UNITRODE
Design Note

UC3842A FAMILY
FREQUENCY FOLDBACK TECHNIQUE PROVIDES PROTECTION

Excessive power dissipation in switching devices can occur during start-up and overload conditions in many switchmode power supplies. Many sophisticated PWM controllers provide the means for protection against these conditions; however, simple low-cost controllers will require additional circuitry. The circuit described below utilizes only one additional resistor and transistor to enhance the performance of the UC3842A family of controllers.

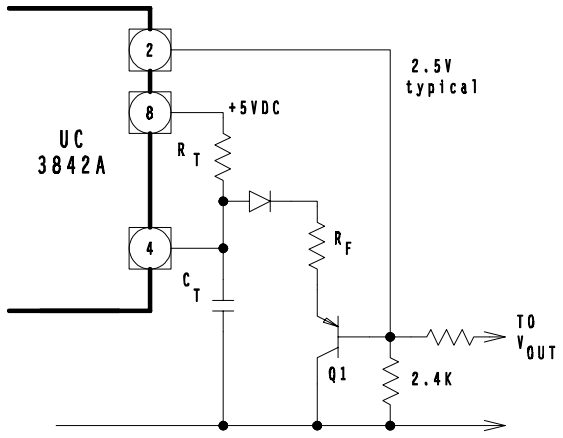
The power supply output voltage is fed to the error amplifier inverting input (pin 2) at a 2.5 volt amplitude under normal operating conditions. During start-up or overload, however, this voltage can drop to zero. The circuit shown uses this feedback voltage to divert normal charging current from the IC's timing capacitor to ground whenever the feedback voltage is below the 2.5 volt nominal. A linear three-to-one reduction of oscillator frequency is obtainable for most applications. This technique lengthens the potential maximum on-time and reduces the programmed deadtime. In many circuits, however, the peak current limit threshold is reached early in the cycle under these overload conditions, and this is not a problem. For most applications, the foldback resistor value (R_F) should equal that of the timing resistor (R_T).

EXAMPLE:

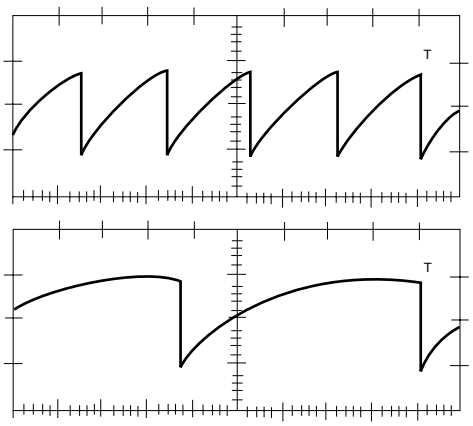
100 kHz operation, R_T = 15k, C_T = 1 nF, R_F = 15k, Q_1 = 2N2907A

OPERATING MODE	NORMAL	OVERLOAD
$V_{E/A}$ - (pin 2)	2.50V	0.00V
Oscillator Freq.	105 kHz	36 kHz

FREQUENCY FOLDBACK TECHNIQUE CIRCUIT



OSCILLATOR FREQUENCY



UNITRODE CORPORATION
7 CONTINENTAL BLVD. • MERRIMACK, NH 03054
TEL. (603) 424-2410 • FAX (603) 424-3460