

Low Dropout Linear Regulator

General Description

The CP1117 is a series of low dropout three-terminal regulators with a dropout of 1.2V at 1A output current.

The CP1117 has an adjustable version, that can provide the output voltage from 1.25V to 12V with only 2 external resistors.

The CP1117 series provides current limiting and thermal shutdown. Its circuit includes a trimmed bandgap reference to assure output voltage accuracy to be within 1%. Current limit is trimmed to ensure specified output current and controlled short-circuit current.

Onchip thermal shutdown provides protection against any combination of overload and ambient temperature that would create excessive junction temperature.

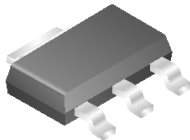
The CP1117 series is available in the industry standard SOT-223 power package

Features

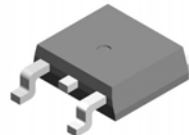
- Low dropout voltage: 1.2V at 1A output current
- Trimmed current limit
- On-chip thermal shutdown
- Three-terminal adjustable of fixed 1.5V, 1.8V, 2.5V, 3.3V, 5V
- Operation junction temp.: 0 to 125

Applications

- PC Motherboard
- LCD Monitor
- Graphic Card
- DVD-Video Player
- NIC/Switch
- Telecom Equipment
- ADSL Modem
- Printer and other Peripheral Equipment

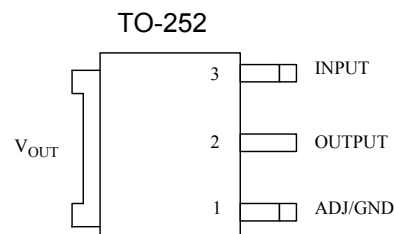
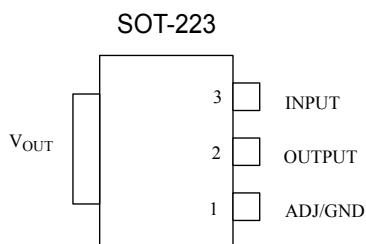


SOT-223



TO-252

Pin Configurations



* All specs and applications shown above subject to change without prior notice.

