

Features

- Operation from 3.0V to 40V
- Short circuit current limiting
- Low standby current
- Output switch current of 1.2A without external transistors
- Frequency of operation from 100Hz to 100kHz
- Step-up, step-down or inverting switch regulators
- package: SOP8

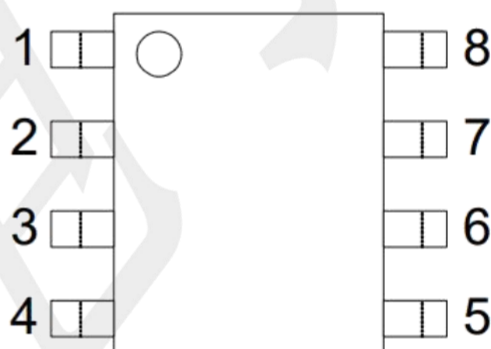
Applications

- Battery Chargers
- NICs / Switches / Hubs
- LCD TV
- DSL Modem
- Access Point Router
- Negative Voltage Power Supplies
- Set Top Box

General Description

The 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.

Pinout (top view)



SOP8

Pin Configurations

Pin Number	Pin Name	Pin Function
1	SC	Internal Darlington pairs T1 collector
2	SE	Internal Darlington pairs T1 emitter
3	CT	The value of selected capacitor controls the internal oscillator run rate
4	GND	Analog ground pin.
5	CII	Inverting input of comparator which can set & initiate the Darlington pairs output switch
6	VCC	Power Supply Input.
7	IpK	Current sense input to monitor the voltage drop across an external resistor placed in series with V _{CC}
8	DC	Internal Darlington pairs T1 collector

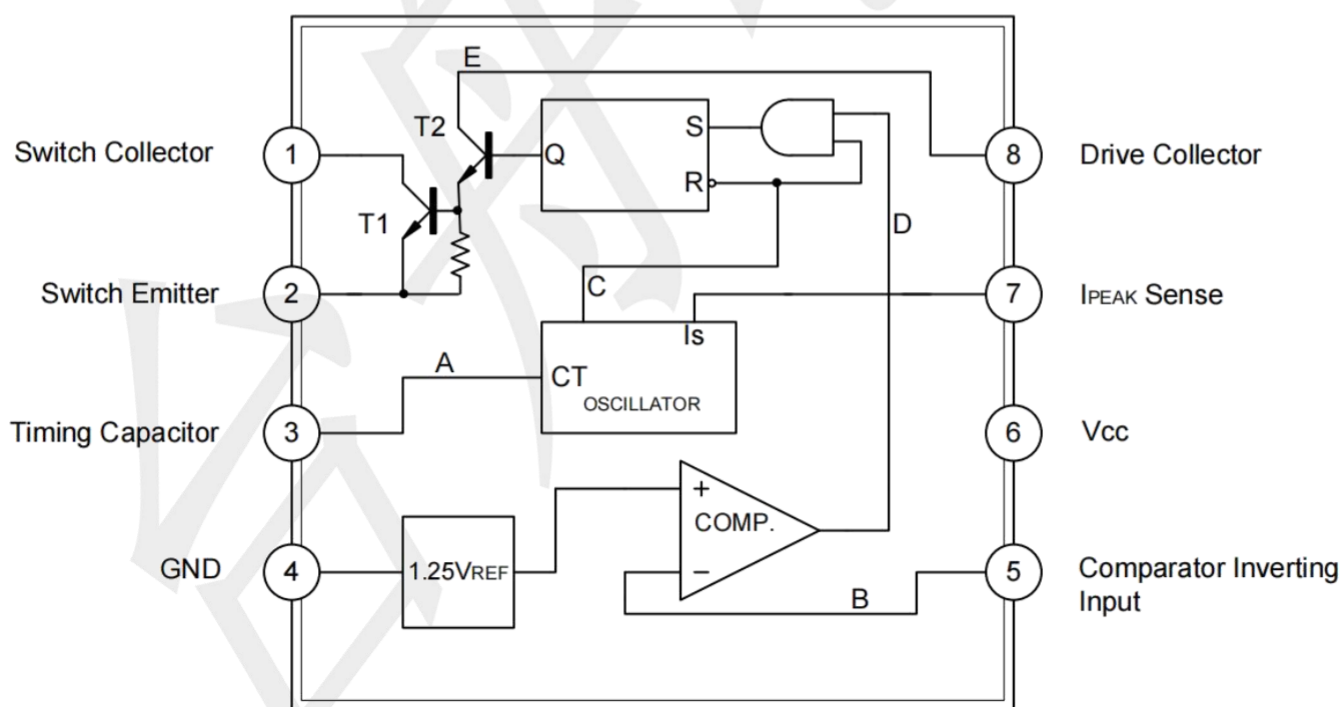
1.2 A, Step-Up/Down/Inverting Switching Regulators

