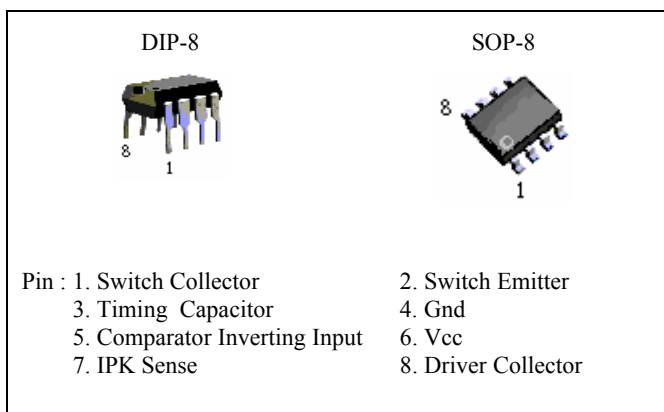


DC-To-DC Converter Controller

The PJ34063 Series is a monolithic control circuit containing the primary functions required for DC to DC converters. These devices consist of an internal duty cycle oscillator with an active current limit circuit, drive and a high current output switch. This series was specifically designed to be incorporated in step-up, step-down and voltage-inverting applications with a minimum number of external components. temperature compensated reference, comparator, controlled.

FEATURES

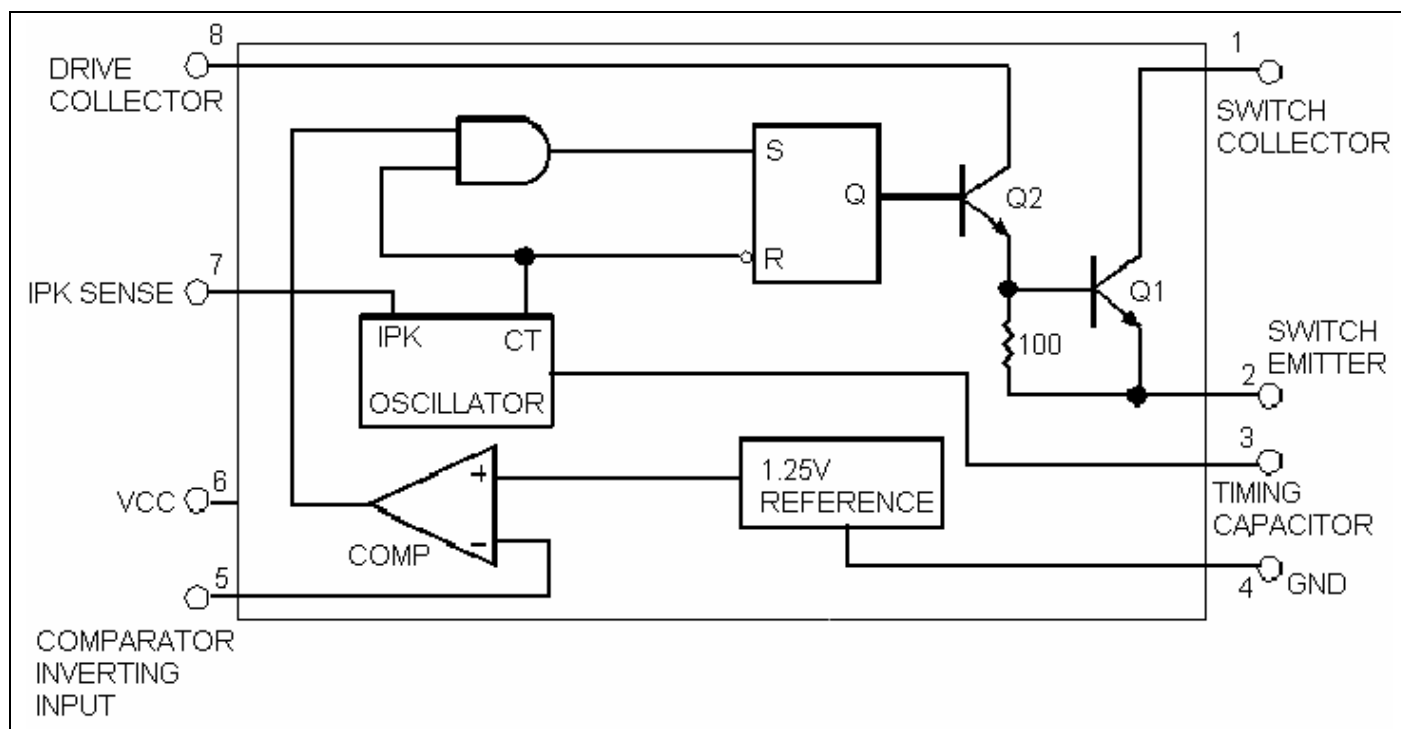
- Operation from 3 to 40V input
- Low standby current
- Current limiting
- Output switch current to 1.5A
- Precision 2% reference
- Output - voltage adjustable
- Frequency of operation from 100Hz to 100KHz



