UNITRODE
Design Note

UC3842A
LOW COST START-UP AND FAULT PROTECTION CIRCUIT

This circuit optimizes control circuit performance to include:

- **Low Start-up Current, Less Than 0.5 ma**
- **MOSFET Compatible Undervoltage Lockout Thresholds 16V Turn-on, 10V Turn-off**
- **Programmable Restart Delay HICCUP Fault Protection**
- **Auxiliary 5V Precision Reference**
- **Overvoltage/Overtemperature Protection**

CIRCUIT DESCRIPTION AND OPERATION:

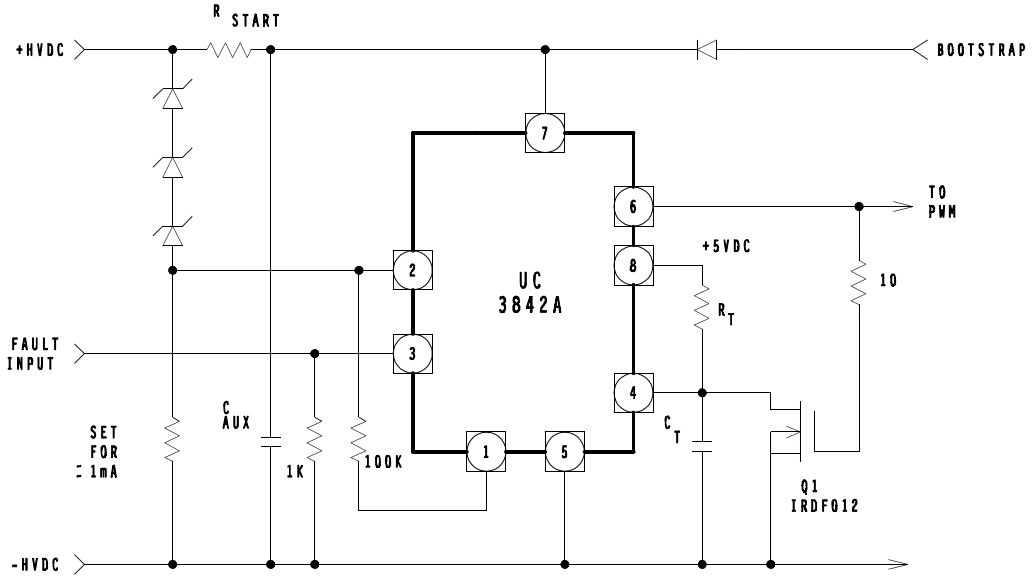
The UC3842A Controller is featured in this design ***NOT*** as the power supply control IC, but in a supervisory function to assist the principal PWM. It will be utilized to facilitate a low current start-up of less than 0.5 milliamp from the high voltage bulk supply. Additionally, the UC3842A features 16 volt turn-on and 10 volt turn-off thresholds, ideally suited for power mosfet gate drive circuits. The 1 amp output of the UC3842A is used to switch the auxiliary supply voltage to the principal PWM controller, a UC3825 or UC3846 for example.

The oscillator of the UC3842A is configured to generate a constant off time, corresponding to the desired restart delay interval. At the beginning of its operation, the UV initiates a clock cycle and the PWM output at pin 6 goes high. This is fed to transistor Q_1 which pulls the R_t/C_t input at pin 4 low, thus "freezing" the oscillator, while keeping the PWM output high. Once a valid fault (greater than 1 volt) is received at the current sense input (pin 3), the output at pin 6 will go low. Transistor Q_1 is then turned off, and the oscillator generates an off period, or delay as programmed by the R_t/C_t components. This procedure will repeat as often as dictated by the fault conditions, but significantly reduces the average short circuit currents and power dissipation.

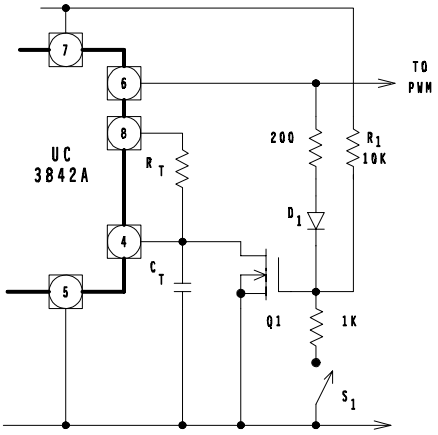
The UC3842A's current sense node is used as the fault input, and can be configured to provide numerous safeguards. Primary overvoltage protection is accomplished by using a simple resistor divider network or series string of zener diodes to the high voltage rail. Overtemperature protection is possible by including the UC3730 Precision Thermal Monitor IC, or a variable impedance thermistor. In a simple configuration, the fault circuit is designed to deliver a 1 volt input to pin 3 of the UC3842A when a fault response is necessary. The error amplifier can also be biased to accept lower amplitudes of valid fault inputs at the current sense input. A precision five volt auxiliary supply is made available at the IC's reference output, pin 8 and can supply 20 milliamps maximum.

UC3842A Supervisory Function Circuits

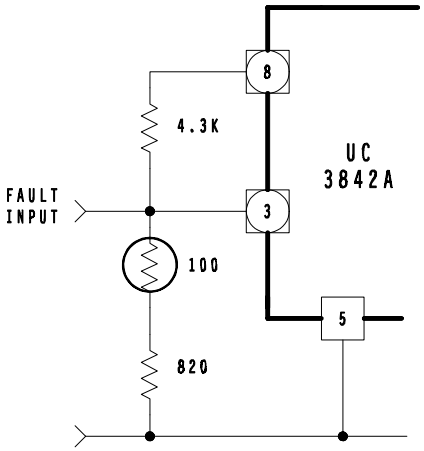
LOW COST START-UP and FAULT PROTECTION CIRCUIT



COMBINED LATCH/RESET/HICCUP FUNCTIONS
General Circuit



OVER-TEMPERATURE PROTECTION
using 50 to 100Ω thermocouples



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