0.8A Step Down / Step Up / Inverting DC-DC Converter MC34063C

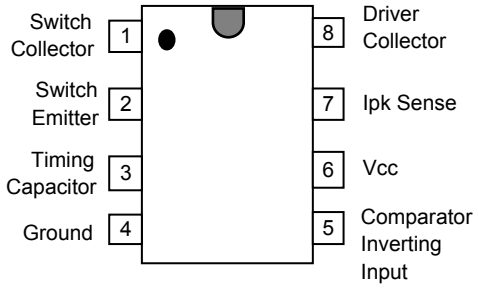
FEATURES

- Operating From 3V To 40V
- Low Standby Current
- Current Limitting
- Output Switch Current to 0.8A
- Output Valtage Adjustable
- Operation Frequency up to 180KHz (CT=100pF)
- Precision 2% Reference
- Moisture Sensitivity Level 3

8 SOP/ 8 DIP PIN Configulation

SOP-8 PKG

DIP-8 PKG



Application

- Battery Chargers
- NICs / Switches / Hubs
- ADSL Modems
- Negative Voltage Power Supplies

ORDERING INFORMATION

Device	Package
MC34063CD	SOP-8
MC34063CN	DIP-8

DESCRIPTION

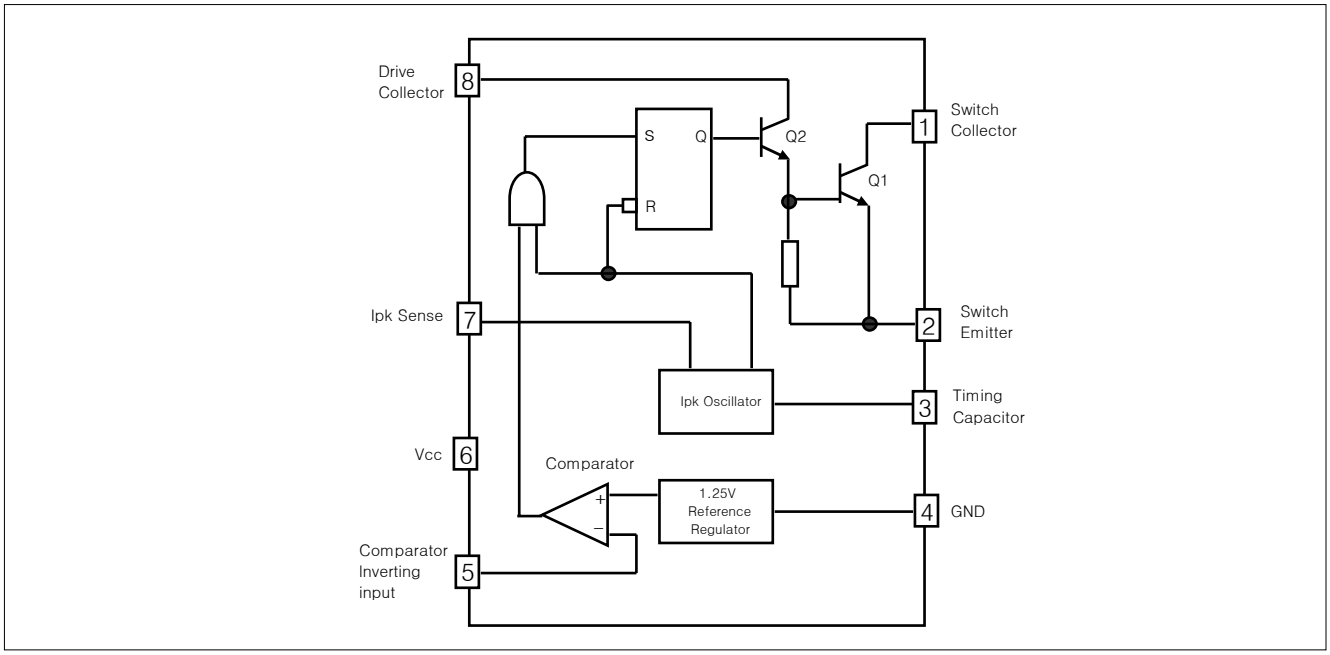
The MC34063C is a monolithic switching regulator control circuit containing the primary funtions required for DC-DC converters.

This device consists of internal temperature compenssated reference, voltage comparator, cotrolled duty cycle duty cycle oscillator with active current. The device is specifically designed to be used in Step-Down, Step-Up and Voltage-Inverting applications with a minimum number of external components.

The MC34063C is the enhanced version of MC34063A with the ability to work in higher frequency.

The 34063C is available in 2 pcakages : SOP-8 and DIP-8.