ORDERING INFORMATION

Device	Operating temperature (Ambient)	Package
PJ34063CD	-20°C ~ +85°C	DIP-8
PJ34063CS		SOP-8

BLOCK DIAGRAM



DC-To-DC Converter Controller
ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Power Supply Voltage	V_{CC}	40	Vdc
Comparator Input Voltage Range	V_{IR}	-0.3 ~ +40	Vdc
Switch Collector Voltage	$V_{C(SW)}$	40	Vdc
Switch Emitter Voltage	$V_{E(SW)}$	40	Vdc
Switch Collector to Emitter Voltage	$V_{CE(SW)}$	40	Vdc
Driver Collector Voltage	$V_{C(drive)}$	40	Vdc
Drive Collector Current (Note 1)	$I_{C(drive)}$	100	mA
Switch Current	I_{sw}	1.5	A
Operating Junction Temperature	T_J	0 to +125	°C
Operating Ambient Temperature Range	T_A	-20 to +85	°C
Storage Temperature Range	T_{stg}	-25 to +150	°C

ELECTRICAL CHARACTERISTICS

($V_{CC} = 5.0V$, $T_A = T_{low}$ to T_{high} , unless otherwise specified)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
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OSCILLATOR

Frequency	fosc	$V_{PIN5}=0V$, $C_T=1.0nF$, $T_A=25^\circ C$	24	33	42	KHz
Charging Current	I_{chg}	$V_{CC}=5$ to 40V, $T_A=25^\circ C$	24	35	42	μA
Discharge Current	I_{dischg}	$V_{CC}=5$ to 40V, $T_A=25^\circ C$	140	220	260	μA
Discharge To Charge Current Ratio	I_{dischg}/I_{chg}	Pin7 to V_{CC} , $T_A=25^\circ C$	5.2	6.5	7.5	--
Current Limit Sense Voltage	$V_{IPK(sense)}$	$I_{chg} = I_{dischg}$, $T_A=25^\circ C$	250	300	350	mV

OUTPUT SWITCH(NOTE 2)

Saturation Voltage , Darlington Connection	$V_{CE(sat)}$	$I_{sw}=1.0A$, Pins 1,8 connected	--	1.0	1.3	V
Saturation Voltage , Darlington Connection	$V_{CE(sat)}$	$I_{sw}=1.0A$, $R_{PIN8}=82\ \Omega$ to V_{CC} , Forced $\beta \leq 20$	--	0.45	0.7	V
DC Current Gain	h_{FE}	$I_{sw}=1.0A$, $V_{CE} = 5.0V$, $T_A=25^\circ C$	50	75	--	--
Collector Off- State Current	$I_{C(off)}$	$V_{CE}=40V$	--	40	100	μA

COMPARATOR

Threshold Voltage	V_{TH}	$T_A=25^\circ C$	1.23	1.25	1.27	V
Threshold Voltage Line Regulation	Regline	$V_{CC} = 3$ to 40V	--	1.4	5.0	mV
Input Bias Current	I_{IB}	$V_{IN}=0V$	--	-20	-400	nA

TOTAL DEVICE

Supply Current	I_{CC}	$V_{CC}=5$ to 40V, $C_T=1.0nF$, Pin7= V_{CC} , $V_{PIN} > V_{th}$ Pin 2 =GND, remaining pins open	--	--	4.0	mA
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Notes : 1.Maximum package power dissipation limits must be observed.

