

### General Description

The EC48117 is a series of low dropout three-terminal regulators with a dropout of 1.15V at 1A output current.

The EC48117 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. On-chip thermal shutdown provides protection against any combination of overload and ambient temperature that would create excessive junction temperature.

The EC48117 has an adjustable version that can provide the output voltage from 1.25V to 12V with only 2 external resistors.

The EC48117 series is available in the industry standard SOT-223, SOT-89, TO-220, TO-252, TO-263 power packages.

### Features

Low Dropout Voltage: 1.15V at 1A Output Current

Trimmed Current Limit

On-Chip Thermal Shutdown

Three-Terminal Adjustable or Fixed 1.5V, 1.8V, 2.5V, 3.3V, 5V

Operation Junction Temperature: 0°C to 125°C

### Applications

PC Motherboard

LCD Monitor

Graphic Card

DVD-Video Player

NIC/Switch

Telecom Equipment

ADSL Modem

Printer and other Peripheral Equipment

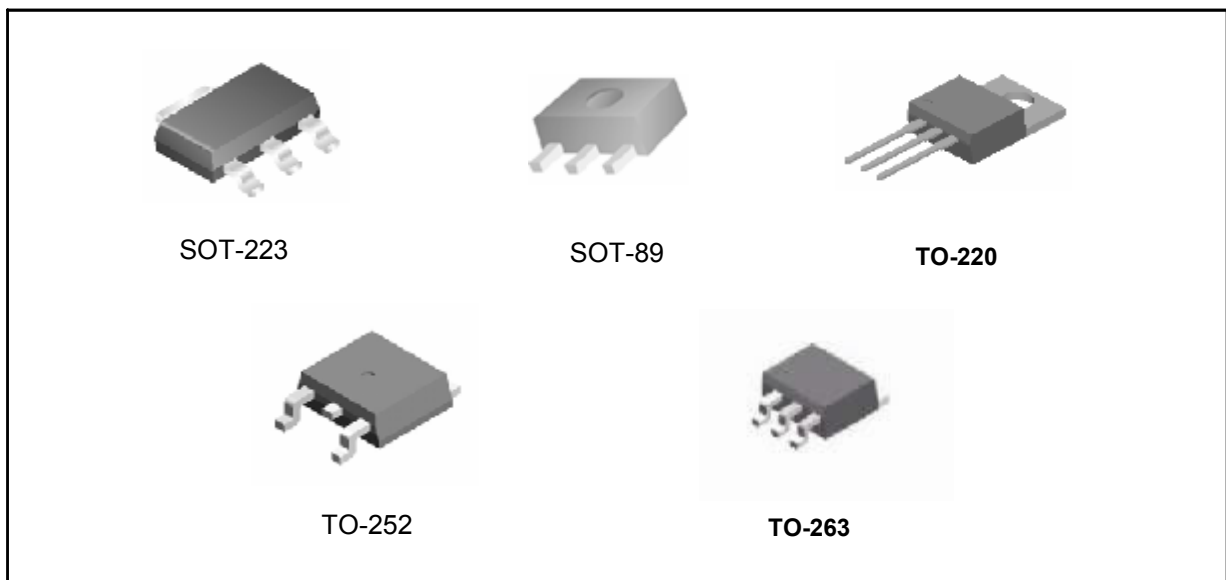


Figure 1. Package Types of EC48117

**Pin Configurations**

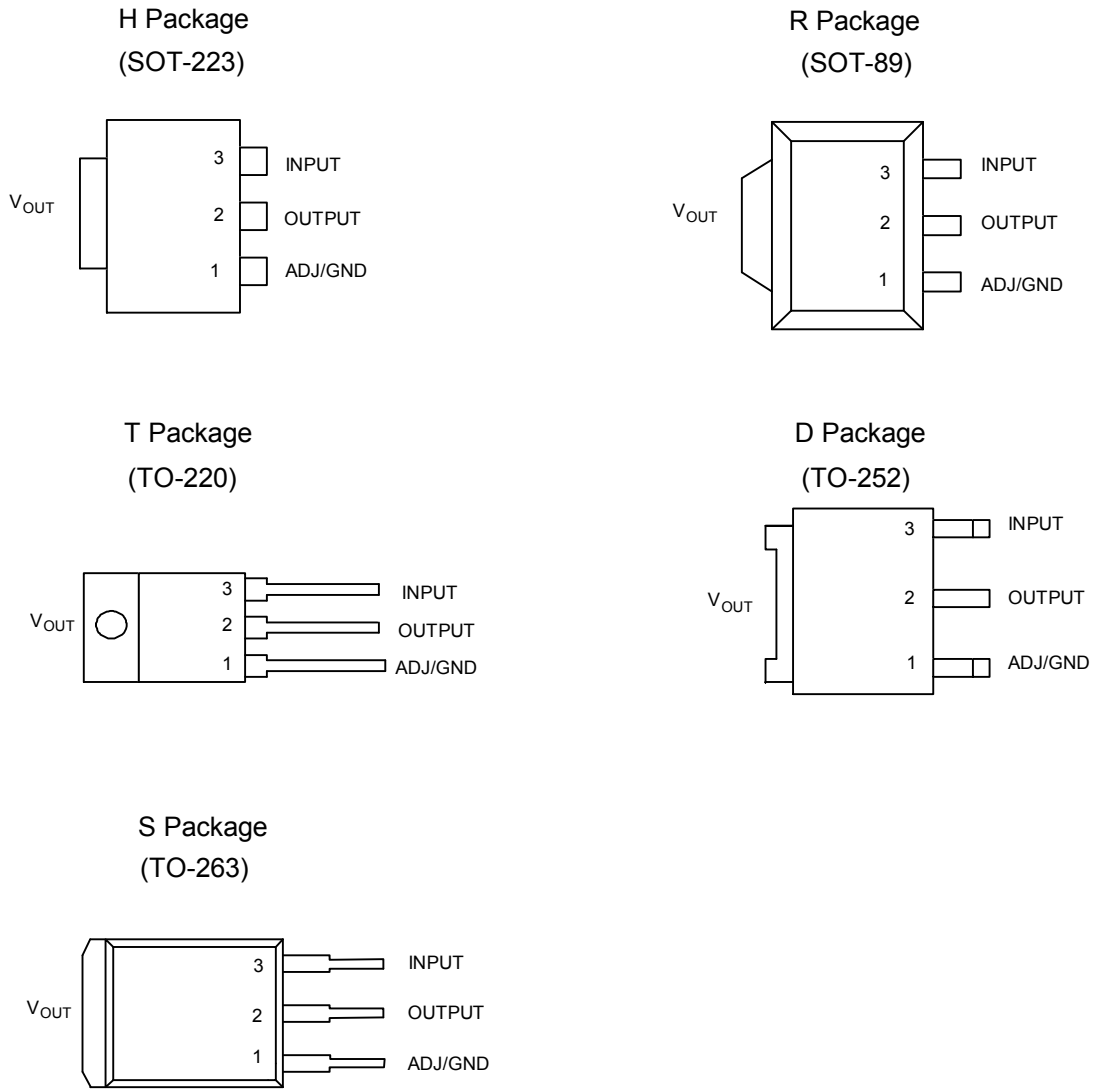


Figure 2. Pin Configurations of EC48117

**Functional Block Diagram**

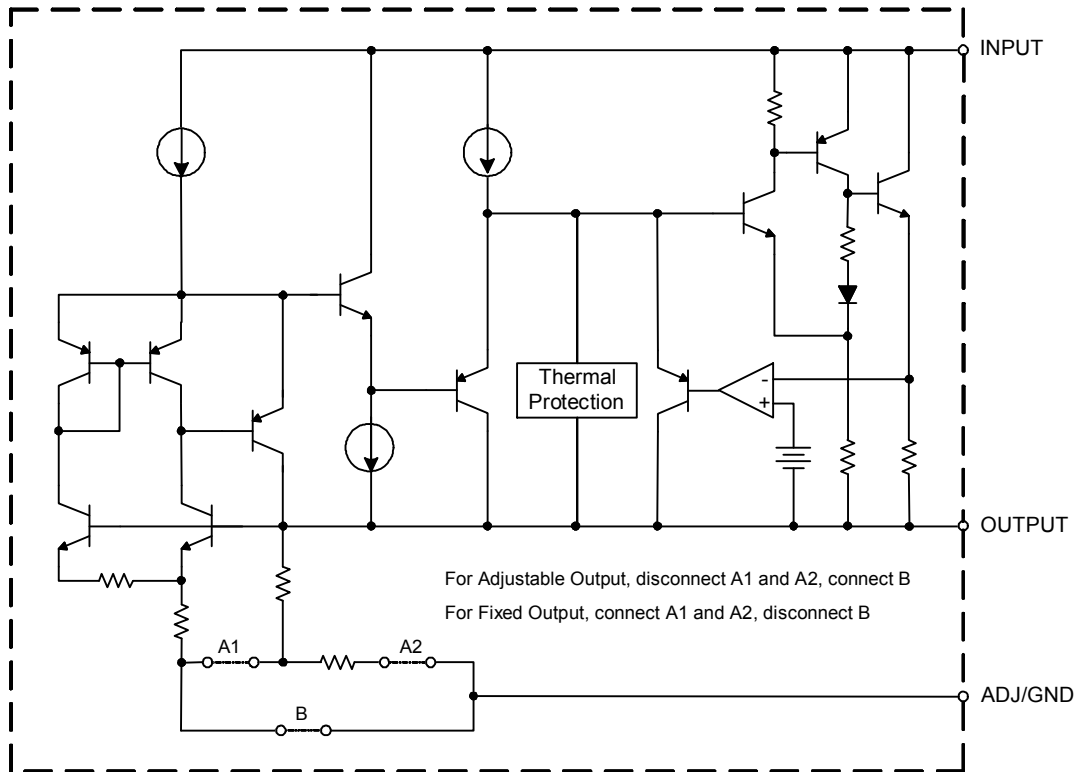




