

# CAT1117

## 1A Low-Dropout Linear Regulator

### Features

- Available in 1.5V, 1.8V, 2.5V, 3.3V, 5.0V Version
- Space Saving SOT-223 and TO252 Package
- Internal Short Circuit Current Limiting
- Internal Over Temperature Protection
- Output Current in Excess of 1A

### Applications

- Post Regulation for Switching DC/DC Converter
- High Efficiency Linear Regulator
- Battery Charger
- Battery Powered Instrumentation
- Motherboard

### General Description

The CAT1117 is a low dropout linear regulator with a dropout of 1.3V at 1A of load current. It is available in four fixed voltage: 1.5V, 1.8V, 2.5V, 3.3V and 5.0V versions.

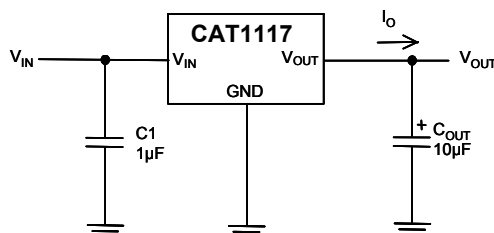
The CAT1117 provides over temperature and over current protection circuits to prevent it from being damaged by abnormal operating conditions.

The CAT1117 is available in SOT-223 packages. A minimum of 10 $\mu$ F tantalum electrolytic capacitor is required at the output to improve the transient response and stability.

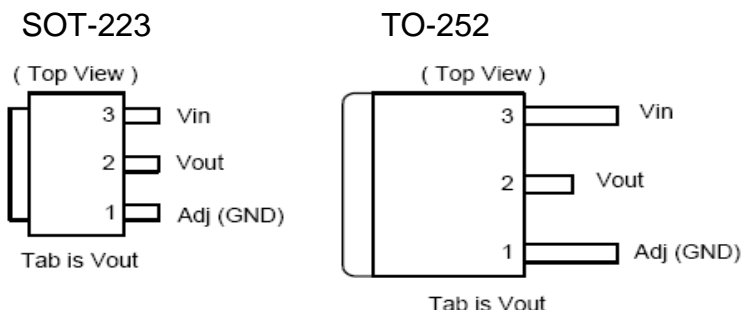
### Ordering Information

CAT1117	<u>X</u>	<u>XX</u>
	Package	Output Voltage
R	SOT223-3L	15 : 1.5V
S	TO252-3L	18 : 1.8V
		25 : 2.5V
		33 : 3.3V
		50 : 5.5V
		Adj : Blank

