

## CJ6109 Series

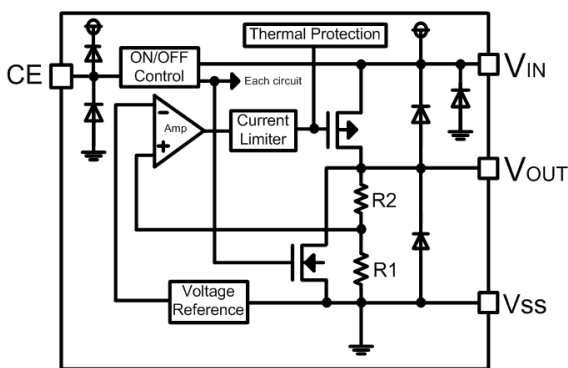
### ■ INTRODUCTION

The CJ6109 series are a group of positive voltage regulators manufactured by CMOS technology, which have high ripple rejection, ultra fast transient response and low dropout voltage, and can provide large output current even if the input and output voltage difference is small. Each of CJ6109 series consists of a high precision voltage reference, an error correction circuit and a current limiting output driver. Therefore, this series of products are very suitable for the following equipment application scenarios: industrial applications, battery power supply, wireless communication and so on.

### ■ APPLICATIONS

- CD/DVD-ROM, CD/RW
- Wireless devices
- Battery charger

### ■ BLOCK DIAGRAM



### ■ FEATURES

- Guaranteed Output Current : 1.0A (Typ.)
- Low Quiescent Current : 70μA (Typ.)
- Output Voltage Range : 0.9V~4.0V
- Input Voltage Range : 1.6V~6.0V
- High Accuracy : ±2% (Typ.)
- Dropout Voltage : 320mV@1.0A (3.3V Typ.)
- Excellent Line Regulation : 0.02%/V
- High PSRR : 70dB@10KHz
- Built-in Current Limiter & Thermal Protection
- Short Circuit Current Fold-back
- Output Capacitor : Ceramic Compatible

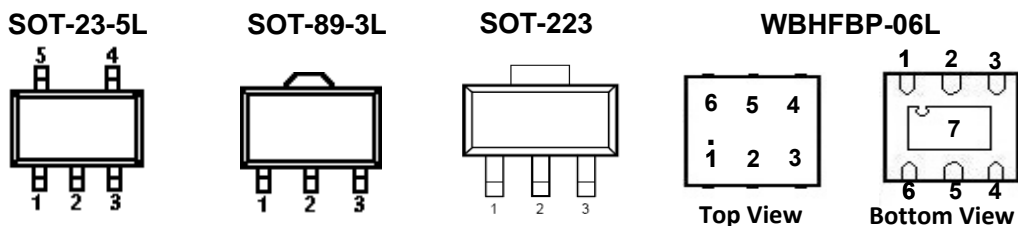
- Portable instrumentations
- PC peripherals
- Battery-Powered systems

### ■ ORDER INFORMATION

#### CJ6109①②③④

DESIGNATOR	SYMBOL	DESCRIPTION
①	A	Standard
	B	With Shutdown Function
②③	Integer	Output Voltage(0.8~5.0V) e.g:3.0V=②:3, ③:0
④	M	Package:SOT-23-5L
	P	Package:SOT-89-3L
	GW	Package:SOT-223
	FB	Package:WBHFBP-06L

## ■ PIN CONFIGURATION



### SOT-223/SOT-89-3L

PIN NUMBER			PIN NAME	FUNCTION
CJ6109AxxGW	CJ6109AxxP/PL			
GW	P	PL		
1	1	2	$V_{SS}$	Ground
3	2	1	$V_{IN}$	Power input
2	3	3	$V_{OUT}$	Output

### SOT-23-5L/WBHFBP-06L

PIN NUMBER		SYMBOL	FUNCTION
M	FB		
1	3	$V_{IN}$	Power Input Pin
2	2	$V_{SS}$	Ground
3	1	CE	Chip Enable Pin
4	5	NC	No Connection
5	4	$V_{OUT}$	Output Pin
-	6	NC	No Connection
-	7		Thermal Pad

