

Product Summary

The GPL6109 series are a group of positive voltage regulators manufactured by CMOS technologies with high ripple rejection, ultra-low noise, low power consumption and low dropout voltage, which can prolong battery life in portable electronics. The GPL6109 series work with low-ESR ceramic capacitors, reducing the amount of board space necessary for power applications. The GPL6109 series consume less than 0.1 μ A in shutdown mode and have fast turn-on time less than 50 μ S. The series are very suitable for the battery-powered equipments, such as RF applications and other systems requiring a quiet voltage source.

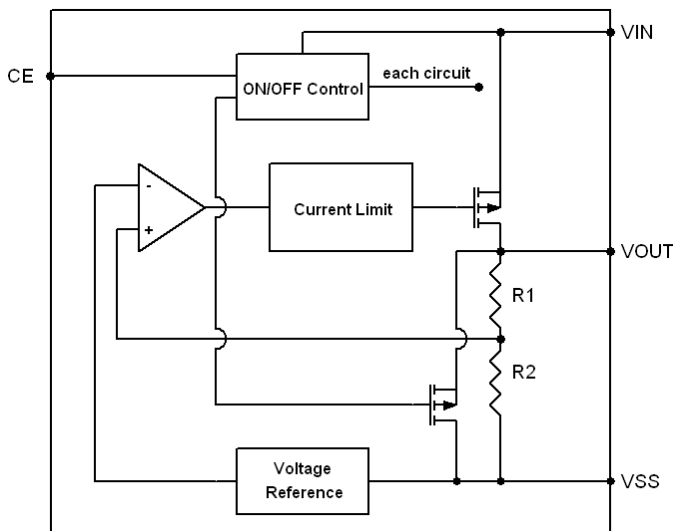
Features

- Low Quiescent Current: 70 μ A
- Guaranteed Output Current: 1.0A (Typ.)
- Operating Voltage Range: 2.0V~6.0V
- Input Voltage Range: 1.6V~6.0V
- Output Voltage: 0.9V~4.0V
- High Accuracy: $\pm 2\%$ (Typ.)
- High PSRR : 70dB@10KHz
- Excellent Line Regulation: 0.02%/V
- Built-in Current Limiter, Short-Circuit Protection

Applications

- Cellular and Smart Phones
- Radio control systems
- Laptop, Palmtops and PDAs
- Digital Still and Video Cameras
- MP3, MP4 Player
- Battery-Powered Equipment

Block Diagram

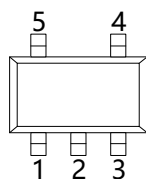
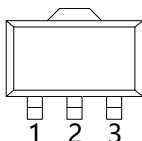
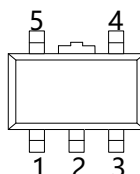


Order Information

GPL6109V①②

Designator	Description
①	Output Voltage e.g. 1.8V=18
②	Package: SOT-23-5L=K5 SOT-89-3L=KE SOT-89-5L=KT

Pin Configuration

SOT-23-5

SOT-89-3

SOT-89-5


Pin Number	Pin Name	Function
SOT-89-3		
1	V_{SS}	Ground
3	V_{OUT}	Output
2	V_{IN}	Power input

Pin Number		Pin Name	Function
SOT-23-5L	SOT-89-5L		
1	5	V_{IN}	Power Input Pin
2	2	V_{SS}	Ground
3	4	CE	Chip Enable Pin
4	3	NC	No Connection
5	1	V_{OUT}	Output Pin

Absolute Maximum Ratings ($T_a=25^{\circ}\text{C}$, unless otherwise noted)

