Application Brief
ADS1278-SP Power-On Reset Procedure

![Texas Instruments logo]

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Introduction

The ADS1278 family of devices are high-performance 24-bit Delta-Sigma ADCs that recommend a specific power-on sequence for the best operation. Correct sequencing maintains consistent performance and predictable operation of the device. The following recommendations apply to all devices in the ADC family, including the ADS1278, ADS1274, ADS1178, ADS1174, ADS1278-EP, ADS1278-HT, and the ADS1278-SP devices.

Power-On Sequencing

When powering on the ADS1278, sequencing the supplies in a specific order is recommended. The following statement is provided in the *Power Supply Recommendations* of the *ADS1278-SP Radiation Hardened 8-Ch Simultaneous-Sampling 24-Bit Analog-to-Digital Converter Data Sheet*. At power-on, bring up the DVDD supply first, followed by IOVDD and then AVDD. Check the power-supply sequence for proper order, including the ramp rate of each supply. DVDD and IOVDD can be sequenced at the same time if the supplies are tied together. The power supplies can be applied before any analog or digital pin is driven. For consistent performance, assert SYNC after device power-on when data first appear.

The ADS1278 device can also be powered-on with any supply voltage sequence. However, if the AVDD supply is powered up first, the ADS1278 can power-up in an unknown state and temporarily require a large amount of current exceeding the *ADS1278-SP Radiation Hardened 8-Ch Simultaneous-Sampling 24-Bit Analog-to-Digital Converter Data Sheet* specification. In this condition, a typical value for AVDD current can be 200mA ranging up to 300mA in some situations. This condition does not damage the ADC or impact long-term reliability, but the AVDD power source must be capable of providing this level of current in this condition. After AVDD, DVDD, and IOVDD supplies have ramped up to specified operating conditions, asserting the SYNC pin after data first appear resets the device and normal operation of the ADC resumes.

Power-Off Sequencing

There are no power-off sequence requirements for the supply voltages. However, the ABS MAX specs for inputs can be met when powering off the ADS1278. These requirements are normally met when input amplifiers and references are powered from the same AVDD supply as the ADS1278, and any digital input drivers are powered from the same IOVDD supply as the ADS1278. If ADS1278 inputs can be driven to voltages outside of the ABS MAX specifications, then additional input protection circuits can be used to maintain long-term reliability of the ADC.

Key Points for Consideration

Simultaneous Power-On: IOVDD and DVDD can power on at the same time if connected to the same power supply, followed by AVDD.

Power-On and Power-Off Requirements: No analog or digital input pin on the ADS1278 can be driven outside the ABS MAX specifications at any time, including ramping of power supplies during power-up or power-down. The ABS MAX specifications require input pin voltages greater than -0.3V and analog input pin voltages less than AVDD+0.3V and digital input pin voltages less than IOVDD+0.3V.

Conclusion

The ADS1278's power-on sequencing requirements can be followed to meet the *ADS1278-SP Radiation Hardened 8-Ch Simultaneous-Sampling 24-Bit Analog-to-Digital Converter Data Sheet* specifications, but are not required. By maintaining the AVDD power supply can provide up to 300mA and asserting the SYNC pin after data first appear also provides reliable device operation and does not impact long-term reliability.

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