Low Dropout Linear Regulator

Functional Block Diagram

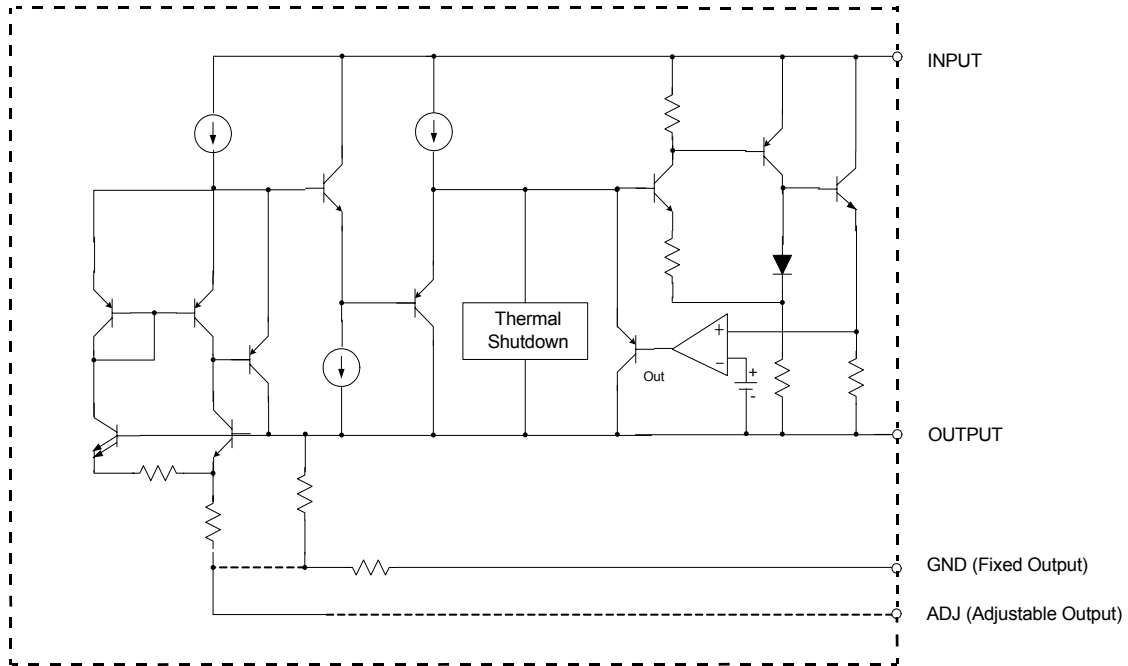


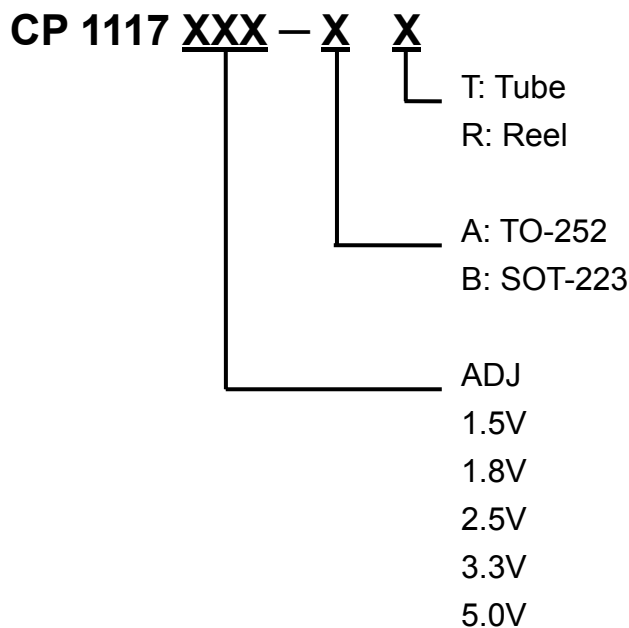
Figure 1. Functional Block Diagram of CP1117

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Order Information

Package	Temperature Range	Part Number	Packing Type	Marking
TO-252	0 ~125	CP1117 ADJ-A	Tape/Reel	CP1117 ADJ-A
		CP1117 1.5-A	Tape/Reel	CP1117 1.5-A
		CP1117 1.8-A	Tape/Reel	CP1117 1.8-A
		CP1117 2.5-A	Tape/Reel	CP1117 2.5-A
		CP1117 3.3-A	Tape/Reel	CP1117 3.3-A
		CP1117 5.0-A	Tape/Reel	CP1117 5.0-A
SOT-223		CP1117 ADJ-B	Tape/Reel	ADJ-B
		CP1117 1.5-B	Tape/Reel	1.5-B
		CP1117 1.8-B	Tape/Reel	1.8-B
		CP1117 2.5-B	Tape/Reel	2.5-B
		CP1117 3.3-B	Tape/Reel	3.3-B
		CP1117 5.0-B	Tape/Reel	5.0-B



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Absolute Maximum Ratings (Note 1)

Parameter	Value	Unit
V _{IN}	20	V
Maximum Junction Temperature	150	°C
Storage Temperature Range	-65 ~ 150	°C
Lead Temperature (Soldering, 10 sec.)	300	°C
ESD (Machine Model)	600	V

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings " may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings " for extended periods may affect device reliability.

Recommended Operating Conditions

Parameter	Min	Max	Unit
V _{IN}		15	V
Operating Junction Temperature Range	0	125	°C

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Electrical Characteristics

Operating Conditions: $V_{IN} = 10V$, $T_J = 25^{\circ}C$ unless otherwise specified.