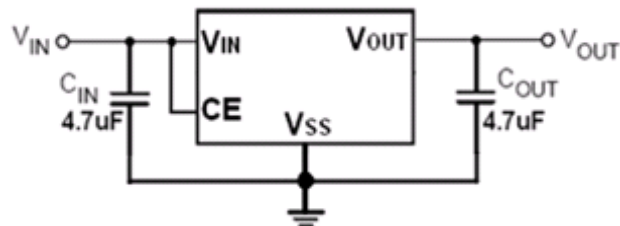
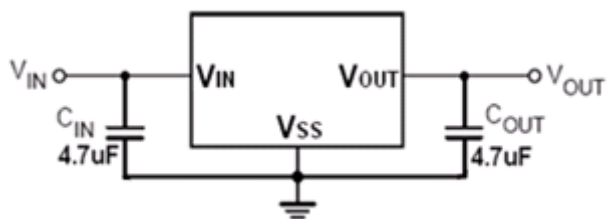
Parameter		Symbol	Ratings	Units
Input Voltage		V_{IN}	$V_{SS}-0.3\sim V_{SS}+7$	V
Output Voltage		V_{OUT}	$V_{SS}-0.3\sim V_{IN}+0.3$	V
Output Current		I_{OUT}	1300	mA
Power Dissipation	SOT-89	P_D	600	mW
	SOT-23-5	P_D	400	mW
Operating Free Air Temperature Range		T_{opr}	$-40\sim+85$	$^{\circ}\text{C}$
Storage Temperature		T_{stg}	$-40\sim+125$	$^{\circ}\text{C}$
Lead Temperature(Soldering, 10 sec)		T_{solder}	260	$^{\circ}\text{C}$

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

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage		$V_{OUT(E)^{2)}$	$I_{OUT}=100\text{mA}$	$V_{OUT}\cdot 0.98$	V_{OUT}	$V_{OUT}\cdot 1.02$	V
Supply Current		I_{SS}	$I_{OUT}=0$		70	140	μA
Shutdown Current		I_{SHDN}	$V_{CE} = V_{SS}$		0.1	1.0	μA
Output Current		I_{OUT}	—	1000	1300		mA
Dropout Voltage3)		V_{dif1}	$I_{OUT} = 300\text{mA}$		70		mV
		V_{dif2}	$I_{OUT} = 1000\text{mA}$		240		
Load Regulation		ΔV_{OUT}	$V_{IN}= V_{OUT} + 1\text{V}$, $1\text{mA}\leq I_{OUT}\leq 1.0\text{A}$		30		mV
Line Regulation		$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT} = 100\text{mA}$ $V_{OUT} + 1\text{V}\leq V_{IN}\leq 6\text{V}$		0.02	0.2	%/V
Output Voltage Temperature Characteristics		$\frac{\Delta V_{OUT}}{\Delta T \cdot V_{OUT}}$	$I_{OUT} = 10\text{mA}$ $-40\leq T\leq +85$		50		ppm
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	$I_{OUT}=100\text{mA}$		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		$^{\circ}\text{C}$
Thermal Shutdown Temperature Hysteresis		ΔT_{SD}			30		

- 1) V_{OUT} : Specified Output Voltage.
- 2) $V_{OUT(E)}$: Effective Output Voltage (i.e. The output voltage when $V_{IN} = (V_{OUT} + 1.0\text{V})$ and maintain a certain I_{OUT} Value).
- 3) 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 Application



Input capacitor (CIN): 4.7 μ F or more;

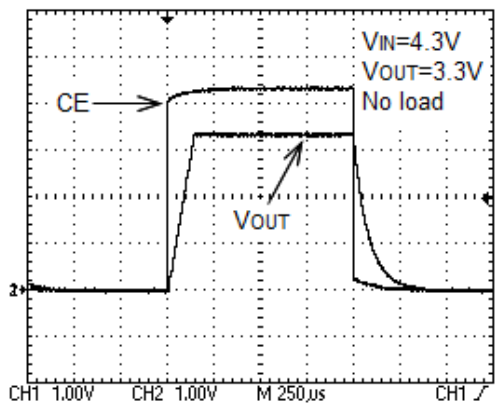
Output capacitor (COUT): 4.7 μ F or more;

Caution: A general series regulator may oscillate, depending on the external components selected.

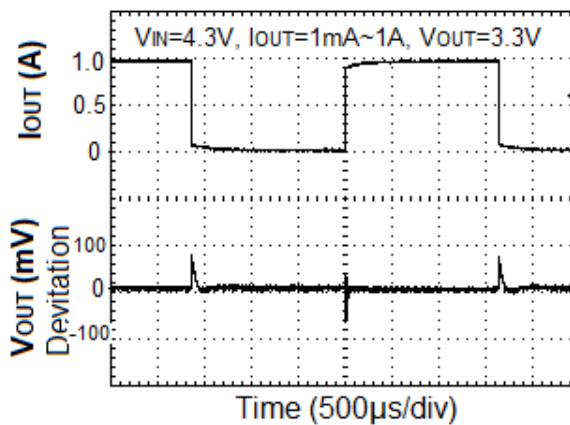
Check that no oscillation occurs with the application using the above capacitor.

