Fig. 2-1 Small-signal equivalent circuit model for a SiGe HBT in the forward active region.
Fig. 2-2 Equivalent circuit for a SiGe HBT at open-collector bias condition.
Fig. 2-3  (a) Plot of $\text{Re}(Z_{22}-Z_{21})$, $\text{Re}(Z_{11}-Z_{12})$, and $\text{Re}(Z_{12})$ versus $1/I_B$, freq = 1.0 GHz. (b) Evolution of the $\text{Im}(Z_{11}-Z_{12})$, $\text{Im}(Z_{12})$, and $\text{Im}(Z_{22}-Z_{21})$ versus $\omega$ when the device is biased at high base current density ($I_B=40 \text{ mA}$).
Fig. 2-4 Small-signal equivalent circuit model for a SiGe HBT biased at $V_{CE} = 0$ and reverse and/or low forward base voltage after de-embedding the “open” dummy pad.
Fig. 2-5 Measured capacitances \((C_{\text{bep}}+C_\pi)\) and \((C_{\text{bep}}+C_{\text{bex}}+C_{\text{bci}})\) versus the expression of \((1-V_j/V_P)^{-m_j}\).
Fig. 2-6 (a) Small-signal equivalent circuit model for a SiGe HBT biased at $V_{BE}=0$ and forward and/or low reverse collector voltage after de-embedding the “open” dummy pad and removing the extrinsic inductances, extrinsic base resistance and extrinsic collector resistance. (b) Application of the $T \leftrightarrow \Pi$ transformation to the HBT device equivalent circuit shown in (a).
Fig. 2-7 Frequency dependencies of the extracted $R_{bi}$ for a SiGe HBT biased at $V_{BE}=0V$ and $V_{CE}=3V$. 
Fig. 2-8 Frequency dependencies of the extracted $\omega C_\pi$ for a SiGe HBT biased at $V_{BE}=0V$ and $V_{CE}=3V$. 
Fig. 2-9 Plot of $\text{Re}(Y_{11,k})$ versus $\omega^2$ for the calculation of $C_{\text{bc1}}$ for a SiGe HBT biased at $V_{\text{BE}}=0\text{V}$ and $V_{\text{CE}}=3\text{V}$.
Fig. 2-10 Plot of frequency dependence of the extracted $\text{Re}(Y_{\text{sub}})$ and $\text{Re}(Y_{22,k} + Y_{21,k})$ biased at $V_{\text{BE}}=0\text{V}$ and $V_{\text{CE}}=3\text{V}$. 
Fig. 2-11 Plot of frequency dependence of the extracted Im($Y_{\text{sub}}$) and Im($Y_{22,k} + Y_{21,k}$) biased at $V_{BE}=0$V and $V_{CE}=3$V.
Fig. 2-12 Plot of \( \text{Im}(Y_{\text{sub}})/(\omega \text{Re}(Y_{\text{sub}})) \) and \( \text{Re}(Y_{\text{sub}}) \) versus \( 1/\omega \) for a SiGe HBT biased at \( V_{\text{BE}}=0\text{V} \) and \( V_{\text{CE}}=3\text{V} \).
Fig. 2-13 Collector-voltage dependence of the extracted $C_{\text{sub}}$, $R_{bk}$ and $C_{bk}$ for a SiGe HBT biased at $V_{BE}=0$V and $V_{CE}=3$V.
Fig.2-14 Small-signal equivalent circuit model of intrinsic SiGe HBT in common collector configuration.
Fig. 2-15 Plot of $\text{Re}(A_{c12}/A_{c22})$ and $\text{Re}(A_{c12}/|A_e|)$ versus frequency. $V_{BE}=0.83\, \text{V}$, $V_{CE}=3\, \text{V}$, $I_C=1.516\, mA$, and $I_B=9.136\, \mu\text{A}$. 
Fig. 2-16 Plot of $\text{Im}(A_{c_1})$ versus $\omega$. $V_{BE}=0.83\,\text{V}$, $V_{CE}=3\,\text{V}$, $I_c=1.516\,\text{mA}$, and $I_B=9.136\,\mu\text{A}$.

$R_{be_{bcl}}=8.291\times10^{-14}$
Fig. 2-17 Plot of $\text{Im}(A_{c,12}/|A_c|)$ versus $1/\omega$. $V_{BE}=0.83\,\text{V}$, $V_{CE}=3\,\text{V}$, $I_C=1.516\,\text{mA}$, and $I_B=9.136\,\mu\text{A}$. 

$C_{\pi}=410.31\,\text{fF}$
Fig. 2-18 Plot of $\text{Im}(A_{c11}/A_{c21})$ versus $1/\omega$. $V_{BE}=0.83\text{V}$, $V_{CE}=3\text{V}$, $I_C=1.516\text{mA}$, and $I_B=9.136\mu\text{A}$.

$C_{be1}+C_{ce}=20.52\text{fF}$
Fig. 2-19 Frequency dependence of extracted $1/R_n$ for a SiGe HBT biased at $V_{BE}=0.83\,\text{V}$, $V_{CE}=3\,\text{V}$, $I_C=1.516\,\text{mA}$, and $I_B=9.136\,\mu\text{A}$.
Fig. 2-20 Frequency dependence of extracted $g_{m0}$ and $\tau$ for a SiGe HBT biased at $V_{BE}=0.83\,\text{V}$, $V_{CE}=3\,\text{V}$, $I_C=1.516\,\text{mA}$, and $I_B=9.136\,\mu\text{A}$.
Fig. 2-21 Measured and simulated $S_{11}$ and $S_{22}$ of the $4 \times 0.24 \times 32 \ \mu\text{m}^2$ SiGe HBT in the frequency range of 1–20 GHz biased at $V_{\text{BE}}=0.83\text{V}$, $V_{\text{CE}}=3\text{V}$, $I_{\text{B}}=9.136\mu\text{A}$, and $I_{\text{C}}=1.516\text{mA}$.
Fig.2-22 Measured and simulated $S_{12}$ and $S_{21}$ of the $4 \times 0.24 \times 32 \, \mu m^2$ SiGe HBT in the frequency range of 1–20 GHz biased at $V_{BE}=0.83V$, $V_{CE}=3V$, $I_B=9.136\mu A$, and $I_C=1.516mA$. 