# ON Semiconductor

# Is Now

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- Latching or Autoï Recovery Timerï Based Overload Protection
- Adjustable Overpower Protection (OPP)
- Fixed or Adjustable Maximum Frequency Clamp
-

**Table 3. PIN FUNCTIONAL DESCRIPTION**

| 8−Pin |
|---|

**Table 5. ELECTRICAL CHARACTERISTICS:** ($V_{CC}$ = 12 V, $V_{HV}$ = 120 V, $V_{Fault}$ = open, $V_{FB}$ = 2 V, $V_{CS}$ = 0 V, $V_{ZCD}$ = 0 V, $V_{FMAX}$ = 0 V, $C_{VCC}$ = 100 nF , $C_{DRV}$ = 100 pF, for typical values $T_J$ = 25°C, for min/max values, $T_J$ is – 40°C to 125°C, unless otherwise noted)

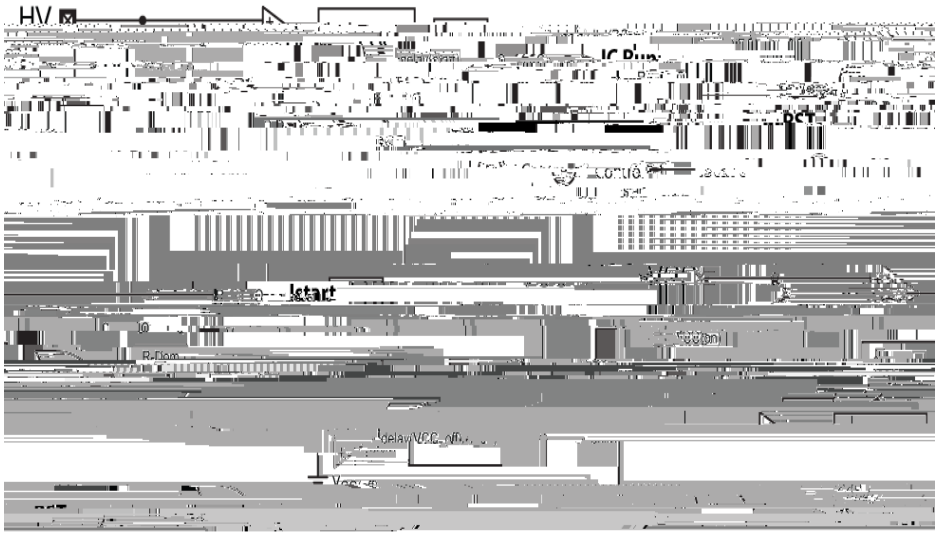
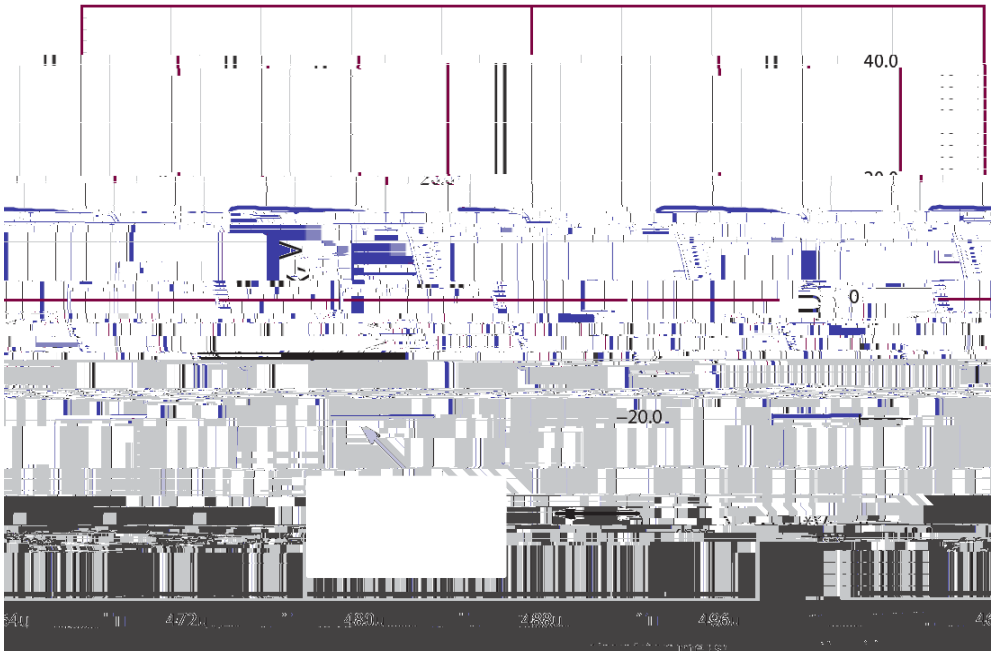


