3-TERMINAL LINEAR VOLTAGE REGULATOR

1.Description

The FLD1117 is a low-dropout three-terminal linear voltage regulator with positive output voltage, delivering a voltage drop of 1.2 V at 1.0 A output current. It comes in two versions: fixed-output (1.8V, 3.3V, or 5.0V) and adjustable output versions, both featuring 1.5% voltage accuracy.

The FLD1117 integrates built-in overheat protection and current-limiting circuits, making it suitable for various electronic devices.

2.Features

- Maximum output current: 1.0 A
- Maximum input voltage: 18V
- Low voltage drop: Only 1.2 V at an output current of 1.0 A
- Output voltages: 1.8 V, 3.3 V, 5 V, and ADJ
- Overheat shutdown
- Traffic Limiting Feature
- Output Voltage Accuracy: ±1.5%
- Packaging Type: SOT-223, SOT-89-3L
- Ceramic Capacitor Stable

3.Applications

- Handheld computers and laptops
- battery charger
- Battery-powered system
- SCSI-II Active Terminal
- mobile telephone
- cordless telephone
- portable set
- Post-installed voltage regulator for the power supply switch

4.Order information

Mode	VOUT(V)	Package	Ordering Number	Packing Option
FLD1117-1.8	1.8	SOT-223	FLD1117-1.8YSOT223G/TR	Tape and Reel,4000
	1.8	SOT-89-3L	FLD1117-1.8YSOT893G/TR	Tape and Reel,1000
FLD1117-3.3	3.3	SOT-223	FLD1117-3.3YSOT223G/TR	Tape and Reel,4000
	3.3	SOT-89-3L	FLD1117-3.3YSOT893G/TR	Tape and Reel,1000
FLD1117-5.0	5.0	SOT-223	FLD1117-5.0YSOT223G/TR	Tape and Reel,4000
	5.0	SOT-89-3L	FLD1117-5.0YSOT893G/TR	Tape and Reel,1000
FLD1117-ADJ	ADJ	SOT-223	FLD1117-AdjYSOT223G/TR	Tape and Reel,4000
	ADJ	SOT-89-3L	FLD1117-AdjYSOT893G/TR	Tape and Reel,1000

