

400mA Low Dropout Voltage Regulator

Outline:

BL8550 is a series of low dropout three terminal regulators with a dropout of 1.22V at 400mA load current.

Other than a fixed version (Vout = 1.8V, 2.5V, 2.85V, 3.3V, 5V), BL8550 has an adjustable version, which can provide an output voltage from 1.25 to 13.8V with only two external resistors.

BL8550 offers thermal shut down and current limit functions, to assure the stability of chip and power system. And it uses trimming technique to guarantee output voltage accuracy within $\pm 2\%$.

BL8550 is available in SOT-89-3 power Package. Lead free package is also available on command.

Features:

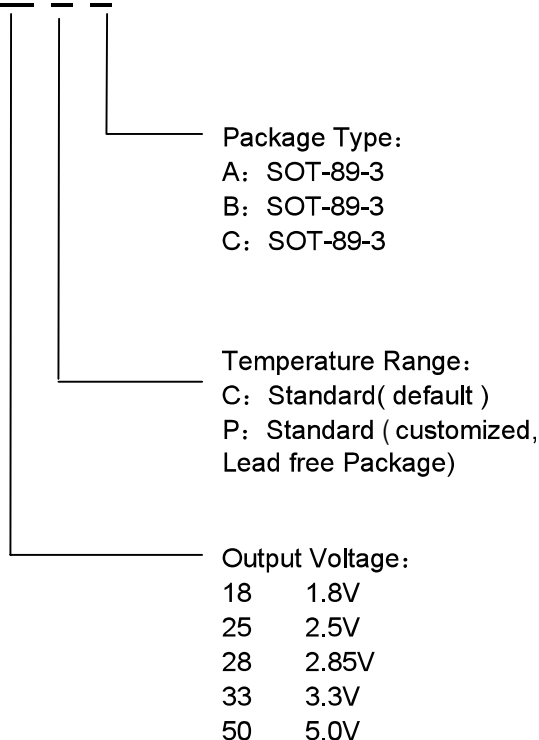
- Other than a fixed version and an adjustable version, output value can be customized on command.
- Maximum output current is 400mA
- Output voltage accuracy is within $\pm 2\%$
- Range of operation input voltage: Max 18V
- Line regulation: 0.2%
- Load regulation: 0.4%
- Environment Temperature: $-50^{\circ}\text{C} \sim 140^{\circ}\text{C}$

Applications:




- Power Management for Computer Mother Board, Graphic Card
- LCD Monitor and LCD TV
- DVD Decode Board

Selection Guide:

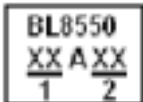
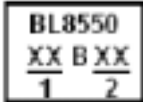
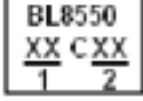
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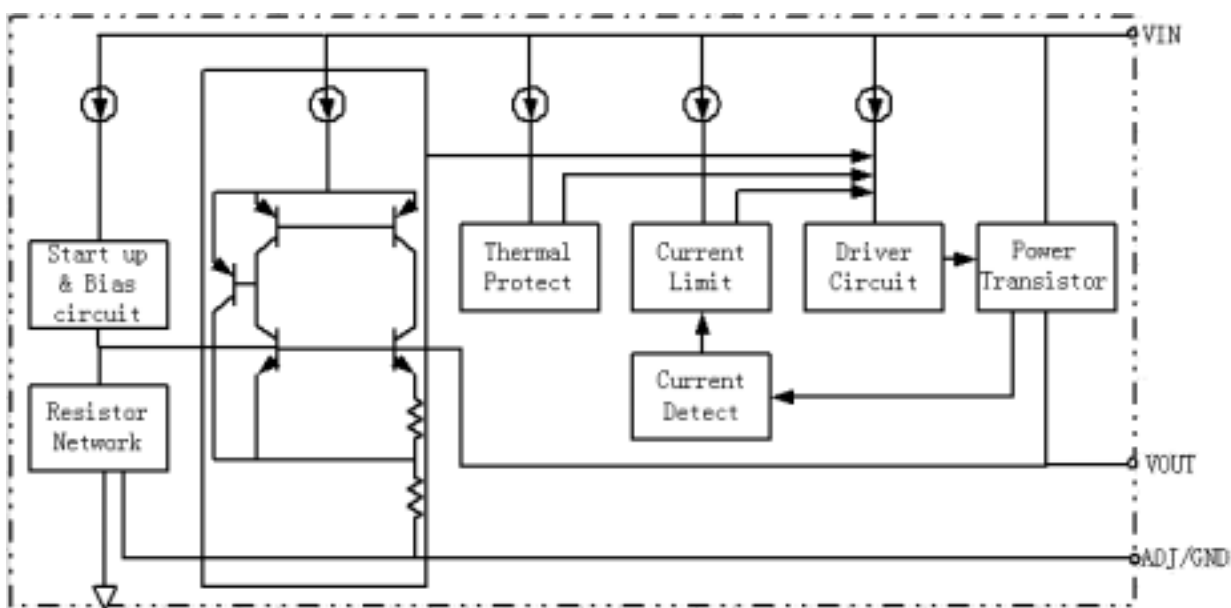


