TS9010

150mA CMOS Low Dropout Voltage Regulator with Enable

Pin assignment
1. Ground
2. Input
3. Enable
4. N/C
5. Output

Low Power Consumption
Low Drop Out Voltage 0.4V
Enable Shutdown

General Description

The TS9010 series is combine high accuracy with very low power consumption, providing high output current even when the application requires very low dropout voltage. The Chip Enable (CE) includes a CMOS or TTL compatible input allows the output to be turned off to prolong battery life. The TS9010 series is included a precision voltage reference, error correction circuit, a current limited output driver and over temperature shutdown.
This series are offered in 5-pin SOT-25 package.

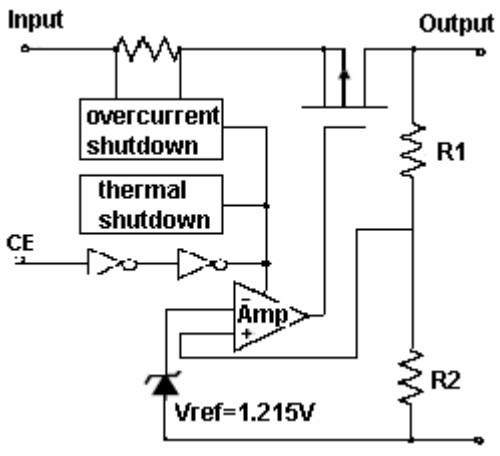
Features

- ✧ Dropout voltage typically 0.4V @Io=150mA (Vo=5V)
- ✧ Output current up to 150mA (Vout=3V)
- ✧ Low power consumption
- ✧ Output voltage +/-2%
- ✧ Internal current limit
- ✧ Thermal shutdown protection

Applications

- ✧ Palmtops
- ✧ Video recorders
- ✧ Battery powered equipment
- ✧ PC peripherals
- ✧ High-efficiency linear power supplies
- ✧ Digital signal camera

Block Diagram

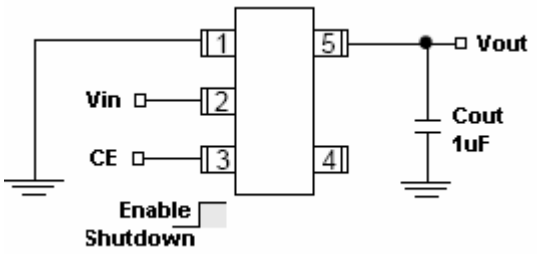


Ordering Information

Part No.	Operating Temp. (Ambient)	Package
TS9010**X**CX5	-40 ~ +85 °C	SOT-25

Note: Where **X** denotes voltage option, available are
A= 1.5V
D= 1.8V,
K= 2.5V,
S= 3.3V,
5= 5.0V.
Contact factory for additional voltage options.

Typical Application Circuit



CE (pin 3) may be connected directly to Vin (pin 2)

Absolute Maximum Rating (Note 1)

Description	Symbol	Value	Unit
Input Supply Voltage	Vin	+12	V
Enable Input Voltage	Vce	0 ~ Vin+0.3	V
Output Current	Io	200	mA
Power Dissipation (Note 3)	P_D	380	mW
Thermal Resistance	Θja	220	°C/W
Operating Junction Temperature Range	Tj	-40 ~ +125	°C
Storage Temperature Range	T_{STG}	-65 ~ +150	°C
Lead Soldering Temperature (260 °C)		5	S

Recommend Operating Rating (Note 2)

Input Supply Voltage	Vin	+10	V
Enable Input Voltage	Vce	Gnd-0.3 ~ Vin+0.3	V

Electrical Characteristics

Ta = 25 °C, Cout=2.2uF, Vce2V, unless otherwise specified.

Parameter	Conditions		Min	Typ	Max	Unit
Output Voltage	Vin=Vo + 1V, Io= 40mA		0.98|Vo|		1.02|Vo|	V
Output Voltage Temperature Coefficient (Note 4)			--	100	--	ppm/ °C
Line Regulation	Vo+1V ≤ Vin ≤ Vo+2V, Io=1mA		--	0.2	0.3	%/V
Load Regulation (Note 5)	Vin=Vo+1V, 1mA≤I_L≤150mA	Vo ≥ 2.5V	--	30	80	mV
	Vin=Vo+1V, 1mA≤I_L≤80mA	Vo< 2.5V	--	40	90	
Dropout Voltage (Note 6)	Io=80mA		--	200	400	mV
	Io=150mA		--	400	700	
Quiescent Current	Vin≤0.4V (shutdown)		--	0.01	1	uA
Ground Pin Current (Note 7)	Vin=Ven=Vo+1V		--	--	19	uA
	Vin=Vo+1V, Ven=Gnd		--	--	0.1	
Output Current Limit	Vout=0V		--	300	--	mA
Power Supply Rejection Ratio	At f=100Hz, Io=0.1mA,		--	45	--	dB
Thermal Regulation (Note 8)			--	0.05	--	%/W
Enable Input						
Enable Input Logic-Low Voltage	Regulation shutdown		--	--	0.25	V
Enable Input Logic-High Voltage	Regulation enable		1.5	--	--	V
Enable Input Current	Vce=Vin		--	--	1	uA
	Vce=Gnd		0.2	0.05	0	

Electrical Characteristics (continued)

Note 1: Exceeding the absolute maximum rating may damage the device.