5.Typical Application

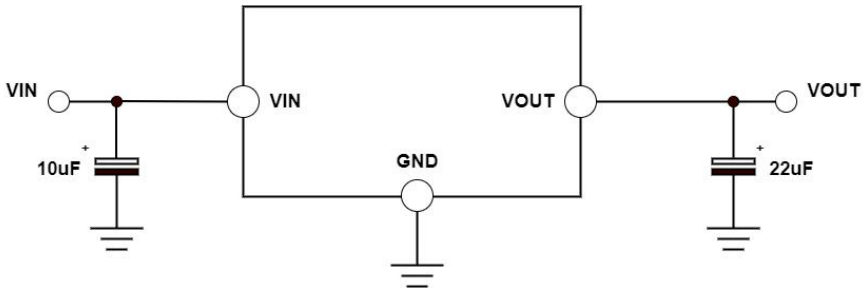


Figure 1. Typical fixed output voltage

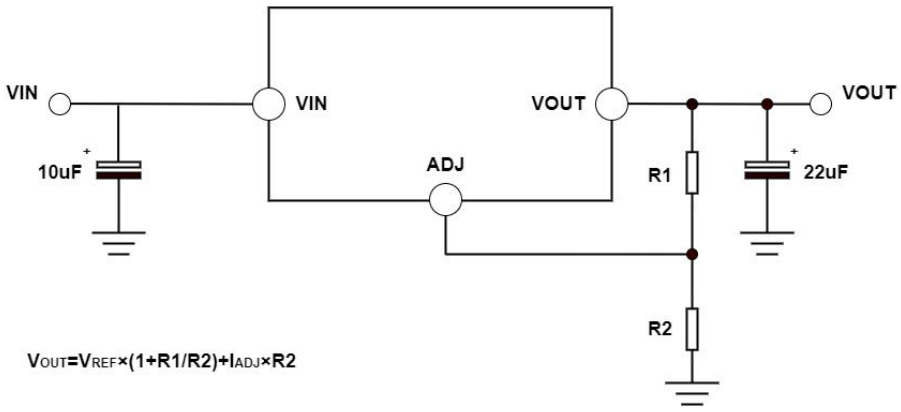
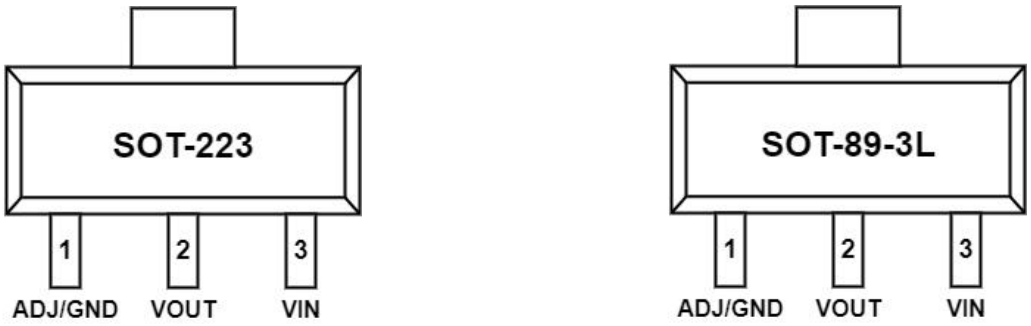


Figure 2. Typical adjustable output voltage

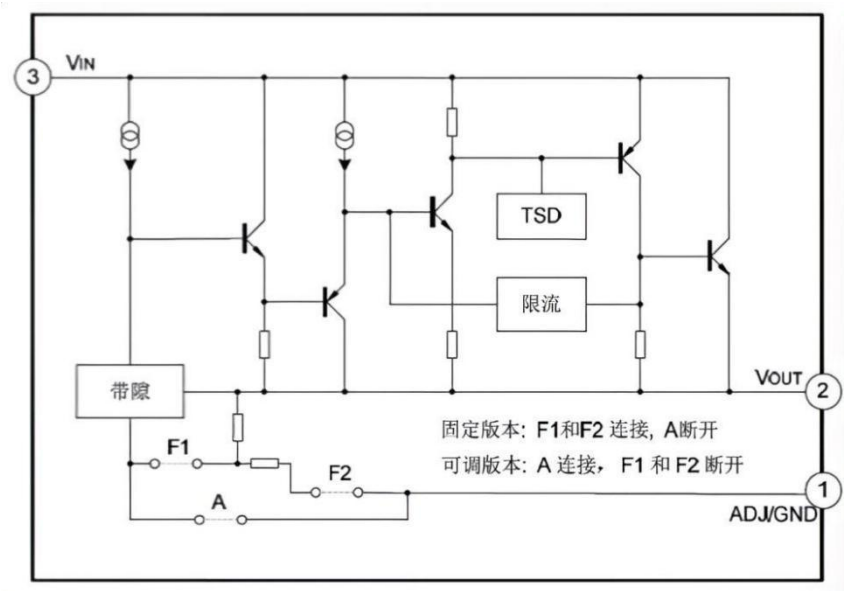
6.Pin Configuration



7.Pin Description

Pin Name	Pin No	Pin Function
GND/ADJ	1	Ground/ADJ
VOUT	2	Output Voltage Pin
VIN	3	Input Voltage pin

8.Functional Block Diagram



8.Absolute Maximum Ratings

Parameter	Symbol	Range	Unit
Input Voltage	V_{IN}	20	V
Pin Temperature (after 5 seconds of soldering)	T_{Lead}	260	°C
Junction Temperature	TJ	150	°C
Storage Temperature	TSTG	-65 to +150	°C
Power Dissipation	PD	Internal Restrictions (Note 1)	mW
Electrostatic Discharge (ESD)	ESD	2000	V

Note: The maximum allowable power consumption is a function of the maximum operating junction temperature TJ(max), the junction air resistance θ_{JA}, and the ambient temperature Tamb. At a given ambient temperature, PD(max) = (TJ(max) – Tamb)/θ_{JA}; exceeding this value will cause the chip to overheat, prompting the regulator to enter an overheat shutdown state. The junction air resistance θ_{JA} varies depending on the packaging type and is determined by the packaging technology.

