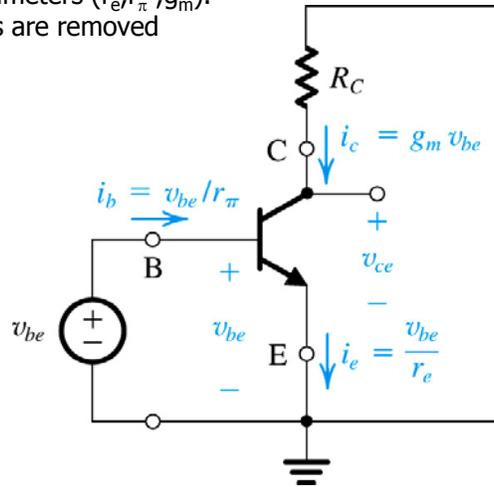


- The DC bias determine the circuit parameters (r_e, r_{π}, g_m).
- DC sources are removed



The Hybrid- π Model

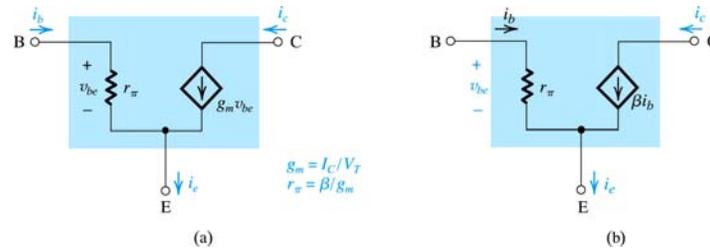


Figure 6.40 Two slightly different versions of the hybrid- π model for the small-signal operation of the BJT. The equivalent circuit in (a) represents the BJT as a voltage-controlled current source (a transconductance amplifier), and that in (b) represents the BJT as a current-controlled current source (a current amplifier).

