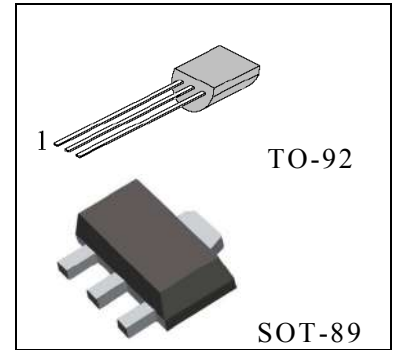


## 100mA Low Power LDO      BL91XX

### DESCRIPTION

The BL91XX series is a set of three-terminal high current low voltage regulator implemented in CMOS technology. They can deliver 100mA output current and allow an input voltage as high as 24V. They are available with several fixed output voltages ranging from 3.0V to 8.0V. 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.

The BL91XX series come in Green TO-92 and SOT-89 packages.

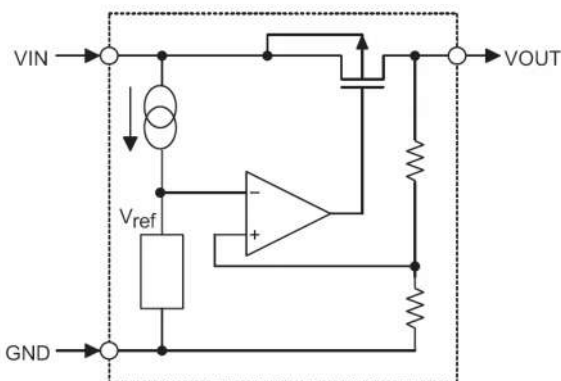
### FEATURES

- Low power consumption
- Low voltage drop
- Low temperature coefficient
- High input voltage (up to 24V)
- High output current : 100mA ( $P_d \leq 250\text{mW}$ )
- Output voltage accuracy: tolerance  $\pm 3\%$

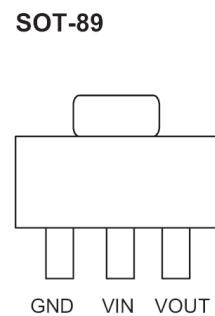
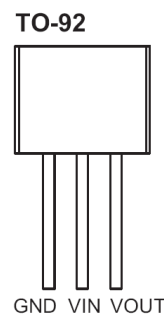
### APPLICATIONS

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

### BLOCK DIAGRAM



### PIN CONFIGURATION



**ABSOLUTE MAXIMUM RATINGS**

Characteristic	Limit	Unit
Supply voltage	-0.3 ~ 26	V
Power consumption	250	mW
Storage temperature	-50 ~ 125	°C
Operating temperature	-40 ~ 85	°C

\*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.

**ELECTRICAL CHARACTERISTICS**
**BL9130, +3.0V Output Type**

Ta=25°C

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
		V <sub>IN</sub>	Conditions				
Output voltage tolerance	V <sub>OUT</sub>	5V	I <sub>OUT</sub> =10mA	2.91	3.0	3.09	V
Output current	I <sub>OUT</sub>	5V		60	100		mA
Load regulation	ΔV <sub>OUT</sub>	5V	1mA ≤ I <sub>OUT</sub> ≤ 50mA		60	150	mV
Voltage drop	VDIF		I <sub>OUT</sub> =1mA		100		mV
Current consumption	I <sub>SS</sub>	5V	No Load		3.5	7	μA
Line regulation			4V ≤ V <sub>IN</sub> ≤ 24V, I <sub>OUT</sub> =1mA		0.2		%/V
Input voltage	V <sub>IN</sub>					24	V
Temperature coefficient		5V	I <sub>OUT</sub> =10mA 0°C ≤ Ta ≤ 70°C		± 0.45		mV/ °C

