

1A Low Dropout Positive Voltage Regulator

TO-252 (DPAK)



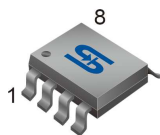
SOT-223



Pin Definition:

1. Fixed / Adj
2. Output (Tab)
3. Input

SOP-8



Pin Definition:

- | | |
|----------------|-----------|
| 1. Fixed / Adj | 8. N/C |
| 2. Output | 7. Output |
| 3. Output | 6. Output |
| 4. Input | 5. N/C |

General Description

TS1117B are high performance positive voltage regulators are designed for use in applications requiring low dropout performance at full rated current, Additionally, TS1117B provides excellent regulation over variations due to changes in line, load and temperature. Outstanding features include low dropout performance at rated current, fast transient response, internal current limiting and thermal shutdown protection of the output device. TS1117B are three terminal regulators with fixed and adjustable voltage options available in popular packages.

Features

- Low Dropout Performance 1.5V max.
- Full Current Rating Over Line and Temperature
- Fast Transient Response
- Built-in thermal shutdown
- Output Current Limit
- Line Regulation Typical 0.2%
- Load Regulation Typical 0.05%
- Low-ESR Ceramic Capacitor (MLCC) Required for Stability.
- Good Ripple Rejection

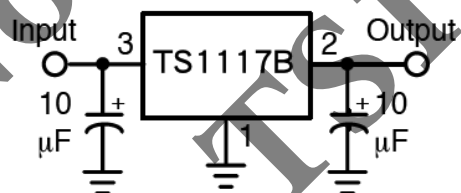
Ordering Information

Part No.	Package	Packing
TS1117BCPxx ROG	TO-252	2.5kpcs / 13" Reel
TS1117BCWxx RPG	SOT-223	2.5kpcs / 13" Reel
TS1117BCSxx RLG	SOP-8	2.5kpcs / 13" Reel

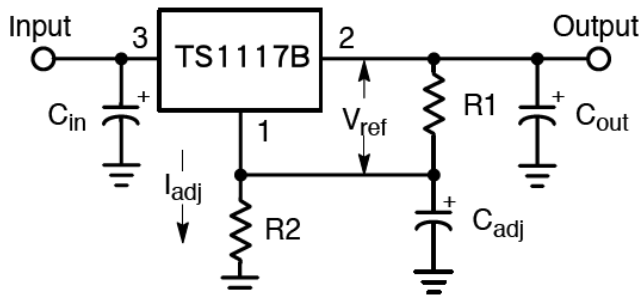
Note: Refer to detail ordering information table.

"G" denotes Halogen Free Products

Typical Application Circuit



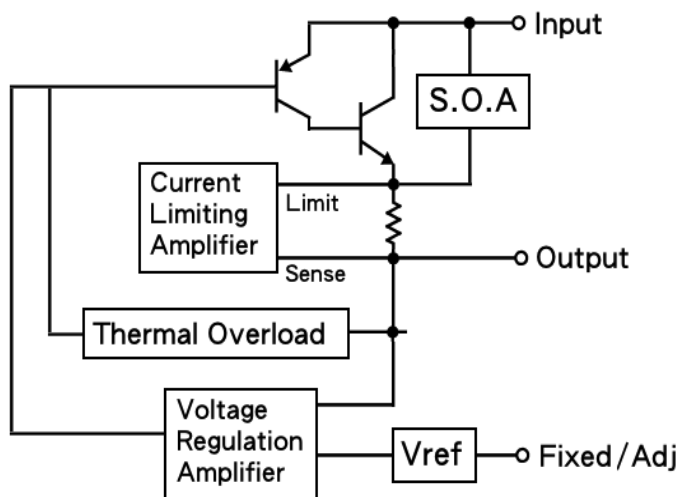
Fixed Output Voltage Version



$$V_{OUT} = V_{REF}(1+R2/R1) + I_{adj} R2$$

Adjustable Output Voltage Version

Block Diagram



Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Limit	Unit
Input Supply Voltage	V_{IN}	15	V
Recommend Operation Input Supply Voltage	V_{IN} (Opr. Typ.)	12	V
Power Dissipation (Note 2)	P_D	Internal limited	
Thermal Resistance Junction to Ambient	TO-252	105	$^{\circ}\text{C/W}$
	SOT-223	130	
	SOP-8	160	
Operating Temperature Range	T_{OPER}	-40 ~ +125	$^{\circ}\text{C}$
Junction Temperature Range	T_J	+150	
Storage Temperature Range	T_{STG}	-65 ~ +150	
Lead Soldering Temperature (260 $^{\circ}\text{C}$)	TO-252 / SOT-223	5	s
	SOP-8	2	

Electrical Specification ($T_A=25^{\circ}\text{C}$, unless otherwise specified.)

