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S E M I N A R

Room 1003, ETB

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Design and Fabrication of 50 GHz mm-Wave VCO Using Coupled Transmission Line on 65-nm CMOS Technology

by

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Abstract: In the past decade, CMOS millimeter wave (mm-wave) circuits have been implemented for short-range high data rate applications. This has resulted in significant cost reduction compared to the conventional monolithic microwave integrated circuit (MMIC) technologies, such as GaAs. At such high frequencies, distributed elements such as transmission lines are widely used smaller size and lower parasitics compared to the lumped inductive elements. We introduce a compact design of a voltage controlled oscillator (VCO) that is tunable from 49.5 GHz to 52.7 GHz. The VCO has phase noise -92 dBc/Hz at 1 MHz offset. The inductive element is based on differential coupled transmission line with low loss. The oscillator was fabricated in TSMC 65-nm CMOS process. The transmission line choice resulted in a compact VCO design which occupies 0.079 mm^2 and 0.016 mm^2 , with and without pads, respectively. The oscillator power dissipation is 40 mW from 1 V supply.

Omar ElSayed was born in Cairo, Egypt, in 1988. He received the B.Sc. and M.Sc. degrees in electronics and communications from Cairo University, Cairo, Egypt, in 2010 and 2012, respectively. He is currently working toward the Ph.D. degree in electrical and computer engineering at Texas A&M University, College Station. He was a Teaching Assistant in the Department of Electronics and Communications, Cairo University. He worked as a research assistant at Youssef Jameel Science & Technology Research Center, The American University in Cairo, Cairo, Egypt. His research interests include RF and mm-wave circuits.

