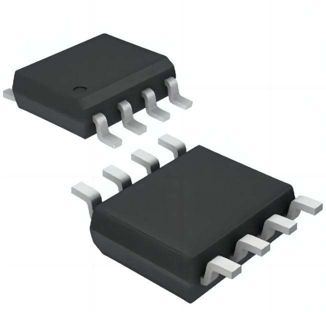
HX34063-S/HX34063-P

Overview

HX34063-S/HX34063-P is a highly functional DC-DC conversion control single-chip integrated circuit. It cleverly integrates a bandgap reference source with temperature automatic compensation, a high-precision comparator, a duty cycle adjustable oscillator with current limiting protection function, a driving transistor, and a switch tube capable of withstanding high currents. By simply connecting a small number of external components, this chip can flexibly achieve voltage boost, buck, and even negative pressure output functions, greatly simplifying the circuit design and implementation process.



SOP-8

DIP-8

Characteristic

working voltage 3V-40V;

Low static power consumption;

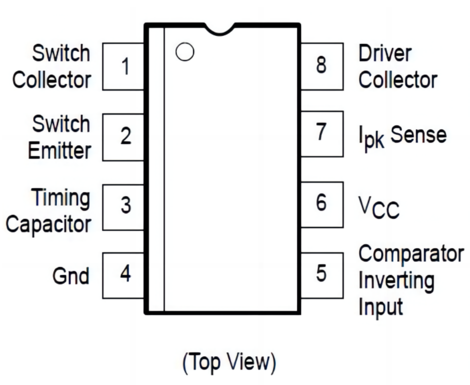
Output switch current 1.5A;

Adjustable output voltage;

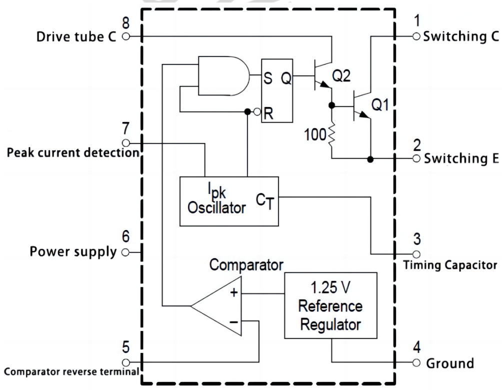
Working frequency reaches 100KHz;

