Choosing Atmel ATF150xASV(L) POR Options

Summary

Atmel EPLDs are capable of operation down to the reset level, V_{RST}. In 5.0V devices, V_{RST} generally is midway between the specified minimum power supply voltage and 0.0V, and so the margin for droop, noise, etc. is sufficient. In low voltage devices, V_{RST} is generally just below the specified minimum power supply voltage, and available margin is reduced. In applications where the supply voltage falls close to the specified minimum power supply voltage, Atmel recommends increasing the margin for falling V_{CC}. In the ATF150xASV(L) family, Atmel recommends changing the Power_On_Reset hysteresis from small to large. Methods and means of implementing this recommendation are discussed.

Details

All Atmel EPLDs are designed with a power-up reset function to initialize all registers at a point delayed slightly from V_{CC} rising above V_{RST}. Similarly, if V_{CC} falls below V_{RST}, the device will return to the reset state. Due to the asynchronous nature of reset and uncertainty of how V_{CC} actually rises in the system, the following conditions are required:

1. The V_{CC} rise must be monotonic.
2. After reset occurs, all input and feedback setup times must be met before driving the clock pin high.
3. The clock must remain stable during T_D.

The Atmel ATF150xASV family of 3.3V parts offers the user a programmable option for the hysteresis about the reset level, small or large. In the case of the Atmel ATF150xASV family, nominal V_{CC} is 3.3V, the minimum V_{CC} is 3.0V and the default small hysteresis choice puts the V_{RST} level just below minimum V_{CC} for both rising and falling V_{CC}.

To ensure a robust operating environment in these cases, Atmel recommends that users set the power-up reset hysteresis to large. With the large hysteresis option selected, the reset level for falling V_{CC} drops to a lower level, increasing the margin before the device returns to the reset state.

- Synario users should open the Properties dialog box and change setting of the Power_On_Reset Hysteresis from the default “Small” to “Large” before running the Fitting process.
- Atmel POF2JED users should include the flag “-power_reset” on the command line after “filename.POF” when running conversions.

To ensure that the registers are properly re-initialized when V_{CC} rises again, the following condition is added:

4. If V_{CC} falls below 2.0V, it must shut off completely before the device is turned on again.

With the hysteresis option set to large, I_{CC} is reduced several hundred µA. This is especially significant for the “ATF150xASL” versions because it brings the standby I_{CC} down to the µA level.

EPLD

Technical Bulletin

Rev. 1964A–10/00

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1964A–10/00/xM