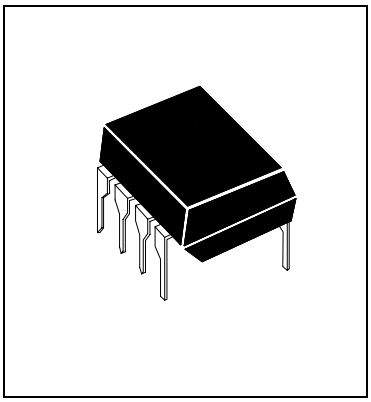
H34063AP

DC-TO-DC CONVERTER INTEGRATE CIRCUIT DEVICES



Description

The H34063AP Series is a monolithic control circuit containing the primary functions required for DC-to-DC converters. These devices consist of an internal temperature compensated reference, comparator, controlled duty cycle oscillator with an active current limit circuit, driver and high current output switch. This series was specifically by Hi-Sincerity Microelectronics Corp.

Features

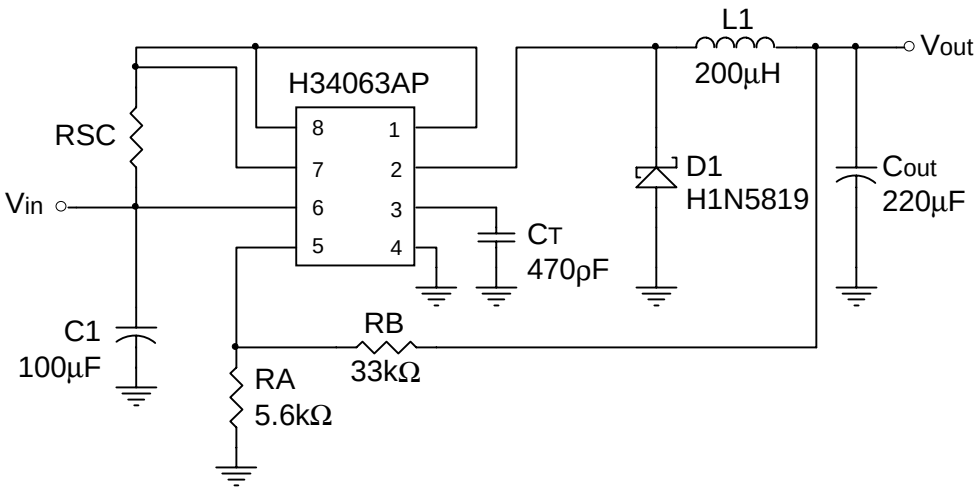
- 3V to 40V Input Voltage Operation
- Internal 1.6A Peak Current Switch
- Internal ±1.8% Reference
- Low Quiescent Current at 1.6mA
- Frequency Operation from 100Hz~100KHz
- Current Limiting

Applications

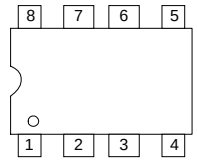
- Saver for Cellular Phone
- DC-DC Converter Module

Typical Application Circuit

Fig1.Saver Circuit for Cellular Phone



Pin Connections



Pin1:Switch Collector	Pin5:Comparator Inverting Input
Pin2:Switch Emitter	Pin6:Vcc
Pin3:Timing Capacitor	Pin7:Ipk Sense
Pin4:Gnd	Pin8:Driver Collector

