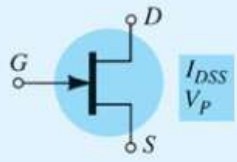
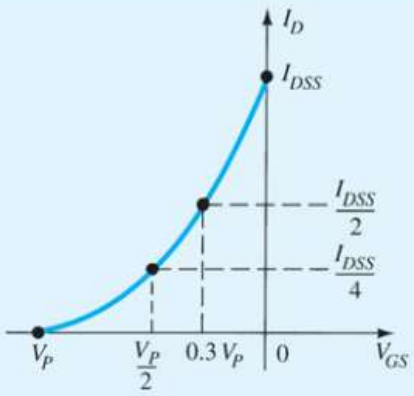
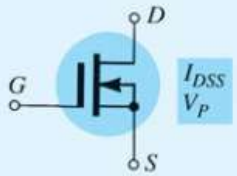
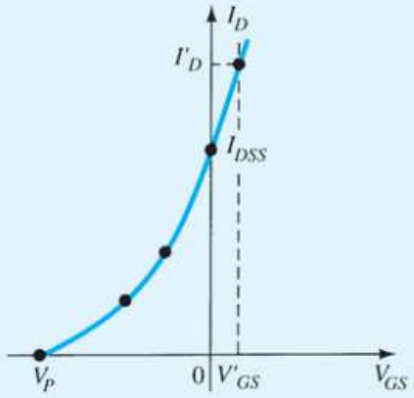
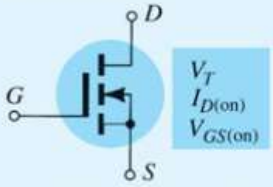
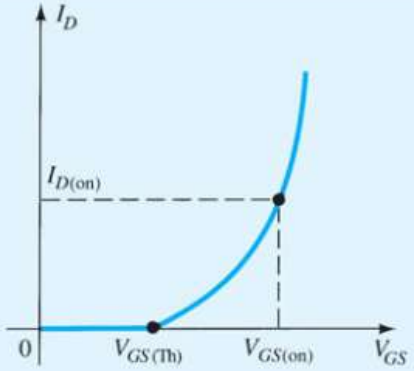
JFET (*n*-channel)	$I_G = 0\ \text{A}, I_D = I_S$  $I_D = I_{DSS}\left(1 - \frac{V_{GS}}{V_P}\right)^2$		$R_i > 100\ \text{M}\Omega$ C_i: (1 – 10) pF
MOSFET depletion type (*n*-channel)	$I_G = 0\ \text{A}, I_D = I_S$  $I_D = I_{DSS}\left(1 - \frac{V_{GS}}{V_P}\right)^2$		$R_i > 10^{10}\ \Omega$ C_i: (1 – 10) pF
MOSFET enhancement type (*n*-channel)	$I_G = 0\ \text{A}, I_D = I_S$  $I_D = k\,(V_{GS} - V_{GS\,(\text{Th})})^2$ $k = \frac{I_{D(on)}}{(V_{GS(on)} - V_{GS\,(\text{Th})})^2}$		$R_i > 10^{10}\ \Omega$ C_i: (1 – 10) pF