2.Low duty cycle pulse techniques are used during test to maintain junction temperature as close to ambient temperature as possible.

DC-To-DC Converter Controller

FIGURE 1.OUTPUT SWITCH ON-OFF TIME versus OSCILLATOR TIMING CAPACITOR

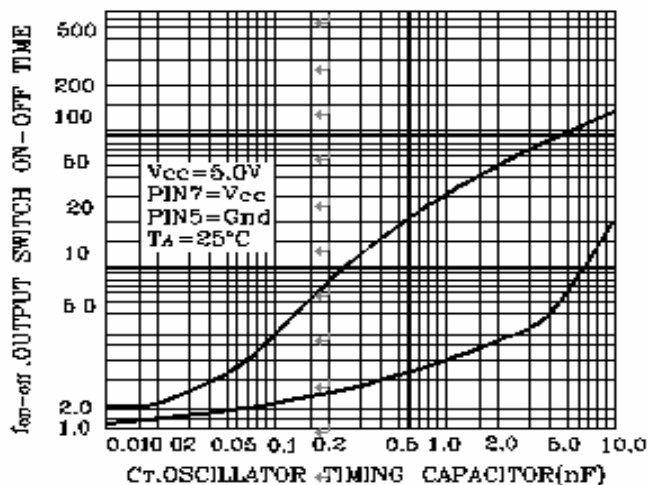


FIGURE 2.TIMING CAPACITOR WAVEFORM

