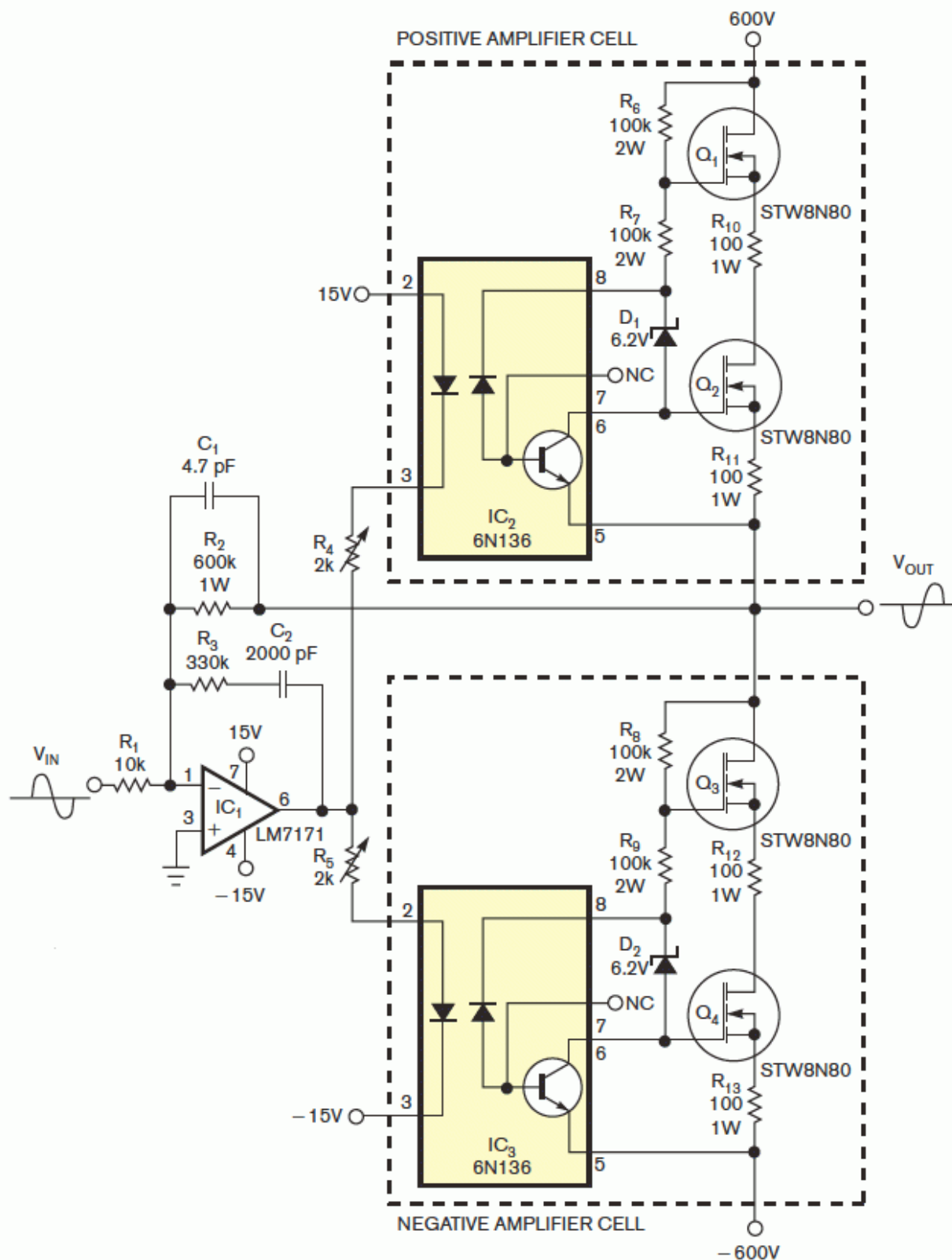


Class AB inverting amp uses two floating-amplifier cells

EDN edn.com/class-ab-inverting-amp-uses-two-floating-amplifier-cells/

March 19, 2009



Transistors often find use as three-pin amplifier devices, in which the input and the output share one pin. Thus, the input and the output must have the same voltage at this pin. On the other hand, a four-pin amplifier could isolate the circuit's input and output. Using optoisolators, you can design a four-pin Class AB amplifier. Although the output voltage of an optoisolator curtails its usefulness, you can add discrete transistors to form an isolated amplifier.

