

EC On-chip Antenna Design

Introduction to millimeter wave technologies: Antenna, RF Electronics, Packaging, Millimeter wave packaging, Review of Microwave Packaging Technologies, Low-cost mm Wave Packaging, Emerging Packaging Technologies, Package Co-design at mm Waves. Millimeter-wave Interconnects: Interconnects at Millimeter-wave Frequencies, Interconnect Technology Options for Millimeter-wave Applications, Performance-oriented Interconnect Technology Optimization, Chip-to-package Interconnects at Millimeter-wave Frequencies.

Printed Millimeter Antennas: Introduction and Considerations for Millimeter-wave Printed Antennas, Multilayer Interconnection Technology, Multilayer Antenna Array with Shaped Beam, Connector and Diffraction Problems for Printed Antennas.

Planar Waveguide-type Slot Arrays: Equivalent Length of a Round-ended Straight Slot, Alternating-phase Fed Single-layer Slotted Waveguide Array and its Side lobe Suppression, Center Feed Single Layer Slotted Waveguide Array, Single-layer Hollow-waveguide Eight-way Butler Matrix, Radial Line Slot Antennas, Post-wall Waveguide-fed Parallel Plate Slot Arrays, Coaxial-line to Post-wall Waveguide Transformers.

Antenna Design for Packaging Applications: Air-suspended Superstrate Antenna, Packaged Antennas, A Patch Array, Circularly Polarized Antenna, Assembly Process, Advanced Packaging Application. Monolithic Integrated Antennas: Monolithic Antenna Integration Challenges, Manufacturing Techniques for Enhanced Antenna Performance, Circuit Integration, Packaging of Integrated Circuits with On-chip Antennas, Monolithic Antenna Measurement Techniques.

Phased Array: Antenna Element Design for Phased Arrays, Beam-forming Network, Design and Manufacture Issues Integrated Phased Arrays: Integrated Phased Arrays, Fully Integrated mm Wave Phased-array Transceiver, Direct Antenna Modulation, Large-scale Integrated Phased Arrays: CMOS RF Circuits- Integrated Transmitter and Receiver, Wireless Inter chip Interconnects.

References:

- 1) Duixian Liu, Brian Gaucher, *Advanced millimeter wave technologies: Antennas, Packaging and Circuits*, Wiley, 2012.
- 2) Mikhail R. Baklanov, Paul S. Ho, Ehrenfried Zschech, *Advanced interconnects for ULSI Technology*, Wiley, 2012.
- 3) Samee Ullah Khan, Joanna Kolodziej, Juan Li, Albert Y. Zomaya, *Evolutionary based solutions for green computing*, Springer 2013.

Mrs. RB/BM
for Senate approval

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