High PSRR Low Dropout Voltage 250mA CMOS LDO Regulator

LR6209 Series

INTRODUCTION

The LR6209 Series are a group of positive voltage regulators manufactured by CMOS technologies with high ripple rejection, extremely low power consumption and low dropout voltage, which provide large output currents even when the difference of the input-output voltage is small. Each of the LR6209 series consists of a high-precision voltage reference, an error correction circuit, and a current limited output driver. Thus the series are very suitable for the battery-powered equipments,such as Portable/Palm computers,Portable consumer equipments, industry equipments and so on, which want to prolong the using life of the battery.

FEATURE

- Standby Current : Less than 0.1μA (TYP.)
- Maximum Output Current：250mA
- Output Voltage Range：1.4V～6.0V, （selectable in 0.1V steps）
- High Accuracy：±2％（Typ）
- Dropout Voltage：160mV@100mA（3.0V Typ）
- Excellent Line Regulaion：0.1％/V
- High Ripple Rejection : 60dB (1kHz)
- Buit-in Current Limiter
- Buit-in Thermal Protection
- Static safety: 2KV@HBM
- TC：100ppm/℃
- Output Capacitor：Ceramic Compatible

APPLICATION

- Battery powered systems
- Portable instrumentations
- Reference Voltage Sources
- Radio control systems
- Portable/Palm computers
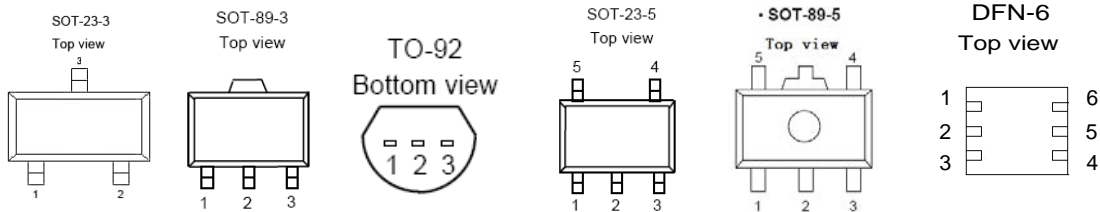- Portable consumer equipments

BLOCK DIAGRAM
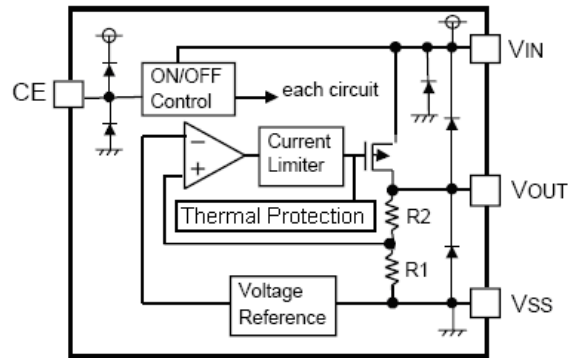
ORDER INFORMATION

LR6209-①.②③④

Designator	Symbol	Description
①	A	Standard
	B	With shudown function
②③	Integer	Output Voltage (1.4v~6.0v) e.g. 3.0v=②:3,③:0
④	M	Package:SOT23,SOT23-5
	P	Package:SOT89
	T	Package:TO-92
	D	Package:DFN-6

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PIN CONFIGURATION

LR6209-A②.③（Pin output sequence can be ordered by customer）

PIN NUMBER							PIN NAME	FUNCTION
SOT23-3				SOT89-3		TO92		
M	MA	MC	MY	P	PT	T		
1	2	3	3	1	2	1	Vss	Ground
2	1	2	1	3	1	3	Vout	Output
3	3	1	2	2	3	2	Vin	Power input

LR6209-B②.③（SOT89-5L）

PIN NUMBER	PIN NAME	FUNCTION
1	Vout	Output Pin
2	Vss	Ground
3	NC	No Connection
4	CE	Chip Enable Pin
5	Vin	Power input