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Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$, unless otherwise specified.)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	VCC	40	V
Comparator Input Voltage	VIN(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	ISW	1.2	A
Power Dissipation ($T_A=25^{\circ}\text{C}$)	P_D	625	mW
Junction-to-Ambient	θ_{JA}	160	$^{\circ}\text{C/W}$
Junction Temperature	T_J	+150	$^{\circ}\text{C}$
Operating Temperature	TOPR	0 ~ +70	$^{\circ}\text{C}$
Storage Temperature	TSTG	-65 ~ +150	$^{\circ}\text{C}$

BLOCK DIAGRAM



1.2 A, Step-Up/Down/Inverting Switching Regulators

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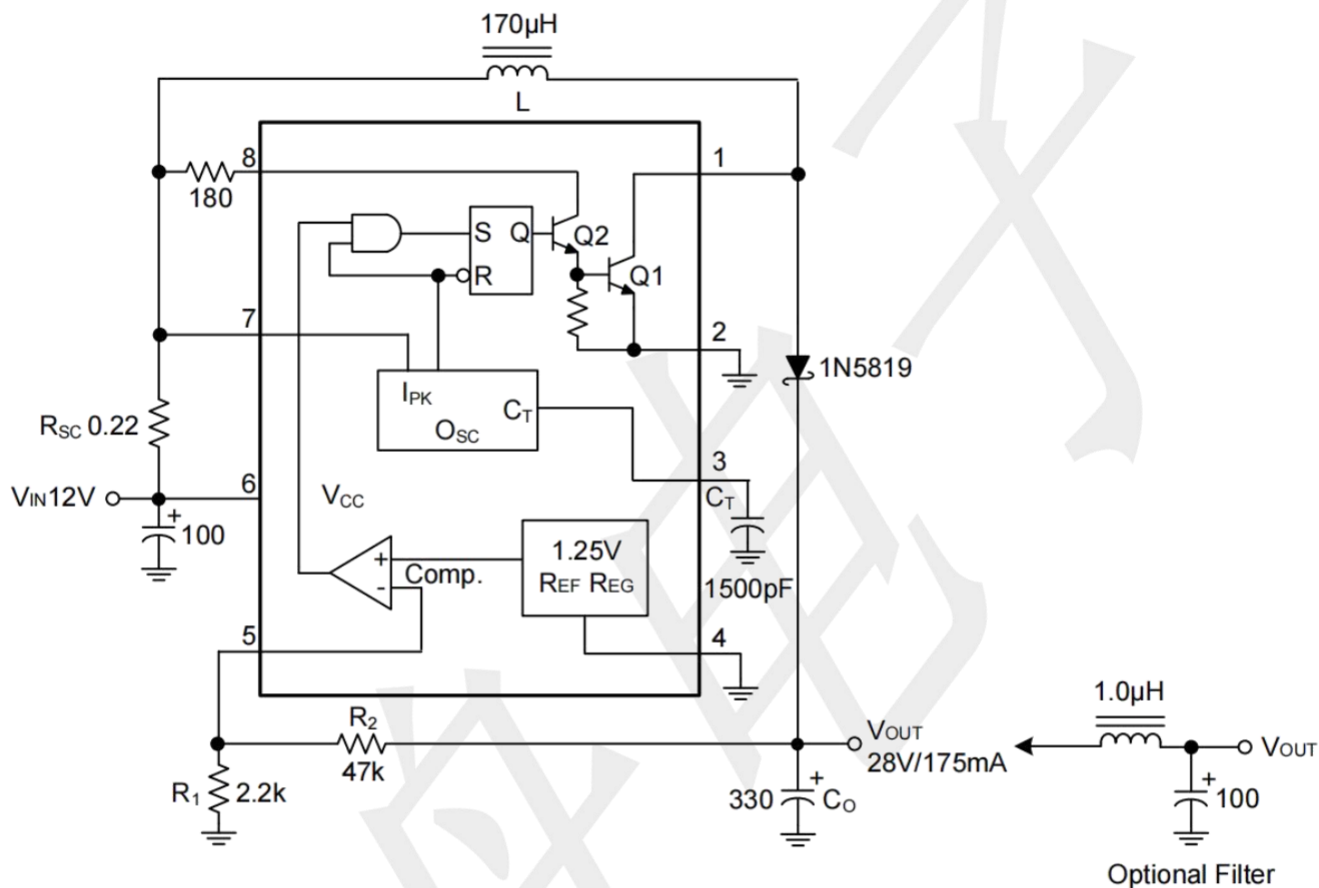
Electrical Characteristics

