



# 深圳市捷盟科技有限公司

SHEN ZHEN GEM SCIENCE TECHNOLOGY LIMITED COMPANY

地址：深圳市南山区南山大道康乐大厦银海阁 24B

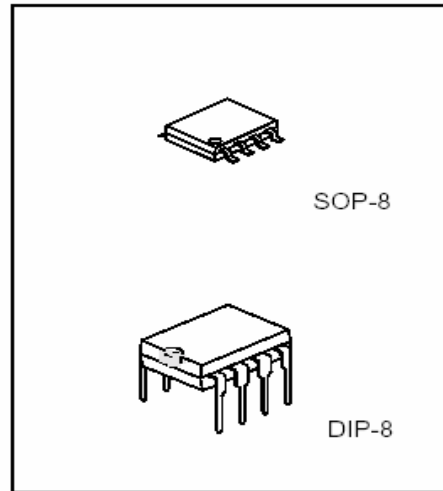
电话：0755-26641579 26641404 传真：0755-26641404

## GEM MC34063 LINEAR INTEGRATED CIRCUIT

### DC TO DC CONVERTER CONTROLLER

### DESCRIPTION

The CCMC MC34063 is a monolithic regulator subsystem , intended for use as DC to DC converter. This device contains a temperature compensated band gap reference, a duty-cycle control oscillator , driver and high current output switch. It can be used for step down , step-up or inverting switching regulators as well as for series pass regulators.



### FEATURES

- \*Operation from 3.0V to 40V.
- \*Short circuit current limiting.
- \*Low standby current.
- \*Output switch current of 1.5A without external transistors.
- \*Frequency of operation from 100Hz to 100kHz.
- \*Step-up, step-down or inverting switch regulators.

### PIN CONFIGURATION

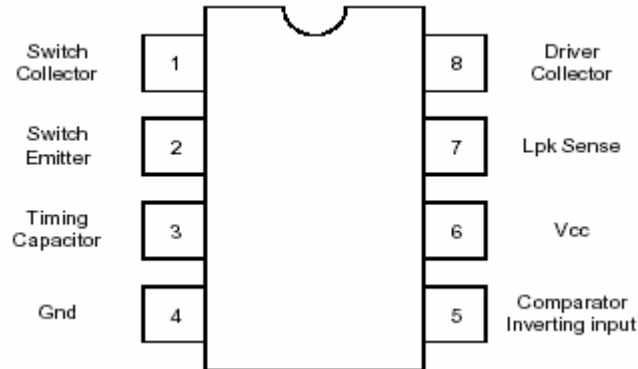


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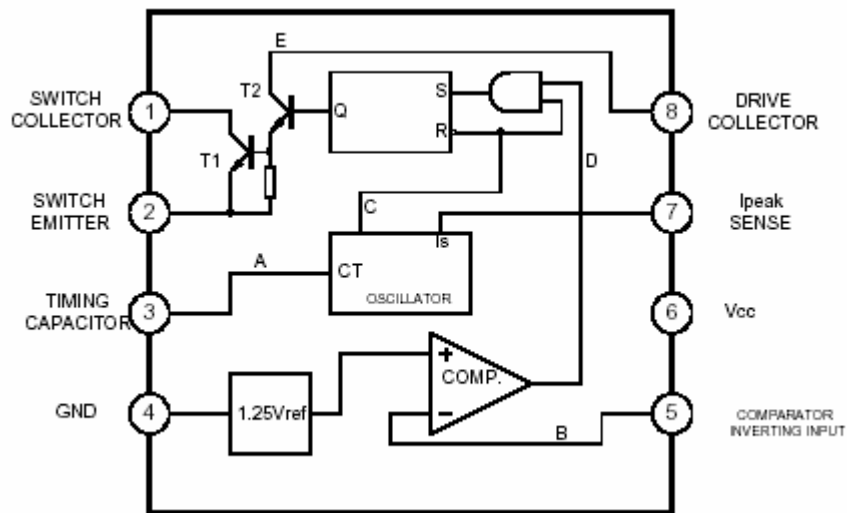
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## BLOCK DIAGRAM



## GEM MC34063 LINEAR INTEGRATED CIRCUIT

ABSOLUTE MAXIMUM RATINGGS(Ta=25C)



