Kaan Tokgoz, Kimsrun Lim, Seitarou Kawai, Kenichi Okada, Akira Matsuzawa, “Crossing Transmission Line Modeling Using Two-port Measurements,” SSDM, Fukuoka, Japan, Sep. 2013

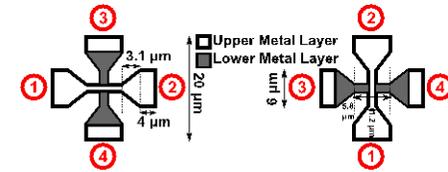


Fig. 1. Detailed CTL

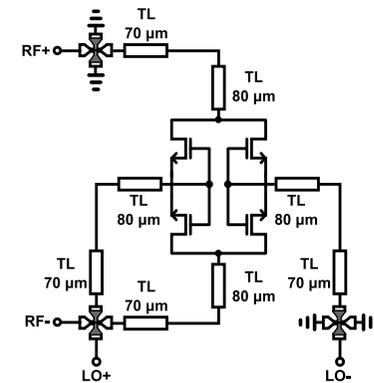


Fig. 2. A balanced mixer with three CTL