($V_{CC}=5.0V$, $T_A=0\sim+70^{\circ}C$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OSCILLATOR						
Maximum Oscillator Frequency	F_{OSC}	$V_{PIN\ 5}=0V$, $C_T=1.0nF$, $T_A=25^{\circ}C$	24	--	42	kHz
Charging Current	I_{CHG}	$V_{CC}=5$ to $40V$, $T_A=25^{\circ}C$	22	31	42	μA
Discharging Current	I_{DISCHG}	$V_{CC}=5$ to $40V$, $T_A=25^{\circ}C$	140	190	260	μA
Oscillator Amplitude	V_{OSC}	$T_A=25^{\circ}C$	--	0.5	--	V
Discharge to Charge Current Ratio	K	$V_7=V_{CC}$, $T_A=25^{\circ}C$	5.2	6.1	7.5	--
Current limit Sense Voltage	V_{SENSE}	$I_{CHG}=I_{DISCHG}$, $T_A=25^{\circ}C$	250	300	350	mV
OUTPUT SWITCH						
Saturation Voltage 1 (Note)	$V_{CE(SAT)1}$	$I_{SW}=1.0A$, $V_{C(DRIVER)}=V_{C(SW)}$	--	1.0	1.3	V
Saturation Voltage 2 (Note)	$V_{CE(SAT)2}$	$I_{SW}=1.0A$, $V_{C(DRIVER)}=50mA$	--	0.45	0.7	V
DC Current Gain (Note)	$G_I(DC)$	$I_{SW}=1.0A$, $V_{CE}=5.0V$, $T_A=25^{\circ}C$	50	120	--	--
Collector Off State Current (Note)	$I_{C(OFF)}$	$V_{CE}=40.0V$, $T_A=25^{\circ}C$	--	0.01	100	μA
COMPARATOR						
Threshold Voltage	V_{THD}	$T_A=25^{\circ}C$	1.23	1.25	1.27	V
		$T_A=0\sim70^{\circ}C$	1.21	1.25	1.29	V
Threshold Voltage Line Regulation	V_{THD}	$V_{CC}=3\sim40V$	--	2.0	5.0	mV
Input Bias Current	$I_{I(BIAS)}$	$V_{IN}=0V$	--	50	400	nA
TOTAL DEVICE						
Supply Current	I_{CC}	$V_{CC}=5\sim40V$, $C_T=0.001$ $V_7=V_{CC}$, $V_C>V_{THD}$, $Pin2=GND$	--	2.5	4.0	mA