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS (NOTE 1)

SYMBOL	PARAMETER		VALUE	UNIT
V_{cc}	Power Supply Voltage		40	V
V_{ir}	Comparator input Voltage Range		-0.3 to 40	V
V_{SWC}	Switch Collector Voltage		40	V
V_{SWE}	Switch Emitter Voltage (VSWC=40V)		40	V
V_{CE}	Switch Collector to Emitter Voltage		40	V
V_{dc}	Driver Collector Voltage		40	V
I_{dc}	Driver Collector Current (NOTE 2)		100	mA
I_{sw}	Switch Current		0.8	A
PD	SOP Package	Power Dissipation at T_{amb}=25℃	1.25	W
$P_{\Theta JA}$		Thermal Resistance	100	℃/W
PD	DIP Package	Power Dissipation at T_{amb}=25℃	0.625	W
$P_{\Theta JA}$		Thermal Resistance	160	℃/W
T_J	Operating Juntion Temperature Range		-40 to 150	℃
T_{stg}	Storage Temperature Range		-65 to +150	℃

Absolute Maximum Rating are those values beyond which damage to the device may occur.

Functional operation under these condition is not implied.

ELECTRICAL CHARACTERISTICS(Refer to the test circuits, V_{CC}=5V, T_a= -40℃ to 85℃)

OSCILLATOR

SYMBOL	PARAMETER	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
F_{OSC}	Frequency	V_{pin5}= 0 V ,C_T= 100pF ,T_a= 25°C	170	180	190	KHz
I_{chg}	Charge Current	V_{CC}= 5 to 40V ,T_a= 25°C	30	38	45	μA
I_{dischg}	Discharge Current	V_{CC}= 5 to 40V ,T_a= 25°C	180	240	290	μA
I_{dischg}/I_{chg}	Discharge to Charge Current Ratio	Pin 7= V_{CC} ,T_a= 25°C	5.2	6.5	7.5	
$V_{ipk(sense)}$	Current Limit Sense Voltage	I_{chg}= I_{dischg} ,T_a= 25°C	250	300	350	mV

OUTPUT SWITCH (NOTE 3)

SYMBOL	PARAMETER	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{CE(sat)}$	Saturation Voltage, Darlington connection	I_{SW}= 1A ,Pins 1,8 connected		1	1.3	V
$V_{CE(sat)}$	Saturation Voltage (NOTE 4)	I_{SW}= 1A ,R_{pin8}= 82Ω to V_{CC}, Forced β ~ 20		0.45	0.8	V
h_{FE}	DC Current Gain	I_{SW}= 1A, V_{CE}= 5V, T_a= 25°C	50	75		
$I_{C(off)}$	Collector Off-State Current	V_{CE}= 40V		0.01	100	μA

COMPARATOR

SYMBOL	PARAMETER	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{th}	Threshold Voltage	T_a= 25°C	1.225	1.25	1.275	V
		T_a= T_{LOW} to T_{HIGH}	1.21		1.29	V
Reg_{line}	Threshold Voltage Line Regulation	V_{CC}= 3 to 40V		1.4	5	mV
I_{IB}	Input Bias Current	V_{IN}= 0V		-20	-400	nA

TOTAL DEVICE

SYMBOL	PARAMETER	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CC}	Supply Current	V_{CC}= 5 to 40V, C_T=1nF Pin7= V_{CC} ,V_{pin5}>V_{th}, Pin2=GND Remaining pins open for MC34063C		2.5	4	mA

Notes:

1 Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress retings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

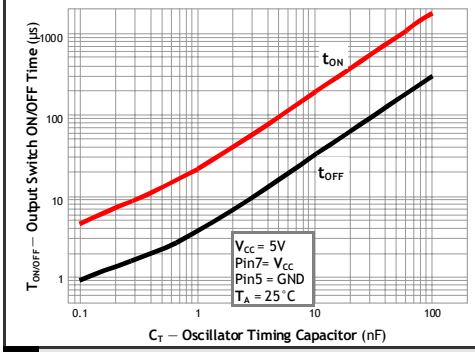
2 Maximum package power dissipation limits must be observed.

3 Low duty cycle pulse technique are used during test to maintain juntion temperature as close to ambient Temperature as possible.

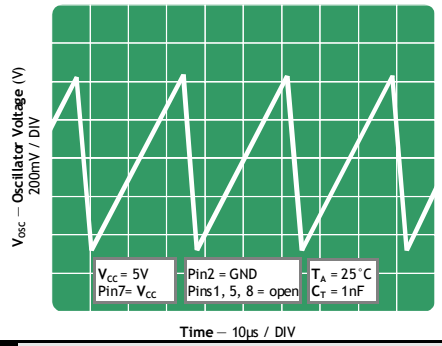
4 If the output switch is driven into hard saturation (non-Darlington configuration) at low switch currents (≤300mA) and high driver currents (≥30mA), it may take up to 2.0 μs for it to come out of saturation. This condition will shorten the off time at frequencies 30kHz, and is magnified at high temperatures. This condition does not occur with a Darlington configuration, since the output switch cannot saturate.