## ■ TYPICAL APPLICATION

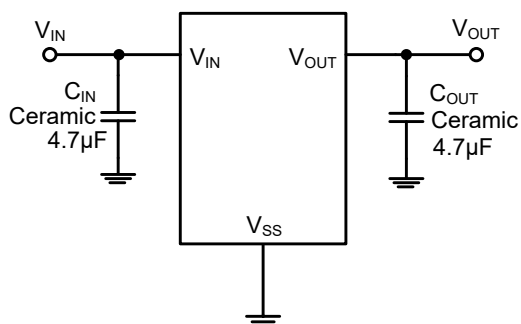


Figure1 CJ6109A Typical Application Circuit

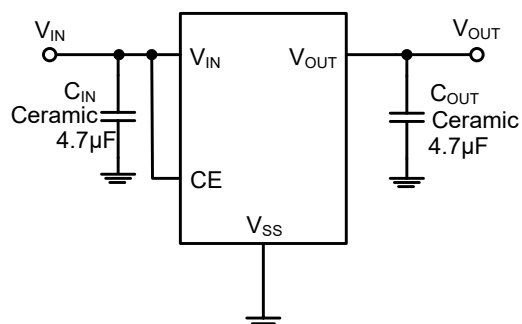


Figure2 CJ6109B Typical Application Circuit

Input capacitor ( $C_{IN}$ ): 4.7µF or more;

Output capacitor ( $C_{OUT}$ ): 4.7µF or more;

Caution: A general series regulator may oscillate, depending on the external components selected. Check that no oscillation occurs with the application using the above capacitor.

### ■ ABSOLUTE MAXIMUM RATINGS<sup>(1)</sup> (Unless otherwise specified, $T_A=25^{\circ}\text{C}$ )

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage <sup>(2)</sup>		$V_{IN}$	$V_{SS}-0.3\sim V_{SS}+7$	V
Output Current <sup>(2)</sup>		$I_{OUT}$	1300	mA
Output Voltage		$V_{OUT}$	$V_{SS}-0.3\sim V_{IN}+0.3$	V
Power Dissipation	SOT-89-3L	$P_d$	600	mW
	SOT-23-5L	$P_d$	400	mW
	WBHFBP-06L	$P_d$	600	mW
	SOT-223	$P_d$	800	mW
Operating Ambient Temperature		$T_A$	-40~+85	$^{\circ}\text{C}$
Operating Junction Temperature <sup>(3)</sup>		$T_J$	-40~+125	$^{\circ}\text{C}$
Storage Temperature		$T_{stg}$	-40~+125	$^{\circ}\text{C}$
Soldering Temperature & Time		$T_{solder}$	260 $^{\circ}\text{C}$ , 10s	

(1) Stresses beyond those listed under *absolute maximum ratings* may cause permanent damage to the device. These are stress ratings 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-rated conditions for extended periods may affect device reliability.

(2) All voltages are with respect to network ground terminal.

(3) This IC includes overtemperature protection that is intended to protect the device during momentary overload. Junction temperature will exceed 125 $^{\circ}\text{C}$  when overtemperature protection is active. Continuous operation above the specified maximum operating junction temperature may impair device reliability.

### ■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	MIN.	NOM.	MAX.	UNITS
Supply voltage at $V_{IN}$	1.6		6	V
Operating junction temperature range, $T_J$	-40		125	$^{\circ}\text{C}$
Operating free air temperature range, $T_A$	-40		85	$^{\circ}\text{C}$

## Electrical Characteristics

CJ6109 Series ( $V_{IN}=V_{OUT}+1V$ ,  $C_{IN}=C_{OUT}=4.7\mu F$ ,  $T_A=25^\circ C$ , unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP. <sup>(3)</sup>	MAX.	UNITS
Output Voltage	$V_{OUT(E)}$ <sup>(4)</sup>	$I_{OUT}=100mA$	$V_{OUT} \cdot 0.98$ <sup>(5)</sup>	$V_{OUT}$ <sup>(5)</sup>	$V_{OUT} \cdot 1.02$ <sup>(5)</sup>	V
Supply Current	$I_{SS}$	$I_{OUT}=0$		70	140	$\mu A$
Shutdown Current	$I_{SHDN}$	$CE = V_{SS}$		0.1	1.0	$\mu A$
Output Current	$I_{OUT}$	—	1000	1300		mA
Dropout Voltage <sup>(6)</sup>	$V_{Dif1}$	$I_{OUT} = 300mA$		90		mV
	$V_{Dif2}$	$I_{OUT} = 1000mA$		320		mV
Load Regulation	$\bar{\Delta}V_{OUT}$	$V_{IN} = V_{OUT} + 1V$ $1mA \leq I_{OUT} \leq 1.0A$		30		mV
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta V_{IN}}$	$I_{OUT} = 100mA$ $V_{OUT} + 1V \leq V_{IN} \leq 6V$		0.02	0.2	%/V
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T \times V_{OUT}}$	$I_{OUT} = 10mA$ $-40^\circ C \leq T \leq +85^\circ C$		50		ppm/ $^\circ C$
Short Current	$I_{Short}$	$V_{OUT} = V_{SS}$		120		mA
Input Voltage	$V_{IN}$	—	1.6		6.0	V
Power Supply Rejection Rate	1kHz	PSRR	$I_{OUT}=100mA$	75		dB
	10kHz			70		
CE "High" Voltage	$V_{CE"H"}$		1.5		$V_{IN}$	V
CE "Low" Voltage	$V_{CE"L"}$				0.3	V
Thermal Shutdown Temperature	$T_{SD}$			150		$^\circ C$
Thermal Shutdown Temperature Hysteresis	$\Delta T_{SD}$			30		$^\circ C$

