

## 1A Voltage High Speed LDO Regulators HM6117 Series

### General Description

The HM6117 series are highly accurate, low noise, LDO Voltage Regulators that are capable of providing an output current that is in excess 910mA up to 1A with a maximum dropout of **0.5V**, at 800mA. This series contains two fixed output voltages of 1.2V, 1.5V, 1.8V, 2.5V, 3.3V, 5.0V. On-chip trimming adjusts the reference/output voltage to within  $\pm 1.5\%$  accuracy. Internal protection features consist of output current limiting, safe operating area compensation, and thermal shutdown. The HM6117 series can operate with up to 18V input. There is SOT23, SOT223, SOT89 and TO252 package.

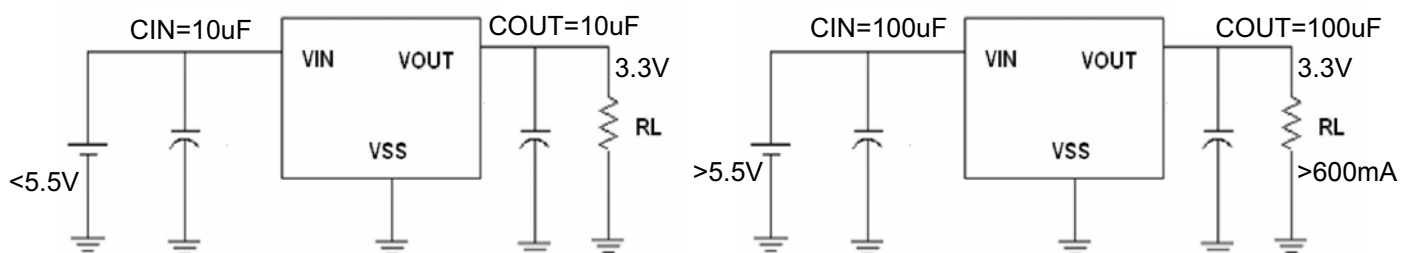
### Features

- **Output Current up to 1A**
- Dropout Voltage: 500mV@  $I_{OUT} = 800mA$
- Operating Voltage Range: 1.6V~16V
- Highly Accuracy:  $\pm 2\%$
- Adjustable Output Voltage Option
- Standby Current: 60uA (TYP.)
- High Ripple Rejection: 75dB@1KHz
- Line Regulation: 0.1% (TYP.)
- Temperature Stability  $\leq 0.5\%$
- Thermal Shutdown Protection: 150°C
- Packages: SOT223, TO252

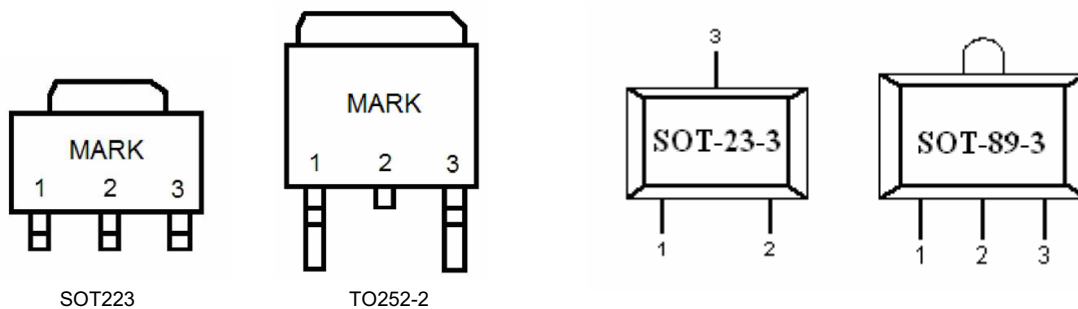
### Typical Application

- Consumer and Industrial Equipment Point of Regulation
- Switching Power Supply Post Regulation
- **Down: 3.7--3.3V; 3.3--2.5V; 2.5--1.8V; 1.8--1.2V**
- Battery Chargers