**BL9133, +3.3V Output Type**

Ta=25°C

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
		V <sub>IN</sub>	Conditions				
Output voltage tolerance	V <sub>OUT</sub>	5.5V	I <sub>OUT</sub> =10mA	3.201	3.3	3.399	V
Output current	I <sub>OUT</sub>	5.5V		60	100		mA
Load regulation	ΔV <sub>OUT</sub>	5.5V	1mA ≤ I <sub>OUT</sub> ≤ 50mA		60	150	mV
Voltage drop	VDIF		I <sub>OUT</sub> =1mA		100		mV
Current consumption	I <sub>SS</sub>	5.5V	No Load		3.5	7	μA
Line regulation			4.5V ≤ V <sub>IN</sub> ≤ 24V, I <sub>OUT</sub> =1mA		0.2		%/V
Input voltage	V <sub>IN</sub>					24	V
Temperature coefficient		5.5V	I <sub>OUT</sub> =10mA 0°C ≤ Ta ≤ 70°C		± 0.5		mV/ °C

**BL9136, +3.6V Output Type**

Ta=25℃

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
		V <sub>IN</sub>	Conditions				
Output voltage tolerance	V <sub>OUT</sub>	5.6V	I <sub>OUT</sub> =10mA	3.492	3.6	3.708	V
Output current	I <sub>OUT</sub>	5.6V		60	100		mA
Load regulation	ΔV <sub>OUT</sub>	5.6V	1mA ≤ I <sub>OUT</sub> ≤ 50mA		60	150	mV
Voltage drop	VDIF		I <sub>OUT</sub> =1mA		100		mV
Current consumption	I <sub>SS</sub>	5.6V	No Load		3.5	7	μA
Line regulation			4.6V ≤ V <sub>IN</sub> ≤ 24V, I <sub>OUT</sub> =1mA		0.2		%/V
Input voltage	V <sub>IN</sub>					24	V
Temperature coefficient		5.6V	I <sub>OUT</sub> =10mA 0℃ ≤ Ta ≤ 70℃		± 0.6		mV/ ℃

**BL9140, +4.0V Output Type**

Ta=25℃

Parameter Name	Symbol	Test Conditions		Value			Unit
		V <sub>IN</sub>	Conditions	Min	Typ	Max	
Output Voltage Tolerance	V <sub>OUT</sub>	6.0V	I <sub>OUT</sub> =10mA	3.880	4.000	4.120	V
Output Current	I <sub>OUT</sub>	6.0V		60	100		mA
Load Regulation	ΔV <sub>OUT</sub>	6.0V	1mA ≤ I <sub>OUT</sub> ≤ 50mA		60	150	mV
Voltage Drop	V <sub>DIF</sub>		I <sub>OUT</sub> =1mA		100		mV
Current Consumption	I <sub>SS</sub>	6.0V	No load		3.5	7	uA
Line Regulation			5.0V ≤ V <sub>IN</sub> ≤ 24V I <sub>OUT</sub> =1mA		0.2		%/ V
Input Voltage	V <sub>IN</sub>					24	V
Temperature Coefficient		6.0V	I <sub>OUT</sub> =10mA 0℃ < Ta < 70℃		±0.6 5		mV/ ℃

**BL9144, +4.4V Output Type**

Ta=25℃

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
		V <sub>IN</sub>	Conditions				
Output voltage tolerance	V <sub>OUT</sub>	6.4V	I <sub>OUT</sub> =10mA	4.268	4.4	4.532	V
Output current	I <sub>OUT</sub>	6.4V		60	100		mA
Load regulation	ΔV <sub>OUT</sub>	6.4V	1mA ≤ I <sub>OUT</sub> ≤ 50mA		60	150	mV
Voltage drop	VDIF		I <sub>OUT</sub> =1mA		100		mV
Current consumption	I <sub>SS</sub>	6.4V	No Load		3.5	7	μA
Line regulation			5.4V ≤ V <sub>IN</sub> ≤ 24V, I <sub>OUT</sub> =1mA		0.2		%/V
Input voltage	V <sub>IN</sub>					24	V
Temperature coefficient		6.4V	I <sub>OUT</sub> =10mA 0℃ ≤ Ta ≤ 70℃		± 0.7		mV/ ℃

