

# ABSTRACT

Fully integrated cmos phase shifter/vco for mimo/ism application communications systems

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A fully integrated CMOS 0 – 900 phase shifter in 0.18um TSMC technology is presented. With the increasing use of wireless systems in GHz range, there is high demand for integrated phase shifters in phased arrays and MIMO on chip systems. Integrated phase shifters have quite a high number of integrated inductors which consume a lot of area and introduce a huge amount of loss which make them impractical for on chip applications. Also tuning the phase shift is another concern which seems difficult with use of passive elements for integrated applications. This work is presents a new method for implementing phase shifters using only active CMOS elements which dramatically reduce the occupied area and make the tuning feasible. Also a fully integrated millimeter-wave VCO is implemented using the same technology. This VCO can be part of a 24 GHz frequency synthesizer for 24 GHz ISM band transceivers. The 24 GHz ISM band is the unlicensed band and available for commercial communication and automotive radar use, which is becoming attractive for high bandwidth data rate.