### Typical Application Circuit



## Pin Configuration



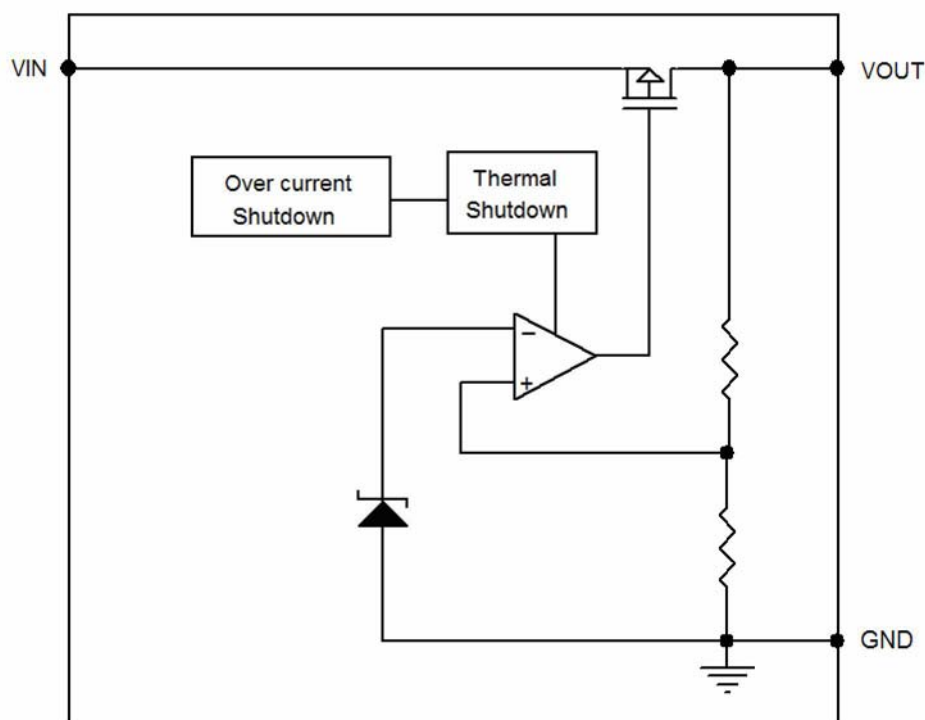
PART NO: HM6117-x.x =SOT223 ; HM6117S=SOT23-3 ; HM6117T= SOT89-3 ; HM6117D=TO252-2  
X.X means output voltage

		Pin Name	Functions
SOT89	SOT223/23,TO252		
1	1	GND	Ground
3	2	V <sub>OUT</sub>	Output
2	3	V <sub>IN</sub>	Power Input

## Absolute Maximum Ratings

Parameter	Symbol	Ratings	Units
Input Voltage	V <sub>IN</sub>	18	V
Output Current	I <sub>OUT</sub>	1	A
Output Voltage	V <sub>OUT</sub>	V <sub>SS</sub> -0.3~V <sub>IN</sub> +0.3	V
Power Dissipation	SOT223	1500	mW
	TO252-2	2500	mW
Operating Temperature Range	T <sub>OPR</sub>	-20~+85	°C
Storage Temperature Range	T <sub>STG</sub>	-40~+150	°C
Lead Temperature		260°C, 4sec	

## Block Diagram



## Electrical Characteristics

### HM6117-X.X

( $V_{IN} = V_{OUT} + 1.5V$ ,  $C_{IN} = C_L = 33\mu F$ ,  $T_a = 25^\circ C$ , unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT}(E)$	$I_{OUT} = 10mA$ , $V_{IN} = V_{OUT} + 1.0V$	X 0.98	$V_{OUT}(T)$	X 1.02	V
Maximum Output Current	$I_{OUTMAX}$	$V_{IN} = V_{OUT} + 1.0V$		910	1000	mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = V_{OUT} + 1.0V$ , $0mA \leq I_{OUT} \leq 800mA$		10	20	mV
Dropout Voltage	$V_{DIF1}$	$I_{OUT} = 200mA$		200		mV
	$V_{DIF2}$	$I_{OUT} = 500mA$		300		mV
	$V_{DIF3}$	$I_{OUT} = 800mA$		500		mV
Quiescent Current	$I_{SS}$	$V_{IN} = V_{OUT} + 1.0V$		60		$\mu A$
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT} = 0mA$ $V_{OUT} + 1.0V \leq V_{IN} \leq 15V$		2	5	mV
Ripple Rejection Rate	PSRR	$V_{IN} = 6.3V$ $+1V_{p-p} AC$	$I_{OUT} = 100mA, 1kHz$	75		dB
			$I_{OUT} = 200mA, 1kHz$	69		
			$I_{OUT} = 500mA, 1kHz$	62		

## Applications Information

### 1. Input Bypass Capacitor

An input capacitor is recommended. A 33uF tantalum on the input is a suitable input bypassing for almost all applications.