Figure 1 shows an example of a simple, 1-kV-p-p Class AB inverting amplifier that uses two identical floating-amplifier cells. The frequency response is dc to 20 kHz at full gain. You can achieve higher frequencies but at lower gains. The ratio of resistors R_2 and R_1 sets the gain. This circuit eliminates the need for many voltage-shifting components, which are typical of a standard circuit design. The positive and the negative cells are driven out of phase. The 15V and $-15V$ and resistors R_4 and R_5 provide the necessary bias to guarantee that the output transistors are always on. Careful trimming of R_4 and R_5 can remove the output crossover distortion. Zener diodes D_1 and D_2 keep the optoisolator photodiodes back-biased at 6.2V. Resistors R_{10} , R_{11} , R_{12} , and R_{13} supply some negative feedback to the output transistors. You must mount the four STW8N80 N-channel MOSFETs on suitable heat sinks to keep them cool. The circuit requires no active short-circuit protection. One pair of 125-mA currents across the high-voltage supply lines is sufficient to safeguard the circuit from destruction.

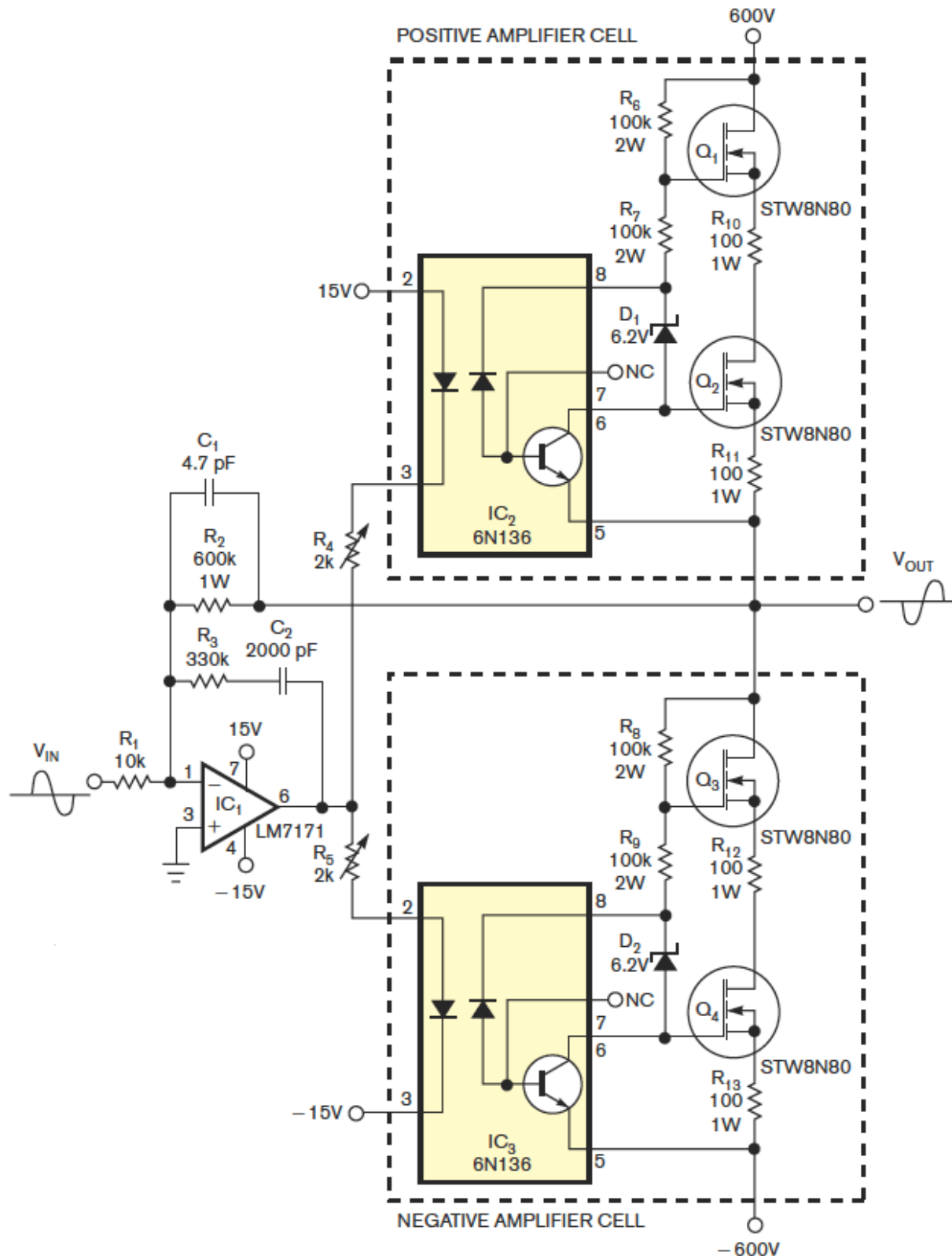


Figure 1 Transistors boost the output voltage and current of optoisolators, making an isolated amplifier output.