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PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	Vcc	40	V
Comparator input range	Vi(comp)	-0.3-+40	V
Switch collector voltage	Vc(sw)	40	V
Switch Emitter Voltage	Ve(sw)	40	V
Switch collector to emitter voltage	Vce(sw)	40	V
Driver collector Voltage	VC(dr)	40	V
Switch current	Lsw	1.5	A
Power Dissipation(Ta=25C)			
DIP		1250	mW
SOP		625	mW
Thermal Characteristics			
DIP		100	C/W
SOP		160	C/W
Operating junction temperature	Tj	150	C
Operating ambient temperature	Ta	0-70	C
Storage temperature range	Tstg	-65-150	C

## ELECTRICAL CHARACTERISTICS(Ta=25C)

(Vcc=5.0V, Ta=0-70C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>Oscillator</b>						
Charging Current	Ichg	Vcc=5-40V, Ta=25C	22	31	42	μ A
Discharging Current	Idischg	Vcc=5-40V, Ta=25C	140	190	260	μ A
Oscillator Amplitude	Vosc	Ta=25C		0.5		V
Discharge to Charge Current Ratio	K	V7=Vcc, Ta=25C	5.2	6.1	7.5	
Current limit Sense Voltage	Vsense	Lchg=Idischg Ta=25C	250	300	350	mA
<b>OUTPUT Switch</b>						
Saturation Voltage 1(note)	Vce(sat)1	Lsw=1.0A Vc(driver)=Vc(sw)		0.95	1.3	V
Saturation Voltage 2(note)	Vce(sat)2	Lsw=1.0A Vc(driver)=50mA		0.45	0.7	V
DC Current Gain(note)	Gi(DC)	Lsw=1.0A Vce=5.0V, Ta=25C	50	180		
Collector Off State Current(note)	C(off)	Vce=40.0V, Ta=25C		0.01	100	
<b>Comparator</b>						
Threshold Voltage	Vth		1.21	1.24	1.29	V



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Threshold Voltage Line Regulation	V <sub>th</sub>	V <sub>cc</sub> =3-40V		2.0	5.0	mA
Input Bias Current	I <sub>bias</sub>	V <sub>i</sub> =0V		50	400	nA
Total Device						
Supply Current	I <sub>cc</sub>	V <sub>cc</sub> =5-40V C <sub>t</sub> =0.001 V <sub>7</sub> =V <sub>cc</sub> V <sub>c</sub> >V <sub>th</sub> Pin=GND		2.7	4.0	mA

## GEM MC34063 LINEAR INTEGRATED CIRCUIT

Figure 1. Output Switch On-Off Time

Figure 2.

### Timing Capacitor Waveform

versus Oscillator Timing Capacitor

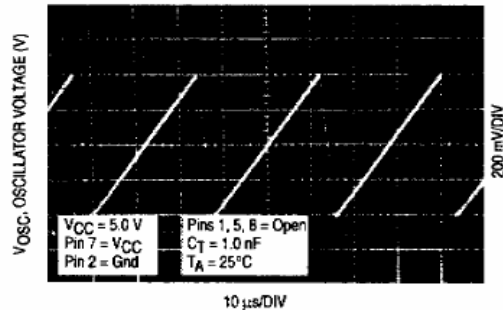
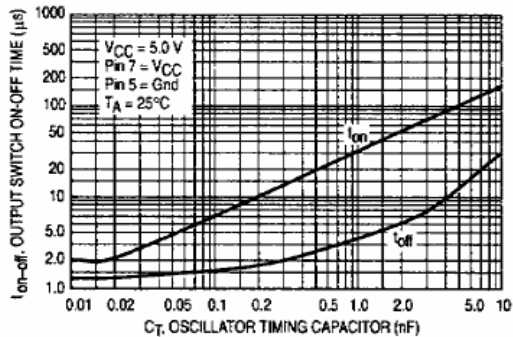


Figure 3. Emitter Follower Configuration Output Saturation Voltage versus Emitter Current

Figure 4. Common Emitter Configuration Output Switch Saturation Voltage versus Collector Current