TYPICAL PERFORMANCE CHARACTERISTICS

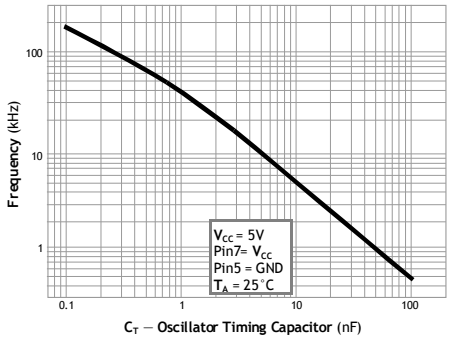
A OUTPUT SWITCH ON-OFF TIME versus OSCILLATOR TIMING CAPACITOR



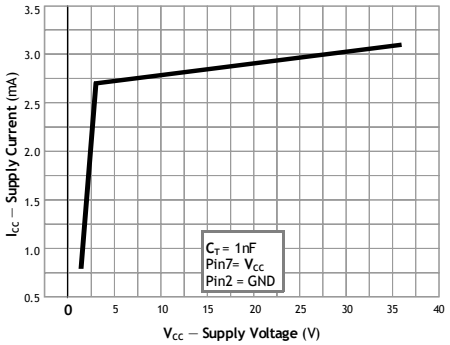
B TIMING CAPACITOR WAVEFORM



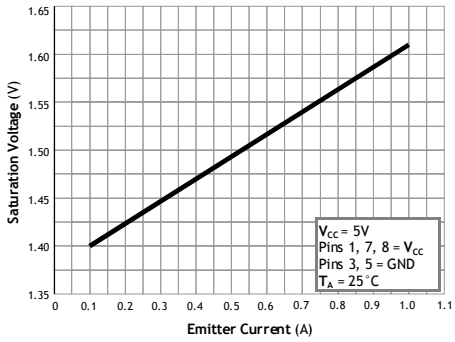
C OSCILLATOR FREQUENCY versus TIMING CAPACITOR



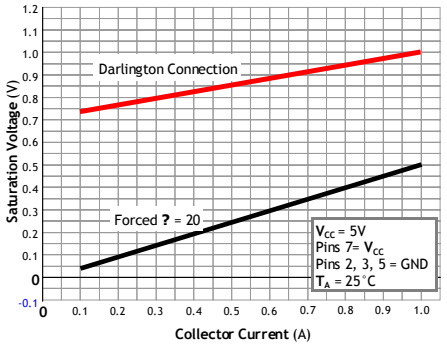
D STANDBY SUPPLY CURRENT versus SUPPLY VOLTAGE