Figure 3. Functional Block Diagram of EC48117

**Ordering Information**

Package	Temperature Range	Part Number	Marking ID	Packing Type
SOT-223	0 to 125°C	EC48117H-ADJ	H11A	Tape/Reel
		EC48117H-1.5	H12A	Tape/Reel
		EC48117H-1.8	H13A	Tape/Reel
		EC48117H-2.5	H14A	Tape/Reel
		EC48117H-3.3	H16A	Tape/Reel
		EC48117H-5.0	H17A	Tape/Reel
SOT-89	0 to 125°C	EC48117R-ADJ	R17A	Tape/Reel
		EC48117R-1.5	R17B	Tape/Reel
		EC48117R-1.8	R17C	Tape/Reel
		EC48117R-2.5	R17D	Tape/Reel
		EC48117R-3.3	R17E	Tape/Reel
		EC48117R-5.0	R17F	Tape/Reel
TO-220	0 to 125°C	EC48117T-ADJ	EC48117T-ADJ	Tube
		EC48117T-1.5	EC48117T-1.5	Tube
		EC48117T-1.8	EC48117T-1.8	Tube
		EC48117T-2.5	EC48117T-2.5	Tube
		EC48117T-3.3	EC48117T-3.3	Tube
		EC48117T-5.0	EC48117T-5.0	Tube
TO-252	0 to 125°C	EC48117D-ADJ	EC48117D-ADJ	Tube/Tape/Reel
		EC48117D-1.5	EC48117D-1.5	Tube/Tape/Reel
		EC48117D-1.8	EC48117D-1.8	Tube/Tape/Reel
		EC48117D-2.5	EC48117D-2.5	Tube/Tape/Reel
		EC48117D-3.3	EC48117D-3.3	Tube/Tape/Reel
		EC48117D-5.0	EC48117D-5.0	Tube/Tape/Reel
TO-263	0 to 125°C	EC48117S-ADJ	EC48117S-ADJ	Tube/Tape/Reel
		EC48117S-1.5	EC48117S-1.5	Tube/Tape/Reel
		EC48117S-1.8	EC48117S-1.8	Tube/Tape/Reel
		EC48117S-2.5	EC48117S-2.5	Tube/Tape/Reel
		EC48117S-3.3	EC48117S-3.3	Tube/Tape/Reel
		EC48117S-5.0	EC48117S-5.0	Tube/Tape/Reel

