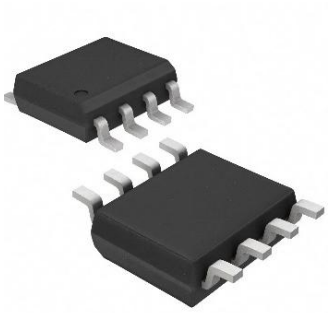
HX33063-S/HX33063-P

概况

HX33063-S/HX33063-P 是一款集成了高度功能性的 DC-DC 转换控制单片集成电路。其内部巧妙地融合了温度自动补偿的带隙基准源、高精度比较器、具备电流限制保护功能的占空比可调节振荡器、驱动晶体管以及能够承受大电流的开关管。通过简单地外接少量元件，这款芯片便能灵活地实现电压的升压、降压甚至负压输出功能，极大地简化了电路设计与实现过程。



SOP-8

特点

工作电压 3V-40V；

静态功耗低；

输出开关电流 1.5A；

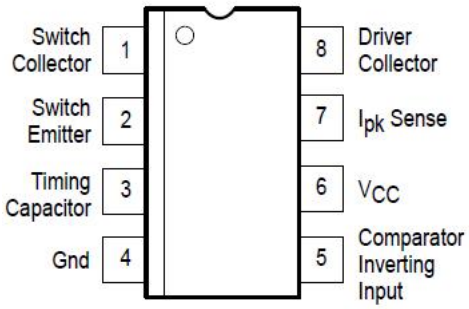
输出电压可调；

工作频率达 100KHz；

精密基准精度 2%。

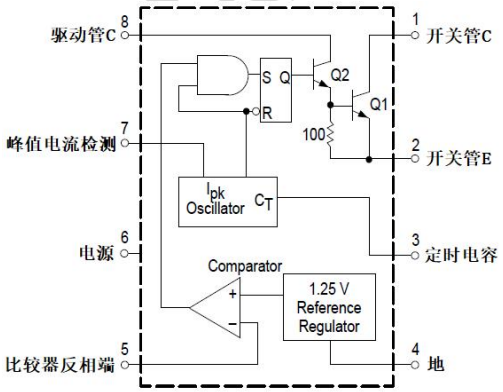
DIP-8

引脚排列、逻辑框图



(Top View)