Precision benchmark accuracy 2%。

Pin arrangement and logic diagram



Pin arrangement



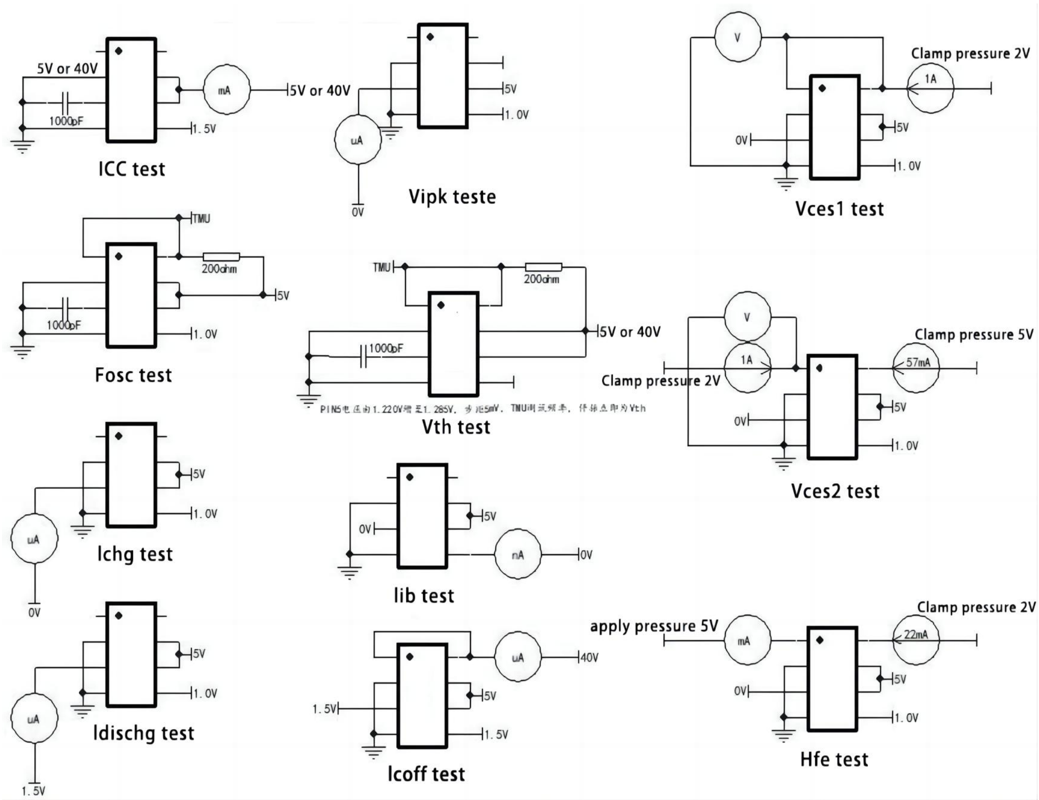
logic diagram

Part Number	Package Type	Package	quantity
HX34063-S	SOP-8	Taping	2500
HX34063-P	DIP-8	Taping	1000

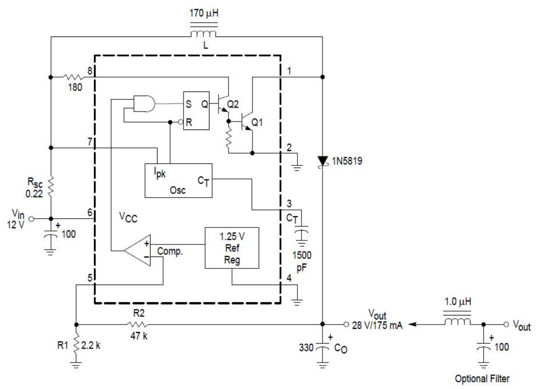
Electrical parameter table (TA=25 ℃, unless otherwise specified)					
Parameter names and symbols	Test conditions	Min	TYP	Max	Unit
Contact testing OS (7 test data)	PIN4 connected to GND; Apply a pressure of -100uA to PIN1-3 and 5-8 respectively, with a clamp pressure of -2V	-0.8	-0.55	-0.3	V
Static power supply current ICC (2 test data)	Refer to the test circuit	1	2.5	4	mA
Frequency FOSC (1 test data)	Refer to the test circuit	24	33	42	KHz
Charging current ICHG (1 test data)	Refer to the test circuit	24	35	42	uA
Discharge Current IDISCHG (1 test data)	Refer to the test circuit	140	220	260	uA
Charge discharge ratio K (1 test data)	VCC=5V 的 IDISCHG/ICHG	5.2	6.5	7.5	
Peak current detection VIPK (1 test data)	Refer to the test circuit	250	300	350	mV
threshold voltage VTH1 (1 test data)	VCC=5V，Refer to the test circuit	1.225	1.250	1.275	V
threshold voltage VTH2 (1 test data)	VCC=40V，Refer to the test circuit	1.230	1.255	1.280	V
bias current IIB (1 test data)	Refer to the test circuit	0	-20	-400	nA
turn-off current ICOFF (1 test data)	Refer to the test circuit	0	0.01	5	uA
saturation voltage VCES1 (1 test data)	Refer to the test circuit	0.7	1	1.3	V
saturation voltage VCES2 (1 test data)	Refer to the test circuit	0.2	0.45	0.7	V
on-off gain HFE (1 test data)	Refer to the test circuit，The unit of test value is mA HFE =test value/(22mA-7mA)	50	75		