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The T Model

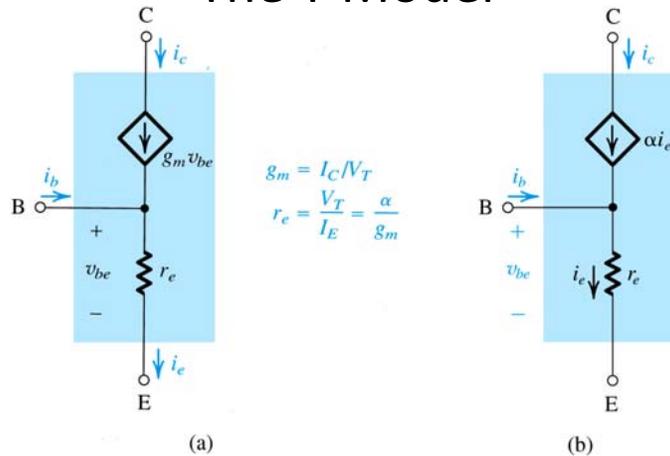
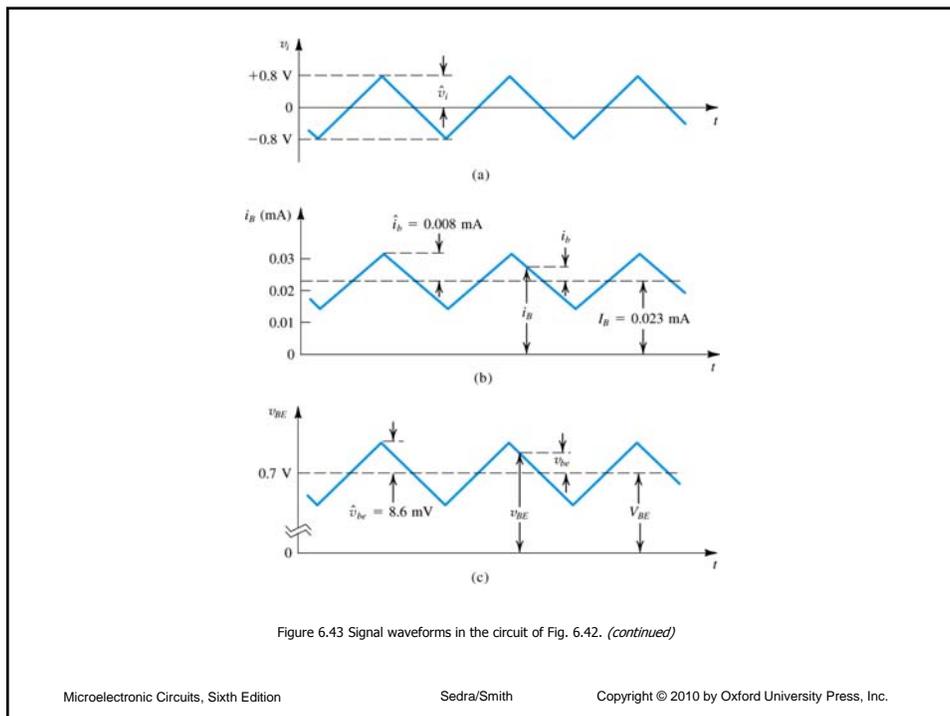
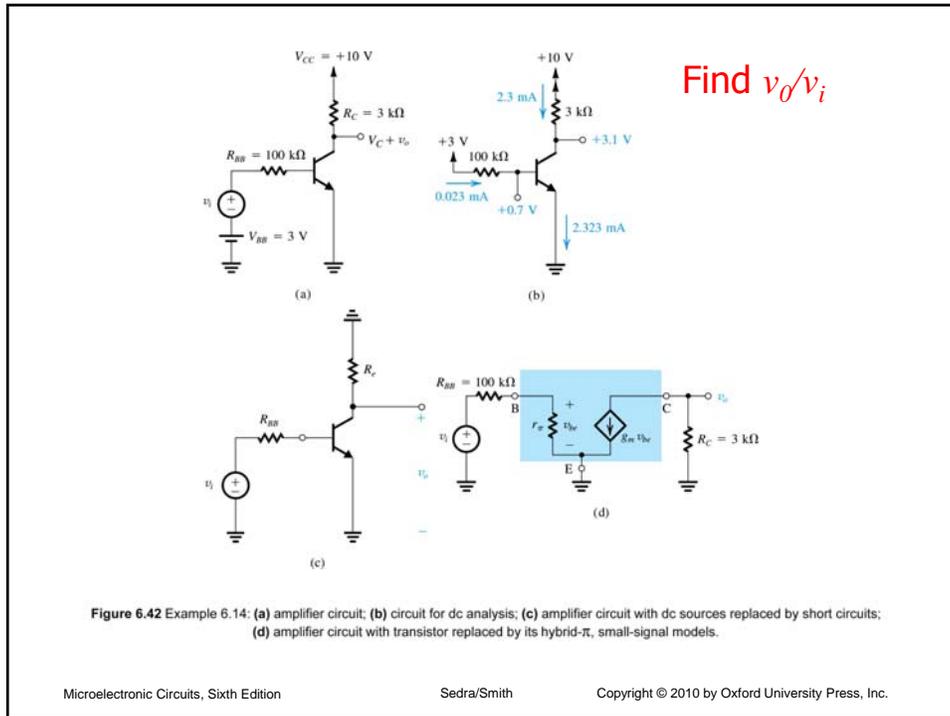


