TUSB6250 Power Supply Sequencing

Connectivity Solutions

This application report describes the corrrect power supply sequencing for devices utilizing two voltages: a 1.8-V core supply and a 3.3-V I/O supply that also contain an internal voltage regulator that is disabled so that both voltages are being supplied externally. This application note also pertains to situations when the internal voltage regulators are enabled and the ramp of the 3.3-V I/O supply is slow.

1.1 Requirement for Power Supply Sequencing

Power supply sequencing is required for devices with disabled internal voltage regulators where a 1.8-V core supply and a 3.3-V I/O supply are provided externally. For the TUSB6250, this is the condition when VREGEN/ and DVREGEN/ are tied high and 1.8 V is being applied to PLLVDD18, UDVDD18, and DVDD18 and 3.3 V is applied to DVDD. The power supply sequencing is required due to the presence of a diode within the disabled voltage regulator. If the 1.8-V supply is applied before the 3.3-V supply is applied, the diode becomes reverse-biased and can lead to device failure.

When the internal voltage regulators are enabled but the ramp of the 3.3-V supply is too slow a situation can exist where the internal voltage regulators begin to function and source 1.8 V before 3.3 V reaches 2.5 V. This causes the voltage regulator diode to become reverse biased and results in unstable operation of the device.

1.2 Power- Up Sequence

The 1.8-V power supply should begin to ramp up after the 3.3-V power supply reaches at least 2.5 V.

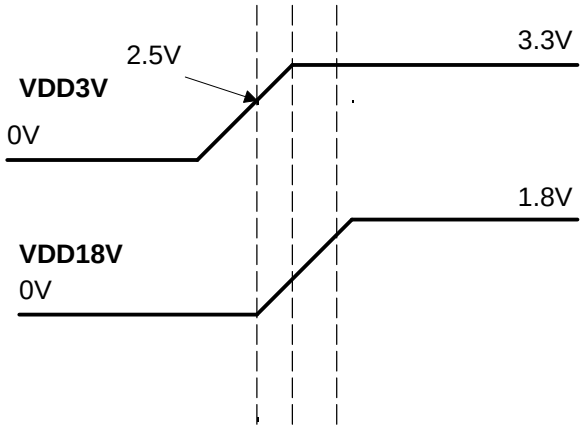

Figure 1-1. Power- Up Sequence

1.3 Power-Down Sequence

The 1.8V power supply should ramp down before the 3.3V power supply. The exact timing will be dependant upon the capacitance of the design.

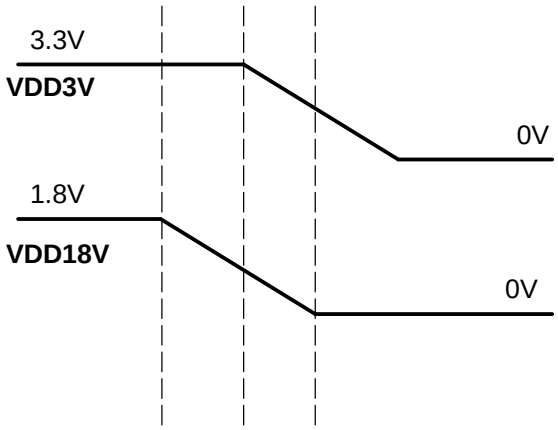

Figure 1-2. Power-Down Sequence

CAUTION

At no time should the 1.8-V power supply have a higher voltage than the 3.3-V power supply.

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