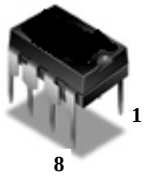
LTO-DMS

UC3842
Fixed Frequency Current Mode PWM Controller

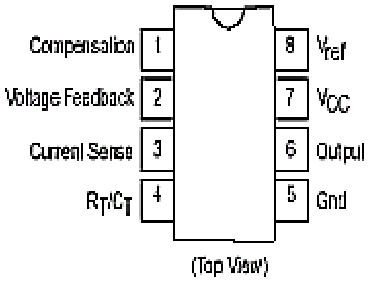
Features

- ♦ Automatic Feed Forward Compensation
- ♦ High Gain Totem Pole Output
- ♦ Internally Trimmed Band gap Reference
- ♦ Under voltage Lockout with Hysteresis
- ♦ Low Start Up Current
- ♦ Optimized for offline converter
- ♦ Double pulse suppression
- ♦ Current mode operation to 500KHz



DIP-8

PIN CONNECTIONS



Description

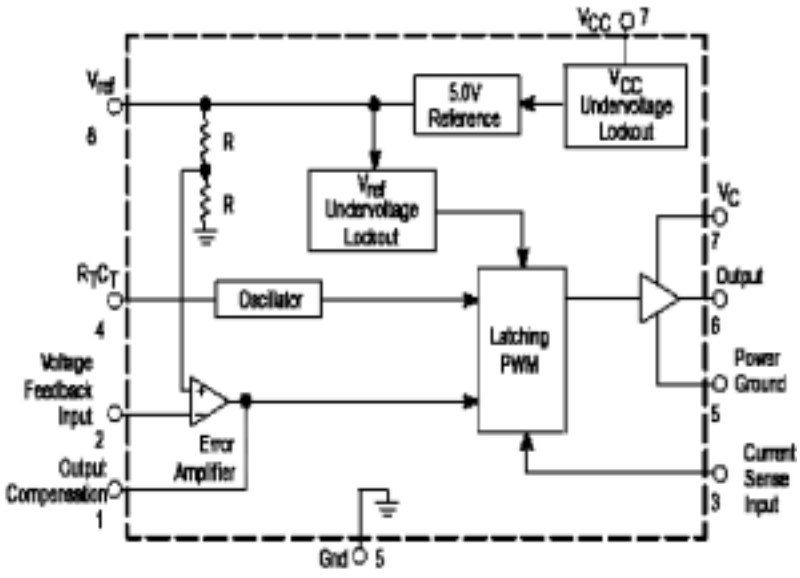
Fixed frequency current-mode PWM controller. It is specially designed for Off Line And DC-to-DC converter applications with minimal external component. This integrated circuit features a trimmed oscillator for precise duty cycle control. a temperature compensated reference, high gain error amplifier, current sensing comparator, and a high current to tem pole output ideally suited for driving a power MOSFET.

Protection circuitry includes built in under-voltage lockout and current limiting

Ordering Information

Device	Operating Temperature Range	Package
UC3842	T_A=0° to +70°C	DIP-8

Simplified Block Diagram

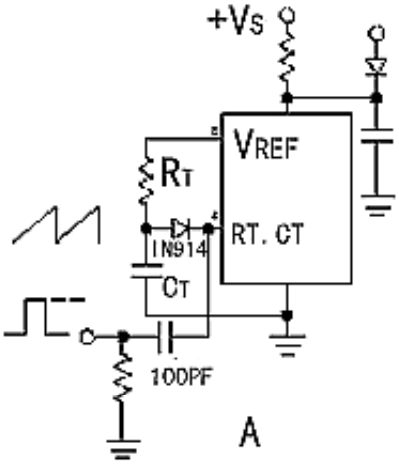


ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Total Power Supply and Zener Current	$(I_{CC}+ I_Z)$	30	mA
Output Current	I_O	±1.0	A
Output Energy (Capacitive Load per Cycle)	W	5.0	μJ
Error Amp Output Sink Current	I_{OE}	10	mA
Current Sense and Voltage Feedback Inputs	Vin	-0.3 to 5.5	V
Maximum Power Dissipation @ T_A= 25°C:	P_D	0.862	W
Thermal Resistance, Junction-to-Air	$R_{\theta JA}$	145	°C/W
Operating Junction Temperature	T_J	+150	°C
Storage Temperature Range	T_{stg}	-65 ~ +150	°C