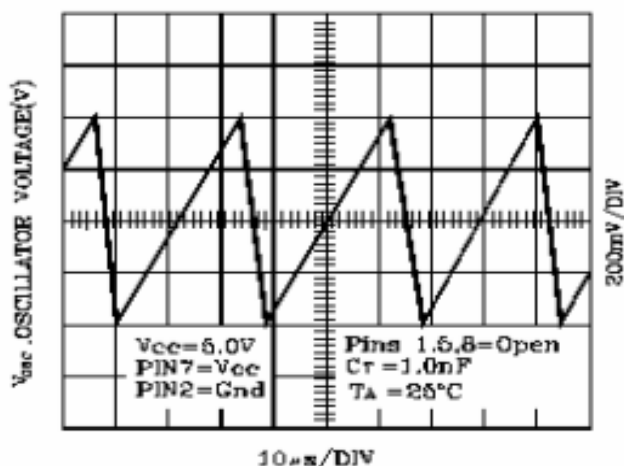


FIGURE 3.EMITTER FOLLOWER CONFIGURATION OUTPUT SATURATION VOLTAGE versus EMITTER CURRENT

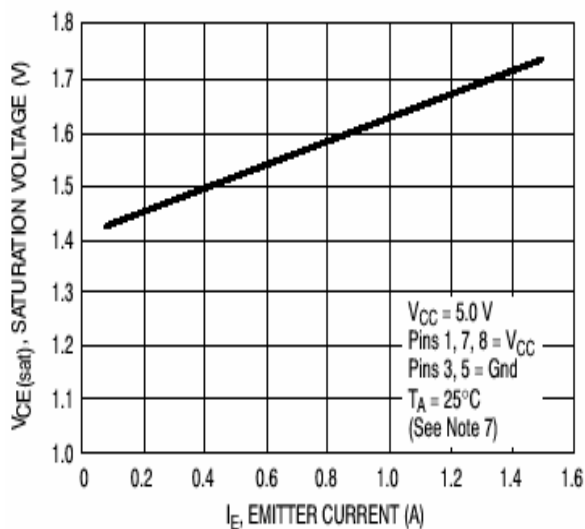


FIGURE 4.COMMON EMITTER CONFIGURATION OUTPUT SWITCH SATURATION VOLTAGE versus COLLECTOR CURRENT

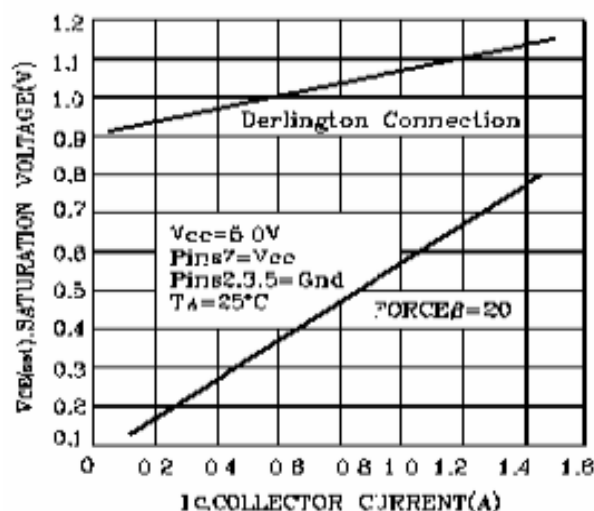