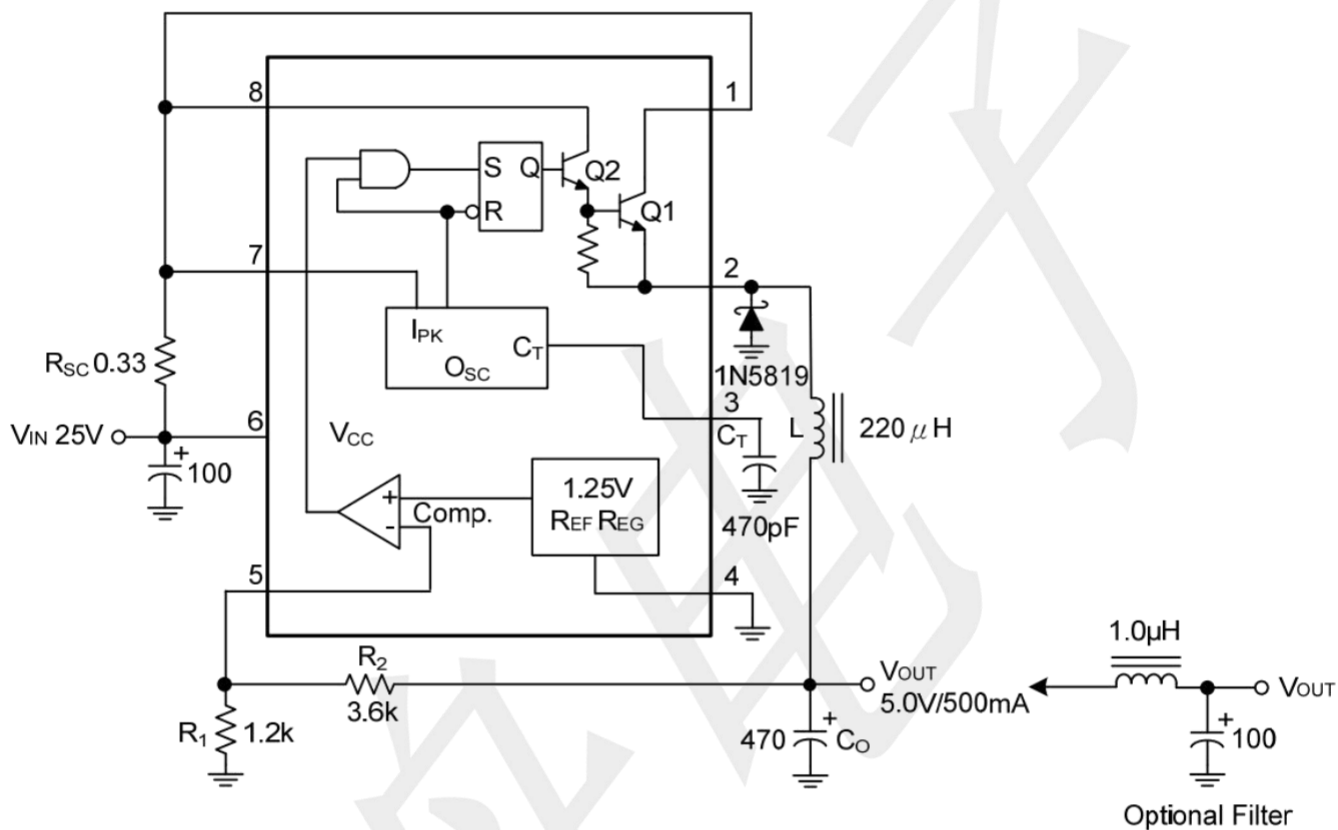
Note: Output switch tests are performed under pulsed conditions to minimize power dissipation.