引脚排列



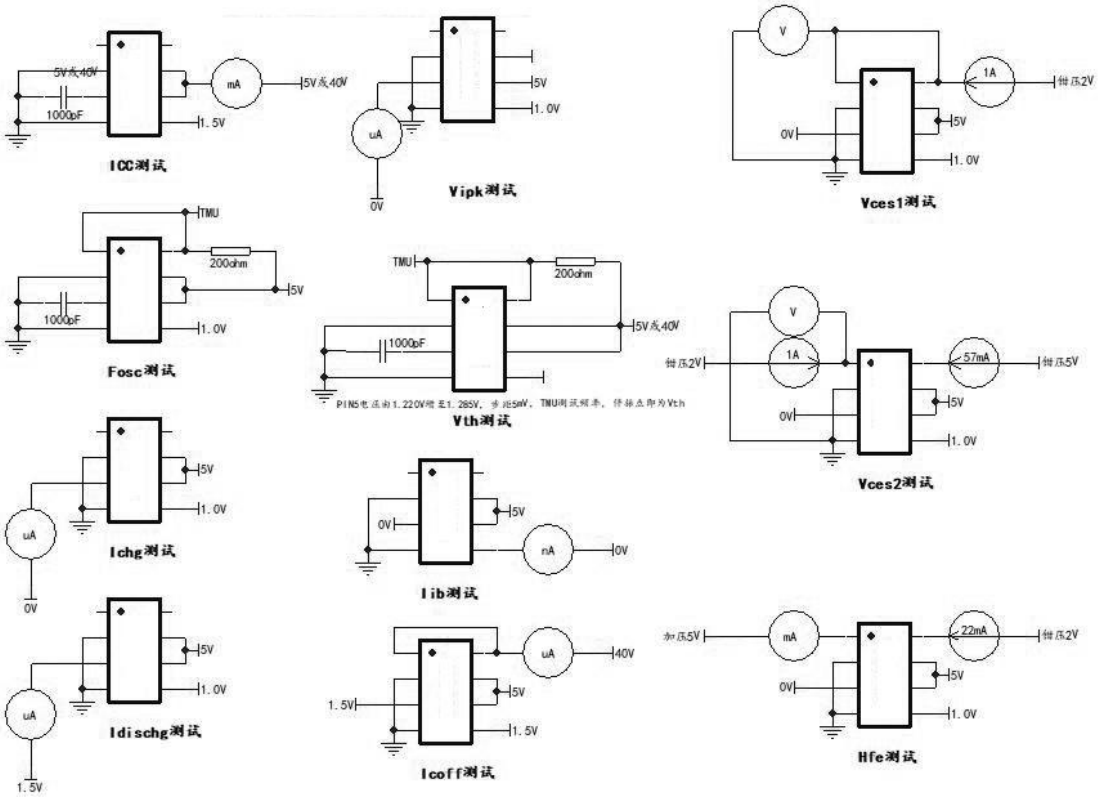
逻辑框图

Part Number	Package Type	Package	quantity
HX33063-S	SOP-8	Taping	2500
HX33063-P	DIP-8	Taping	1000

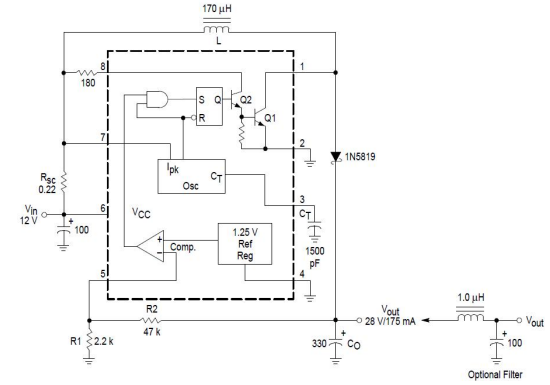
电参数表（TA=25℃, 除另有规定外）					
参数名称及符号	测试条件	最小值	典型值	最大值	单位
接触测试 OS (7 个测试数据)	PIN4 接 GND；PIN1-3、5-8 分别施加 -100uA 测压，钳压-2V	-0.8	-0.55	-0.3	V
静态电源电流 ICC (2 个测试数据)	参照测试线路	1	2.5	4	mA
振荡频率 FOSC (1 个测试数据)	参照测试线路	24	33	42	KHz
充电电流 ICHG (1 个测试数据)	参照测试线路	24	35	42	uA
放电电流 IDISCHG (1 个测试数据)	参照测试线路	140	220	260	uA
充放电比 K (1 个测试数据)	VCC=5V 的 IDISCHG/ICHG	5.2	6.5	7.5	
峰值电流检测 VIPK (1 个测试数据)	参照测试线路	250	300	350	mV
阈值电压 VTH1 (1 个测试数据)	VCC=5V，参照测试线路	1.225	1.250	1.275	V
阈值电压 VTH2 (1 个测试数据)	VCC=40V，参照测试线路	1.230	1.255	1.280	V
偏置电流 IIB (1 个测试数据)	参照测试线路	0	-20	-400	nA
关断电流 ICOFF (1 个测试数据)	参照测试线路	0	0.01	5	uA
饱和压降 VCES1 (1 个测试数据)	参照测试线路	0.7	1	1.3	V
饱和压降 VCES2 (1 个测试数据)	参照测试线路	0.2	0.45	0.7	V
开关增益 HFE (1 个测试数据)	参照测试线路，测试值单位为 mA HFE =测试值/(22mA-7mA)	50	75		