Some of our products are available in Lead Free packages; if buyers need Lead Free product, please add -E1 after the part number in your order. For example, EC358M is a standard tin-lead product, EC358M-E1 means a Lead Free product.

**EC 48117X - Z**

Circuit Type		ADJ: Adjustable Output
Package		1.5: Fixed Output 1.5V
		1.8: Fixed Output 1.8V
		2.5: Fixed Output 2.5V
		3.3: Fixed Output 3.3V
		5.0: Fixed Output 5.0V

H: SOT-223 D: TO-252  
R: SOT-89 S: TO-263  
T: TO-220

**Absolute Maximum Ratings (Note 1)**

Parameter	Value	Unit
V <sub>IN</sub>	20	V
Maximum Junction Temperature	150	°C
Storage Temperature Range	-65 to 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 <sub>IN</sub>		15	V
Operating Junction Temperature Range	0	125	°C

**Electrical Characteristics**

 Operating Conditions:  $V_I \leq 0V$ ,  $T_J = 25^\circ C$  unless otherwise specified.

Parameter	Conditions	Min	Typ	Max	Unit
Reference Voltage	EC48117-ADJ $I_{OUT} = 10mA$ , $V_{IN} - V_{OUT} = 2V$ $10mA \leq I_{OUT} \leq 1A$ , $1.4V \leq V_{IN} - V_{OUT} \leq 8V$ , $P \leq$ Maximum Power Dissipation	1.238 1.225	1.250 1.250	1.262 1.270	V
Output Voltage	EC48117-1.5 $I_{OUT} = 10mA$ , $V_{IN} = 3.5V$ $10mA \leq I_{OUT} \leq 1A$ , $3.0V \leq V_{IN} \leq 10V$	1.485 1.470	1.5 1.5	1.515 1.530	V
	EC48117-1.8 $I_{OUT} = 10mA$ , $V_{IN} = 3.8V$ $10mA \leq I_{OUT} \leq 1A$ , $3.2V \leq V_{IN} \leq 10V$	1.782 1.746	1.8 1.8	1.818 1.854	V
	EC48117-2.5 $I_{OUT} = 10mA$ , $V_{IN} = 4.5V$ $10mA \leq I_{OUT} \leq 1A$ , $3.9V \leq V_{IN} \leq 10V$	2.475 2.450	2.5 2.5	2.525 2.550	V
	EC48117-3.3 $I_{OUT} = 10mA$ , $V_{IN} = 5.0V$ $10mA \leq I_{OUT} \leq 1A$ , $4.75V \leq V_{IN} \leq 10V$	3.267 3.235	3.3 3.3	3.333 3.365	V
	EC48117-5.0 $I_{OUT} = 10mA$ , $V_{IN} = 7.0V$ $10mA \leq I_{OUT} \leq 1A$ , $6.5V \leq V_{IN} \leq 12V$	4.950 4.900	5.0 5.0	5.050 5.100	V
Line Regulation	EC48117-ADJ $I_{OUT} = 10mA$ , $1.5V \leq V_{IN} - V_{OUT} \leq \infty$		0.035	0.2	%
	EC48117-1.5 $I_{OUT} = 10mA$ , $1.5V \leq V_{IN} - V_{OUT} \leq \infty$		1	6	mV
	EC48117-1.8 $I_{OUT} = 10mA$ , $1.5V \leq V_{IN} - V_{OUT} \leq \infty$		1	6	mV
	EC48117-2.5 $I_{OUT} = 10mA$ , $1.5V \leq V_{IN} - V_{OUT} \leq \infty$		1	6	mV
	EC48117-3.3 $I_{OUT} = 10mA$ , $1.5V \leq V_{IN} - V_{OUT} \leq \infty$		1	6	mV
	EC48117-5.0 $I_{OUT} = 10mA$ , $1.5V \leq V_{IN} - V_{OUT} \leq \infty$		1	10	mV
Load Regulation	EC48117-ADJ $V_{IN} - V_{OUT} = 2V$ , $10mA \leq I_{OUT} \leq 1A$		0.2	0.4	%
	EC48117-1.5 $V_{IN} - V_{OUT} = 2V$ , $10mA \leq I_{OUT} \leq 1A$		1	10	mV
	EC48117-1.8 $V_{IN} - V_{OUT} = 2V$ , $10mA \leq I_{OUT} \leq 1A$		1	10	mV
	EC48117-2.5 $V_{IN} - V_{OUT} = 2V$ , $10mA \leq I_{OUT} \leq 1A$		1	10	mV
	EC48117-3.3 $V_{IN} - V_{OUT} = 2V$ , $10mA \leq I_{OUT} \leq 1A$		1	10	mV
	EC48117-5.0 $V_{IN} - V_{OUT} = 2V$ , $10mA \leq I_{OUT} \leq 1A$		1	15	mV

**Electrical Characteristics (Continued)**

 Operating Conditions:  $V_{IN} \leq 0V, T_J = 25^\circ C$  unless otherwise specified.

Parameter	Conditions	Min	Typ	Max	Unit
Dropout Voltage	$V_{REF} = 1\%, I_{OUT} = 0.1A$		1.00	1.1	V
	$V_{REF} = 1\%, I_{OUT} = 0.5A$		1.08	1.18	V
	$V_{REF} = 1\%, I_{OUT} = 1.0A$		1.15	1.25	V
Current Limit	$V_{IN} - V_{OUT} = 2V$	1.25	1.35		A
Adjust Pin Current			60	120	$\mu A$
Adjust Pin Current Change	$1.4V \leq V_{IN} - V_{OUT} \leq 10V, 10mA \leq I_{OUT} \leq 1A$		0.2	5	$\mu A$
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 $V_{OUT}$ )	$T_A = 25^\circ C, 10Hz \leq f \leq 0kHz$		0.003		%
Thermal Resistance, Junction to Case	SOT-223		15		$^\circ C/W$
	TO-252		10		
	TO-220		4.5		
	TO-263		4		
Thermal Shutdown	Junction Temperature		150		$^\circ C$
Thermal Shutdown Hysteresis			25		$^\circ C$

**Typical Performance Characteristics**

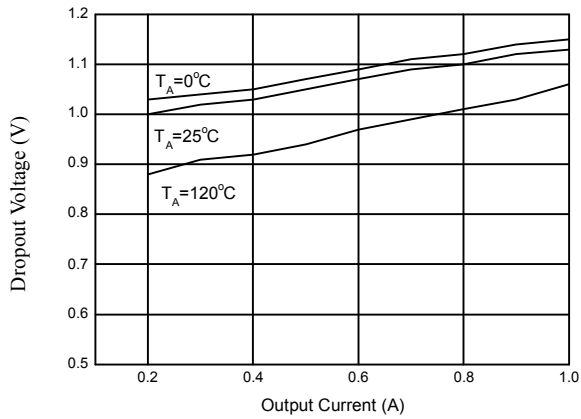


Figure 4. Dropout Voltage vs. Output Current

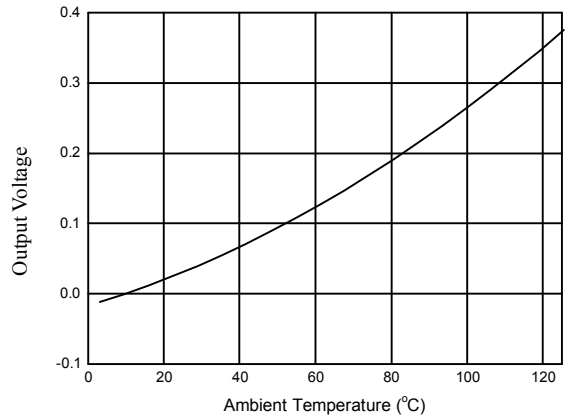


Figure 5. Load Regulation vs. Temperature

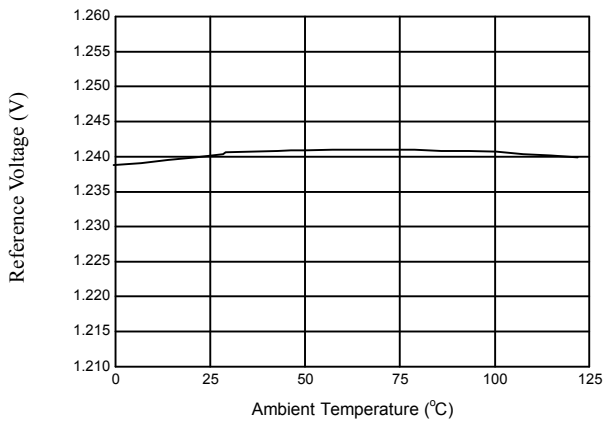


Figure 6. Reference Voltage vs. Temperature

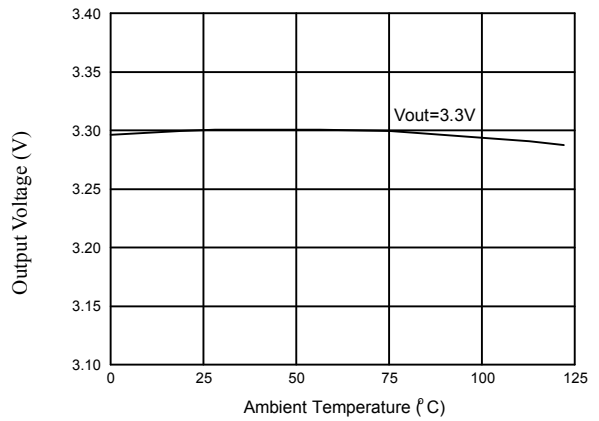


Figure 7. Output Voltage vs. Temperature



**Typical Performance Characteristics (Continued)**

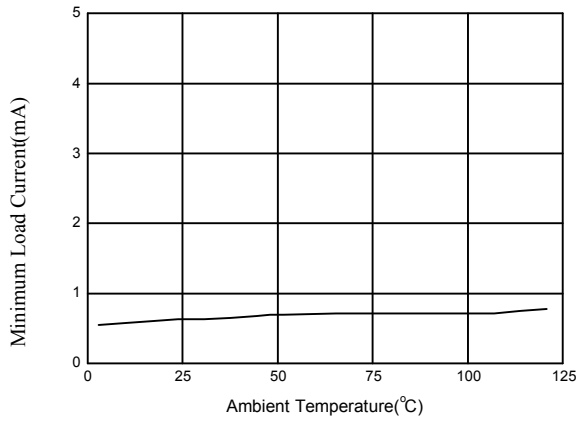


Figure 8. Minimum Load Current vs. Temperature

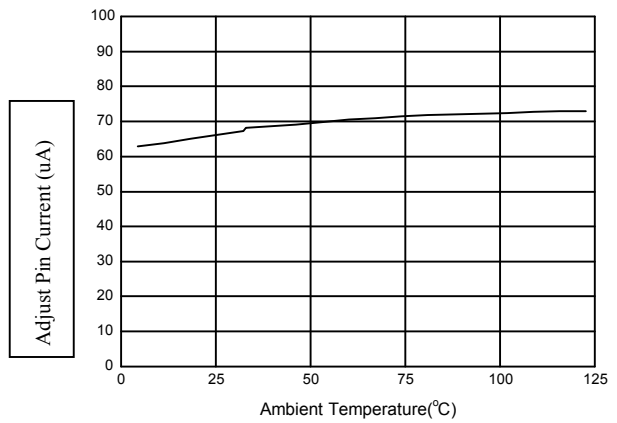