### 2. Load Regulation

The HM6117 regulates the voltage that appears between its output and ground pins, or between its output and adjust pins. In some cases, line resistances can introduce errors to the voltage across the load. To obtain the best load regulation, a few precautions are needed. Figure 1, shows a typical application using a fixed output regulator. The  $R_{t1}$  and  $R_{t2}$  are the line resistances. It is obvious that the  $V_{LOAD}$  is less than the  $V_{OUT}$  by the sum of the voltage drops along the line resistances. In this case, the load regulation seen at the  $R_{LOAD}$  would be degraded from the datasheet specification. To improve this, the load should be tied directly to the output terminal on the positive side and directly tied to the ground terminal on the negative side.

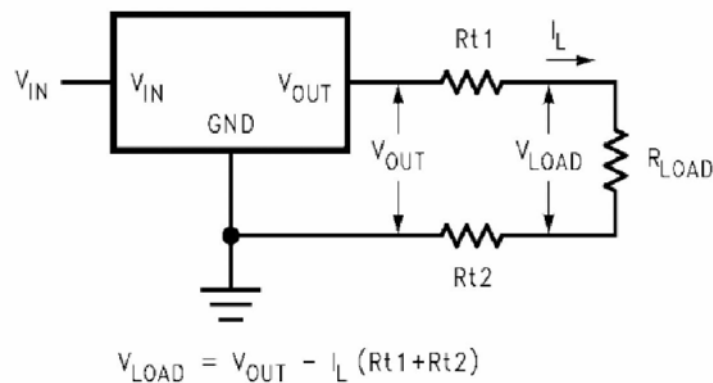
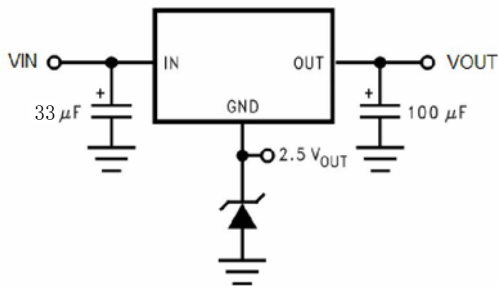


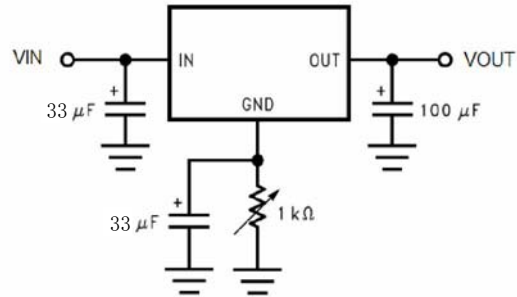
FIGURE 1. Typical Application using Fixed Output Regulator