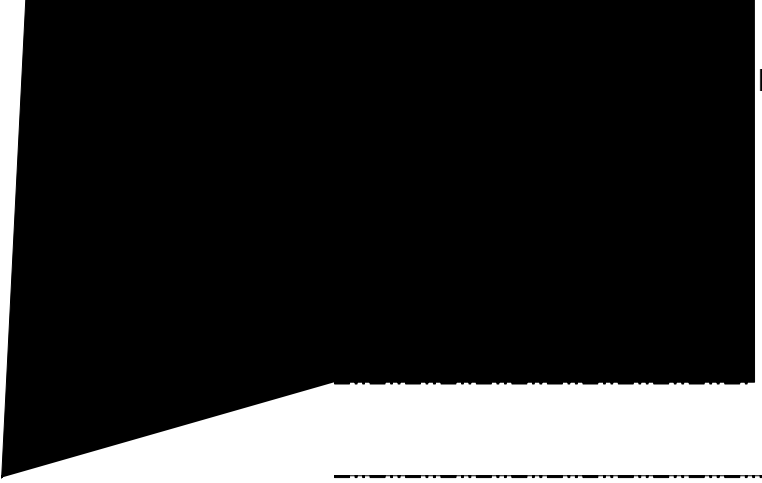

**Figure 5. Start**

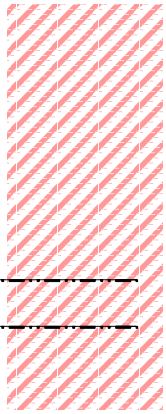

40.0
0
−20.0

**Soft−Start**

Soft−start is achieved by

timeout period will be shorter than the inductor demagnetization period causing CCM operation. CCM operation





### Minimum Frequency Clamp and Skip Mode

As mentioned previously, the circuit prevents the switching frequency from dropping below $f_{MIN}$ (25 kHz typical). When the switching cycle would be longer than 40 □s, the circuit forces a new switching cycle. However, the $f_{MIN}$ clamp cannot generate a DRV pulse until the

**Figure 15. Quiet**

increasing the peak current by 25%, requiring a significantly

### Non−Latching Faults

When the NCP1341 detects a non−latching fault (brownout or thermal shutdown), the drivers are disabled, and $V_{CC}$ falls towards $V_{CC(off)}$ due to the IC internal current consumption. Once $V_{CC}$ reaches $V_{CC(off)}$, the HV current source turns on and $C_{VCC}$ begins to charge towards $V_{CC(on)}$. When $V_{CC}$, reaches $V_{CC(on)}$, the cycle repeats until the fault is removed. Once the fault is removed, the NCP1341 is

## PROTECTION FEATURES

### Brownout Protection

A timer is enabled once $V_{HV}$ drops below its disable threshold, $V_{BO(stop)}$ (typically 99 V). The controller is disabled if $V_{HV}$ doesn't exceed $V_{BO(stop)}$ before the brownout timer, $t_{BO}$ (typically 54 ms), expires. The timer is set long enough to ignore a two cycle dropout. The timer starts counting once $V_{HV}$ drops below $V_{BO(stop)}$.

Figure 22 shows the brownout detector waveforms during a brownout.

When a brownout is detected, the controller stops switching and enters non ǐ latching fault mode (see Figure 20). The HV current source alternatively turns on and off to maintain $V_{CC}$ between $V_{CC(on)}$ and V

is detected. Once the timer expires, a line removal condition is acknowledged initiating an X2 capacitor discharge cycle, and the controller is disabled.

If $V_{CC}$ is above $V_{CC(on)}$, it is first discharged to $V_{CC(on)}$. A second timer, $t_{line(discharge)}$ (typically 32 ms), is used for the time limiting of the discharge phase to protect the device against overheating. Once the discharge phase is complete, $t_{line(discharge)}$ is reused while the device checks to see if the line voltage is reapplied. During the discharge phase, if $V_{CC}$ drops to $V_{CC(on)}$, it is quickly recharged to $V_{CC(X2\_reg)}$. The

**OVP**

### Overload Protection

The overload timer integrates the duration of the overload fault. That is, the timer count increases while the fault is present and reduces its count once it is removed. The overload timer duration, $t_{OVLD}$, is typically 160 ms. When the overload timer expires, the controller detects an overload condition does one of the following:

- The controller latches off (versions A/C/E) or
- Enters a safe, low duty−ratio auto−recovery mode

**Abnormal Overcurrent Protection (AOCP)**

## TYPICAL CHARACTERISTICS

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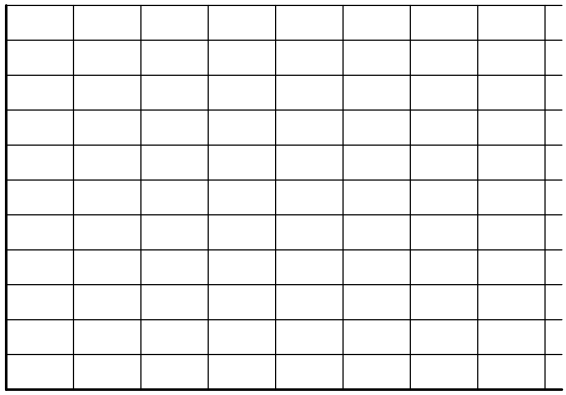

## PACKAGE DIMENSIONS

**SOIC−9 NB**
CASE 751BP
ISSUE A