Parameter	Conditions	Min	Typ.	Max	Unit
Reference Voltage	CP1117- ADJ $I_{OUT} = 10m$, $V_{IN}-V_{OUT} = 2V$	1.238	1.250	1.264	V
	10mA $I_{OUT} = 1A$, 1.4V $V_{IN}-V_{OUT} = 8V$, P Maximum Power Dissipation	1.225	1.250	1.270	
Output Voltage	CP1117-1.5, $I_{OUT} = 10m$, $V_{IN} = 3.5V$	1.485	1.5	1.515	V
	10mA $I_{OUT} = 1A$, 3.0V $V_{IN} = 10V$	1.470	1.5	1.530	
	CP1117-1.8, $I_{OUT} = 10m$, $V_{IN} = 3.8V$	1.782	1.8	1.818	V
	10mA $I_{OUT} = 1A$, 3.2V $V_{IN} = 10V$	1.746	1.8	1.854	
	CP1117-2.5, $I_{OUT} = 10m$, $V_{IN} = 4.5V$	2.475	2.5	2.525	V
10mA $I_{OUT} = 1A$, 3.9V $V_{IN} = 10V$	2.450	2.5	2.550		
Output Voltage	CP1117-3.3, $I_{OUT} = 10m$, $V_{IN} = 5.0V$	3.267	3.3	3.333	V
	10mA $I_{OUT} = 1A$, 4.75V $V_{IN} = 10V$	3.235	3.3	3.365	
Output Voltage	CP1117-5.0, $I_{OUT} = 10m$, $V_{IN} = 7.0V$	4.950	5.0	5.050	V
	10mA $I_{OUT} = 1A$, 6.5V $V_{IN} = 12V$	4.900	5.0	5.100	
Line Regulation	CP1117-ADJ $I_{OUT} = 10Ma$, 1.5V $V_{IN}-V_{OUT} = 10V$		0.035	0.2	%
	CP1117-1.5 $I_{OUT} = 10mA$, 1.5V $V_{IN}-V_{OUT} = 10V$		1	6	mV
	CP1117-1.8 $I_{OUT} = 10mA$, 1.5V $V_{IN}-V_{OUT} = 10V$		1	6	mV
	CP1117-2.5 $I_{OUT} = 10mA$, 1.5V $V_{IN}-V_{OUT} = 10V$		1	6	mV
	CP1117-3.3 $I_{OUT} = 10mA$, 1.5V $V_{IN}-V_{OUT} = 10V$		1	6	mV
	CP1117-5.0 $I_{OUT} = 10mA$, 1.5V $V_{IN}-V_{OUT} = 10V$		1	10	mV
Load Regulation	CP1117-ADJ $V_{IN} -V_{OUT} = 2V$, 10mA $I_{OUT} = 1$		0.2	0.4	%
	CP1117-1.5 $V_{IN} -V_{OUT} = 2V$, 10mA $I_{OUT} = 1$		1	10	mV
	CP1117-1.8 $V_{IN} -V_{OUT} = 2V$, 10mA $I_{OUT} = 1$		1	10	mV
	CP1117-2.5 $V_{IN} -V_{OUT} = 2V$, 10mA $I_{OUT} = 1$		1	10	mV
	CP1117-3.3 $V_{IN} -V_{OUT} = 2V$, 10mA $I_{OUT} = 1$		1	10	mV
	CP1117-5.0 $V_{IN} -V_{OUT} = 2V$, 10mA $I_{OUT} = 1$		1	10	mV

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Low Dropout Linear Regulator

Electrical Characteristics (Continued)

Operating Conditions: $V_{IN} \leq 10V$, $T_J = 25^\circ C$ unless otherwise specified.

