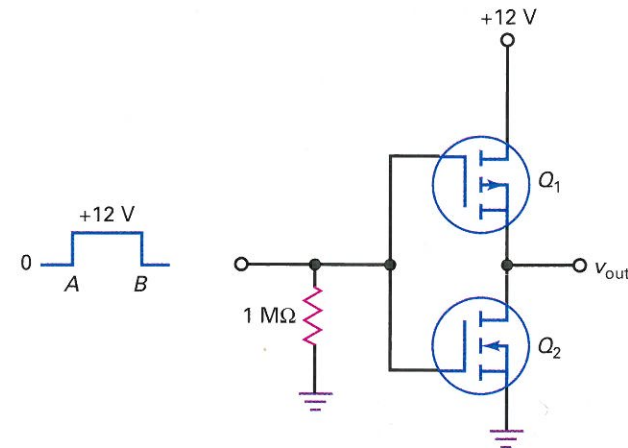


Figure 14-40



SEC. 14-7 CMOS

- 14-20 The MOSFETs of Fig. 14-40 have $R_{DS(on)} = 250 \Omega$ and $R_{DS(off)} = 5 \text{ M}\Omega$. What is the output waveform?
- 14-21 The upper E-MOSFET of Fig. 14-40 has these values: $I_{D(on)} = 1 \text{ mA}$, $V_{DS(on)} = 1 \text{ V}$, $I_{D(off)} = 1 \mu\text{A}$, and $V_{DS(off)} = 10 \text{ V}$. What is the output voltage when the input voltage is low? When it is high?
- 14-22 A square wave with a peak value of 12 V and a frequency of 1 kHz is the input in Fig. 14-40. Describe the output waveform.
- 14-23 During the transition from low to high in Fig. 14-40, the input voltage is 6 V for an instant. At this time, both MOSFETs have active resistances of $R_D = 5 \text{ k}\Omega$. What is the current drain at this instant?

SEC. 14-8 POWER FETS

- 14-24 What is the current through the motor winding of Fig. 14-41 when the gate voltage is low? When it is high?

Figure 14-41

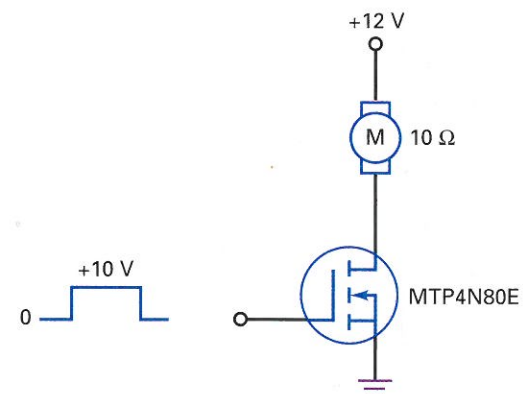
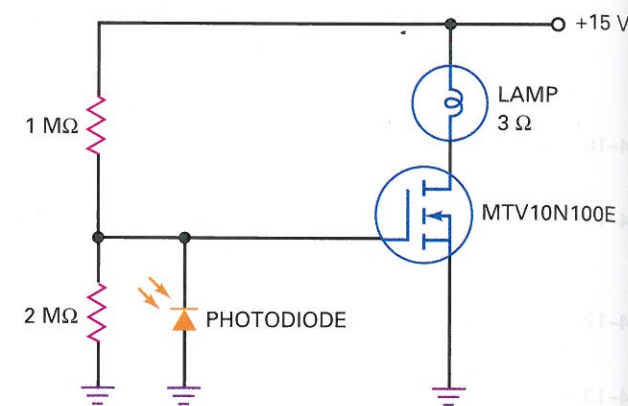


Figure 14-42



- 14-25 The motor winding of Fig. 14-41 is replaced by another with a resistance of 6Ω . What is the current through the winding when the gate voltage is high?
- 14-26 What is the current through the lamp of Fig. 14-42 when the gate voltage is low? When it is $+10 \text{ V}$?
- 14-27 The lamp of Fig. 14-42 is replaced by another with a resistance of 5Ω . What is the lamp power when it is dark?
- 14-28 What is the current through the water valve of Fig. 14-43 when the gate voltage is high? When it is low?
- 14-29 The supply voltage of Fig. 14-43 is changed to 12 V and the water valve is replaced by another with a resistance of 18Ω . What is the current through the water valve when the probes are underwater? When the probes are above the water?

Figure 14-43

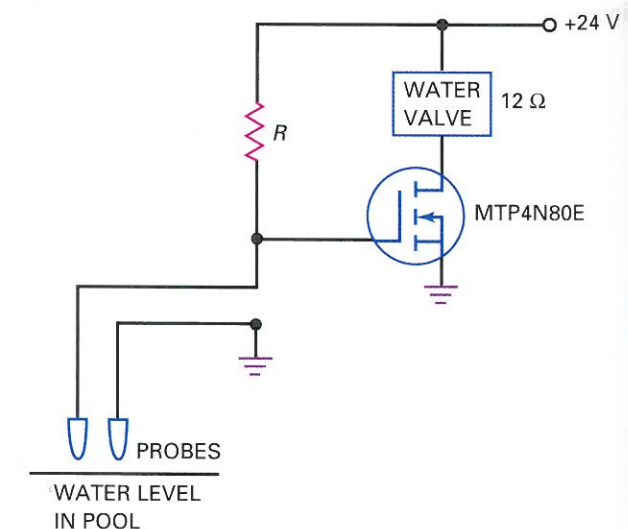
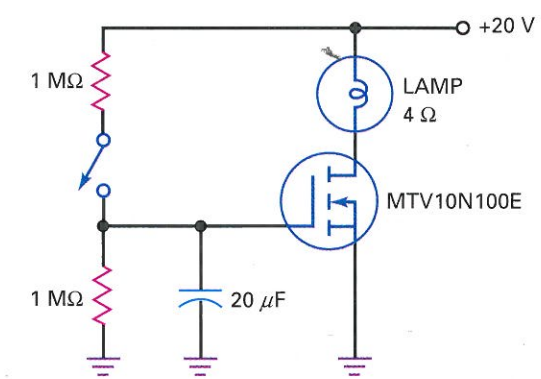


Figure 14-44



- 14-30 What is the RC time constant in Fig. 14-44? The lamp power at full brightness?
- 14-31 The two resistances in the gate circuit are doubled in Fig. 14-44. What is the RC time constant? If the lamp is changed to one with a resistance of 6Ω , what is the lamp current at full brightness?

SEC. 14-9 E-MOSFET AMPLIFIERS

- 14-32 Find the constant k value and I_D of Fig. 14-45 using the minimum values of $I_{D(on)}$, $V_{GS(on)}$, and $V_{GS(th)}$ for the 2N7000.

- 14-33 Determine the g_m , A_v , and V_{out} values for Fig. 14-45 using the minimum rated specifications.
- 14-34 In Fig. 14-45, change R_D to 50Ω . Find the constant k value and I_D using the typical values of $I_{D(on)}$, $V_{GS(on)}$, and $V_{GS(th)}$ for the 2N7000.
- 14-35 Determine the g_m , A_v , and V_{out} values for Fig. 14-45 using the typical rated specifications, V_{DD} at $+12 \text{ V}$ and $R_D = 15 \Omega$.

Figure 14-45