Parameter	Conditions	Min	Typ	Max	Unit
Reference Voltage	$V_{IN} = 2.75, I_O=1\text{A}$	1.225	1.25	1.275	V
Output Voltage (Note 4)	$V_{IN} = 2.7\text{V} \sim 12\text{V}, I_O=1\text{A}$	1.176	1.2	1.224	V
	$V_{IN} = 3\text{V} \sim 12\text{V}, I_O=1\text{A}$	1.470	1.5	1.530	V
	$V_{IN} = 3.3\text{V} \sim 12\text{V}, I_O=1\text{A}$	1.764	1.8	1.836	V
	$V_{IN} = 4\text{V} \sim 12\text{V}, I_O=1\text{A}$	2.450	2.5	2.550	V
	$V_{IN} = 4.8\text{V} \sim 12\text{V}, I_O=1\text{A}$	3.235	3.3	3.366	V
	$V_{IN} = 6.5\text{V} \sim 12\text{V}, I_O=1\text{A}$	4.900	5.0	5.100	V
Line Regulation	$V_O+1.5\text{V} \leq V_{IN} \leq 12\text{V}, I_O=10\text{mA}$	--	0.2	0.5	%
Load Regulation (Note 1,2)	$V_{IN} = V_{OUT}+1.5\text{V}, I_O=10\text{mA} \sim 1\text{A}$	--	0.05	1.0	%
Dropout Voltage	$I_O=1\text{A}, \Delta V_{OUT} = 1\% V_{OUT}$	--	1.3	1.5	V
Quiescent Current	$V_{IN} = 5\text{V}$	--	5	10	mA
Adjustable Pin Current		--	90	--	μA
Output Current Limit	$V_{IN} - V_{OUT} = 1.5\text{V}$	1.1	--	--	A
Temperature Stability	$I_O=10\text{mA}$,	--	0.5	--	%
Ripple Rejection	$F=120\text{Hz}, I_O=1\text{A}, C_{OUT}=25\mu\text{F}, V_{IN}=V_{OUT}+3\text{V}$	--	60	70	dB

Note 1: See thermal regulation specification for changes in output voltage due to heating effects. Line and load regulation are measured at a constant junction temperature by low duty cycle pulse testing. Load regulation is measured at the output lead = 1/18" from the package.

Note 2: Line and load regulation are guaranteed up to the maximum power dissipation of 15W. Power dissipation is determined by the input / output voltage difference and the output current. Guaranteed maximum power dissipation will not be available over the full input / output voltage range.

Note 3: Quiescent current is defined as the minimum output current required to maintain the regulation.

Note 4: The Output Capacitor does not have a theoretical upper limit and increasing its value will increase stability $C_{OUT}=100\mu\text{F}$ or more is typical for high current regulator design.

