Abstracts

MMIC designers trained on real chips without expensive fabrication

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Without many lengthy and expensive design/fabrication/test iterations, we have trained a number of MMIC designers who can contribute to the industry even before they graduate. The approach involves mainly large-signal modeling and internal-node microwave waveform probing of existing MMIC chips. Typically, it starts by a company asking us to help diagnose a certain MMIC. Students then extract large-signal transistor models themselves and use the models to simulate the internal-node waveforms of the MMIC. By comparing the modeled and measured results, students gain insight of the MMIC working principles. Next, design improvement is suggested and verified by novel cutting and pasting techniques. Lastly, by focusing on microwave waveforms students are proficient in both frequency- and time-domain techniques, making them particularly suitable for modern wireless communication applications which involve complex signal-modulation schemes.

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