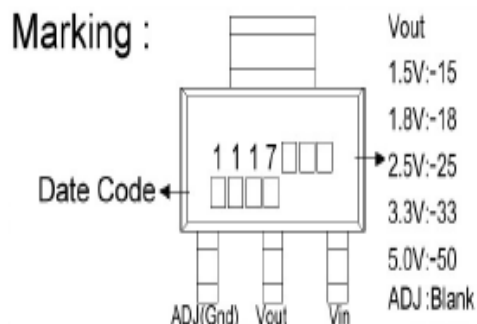
### Typical Application



### Pin Configuration



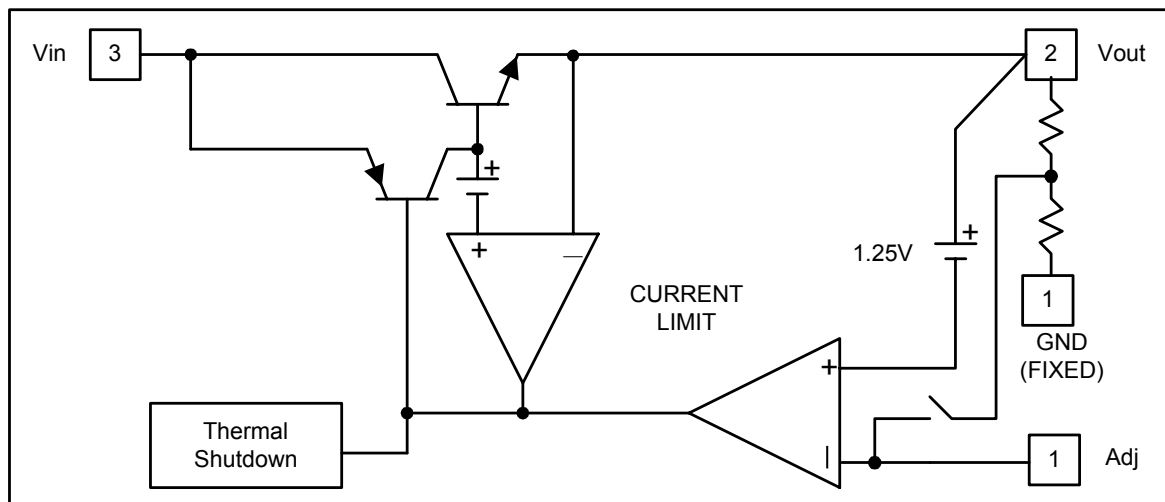
### Marking Information



## Pin Descriptions

Name	I/O	PIN#	FUNCTION
Adj (GND)	I	1	A resistor divider from this pin to the Vout pin and ground sets the output voltage (Ground only for fixed mode)
Vout	O	2	The output of the regulator. A minimum of 10uF capacitor must be connected from this pin to ground to insure stability.
Vin	I	3	The input pin of regulator .Typically a large storage capacitor is connected from this pin to ground to insure that the input voltage does not sag below the minimum