### NOTE:

(3) Typical numbers are at  $25^\circ C$  and represent the most likely norm.

(4)  $V_{OUT(E)}$ : Effective Output Voltage (I.e. The output voltage when  $V_{IN} = (V_{OUT} + 1.0V)$  and maintain a certain  $I_{OUT}$  Value).

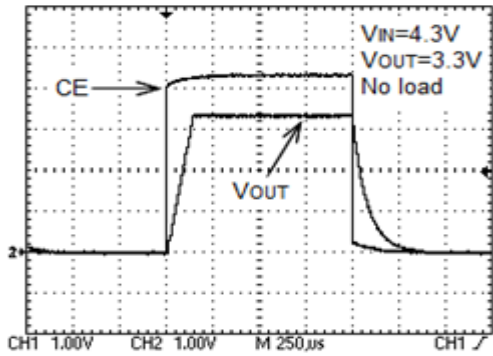
(5)  $V_{OUT}$ : Specified Output Voltage.

(6)  $V_{Dif}$ : The Difference Of Output Voltage And Input Voltage When Input Voltage Is Decreased Gradually Till Output Voltage Equals To 98% Of  $V_{OUT(E)}$ .

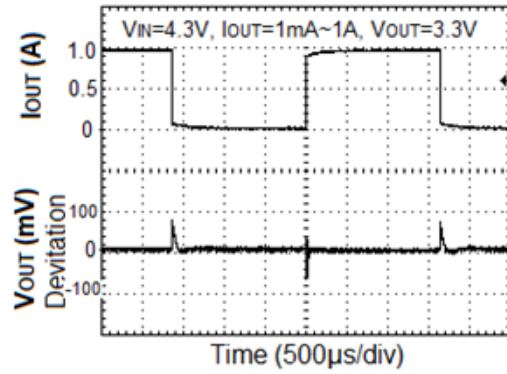
# Typical Characteristics

( $V_{CE}=V_{IN}=V_{OUT}+1V$ ,  $C_{IN}=C_{OUT}=1\mu F$ ,  $T_A=25^\circ C$ , unless otherwise specified)

