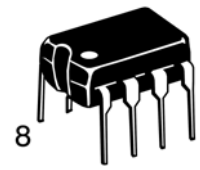




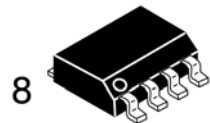
概述

UC3843是专为离线和 DC-DC 开关电源应用设计的恒频电流型 PWM 控制器。内部包含温度补偿精密基准、供精密占空比调节用的可调振荡器、高增益误差放大器、电流传感比较器和适合作功率 MOSFET 驱动用的大电流推挽输出级以及单周期回滞式限流欠压锁定、死区可调、单脉冲计数拴锁等保护电路。

UC3843采用 DIP8 或 SOP8 形式封装。



1
DIP-8

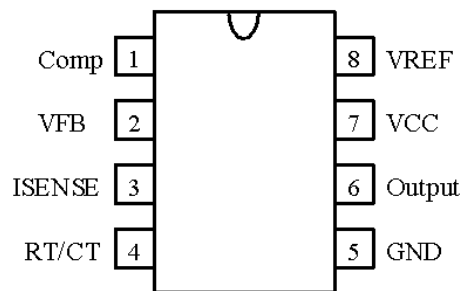


1
SOP-8

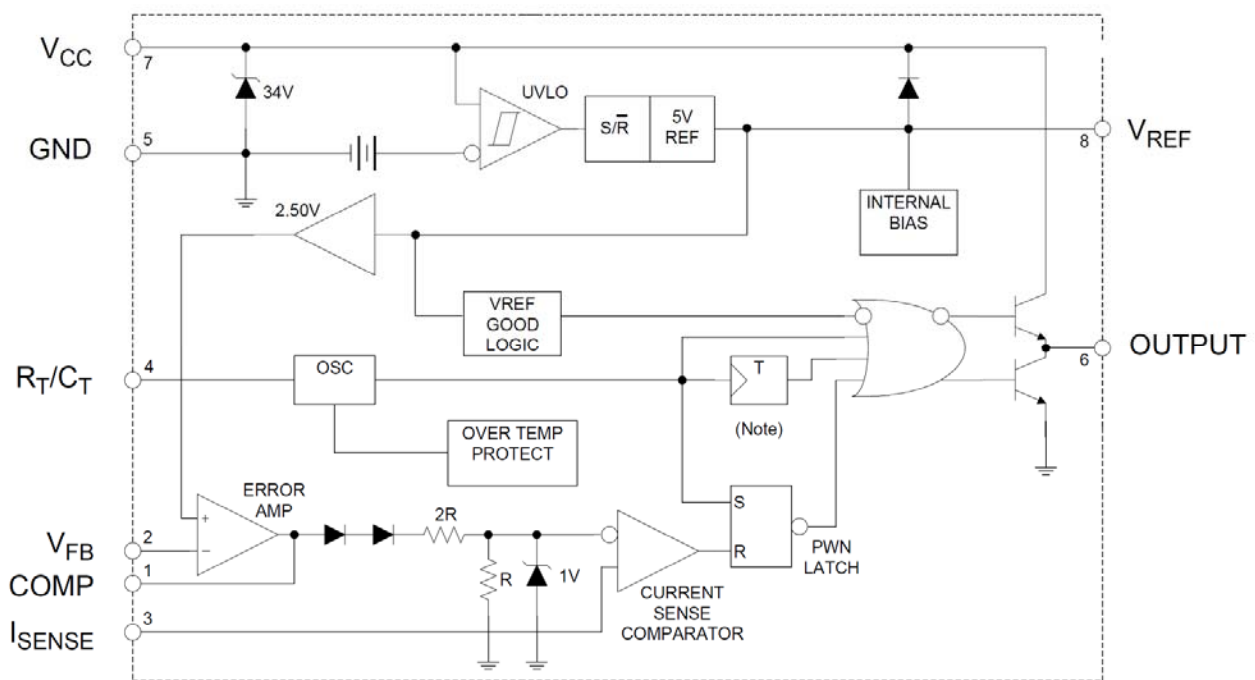
主要特点

- 起动电流小 ($< 0.5\text{mA}$)
- 自动前馈补偿
- 具有徊滞特性的欠压锁定
- 最大占空比箝制
- 工作频率可达 500kHz

引脚排列



功能框图





引出端功能说明

引出端序号	功 能	符 号	说 明
1	比较端	COMP	是误差放大器的输出，可以用作回路补偿
2	电压反馈输入	VFB	误差放大器的反相输入，它通常经过一个电阻分压器和开关电源连接
3	电流传感器	Sen	一个和电感线圈的电流成比例的电压连接到这个输入端。PWM 在该端检测到的电压决定输出是否关断
4	振荡端	OSC	将 RT 和 VREF 相连，将 CT 和地相连以控制振荡器频率和最大输出占空比。最高频率可达 500kHz
5	地	GND	地