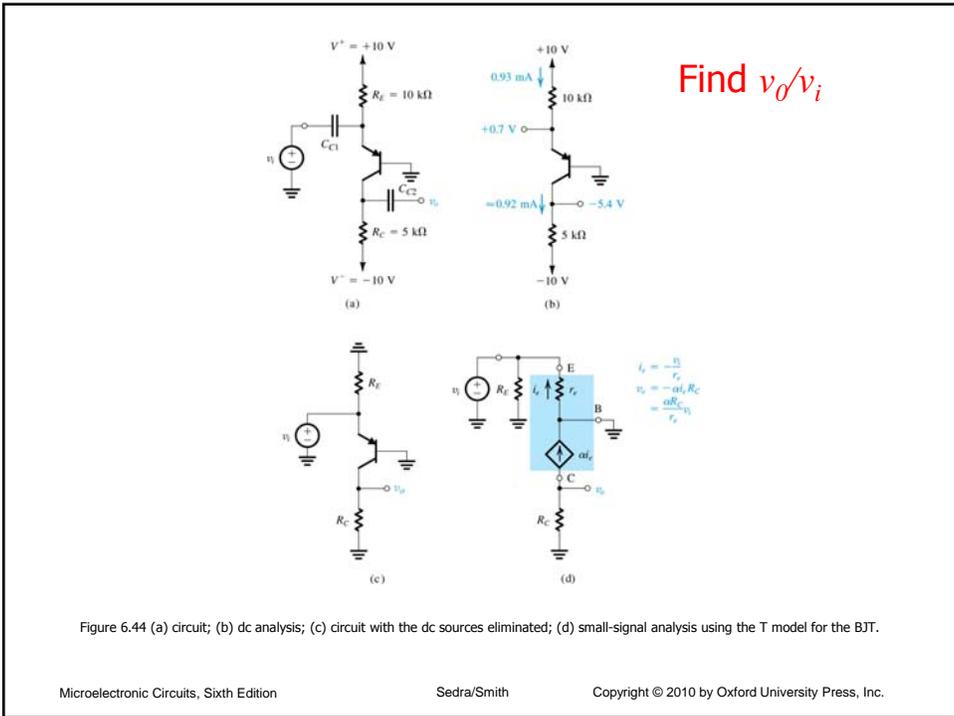
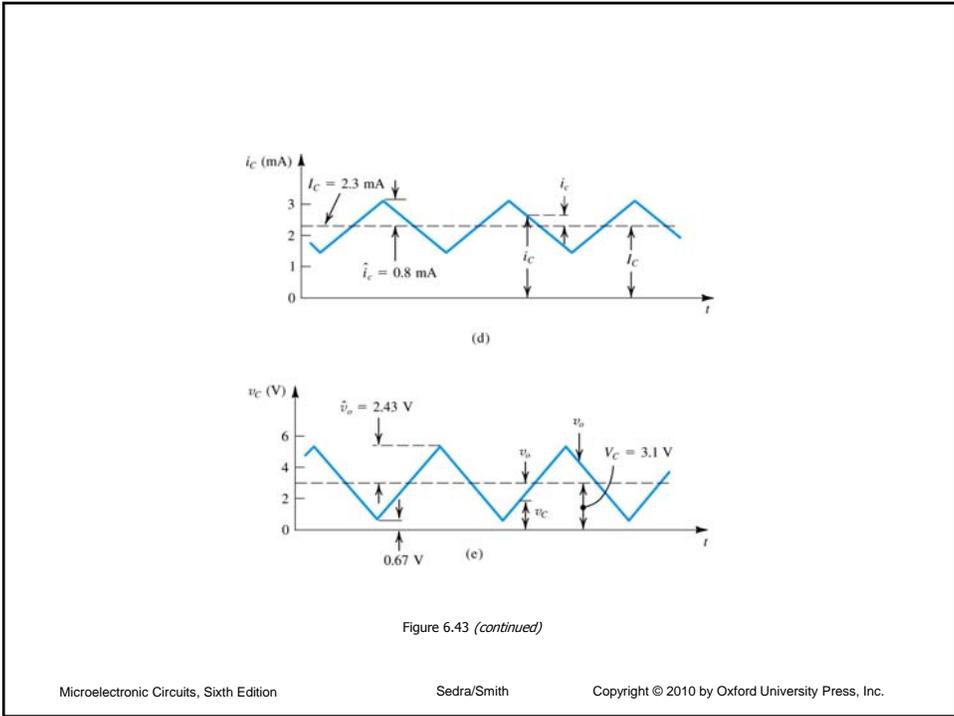
Figure 6.41 Two slightly different versions of what is known as the T model of the BJT. The circuit in (a) is a voltage-controlled current source representation and that in (b) is a current-controlled current source representation. These models explicitly show the emitter resistance r_e rather than the base resistance r_{π} featured in the hybrid- π model.