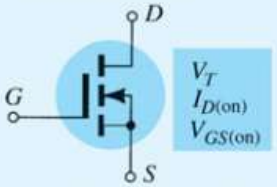
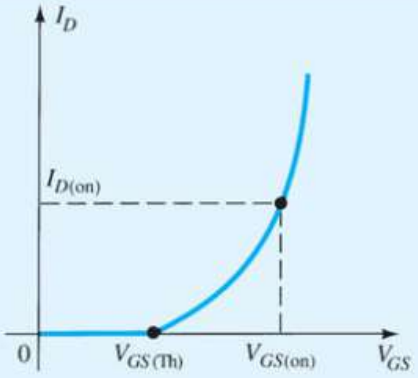
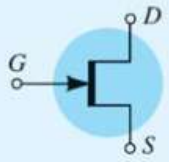
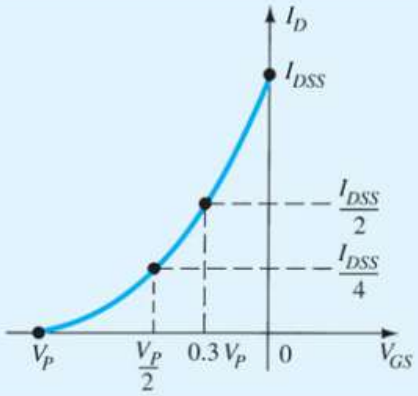
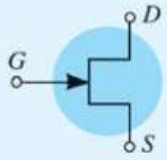
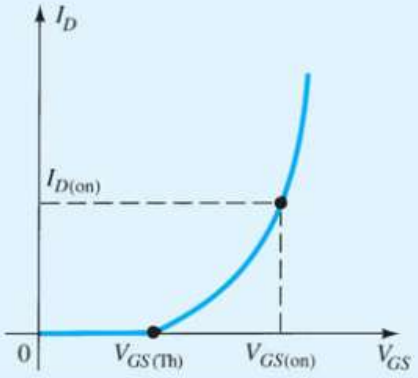
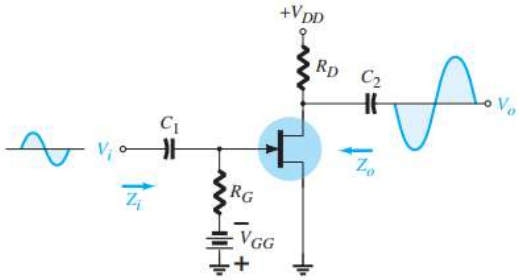
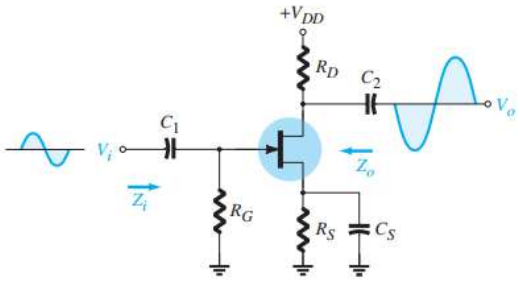
MOSFET enhancement type (*n*-channel)	$I_G = 0$ A, $I_D = I_S$  $I_D = k(V_{GS} - V_{GS(Th)})^2$ $k = \dfrac{I_{D(on)}}{(V_{GS(on)} - V_{GS(Th)})^2}$	 	$R_i > 10^{10}\ \Omega$ C_i: (1 − 10) pF
MESFET depletion type (*n*-channel)	$I_G = 0$ A, $I_D = I_S$  $I_D = I_{DSS}\left(1 - \dfrac{V_{GS}}{V_P}\right)^2$ $I_G = 0$ A, $I_D = I_S$	 	$R_i > 10^{12}\ \Omega$ C_i: (1 − 5) pF
MESFET enhancement type (*n*-channel)	 $I_D = k(V_{GS} - V_{GS(Th)})^2$ $k = \dfrac{I_{D(on)}}{(V_{GS(on)} - V_{GS(Th)})^2}$	 	$R_i > 10^{12}\ \Omega$ C_i: (1 − 5) pF

TABLE 8.1

Z_i, Z_o, and A_v for various FET configurations

Configuration	Z_i	Z_o	$A_v = \dfrac{V_o}{V_i}$
Fixed-bias [JFET or D-MOSFET] 	High (10 MΩ) $= R_G$	Medium (2 kΩ) $= R_D \| r_d$ $\cong R_D$ $(r_d \geq 10\,R_D)$	Medium (−10) $= -g_m(r_d \| R_D)$ $\cong -g_m R_D$ $(r_d \geq 10\,R_D)$
Self-bias bypassed R_S [JFET or D-MOSFET] 	High (10 MΩ) $= R_G$	Medium (2 kΩ) $= R_D \| r_d$ $\cong R_D$ $(r_d \geq 10\,R_D)$	Medium (−10) $= -g_m(r_d \| R_D)$ $\cong -g_m R_D$ $(r_d \geq 10\,R_D)$