6	输出	OUTPUT	输出直接驱动功率 MOSFET 的栅极。高达 1A 的峰值电流可由此脚输出或吸入。
7	电源	Vcc	控制集成电路的正电流
8	基准电压	VREF	基准电压的输出。它经过电阻器 RT 为电容器 CT 提供充电电流

极限值（绝对最大额定值，若无其它规定，Tamb=25℃）

参 数 名 称	符 号	数 值		单 位
		最 小	最 大	
电源电压	Vcc		30	V
输出电流	Io	-1	1	A
输出能量	W		5.0	J
误差放大器输出吸电流	Io		10	mA
电流传感和电压反馈输入	Vin	-0.3	5.5	V
工作结温	Tj		150	℃
功耗	PD		1	W
工作环境温度	Tamb	0	70	℃
贮存温度	Tstg	-55	150	℃

电特性（若无其它规定，Vcc=15V，Tamb=0~70℃，RT=10kΩ，CT=3.3nF）

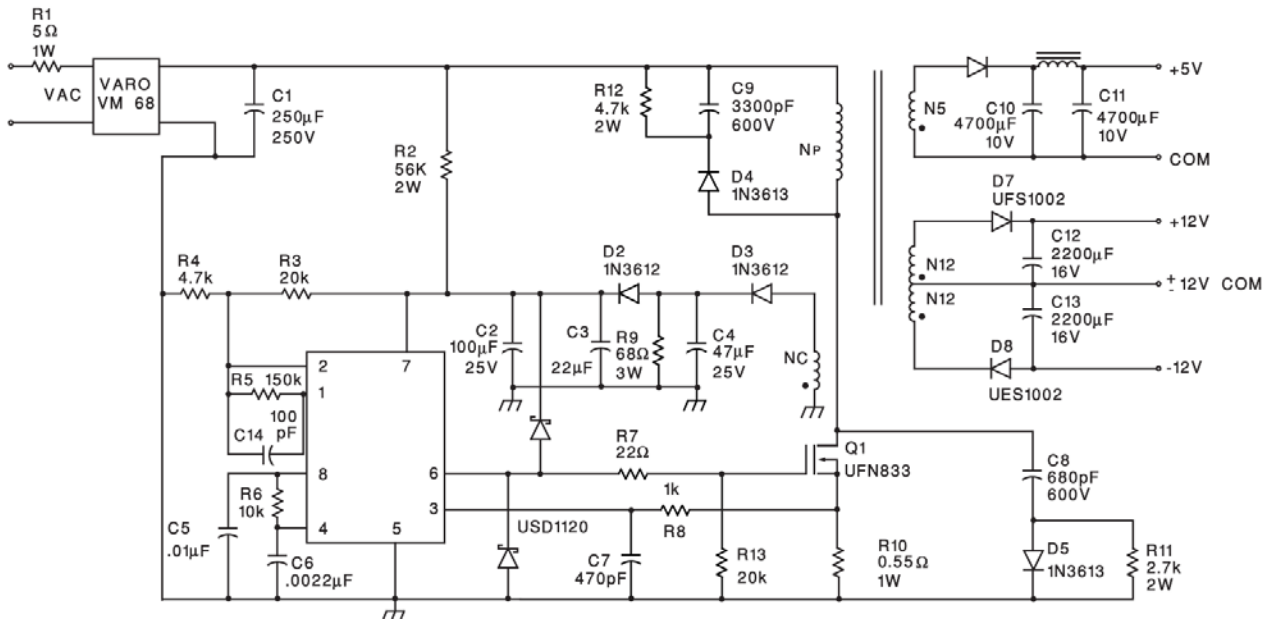
特 性	测试条件	符 号	规 范 值			单 位
			最 小	典 型	最 大	
基准部分						
基准输出电压	Tj=25℃ Io=1mA	Vref	4.90	5.00	5.10	V
线性调整率	12V ≤ Vi ≤ 25V	ΔVref		6	20	mV
负载调整率	1mA ≤ Vi ≤ 20mA	ΔVref		6	25	mV
输出噪声电压	10Hz ≤ f ≤ 10kHz	en		50		μV
短路输出电流	Ta=25℃	Isc	-30	-100	-180	mA
振荡器部分						
振荡频率	Tj=25℃	fosc	47	52	57	kHz
振荡电压特性	Vcc=12V to 25V	Δfosc/V	-	0.2	1	%



