

## Current Mode Controllers

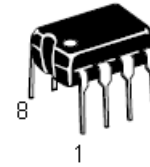
The UC3842A, UC3843A series of high performance fixed frequency current mode controllers are specifically designed for off-line and dc-to-dc converter applications offering the designer a cost effective solution with minimal external components. These integrated circuits feature a trimmed oscillator for precise duty cycle control, a temperature compensated reference, high gain error amplifier, current sensing comparator, and a high current totem pole output ideally suited for driving a power MOSFET.

Also included are protective features consisting of input and reference undervoltage lockouts each with hysteresis, cycle-by-cycle current limiting, programmable output deadtime, and a latch for single pulse metering.

These devices are available in an 8-pin dual-in-line plastic package as well as the 14-pin plastic surface mount (SO-14). The SO-14 package has separate power and ground pins for the totem pole output stage.

The UC3842A has UVLO thresholds of 16 V (on) and 10 V (off), ideally suited for off-line converters. The UC3843A is tailored for lower voltage applications having UVLO thresholds of 8.5 V (on) and 7.6 V (off).

- Trimmed Oscillator Discharge Current for Precise Duty Cycle Control
- Current Mode Operation to 500 kHz
- Automatic Feed Forward Compensation
- Latching PWM for Cycle-By-Cycle Current Limiting
- Internally Trimmed Reference with Undervoltage Lockout
- High Current Totem Pole Output
- Undervoltage Lockout with Hysteresis
- Low Startup and Operating Current
- Direct Interface with Motorola SENSEFET Products

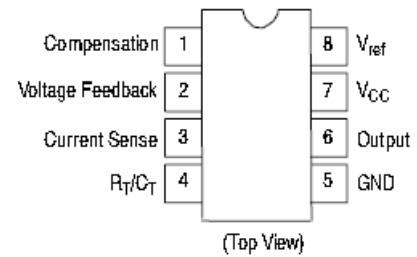


PDIP-8  
N SUFFIX  
CASE 626

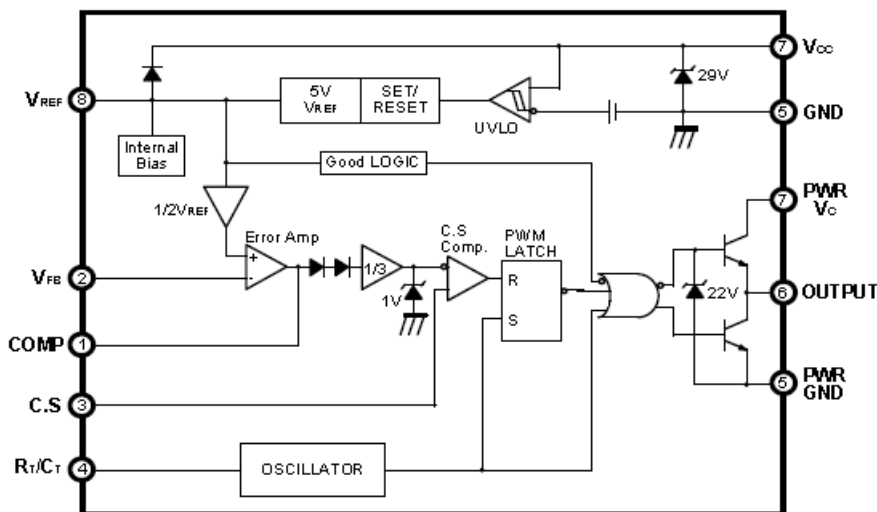


SOIC-8  
D SUFFIX  
CASE 751

### PIN CONNECTIONS



### Internal Block Diagram



**Absolute Maximum Ratings**

Parameter	Symbol	Value	Unit
Supply Voltage	V <sub>CC</sub>	30	V
Output Current	I <sub>O</sub>	± 1	A
Analog Inputs (pin 2, 3)	V <sub>I(ANA)</sub>	- 0.3 to 6.3	V
Error Amp. Output Sink Current	I <sub>SINK(EA)</sub>	10	mA
Power Dissipation	P <sub>D</sub>	1	W