dropout voltage during the load transient response .This pin must always be 1.3V higher than Vout in order for the device to regulate properly.

## Block Diagram



## Absolution Maximum Ratings

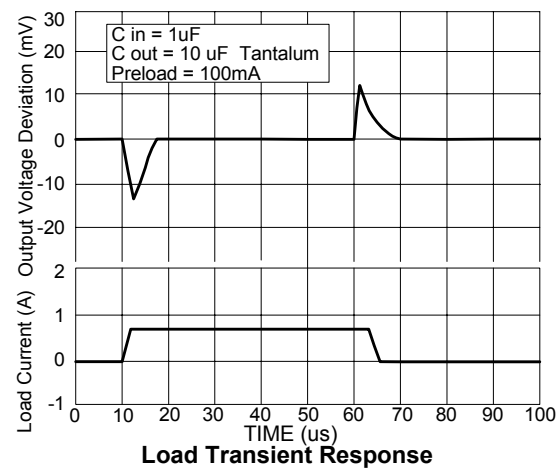
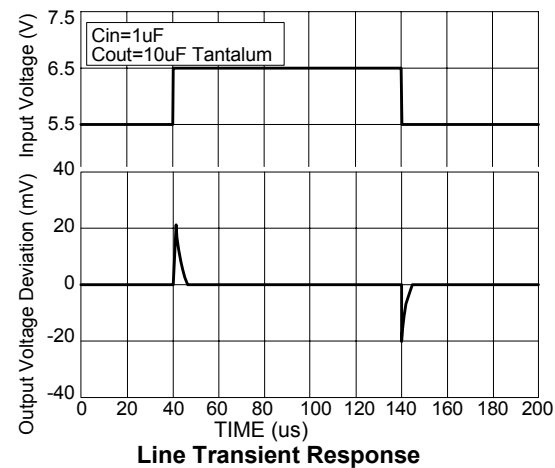
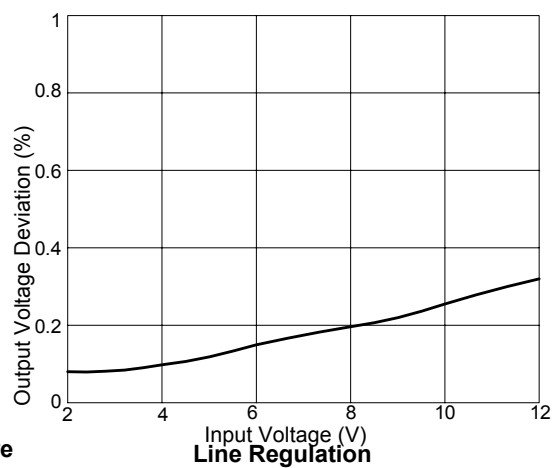
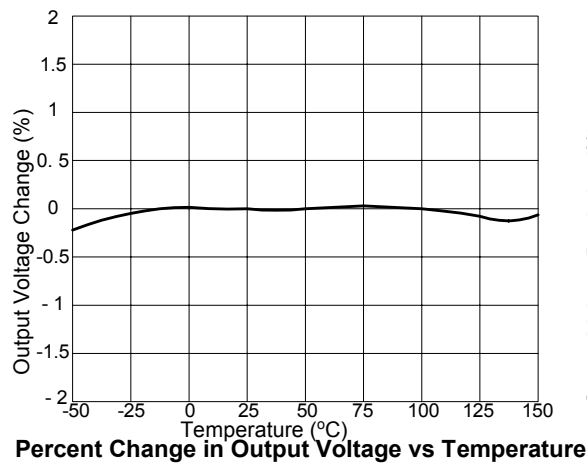
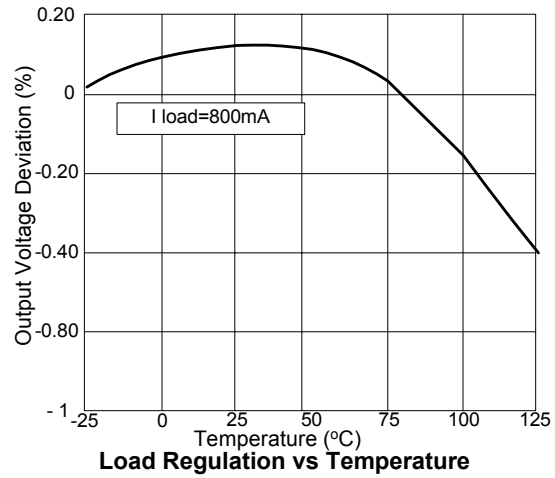
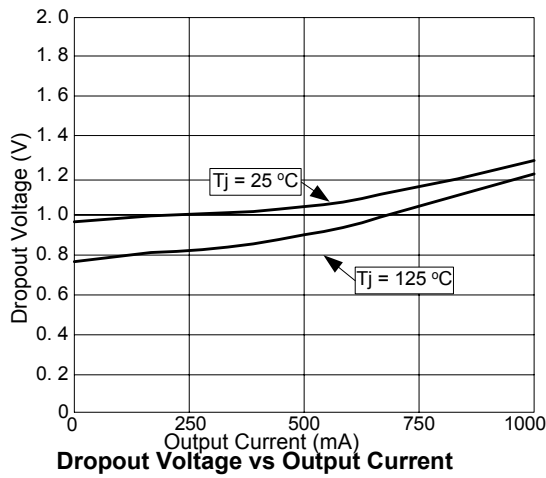
Symbol	Parameter	Ratings	Unit
Vin	DC Supply Voltage	-0.3 to 12	V
PD	Power Dissipation	Internally Limited	
TST	Storage Temperature	-65 ~ + 150	°C
TOP	Operating Junction Temperature Range	0 ~ + 150	°C