9.Recommended Operating Conditions

Parameter	Symbol	Range	Unit
Input Voltage	V_{IN}	18	V
Operating Junction Temperature	T_J	-40-125	℃

10.Electrical Characteristics

(-40℃<T_J<125℃, Tamp=25℃, unless otherwise specified.)

V_{OUT}=1.8V, C_{IN}=10uF, C_{OUT}=22uF

Paramter	Symbol	Conditions	Min	Typ	Max	Unit
Input Voltage	V_{IN}	-	-	-	36	V
Output Voltage	V_{OUT}	I_{OUT}=10mA ， V_{IN} =3.8V， T_J=25 ℃	1.773	1.800	1.827	V
		0≤I_{OUT}≤1000mA，3.2V≤V_{IN}≤12V	1.764	1.800	1.836	
Output Voltage Temperature Accuracy	Tsout	-	-	0.3	-	%
Load Regulation	R_{load}	10mA ≤I_{OUT}≤1000mA	-	10	18	mV
Line Regulation	R_{line}	$V_{IN\ MIN}$≤V_{IN}≤18V，I_{OUT} =10mA	-	9	18	mV
Dropout Voltage	V_{DIF}	I_{OUT} =100mA	-	1.00	1.20	V
		I_{OUT} =500mA	-	1.05	1.25	
		I_{OUT} = 1.0A	-	1.10	1.30	
Quiescent Current	I_{SS}	$V_{IN\ MIN}$≤V_{IN}≤18V，I_{OUT} = 0A	-	5	10	mA
Power Supply Rejection Ratio	PSRR	f_{RIPPLE}=120Hz，(V_{IN}-V_{OUT})=3V V_{RIPPLE}=1VPP	60	75	-	dB
Temperature Control	T_{SD}	-	-	150	-	℃
Current Limit	L_{limit}	-	2.1	-	2.5	mA
RMS output noise		% of V_{OUT} ， 10Hz≤f≤10KHz	-	0.003	-	%
Resistance coefficient (without heat sink)	θ_{JA}	SOT-89-3L	-	165	-	℃/W
		SOT-223	-	120	-	

Note: Under a fixed load condition where V_{IN} = V_{OUT} + 2V, the dropout voltage is defined as the difference between the input voltage and the output voltage when the output voltage decreases by 2%.

V_{OUT}=3.3V, C_{IN}=10uF, C_{OUT}=22uF

Paramter	Symbol	Conditions	Min	Typ	Max	Unit
Input Voltage	V_{IN}	-	-	-	36	V
Output Voltage	V_{OUT}	I_{OUT}=10mA ，V_{IN} =5V，T_J=25 ℃	3.250	3.300	3.349	V
		0≤I_{OUT}≤1000mA，4.75V≤V_{IN}≤12V	3.235	3.300	3.365	
Output Voltage Temperature Accuracy	Tsout	-	-	0.3	-	%
Load Regulation	R_{load}	10mA ≤I_{OUT}≤1000mA	-	10	18	mV
Line Regulation	R_{line}	$V_{IN\ MIN}$≤V_{IN}≤18V，I_{OUT} =10mA	-	9	18	mV
Dropout Voltage	V_{DIF}	I_{OUT} =100mA	-	1.00	1.20	V
		I_{OUT} =500mA	-	1.05	1.25	
		I_{OUT} = 1.0A	-	1.10	1.30	
Quiescent Current	I_{SS}	$V_{IN\ MIN}$≤V_{IN}≤18V，I_{OUT} = 0A	-	5	10	mA
Power Supply Rejection Ratio	PSRR	f_{RIPPLE}=120Hz，(V_{IN}-V_{OUT})=3V V_{RIPPLE}=1VPP	60	75	-	dB
Temperature Control	T_{SD}	-	-	150	-	℃
Current Limit	L_{limit}	-	1.2	-	1.8	mA
RMS output noise		% of V_{OUT} ， 10Hz≤f≤10KHz	-	0.003	-	%
Resistance coefficient (without heat sink)	θ_{JA}	SOT-89-3L	-	165	-	℃/W
		SOT-223	-	120	-	

Note: Under a fixed load condition where V_{IN} = V_{OUT} + 2V, the dropout voltage is defined as the difference between the input voltage and the output voltage when the output voltage decreases by 2%.