**BL9150, +5.0V Output Type**

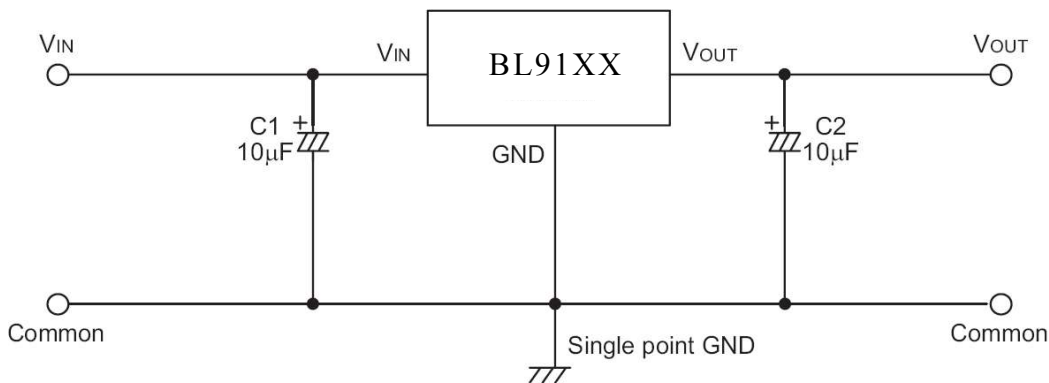
Ta=25°C

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
		V <sub>IN</sub>	Conditions				
Output voltage tolerance	V <sub>OUT</sub>	7V	I <sub>OUT</sub> =10mA	4.85	5.0	5.15	V
Output current	I <sub>OUT</sub>	7V		100	150		mA
Load regulation	ΔV <sub>OUT</sub>	7V	1mA ≤ I <sub>OUT</sub> ≤ 70mA		60	150	mV
Voltage drop	VDIF		I <sub>OUT</sub> =1mA		100		mV
Current consumption	I <sub>SS</sub>	7V	No Load		3.5	7	μA
Line regulation			6V ≤ V <sub>IN</sub> ≤ 24V, I <sub>OUT</sub> =1mA		0.2		%/V
Input voltage	V <sub>IN</sub>					24	V
Temperature coefficient		7V	I <sub>OUT</sub> =10mA 0°C ≤ Ta ≤ 70°C		± 0.75		mV/ °C

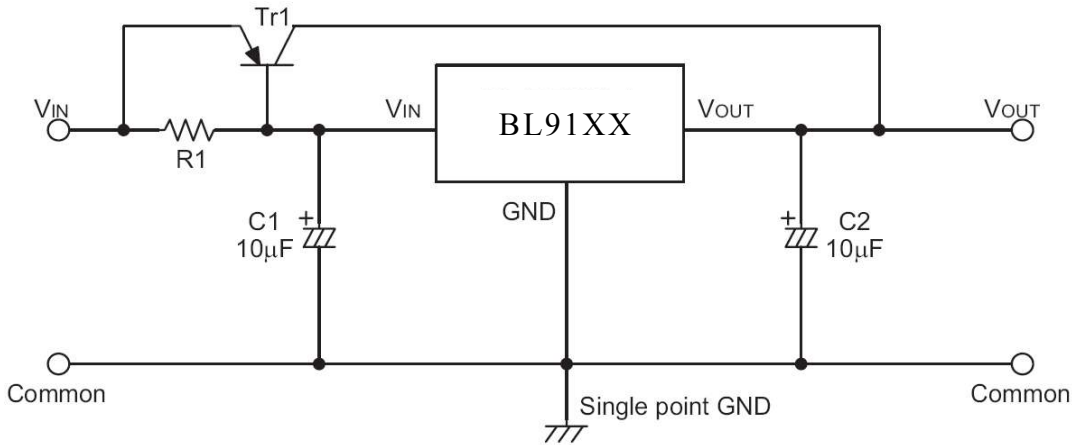
**BL9180, +8.0V Output Type**

Ta=25°C

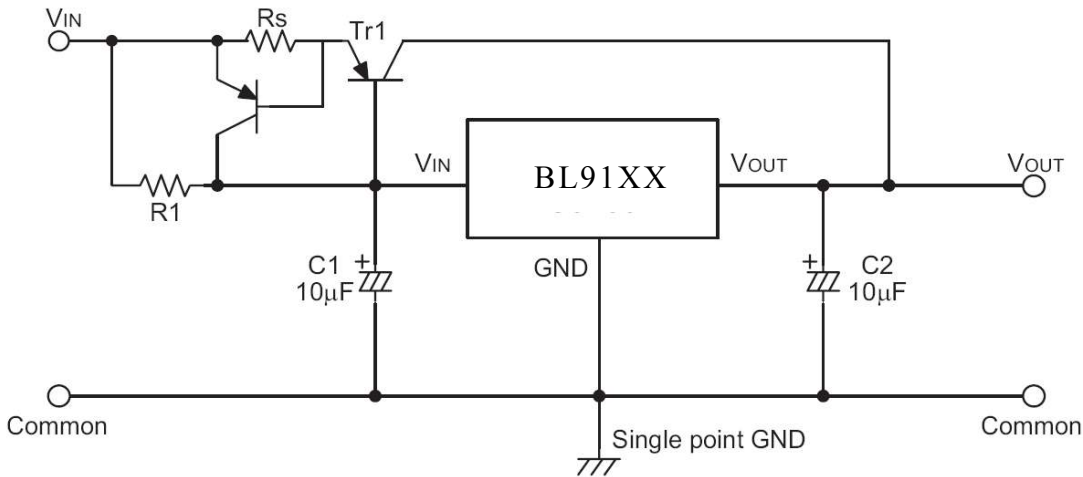
Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
		V <sub>IN</sub>	Conditions				
Output voltage tolerance	V <sub>OUT</sub>	10V	I <sub>OUT</sub> =10mA	7.76	8.0	8.24	V
Output current	I <sub>OUT</sub>	10V		100	150		mA
Load regulation	ΔV <sub>OUT</sub>	10V	1mA ≤ I <sub>OUT</sub> ≤ 70mA		60	150	mV
Voltage drop	VDIF		I <sub>OUT</sub> =1mA		100		mV
Current consumption	I <sub>SS</sub>	10V	No Load		3.5	7	μA
Line regulation			9V ≤ V <sub>IN</sub> ≤ 24V, I <sub>OUT</sub> =1mA		0.2		%/V
Input voltage	V <sub>IN</sub>					24	V
Temperature coefficient		10V	I <sub>OUT</sub> =10mA 0°C ≤ Ta ≤ 70°C		± 1.2		mV/ °C

**APPLICATION CIRCUIT**
**Basic Circuit**


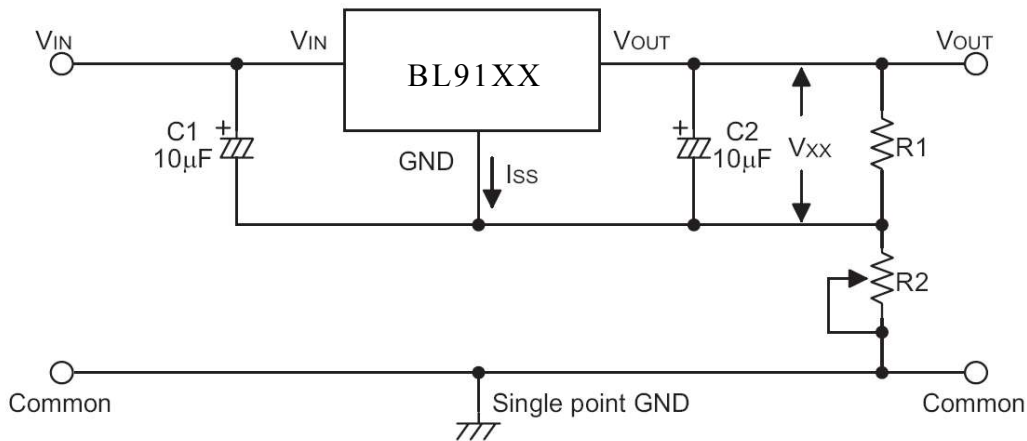
**High Output Current Positive Voltage Regulator**



