HT1117 Series
1A General Purpose LDO

Features

- Output voltage ranges: Fixed range of 1.8V, 2.5V, 2.85V, 3.3V, 5.0V or adjustable type.
- High accuracy: ±2%
- Low voltage drop: 1.1V (typ.), V_{OUT}=5.0V at 1A
- Guaranteed output current: 1A
- Low quiescent current: 8mA (typ.)
- Integrated current limit & thermal protection circuits
- SOT-223 package

Applications

- Active SCSI terminations
- Post regulator for switching power supplies
- Low voltage microcontrollers
- Motherboard clock supplies
- Battery chargers

General Description

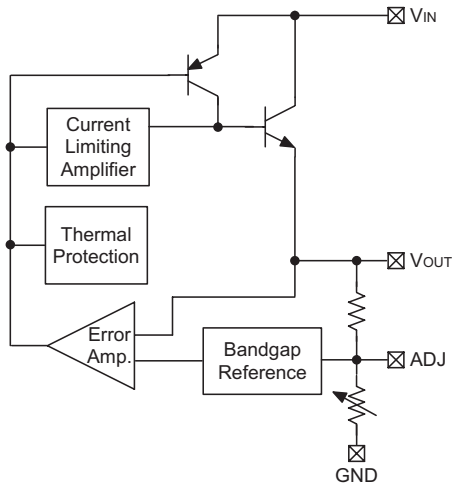
The HT1117 devices are a series of three-terminal high current low voltage regulators. They can deliver an output current of 1A and can accept input voltages up to 12V. The devices are available in both adjustable and fixed output voltage type with a range of 1.8V to 5.0V. Internal current limit and thermal protection circuits provide protection against overload conditions that could create excessive junction temperatures.

Selection Table

Part No.	Output Voltage	Package	Marking
HT1117-ADJ	Adjust	SOT-223	HT1117-ADJ HT1117-18 HT1117-25 HT1117-28 HT1117-33 HT1117-50
HT1117-18	1.8V		
HT1117-25	2.5V		
HT1117-28	2.85V		
HT1117-33	3.3V		
HT1117-50	5.0V		

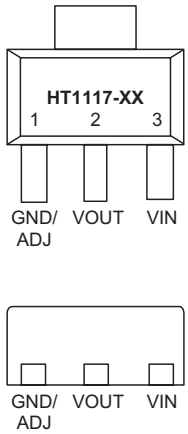
Note: For lead free devices, a "#" mark is suffixed at the end of the date code.

Block Diagram



Pin Assignment

SOT-223



Absolute Maximum Ratings*

Input Supply Voltage .....V_{SS}–0.3V to V_{SS}+13V

Storage Temperature .....–50°C to 125°C

Note: These are stress ratings only. Stresses exceeding the range specified under "Absolute Maximum Ratings" may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

"*" Absolute maximum ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but do not guarantee specific performance limits. The guaranteed specifications apply only for the test conditions listed.

Recommended Operating Conditions

Input Supply Voltage .....V_{SS}–0.3V to V_{SS}+12V

Ambient Temperature .....–40°C to 85°C

Thermal Information

Symbol	Parameter	Package	Max.	Unit
θ_{JA}	Thermal Resistance (Junction to Ambient)	SOT-223	134	°C/W
P_D	Power Dissipation	SOT-223	0.75	W

Note: P_D is measured at Ta= 25°C

Electrical Characteristics

T_J=25°C, V_{IN}=V_{OUT}+1.5V, I_O=10mA, unless otherwise specified (see note 1)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{REF}	Reference Voltage	2.75V ≤ V_{IN} ≤ 12V	1.225	1.250	1.275	V
V_{OUT}	Output Voltage	HT1117-18	1.764	1.800	1.836	V
		HT1117-25	2.45	2.50	2.55	V
		HT1117-28	2.793	2.850	2.907	V
		HT1117-33	3.234	3.300	3.366	V
		HT1117-50	4.90	5.00	5.10	V
ΔV_{LOAD}	Load Regulation (see note 2)	10mA ≤ I_{OUT} ≤ 1A	1	—	30	mV
ΔV_{LINE}	Line Regulation	2.75V ≤ V_{IN} ≤ 12V	—	0.015	0.150	%/V
V_{DIF}	Dropout Voltage (see note 3)	ΔV_{OUT}=2%, I_{OUT}=1A	—	1.1	1.3	V
I_{LIMIT}	Current Limit (see note 4)	ΔV_{OUT}=10%	1	2.3	—	A
I_{ADJ}	Adjust Pin Current (Variable Version)	2.75V ≤ V_{IN} ≤ 12V	—	55	120	μA
I_{SS}	Quiescent Current (Fixed Version)	2.75V ≤ V_{IN} ≤ 12V	—	8	13	mA
RR	Ripple Rejection	120Hz input ripple C_{OUT}=22μF	—	60	—	dB
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	–40°C<Ta<85°C	—	±0.4	—	mV/°C