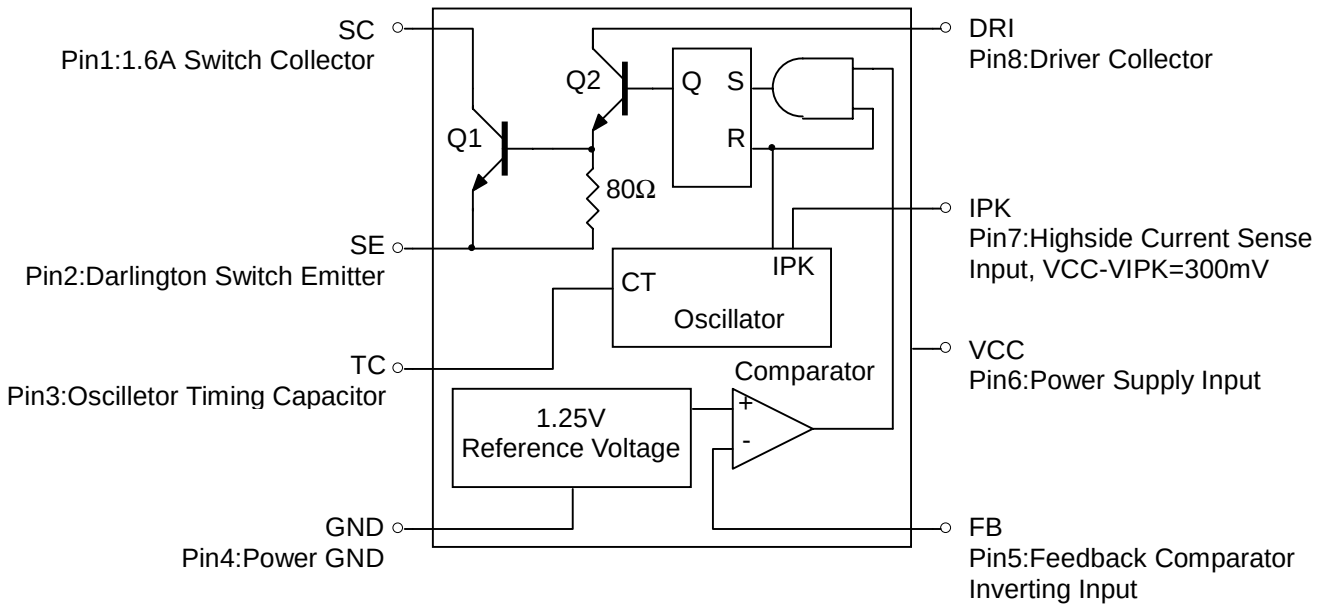
Absolute Maxium Rating

Supply Voltage ..... 40 V
Comparator Input Voltage Range ..... -0.3V ~ 40 V
Switch Collector Voltage ..... 40 V
Switch Emitter Voltage ..... 40 V
Switch Collector to Emitter Voltage ..... 40 V
Driver Collector Voltage ..... 40 V
Switch Current ..... 1.6 A
Power Dissipation DIP Package Ta=25°C ..... 1.0 W
Thermal Resistance Junction To Air..... 125 °C / W
Operating Junction Temperature..... 125 °C
Operating Ambient Temperature Range ..... 0 ~ 70 °C
Storage Temperature Range..... -40 °C ~ 125 °C

Electrical Characteristics (Vcc=5V,Ta=25°C, unless otherwise specified)

Parameter	Test Condition	Symbol	Min.	Typ.	Max.	Unit
Oscillator						
Charging Current	5.0V≤V_{CC}≤40V	I_{chg}	24	35	42	uA
Discharge Current	5.0V≤V_{CC}≤40V	I_{dischg}	140	220	260	uA
Voltage Amplitude	Pin3	V_{OSC}	-	0.6	-	V
Discharge to Charge Current Ratio	$V_{IPK(Sense)}$ =V_{CC}	I_{Dischg}/I_{chg}	5.2	6.5	7.5	
Current Limit Sense Voltage	I_{Chg}=I_{dischg}	$V_{IPK(Sence)}$	250	300	350	mV
Output Switch						
Saturation Voltage, Darlington Connection	I_{SW}=1.0A, $V_{C(Driver)}$=VC(Switch)	$V_{CE(Sat)}$	-	1.0	1.3	V
Saturation Voltage	I_{SW}=1.0A, $I_{C(Driver)}$=50mA (Forced β ≈ 20)	$V_{CE(Sat)}$	-	0.4	0.7	V
DC Current Gain	I_{SW}=1.0A, V_{CE}=5.0V	hFE	50	75	-	V
Collector Off-State Current	V_{CE}=30V	$I_{CC(Off)}$	-	0.01	100	UA
Comparator						
Threshold Voltage Threshold Voltage	0°C≤Ta≤70°C	V_{FB}	1.227 1.210	1.250 -	1.273 1.29	V
Threshold Voltage Line Regulation	3.0V≤V_{CC}≤40V	Regline	-	1.5	6	mV
Input Bias Current	V_{IN}=0V	I_{IB}	-	-20	-400	nA
Supply Current	$V_{IPK(Sence)}$=V_{CC} V_{Pin5}>V_{FB}, 5.0V≤V_{CC}≤40V C_T=0.0001uF,Pin2=Gnd Remaining pins open	I_{CC}	-	1.6	3	mA