LR6209-B②.③（SOT23-5L）

PIN NUMBER		PIN NAME	FUNCTION
M	MS		
1	5	Vin	Power input
2	2	Vss	Ground
3	1	CE	Chip Enable Pin
4	3	NC	No Connection
5	4	Vout	Output Pin

LR6209-B②.③（DFN-6L）

PIN NUMBER	PIN NAME	FUNCTION
1	Vin	Power input
2	NC	No Connection
3	Vout	Output
4	NC	No Connection
5	GND	Ground
6	CE	Chip Enable Pin

ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	DESCRIPTION	UNIT
Input Voltage		V_{IN}	10	V
Output Current		I_{out}	500	mA
Output Voltage		V_{out}	Vss-0.3~Vout+0.3	V
Power Dissipation	SOT23	Pd	250	mW
	SOT89	Pd	500	mW
	TO92	Pd	500	mW
Operating Temperature		T_{Opr}	-40~+85	℃
Storage Temperature		T_{stg}	-55~+125	℃
Soldering Temperature & Time		T_{solder}	260℃, 10s	

ELECTRICAL CHARACTERISTICS

LR6209 Series Ta=25℃

| PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Output Voltage	$V_{OUT}(E)$ (Note 2)	I_{OUT}=40mA V_{IN}= V_{OUT} +1V	V_{OUT} *0.98	V_{OUT}	V_{OUT} *1.02	V
Supply Current	I_{SS}	V_{CE} =V_{IN} =Vout+1V		3		μA
Standby Current	$I_{Standby}$	V_{CE} =Vss			0.1	μA
Output Current	Iout	—			250	mA
Dropout Voltage◆ (Note 3)	V_{dif1}	I_{OUT} =40mA		80		mV
	V_{dif2}	I_{OUT} =100mA		160		mV
Load Regulation	ΔV_{OUT}	V_{IN}= V_{OUT} +1V, 1mA≤I_{OUT}≤100mA		10		mV
Line Regulation	$\dfrac{\Delta V_{OUT}}{\Delta V_{IN} * V_{OUT}}$	I_{OUT} =40mA V_{OUT}+1V≤V_{IN}≤8V		0.1		%/V
Output Voltage Temperature Characteristics	$\dfrac{\Delta V_{OUT}}{\Delta T * V_{OUT}}$	I_{OUT} =40mA -40≤T≤+85		100		ppm
Short Current	I_{Short}	V_{OUT} =V_{SS}		100		mA
Input Voltage	V_{IN}	—	2.4		8	V
CE "High" Voltage	$V_{CE}″H″$		1.0		V_{IN}	V
CE "Low" Voltage	$V_{CE}″L″$				0.2	V

NOTE :

1. V_{OUT}：Specified Output Voltage.

2. $V_{OUT}(E)$ ：Effective Output Voltage (Ie. The Output Voltage When V_{IN} = (V_{OUT} +1.0V) 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).

◆The Dropout Voltage is fit to the products that 2.4V＜Vout.When the Vout＜ 2.4V,please ensure the input voltage more than 2.4V.
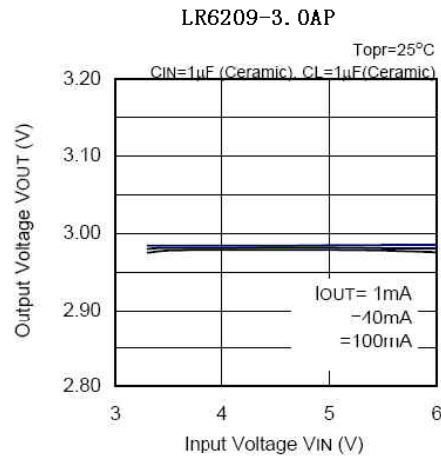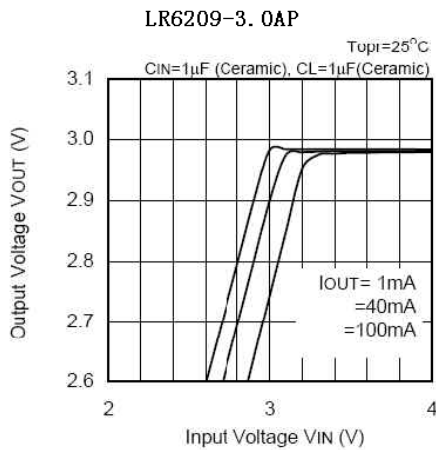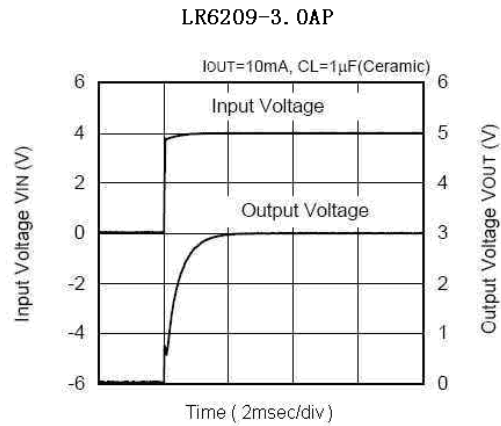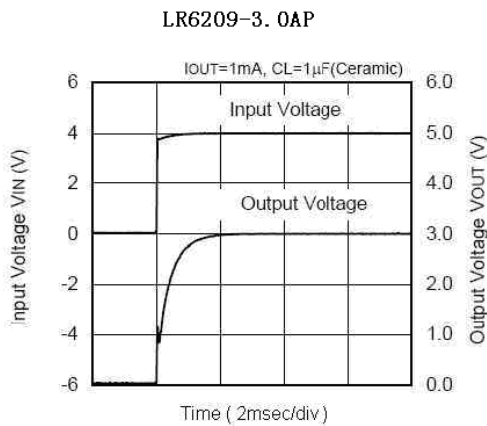
TYPICAL APPLICATION CIRCUIT
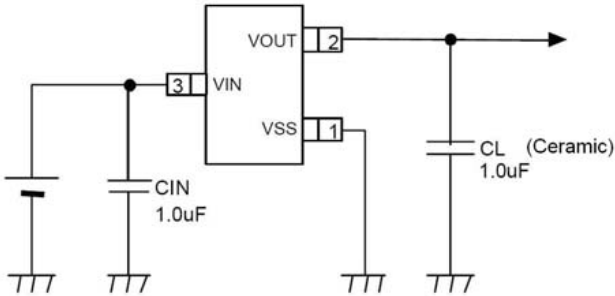
LR6209-①.②A Series
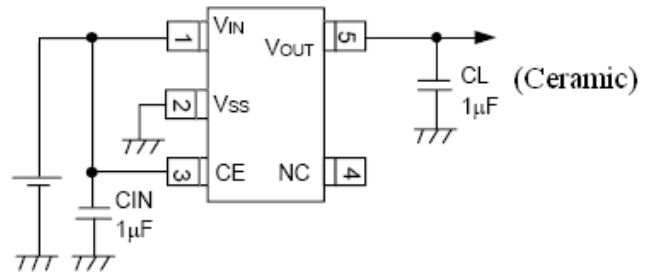
LR6209-①.②B Series
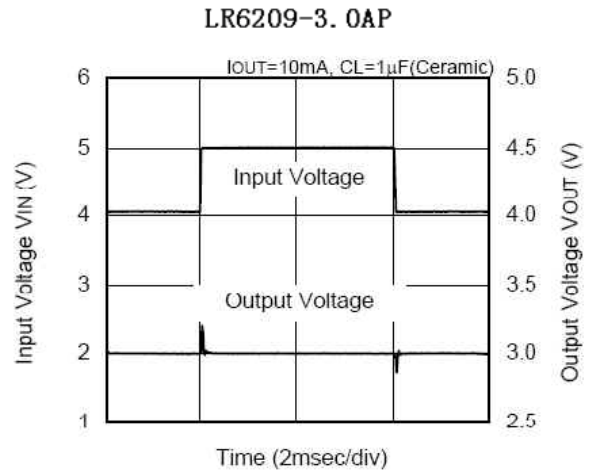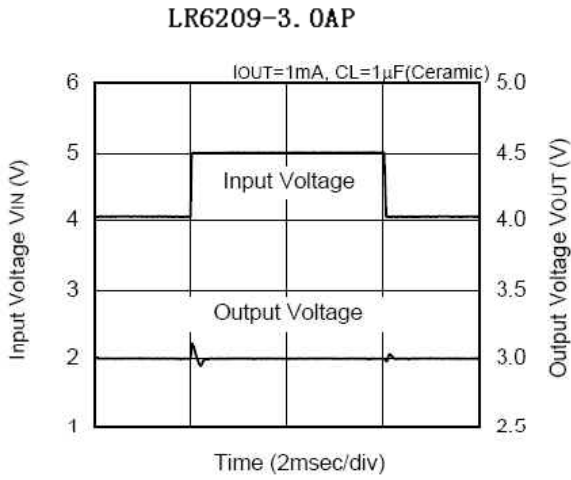
Typical Performance Characteristics