Principles of Electrical Parameter Testing

PIN7 voltage is 4.760V or up to 4.640V, with a step size of - nV. Monitor the charging current to increase to (loHg+ldisaHg)/2 or above, and stop 5V - the corresponding PIN7 voltage, which is Vipk

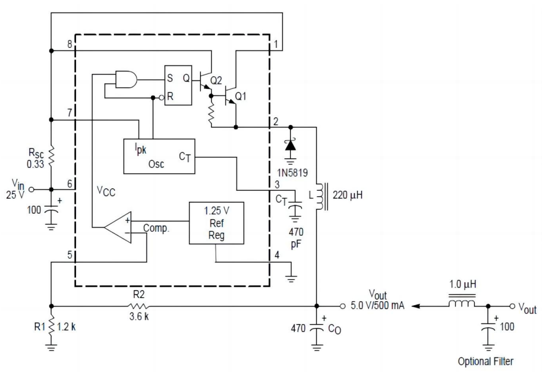


Typical applications



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

Boost application



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

Voltage reducing application

Peripheral component calculation

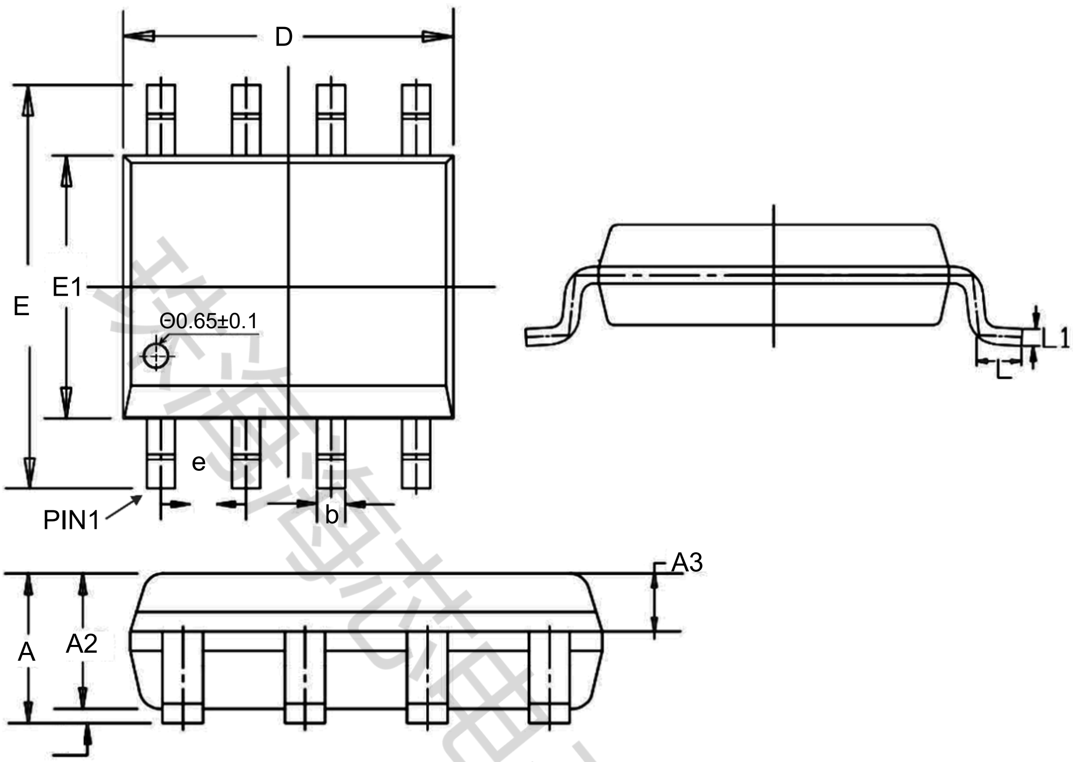
Calculation	Step–Up	Step–Down	Voltage–Inverting
t_{on}/t_{off}	$\frac{V_{out} + V_F - V_{in(min)}}{V_{in(min)} - V_{sat}}$	$\frac{V_{out} + V_F}{V_{in(min)} - V_{sat} - V_{out}}$	$\frac{\lvert V_{out}\rvert + V_F}{V_{in} - V_{sat}}$
$(t_{on} + t_{off})$	$\frac{1}{f}$	$\frac{1}{f}$	$\frac{1}{f}$
t_{off}	$\frac{t_{on} + t_{off}}{\frac{t_{on}}{t_{off}} + 1}$	$\frac{t_{on} + t_{off}}{\frac{t_{on}}{t_{off}} + 1}$	$\frac{t_{on} + t_{off}}{\frac{t_{on}}{t_{off}} + 1}$
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.