Block Diagram



Application Information

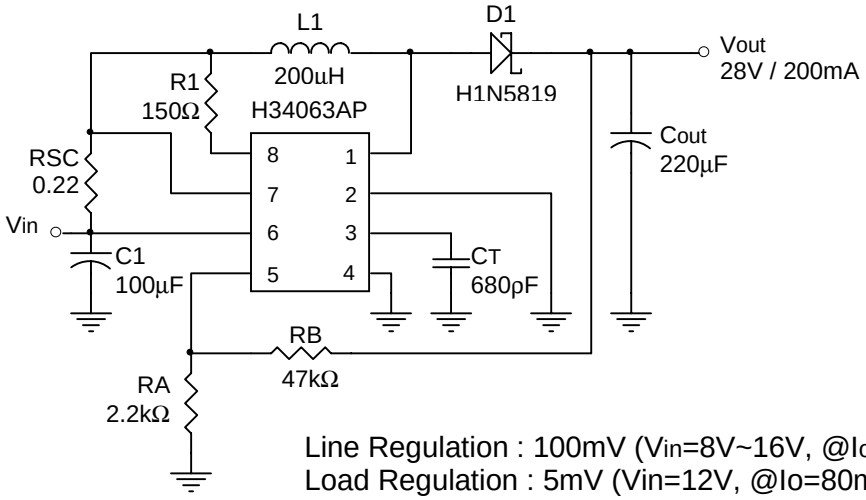
Design Formula Table

Calculation	Step-Down	Step-Up	Voltage-Inverting
t_{on} / t_{off}	$V_{out}+V_F$ / $V_{in(min)}$ -V_{sat}-V_{Out}	$V_{out}+V_F$-$V_{in(min)}$ / $V_{in(min)}$-V_{sat}	$\|V_{out}\|$ + V_F / V_{in}-V_{sat}
(t_{on} + t_{off}) max	1/F_{min}	1/F_{min}	1/F_{min}
C_T	$4*10^{-5}t_{on}$	$4*10^{-5}t_{on}$	$4*10^{-5}t_{on}$
$I_{C(switch)}$	$2*I_{out(max)}$	$2*I_{out(max)}(t_{on}+t_{off}/t_{off})$	$2*I_{out(max)}(t_{on}+t_{off}/t_{off})$
RS	0.3 / $I_{C(switch)}$	0.3 / $I_{C(switch)}$	0.3 / $I_{C(switch)}$
$L_{(min)}$	($V_{in(min)}$-V_{sat}-V_{out} / $I_{C(switch)}$) *$t_{on(max)}$	($V_{in(min)}$-V_{sat} / $I_{C(switch)}$) *$t_{on(max)}$	($V_{in(min)}$-V_{sat}/ $I_{C(switch)}$) *$t_{on(max)}$
C_O	$I_{C(switch)}$*(t_{on}+t_{off}) / 8$V_{Ripple(P-P)}$	I_{out}*t_{on} / $V_{Ripple(P-P)}$	I_{out}*t_{on} / $V_{Ripple(P-P)}$