特性	测试条件	符号	规范值			单位
			最小	典型	最大	
振荡温度特性	Ta=Tlow to Thigh	fosc/ T	-	5	-	%
振荡幅度	peak to peak	Vosc	-	1.6	-	V
放电电流	Tj=25°C	Idischg	7.8	8.3	8.8	mA
误差放大器部分						
输入电压	Vpin1=2.5V	Vfb	2.42	2.50	2.58	V
输入偏置电流	Vfb=5V	Ibias		-0.1	-2	μA
开环电压增益	2V ≤ Vo ≤ 4V	Gvo1	65	90		dB
单位增益带宽	Tj=25°C	BW	0.7	1		MHz
电源纹波抑制比	12V ≤ Vi ≤ 25V	PSRR	60	70		dB
输出灌电流	Vpin2=2.7V, Vpin1=1.1V	Isink	2	12		mA
输出吸电流	Vpin2=2.3V, Vpin1=5V	Isource	-0.5	-1		mA
输出高电平	Vpin2=2.3V; Rl=15kΩ to Ground	VOH	5	6.2		V
输出低电平	Vpin2=2.7V; Rl=15kΩ to Pin8	VOL		0.8	1.1	V
电流传感部分						
增益	(注 1 & 2)	Gv	2.85	3	3.15	V/V
最大输入信号	Vpin1=5V(注 1)	V3	0.9	1.0	1.1	V
电源抑制比	12V ≤ Vi ≤ 25V(注 1)	SVR		70		dB
输入偏置电流		Ib		-2	-10	μA
传输延迟	电流传感输入到输出	TPLH(in/off)		150	300	ns
输出部分						
输出低电平	Isink=20mA	VOL		0.1	0.4	V
	Isink=200mA			1.6	2.2	V
输出高电平	Isource=20 mA	VOH	13	13.5		V
	Isource=200 mA		12	13.5		V
欠压锁定的输出电压	Vcc=6V; Isink=1mA	Vols		0.7	1.2	V
输出电压上升时间	Tj=25°C Cl=1nF(注 3)	tr		50	150	ns
输出电压下降时间	Tj=25°C Cl=1nF(注 3)	tf		50	150	ns
欠压锁定部分						
起动电压		Vth	7.8	8.4	9.0	V
维持电压		Vcc(min)	7.0	7.6	8.2	V
PWM 部分						
最大占空比		D (max)	94	96	100	%
最小占空比		D (min)		0		%
整个器件						
启动电流	Vi=14V	Ist		0.12	0.3	mA
工作电源电流	Vpin2=Vpin3=0V	Ii		12	17	mA
Zener 电压	Ii=25mA	Viz	30	36		V



应用电路图



- 注：1. 输入电压： 95Vac ~130Vac (50Hz/60Hz)
 2. 线形隔离： 3850V
 3. 开关频率： 40kHz
 4. 效率： 满负荷 70%
 5. 输出电压： A +5V 5%/-5%： 1A~4A 负载， 脉动电压： 50mVp-pmax
 B +12V 3%/-3%： 0.1A~0.3A 负载， 脉动电压： 100mVp-pmax
 C -12V 3%/-3%： 0.1A~0.3A 负载， 脉动电压： 100mVp-pmax