STEP-UP CONVERTER



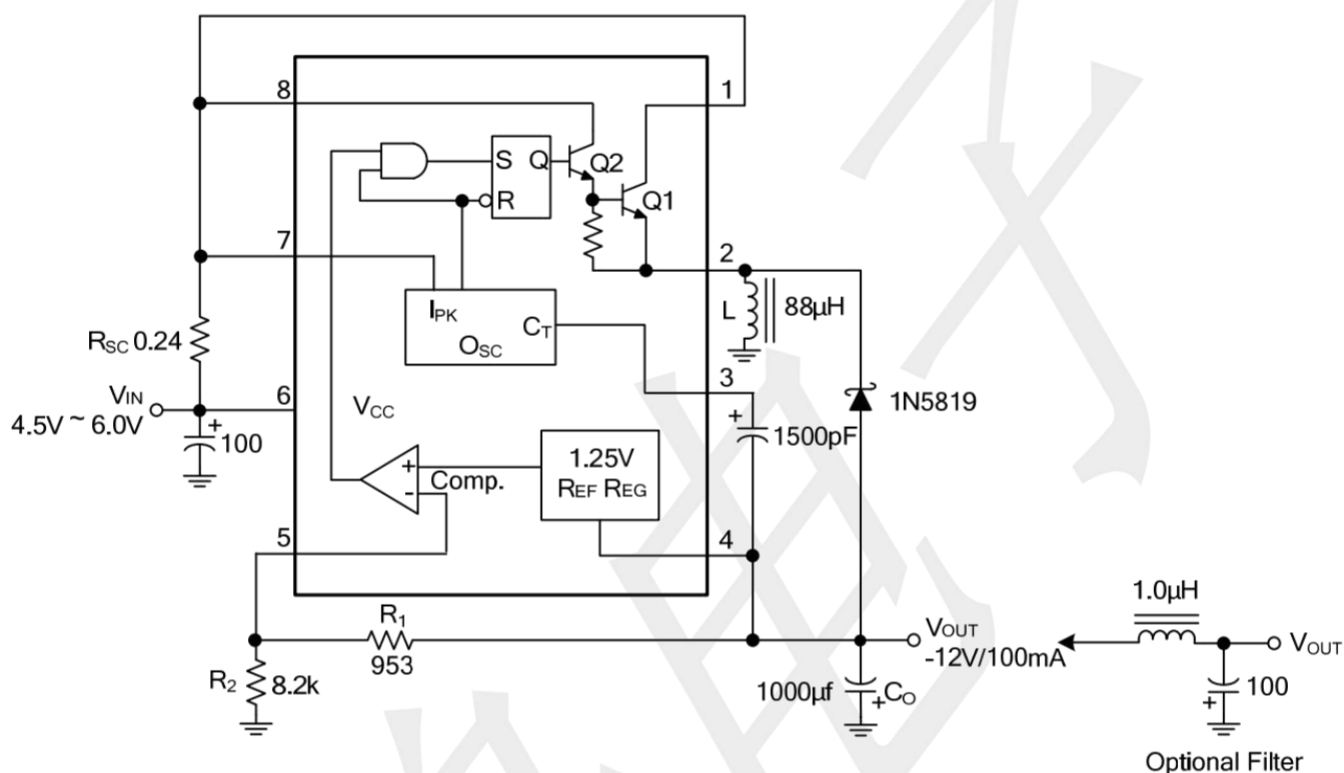
TEST	CONDITIONS	RESULTS
Line Regulation	$V_{IN} = 8.0V \sim 16V$, $I_{OUT} = 175mA$	$30mV = \pm 0.05\%$
Load Regulation	$V_{IN} = 12V$, $I_{OUT} = 75mA \sim 175mA$	$10mV = \pm 0.017\%$
Output Ripple	$V_{IN} = 12V$, $I_{OUT} = 175mA$	$400mV_{P-P}$
Efficiency	$V_{IN} = 12V$, $I_{OUT} = 175mA$	87.7%
Output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

