

ACT8865 – Eliminating Pushbutton Functionality

Abstract

This application note explains how to use the ACT8865 without pushbutton functionality (nPBIN).

Introduction

The ACT8865 is a complete, cost effective, highly-efficient ActivePMU™ power management solution, optimized for the unique power, voltage-sequencing, and control requirements of the Atmel SAMA5 and SAM9 based eMPU series processors. It integrates many functions required for portable handheld applications, including pushbutton functionality. This application note describes how to implement ACT8865 turn-on and turn-off functionality for applications that do not require pushbutton control. This includes automatic turn-on when input power is applied. It explains the hardware settings and how they affect other pin functionality, and internal register settings.

Circuit Modifications

Pushbutton functionality can be eliminated by simply leaving nPBIN floating. There are no concerns with floating the nPBIN input because the ACT8865 internally pulls nPBIN up to VDDREF. To control the turn-on, drive PWRHLD and PWREN with logic signal from a microcontroller. To configure the circuit for automatic turn-on when power is applied, connect PWRHLD and PWREN directly to VDDREF.

Enable

REG1/2/3/4/5 can be enabled with the PWRHLD pin or via I2C. Driving PWRHLD high initiates a standard startup sequence. At the rising edge of PWRHLD, nRSTO asserts and REG3/5 start their softstart sequence. After both REG3/REG5 reach their Power-OK threshold, REG1 is enabled after a 2ms delay, REG2 is enabled after a 4ms delay, and REG4 is enabled after an 8ms delay. nRSTO automatically deasserts 64ms after REG3 reaches its Power-OK threshold.

REG1/2/3/4/5 can also be enabled one at a time via I2C. Writing a 1 into a regulator's ON bit initiates softstart independently of the PWRHLD state.

REG6/7 can be enabled with the PWREN pin or via I2C. Driving PWREN high enables OUT6/7 regardless of the nPBIN or PWRHLD pins. Writing a 1 into a regulator's ON bit initiates softstart independently of the PWREN state. Note that OUT6/7 may be turned on at any time independently of PWRHLD.

Disable

Driving PWRHLD low immediately asserts nRSTO and disables OUT1/2/3/4/5. Driving PWREN low immediately disables OUT6/7. These supplies can also be disabled one at a time via I2C by writing a 0 into a regulator's ON bit. Note that changing the state of PWRHLD or PWREN does not affect a regulator's ON bit. To turn off a regulator who's ON bit defaults to 0 at turn-on, the user must first write a 1 and then write a 0.

Note that the state of nPBSTAT is directly controlled by nPBIN. When nPBIN is floating (pulled high internally) or driven high, nPBSTAT is high impedance. When nPBIN is pulled to ground, nPBSTAT is pulled to ground.

nIRQ is not affected by floating the nPBIN pin.

Caution

When power is applied to the ACT8865, the MSTROFF bit defaults to 0. This allows all supplies to be turned on. Once turned on, all supplies can be turned off at the same time by writing a 1 to MSTROFF. Note that in this situation, the only way to turn the supplies back on is to write a 0 to MSTROFF. Without I2C or pushbutton functionality, the only way to turn the supplies back on is to recycle input power.