**Electrical Characteristics**

(V<sub>CC</sub> = 15V, R<sub>T</sub> = 10KΩ, C<sub>T</sub> = 3.3nF, T<sub>A</sub> = 0°C to + 70°C, Unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>REFERENCE SECTION</b>						
Output Voltage	V <sub>REF</sub>	T <sub>J</sub> = 25°C, I <sub>O</sub> = 1mA	4.9	5.0	5.1	V
Line Regulation	ΔV <sub>REF</sub>	V <sub>CC</sub> = 12V to 25V	-	6	20	mV
Load Regulation	ΔV <sub>REF</sub>	I <sub>O</sub> = 1mA to 20mA	-	6	25	mV
Output Short Circuit	I <sub>SC</sub>	T <sub>a</sub> = 25°C	-	- 100	- 180	mA
<b>OSILLATOR SECTION</b>						
Initial Accuracy	F <sub>O</sub> SC	T <sub>J</sub> = 25°C	47	52	57	KHz
Voltage Stability	STV	V <sub>CC</sub> = 12V to 25V	-	0.2	1	%
Amplitude	V <sub>O</sub> SC	V <sub>PIN4</sub> , Peak to Peak	-	1.7	-	V
Discharge Current	I <sub>D</sub> ISCHG	T <sub>J</sub> = 25°C, Pin4 = 2V	7.8	8.3	8.8	mA
<b>CURRENT SENSE SECTION</b>						
Gain	G <sub>V</sub>	(NOTE 2, 3)	2.85	3	3.15	V/V
Maximum Input Signal	V <sub>I(MAX)</sub>	V <sub>PIN1</sub> = 5V(NOTE 2)	0.9	1.0	1.1	V
PSRR	PSRR	V <sub>CC</sub> = 12V to 25V (NOTE 1, 2)	-	70	-	dB
Input Bias Current	I <sub>B</sub> IAS	-	-	- 2	-10	μA
Delay to Output	T <sub>D</sub>	V <sub>PIN3</sub> = 0 V to 2V (NOTE1)	-	100	200	ns

**Electrical Characteristics (Continued)**

 (V<sub>CC</sub> = 15V, R<sub>T</sub> = 10KΩ, C<sub>T</sub> = 3.3nF, T<sub>A</sub> = 0°C to + 70°C, Unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>ERROR AMPLIFIER SECTION</b>						
Input Voltage	V <sub>I</sub>	TPIN1 = 2.5V	2.42	2.50	2.58	V
Input Bias Current	I <sub>BIAS</sub>	-	-	-0.3	-2	uA
Open Loop Gain	G <sub>VO</sub>	V <sub>O</sub> = 2V to 4V (NOTE 1)	65	90	-	dB
Unity Gain Bandwidth	GBW	T <sub>J</sub> = 25°C (NOTE 1)	0.7	1	-	MHz
PSRR	PSRR	V <sub>CC</sub> = 12V to 25V (NOTE 1)	60	70	-	dB
Output Sink Current	I <sub>SINK</sub>	V <sub>PIN2</sub> = 2.7V V <sub>PIN1</sub> = 1.1V	2	6	-	mA
Output Source Current	I <sub>SOURCE</sub>	V <sub>PIN2</sub> = 2.3V V <sub>PIN1</sub> = 5.0V	-0.5	-0.8	-	mA
Output High Voltage	V <sub>OH</sub>	V <sub>PIN2</sub> = 2.3V R1 = 15KΩ to GND	5	6	-	V
Output Low Voltage	V <sub>OL</sub>	V <sub>PIN2</sub> = 2.7V R1 = 15KΩ to Pin8	-	0.8	1.1	V
<b>OUTPUT SECTION</b>						
Output Low Level	V <sub>OL</sub>	I <sub>SINK</sub> = 20mA	-	0.1	0.4	V
		I <sub>SINK</sub> = 200mA	-	1.5	2.2	V
Output High Level	V <sub>OH</sub>	I <sub>SOURCE</sub> = 20mA	13	13.5	-	V
		I <sub>SOURCE</sub> = 200mA	12	13.5	-	V
Rise Time	t <sub>R</sub>	T <sub>J</sub> = 25°C, C1 = 1nF (NOTE 1)	-	40	100	ns
Fall Time	t <sub>F</sub>	T <sub>J</sub> = 25°C, C1 = 1nF (NOTE 1)	-	40	100	ns
Output Voltage Swing Limit	V <sub>OLIM</sub>	V <sub>CC</sub> = 27V, C1 = 1nF	-	22	-	V
<b>UNDER VOLTAGE LOCKOUT SECTION</b>						
Start Threshold	V <sub>TH</sub>	UC3842A	15	16	17	V
		UC3843A	7.8	8.4	9.0	V
Min. Operating Voltage ( After turn on )	V <sub>TL</sub>	UC3842A	9	10	11	V
		UC3843A	7.0	7.6	8.2	V
<b>PWM SECTION</b>						
Maximum Duty Cycle	D <sub>MAX</sub>	UC3842A/UC3843A	94	96	100	%
Minimum Duty Cycle	D <sub>MIN</sub>	-	-	-	0	%
<b>TOTAL STANDBY CURRENT</b>						
Start-Up Current	I <sub>ST</sub>	-	-	0.2	0.4	mA
Operating Supply Current	I <sub>CC</sub>	V <sub>PIN2</sub> = V <sub>PIN3</sub> = 0V	-	11	17	mA
V <sub>CC</sub> Zener Voltage	V <sub>Z</sub>	I <sub>CC</sub> = 25mA	-	29	-	V