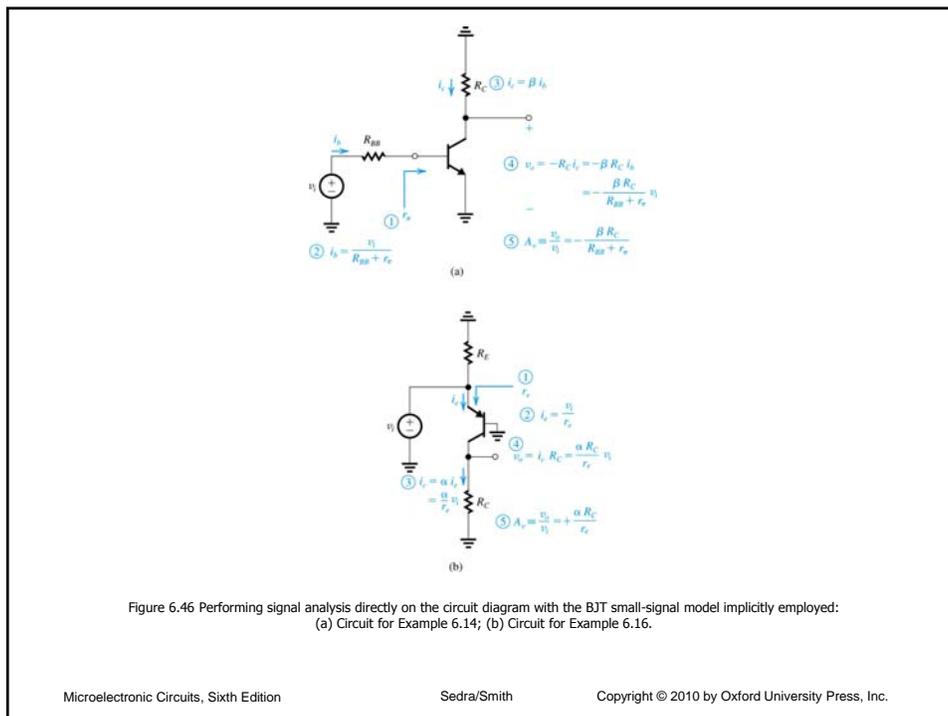
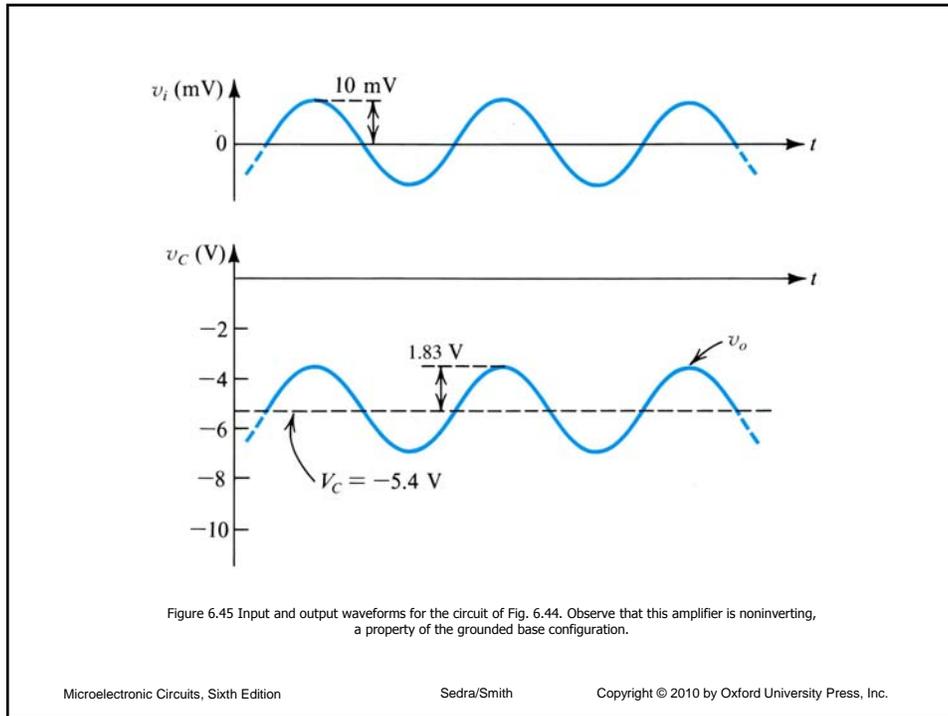
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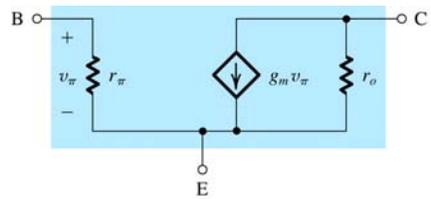
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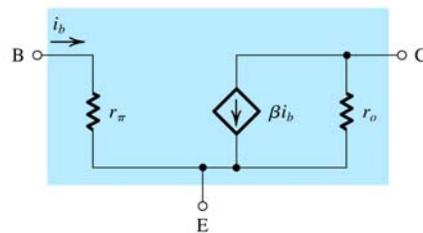