使用说明

1. 振荡部分

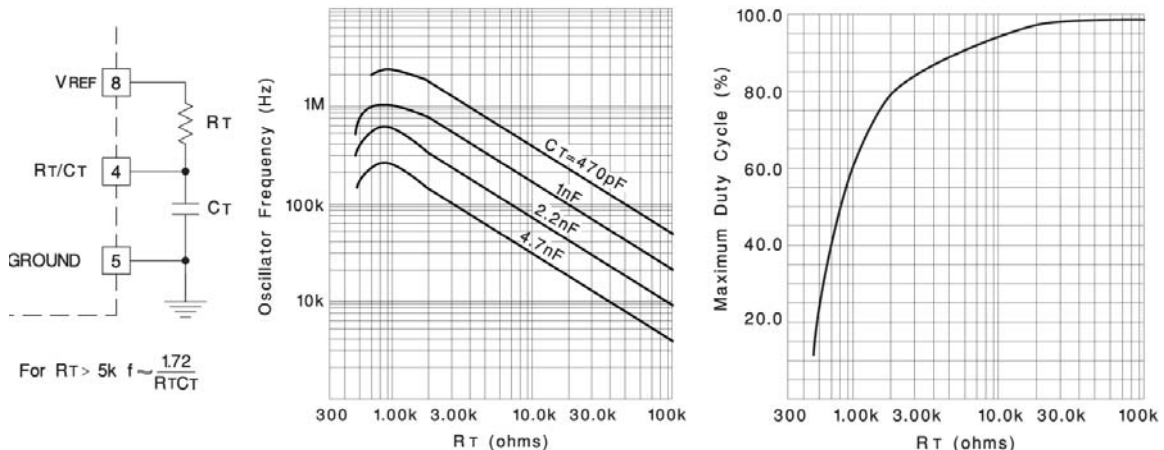
外围元件 RT 和 CT 决定振荡频率和最大占空比，如下图所示，充放电时间由下式表示。