 \* Adjust V<sub>CC</sub> above the start threshold before setting at 15V

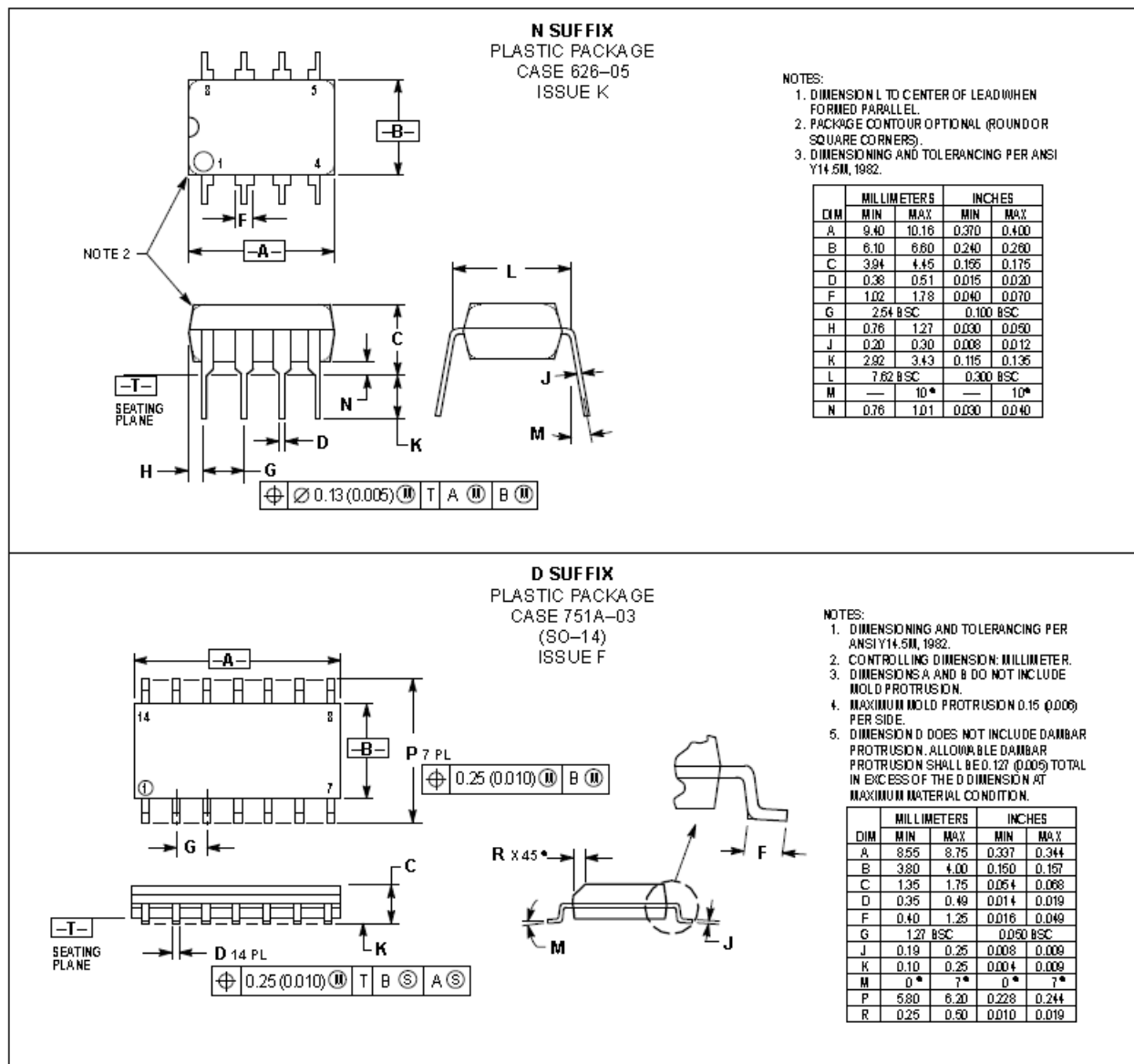
**Notes :**

1. These parameters, although guaranteed, are not 100% tested in production.
2. Parameter measured at trip point of latch with V<sub>2</sub> = 0V.
3. Gain defined as: G<sub>V</sub> = ΔV<sub>PIN1</sub>/ΔV<sub>PIN3</sub>(V<sub>PIN3</sub> = 0 to 0.8V)

## Pin functions

N	Function	Description
1	COMP	This pin is the Error Amplifier output and is made for loop compensation.
2	V <sub>FB</sub>	This is the inverting input of the Error Amplifier. It is normally connected to the switching power supply output through a resistor divider.
3	I <sub>SENSE</sub>	A voltage proportional to inductor current is connected to this input. The PWM uses this information to terminate the output switch conduction.
4	R <sub>T</sub> /C <sub>T</sub>	The oscillator frequency and maximum Output duty cycle are programmed by connecting resistor R <sub>T</sub> to V <sub>ref</sub> and capacitor C <sub>T</sub> to ground.
5	GROUND	This pin is the combined control circuitry and power ground.
6	OUTPUT	This output directly drives the gate of a power MOSFET. Peak currents up to 1A are sourced and sink by this pin.
7	V <sub>CC</sub>	This pin is the positive supply of the integrated circuit.
8	V <sub>ref</sub>	This is the reference output. It provides charging current for capacitor C <sub>T</sub> through resistor R <sub>T</sub> .

## OUTLINE DIMENSIONS



**Ordering Information**

Product Number	Package	Operating Temperature
UC3842AN	8 DIP	0 ~ + 70°C
UC3842AD	8 SOP	
UC3843AN	8 DIP	
UC3843AD	8 SOP	