Note: 1. Specifications are production tested at room temperature, Ta. Specifications within the –40°C to 85°C operating temperature range are assured by design, characterization and correlation with Statistical Quality Controls (SQC).

2. Load regulation is measured at a constant junction temperature, using pulse testing with a low ON time and is guaranteed up to the maximum power dissipation. Power dissipation is determined by the input/output differential voltage and the output current. Guaranteed maximum power dissipation will not be available over the full input/output range. The maximum allowable power dissipation at any ambient temperature is $P_D = (T_{J(MAX)} – Ta) / \theta_{JA}$.

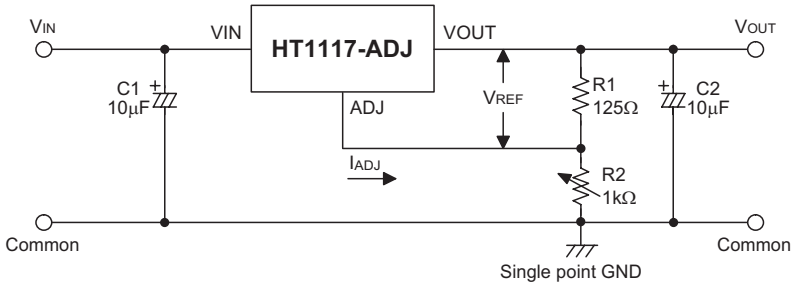
3. Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+1.5V with a fixed load.

4. Current limit is measured by pulsing for a short time.

Application Circuits

Basic Circuits

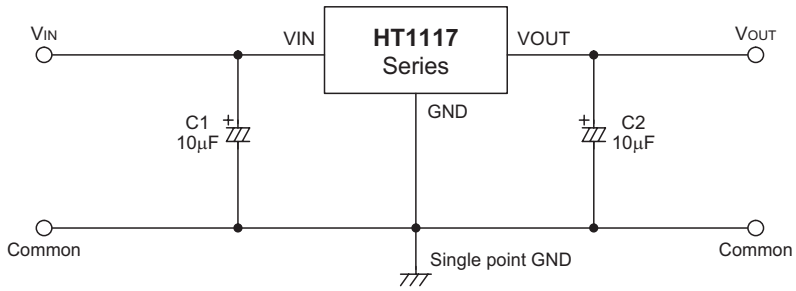
- Variable voltage type



$$V_{OUT} = V_{REF} \left(1 + \frac{R2}{R1} \right) + I_{ADJ} R2$$

Note: C1 is required if the needed if the device is located far from filter capacitors, the recommended value is 10μF.
C2 is required for stability, the recommended value is 10μF.
R1 is required for regulation, the recommended value is 125Ω.

