

## Lab 5: Transistor Switch Lab Exercise (Multisim)

### Bipolar Junction Power Transistor

- Build the circuit in Figure 1. Set the load resistor to 110 Ohm.
- Set the signal from the generator to 0 V to 10 V, 50% duty cycle square wave at 5 kHz.
- Verify that the output is correct by displaying both the input and the collector waveforms with an oscilloscope. Observe the collector low voltage level and the pulse widths.
- Replace the load resistor with a motor. Keep the leads to the motor as short as possible.
- Assure that the oscilloscope probe at the collector has a x10 attenuator.
- Record the wave shapes of the voltage at the input and across the transistor.
- Measure the storage time, rise time, delay time, and the fall time of the voltage at the collector.

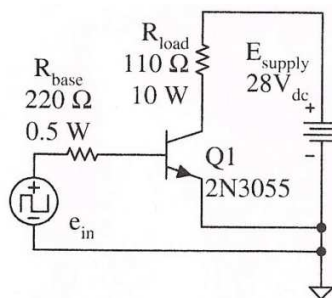


Figure 1

### N-Channel MOSFET Switch

- Build the circuit in Figure 2. Connect the Schottky diode across the load terminals.
- Increase the frequency of the signal from the generator to provide 0 V to 10 V, 50% duty cycle square wave at 50 kHz.
- Verify that the output is correct by displaying both the input and the drain waveform with an oscilloscope. Look carefully at the drain low voltage level and the pulse widths.
- Replace the load resistor with a motor.
- Place the diode across the motor.
- Assure that the oscilloscope probe at the drain has a x10 attenuator.
- Record the wave shapes of the voltage at the input and across the transistor.
- Measure storage time, time rise, delay time and the fall time of the voltage at the drain.

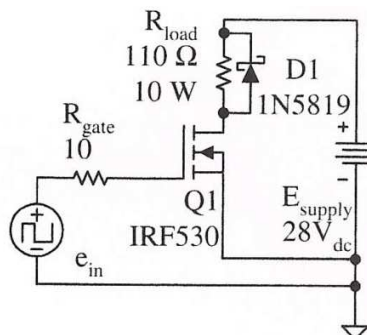


Figure 2