STEP-DOWN CONVERTER



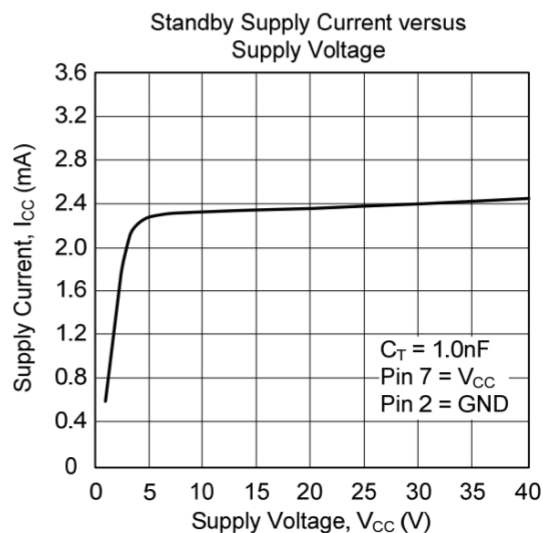
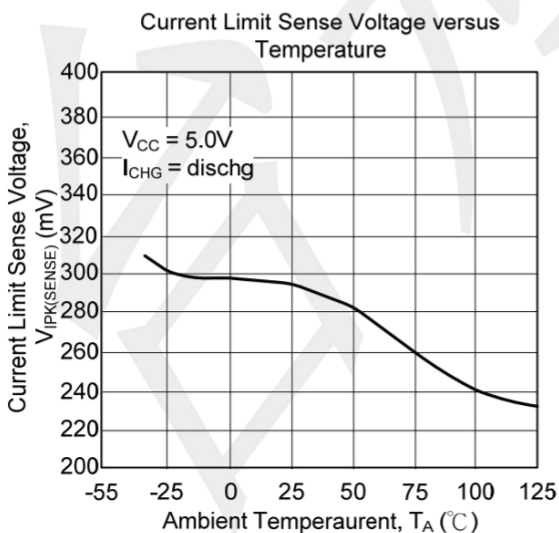
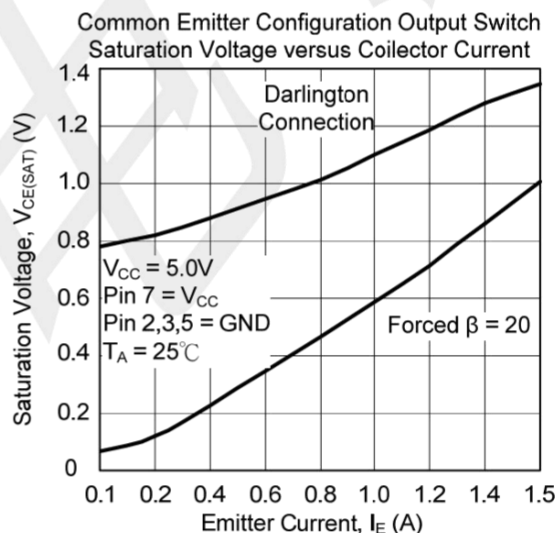
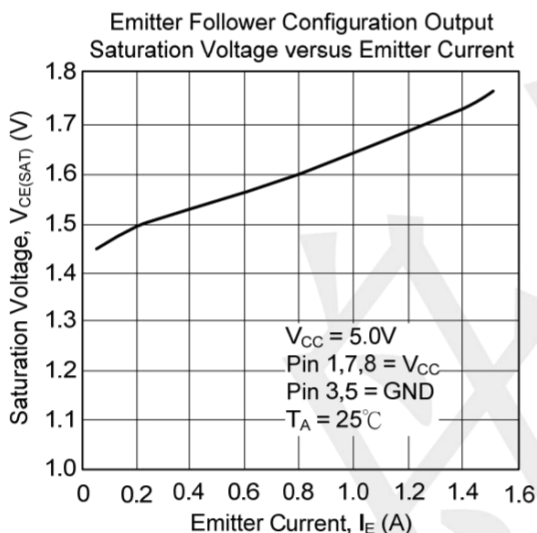
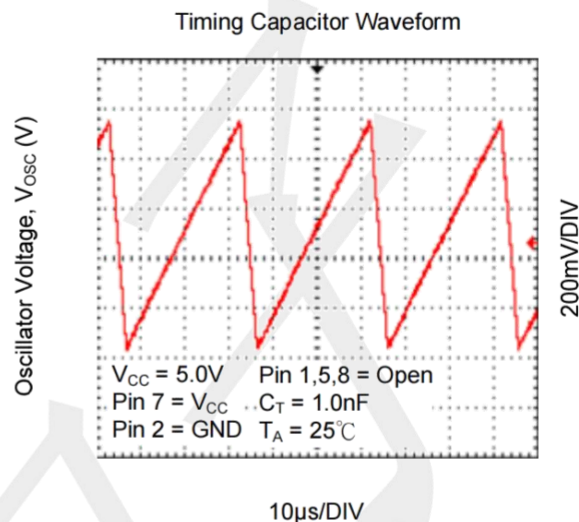
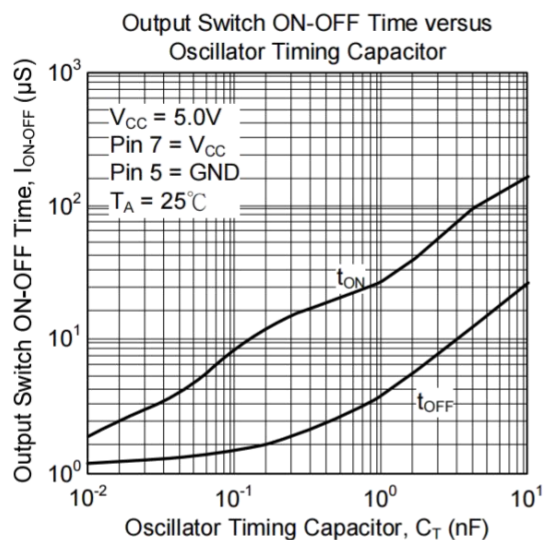
TEST	CONDITIONS	RESULTS
Line Regulation	$V_{IN} = 15V \sim 25V$, $I_{OUT} = 500mA$	$12mV = \pm 0.12\%$
Load Regulation	$V_{IN} = 25V$, $I_{OUT} = 50mA \sim 500mA$	$3.0mV = \pm 0.03\%$
Output Ripple	$V_{IN} = 25V$, $I_{OUT} = 500mA$	$120mV_{P-P}$
Short Circuit Current	$V_{IN} = 25V$, $R_L = 0.1\Omega$	1.1A
Efficiency	$V_{IN} = 25V$, $I_{OUT} = 500mA$	83.7%
Output Ripple With Optional Filter	$V_{IN} = 25V$, $I_{OUT} = 500mA$	$40mV_{P-P}$

