

## BL6312R series

## 100mA Low Power LDO

### Features

- Low power consumption
- Low voltage drop
- Low temperature coefficient
- High input voltage (up to 40V)
- Output voltage accuracy: tolerance  $\pm 2\%$
- TO92 and SOT89 package

### Applications

- Battery-powered equipment
- Communication equipment
- Audio/Video equipment

### General Description

The BL6312R series is a set of three-terminal low power high voltage regulators implemented in CMOS technology. They allow input voltages as high as 40V. They are available with several fixed output voltages ranging from 3.0V to 5.0V. CMOS technology ensures low voltage drop and low quiescent current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain variable voltages and currents.

### Selection Table

Part No.	Output Voltage	Package	Marking
BL6312R-30xx	3.0V	TO92 SOT89	BL6312R-30
BL6312R-33xx	3.3V		BL6312R-33
BL6312R-36xx	3.6V		BL6312R-36
BL6312R-40xx	4.0V		BL6312R-40
BL6312R-44xx	4.4V		BL6312R-44
BL6312R-50xx	5.0V		BL6312R-50

Note: "xx" stands for package.

### Order Information

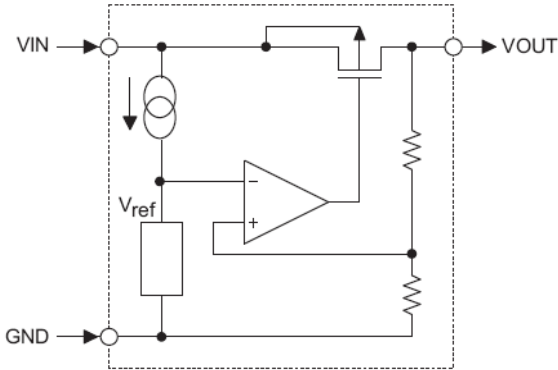
BL6312R-①②③④

Designator	Symbol	Description
① ②	Integer	Output Voltage(3.0~5.0V)
③	T	Package:TO-92
	P	Package:SOT89
④	R	RoHS / Pb Free
	G	Halogen Free

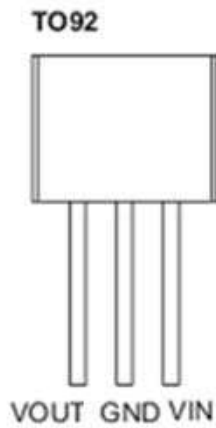
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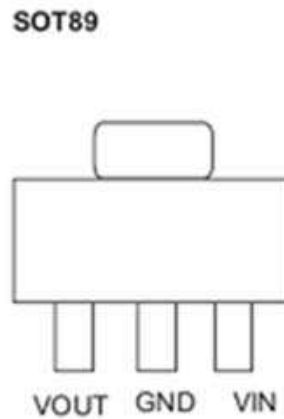
**Block Diagram**



**Pin Assignment**



Front View



**Absolute Maximum Ratings**

Supply Voltage .....-0.3V to 40V

Storage Temperature .....-50°C to 125°C

Operating Temperature .....-40°C to 85°C

Note: These are stress ratings only. Stresses exceeding the range specified under “Absolute Maximum Ratings” may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

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### Thermal Information

Symbol	Parameter	Package	Max.	Unit
$\theta_{JA}$	Thermal Resistance (Junction to Ambient) (Assume no ambient airflow, no heat sink)	SOT89	200	°C/W
		TO92	200	°C/W
$P_D$	Power Dissipation	SOT89	0.50	W
		TO92	0.50	W