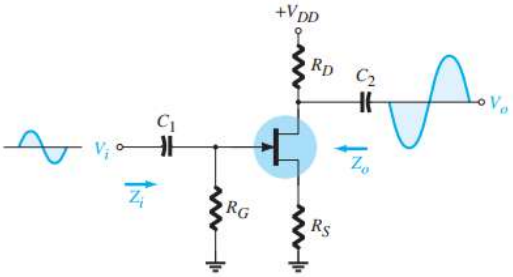
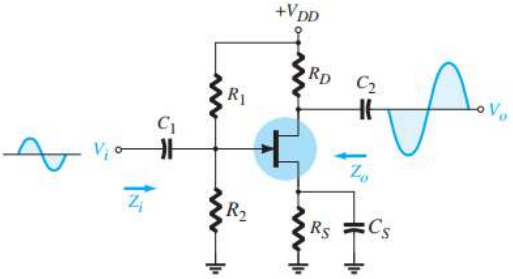
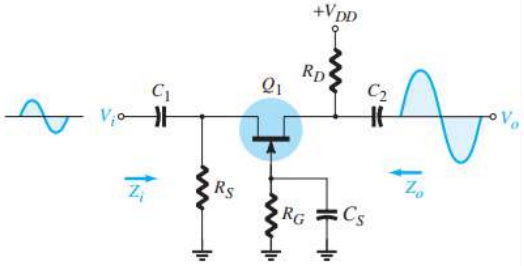
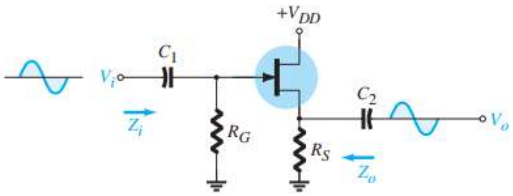
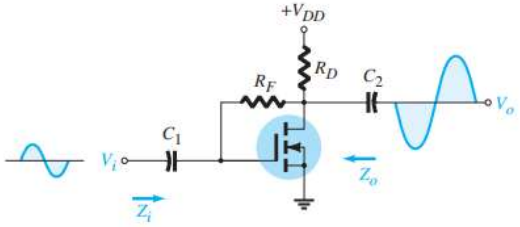
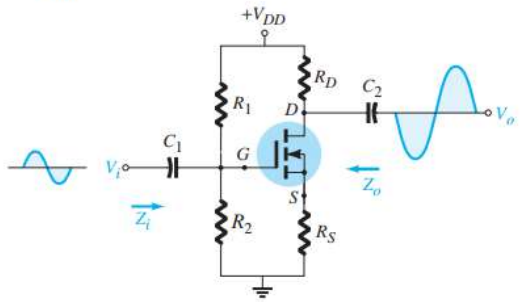
Self-bias unbypassed R_S [JFET or D-MOSFET] 	High (10 MΩ) $= R_G$	$= \dfrac{\left[1 + g_m R_S + \dfrac{R_S}{r_d}\right] R_D}{\left[1 + g_m R_S + \dfrac{R_S}{r_d} + \dfrac{R_D}{r_d}\right]}$ $= R_D$ $r_d \geq 10\,R_D$ or $r_d = \infty\,\Omega$	Low (−2) $= \dfrac{g_m R_D}{1 + g_m R_S + \dfrac{R_D + R_S}{r_d}}$ $\cong -\dfrac{g_m R_D}{1 + g_m R_S}$ $[r_d \geq 10\,(R_D + R_S)]$
Voltage-divider bias [JFET or D-MOSFET] 	High (10 MΩ) $= R_1 \| R_2$	Medium (2 kΩ) $= R_D \| r_d$ $\cong R_D$ $(r_d \geq 10\,R_D)$	Medium (−10) $= -g_m(r_d \| R_D)$ $\cong -g_m R_D$ $(r_d \geq 10\,R_D)$

TABLE 8.1
(Continued)

Configuration	Z_i	Z_o	$A_v = \dfrac{V_o}{V_i}$
Common-gate [JFET or D-MOSFET] 	Low (1 kΩ) $= R_S \Vert \left[\dfrac{r_d + R_D}{1 + g_m r_d} \right]$ $\cong R_S \Vert \dfrac{1}{g_m}$ $(r_d \geq 10\,R_D)$	Medium (2 kΩ) $= R_D \Vert r_d$ $\cong R_D$ $(R_d \geq 10\,R_D)$	Medium (+10) $= \dfrac{g_m R_D + \dfrac{R_D}{r_d}}{1 + \dfrac{R_D}{r_d}}$ $\cong g_m R_D$ $(r_d \geq 10\,RD)$
Source-follower [JFET or D-MOSFET] 	High (10 MΩ) $= R_G$	Low (100 kΩ) $= r_d \Vert R_S \Vert 1/g_m$ $\cong R_S \Vert 1/g_m$ $(r_d \geq 10\,R_S)$	Low (<1) $= \dfrac{g_m(r_d \Vert R_S)}{1 + g_m(r_d \Vert R_S)}$ $\cong \dfrac{g_m R_S}{1 + g_m R_S}$ $(r_d \geq 10\,R_S)$

Drain-feedback bias E-MOSFET 	Medium (1 MΩ) $= \dfrac{R_F + r_d \| R_D}{1 + g_m(r_d \| R_D)}$ $\cong \dfrac{R_F}{1 + g_m R_D}$ $(r_d \geq 10\,R_D)$	Medium (2 kΩ) $= R_F \| r_d \| R_D$ $\cong R_D$ $(R_F,\ r_d \geq 10R_D)$	Medium (−10) $= -g_m(R_F \| r_d \| R_D)$ $\cong -g_m R_D$ $(R_F,\ r_d \geq 10R_D)$
Voltage-divider bias E-MOSFET 	Medium (1 MΩ) $= R_1 \| R_2$	Medium (2 kΩ) $= R_D \| r_d$ $\cong R_D$ $(r_d \geq 10\,R_D)$	Medium (−10) $= -g_m(r_d \| R_D)$ $\cong -g_m R_D$ $(r_d \geq 10\,R_D)$