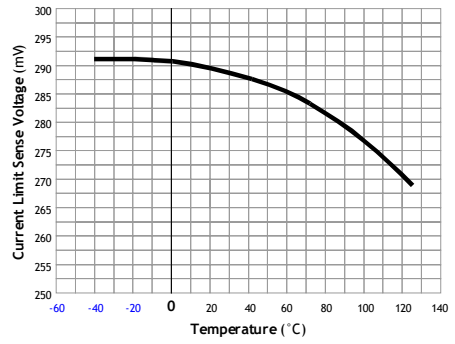
E EMITTER FOLLOWER CONFIGURATION OUTPUT SATURATION VOLTAGE vs. EMITTER CURRENT



F COMMON EMITTER CONFIGURATION OUTPUT SWITCH SATURATION VOLTAGE vs. COLLECTOR CURRENT

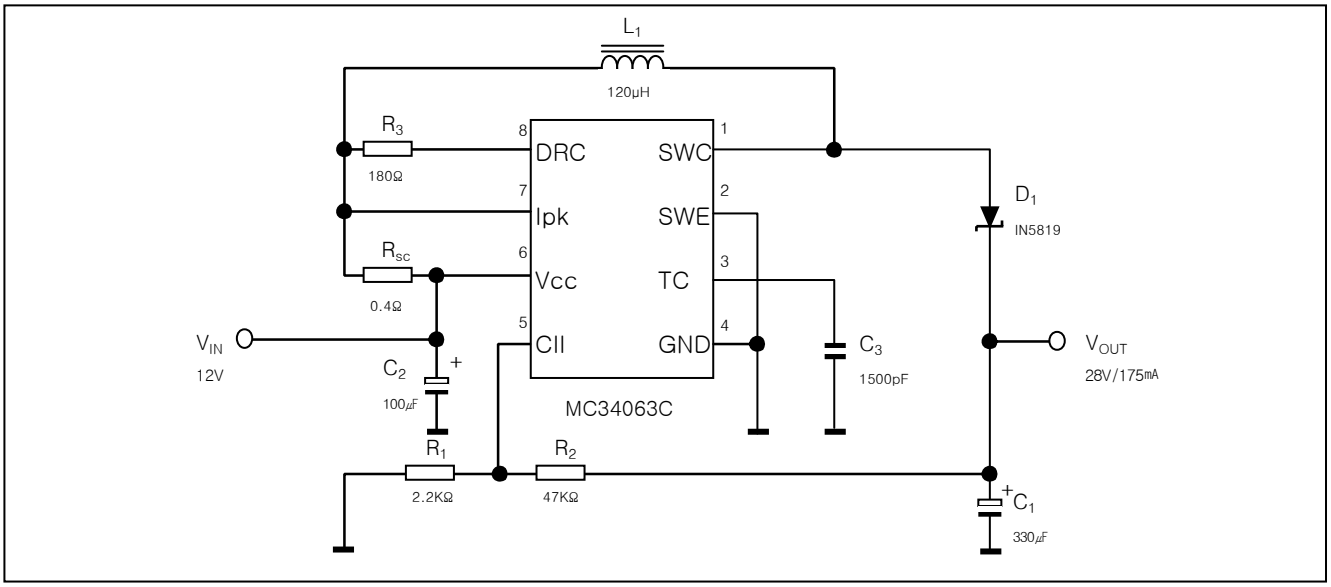


G CURRENT LIMIT SENSE VOLTAGE versus TEMPERATURE

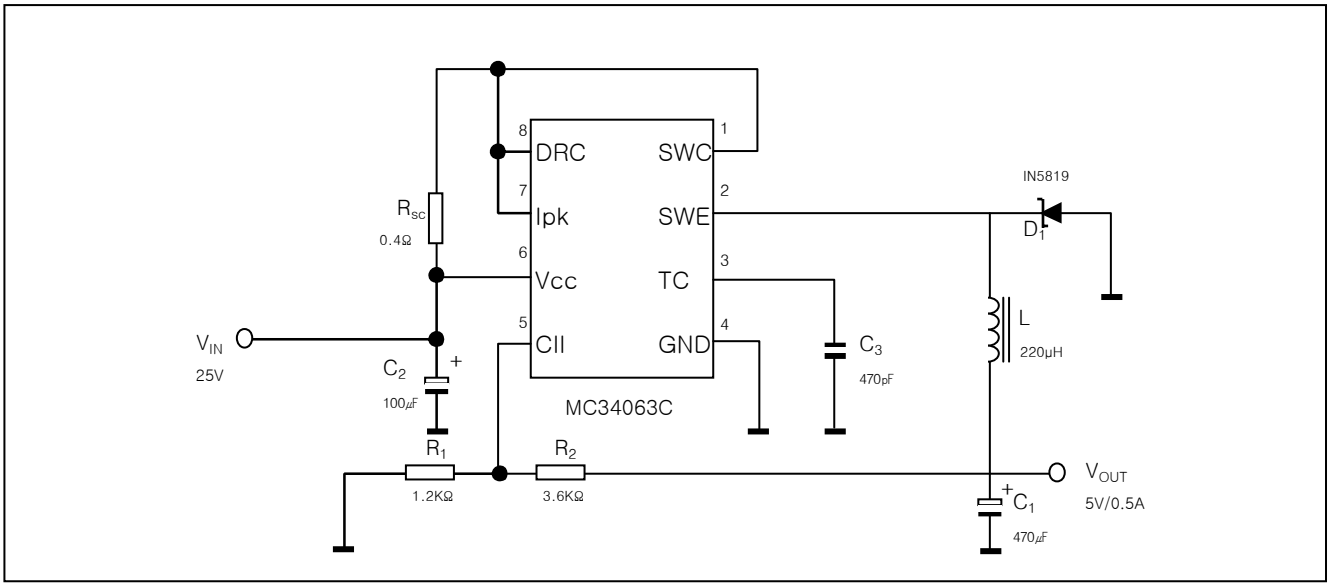


TYPICAL APPLICATION CIRCUIT

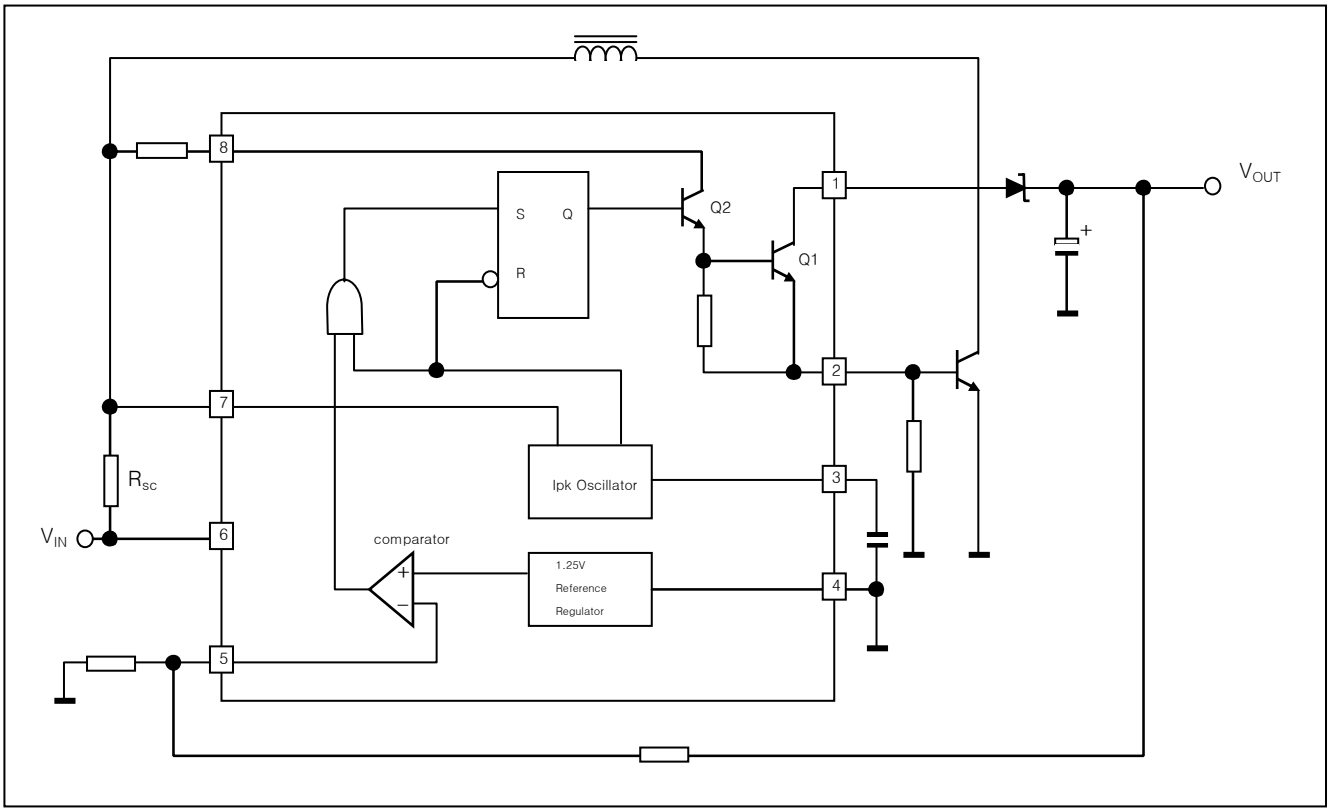