Pin Assignment:

Product Type	Pin configuration
BL8550-□□CA	SOT-89-3  1.Vout 2.GND 3.Vin
BL8550-□□CB	SOT-89-3  1.GND 2.Vin 3.Vout
BL8550-□□CC	SOT-89-3  1.GND 2.Vout 3.Vin

Product Classification:

Product Name	Output Value	Package type	Package Marking
BL8550-18CA	1.8 V	SOT-89-3	 1. Output Voltage Value 2. Manufacture No.
BL8550-25CA	2.5 V	SOT-89-3	
BL8550-28CA	2.85 V	SOT-89-3	
BL8550-33CA	3.3 V	SOT-89-3	
BL8550-50CA	5.0V	SOT-89-3	
BL8550-18CB	1.8 V	SOT-89-3	 1. Output Voltage Value 2. Manufacture No.
BL8550-25CB	2.5 V	SOT-89-3	
BL8550-28CB	2.85 V	SOT-89-3	
BL8550-33CB	3.3 V	SOT-89-3	
BL8550-50CB	5.0V	SOT-89-3	
BL8550-18CC	1.8 V	SOT-89-3	 1. Output Voltage Value 2. Manufacture No.
BL8550-25CC	2.5 V	SOT-89-3	
BL8550-28CC	2.85 V	SOT-89-3	
BL8550-33CC	3.3 V	SOT-89-3	
BL8550-50CC	5.0V	SOT-89-3	

Block Diagrams:

Absolute Maximum Ratings:

Maximum Input Voltage	18V
Junction Temperature (T _J)	150° C
Environment Temperature (T _A)	140° C
Storage Temperature (T _s)	-65~150° C
Lead Temperature and Time	260° C, 10S
Power Dissipation	
SOT-89-3	0.5W

Recommended Work Conditions:

Item	Min	Recommended	Max	Units
Input Voltage Range			18	V
Ambient Temperature	-50		140	°C

Electrical Characteristics (Table 1):

 T_j=25°C

Symbol	Parameter	Condition	Min	Typical	Max	Units
V _{out}	Output Voltage	BL8550-1.8V	1.764	1.80	1.836	V
		BL8550-2.5V	2.45	2.5	2.55	V
		BL8550-2.85V	2.793	2.85	2.907	V
		BL8550-3.3V	3.234	3.3	3.366	V
		BL8550-5.0V	4.9	5	5.1	V
ΔV _{out}	Line Regulation (note1)	V _{in} =5V~15V		0.2	0.4	%
		BL8550-5.0V (V _{in} =7V~15V)		0.2	0.4	%
ΔV _{out}	Load Regulation (note1,2)	I _L =0~400mA		0.2	0.4	%
Dropout Voltage	Input-Output Voltage Differentia (note3)	ΔV _{out} , ΔV _{ref} =1%, I _{out} =400mA		1.22	1.3	V
Current Limit	Max Load Current	V _{in} -V _{out} =2V, T _j =25°C	600			mA
I _q	Quiescent Current			4	8	mA
$\frac{\Delta V_{out}}{\Delta T \cdot V_{out}}$	Temperature Stability				0.5	%

Note:

- Note1: The Parameters of Line Regulation and Load Regulation in Table1 are tested under constant junction temperature. The Curve of Load Regulation vs. Temperature is shown in typical parameter curve that follows.
- Note2: When I_{out} varies between 0~400mA, V_{in}-V_{out} varies between 1.5V~12V under constant junction temperature, the parameter is satisfied the criterion in table. If temperature varies between -50°C ≤ T_A ≤ 140°C, it needs output current to be larger than 10mA to satisfy the criterion.
- Note3: Dropout Voltage is specified over the full output current range of the device, and it is tested under following testing conditions: First step is to find out the V_{out} value (V_{out1}) when V_{in1}=V_{out}+1.5V, second step is to decrease V_{in}(V_{in2}) until V_{out} value is equal to 99%*V_{out1}(V_{out2}). V_{dropout}=V_{in2}-V_{out2}.
- Note4: Minimum Load Current is defined as the minimum output current required to maintain regulation. When 1.5V ≤ V_{in}-V_{out} ≤ 12V, the device is guaranteed to regulate if the output current is greater than 10mA.