Note:  $P_D$  is measured at  $T_a = 25^\circ\text{C}$

### Electrical Characteristics

#### BL6312R-30xx, +3.0V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		$V_{IN}$	Conditions				
$V_{OUT}$	Output Voltage	8V	$I_{OUT}=10\text{mA}$	2.91	3.00	3.09	V
$I_{OUT}$	Output Current	8V	-	70	-	-	mA
$\Delta V_{OUT}$	Load Regulation	8V	$1\text{mA} \leq I_{OUT} \leq 20\text{mA}$	-	60	100	mV
$V_{DIF}$	Voltage Drop(Note)	-	$I_{OUT}=1\text{mA}, \Delta V_{OUT}=2\%$	-	100	-	mV
ISS	Current Consumption	8V	No load	-	2.5	5.0	$\mu\text{A}$
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	$4\text{V} \leq V_{IN} \leq 24\text{V}$ $I_{OUT}=1\text{mA}$	-	0.2	-	%/V
$V_{IN}$	Input Voltage	-	-	-	-	40	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	8V	$I_{OUT}=10\text{mA}$ $0^\circ\text{C} < T_a < 70^\circ\text{C}$	-	$\pm 0.45$	-	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at  $V_{IN} = V_{OUT} + 4\text{V}$  with a fixed load.

#### BL6312R-33xx, +3.3V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		$V_{IN}$	Conditions				
$V_{OUT}$	Output Voltage	8V	$I_{OUT}=10\text{mA}$	3.201	3.300	3.399	V
$I_{OUT}$	Output Current	8V	-	70	-	-	mA
$\Delta V_{OUT}$	Load Regulation	8V	$1\text{mA} \leq I_{OUT} \leq 20\text{mA}$	-	60	100	mV
$V_{DIF}$	Voltage Drop(Note)	-	$I_{OUT}=1\text{mA}, \Delta V_{OUT}=2\%$	-	100	-	mV
ISS	Current Consumption	8V	No load	-	2.5	5.0	$\mu\text{A}$
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	$4.5\text{V} \leq V_{IN} \leq 24\text{V}$ $I_{OUT}=1\text{mA}$	-	0.2	-	%/V
$V_{IN}$	Input Voltage	-	-	-	-	40	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	8V	$I_{OUT}=10\text{mA}$ $0^\circ\text{C} < T_a < 70^\circ\text{C}$	-	$\pm 0.5$	-	mV/°C

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Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at  $V_{IN} = V_{OUT} + 4V$  with a fixed load.

### BL6312R-36xx, +3.6V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		$V_{IN}$	Conditions				
$V_{OUT}$	Output Voltage	8V	$I_{OUT}=10mA$	3.492	3.600	3.708	V
$I_{OUT}$	Output Current	8V	-	70	-	-	mA
$\Delta V_{OUT}$	Load Regulation	8V	$1mA \leq I_{OUT} \leq 20mA$	-	60	100	mV
$V_{DIF}$	Voltage Drop(Note)	-	$I_{OUT}=1mA, \Delta V_{OUT}=2\%$	-	100	-	mV
ISS	Current Consumption	8V	No load	-	2.5	5.0	$\mu A$
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	$4.6V \leq V_{IN} \leq 24V$ $I_{OUT}=1mA$	-	0.2	-	%/V
$V_{IN}$	Input Voltage	-	-	-	-	40	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	8V	$I_{OUT}=10mA$ $0^\circ C < T_a < 70^\circ C$	-	$\pm 0.6$	-	mV/ $^\circ C$

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at  $V_{IN} = V_{OUT} + 4V$  with a fixed load.

### BL6312R-40xx, +4.0V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		$V_{IN}$	Conditions				
$V_{OUT}$	Output Voltage	8.0V	$I_{OUT}=10mA$	3.880	4.000	4.120	V
$I_{OUT}$	Output Current	8.0V	-	80	-	-	mA
$\Delta V_{OUT}$	Load Regulation	8.0V	$1mA \leq I_{OUT} \leq 20mA$	-	60	100	mV
$V_{DIF}$	Voltage Drop(Note)	-	$I_{OUT}=1mA, \Delta V_{OUT}=2\%$	-	100	-	mV
ISS	Current Consumption	8.0V	No load	-	2.5	5.0	$\mu A$
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	$5.0V \leq V_{IN} \leq 24V$ $I_{OUT}=1mA$	-	0.2	-	%/V
$V_{IN}$	Input Voltage	-	-	-	-	40	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	8.0V	$I_{OUT}=10mA$ $0^\circ C < T_a < 70^\circ C$	-	$\pm 0.6$	-	mV/ $^\circ C$

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at  $V_{IN} = V_{OUT} + 4V$  with a fixed load.