V_{sat} : Saturation voltage of the output switch.
V_F : Forward voltage drop of the ringback rectifier.
The following power supply characteristics must be chosen :
V_{in} : Nominal input voltage.
V_{out} : Desired output voltage. $|V_{out}|$=1.25*(1+RB/RA)
I_{out}- Desired output current
Fmin : Minimum desired output switching frequency at the selected values for V_{in} and I_{out}.
$V_{Ripple(P-P)}$: Desired peak to peak output ripple voltage in practice, the calculated value will need to be increased due to the capacitor equivalent series resistance and board layout. The ripple voltage should be kept to a low value since it will directly effect the line and load regulation.

Application Information (Continuos)

Fig.2 Step-Up Converter



Line Regulation : 100mV (V_{in}=8V~16V, @I_o=200mA)
Load Regulation : 5mV (Vin=12V, @Io=80mA~200mA)

Fig.3 Step-Up Converter With External NPN Switch

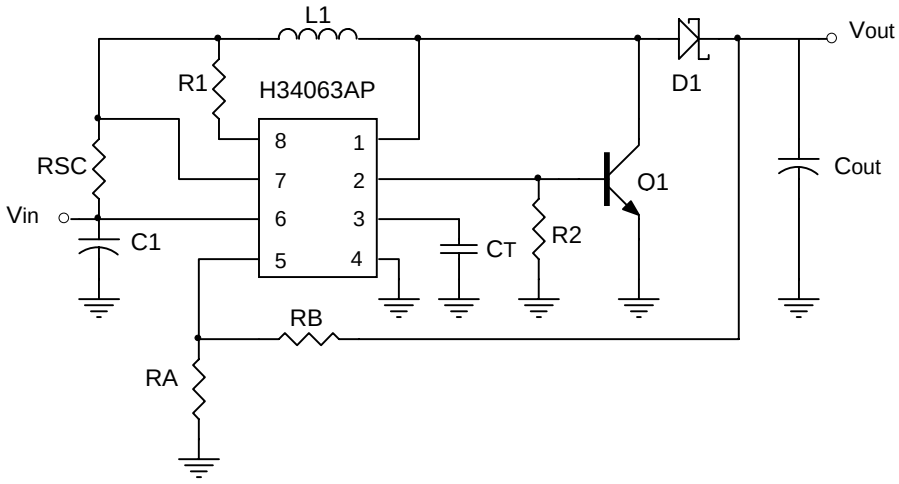
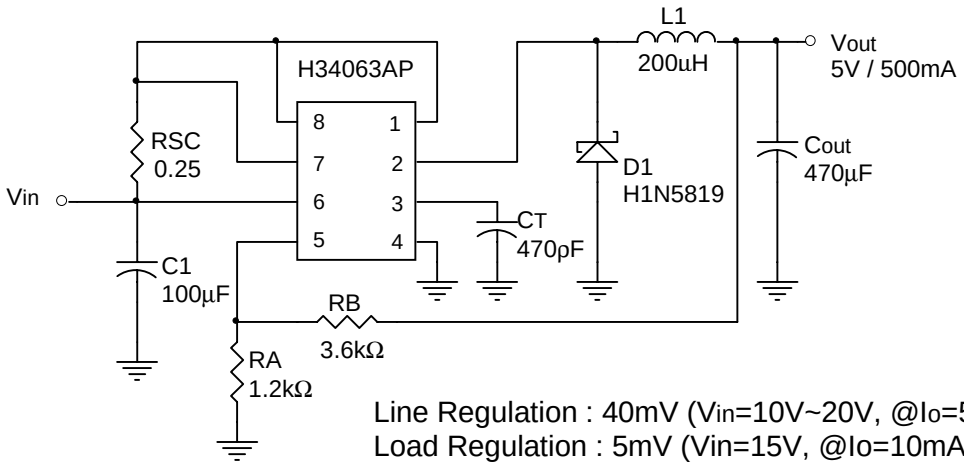