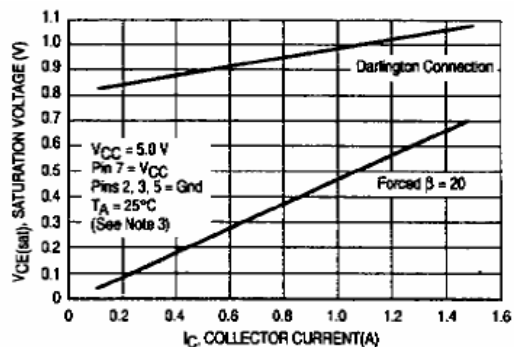
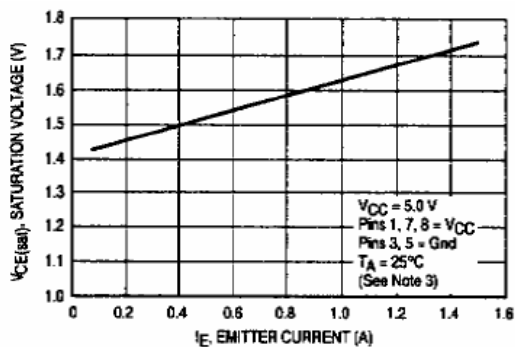


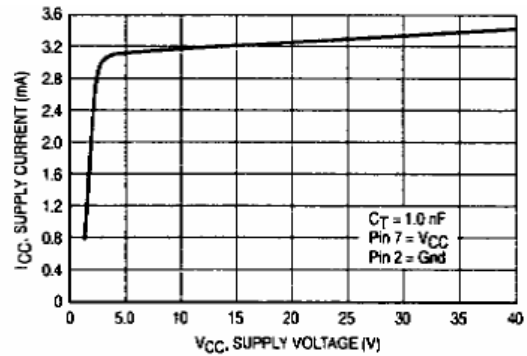
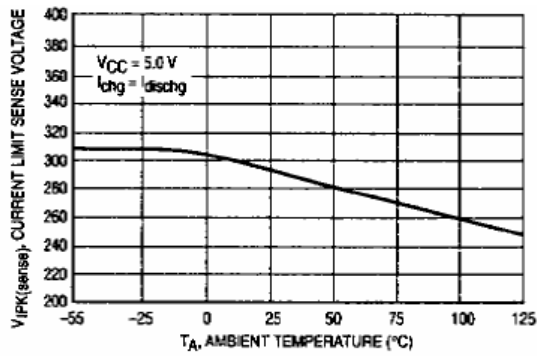
Figure 5. Current Limit Sense Voltage