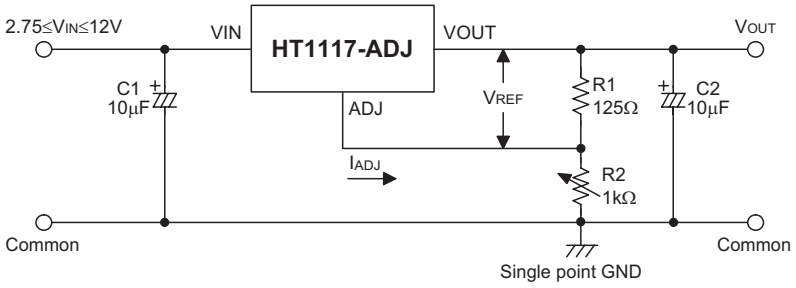
- Fixed voltage type



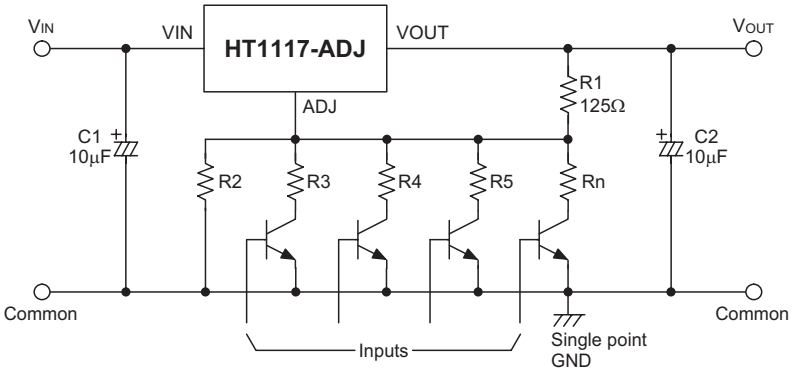
Note: C1 is required if the needed if the device is located far from filter capacitors, the recommended value is 10μF.
C2 is required for stability, the recommended value is 10μF.

Typical Application Circuits

- 1.25V~10.5V regulator

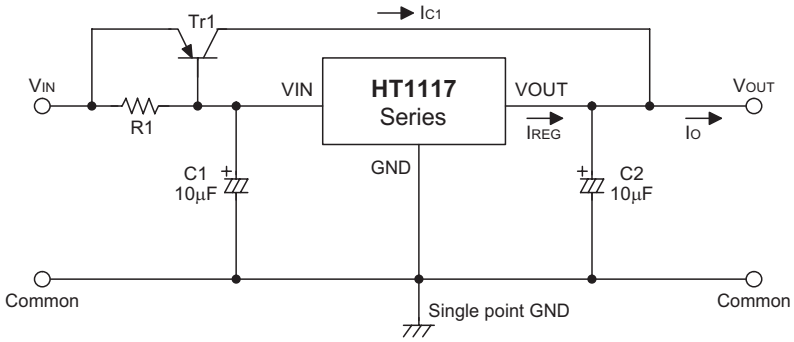


- Digitally selected outputs



Note: R2 can set the maximum voltage.

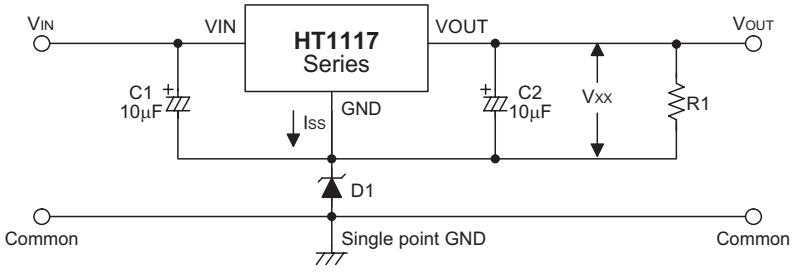
- High output current positive voltage regulator