Electrical Characteristics Curve

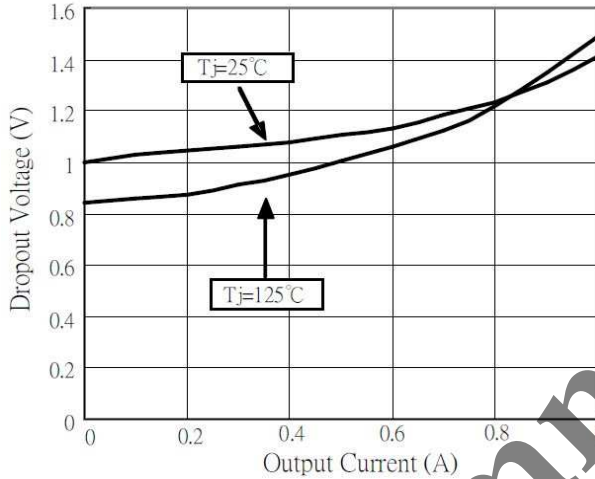


Figure 1. Vdrop vs. Output Current

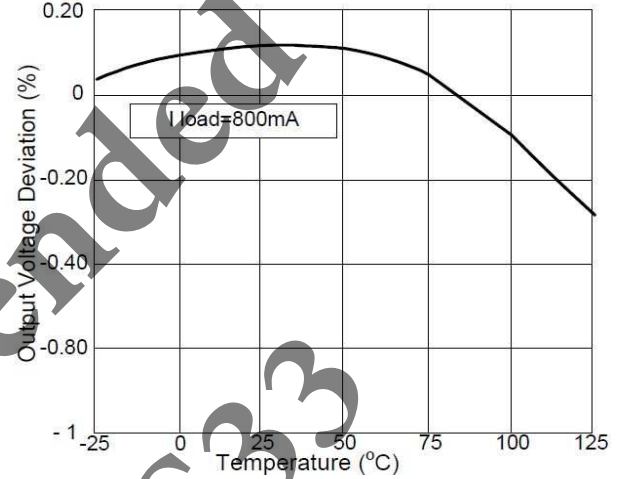


Figure 2. Load Regulation vs. Temperature

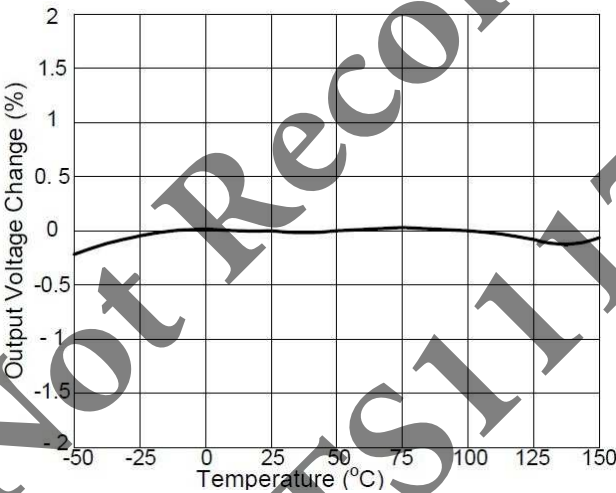


Figure 3. Vout Change vs. Temperature

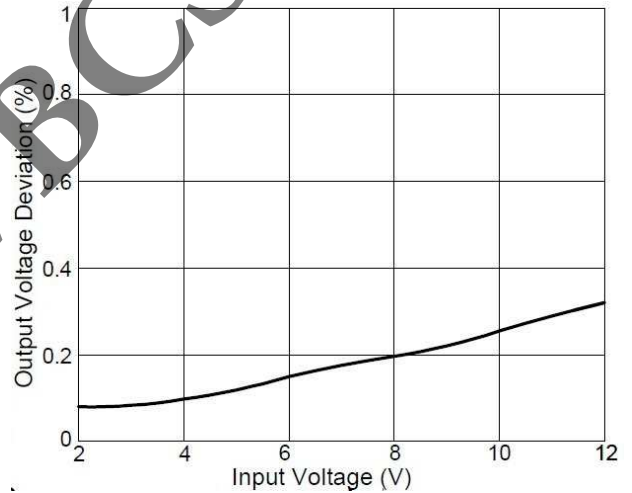


Figure 4. Vout Deviation vs. Temperature

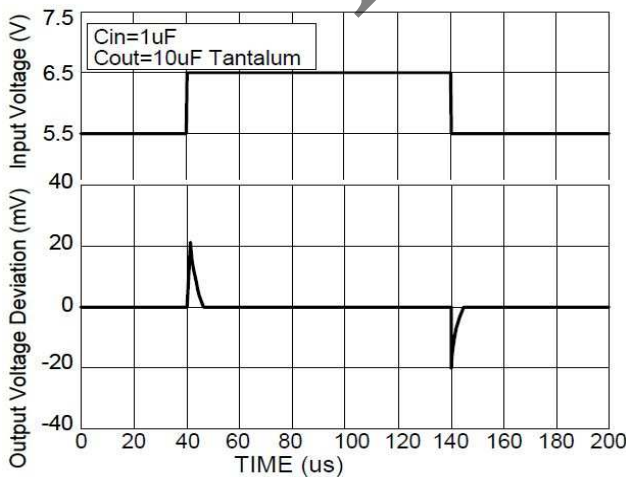


Figure 5. Line Transient Response

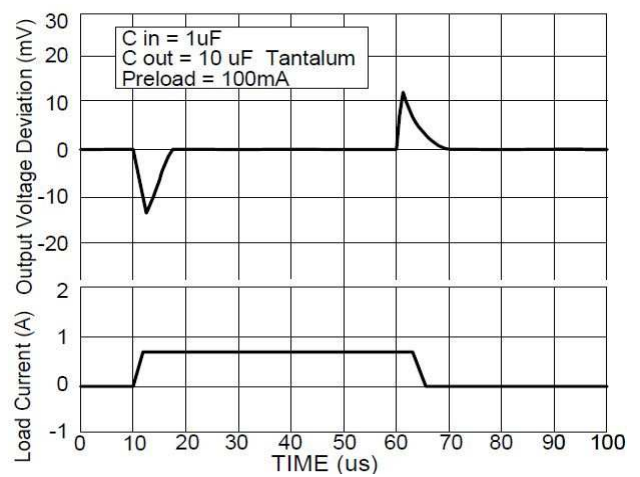


Figure 6. Load Transient Response