Parameter	Conditions	Min	Typ	Max	Unit
Dropout Voltage	$\Delta V_{REF} = 1\%$, $I_{OUT} = 0.1A$		1.00	1.1	V
	$\Delta V_{REF} = 1\%$, $I_{OUT} = 0.5A$		1.08	1.18	V
	$\Delta V_{REF} = 1\%$, $I_{OUT} = 1.0A$		1.2	1.25	V
Current Limit	$V_{IN} - V_{OUT} = 2V$	1.25	1.35	1.8	A
Adjust Pin Current			60	120	μA
Adjust Pin Current Change	$1.4V \leq V_{IN} - V_{OUT} \leq 10V$, $10mA \leq I_{OUT} \leq 1A$		0.2	5	μA
Minimum Load Current (ADJ)	$1.5V \leq V_{IN} - V_{OUT} \leq 10V$ (ADJ only)		1.7	5	mA
Quiescent Current	$V_{IN} = V_{OUT} + 1.25V$		5	10	mA
Ripple Rejection	$f = 120Hz$, $C_{OUT} = 22\mu F$ Tantalum, $V_{IN} - V_{OUT} = 3V$, $I_{OUT} = 1A$	60	75		dB
Temperature Stability			0.5		%
Long -Term Stability	$T_A = 125^\circ C$, 1000hrs		0.3		%
RMS Output Noise (% of V_{OUT})	$T_A = 25^\circ C$, $10Hz \leq f \leq 10kHz$		0.003		%
Thermal Resistance, Junction to Case			15		$^\circ C/W$
Thermal Shutdown	Junction Temperature		150		$^\circ C$
Thermal Shutdown Hysteresis			25		$^\circ C$

