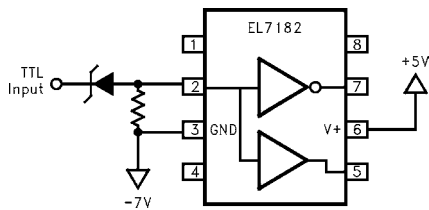


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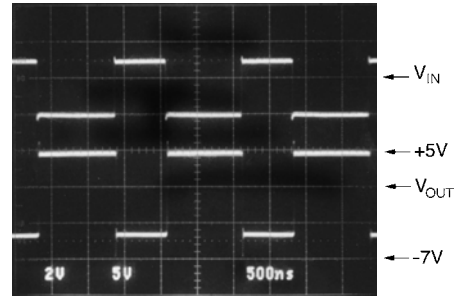
There are many applications such as IGBT, CCD, and transducer drivers where high peak current and bipolar output voltage swings are often required. This applications brief discusses two implementations of generating bipolar output using the EL7182 and EL7501 CMOS drivers.

Figure 1 shows the traditional scheme. The EL7182 is powered with a +5V and -7V supplies. The input comparator threshold is referenced to the ground pin which is connected to the negative supply so proper input voltage level shifting is necessary to operate the input comparator. The Zener diode in series from the TTL output to the input of the EL7182 provides the voltage level shift. Figure 2 depicts the inputs and the output waveforms. When TTL input is 0V, the voltage at the EL7182 input is shifted to -7V. When TTL input is 3V, the voltage at the EL7182 input is shifted to -4V which is 3V above the -7V on the ground pin. However, this implementation has a couple of drawbacks, in addition to the extra components required for input level shifting, the series Zener diode and resistor can also load down the TTL signal. When TTL input signal is high, bias current must flow across the Zener diode through the resistor to ground. This pulls the EL7182 input pin high with reference to the -7V supply.

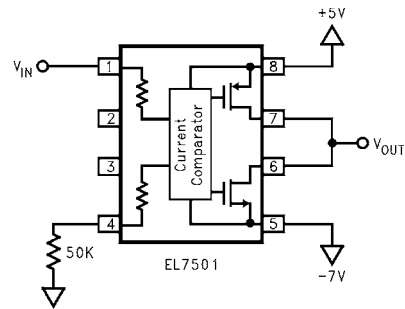


**FIGURE 1.**

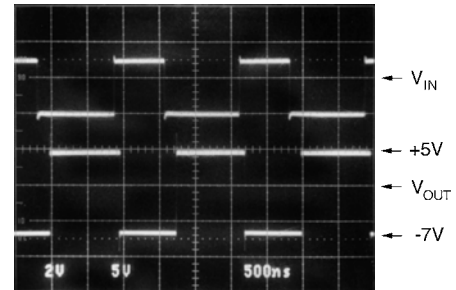
Figure 2 uses the EL7501 to escape the input loading problem. The inputs of the EL7501 are differential where a 1V differential voltage across its input pins guarantees the output voltage to switch state. The input can be modeled as a series 180kΩ resistor tied to a DC voltage 1V below the V<sub>DD</sub> supply. The series 50kΩ resistor puts a 1.1 voltage at pin 4, as a result, when the TTL input at pin 1 is switching between 0V to 3V, the current comparator internal to the EL7501 senses current changes through the input resistors and changes the state of its output FETs. The ground and input pins are isolated and their breakdown voltage is over 100V. There are a couple of drawbacks with this circuit solution, 1) the maximum frequency is limited to 2.5MHz, 2) input to output delay is higher than the EL7182. Figure 4 shows the input and output waveforms.



**FIGURE 2.**



**FIGURE 3.**



**FIGURE 4.**

*Intersil Corporation reserves the right to make changes in circuit design, software and/or specifications at any time without notice. Accordingly, the reader is cautioned to verify that the Application Note or Technical Brief is current before proceeding.*