Figure 6. Standby Supply Current versus

Versus

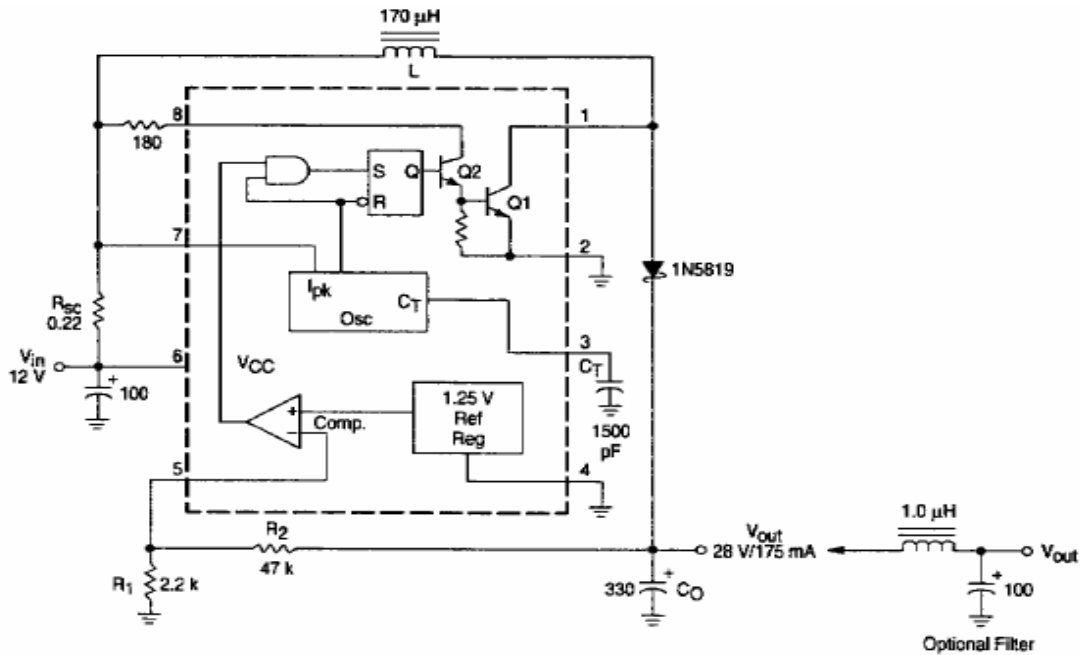
Temperature

Supply Voltage



**GEM MC34063 LINEAR INTEGRATED CIRCUIT**

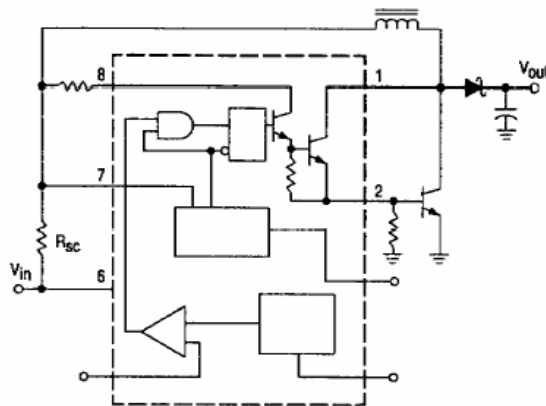
Figure 7. Step-up Converter



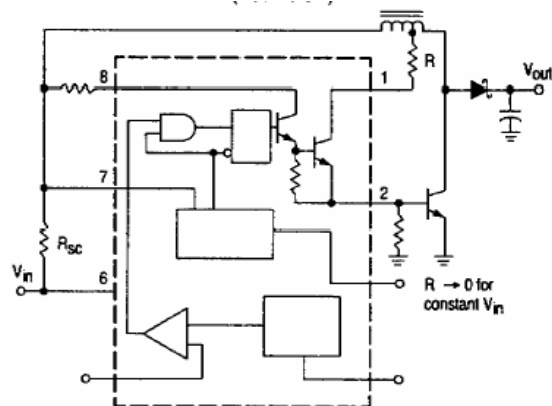
TEST	CONDITIONS	RESULTS
Line Regulation	$V_{in}=8.0-16V, I_o=75-175mA$	$30mV = \pm 0.05\%$
Load Regulation	$V_{in}=12V, I_o=175mA$	$10mV = \pm 0.017\%$
Output Ripple	$V_{in}=12V, I_o=175mA$	$400mV_{p-p}$
Efficiency	$V_{in}=12V, I_o=175mA$	$87.7\%$
Output Ripple With Optional Filter	$V_{in}=12V, I_o=175mA$	$40mV_{p-p}$

Figure 8. External Current Boost Connections for IC Peak Greater Than 1.5A

### 8a. External NPN Switch



### 8b. External NPN Saturated Switch (See note4)



NOTE:4. If the output switch is driven into hard saturation (non-Darlington configuration) at low switch



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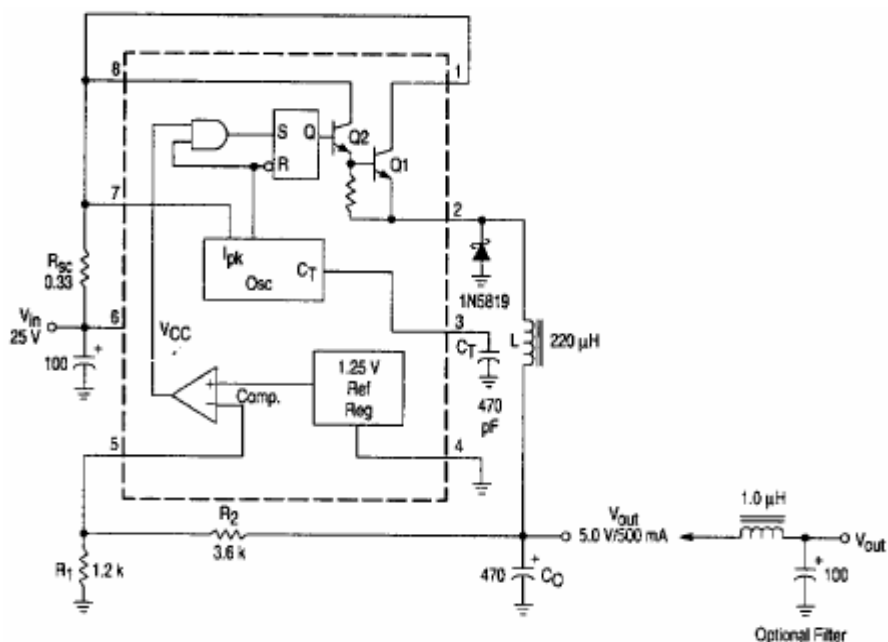
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current (<300mA) and high driver currents(>30mA) it may take up to 2.0us to come out of saturation. This condition will shorten the off time at frequencies>30kHz, and is magnified at high temperatures. This condition does not occur with a Darlington configuration, since the output switch cannot saturate. If a non-Darlington configuration is used, the following output drive condition is recommended.