## Application Circuit

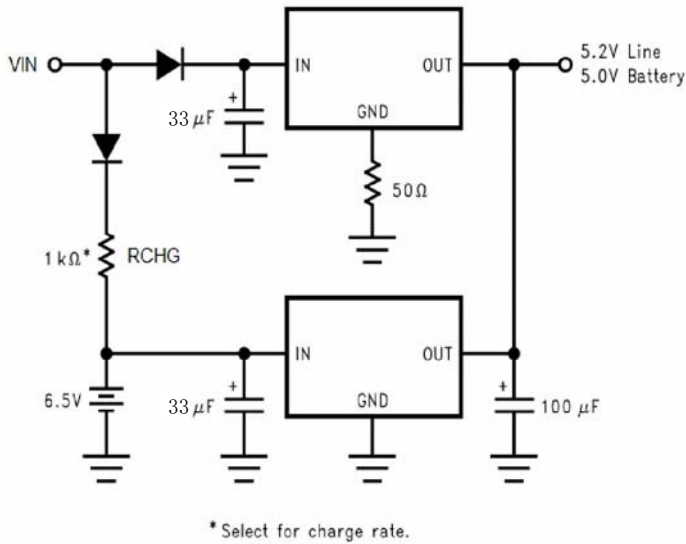
### (1) Regulator with Reference



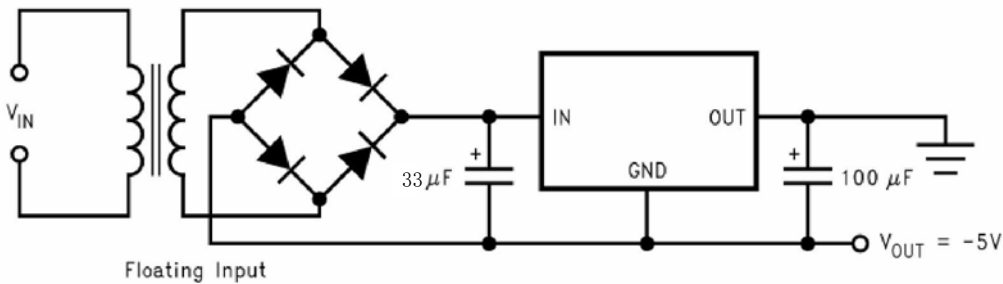
### (2) Adjusting Output of Fixed Voltage Regulators