V_{OUT}=5.0V, C_{IN}=10uF, C_{OUT}=22uF

Paramter	Symbol	Conditions	Min	Typ	Max	Unit
Input Voltage	V_{IN}	-	-	-	36	V
Output Voltage	V_{OUT}	I_{OUT}=10mA ，V_{IN} =7V，T_J=25 ℃	4.925	5.000	5.075	V
		0≤I_{OUT}≤1000mA，6.5V≤V_{IN}≤12V	4.900	5.000	5.10	
Output Voltage Temperature Accuracy	Tsout	-	-	0.3	-	%
Load Regulation	R_{load}	10mA ≤I_{OUT}≤1000mA	-	10	18	mV
Line Regulation	R_{line}	$V_{IN\ MIN}$≤V_{IN}≤18V，I_{OUT} =10mA	-	9	18	mV
Dropout Voltage	V_{DIF}	I_{OUT} =100mA	-	1.00	1.20	V
		I_{OUT} =500mA	-	1.05	1.25	
		I_{OUT} = 1.0A	-	1.10	1.30	
Quiescent Current	I_{SS}	$V_{IN\ MIN}$≤V_{IN}≤18V，I_{OUT} = 0A	-	5	10	mA
Power Supply Rejection Ratio	PSRR	f_{RIPPLE}=120Hz，(V_{IN}-V_{OUT})=3V V_{RIPPLE}=1VPP	60	75	-	dB
Temperature Control	T_{SD}	-	-	150	-	℃
Current Limit	L_{limit}	-	1.2	-	1.8	mA
RMS output noise		% of V_{OUT} ， 10Hz≤f≤10KHz	-	0.003	-	%
Resistance coefficient (without heat sink)	θ_{JA}	SOT-89-3L	-	165	-	℃/W
		SOT-223	-	120	-	

Note: Under a fixed load condition where V_{IN} = V_{OUT} + 2V, the dropout voltage is defined as the difference between the input voltage and the output voltage when the output voltage decreases by 2%.

V_{OUT}=Adj, C_{IN}=10uF, C_{OUT}=22uF

Paramter	Symbol	Conditions	Min	Typ	Max	Unit
Input Voltage	V_{IN}	-	-	-	36	V
Output Voltage	V_{OUT}	I_{OUT}=10mA ， V_{IN} -V_{OUT} =2V，T_J=25 ℃	1.231	1.250	1.268	V
		10mA≤I_{OUT}≤1000mA，1.4V≤V_{IN} -V_{OUT}≤10V	1.225	1.250	1.275	
Output Voltage Temperature Accuracy	Tsout	-	-	0.3	-	%
Load Regulation	R_{load}	10mA ≤I_{OUT}≤1000mA, Vout=Adj	-	10	18	mV
Line Regulation	R_{line}	$V_{IN\ MIN}$≤V_{IN}≤18V，I_{OUT} =10mA, Vout=Adj	-	9	18	mV
Dropout Voltage	V_{DIF}	I_{OUT} =100mA	-	1.00	1.20	V
		I_{OUT} =500mA	-	1.05	1.25	
		I_{OUT} = 1.0A	-	1.10	1.30	
Quiescent Current	I_{SS}	$V_{IN\ MIN}$≤V_{IN}≤18V，I_{OUT} = 0A	-	5	10	mA
Power Supply Rejection Ratio	PSRR	f_{RIPPLE}=120Hz，(V_{IN}-V_{OUT})=3V V_{RIPPLE}=1VPP	60	75	-	dB
Adjustable Pin Current	Iadj		-	60	120	uA
Adjustable pin current variation		0mA≤I_{OUT}≤1000mA，1.4V≤V_{IN}-V_{OUT}≤10V	-	0.2	5	uA
Temperature Control	T_{SD}	-	-	150	-	℃
Current Limit	L_{limit}	-	1.2	-	1.8	mA
RMS output noise		% of V_{OUT} ， 10Hz≤f≤10KHz	-	0.003	-	%
Resistance coefficient (without heat sink)	θ_{JA}	SOT-89-3L	-	165	-	℃/W
		SOT-223	-	120	-	

Note: Under a fixed load condition where V_{IN} = V_{OUT} + 2V, the dropout voltage is defined as the difference between the input voltage and the output voltage when the output voltage decreases by 2%.

11. Function Description

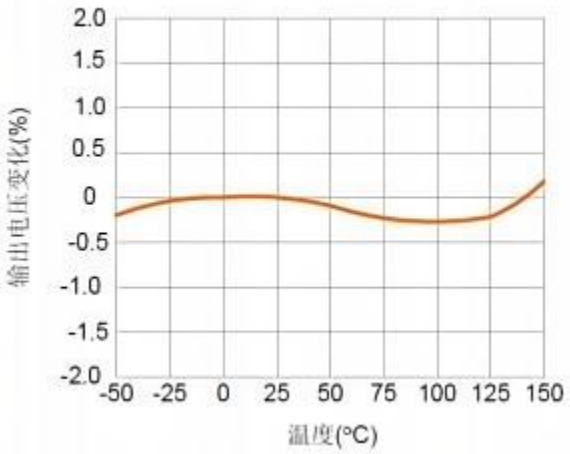
The FLD1117 series is a low-dropout voltage regulator featuring a voltage-regulating transistor composed of a PNP-driven NPN device, with the voltage drop defined as $V_{DROP} = V_{BE} + V_{SAT}$.

The FLD1117 is available in both fixed and adjustable versions, with output voltages of 1.8V, 3.3V, or 5.0V. The built-in overheat protection circuit provides overload and overheating protection to prevent excessive junction temperatures caused by ambient conditions.

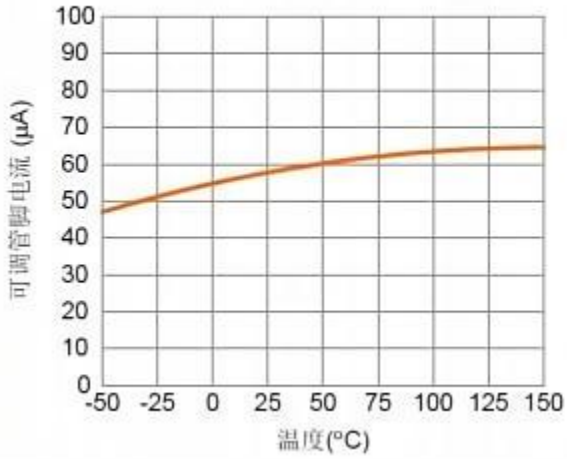
To ensure the stability of FLD1117, the adjustable-voltage version requires connecting an output capacitor of at least 22 μF made of tantalum. For the fixed-voltage version, a smaller capacitor may be used, depending on specific application requirements. Generally, the stability of linear regulators decreases as the output current increases.