# CAT1117 1A Low-Dropout Linear Regulator

## Electrical Characteristics (Under Operating Conditions)

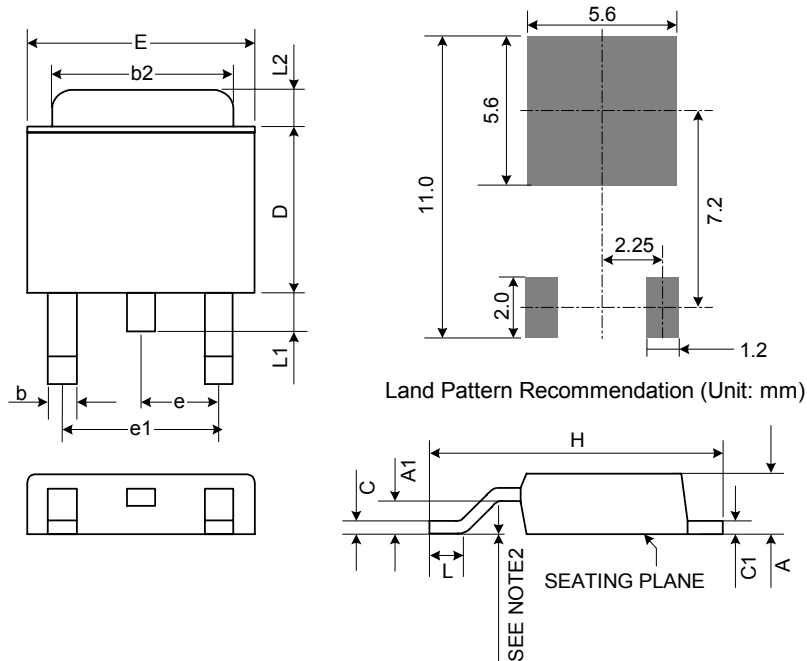
PARAMETER	CONDITIONS		MIN	TYP	MAX	UNIT
Reference Voltage	CAT1117-ADJ	$T_J=25^{\circ}\text{C}, (V_{IN}-V_{OUT})=1.5\text{V}$ $I_O=10\text{mA}$	1.225	1.250	1.275	V
Output Voltage	CAT1117-1.5	$I_{OUT} = 10\text{mA}, T_J = 25^{\circ}\text{C},$ $3\text{V} \leq V_{IN} \leq 12\text{V}$	1.470	1.500	1.530	V
	CAT1117-1.8	$I_{OUT} = 10\text{mA}, T_J = 25^{\circ}\text{C},$ $3.3\text{V} \leq V_{IN} \leq 12\text{V}$	1.764	1.800	1.836	V
	CAT1117-1.9	$I_{OUT} = 10\text{mA}, T_J = 25^{\circ}\text{C},$ $3.3\text{V} \leq V_{IN} \leq 12\text{V}$	1.862	1.900	1.938	V
	CAT1117-2.5	$I_{OUT} = 10\text{mA}, T_J = 25^{\circ}\text{C},$ $4\text{V} \leq V_{IN} \leq 12\text{V}$	2.450	2.500	2.550	V
	CAT1117-3.3	$I_{OUT} = 10\text{mA}, T_J = 25^{\circ}\text{C},$ $4.8\text{V} \leq V_{IN} \leq 12\text{V}$	3.235	3.300	3.365	V
	CAT1117-5.0	$I_{OUT} = 10\text{mA}, T_J = 25^{\circ}\text{C},$ $6.5\text{V} \leq V_{IN} \leq 12\text{V}$	4.900	5.000	5.100	V
Line Regulation	CAT1117-XXX	$I_O=10\text{mA}, V_{OUT}+1.5\text{V} < V_{IN} < 12\text{V},$ $T_J=25^{\circ}\text{C}$			0.2	%
Load Regulation	CAT1117-ADJ	$V_{IN}=3.3\text{V}, V_{adj}=0, 0\text{mA} < I_O < 1\text{A},$ $T_J=25^{\circ}\text{C}$ (Note 1,2)			1	%
	CAT1117-1.5	$V_{IN}=3\text{V}, 0\text{mA} < I_O < 1\text{A},$ $T_J=25^{\circ}\text{C}$ (Note 1,2)		12	15	mV
	CAT1117-1.8	$V_{IN}=3.3\text{V}, 0\text{mA} < I_O < 1\text{A},$ $T_J=25^{\circ}\text{C}$ (Note 1,2)		15	18	mV
	CAT1117-1.9	$V_{IN}=3.3\text{V}, 0\text{mA} < I_O < 1\text{A},$ $T_J=25^{\circ}\text{C}$ (Note 1,2)		16	19	mV
	CAT1117-2.5	$V_{IN}=4\text{V}, 0\text{mA} < I_O < 1\text{A},$ $T_J=25^{\circ}\text{C}$ (Note 1,2)		20	25	mV
	CAT1117-3.3	$V_{IN} = 5\text{V}, 0 \leq I_{OUT} \leq 1\text{A},$ $T_J=25^{\circ}\text{C}$ (Note 1,2)		26	33	mV
	CAT1117-5.0	$V_{IN} = 8\text{V}, 0 \leq I_{OUT} \leq 1\text{A},$ $T_J=25^{\circ}\text{C}$ (Note 1,2)		40	50	mV
Dropout Voltage ( $V_{IN}-V_{OUT}$ )	CAT1117-ADJ/1.5/1.8 /1.9/2.5/3.3/5.0	$I_{OUT} = 1\text{A}, \Delta V_{OUT}=0.1\%V_{OUT}$		1.3	1.4	V
Current Limit	CAT1117-ADJ/1.5/1.8 /1.9/2.5/3.3/5.0	$(V_{IN}-V_{OUT}) = 5\text{V}$	1.1			A
Minimum Load Current	CAT1117-XXX	$0^{\circ}\text{C} \leq T_J \leq 125^{\circ}\text{C}$		5	10	mA
Thermal Regulation	$T_A=25^{\circ}\text{C}, 30\text{ms pulse}$			0.008	0.04	%/W
Ripple Rejection	$F=120\text{Hz}, C_{OUT}=25\mu\text{F Tantalum}, I_{OUT}=1\text{A}$					
	CAT1117-XXX	$V_{IN}=V_{OUT}+3\text{V}$		60	70	dB
Temperature Stability	$I_O=10\text{mA}$			0.5		%
$\theta_{JA}$ Thermal Resistance Junction-to-Ambient(No heat sink ;No air flow)	SOT-223 TO-252			117 92		$^{\circ}\text{C/W}$
$\theta_{JC}$ Thermal Resistance Junction-to-Case	SOT-223 : Control Circuitry/Power Transistor TO-252 : Control Circuitry/Power Transistor			15 10		$^{\circ}\text{C/W}$