充电时间： $t_c = 0.55RT * CT$

放电时间： $t_d \approx RT * CT * \ln\{(0.0063RT - 2.7)/(0.0063RT - 4)\}$

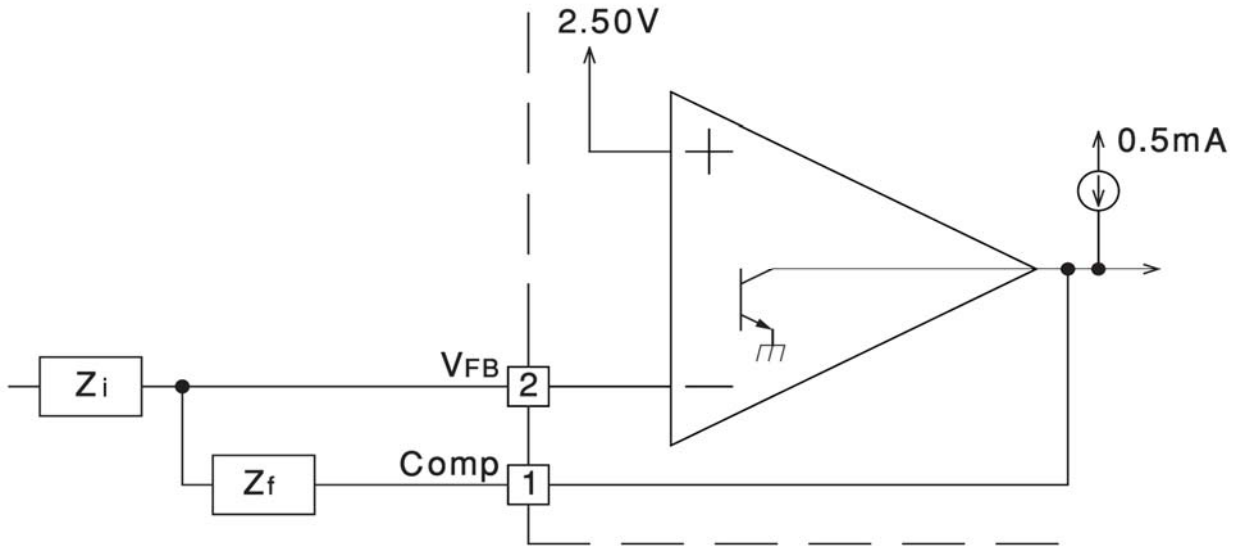
频率与电阻

最大占空比





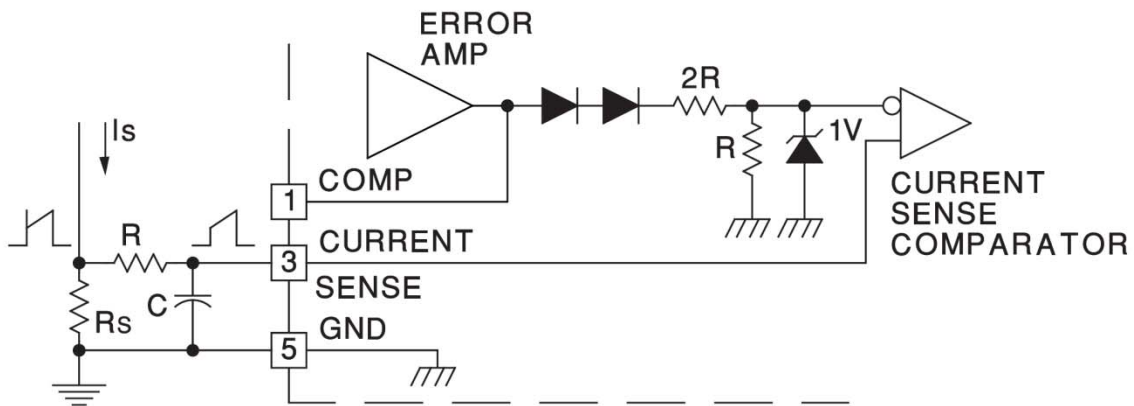
2. 误差放大器



该放大器的开环增益可达 80dB，开环条件下，频率特性如图所示。

内部有 2.5V 基准电压，加在放大器的正端，取样电压经 R1、R2 分压加在放大器的负端输入，负反馈电阻 Rf 可以调节闭环增益的大小。

3. 电流传感比较器



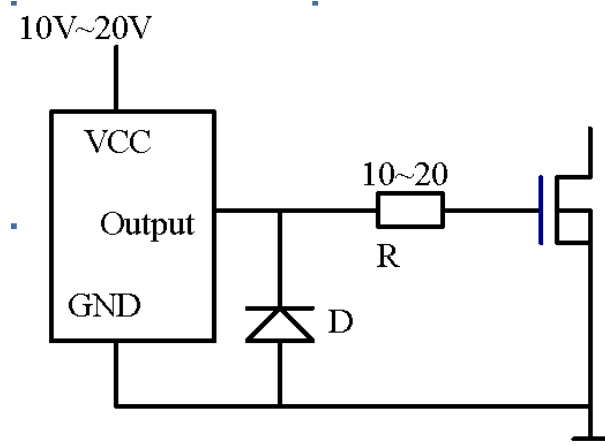
Peak Current (I_s) is Determined By The Formula

$$I_{SMAX} = \frac{1.0V}{RS}$$

取样电压经误差放大器放大后，送至电流传感比较器转换成电流方式控制脉宽。另外，电流传感比较器起着过电流保护作用，最大输出电流 $I_{max} = (N \cdot 1V) / R_s$ ，N 为变压器初级匝数之比。

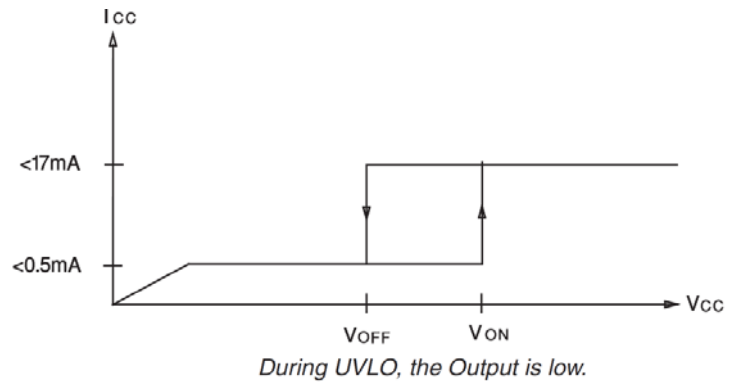
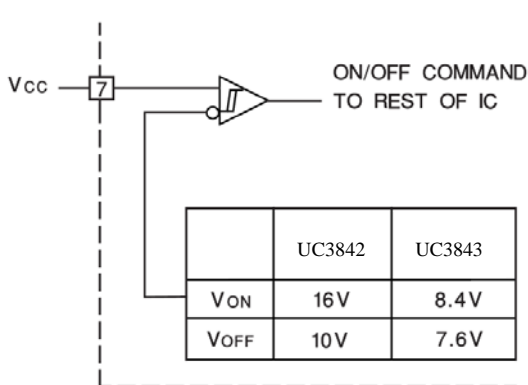