FIGURE 5.CURRENT LIMIT SENSE VOLTAGE versus TEMPERATURE

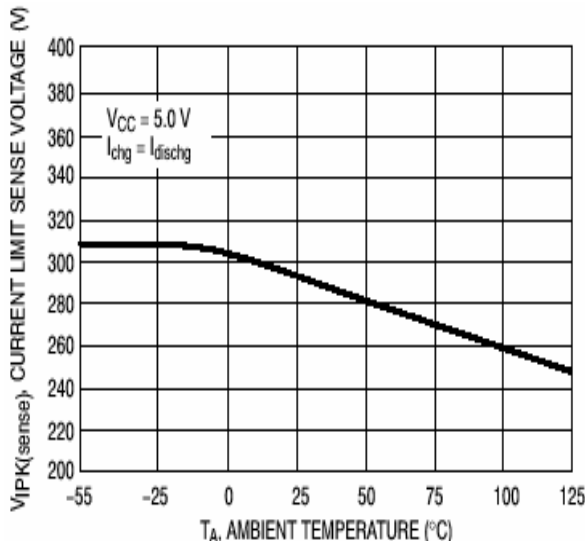


FIGURE 6.STANDBY SUPPLY CURRENT versus SUPPLY VOLTAGE

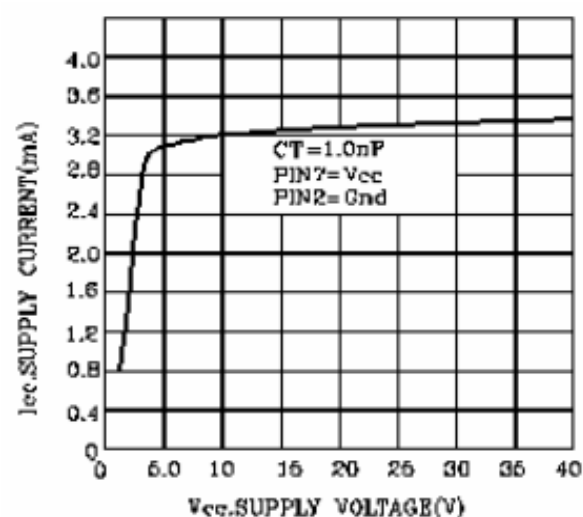


FIGURE 1.STEP-UP CONVERTER

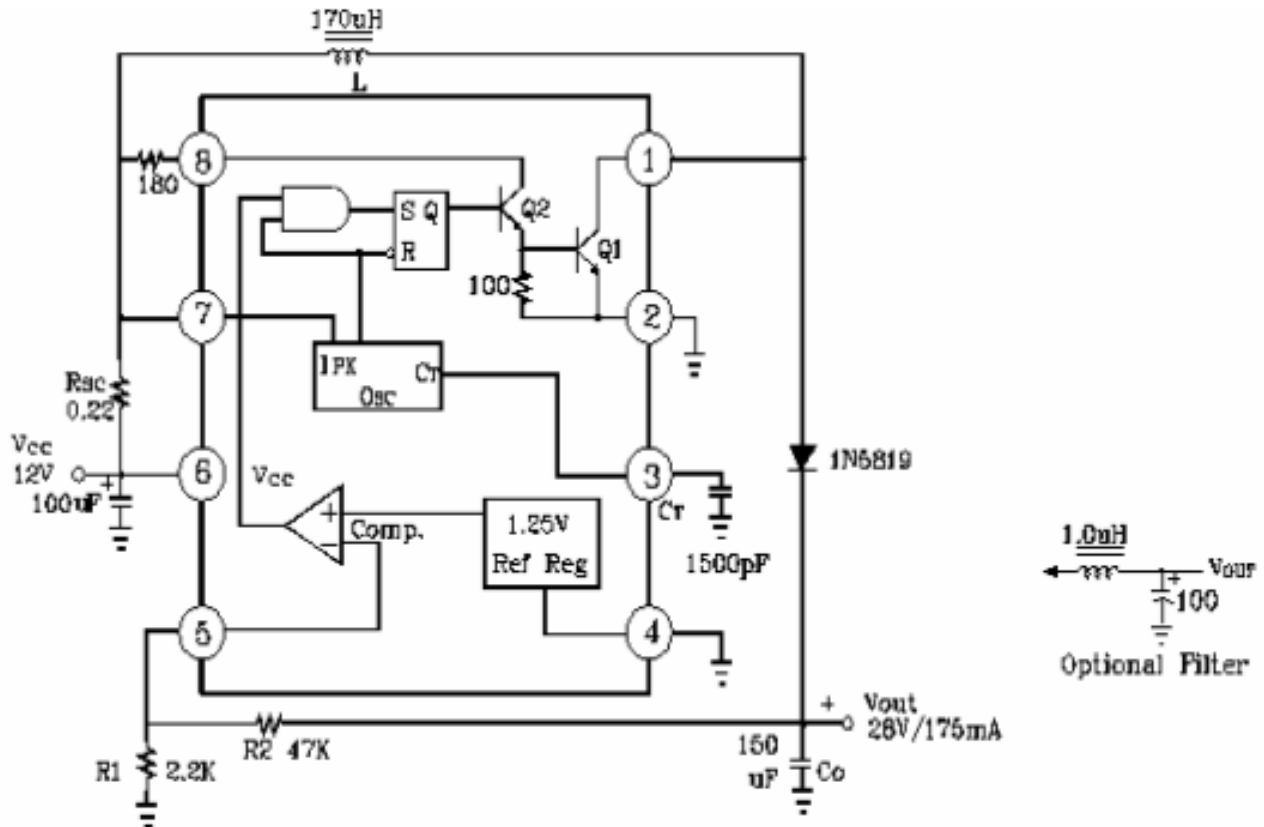
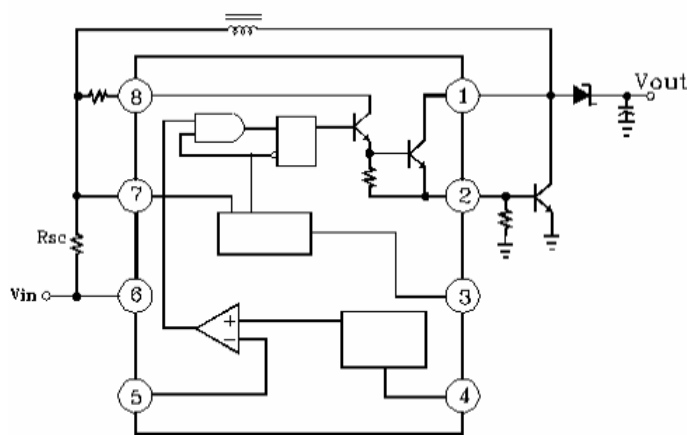
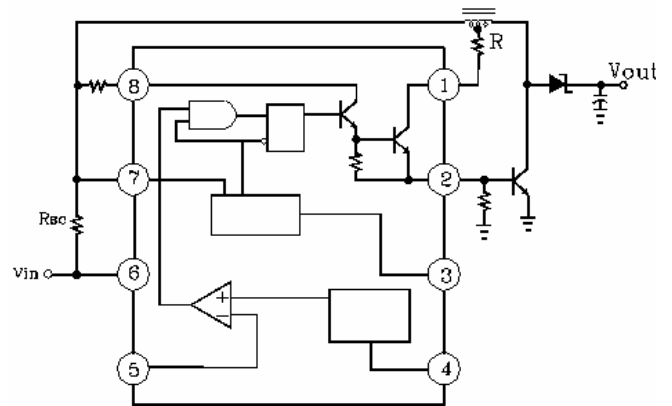