12.Typical Characteristics

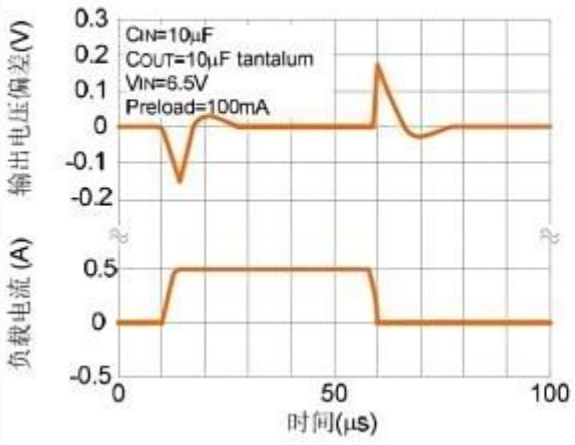
温度稳定性



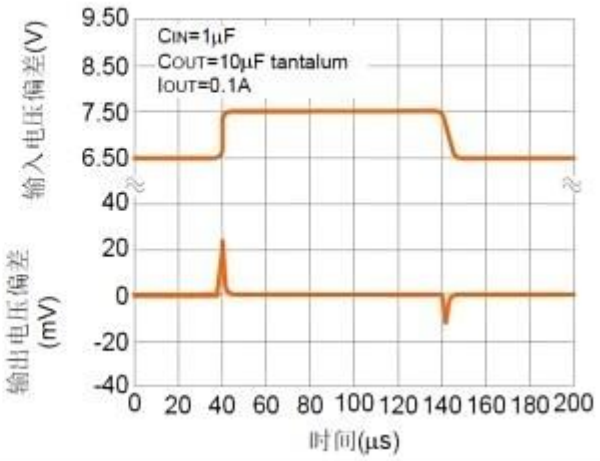
可调管脚电流



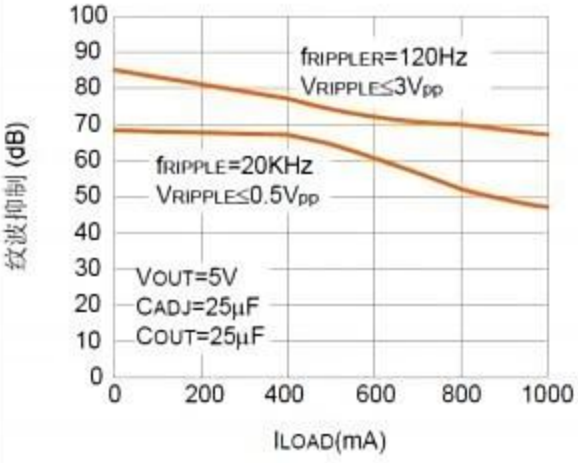
负载瞬态反应（VOUT=5 V）



线性瞬态响应（VOUT=5 V）

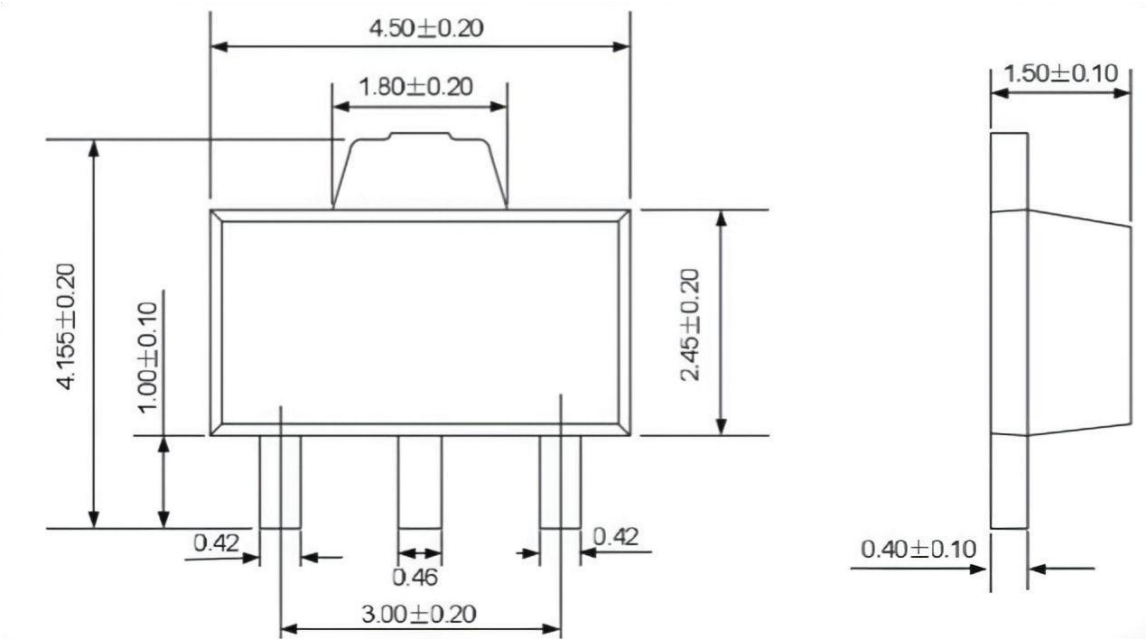


纹波抑制 VS 电流

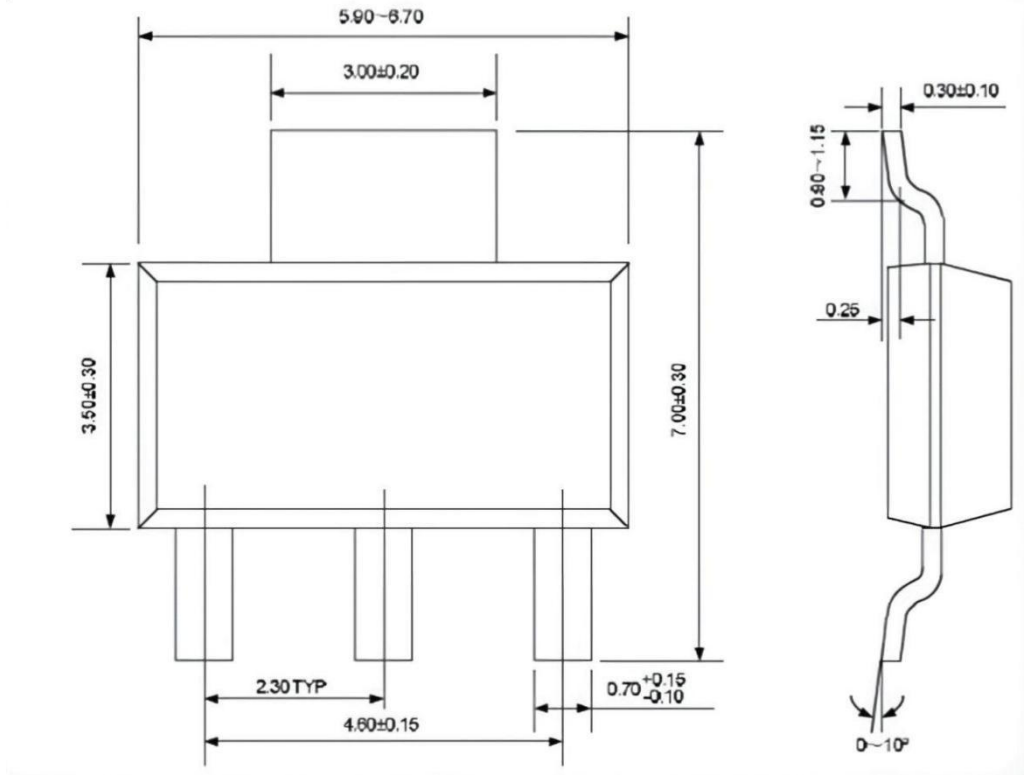


13.Package Outline Dimensions(All dimensions in mm.)

(1) Package Type: SOT-89-3L



(2) Package Type: SOT-223



14.Important Notice And Disclaimer

- We reserves the right to change the instruction manual without prior notice.
- Any semiconductor product has a certain possibility of failure or malfunction under specific conditions. The buyer is responsible for complying with safety standards and taking safety measures when using our products for system design and overall manufacturing to avoid potential failure risks that may cause personal injury or property damage.
- The improvement of product quality is endless, our company will be dedicated to provide customers with better products.

15.Version Modification Record

Version Number	Revision
first edition	
V1.0	1. Update the Important Notice And Disclaimer on page 11.
V1.1	2. Update the document's format
V1.2	3. Update the Pin Configuration on page 3.