4. 推挽输出



UC3843脉冲方波能直接驱动场效应管，它具有 $\pm 1A$ 峰值的驱动电流。

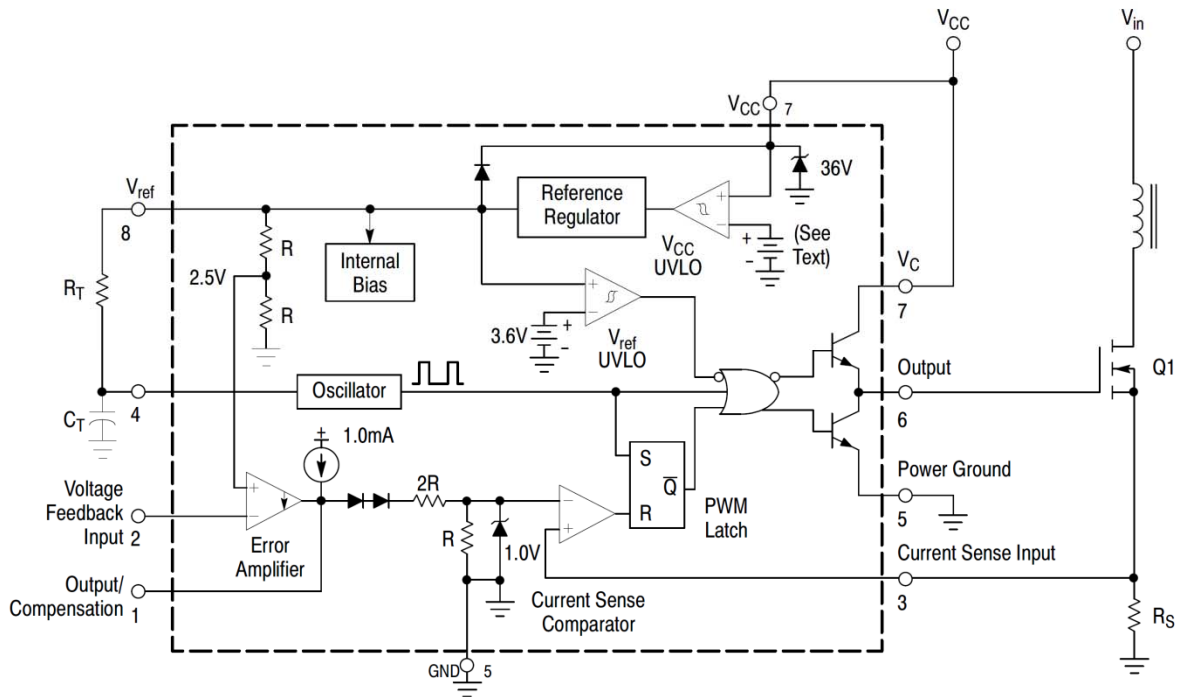
5. 欠电压锁定电路



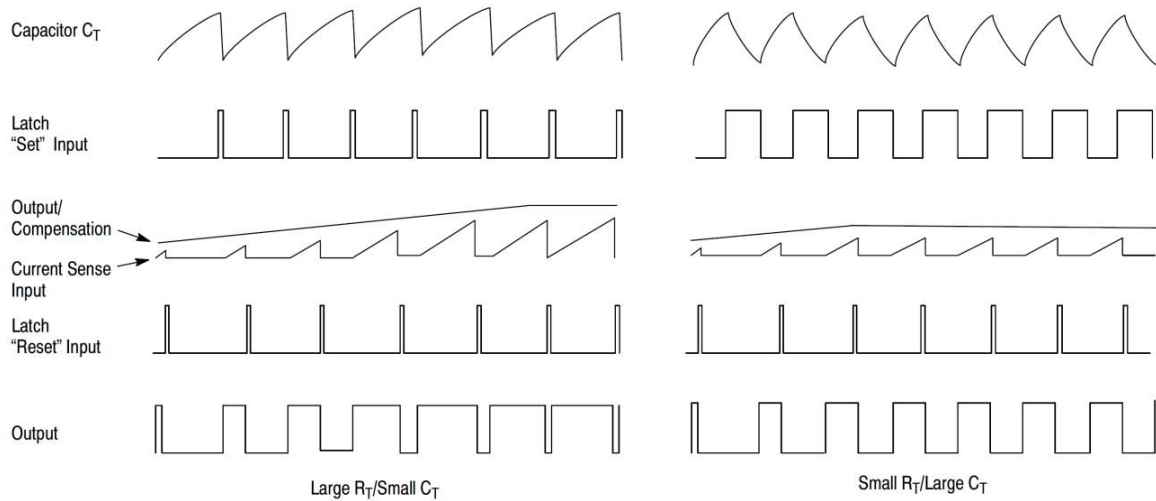
UC3843内有欠电压锁定电路 (UVLO)，启动电压、关断电压小于 10V，这样能使开关电源工作稳定，不受电网波动的影响，另外内部采用 5V 能隙基准电源，非常精确和稳定。