Step-Up Converter



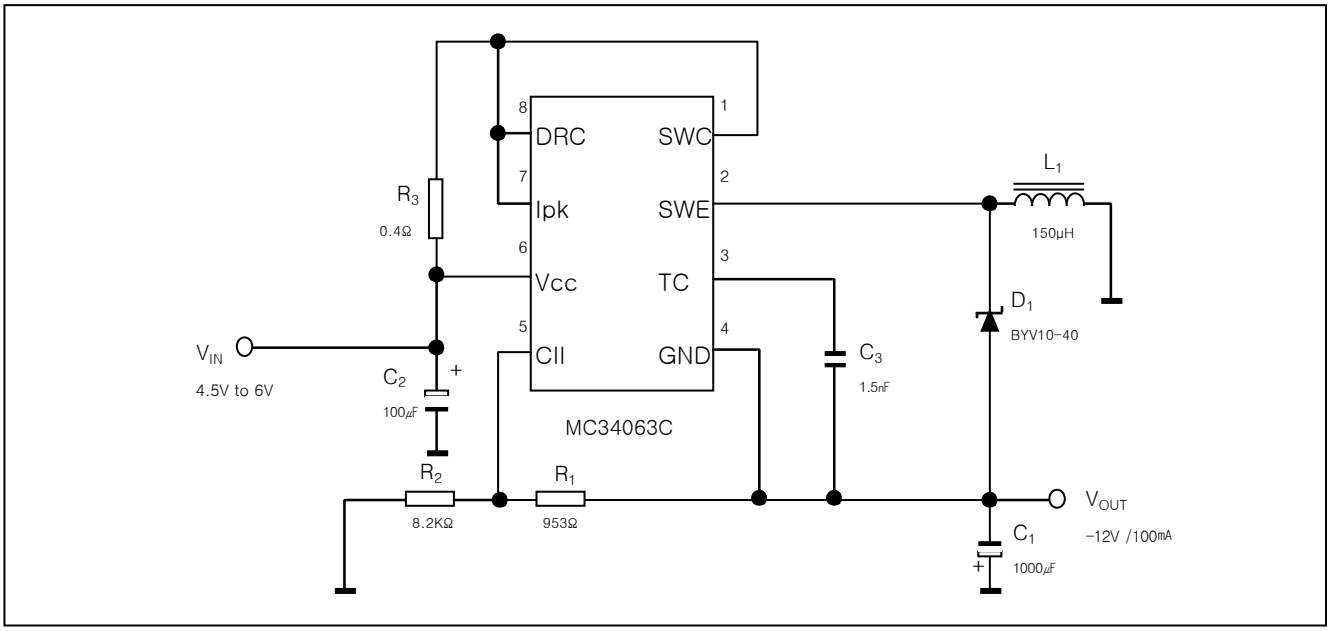
Step-Down Converter



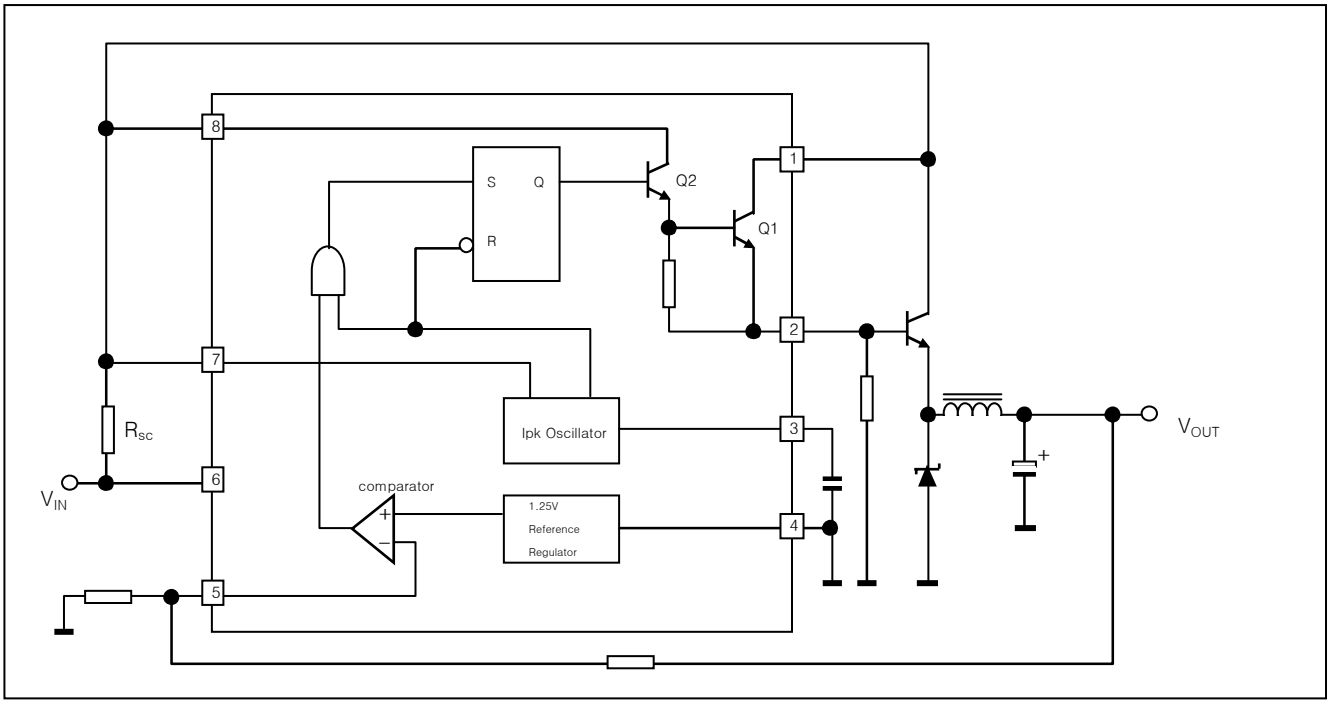
Step-Up With External NPN Switch



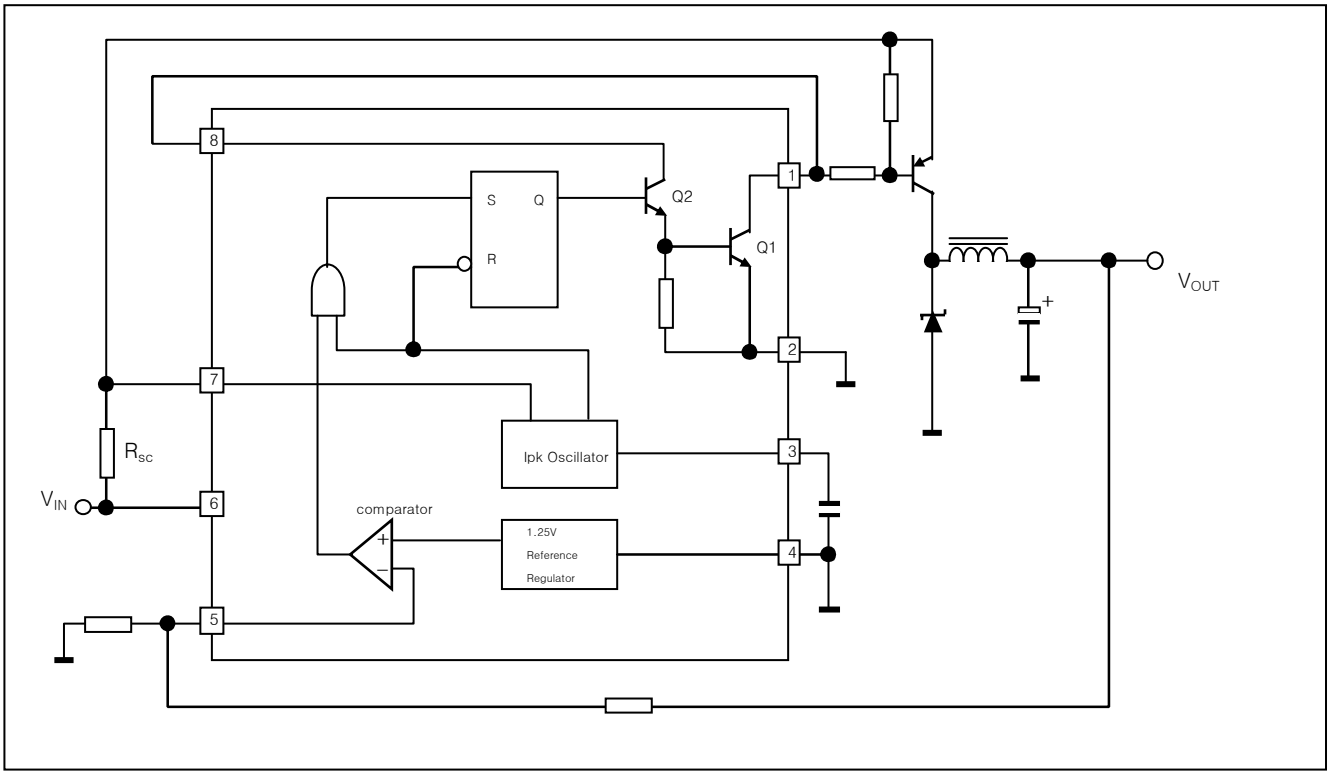
