Motorola
Digital DNA
Activities

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DDL-DNA Phoenix

- Technology (Si, SiGe, GaAs, III/V on Si)
- Modeling:
  - Gummel-Poon
  - VBIC (scaleable, statistical)
  - In-house models
- Circuit Design
DDL-EMEA Facility Berlin

- On-Wafer DC- and RF-Characterization up to 120 GHz
- Noise Parameter Characterization (external)
- Load-Pull Characterization (external)
- Technology Development and Evaluation
- Circuit Design: Digital and Analog RF
S-Parameter Set-up 45 MHz up to 110 GHz
Probe-tip Configuration
RF-Performance of High-Speed SiGe(C)-HBT

\[ V_{CE} = V_{BE} = 0.975 \text{ V}, \ T_a = 297 \text{ K} \]

- Current gain \(|h_{21}|\) /dB
- Unilateral gain \(G_U\) /dB

- \(f_T = 85 \text{ GHz}\)
- \(f_{\text{max}} = 95 \text{ GHz}\)
Transmission Lines

Coplanar Line (CPW)

Microstrip Line (MS)

SiO$_2$

Low resistivity Silicon

Metal 4

Metal 1

Metal 1 (signal ground)
Measured and Modeled S-Parameters

Frequency range: 0.5 – 119.5 GHz

High-speed SiGe(C)-HBT

Motorola Technology

Max. $s_{21} = 18.0$  Max. $s_{12} = 0.25$

$S_{21}$  $S_{12}$

$S_{22}$  $S_{11}$

× measured  — modeled
Measured and Modeled Noise Parameters

- High-speed SiGe(C)-HBT
- Motorola Technology
- Extrinsic Noise Data

freq (2.000GHz to 26.50GHz)

S11 & S22 & S21' & S12'

S11 & S22

min. noise figure Fmin /dB

calc. generator reflexion coefficient Gs,calc

freq (2.000GHz to 26.00GHz)

freq (2.000GHz to 26.50GHz)

equivalent noise resistance Rn /Ohm

frequency f /GHz

frequency f /GHz


Bipolar User Meeting, Rev. 1.0, 10

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