6. 典型工作框图

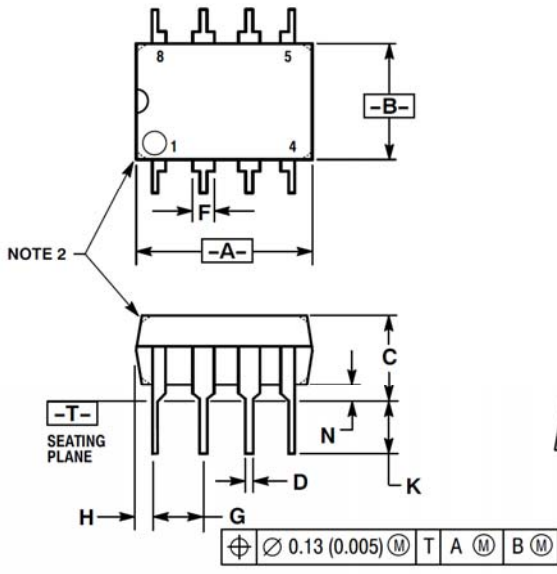


时序图





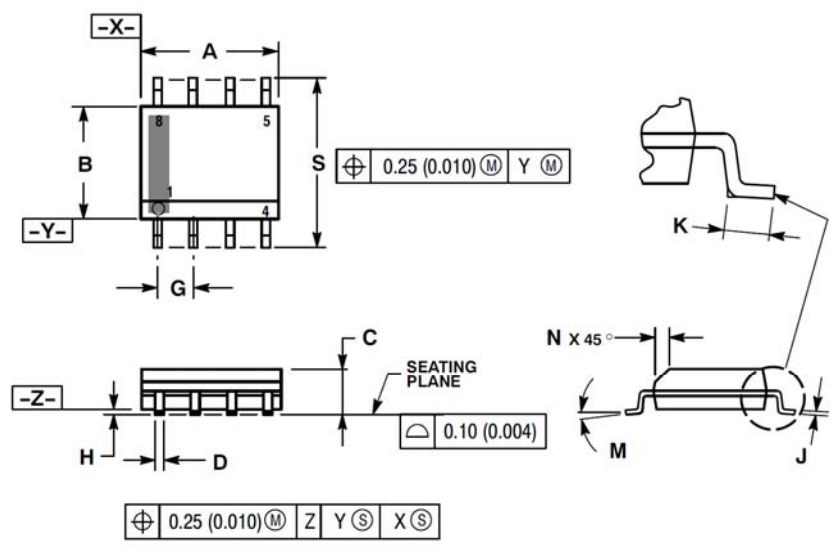
封装信息



DIP8

- NOTES:
1. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
 2. PACKAGE CONTOUR OPTIONAL (ROUND OR SQUARE CORNERS).
 3. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.40	10.16	0.370	0.400
B	6.10	6.60	0.240	0.260
C	3.94	4.45	0.155	0.175
D	0.38	0.51	0.015	0.020
F	1.02	1.78	0.040	0.070
G	2.54 BSC		0.100 BSC	
H	0.76	1.27	0.030	0.050
J	0.20	0.30	0.008	0.012
K	2.92	3.43	0.115	0.135
L	7.62 BSC		0.300 BSC	
M	---	10°	---	10°
N	0.76	1.01	0.030	0.040



SOP8

- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: MILLIMETER.
 3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
 4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
 5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.
 6. 751-01 THRU 751-06 ARE OBSOLETE. NEW STANDARD IS 751-07.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.197
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.053	0.069
D	0.33	0.51	0.013	0.020
G	1.27 BSC		0.050 BSC	
H	0.10	0.25	0.004	0.010
J	0.19	0.25	0.007	0.010
K	0.40	1.27	0.016	0.050
M	0°	8°	0°	8°
N	0.25	0.50	0.010	0.020
S	5.80	6.20	0.228	0.244



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