## GEM MC34063 LINEAR INTEGRATED CIRCUIT

Figure 9. Step-up Converter



TEST	CONDITIONS	RESULTS
Line Regulation	V <sub>in</sub> =15-25V I <sub>o</sub> =500mA	12mV= ± 0.12%
Load Regulation	V <sub>in</sub> =25V I <sub>o</sub> =50-500mA	3.0mV= ± 0.03%
Output Ripple	V <sub>in</sub> =25V I <sub>o</sub> =500mA	120mVp-p
Short Circuit	V <sub>in</sub> =25V R <sub>L</sub> =0.1	1.1A
Efficiency	V <sub>in</sub> =25V I <sub>o</sub> =500mA	83.7%
Output Ripple With optional Filter	V <sub>in</sub> =25V I <sub>o</sub> =500mA	40mVp-p

Figure 10. External Current Boost Connections for IC Peak Greater Than 1.5A

10a. External NPN Switch

10b. External NPN Saturated Switch

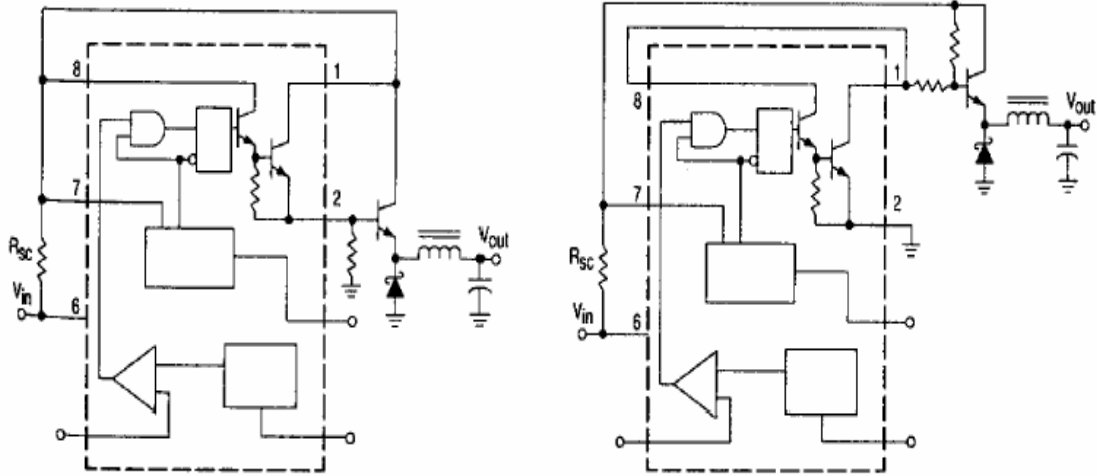


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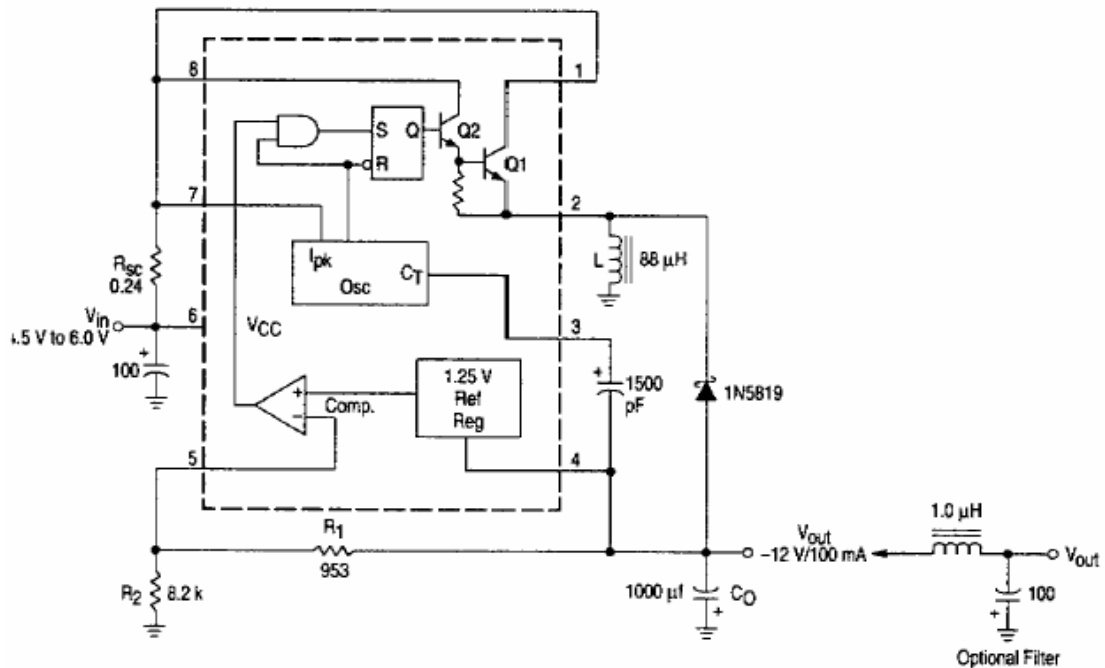