FIGURE 2.EXTERNAL CURRENT BOOST CONNECTIONS FOR I_c PEAK GREATER THAN 1.5A

2a.EXTERNAL NPN SWITCH



2b.EXTERNAL NPN SATURATED SWITCH



Note : $R \rightarrow 0$ for constant V_{in}

FIGURE 3.STEP-DOWN CONVERTER

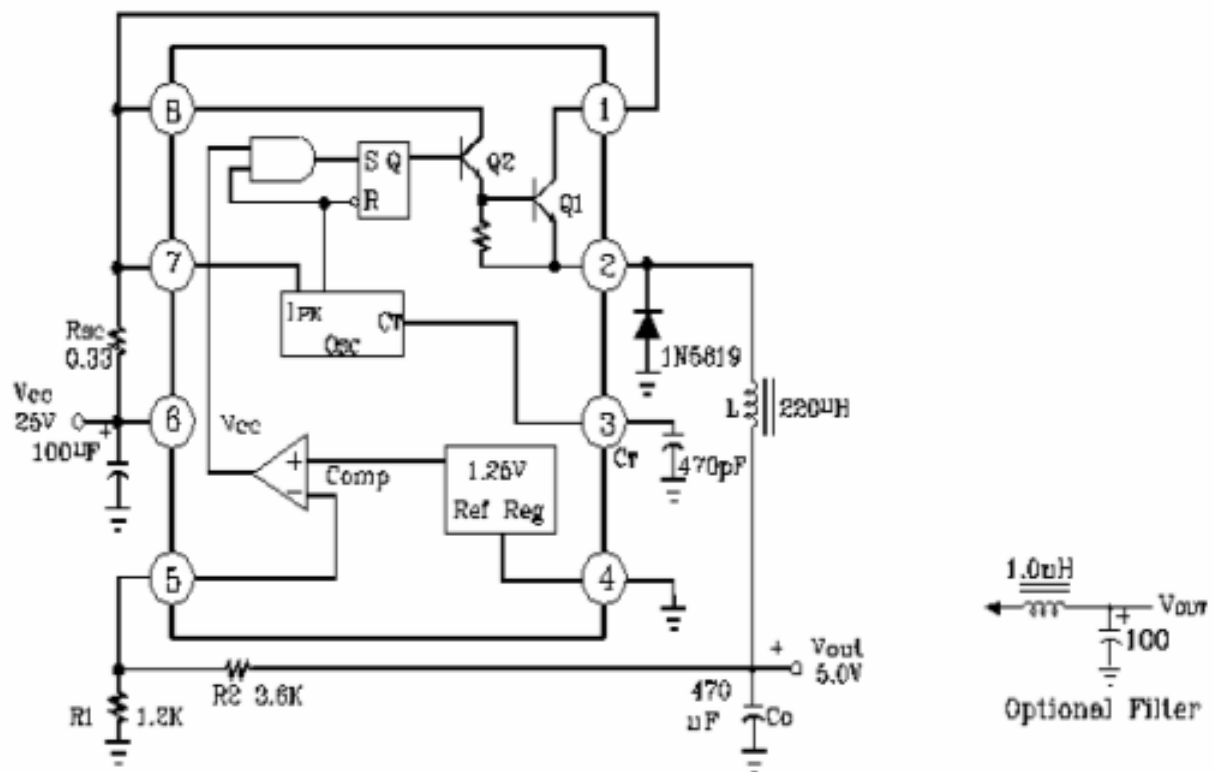
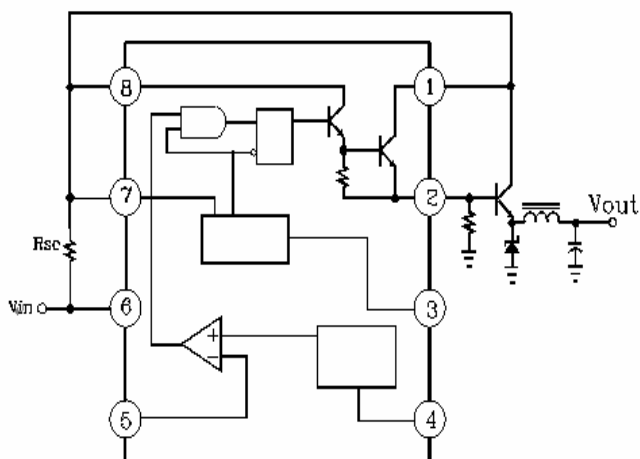
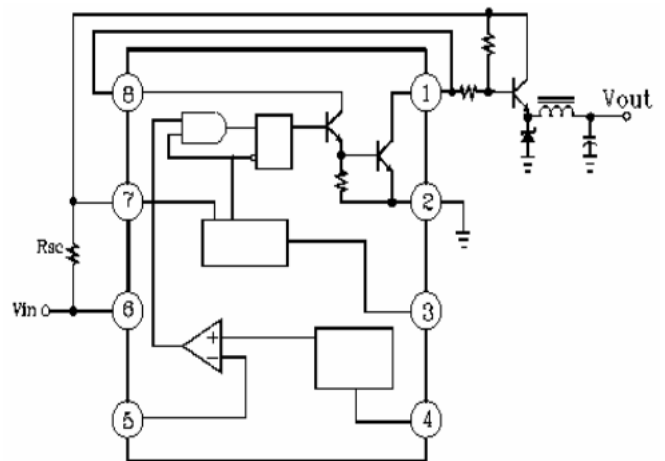