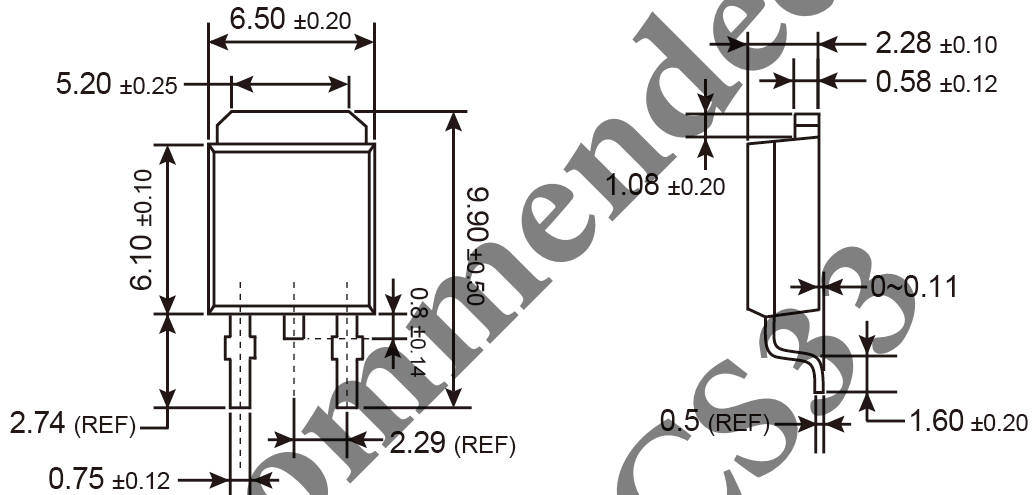
Ordering information

Voltage	TO-252	SOT-223	SOP-8
ADJ	TS1117BCP ROG	TS1117BCW RPG	
1.2V		TS1117BCW12 RPG	
1.8V		TS1117BCW18 RPG	
2.5V		TS1117BCW25 RPG	
3.3V	TS1117BCP33 ROG	TS1117BCW33 RPG	TS1117BCS33 RLG
5V	TS1117BCP50 ROG	TS1117BCW50 RPG	

Packing code information

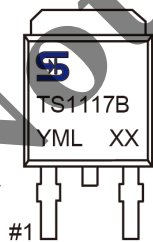
Packing	2.5kpcs / 13" Reel	2.5kpcs / 13" Reel	2.5kpcs / 13" Reel
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TO-252 Mechanical Drawing