Voltage Inverting Converter



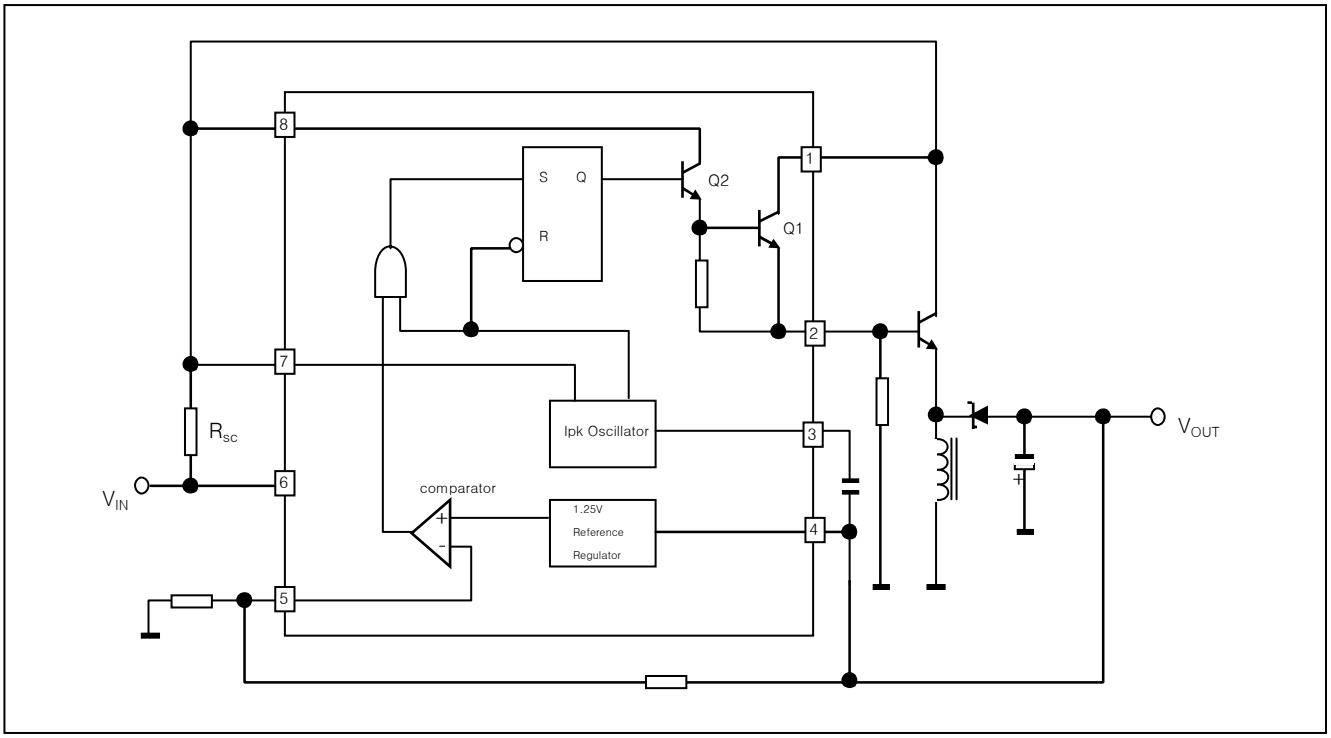
Step-Down With External NPN Switch



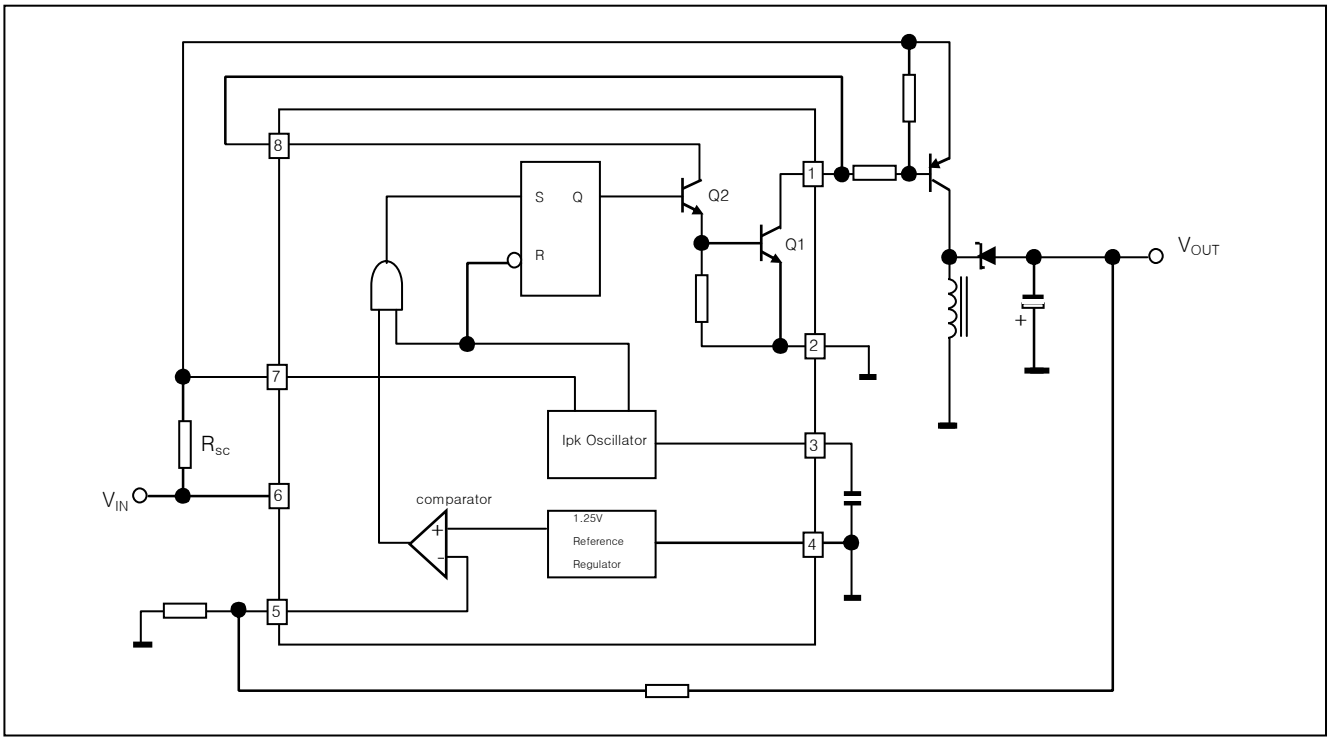
Step-Down With External PNP Switch