（1）**Output Voltage vs Input Voltage**

（2）**Input Transient Response 1**

（**3**）**Input Transient Response 2**

（**4**）**Load Transient Response**

（**5**）**Ripple Rejection Rate**

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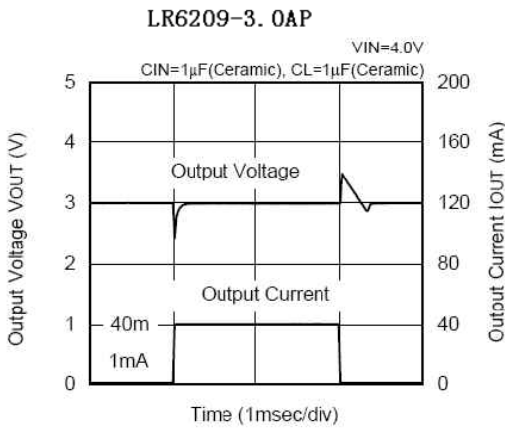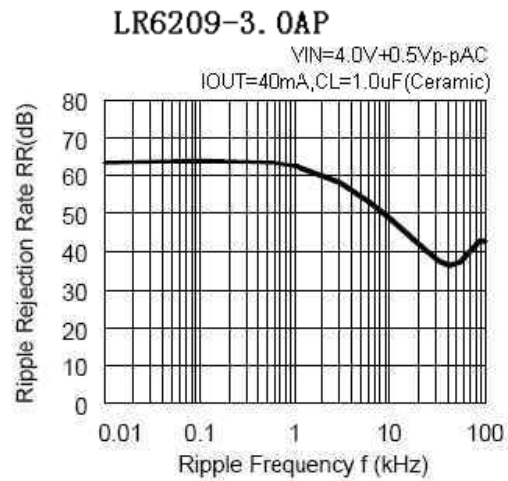
PACKAGING INFORMATION
● **SOT-23**
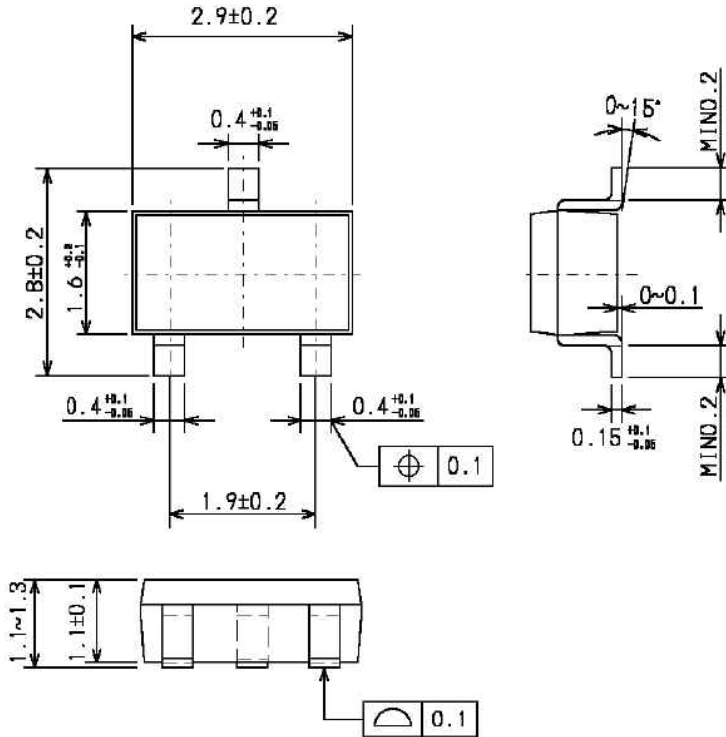
● **SOT-89**
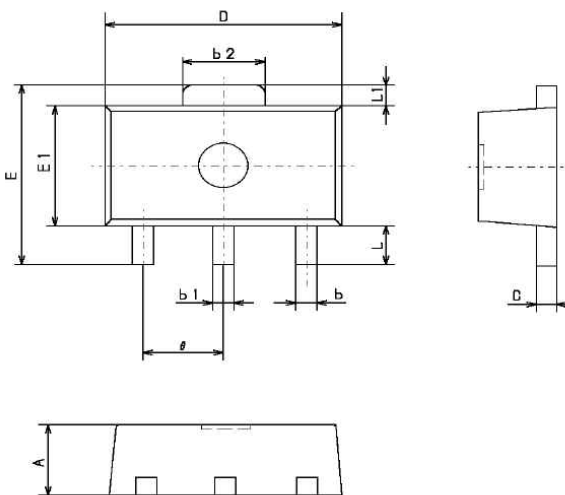
Symbols	Dimensions in millimeters		
	Min	Nom	Max
A	1.40	1.50	1.60
b	0.36	0.42	0.48
b1	0.41	0.47	0.53
b2	1.40	1.60	1.75
C	0.38	0.40	0.43
D	4.40	4.50	4.60
E	—	—	4.25
E1	2.40	2.50	2.60
θ	1.40	1.50	1.60
L	1.80	—	—
L1	—	0.40	—