### (3) Battery Backed-Up Power Supply

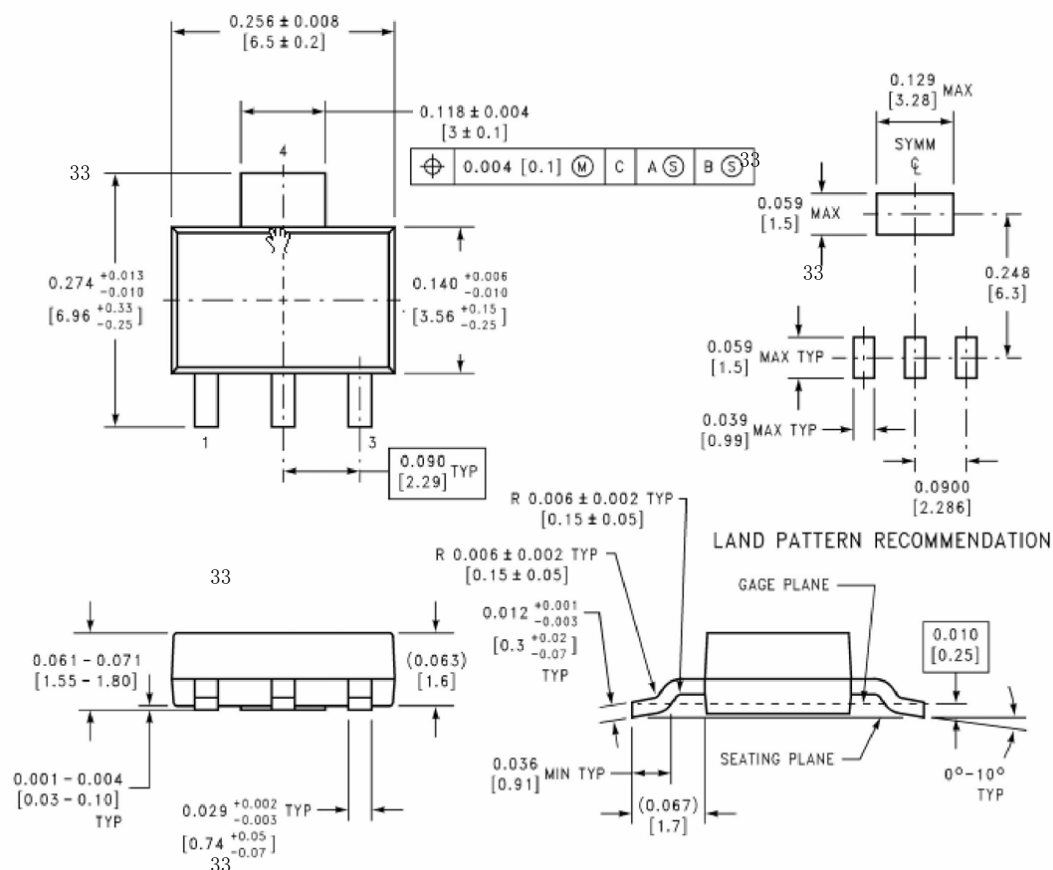


### (4) Low Dropout Negative Supply

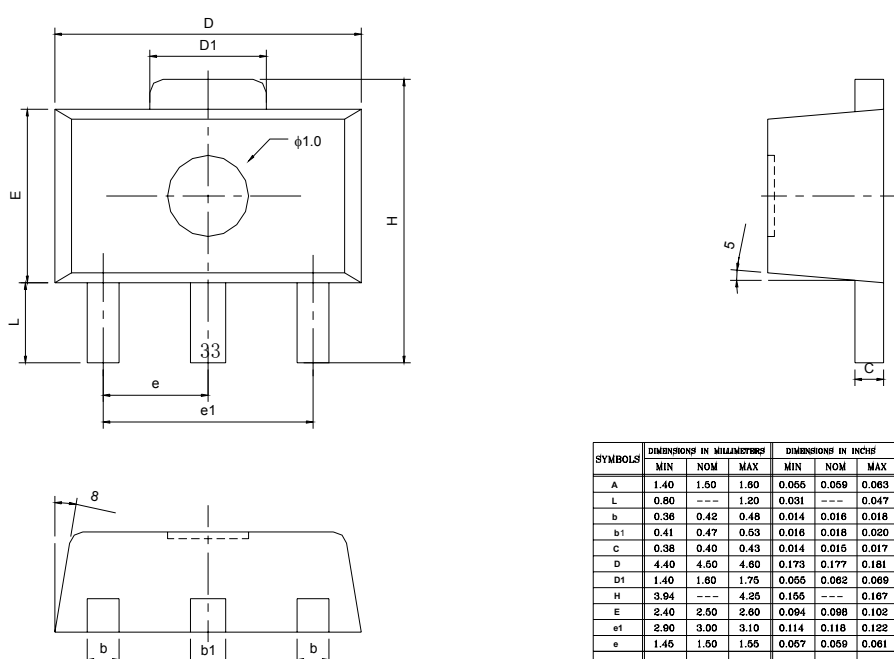


## Packaging Information

● SOT223

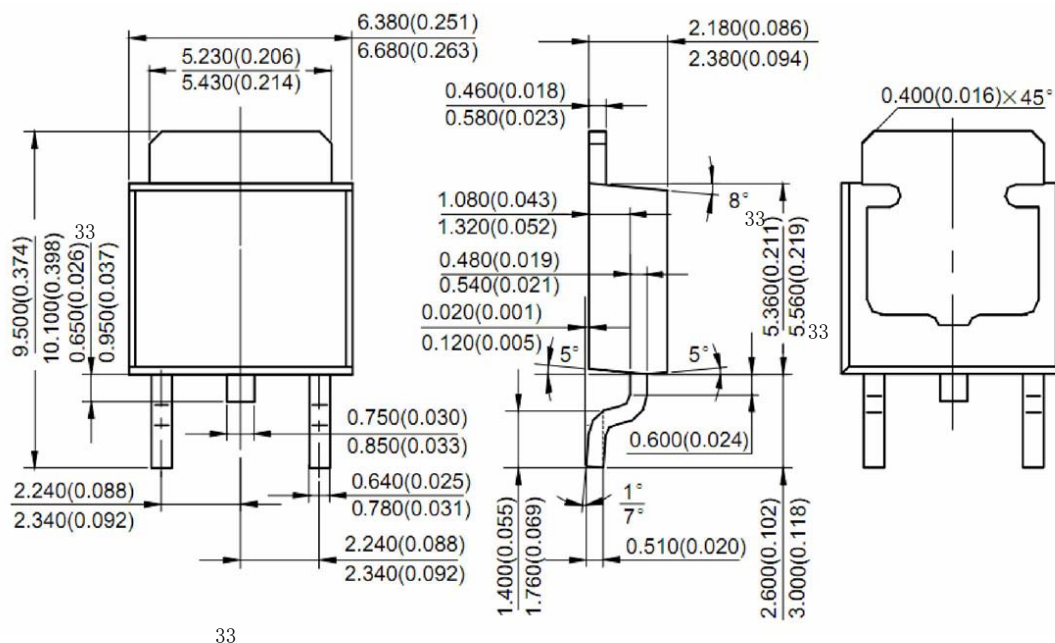


## SOT-89 (M89)



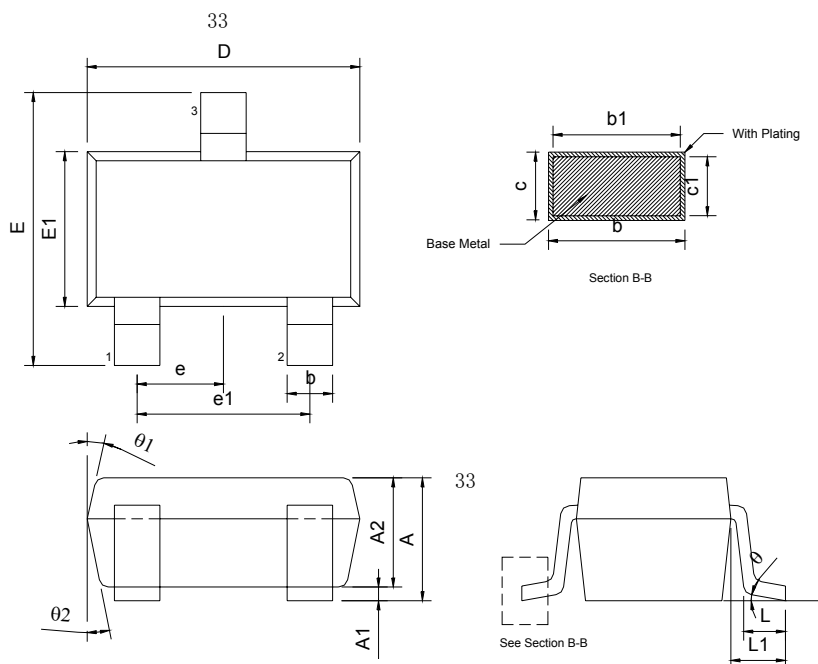
SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.40	1.50	1.80	0.055	0.059	0.063
L	0.80	—	1.20	0.031	—	0.047
b	0.36	0.42	0.48	0.014	0.016	0.018
b <sub>1</sub>	0.41	0.47	0.53	0.016	0.018	0.020
C	0.38	0.40	0.43	0.014	0.015	0.017
D	4.40	4.50	4.80	0.173	0.177	0.181
D <sub>1</sub>	1.40	1.60	1.75	0.055	0.062	0.068
H	3.94	—	4.25	0.155	—	0.167
E	2.40	2.50	2.60	0.094	0.098	0.102
e	2.90	3.00	3.10	0.114	0.118	0.122
e <sub>1</sub>	1.45	1.50	1.55	0.057	0.059	0.061

● TO252-2



PACKAGE DIMENSION

SOT-23-3 (M23)



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.05	---	1.35	0.041	---	0.053
A1	0.05	---	0.15	0.002	---	0.006
A2	1.00	1.10	1.20	0.039	0.043	0.047
b	0.25	---	0.50	0.010	---	0.020
b1	0.25	0.40	0.45	0.010	0.016	0.018
c	0.08	---	0.20	0.003	---	0.008
c1	0.08	0.11	0.15	0.003	0.004	0.006
D	2.70	2.90	3.00	0.106	0.114	0.118
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.50	1.60	1.70	0.059	0.063	0.067
L	0.35	0.45	0.55	0.014	0.018	0.022
L1	0.60 REF			0.024 REF		
e	0.95 BSC			0.037 BSC		
e1	1.90 BSC			0.075 BSC		
θ	0°	5°	10°	0°	5°	10°
θ1	3°	5°	7°	3°	5°	7°
θ2	6°	8°	10°	6°	8°	10°