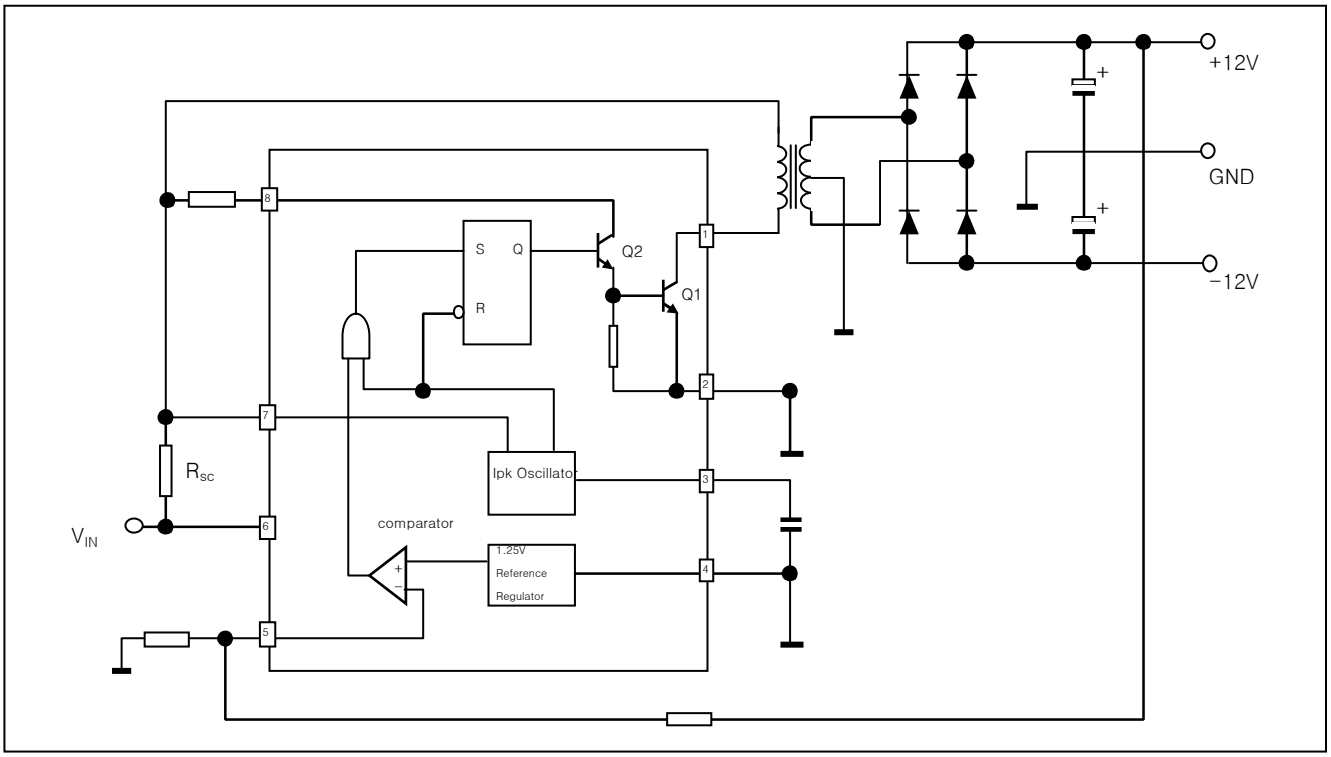
Voltage Inverting With External NPN Switch



Voltage Inverting With External PNP Saturated Switch



Dual Output Voltage



Higher Output Power, Higher Input Voltage