## Typical Performance Characteristics (continued)



## Package Information

TO252

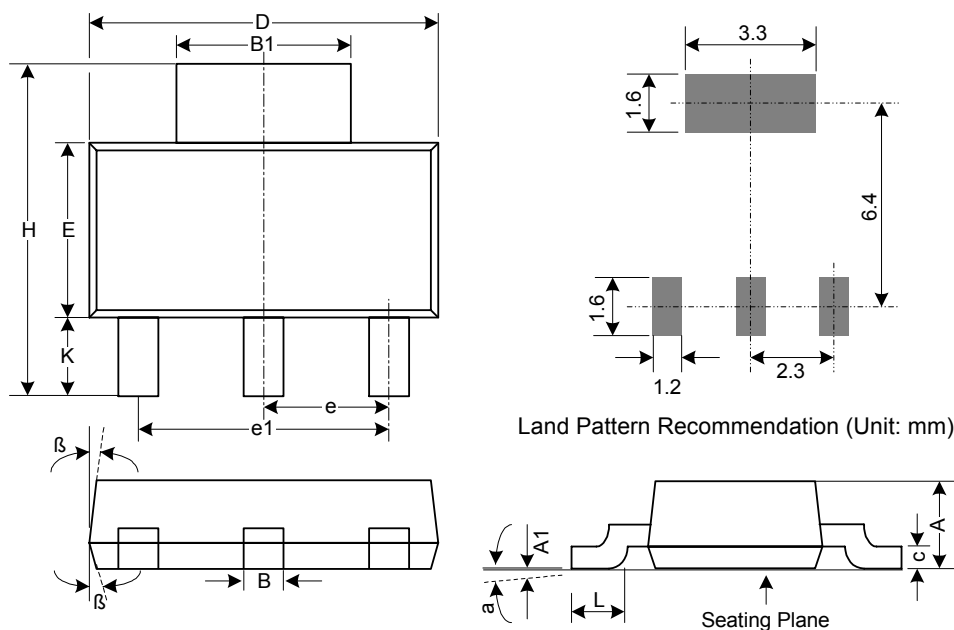


Notes:

1. JEDEC Outline: TO-252 AB
2. Mils suggested for positive contact at mounting.

Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	2.18	2.29	2.40	0.086	0.090	0.094
A1	0.89	-	1.14	0.035	-	0.045
b	0.61 TYP.			0.024 TYP.		
b2	5.20	5.35	5.50	0.205	0.211	0.217
C	0.45	0.52	0.58	0.018	0.020	0.023
C1	0.45	0.52	0.58	0.018	0.020	0.023
D	5.40	5.57	6.20	0.213	0.219	0.244
E	6.35	6.58	6.80	0.250	0.259	0.268
e	2.28 BSC.			0.090 BSC.		
e1	4.57 BSC.			0.180 BSC.		
H	9.00	9.70	10.40	0.354	0.382	0.409
L	0.51	-	-	0.020	-	-
L1	0.64	0.83	1.02	0.025	0.033	0.040
L2	0.88	-	1.27	0.035	-	0.050

SOT223



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.50	1.65	1.80	0.059	0.065	0.071
A1	0.02	0.05	0.08	0.001	0.002	0.003
B	0.60	0.70	0.80	0.024	0.028	0.031
B1	2.90	-	3.15(Ref.)	0.114	-	0.124(Ref.)
c	0.28	0.30	0.32	0.011	0.012	0.013
D	6.30	6.50	6.70	0.248	0.256	0.264
E	3.30	3.50	3.70	0.130	0.138	0.146
e	2.3 Basic			0.091 Basic		
e1	4.6 Basic			0.181 Basic		
H	6.70	7.00	7.30	0.264	0.276	0.287
L	0.91	1.00	1.10	0.036	0.039	0.043
K	1.50	1.75	2.00	0.059	0.069	0.079
$\alpha$	0°	5°	10°	0°	5°	10°
$\beta$	-	13°	-	-	13°	-