

IC Drives Up to Four Single-Coil Latching Relays

Relay-driver IC allows a 3-bit parallel interface to independently open or close each of four latching relays.

Single-coil latching relays, with applications in signal routing, audio, and automotive systems, can pose a design challenge because coil current must flow in both directions through a single coil. Current flowing in one direction latches the relay in its "set" position. Current in the opposite direction latches it in the "reset" position. The relay maintains its position even when the coil current is removed. Power is saved by removing coil current after the relay latches.

In Figure 1, current flowing from pin 1 to pin 8 latches the relay in the set position, while current from pin 8 to pin 1 resets it.

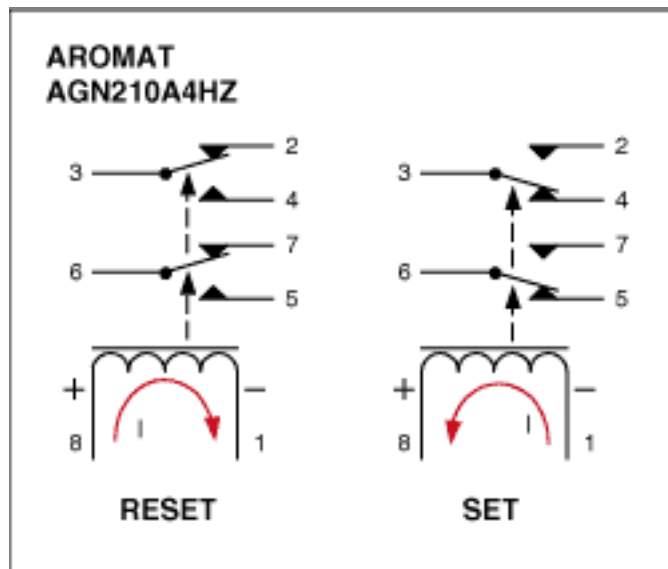


Figure 1. Current flow in a single coil latches the corresponding relay in its SET or RESET position.

A simple circuit that drives up to four single-coil latching relays (Figure 2) includes a parallel-interface relay driver (U1) with open-drain outputs (Figure 3) and inductive-kickback protection. Latch any of the four relays to its set or reset position by turning on the corresponding output (OUTX). That output is selected by asserting its digital address on pins A2-A0 while /CS\ is high. Activate the output by toggling /CS\ (Figure 4).

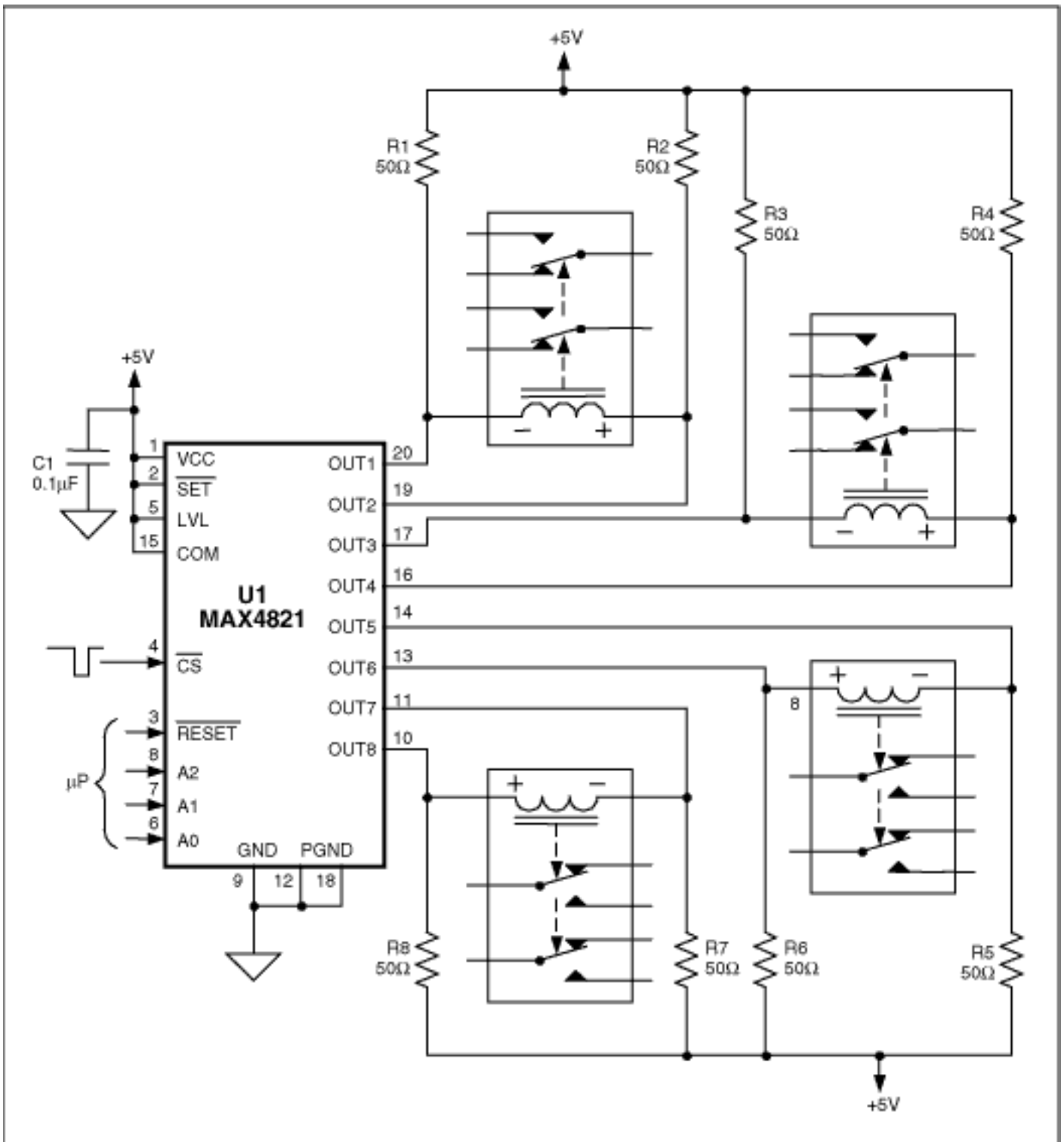


Figure 2. This circuit easily drives four single-coil latching relays.

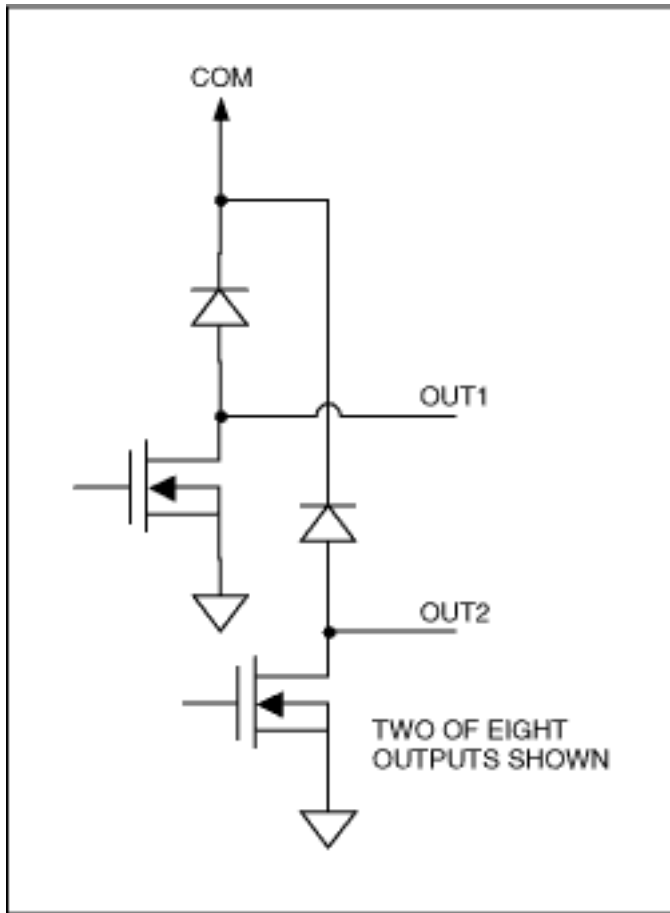


Figure 3. U1's open-drain outputs, from Figure 2.

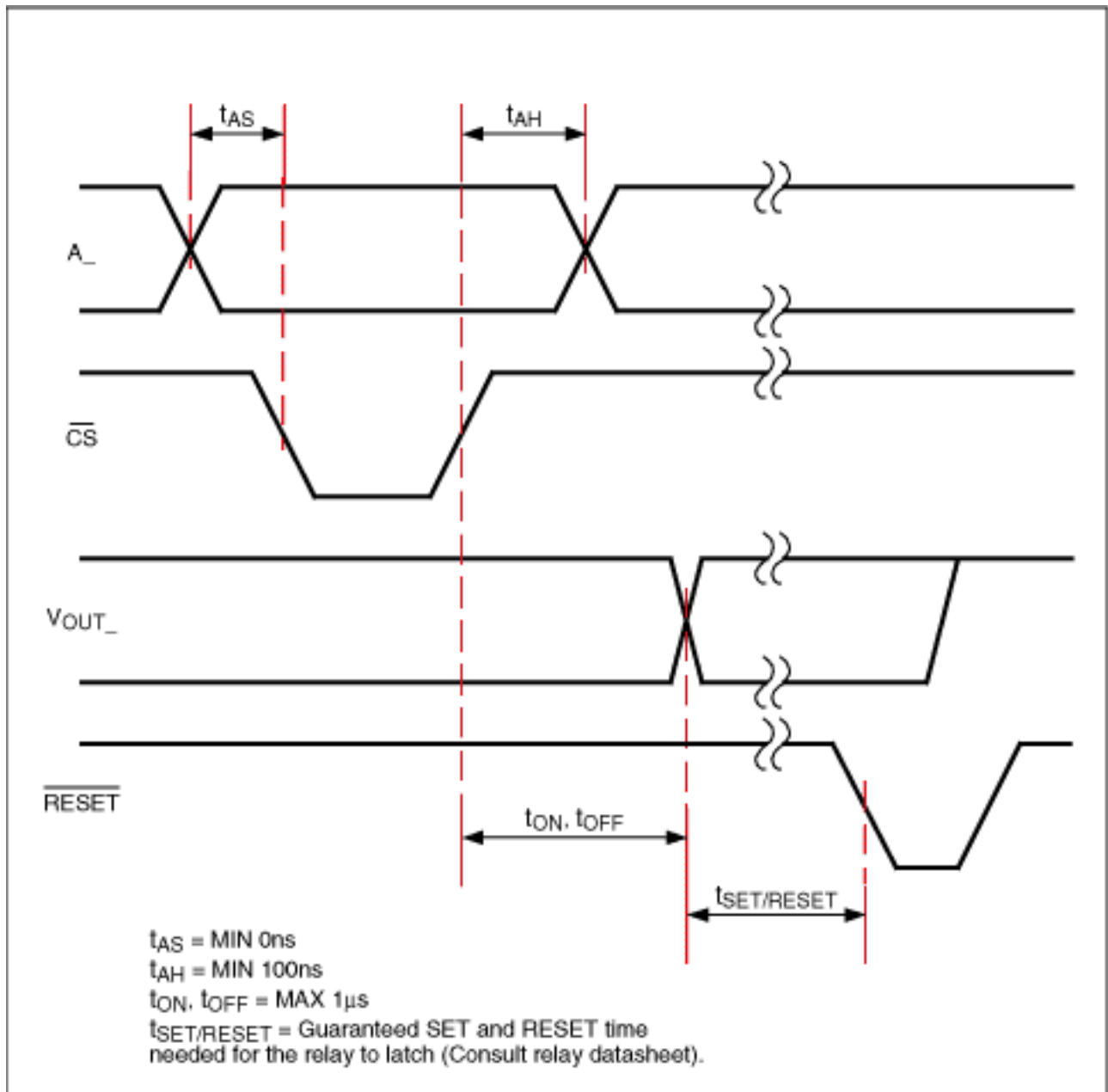


Figure 4. Interface timing for the circuit of Figure 2.

Current flows into the enabled open drain output and latches the relay to its set or reset position, according to the direction of coil current. Drive \overline{RESET} low to turn off all enabled open-drain outputs. Drive \overline{RESET} low as soon as the relays latch to ensure lowest power consumption. Observe the set/reset timing shown in Figure 4. Do not pull \overline{RESET} low until the required time ($t_{SET/RESET}$) has elapsed. Waiting $t_{SET/RESET}$ after the last \overline{CS} toggle ensures that all selected relays will properly latch to their intended positions.

Clamping diodes on each OUTX pin catch high-voltage transients that occur when the coil current is interrupted. Those diodes (shown in Figure 2) clamp the OUTX voltage at $V_{CC} - 0.7\text{V}$.

More Information

MAX4821: [QuickView](#) -- [Full \(PDF\) Data Sheet](#) -- [Free Samples](#)