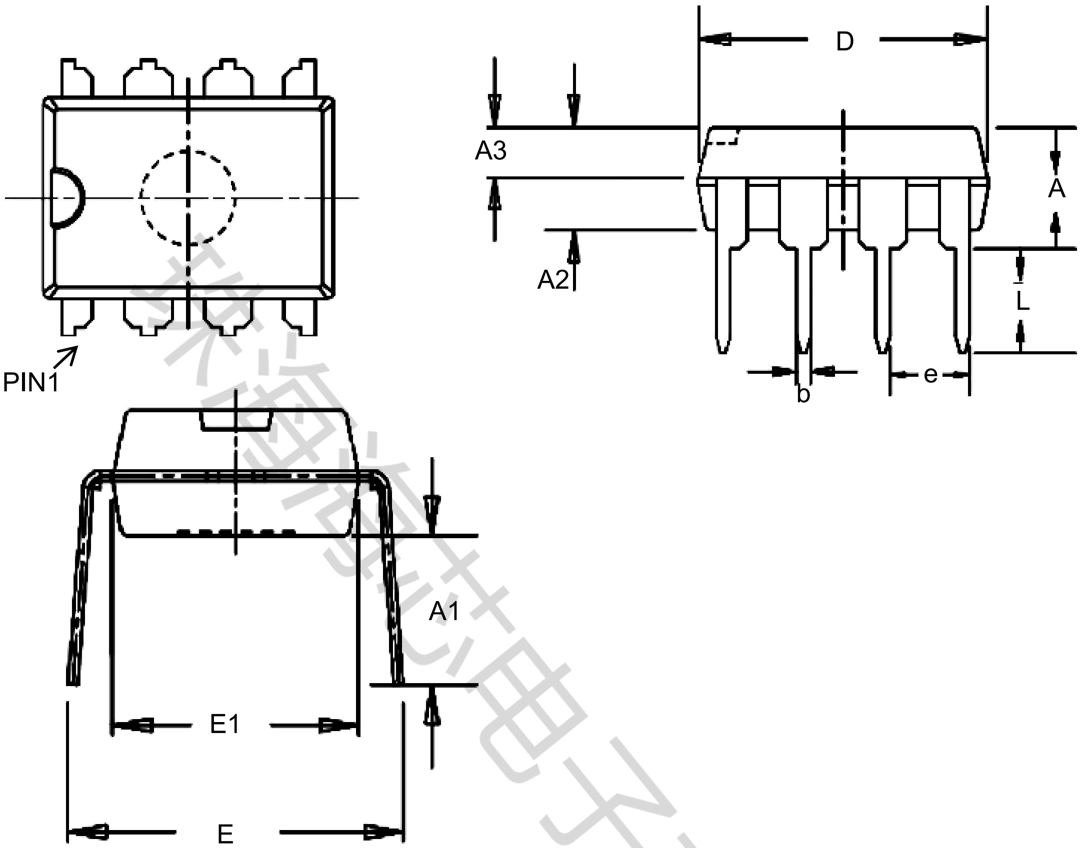
DIMENSIONAL DRAWINGS



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		