On-Chip ESD Protection in RF Technologies

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Outline

- ESD RF Year in Review
- ESD Physical Electro-thermal Models
- RF ESD Testing Methods
- RF ESD Circuit Design
- RF CMOS
- Silicon Germanium and GaAs
- RF ESD Design Systems
Purpose

RF ESD – What is Different?

• Everything!!
Introduction

• Testing Methods
• Failure Criteria
• RF ESD Design Methods
• RF ESD Circuits
• Technologies
• CAD Design Tools
Conclusion

- RF ESD development significantly deviates from digital ESD design in the following areas:
  - Technology and element types
  - Circuitry and layout
  - Test Methods
  - Failure criteria and Parameters
  - Failure mechanisms
  - ESD CAD layout design
Summary

• ESD RF design will continue to be a challenge in future technologies as the application frequencies increase.
• ESD RF design will evolve from on-chip design, co-synthesis to off-chip ESD design as application frequency increases.