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**GEM MC34063 LINEAR INTEGRATED CIRCUIT**

**Figure 11. Inverting Converter**



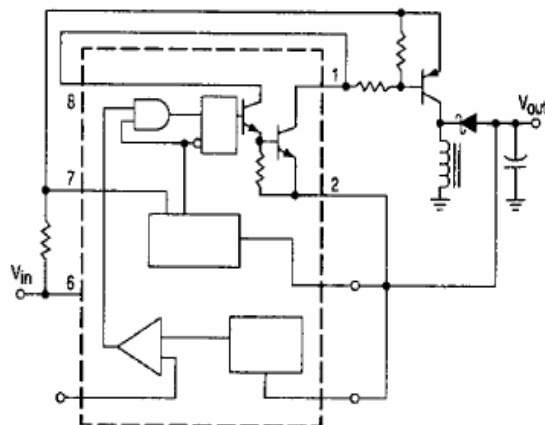
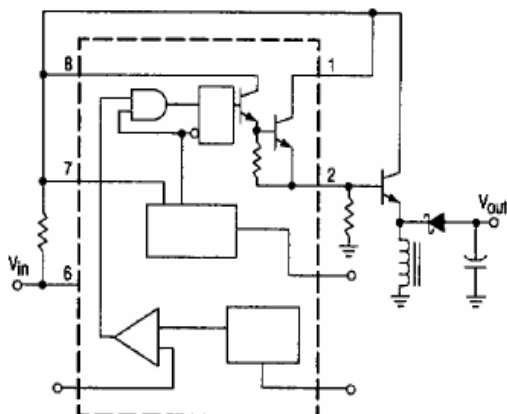


TEST	CONDITIONS	RESULTS
Line Regulation	V <sub>in</sub> =4.5-6.0V I <sub>o</sub> =100mA	3.0mV = ± 0.012%
Load Regulation	V <sub>in</sub> =5.0V I <sub>o</sub> =10-100mA	0.022V = ± 0.09%
Output Ripple	V <sub>in</sub> =5.0V I <sub>o</sub> =100mA	500mVp-p
Short Circuit	V <sub>in</sub> =5.0V R <sub>I</sub> =0.1	910mA
Efficiency	V <sub>in</sub> =5.0V I <sub>o</sub> =100mA	62.2%
Output Ripple With optional Filter	V <sub>in</sub> =5.0V I <sub>o</sub> =100mA	70mVp-p

Figure 12. External Current Boost Connections for IC Peak Greater Than 1.5A

12a. External NPN Switch

12b. External NPN Saturated Switch





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