FIGURE 4.EXTERNAL CURRENT BOOST CONNECTIONS FOR Ic PEAK GREATER THAN 1.5A

4a.EXTERNAL NPN SWITCH



4b.EXTERNAL NPN SWITCH



6a.EXTERNAL NPN SWITCH

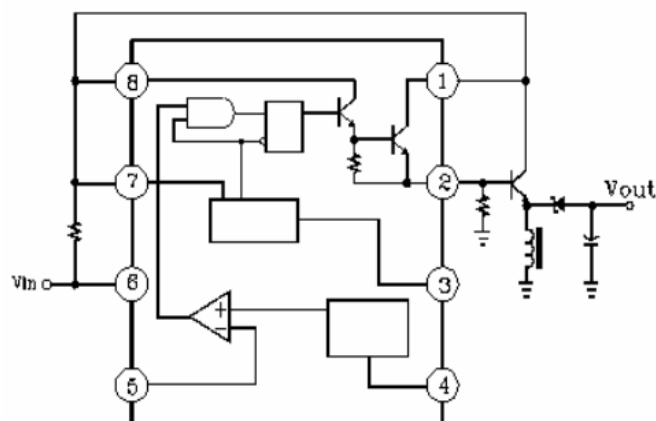


Table : Design Formula

Calculation	Step-Up	Step-Down	Voltage-Inverting
$\frac{ton}{toff}$	$\frac{V_{out} + V_F - V_{in}(min)}{V_{cc}(min) - V_{sat}}$	$\frac{V_{OUT} + V_F}{V_{cc} - V_{sat} - V_{OUT}}$	$\frac{ V_{OUT} + V_F}{V_{cc} + V_{sat}}$
(ton+toff) max	$\frac{1}{f \min}$	$\frac{1}{f \min}$	$\frac{1}{f \min}$
C _T	$4.0 \times 10^{-5} \text{ ton}$	$4.0 \times 10^{-5} \text{ ton}$	$4.0 \times 10^{-5} \text{ ton}$
I _{pk} (switch)	$2I_{out(max)} \left(\frac{ton}{toff} + 1 \right)$	$2I_{out(max)}$	$2I_{out(max)} \left(\frac{ton}{toff} + 1 \right)$
R _{sc}	$0.3/I_{PK}(\text{switch})$	$0.3/I_{PK}(\text{switch})$	$0.3/I_{PK}(\text{switch})$
L (min)	$\left(\frac{V_{in}(min) - V_{sat}}{I_{pk}(switch)} \right) ton(max)$	$\left(\frac{V_{in}(min) - V_{sat} - V_{out}}{I_{pk}(switch)} \right) ton(max)$	$\left(\frac{V_{in}(min) - V_{sat}}{I_{pk}(switch)} \right) ton(max)$
Co	$\left(\frac{I_{outton}}{V_{ripple}(pp)} \right)$	$\left(\frac{I_{pk}(switch)(ton + toff)}{8V_{ripple}(pp)} \right)$	$\left(\frac{I_{outton}}{V_{ripple}(pp)} \right)$

TERMS AND DEFINITIONS