VOLTAGE INVERTING CONVERTER



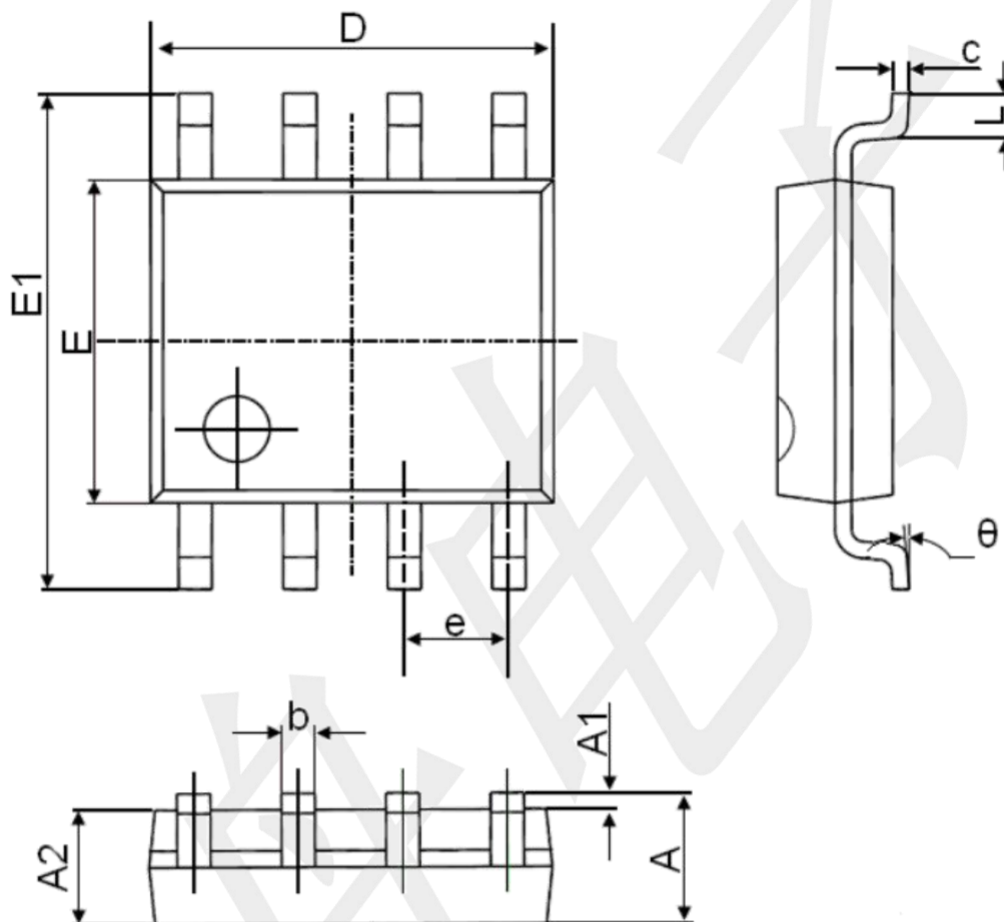
TEST	CONDITIONS	RESULTS
Line Regulation	$V_{IN} = 4.5V \sim 6.0V$, $I_{OUT} = 100mA$	3.0mV = $\pm 0.012\%$
Load Regulation	$V_{IN} = 5.0V$, $I_{OUT} = 10mA \sim 100mA$	0.022V = $\pm 0.09\%$
Output Ripple	$V_{IN} = 5.0V$, $I_{OUT} = 100mA$	500mV _{P-P}
Short Circuit Current	$V_{IN} = 5.0V$, $R_L = 0.1\Omega$	910mA
Efficiency	$V_{IN} = 5.0V$, $I_{OUT} = 100mA$	62.2%
Output Ripple With Optional Filter	$V_{IN} = 5.0V$, $I_{OUT} = 100mA$	70mV _{P-P}

TYPICAL CHARACTERISTICS



Package Outline Dimensions (unit: mm)

SOP8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°