电参数测试原理

PIN7 电压 4.760V 或至 4.640V，步距-nV，监测充电电流增大至（Iohq+Idisohq）/2 以上，停止 5V-相应的 PIN7 电压，即为 Vipk

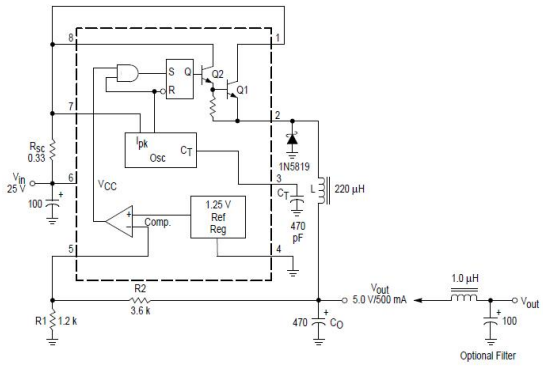


典型应用



Test	Conditions	Results
Line Regulation	V_{in} = 8.0 V to 16 V, I_O = 175 mA	30 mV = ±0.05%
Load Regulation	V_{in} = 12 V, I_O = 75 mA to 175 mA	10 mV = ±0.017%
Output Ripple	V_{in} = 12 V, I_O = 175 mA	400 mVpp
Efficiency	V_{in} = 12 V, I_O = 175 mA	87.7%
Output Ripple With Optional Filter	V_{in} = 12 V, I_O = 175 mA	40 mVpp

升压应用



Test	Conditions	Results
Line Regulation	V_{in} = 15 V to 25 V, I_O = 500 mA	12 mV = ±0.12%
Load Regulation	V_{in} = 25 V, I_O = 50 mA to 500 mA	3.0 mV = ±0.03%
Output Ripple	V_{in} = 25 V, I_O = 500 mA	120 mVpp
Short Circuit Current	V_{in} = 25 V, R_L = 0.1 Ω	1.1 A
Efficiency	V_{in} = 25 V, I_O = 500 mA	83.7%
Output Ripple With Optional Filter	V_{in} = 25 V, I_O = 500 mA	40 mVpp