Note 2: The device is not guaranteed to function outside its operating rating.

Note 3: The maximum allowable power dissipation at any Ta is Pd(max) = [Tj(max) - Ta] * Θja. Exceeding the maximum allowable power dissipation will result in excessive die temperature, and the regulator will go into thermal shutdown.

Note 4: Output voltage temperature coefficient is defined as the worst case voltage change divided by the total temperature range.

Note 5: Regulation is measured at constant junction temperature using low duty cycle pulse testing. Parts are tested for load regulation in the load range from 1mA to 150mA(Vout>2.5V) and 1mA to 80mA(Vout<2.5V). Changes in output voltage due to heating effects are covered by the thermal regulation specification.

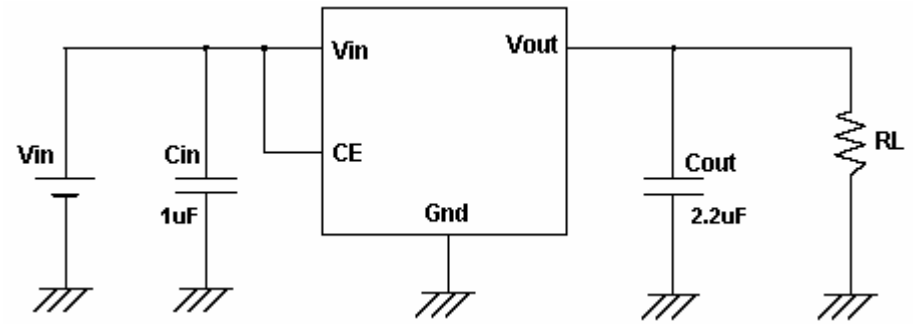
Note 6: Dropout voltage is defined as the input to output differential at which the output voltage drops 2% below its nominal value measured at 1V differential.

Note 7: Ground pin current is the regulator quiescent current plus pass transistor base current. The total current drawn from the supply is the sum of the load current plus the ground pin current.

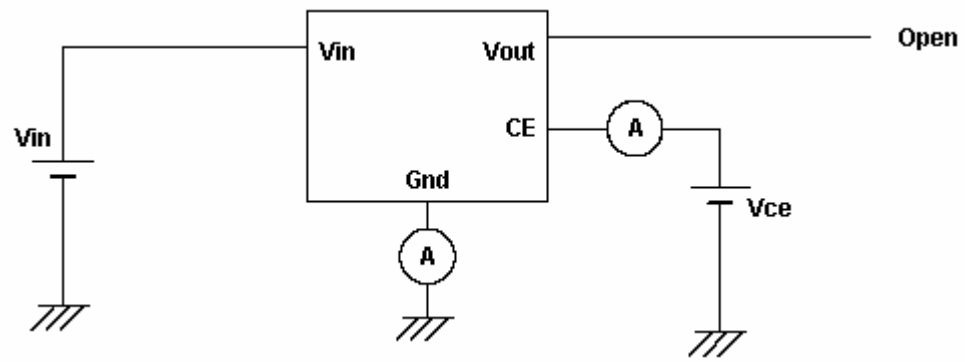
Note 8: Thermal regulation is defined as the change in output voltage at a time "t" after a change in power dissipation is applied, excluding load or line regulation effects. Specifications are for a 150mA load pulse at Vin=12V for t=10mS.

Application Examples

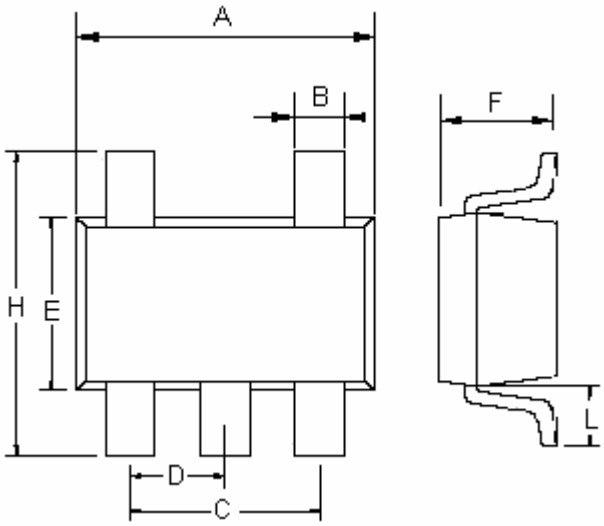
Standard Circuit



Typical Application Circuit 2



SOT-25 Mechanical Drawing



SOT-23 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.70	3.00	0.106	0.118
B	0.25	0.50	0.010	0.020
C	1.90(typ)		0.075(typ)	
D	0.95(typ)		0.037(typ)	
E	1.50	1.70	0.059	0.067
F	1.05	1.35	0.041	0.053
H	2.60	3.00	0.102	0.118
L	0.60(typ)		0.024(typ)	