Isolator Output Conditions during Power-Up

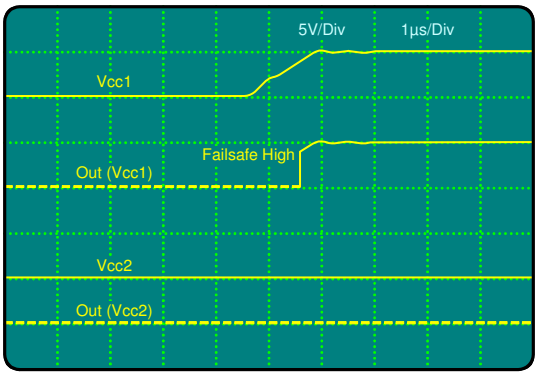

Fig. 1. Vcc1 = 5V, Vcc2 = off

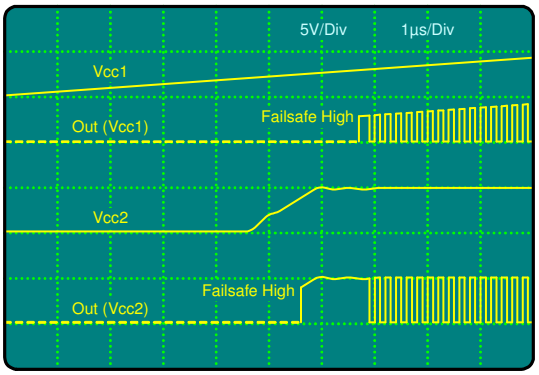

Fig. 2. Different Ramp-Up Rates

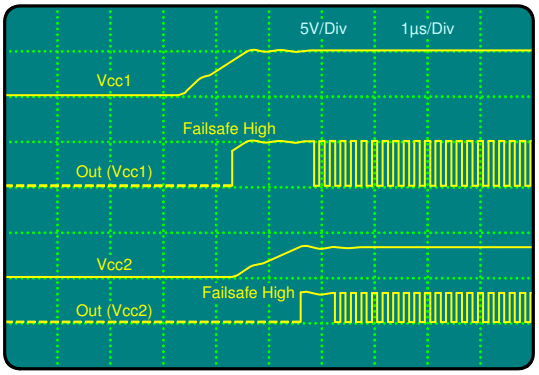

Fig. 3. Different Supply Voltages

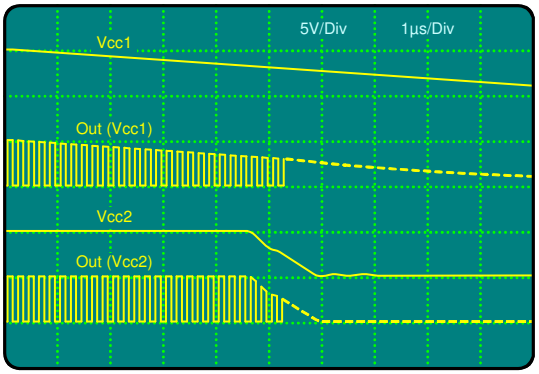

Fig. 4. Different Power-Down Rates

When powering up the ISO72xx family of digital isolators, the condition of an isolator output solely depends on its corresponding output supply.

As long as the output supply is below an internally fixed voltage threshold of approximately 2.5V, the output is switched-off, or high-impedance. When the supply voltage reaches 2.5V, the output assumes failsafe-high. At this moment the output connects internally to the supply rail and continues tracking with the supply voltage until the full supply level is reached.

Figure 1 gives an example. While Vcc2 and its corresponding output are off, Vcc1 ramps-up from 0V to 5V. Below 2.5V the output is high-impedance (dotted line), above 2.5V the output tracks with Vcc1.

Figure 2 presents the case for equal supply voltages, Vcc1 = Vcc2 = 5V, but different ramp-up slopes. Because Vcc2 ramps-up faster then Vcc1, the Vcc2 related output assumes failsafe-high before the output on the Vcc1-side.

Note that for the Vcc1 related output the timely distance failsafe-high and data transfer is relative short. This is because Vcc2, the input supply for the corresponding transmitter is fully established at that time, and data output only depends on the development of the output supply, Vcc1.

In the other direction, Vcc2 is the fully established output supply. The long delay between data output and failsafe-high is due to the slow increase of the corresponding input supply, Vcc1, and the non-activated transmitters.

In Figure 3 both supplies have a similar ramp-up but differ in their final supply voltage levels. Again, transfer data on the output assuming failsafe-high first can only occur, once its corresponding transmitter supply is sufficiently established.

In the opposite direction, however, transfer data occurs shortly after failsafe-high.

Figure 4 represent the power-down events at different rates. The outputs on both sides of the isolator track with their corresponding supplies. Once a supply has dropped below the internal failsafe threshold, its corresponding output assumes high-impedance.