降压应用

外围元件计算

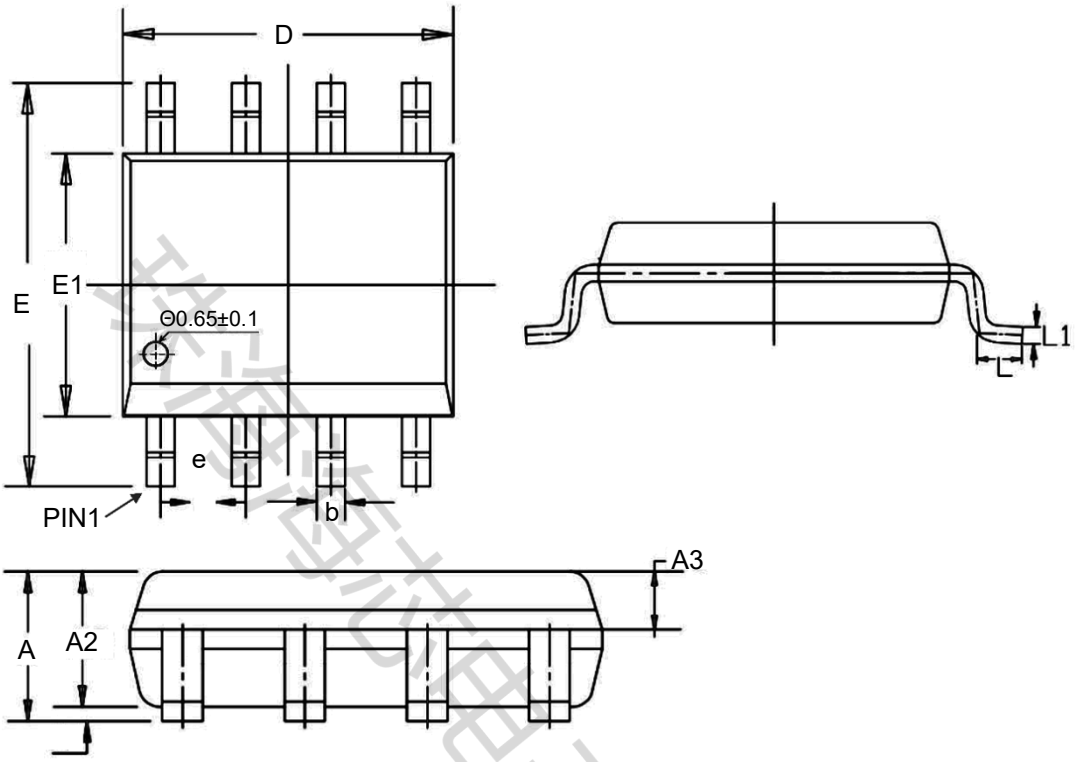
Calculation	Step–Up	Step–Down	Voltage–Inverting
t_{on}/t_{off}	$\frac{V_{out} + V_F - V_{in(min)}}{V_{in(min)} - V_{sat}}$	$\frac{V_{out} + V_F}{V_{in(min)} - V_{sat} - V_{out}}$	$\frac{\lvert V_{out}\rvert + V_F}{V_{in} - V_{sat}}$
$(t_{on} + t_{off})$	$\frac{1}{f}$	$\frac{1}{f}$	$\frac{1}{f}$
t_{off}	$\frac{t_{on} + t_{off}}{\frac{t_{on}}{t_{off}} + 1}$	$\frac{t_{on} + t_{off}}{\frac{t_{on}}{t_{off}} + 1}$	$\frac{t_{on} + t_{off}}{\frac{t_{on}}{t_{off}} + 1}$
t_{on}	$(t_{on} + t_{off}) - t_{off}$	$(t_{on} + t_{off}) - t_{off}$	$(t_{on} + t_{off}) - t_{off}$
C_T	$4.0 \times 10^{-5}\, t_{on}$	$4.0 \times 10^{-5}\, t_{on}$	$4.0 \times 10^{-5}\, t_{on}$
$I_{pk(switch)}$	$2I_{out(max)}\left(\frac{t_{on}}{t_{off}} + 1\right)$	$2I_{out(max)}$	$2I_{out(max)}\left(\frac{t_{on}}{t_{off}} + 1\right)$
R_{sc}	$0.3/I_{pk(switch)}$	$0.3/I_{pk(switch)}$	$0.3/I_{pk(switch)}$
$L_{(min)}$	$\left(\frac{(V_{in(min)} - V_{sat})}{I_{pk(switch)}}\right) t_{on(max)}$	$\left(\frac{(V_{in(min)} - V_{sat} - V_{out})}{I_{pk(switch)}}\right) t_{on(max)}$	$\left(\frac{(V_{in(min)} - V_{sat})}{I_{pk(switch)}}\right) t_{on(max)}$
C_O	$9\,\frac{I_{out}t_{on}}{V_{ripple(pp)}}$	$\frac{I_{pk(switch)}(t_{on} + t_{off})}{8V_{ripple(pp)}}$	$9\,\frac{I_{out}t_{on}}{V_{ripple(pp)}}$

V_{sat} = Saturation voltage of the output switch.
V_F = Forward voltage drop of the output rectifier.

The following power supply characteristics must be chosen:

V_{in} – Nominal input voltage.
V_{out} – Desired output voltage, $\lvert V_{out}\rvert = 1.25\left(1 + \frac{R2}{R1}\right)$
I_{out} – Desired output current.
f_{min} – Minimum desired output switching frequency at the selected values of V_{in} and I_O.
$V_{ripple(pp)}$ – Desired peak–to–peak output ripple voltage. In practice, the calculated capacitor value will need to be increased due to its equivalent series resistance and board layout. The ripple voltage should be kept to a low value since it will directly affect the line and load regulation.