● **SOT- 23- 5**
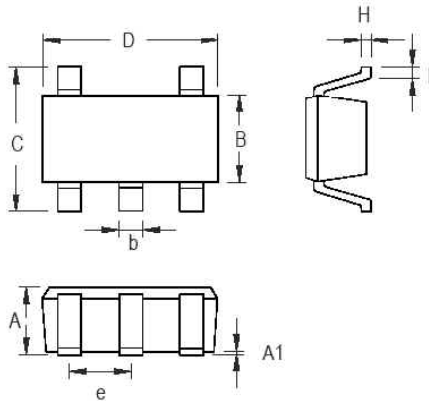
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.889	1.295	0.035	0.051
A1	0.000	0.152	0.000	0.006
B	1.397	1.803	0.055	0.071
b	0.356	0.559	0.014	0.022
C	2.591	2.997	0.102	0.118
D	2.692	3.099	0.106	0.122
e	0.838	1.041	0.033	0.041
H	0.080	0.254	0.003	0.010
L	0.300	0.610	0.012	0.024

● **TO92**

DIMENSIONS ARE IN MILLIMETERS

● **SOT‑89‑5**

SYMBOLS	DIMENSIOS IN MILLIMETERS		
	MIN	NOM	MAX
A	1.40	1.50	1.60
b	0.36	0.42	0.48
b1	0.41	0.47	0.53
b2	1.40	1.60	1.75
C	0.38	0.40	0.43
D	4.40	4.50	4.60
E	—	—	4.25
E1	2.40	2.50	2.60
e	1.40	1.50	1.60
L	0.80	—	—

2.00±0.05

6

C0.2

1

0.65 Ref.

1.20±0.10

2.00±0.05

4

3

0.25±0.05

0.70±0.10   0.35±0.10

0.75±0.05