Fig.4 Step-Down Converter



Line Regulation : 40mV (V_{in}=10V~20V, @I_o=500mA)
Load Regulation : 5mV (Vin=15V, @Io=10mA~500mA)
Short Circuit Current : 1.3A (Vin=15V, @RL=0.1Ω

Fig.5 Step-Down Converter With External PNP Saturation Switch

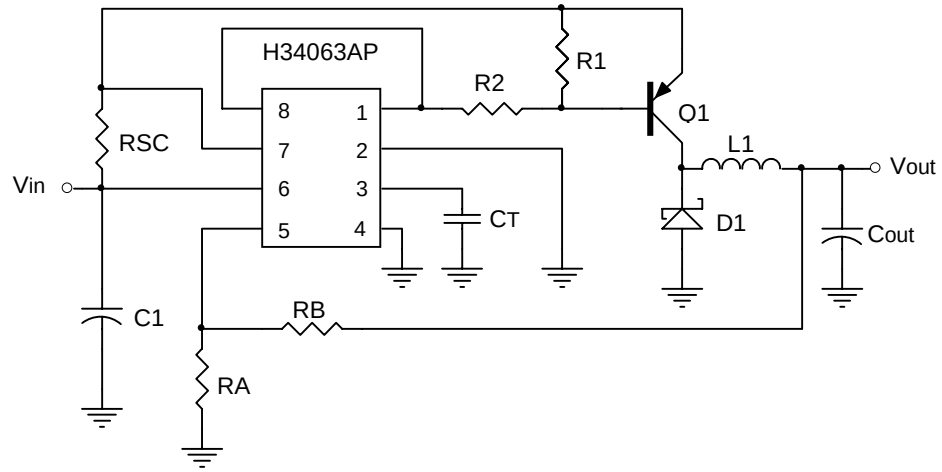
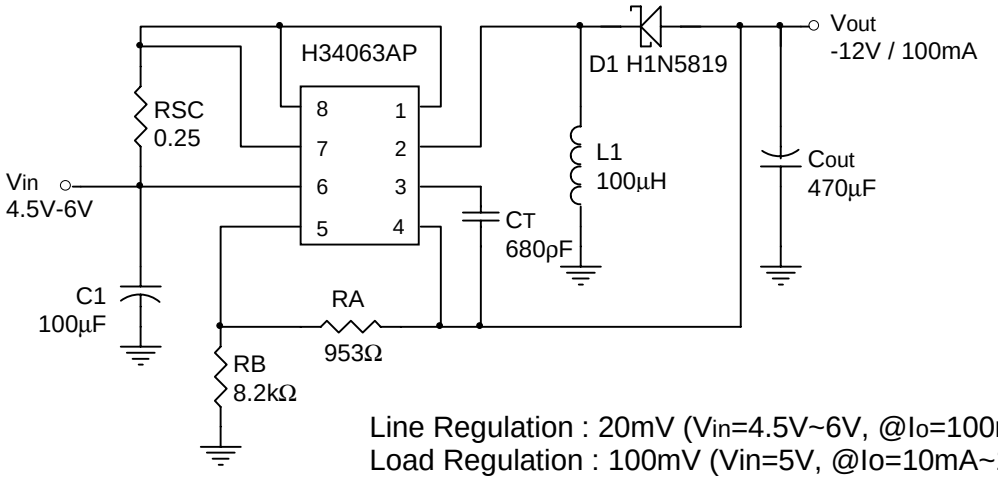
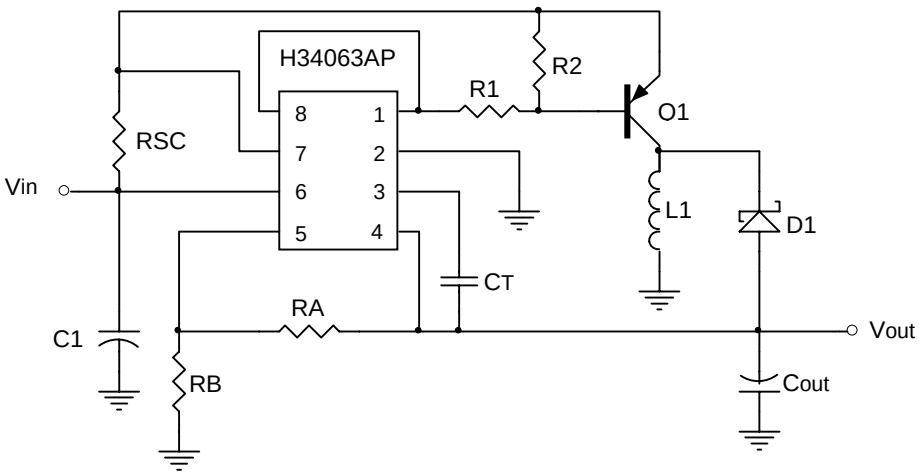