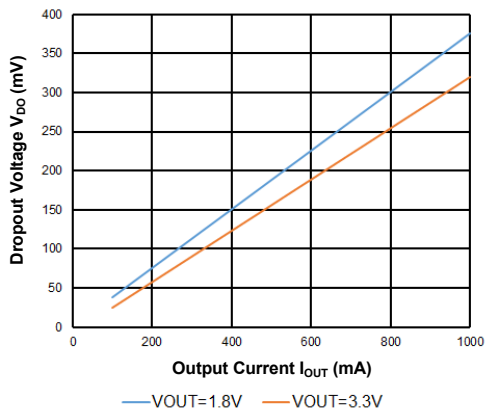
CE Start & Shutdown Response



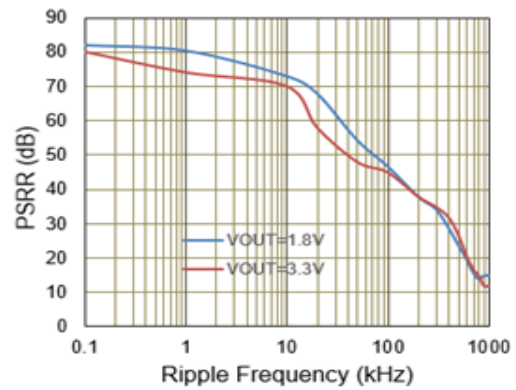
Load Transient Response



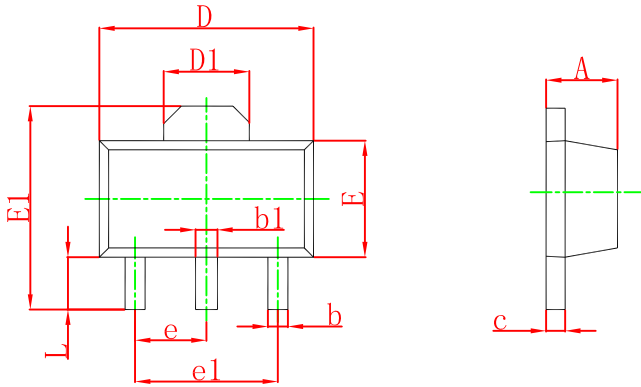
Dropout Voltage vs. Output Current



Power Supply Rejection Ratio

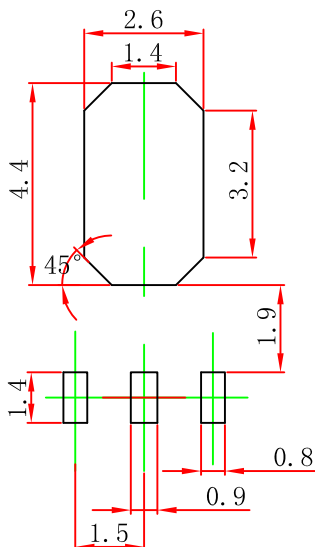


## SOT-89-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.197
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF		0.061 REF	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP		0.060 TYP	
e1	3.000 TYP		0.118 TYP	
L	0.900	1.200	0.035	0.047

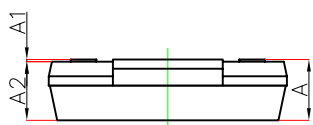
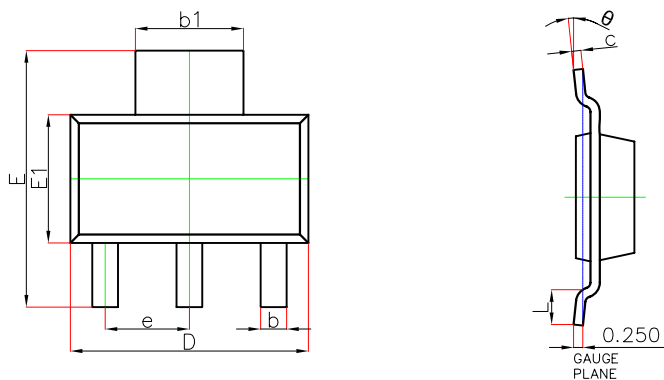
## SOT-89-3L Suggested Pad Layout



Note:

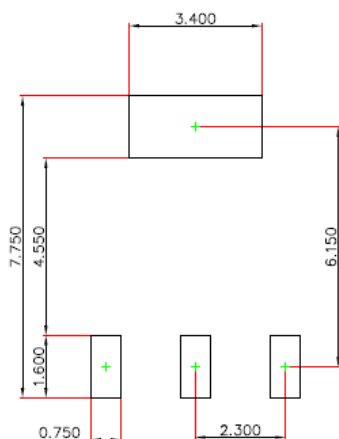
1. Controlling dimension "in" millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purpose only.

## SOT-223 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	—	1.800	—	0.071
A1	0.020	0.100	0.001	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.840	0.026	0.033
b1	2.900	3.100	0.114	0.122
c	0.230	0.350	0.009	0.014
D	6.300	6.700	0.248	0.264
E	6.700	7.300	0.264	0.287
E1	3.300	3.700	0.130	0.146
e	2.300(BSC)		0.091(BSC)	
L	0.750	—	0.030	—
θ	0°	10°	0°	10°

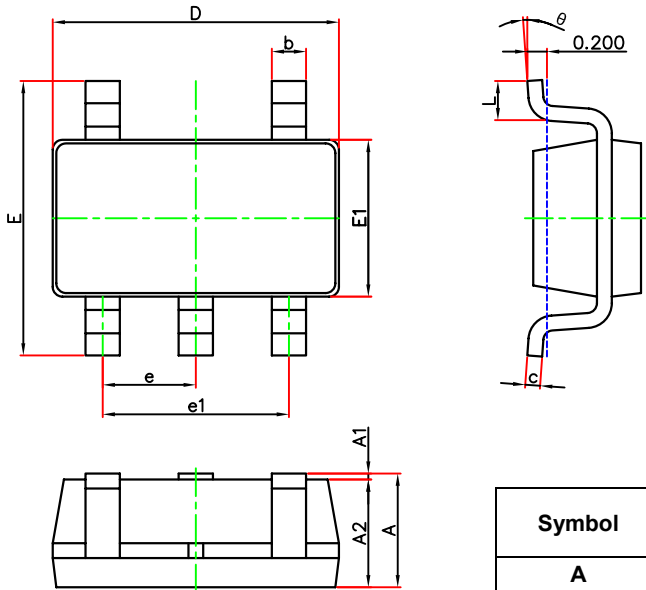
## SOT-223 Suggested Pad Layout



Note:

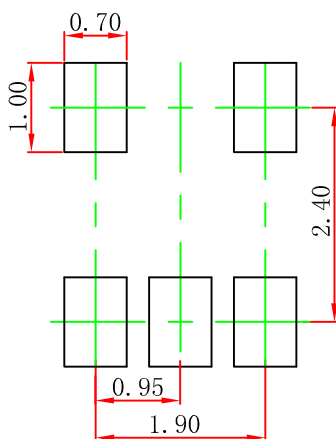
1. Controlling dimension "in" millimeters.
2. General tolerance:  $\pm 0.05$  mm.
3. The pad layout is for reference purpose only.

## SOT-23-5L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	2.650	2.950	0.104	0.116
E1	1.500	1.700	0.059	0.067
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
$\theta$	0°	8°	0°	8°

## SOT-23-5L Suggested Pad Layout

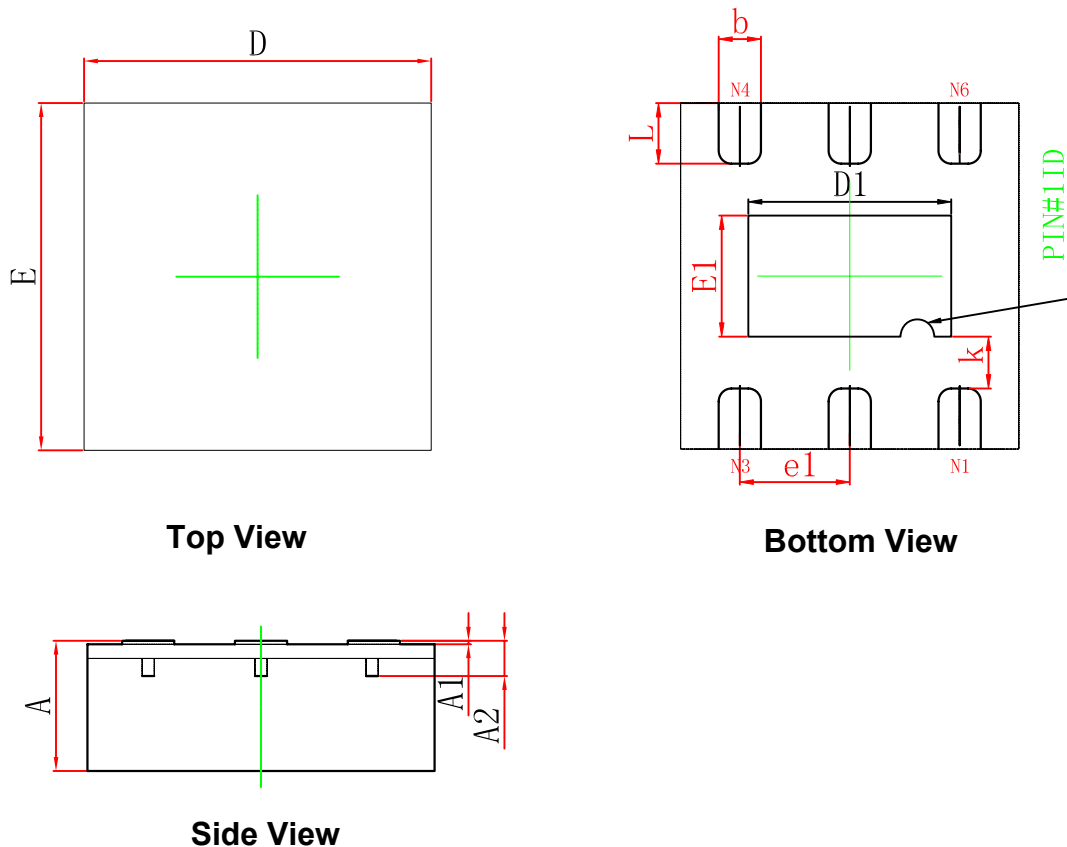


Note:

1. Controlling dimension "in" millimeters.
2. General tolerance:  $\pm 0.05$  mm.
3. The pad layout is for reference purpose only.



# WBHFBP-06L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimension In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.203REF		0.008REF	
D	1.950	2.050	0.077	0.081
E	1.950	2.050	0.077	0.081
D1	1.150	1.250	0.045	0.049
E1	0.650	0.750	0.026	0.030
b	0.200	0.300	0.008	0.012
e1	0.650TYP		0.026TYP	
k	0.200MIN		0.008MIN	
L	0.300	0.400	0.012	0.016

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