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**BL6312R-44xx, +4.4V Output Type**

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V <sub>IN</sub>	Conditions				
V <sub>OUT</sub>	Output Voltage	8V	I <sub>OUT</sub> =10mA	4.268	4.400	4.532	V
I <sub>OUT</sub>	Output Current	8V	-	80	-	-	mA
ΔV <sub>OUT</sub>	Load Regulation	8V	1mA ≤ I <sub>OUT</sub> ≤ 20mA	-	60	100	mV
V <sub>DIF</sub>	Voltage Drop(Note)	-	I <sub>OUT</sub> =1mA, ΔV <sub>OUT</sub> =2%	-	100	-	mV
ISS	Current Consumption	8V	No load	-	2.5	5.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	5.4V ≤ V <sub>IN</sub> ≤ 24V I <sub>OUT</sub> =1mA	-	0.2	-	%/V
V <sub>IN</sub>	Input Voltage	-	-	-	-	40	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	6.4V	I <sub>OUT</sub> =10mA 0°C < T <sub>a</sub> < 70°C	-	±0.7	-	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V<sub>IN</sub> = V<sub>OUT</sub>+4V with a fixed load.

**BL6312R-50xx, +5.0V Output Type**

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V <sub>IN</sub>	Conditions				
V <sub>OUT</sub>	Output Voltage	8V	I <sub>OUT</sub> =10mA	4.85	5.00	5.15	V
I <sub>OUT</sub>	Output Current	8V	-	100	-	-	mA
ΔV <sub>OUT</sub>	Load Regulation	8V	1mA ≤ I <sub>OUT</sub> ≤ 20mA	-	60	100	mV
V <sub>DIF</sub>	Voltage Drop(Note)	-	I <sub>OUT</sub> =1mA, ΔV <sub>OUT</sub> =2%	-	100	-	mV
ISS	Current Consumption	8V	No load	-	2.5	5.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	6V ≤ V <sub>IN</sub> ≤ 24V I <sub>OUT</sub> =1mA	-	0.2	-	%/V
V <sub>IN</sub>	Input Voltage	-	-	-	-	40	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	8V	I <sub>OUT</sub> =10mA 0°C < T <sub>a</sub> < 70°C	-	±0.75	-	mV/°C

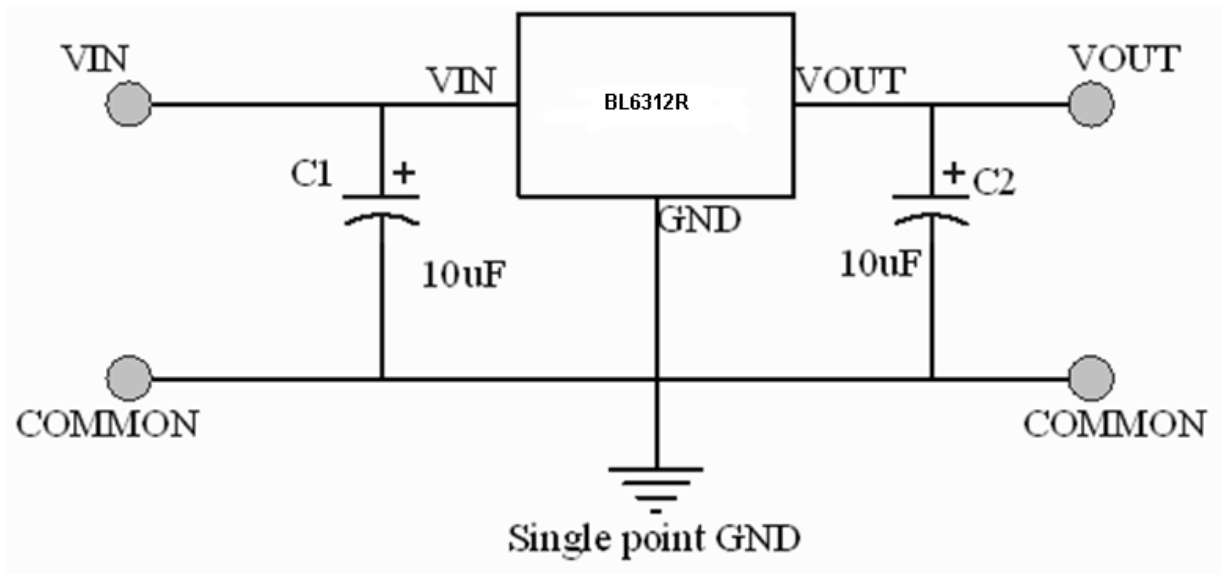
Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V<sub>IN</sub> = V<sub>OUT</sub>+4V with a fixed load.