Figure 9. Adjust Pin Current vs. Temperature

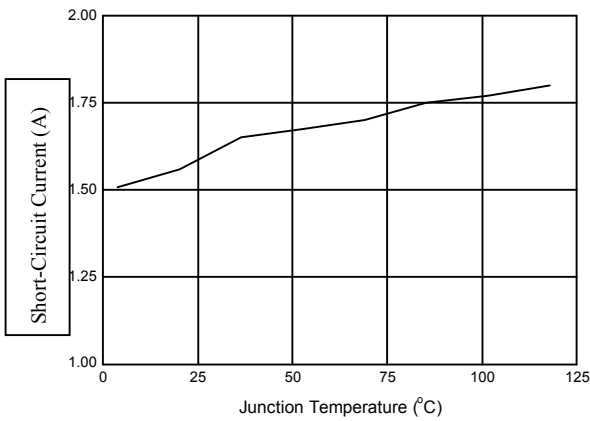


Figure 10. Short-Circuit Current vs. Temperature

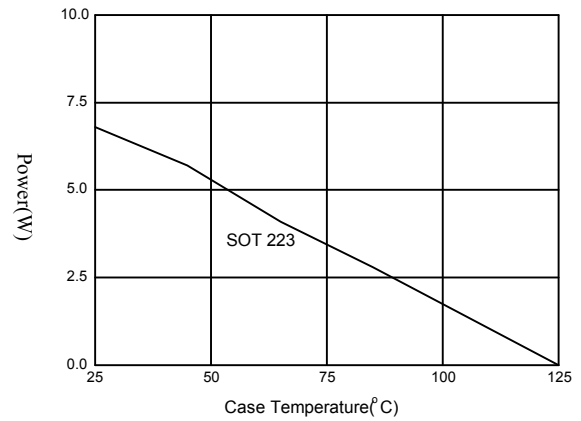


Figure 11. Maximum Power Dissipation

### Typical Performance Characteristics (Continued)

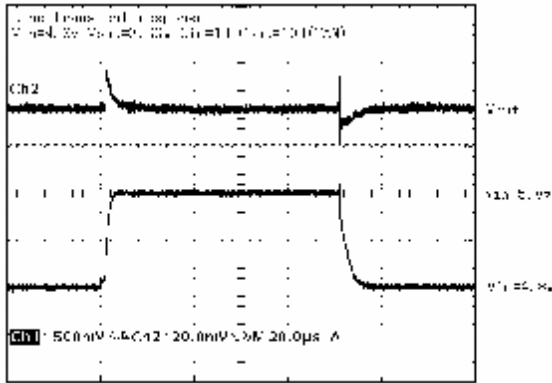


Figure 12. Line Transient Response

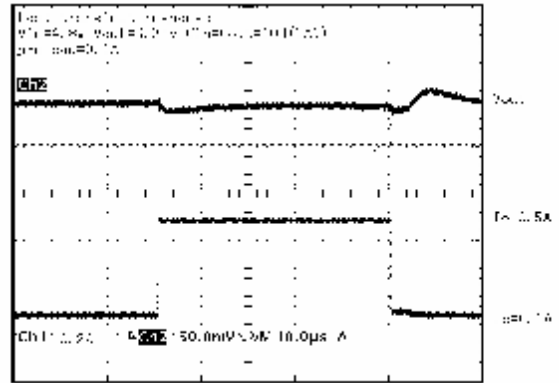


Figure 13. Load Transient Response

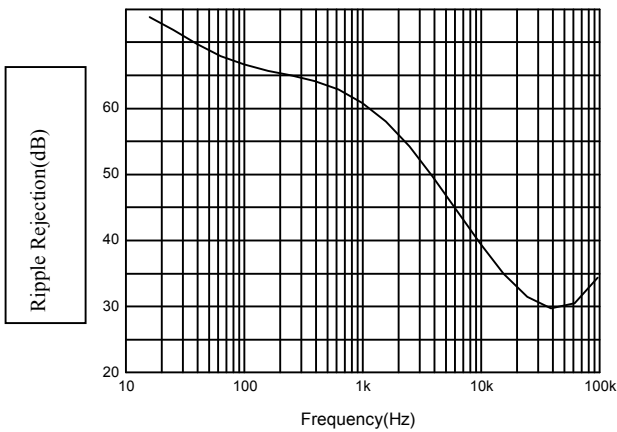


Figure 14. Ripple Rejection vs. Frequency

**Typical Applications**

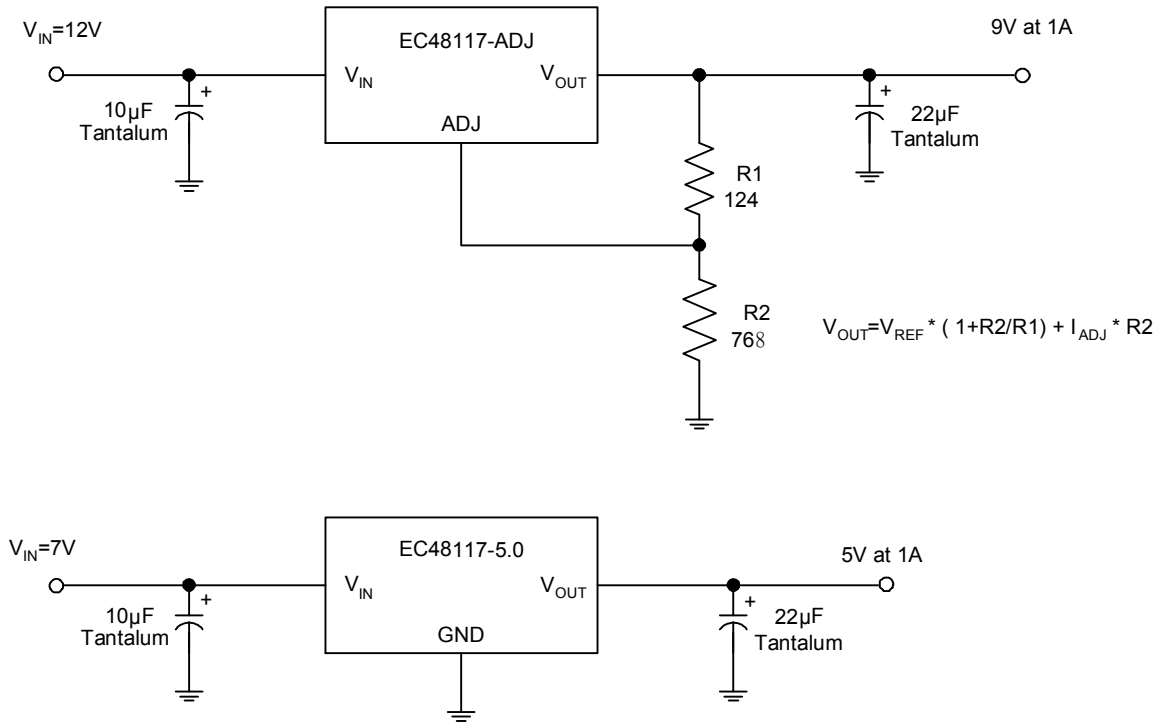
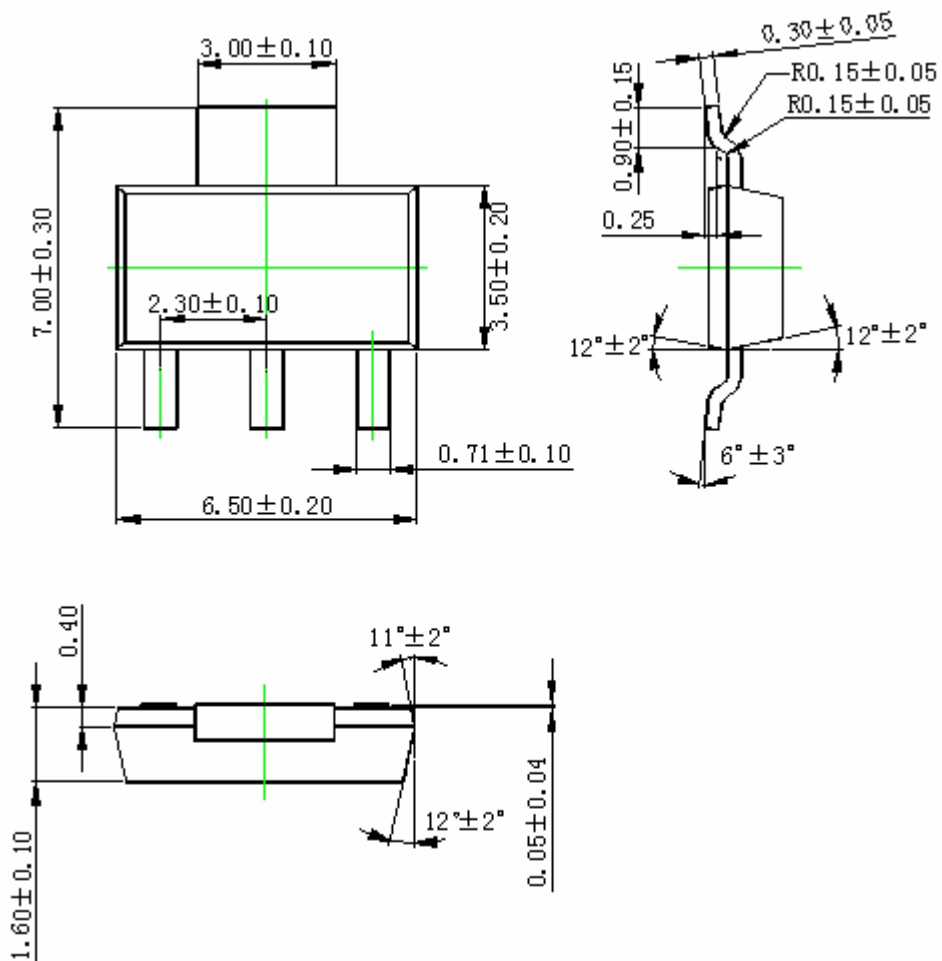


