Power-Up

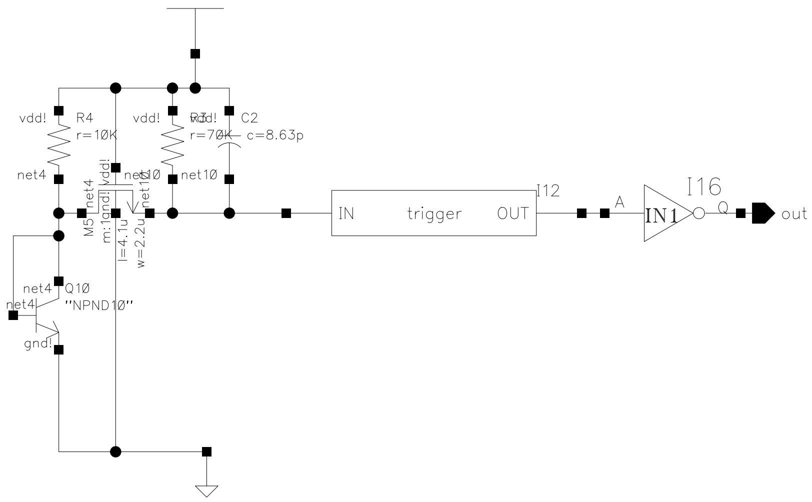
Implemented in ABCD2T/NT (SCT Readout chip)

Francis ANGHINOLFI

1. Specification

The ABCD2T/NT chips contain a power-up circuit to set the status of the logic during the power supply ramp-up. The status of the chip after power-up is exactly identical to the status after an external reset action. The power-up circuit is always active. Its output is XOR-ed with the external reset command (ResetB pin of the chip) so that a wrong polarity of the power-up signal, if it happens, can be corrected by inverting the external reset polarity.

2. Description



Pin name	Function
out	Output signal, low during power-up, high at stable VDD above ~3V

The power-up circuit is made of one analog static system to detect VDD crossing approx. 3V coupled to a RC network. The RC guaranties a minimum duration of the signal when VDD increase is fast. When the ramp-up time is slow, the static detection guaranties the signal is not released until VDD is large enough, such that the circuit sufficiently biased for settling in the reset state.

3. Simulation outputs

The following figures show the operation of the power-up circuit in different configurations.

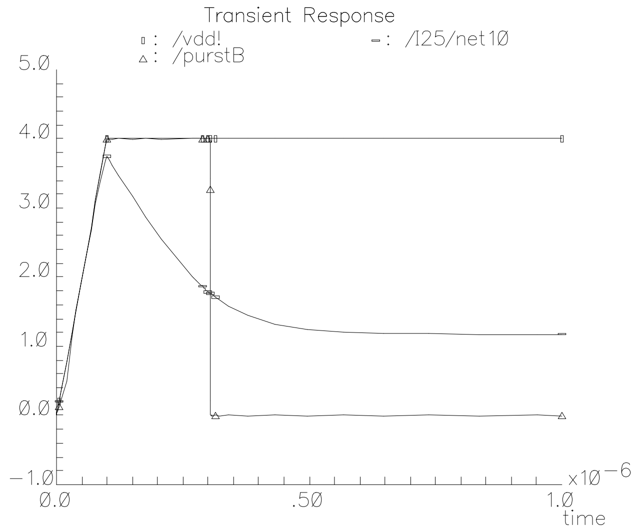


Figure 1 : Fast VDD ramp-up. Typical process parameters, VDD= 4V, TEMP= 0 deg.C. Top trace is the VDD ramp, middle trace shows shows the analog internal node before the Schmitt trigger. Lower trace is the Power up circuit output.

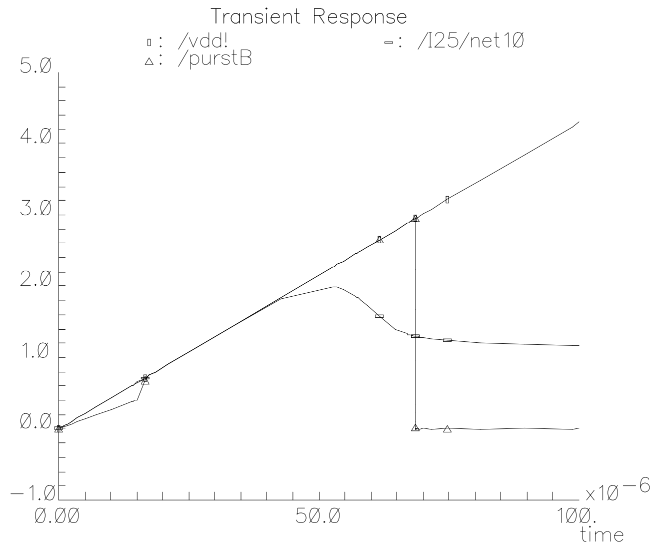


Figure 2 : Slow VDD ramp-up. Typical process parameters, VDD= 4V, TEMP= 27 deg.C. Top trace is the VDD ramp, middle trace shows the analog internal node before the Schmitt trigger. Lower trace is the Power up circuit output.

Correct operations have been checked with all conditions of temperature and process parameters (DMILL4.3). The following table indicates the minimum width of the Power-Up pulse (PwT) (measured with a fast VDD ramp) and of the VDD value (PwrV) at which the Power-Up signal switches (measured with a slow VDD ramp) for the fast-fast (ff), typical (tt) and irradiated slow-slow (iss) corners of the process parameters :

	ff 4.3 V 0 ^{o}C	**tt** 4 V 27 ^{o}C	**iss** 3.7 V 40 ^{o}C
PwT	200ns	300ns	1.2us
PwV	277V	2.95V	3.67V