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Typical Characteristics

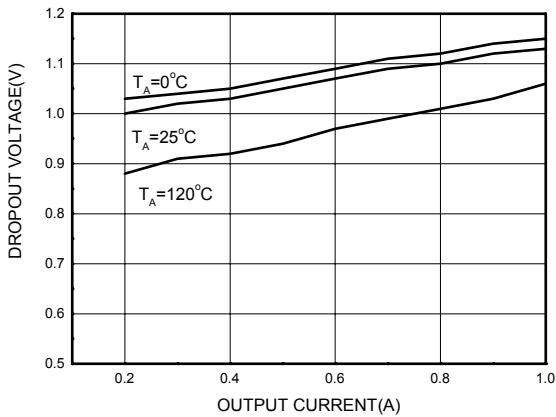


Figure 2. Dropout Voltage vs. Output Current

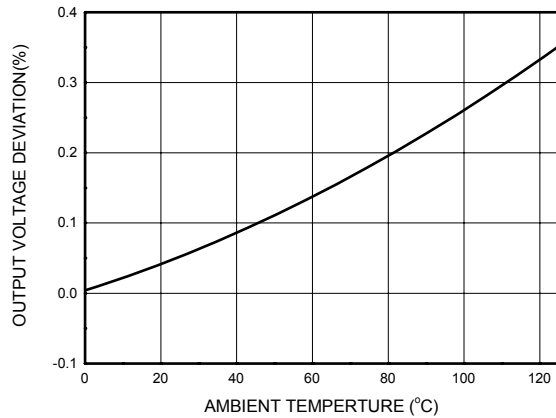


Figure 3. Load Regulation vs. Temperature

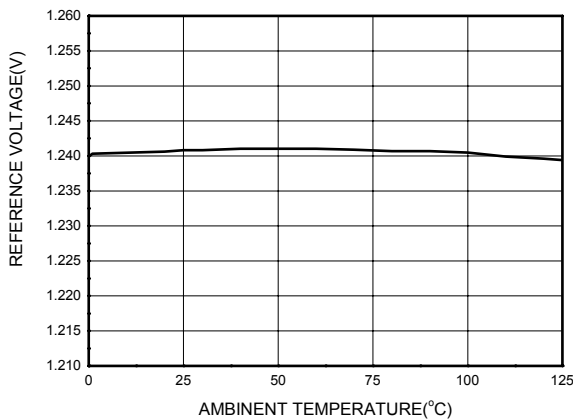


Figure 4. Reference Voltage vs. Temperature

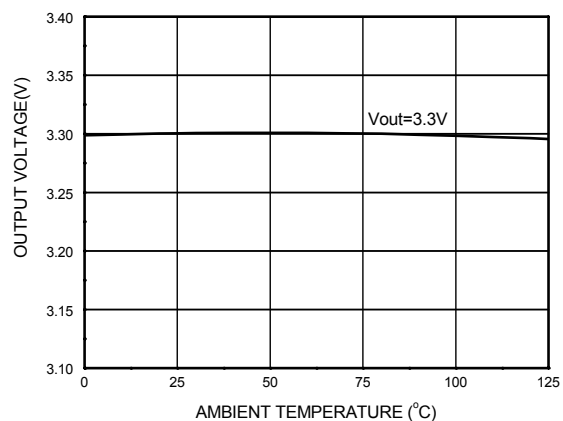


Figure 5. Output Voltage vs. Temperature

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Low Dropout Linear Regulator

Typical Characteristics (Continued)