Figure 15. Typical Applications of EC48117

**Mechanical Dimensions**

**SOT - 223**

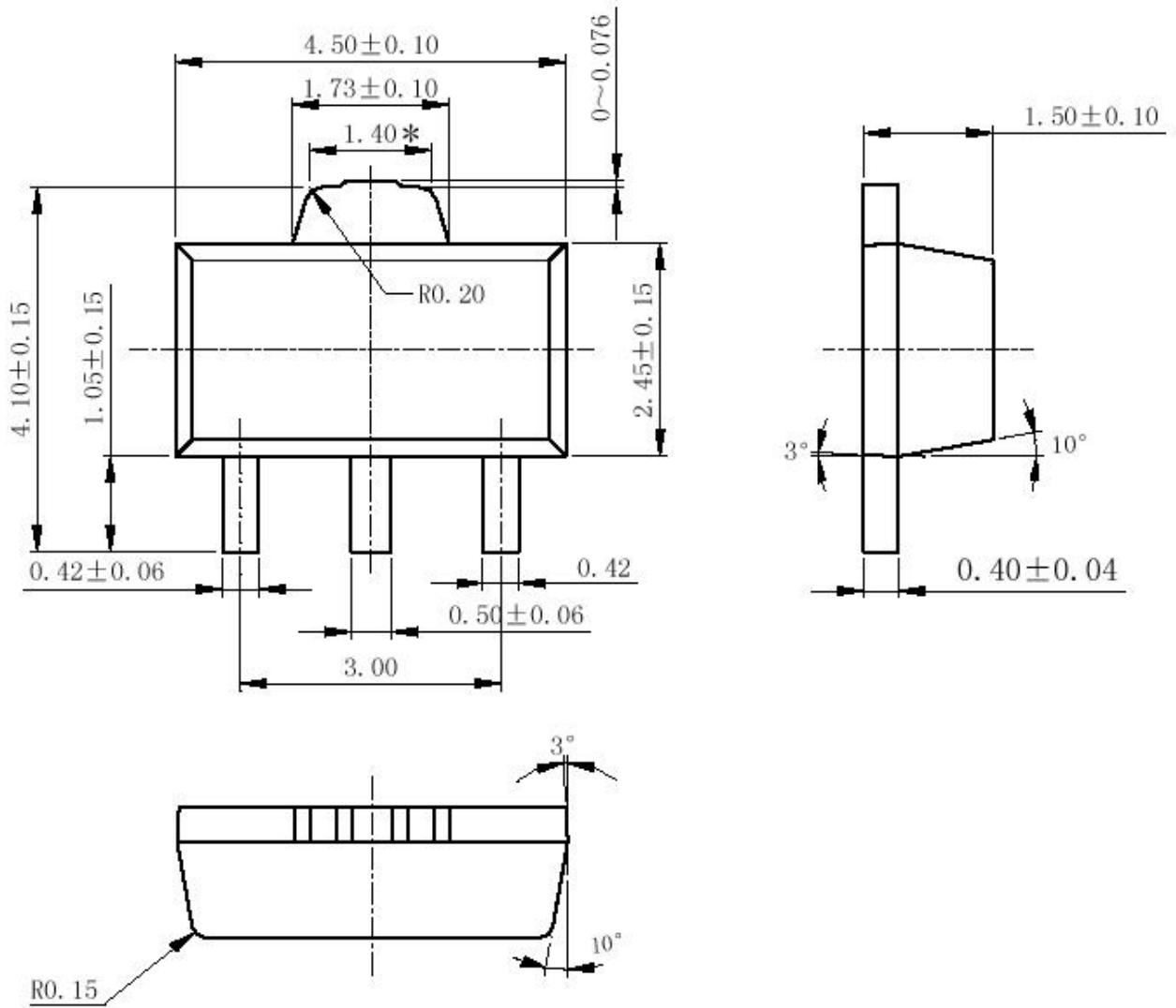
**Unit: mm**



**Mechanical Dimensions (Continued)**

**SOT-89**

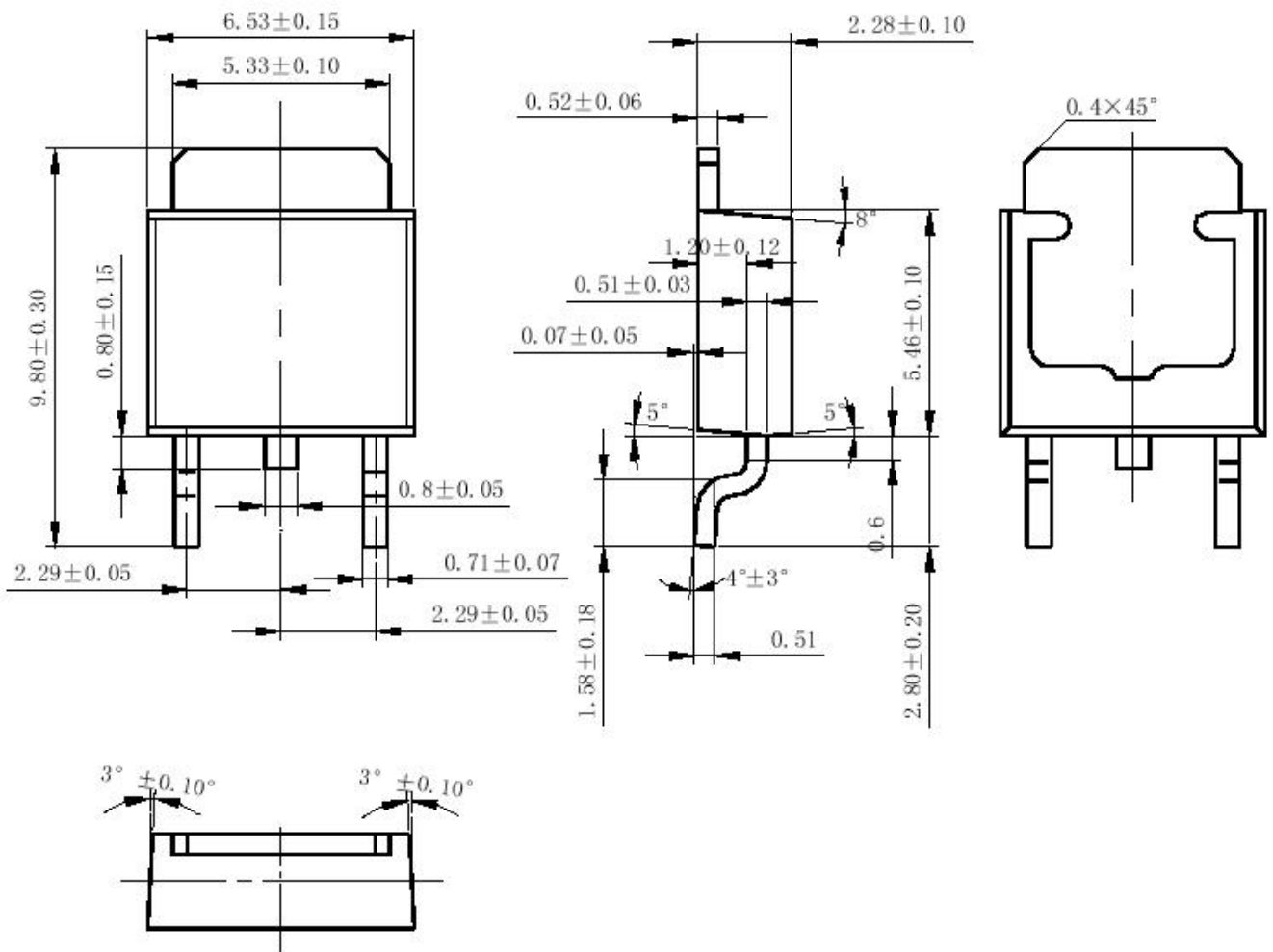