Including the early Effect



(a)



(b)

$V_A=100 \text{ V}, \beta=100$

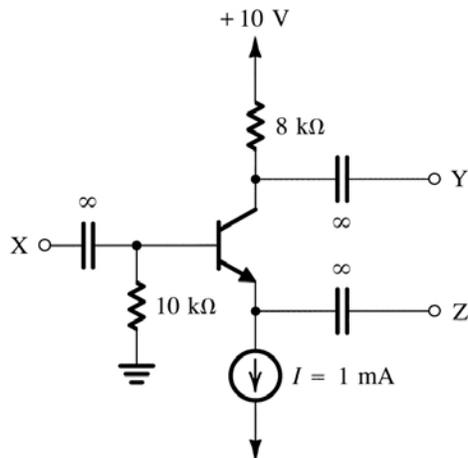
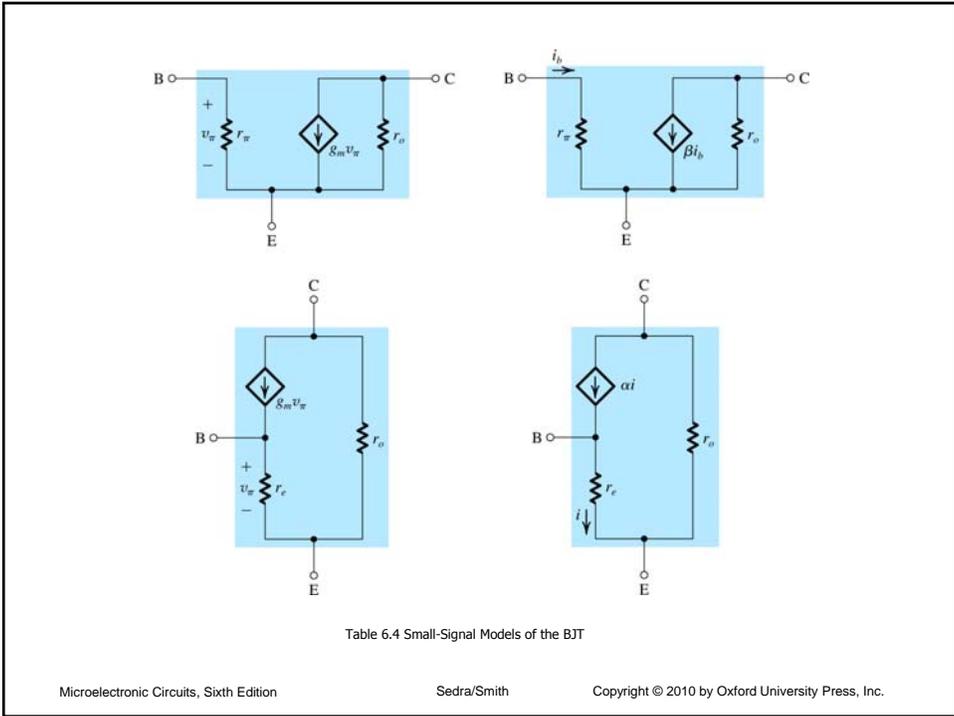
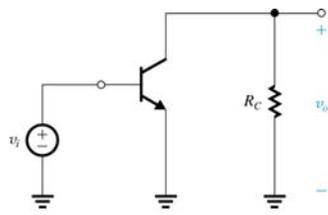


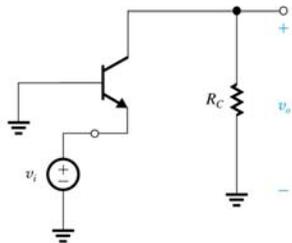
Figure E6.41



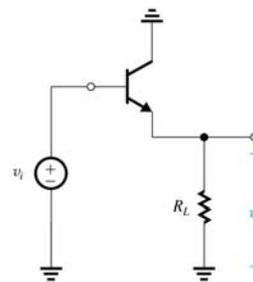
Basic Amplifier Configuration



(a) Common-Emitter (CE)



(b) Common-Base (CB)



(c) Common-Collector (CC) or Emitter Follower