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**Application Circuits**

**Basic Circuits**

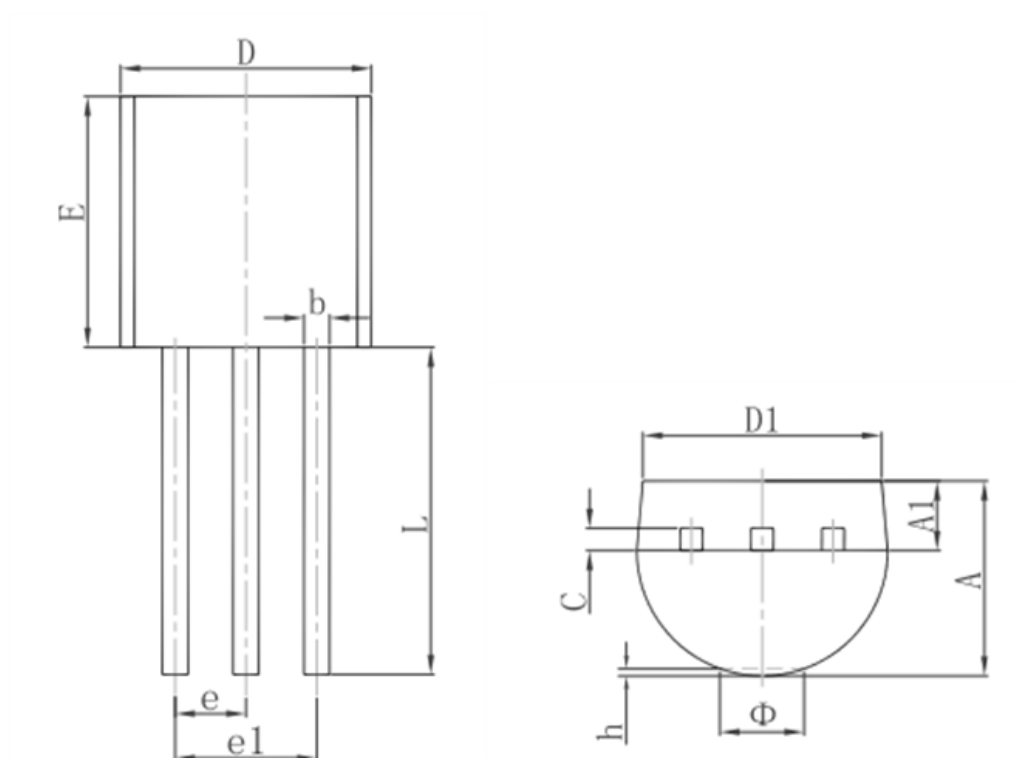


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**Package Information**

**3-pin TO92 Outline Dimensions**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	3.300	3.700	0.130	0.146
A1	1.100	1.400	0.043	0.055
b	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.300	4.700	0.169	0.185
D1	3.430		0.135	
E	4.300	4.700	0.169	0.185
e	1.270 TYP.		0.050 TYP.	
e1	2.440	2.640	0.096	0.104
L	14.100	14.500	0.555	0.571
Φ		1.600		0.063
h	0.000	0.380	0.000	0.015