**Short-Circuit Protection for Tr1**

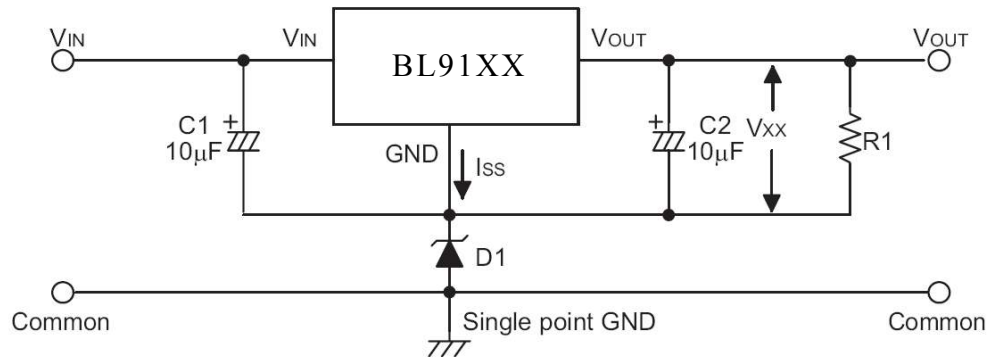


**Circuit for Increasing Output Voltage**



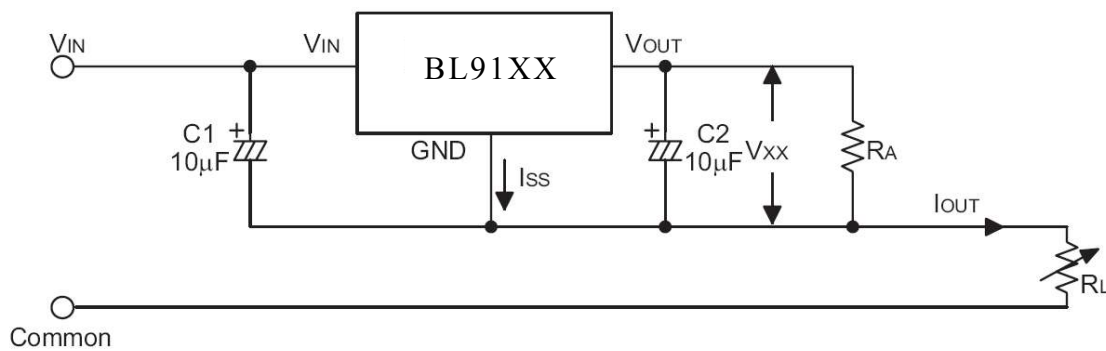
$$V_{OUT} = V_{xx} \left( 1 + \frac{R2}{R1} \right) + I_{ss} R2$$

**Circuit for Increasing Output Voltage**



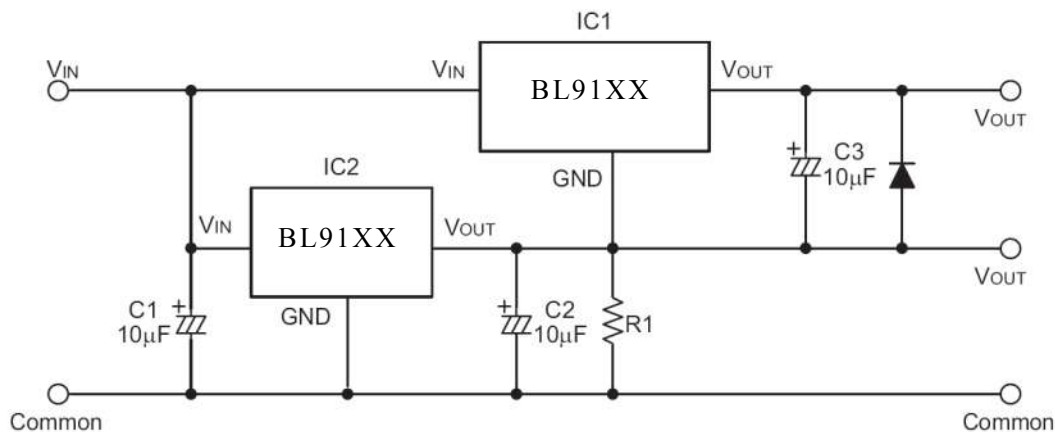
$$V_{OUT} = V_{xx} + V_{D1}$$

**Constant Current Regulator**



$$I_{OUT} = \frac{V_{xx}}{R_A} + I_{ss}$$

**Dual Supply**



OUTLINE DRAWING