Pin No.	function	description
	Ompensation	his pln is the Error Amplifier output and is made available for loop compensation
	voltage Feedback	his is the inverting input of the Error Amplifier. It is normally connected to the switching power supply output through a resistor divider.
	current Sense	voltage proportional to inductor current is connected to this input. The PWM uses this. information to terminate the output switch conduction
	T/CT	he Oscillator frequency and maximum Output duty cycle are programmed by connecting resistor R_T to V_{REF} and capacitor C_T to ground. Operation to 500kHz is possible.
	ND	his pin is the combined control circuitry and power ground
	output	his output directly drives the gate of a power MOSFET. Peak currents up to 1,0A are sourced and sunk by this pin.
	cc	his pin is the positive supply of the control IC.
	REF	his is the reference output. It provides charging current for capacitor C_T through resistor R_T

External Synchronization and Wafeforms



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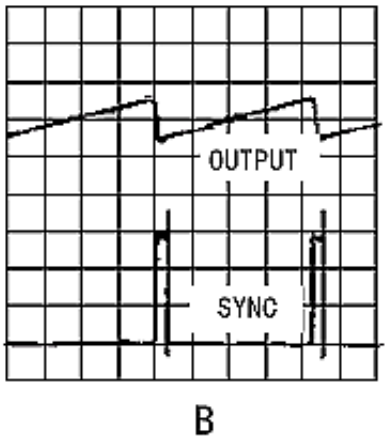

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ELECTRICAL CHARACTERISTICS (Vcc=15V unless otherwise noted)

Characteristics	Symbol	Min	Max	Unit
REFERENCE SECTION				
Reference Output Voltage (I_O=1.0mA, V_{CC}=15V,T_A=25±10°C) (I_O=1.0mA, V_{CC}=15V,T_A= Tlow to Thigh)	V_{ref}	4.9 4.865	5.1 5.135	V
Line Regulation (V_{CC}=12V to 25V,T_A=Tlow to Thigh)	Reg_{line}		20	mV
Load Regulation (I_O=1.0 to 20mA,T_A=Tlow to Thigh)	Reg_{load}		25	mV
Total Output Variation over Line,Load,Temperature (Note1) (V_{CC}=12V, I_O=1.0mA,T_A=Tlow to Thigh) (V_{CC}=25V, I_O=20mA,T_A=Tlow to Thigh)	Vfinal	4.82	5.18	V
Output Short Circuit Current (V_{CC}=15V)	I_{SC}	-30	-180	mA
OSCILLATOR SECTION				
Frequency (V_{CC}=15V,Tj=25°C,R_T=10k,C_T=3.3nF) (V_{CC}=15V, T_A=Tlow to Thigh,R_T=10k,C_T=3.3nF)	f_{osc}	47 46	57 60	kHz
Frequency Change with Voltage (V_{CC}=12V to 25V, T_A=Tlow to Thigh,R_T=10k,C_T=3.3nF)	$\Delta f_{osc}/\Delta V$		1.0	%
Discharge Current (Vosc=2.0V, V_{CC}=15V) Tj=25°C T_A=Tlow to Thigh	Idisch	 7.5 7.2	 9.3 9.5	mA
ERROR AMPLIFIER SECTION				
Voltage Feedback Input (V_O=2.5V,V_{CC}=15V, T_A=Tlow to Thigh)	V_{FB}	2.42	2.58	V
Input Bias Current (V_{FB}=2.7V,V_{CC}=15V, T_A=Tlow to Thigh)	I_{IB}		-2.0	µA
Open Loop Voltage Gain (V_O=2.0V to 4.0V,V_{CC}=15V, T_A=Tlow to Thigh)	A_{VOL}	65		dB
Unity Gain Bandwidth (V_{CC}=15V, T_A=Tlow to Thigh)	BW	0.7		MHz
Power Supply Rejection Ratio (V_{CC}=12V to 25V, T_A=Tlow to Thigh)	PSRR	60		dB
Output Current Sink (V_O=1.1V,V_{FB}=2.7V, V_{CC}=15V, T_A=Tlow to Thigh) Source (V_O=5.0V,V_{FB}=2.3V, V_{CC}=15V, T_A=Tlow to Thigh)	 I_{Sink} I_{Source}	 2.0 -0.5		mA
Output Voltage Swing High State (V_{FB}=2.3V, V_{CC}=15V,$R_{L(GND)}$=15k, T_A=Tlow to Thigh) Low State (V_{FB}=2.7V, V_{CC}=15V,$R_{L(5.0)}$=15k, T_A=Tlow to Thigh)	 V_{OH} V_{OL}	 5.0	 1.1	V