Figure 2 shows the square response at 10 kHz. There are no overshoots or undershoots, and the rising edge is almost antisymmetric with respect to the trailing edge. **Figure 3** shows the sine-wave response at 20 kHz. Both outputs are 1 kV p-p.

READ MORE
designideas

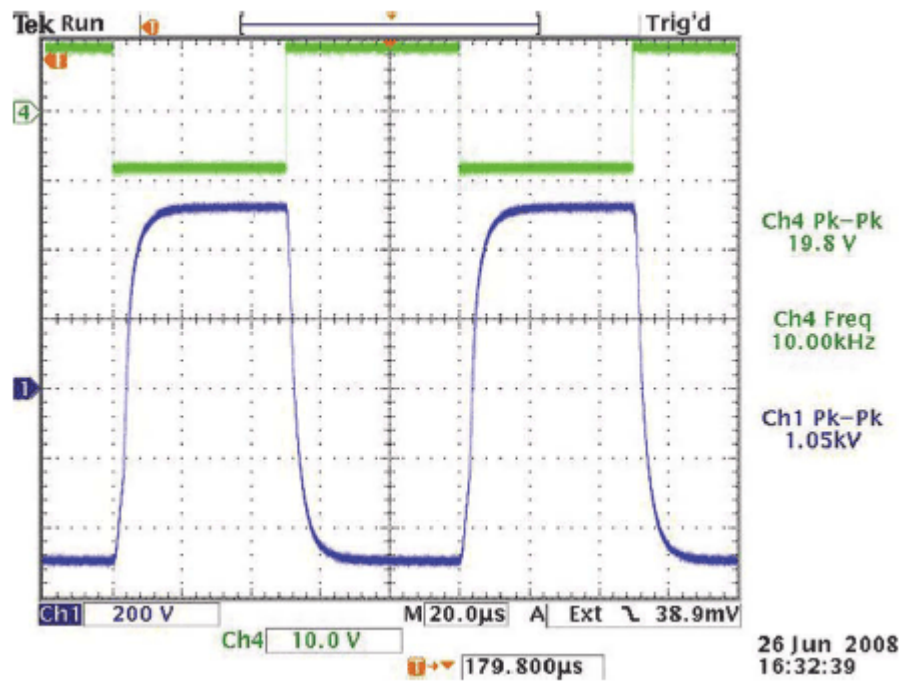


Figure 2 The amplifier's square-wave response at 10 kHz shows some high-frequency cutoff.

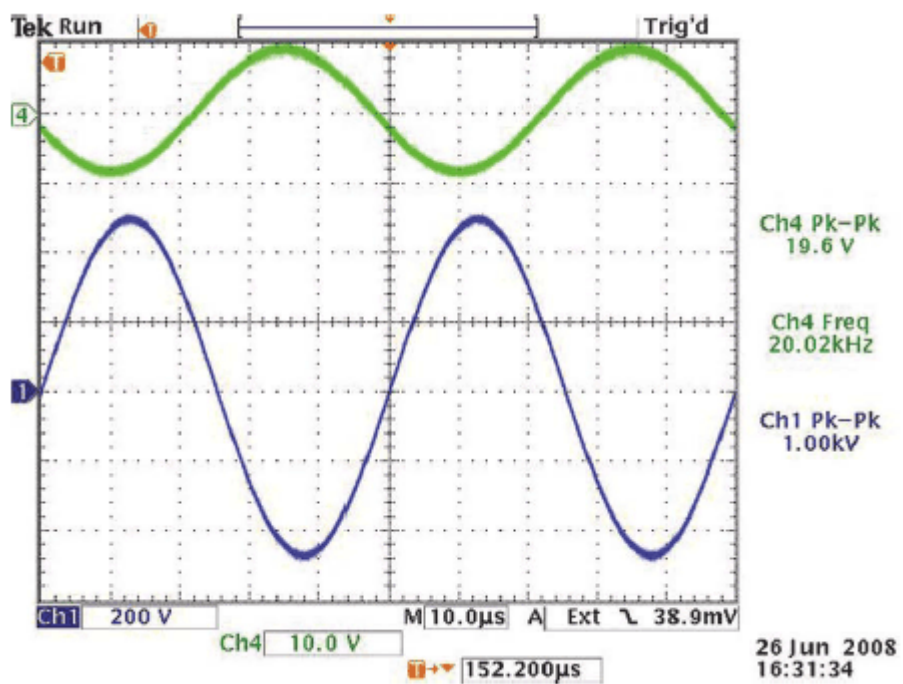


Figure 3 The amplifier's sine-wave response at 20 kHz shows a clean output signal.