Typical Performance Characteristics

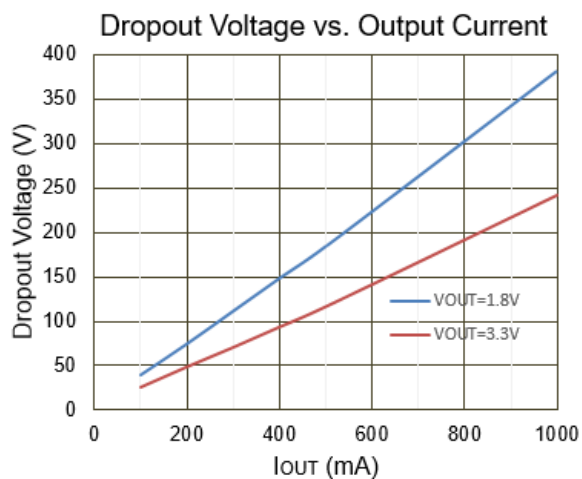
CE Start & Shutdown Response



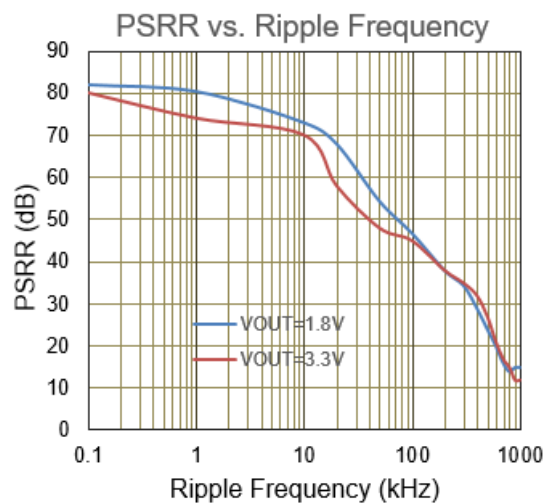
Load Transient Response



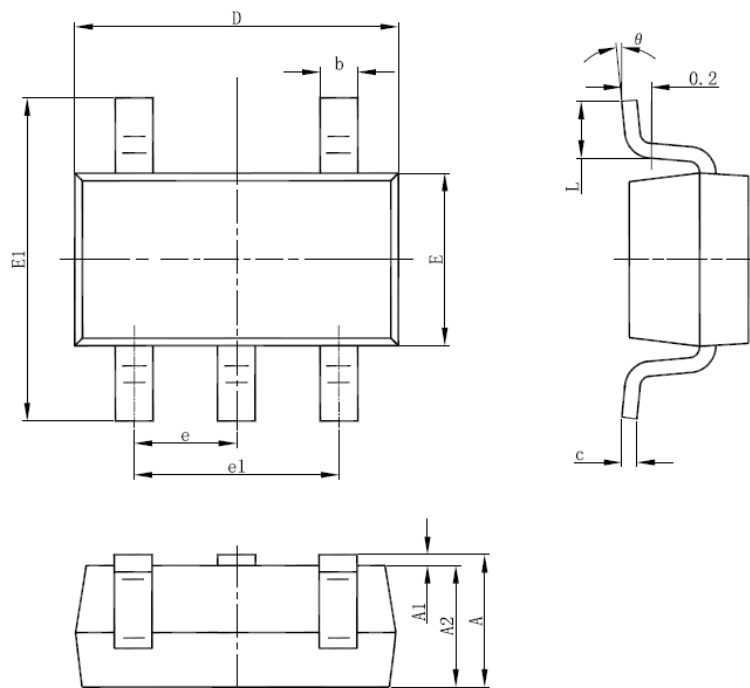
Dropout Voltage vs. Output Current



Power Supply Rejection Ratio

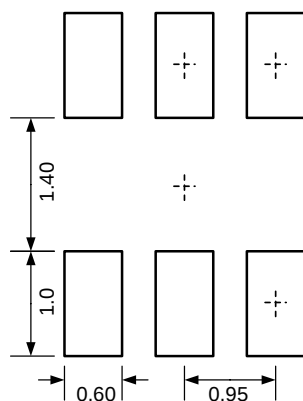


SOT-23-5L Package Outline Dimensions



Symbol	Dimensions In Millimeters	
	Min.	Max.
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.820	3.020
E	1.500	1.700
E1	2.650	2.950
e	0.950(BSC)	
e1	1.800	2.000
L	0.300	0.600
θ	0°	8°