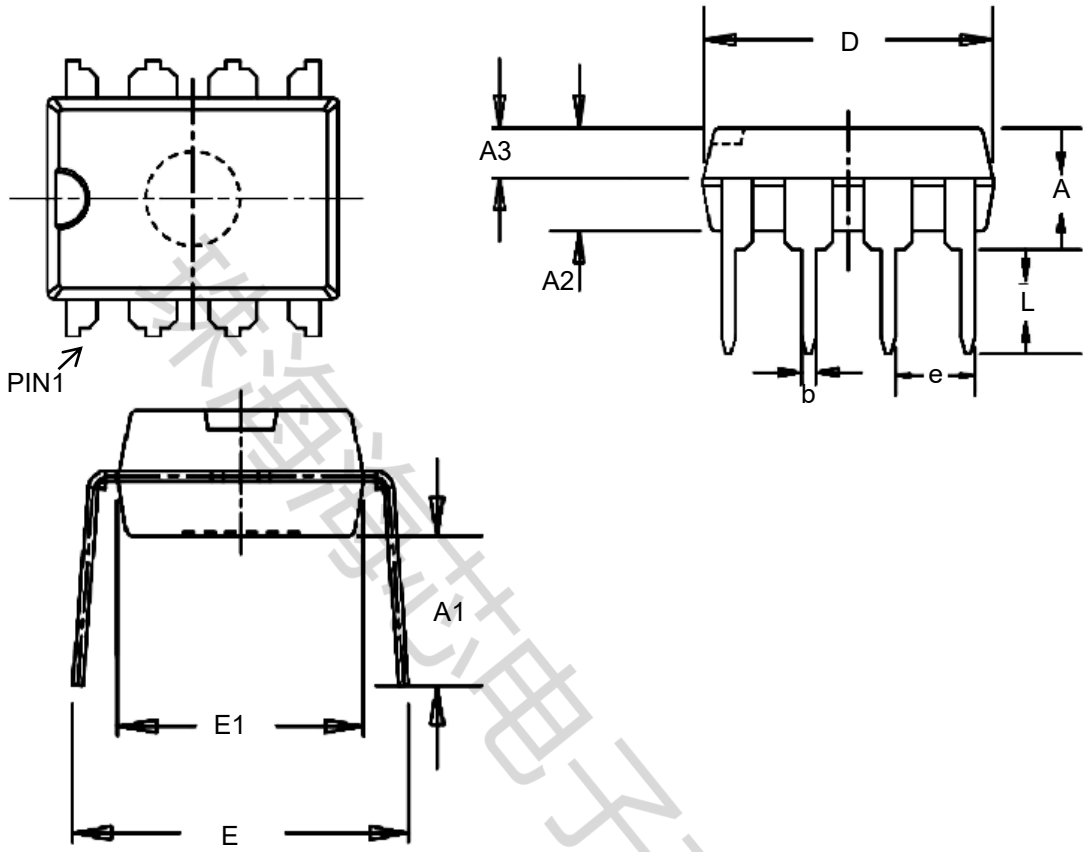
DIMENSIONAL DRAWINGS



SOP-8

UNIT:mm

	MIN	NOM	MAX
A	1.450	1.550	1.650
A1	0.100	0.150	0.200
A2	1.300	1.400	1.500
A3	0.600	0.650	0.700
b	0.380		0.510
e	1.240	1.270	1.300
D	4.800	4.900	5.000
E	5.800	6.000	6.200
E1	3.800	3.900	4.000
L	0.450	0.600	0.750
L1		0.25BSC	



DIP-8

UNIT:mm

	MIN	NOM	MAX
A	3.600	3.800	4.000
A1	3.786	3.886	3.986
A2	3.200	3.300	3.400
A3	1.550	1.600	1.650
b	0.440		0.490
e	2.510	2.540	2.570
D	9.150	9.250	9.350
E	7.800	8.500	9.200
E1	6.280	6.380	6.480
L	3.000		