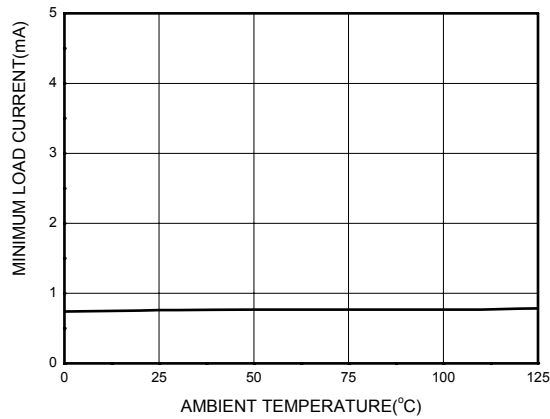


Figure 6. Minimum Load Current vs. Temperature

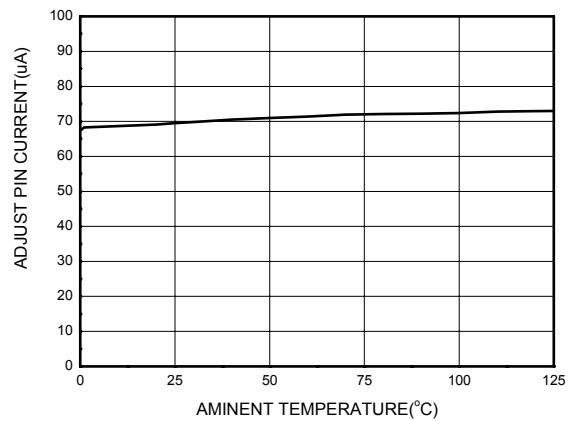


Figure 7. Adjust Pin Current vs. Temperature

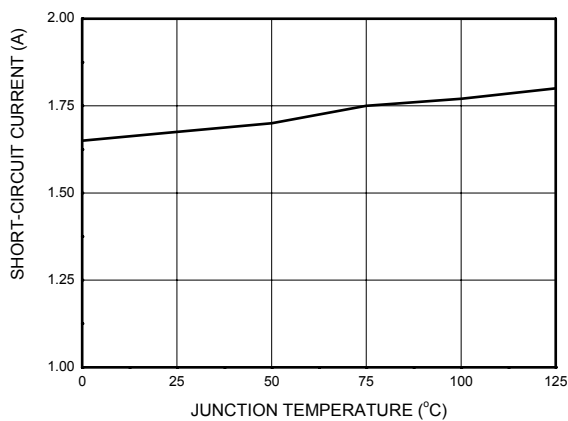


Figure 8. Short-Circuit Current vs. Temperature

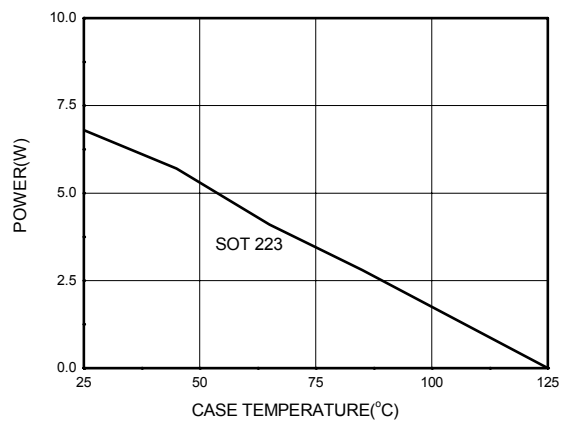


Figure 9. Maximum Power Dissipation

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Low Dropout Linear Regulator

Typical Characteristics (Continued)