Fig.6 Voltage Inverting Converter

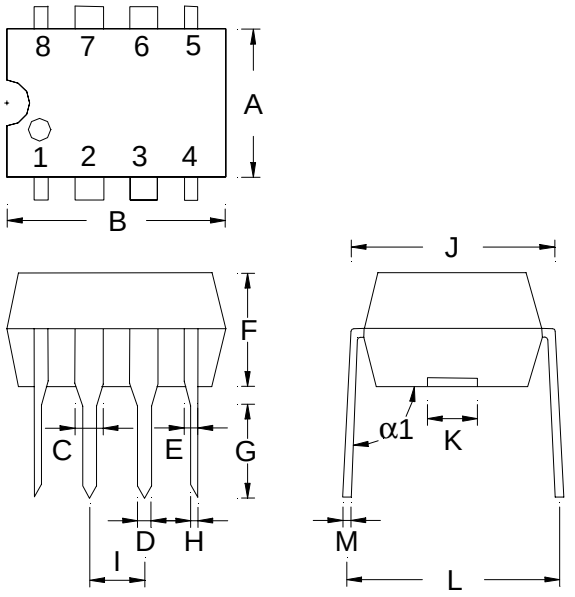


Line Regulation : 20mV (V_{in}=4.5V~6V, @I_o=100mA)
Load Regulation : 100mV (Vin=5V, @Io=10mA~100mA)

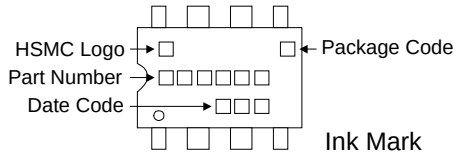
Fig.7 Voltage Inverting Converter With External PNP Saturation Switch



DIP-8P Dimension



Marking :



DIP-8P Plastic Package
HSMC Package Code : P

*:Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.2480	0.2520	6.29	6.40	H	0.0150	0.0210	0.38	0.53
B	0.3630	0.3670	9.22	9.32	I	0.0898	0.1098	2.28	2.79
C	-	*0.0600	-	*1.52	J	0.2950	0.3050	7.49	7.74
D	-	*0.0500	-	*1.27	K	-	*0.1181	-	*3.00
E	-	*0.0390	-	*0.99	L	0.3370	0.7470	8.56	8.81
F	0.1280	0.1320	3.25	3.35	M	0.0090	0.0150	0.229	0.381
G	0.1250	0.1400	3.17	3.55	α1	94°	97°	94°	97°

Notes : 1.Dimension and tolerance based on our Spec. dated Sep. 07,1997.
2.Controlling dimension : millimeters.
3.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
4.If there is any question with packing specification or packing method, please contact your local HSMC sales office.

Material :

- Lead : 42 Alloy ; solder plating
- Mold Compound : Epoxy resin family, flammability solid burning class:UL94V-0

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