ELECTRICAL CHARACTERISTICS (Vcc=15V unless otherwise noted)

Characteristics	Symbol	Min	Max	Unit
CURRENT SENSE SECTION				
Current Sense Input Voltage Gain (V_{FB}=0V, V_{CC}=15V, T_A=T low to Thigh)	Av	2.85	3.15	V/V
Maximum Current Sense Input Threshold (V_{FB}=0V, V_{CC}=15V, T_A=T low to Thigh)	V th	0.9	1.1	V
Input Bias Current (V_{CC}=15V, T_A=T low to Thigh)	I_{IB}		-10	μA
Propagation Delay (Current Sense Input to Output) (V_{CC}=15V, T_A=T low to Thigh)	t_{PLH}		300	ns
OUTPUT SECTION				
Output Voltage Low State (Sink=20mA, V_{CC}=15V) (Sink=200mA, V_{CC}=15V) High State (Sink=20mA, V_{CC}=15V) (Sink=200mA, V_{CC}=15V)	 V_{OL} V_{OH}	 13 12	 0.4 2.2	 V
Output Voltage with UVLO Activated (V_{CC}=6.0V, I_{Sink},=1.0mA, T_A=T low to Thigh)	$V_{OL(UVLO)}$		1.1	V
Output Voltage Rise Time (C_L=1.0nF, V_{CC}=15V, T_A=T low to Thigh)	tr		150	ns
Output Voltage Fall Time (C_L=1.0nF, V_{CC}=15V, T_A=T low to Thigh)	tf		150	ns
ONDERVOLTAGE LOCKOUT SECTION				
Startup Threshold (V_{CC}=0V to 25V,T_A=T low to Thigh)	Vth	14.5	17.5	V
Minimum Operating Voltage After Turn-On (V_{CC}=0V to 25V,T_A=Tlow to Thigh)	$V_{CC(min)}$	8.5	11.5	V
PWM SECTION				
Duty Cycle Maximum (V_{CC}=15V, T_A=T_{low} to Thigh, R_T=10k,C_T=3.3nF) Minimum (V_{CC}=15V, T_A=Tlow to Thigh, R_T=10k,C_T=3.3nF)	 DCmax DCmin	 94 	 0	 %
TOTAL DEVICE				
Power Supply Current Startup: V_{CC}=14V V_{CC}=15V Operating	 I_{CC}		 1.0 17	 mA
Power Supply Zener Voltage (I_{CC}=25mA, V_{CC}=0 to 40V)	Vz	30	40	V

NOTES: 1. $V_{final}= V_{ref25} \pm(Reg_{line}+ Reg_{load})/1000\pm | V_{ref70}(V_{ref0})-V_{ref25} |$
V_{ref25}=Vref @ T_A=25°C;
V_{ref70}=Vref @ T_A=70°C;
V_{ref0}=Vref @ T_A=0°C.
2. Tlow= 0°C ; Thigh=+70°C