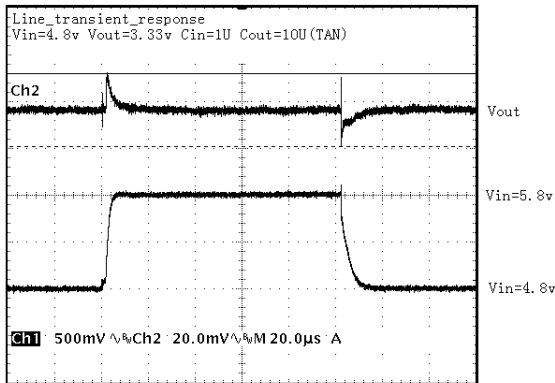


Figure 10. Line Transient Response

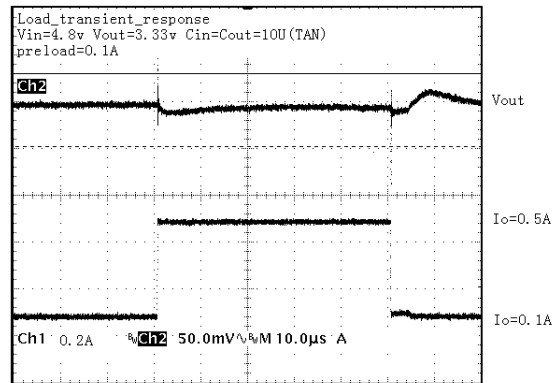


Figure 11. Load Transient Response

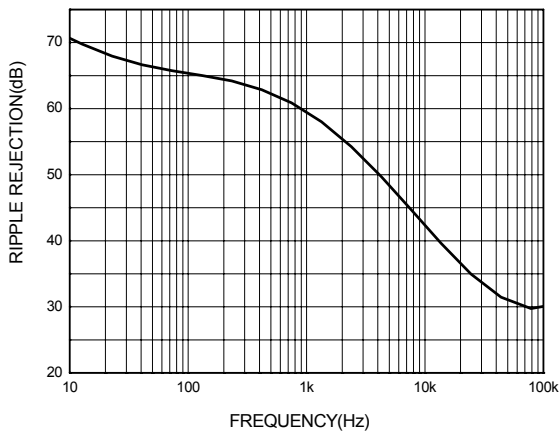


Figure 12. Ripple Rejection vs. Frequency

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Typical Applications

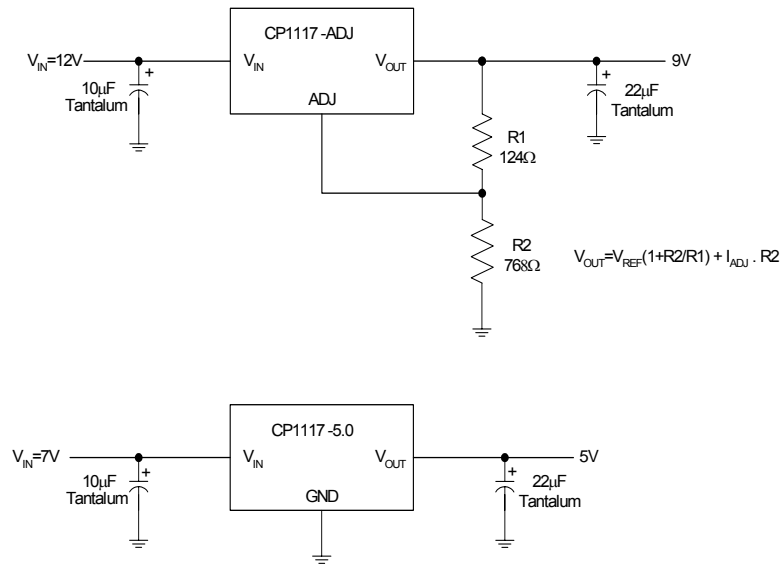


Figure 13. Typical Applications of CP1117

NOTE: The lead free label will be pasted on the Reed, Box and Carton for the Lead Free Process.

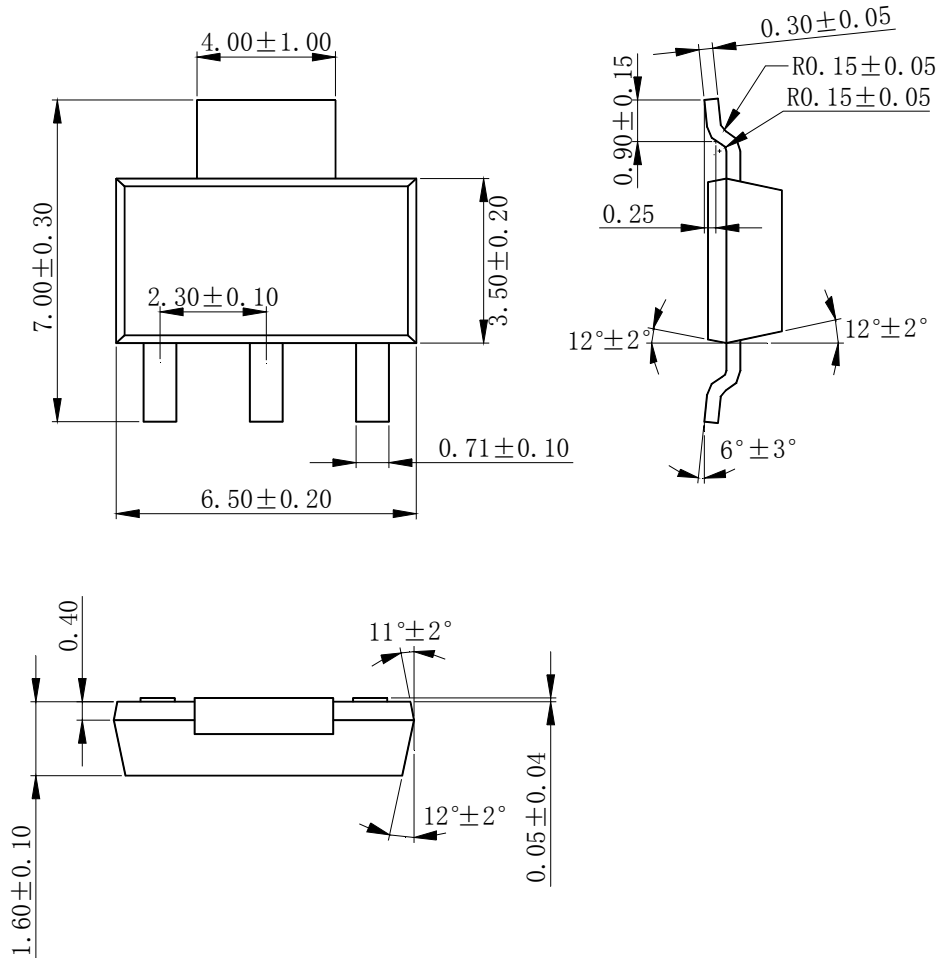
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Mechanical Dimensions