Detailed Description:

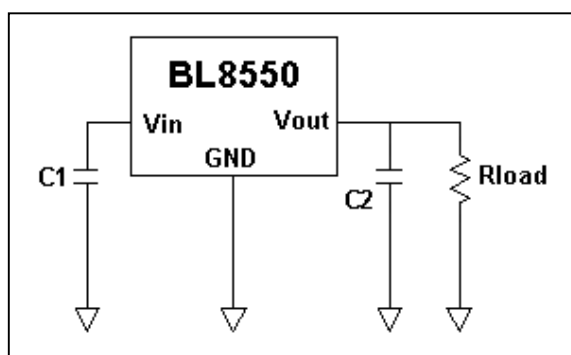
BL8550 is a series of low dropout voltage, three terminal regulators. Its application circuit is very simple: the fixed version only needs two capacitors and the adjustable version only needs two resistors and two capacitors to work. It is composed of some modules

including start-up circuit, bias circuit, bandgap, thermal shutdown, current limit, power transistors and its driver circuit and so on.

The thermal shut down and current limit modules can assure chip and its application system working safety when the environment temperature is larger than 140°C or output current is larger than 600mA. The bandgap module provides stable reference voltage, whose temperature coefficient is compensated by careful design considerations. The temperature coefficient is under 100ppm/°C. And the accuracy of output voltage is guaranteed by trimming technique,

Typical Application :

BL8550 has an adjustable version and five fixed versions, Chart1 is its typical application:

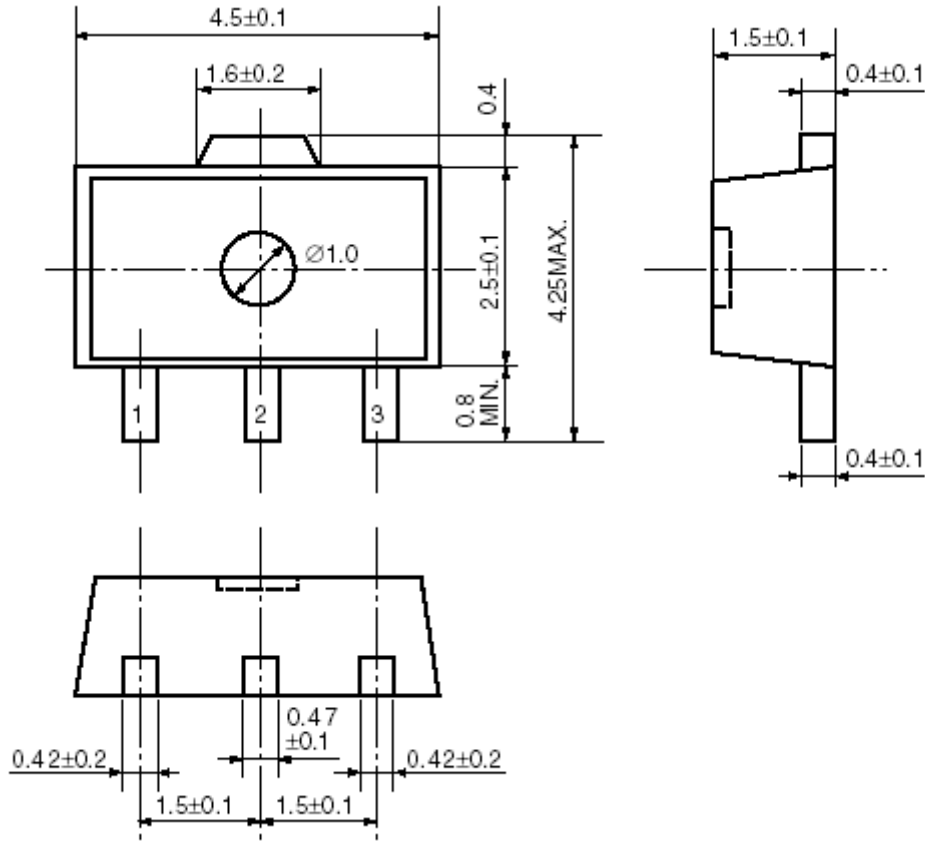
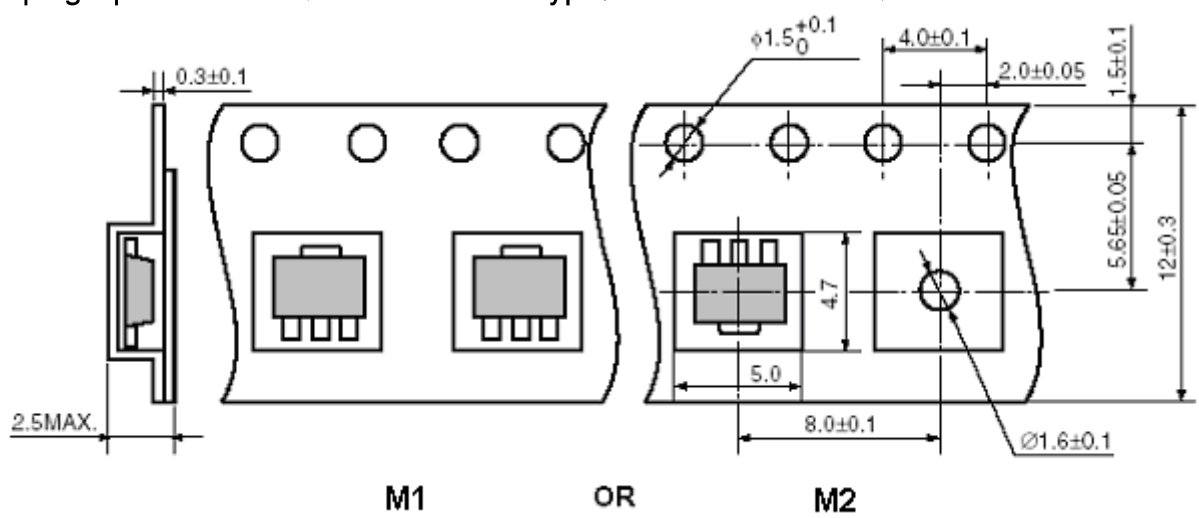


Typical Application of BL8550

Application Hints:

1. Recommend using 10uF tan capacitor as bypass capacitor(C1) for all application circuit.
2. Recommend using 22uF tan capacitor to assure circuit stability.
3. Using a bypass capacitor(CAdj) between the adjust terminal and ground can improve ripple rejection, This bypass capacitor prevents ripple from being amplified as the output voltage is increased. The impedance of CAdj should be less than the resistor's(R1) which is between output and adjust pins to prevent ripple from being amplified at any ripple frequency. As R1 is normally in the range of 200Ω~350Ω, the value of CAdj should satisfy this equation: $2 * \text{Fripple} * C_{Adj} < R1$. Recommend using 10uF tan capacitor.

Package outline:

Package	SOT-89-3	Devices per reel	1000	Unit	mm
Package Dimension:  <p> Top view dimensions: Total width 4.5 ± 0.1, lead width 1.6 ± 0.2, lead height 0.4, lead pitch 0.8 MIN., body width 2.5 ± 0.1, maximum body height 4.25 MAX., hole diameter $\varnothing 1.0$. Side view dimensions: Lead width 1.5 ± 0.1, lead height 0.4 ± 0.1, body height 0.4 ± 0.1. Bottom view dimensions: Lead width 0.42 ± 0.2, lead pitch 1.5 ± 0.1, lead height 0.47 ± 0.1. </p>					
Taping Specification: (M1: Standard Type, M2: Customized)  <p> M1 dimensions: Lead height 0.3 ± 0.1, maximum body height 2.5 MAX., hole diameter $\varnothing 1.5^{+0.1}_0$, lead pitch 4.0 ± 0.1, lead width 2.0 ± 0.05, body height 1.5 ± 0.1, body width 5.65 ± 0.05, total height 12 ± 0.3, hole diameter $\varnothing 1.6 \pm 0.1$, body width 8.0 ± 0.1, lead width 5.0, lead height 4.7. </p>					

Taping Reel Dimension:

