Two op amps provide averaged absolute value

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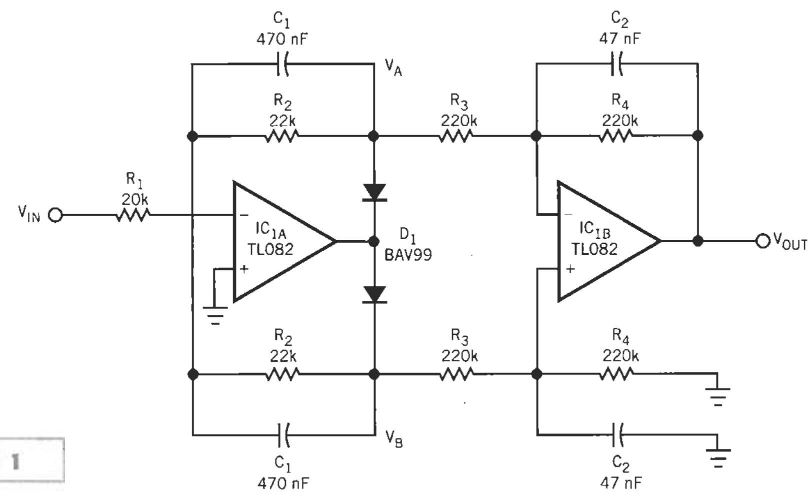
The circuit in **Figure 1** is useful when you need amplitude demodulation or an averaged absolute-value conversion. The circuit comprises two stages, the first of which, IC_{1A}, is a differential-output absolute-value converter. The second stage, IC_{1B}, is a traditional differential amplifier. The combination of the two stages performs single-ended absolute-value conversion but only if $R_3 >> R_2$. The C_1 capacitors integrate the current flow and yield averaged voltages V_A and V_B. In addition, the capacitors ensure low ac-impedance points at nodes V_A and V_B when the output diodes are reverse-biased. The additional C_2 capacitors in parallel with R_4 resistors impart a second-order-lowpass-filter characteristic to the circuit and remove the remaining ac signal. From a practical point of view, you can choose R_3 to be five to 10 times higher than R_2. The gain of the circuit is $(R_2||R_3/R_1)(R_4/R_3)$. In most applications, you would choose the filter time constants $\tau_1=R_2||R_3C_1$ and $\tau_2=R_4C_2$ to be equal. The circuit in **Figure 1** is simple, symmetrical, and cost-effective. It also makes it easy to calculate and adjust the gain using one resistor, R_1. Other advantages are that the circuit has equal delay for positive- and negative-going signals and that it doesn't need matched diodes.□

Figure 1



This single-ended, averaged absolute-value converter is useful for amplitude demodulation.