Control Pin Operations

Soft Start

Pin 3 is the Soft Start input pin. The Soft Start pin may be used to externally program how slowly the converter turns on. There is an approximate 50 microampere current source on this pin, which charges an internal capacitor. The voltage on this capacitor clamps the PWM stage error amplifier, causing the output voltage to ramp up. The connection to pin 3 allows external capacitors to be placed in parallel with the internal capacitor.
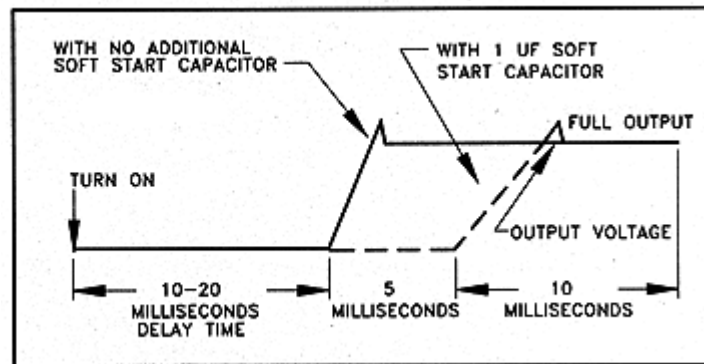
At turn on, the capacitor is completely discharged. There is a charge interval during which the converter is completely off. This is known as the turn on delay interval. Then, the capacitor voltage traverses the active region. The capacitor voltage level in the active region depends on the load condition of the DC-DC Converter. If the converter is lightly loaded, the error amplifier voltage required to produce full regulated output is relatively low. Therefore, the transition through the active region is relatively fast. If the converter is fully loaded, the error amplifier voltage required to produce full regulated output is relatively high. Therefore, the transition through the active region is relatively slower.

Following transition through the active region, the soft start capacitor voltage enters the saturation region, reaching approximately 5 VDC. Therefore, if an external Soft Start capacitor is used, it should be rated for at least 10 VDC.

MDI's proton rad hard parts (5000, 7000, 8000 and 9000 series) also have a non-adjustable output soft start. This feature is designed to minimize or eliminate output overshoots on turn on.

Most applications of the proton rad hard series will perform more satisfactorily with no external soft start capacitor connected to pin 3. This is because external soft start capacitor values below approximately 10 microfarads will defeat the effect of the output soft start, still resulting in a soft start delay, but possibly causing an undesirable output overshoot on turn on.

For these parts, larger values of the external soft start capacitor may still be used.

The soft start pin should be left open if unused,or may be used to inhibit the converter if connected to the input return.