Unit: mm

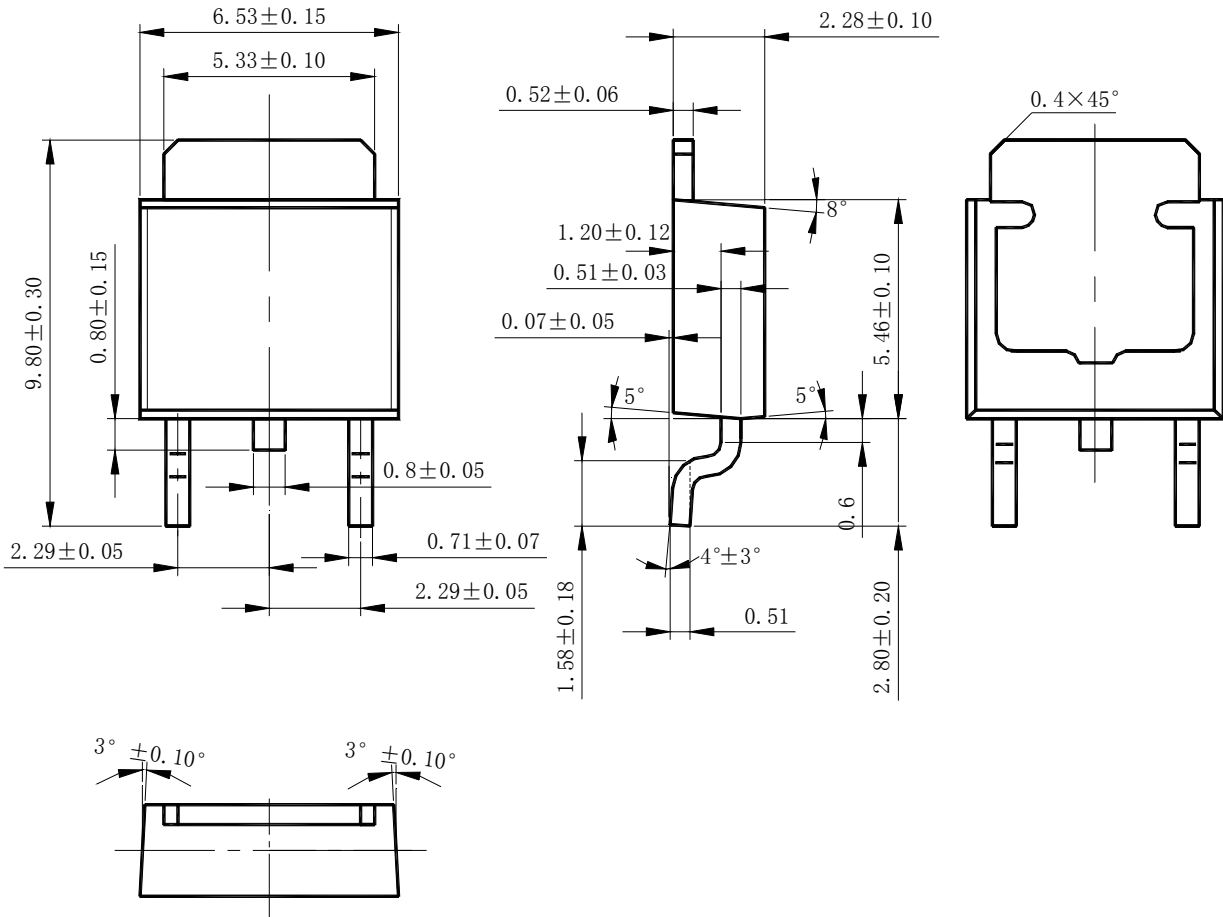
SOT - 223



* All specs and applications shown above subject to change without prior notice.

TO - 252

Unit: mm



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