- ◆ V_{sat} = Saturation Voltage of the output switch.
- ◆ V_F = Forward Voltage drop of the rectifier.

The following power supply characteristics must be chosen:

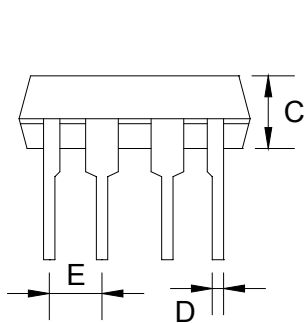
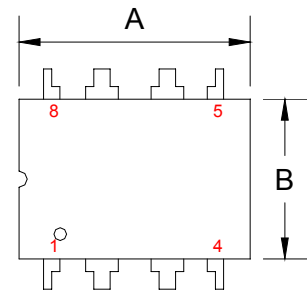
- ◆ V_{in} = Normal input voltage
- ◆ V_{out}: Desired Output voltage, $|V_{out}| = 1.25 \left(1 + \frac{R2}{R1} \right)$
- ◆ I_{out} : Desired output current.
- ◆ f_{min} : Minimum desired output switching frequency at the selected values for V_{in} and I_o.
- ◆ V_{ripple}(p-p): Desired peak-to-peak 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.

DIP-8 Mechanical drawing

1.Top View

2.Side View

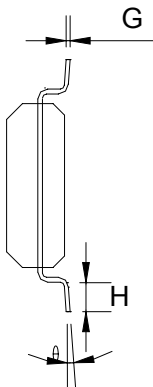
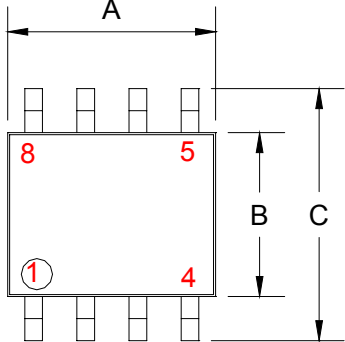


DIP-8 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.85	9.05	0.348	0.356
B	6.30	6.40	0.248	0.252
C	3.65	3.95	0.143	0.156
D	0.45	0.55	0.017	0.022
E	2.54BSC		0.10BSC	
F	7.75	8.00	0.305	0.315
G	0.20	0.30	0.007	0.012
H	-	10°	-	10°

SOP-8 Mechanical drawing

1.Top View

2.Side View



SOP-8 DIMENSION				
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	5.80	6.20	0.228	0.244
D	1.40	1.50	0.055	0.059
E	0.33	0.51	0.013	0.020
F	1.27BSC		0.05BSC	
G	0.19	0.25	0.007	0.010
H	0.40	1.27	0.016	0.050
θ	0°	8°	0°	8°