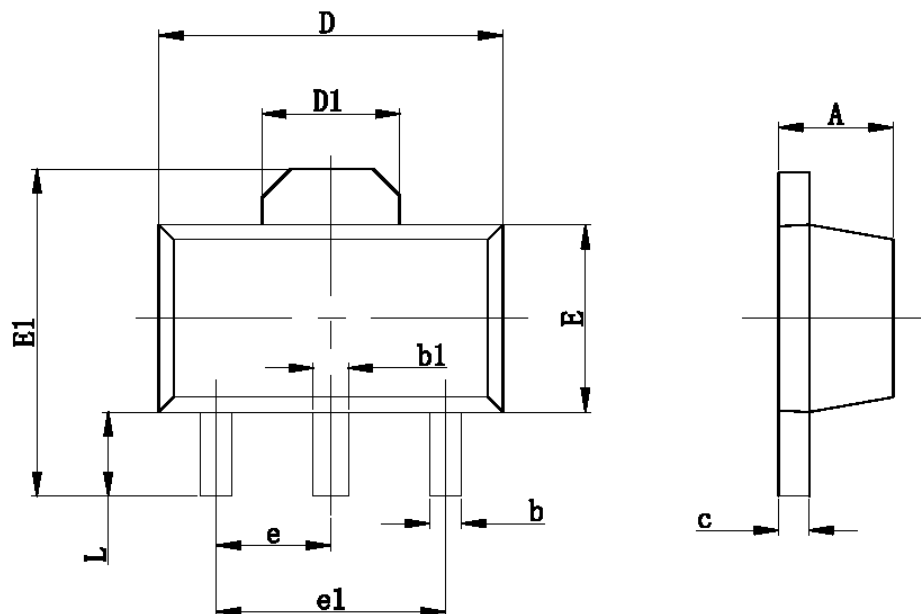
SOT-23-5L Suggested Pad Layout (Unit: mm)



Notes:

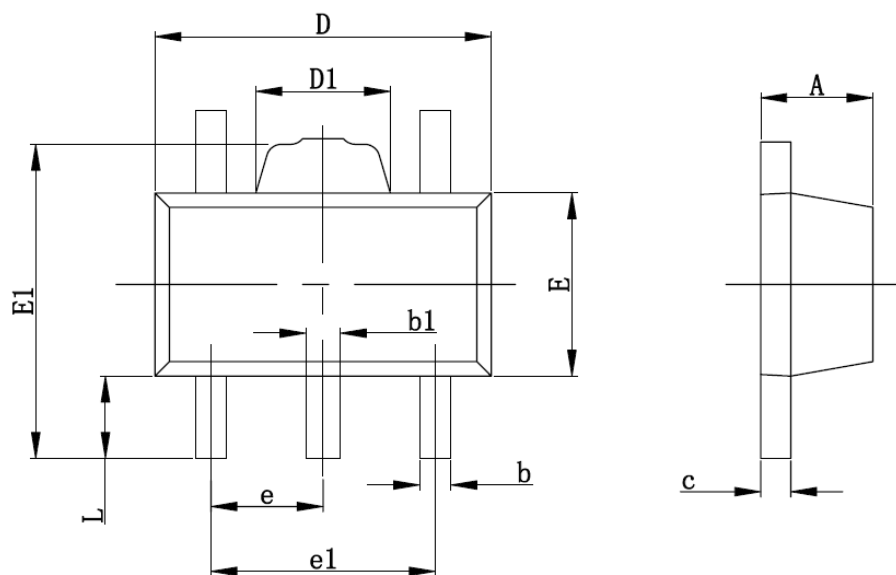
- General tolerance: ± 0.05 mm.
- The pad layout is for reference purposes only.

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	1.550REF		0.061REF	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500TYP		0.060TYP	
e1	3.000TYP		0.118TYP	
L	0.900	1.200	0.035	0.047

SOT-89-5L 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	0.360	0.560	0.014	0.022
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.400	1.800	0.055	0.071
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500TYP		0.060TYP	
e1	2.900	3.100	0.114	0.122
L	0.900	1.100	0.035	0.043