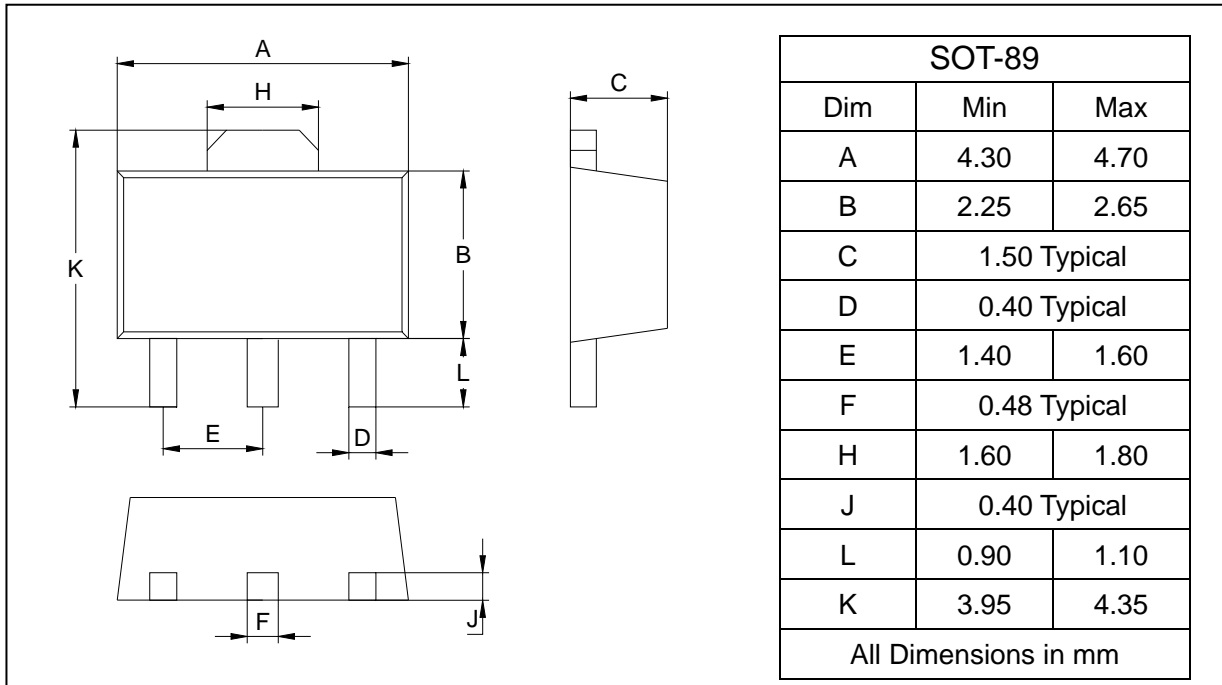
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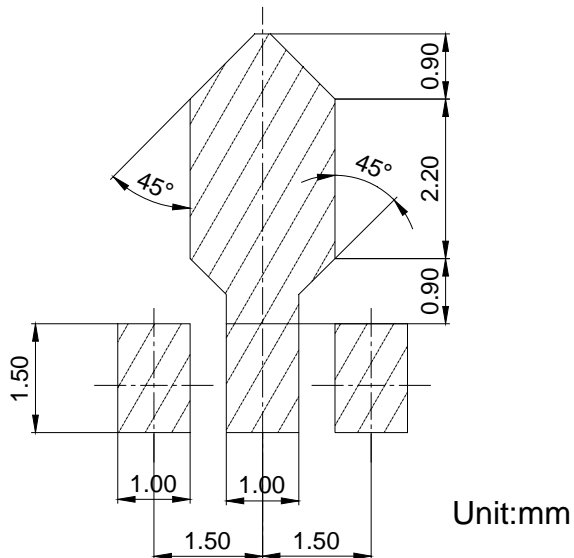
### 3-pin SOT89 Outline Dimensions

Plastic surface mounted package

SOT-89



### SOLDERING FOOTPRINT



### PACKAGE INFORMATION

Device	Package	Shipping
BL6312R Series	SOT-89	1000/Tape&Reel