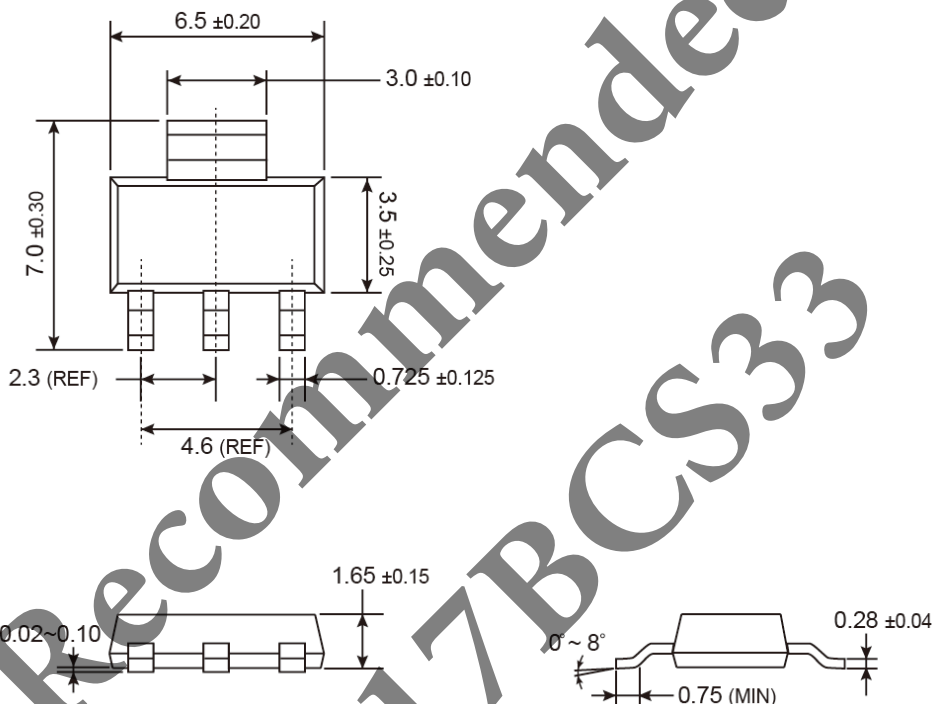
Unit: Millimeters

Marking Diagram



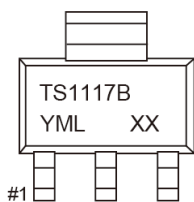
- Y** = Year Code
- M** = Month Code for Halogen Free Product
(**O**=Jan, **P**=Feb, **Q**=Mar, **R**=Apr, **S**=May, **T**=Jun, **U**=Jul, **V**=Aug, **W**=Sep, **X**=Oct, **Y**=Nov, **Z**=Dec)
- L** = Lot Code
- XX** = Output Voltage
(**3.3**=3.3V, **5.0**=5V)
- CP** = Adjustable Voltage

SOT-223 Mechanical Drawing



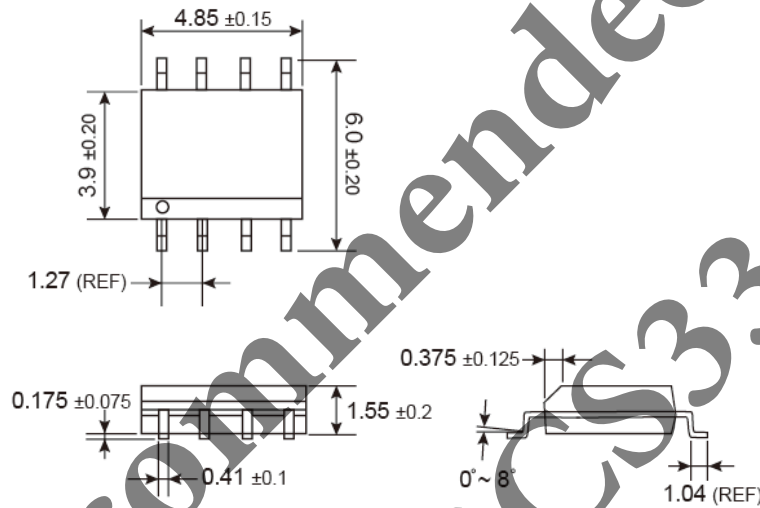
Unit: Millimeters

Marking Diagram



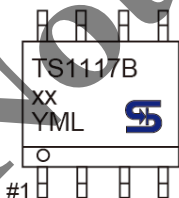
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- L** = Lot Code
- XX** = Output Voltage
(**1.2**=1.2V, **1.8**=1.8V, **2.5**=2.5V, **3.3**=3.3V, **5.0**=5V)

SOP-8 Mechanical Drawing



Unit: Millimeters

Marking Diagram



- Y** = Year Code
- M** = Month Code for Halogen Free Product
(**O**=Jan, **P**=Feb, **Q**=Mar, **R**=Apr, **S**=May, **T**=Jun, **U**=Jul, **V**=Aug, **W**=Sep, **X**=Oct, **Y**=Nov, **Z**=Dec)
- L** = Lot Code
- XX** = Output Voltage
(**3.3**=3.3V)

Not Recommended
TS1117BCS33

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