**Unit: mm**



**Mechanical Dimensions (Continued)**

**TO - 252**

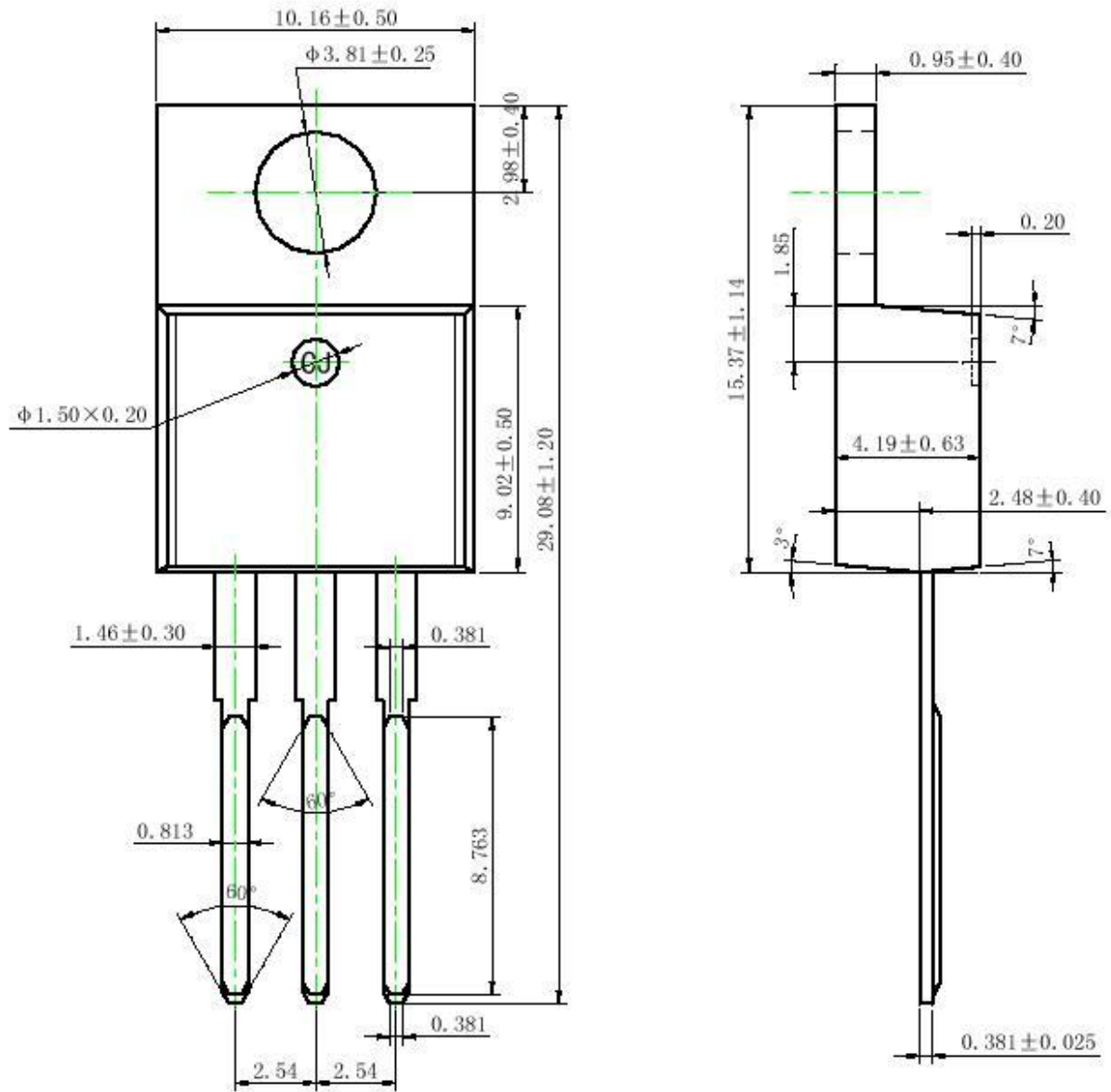
**Unit: mm**



**Mechanical Dimensions (Continued)**

**TO - 220**

**Unit: mm**



**Mechanical Dimensions (Continued)**

**TO - 263**

**Unit: mm**

