



Design Note

**CURRENT MODE CONTROLLED QUASI-RESONANT  
ZERO VOLTAGE SWITCHING POWER CONVERSION**

Variable frequency power converters can also benefit from the use of current mode control. Two loops are used to determine the precise switch ON time, an "outer" voltage feedback loop, and an "inner" current sensing loop. The advantage to this approach is making the power stage operate as a voltage controlled current source. This eliminates the two pole output inductor characteristics in addition to providing enhanced dynamic transient response.

**PRINCIPLES OF OPERATION**

Two control ICs are utilized in this design example. The UC3843A PWM performs the current mode control by providing an output pulse width determined by the two control loop inputs. This pulse width, or

repetition rate is used to set the conversion period of the UC3864 ZVS resonant controller. Rather than utilize its voltage controlled oscillator (VCO) to generate the conversion period, it is determined by the UC3843A output pulse width.

Zero voltage switching is performed by the UC3864 one-shot timer and zero crossing detection circuitry in their standard configuration. When the resonant capacitor voltage crosses zero, the UC3864 output goes high. This turns ON transistor Q1 and recycles the UC3843A which initiates the next current mode controlled period. The UC3864 error amplifier and VCO are not used, however the fault protection circuitry will still respond to an overcurrent fault.

**CURRENT MODE CONTROLLED ZVS FORWARD CONVERTER**