$$R_1 = \frac{V_{BE1}}{I_{REG} - \frac{I_{C1}}{(1+\beta)}},$$

$$I_O = I_{C1} + I_{REG}$$

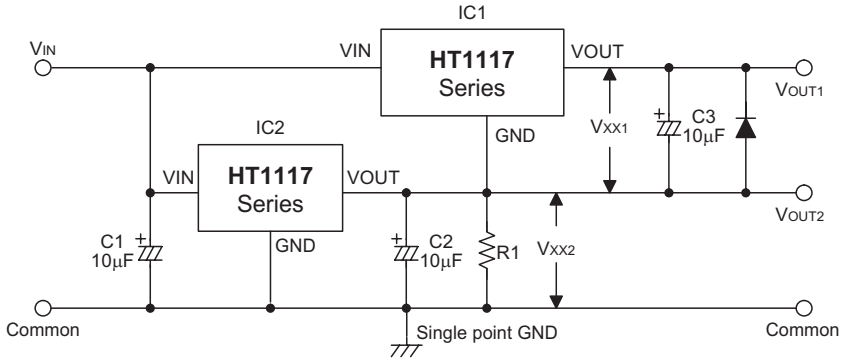
- Increased Output voltage Circuit



$$V_{OUT} = V_{XX} + V_{D1}$$

$$R_1 = \frac{V_{XX}}{I_{SS}}$$

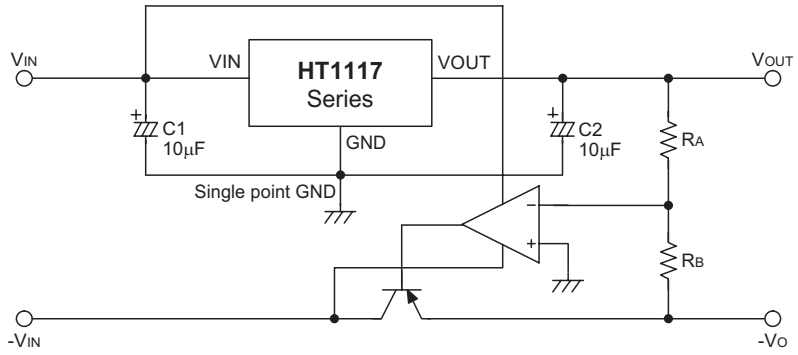
• Dual Supply Circuit



$$V_{OUT1} = V_{XX2} + V_{XX1}$$

$$V_{OUT2} = V_{XX2}$$

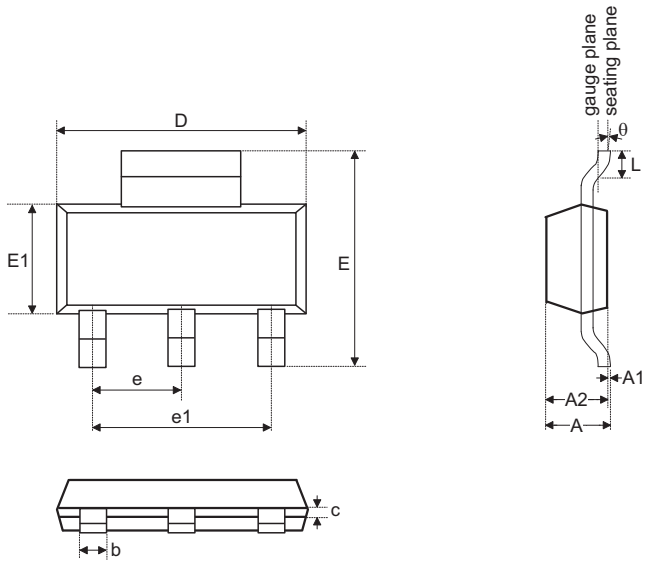
• Tracking Voltage Regulator



$$-V_O = V_O \times \frac{R_A}{R_B}$$

Package Information

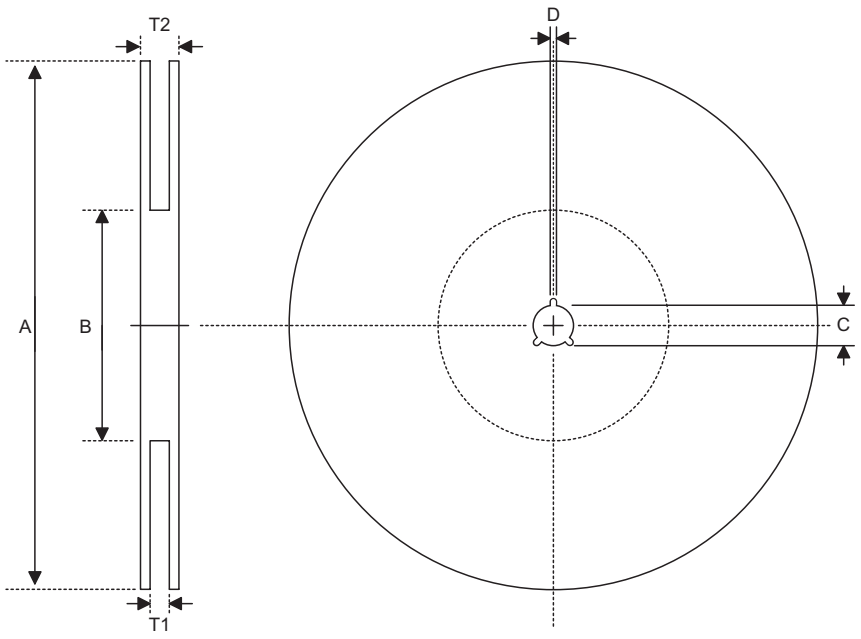
3-pin SOT-223 Outline Dimensions



Symbol	Dimensions in mm		
	Min.	Nom.	Max.
A	—	—	1.8
A1	0.02	—	0.10
A2	1.50	—	1.70
b	0.66	—	0.84
C	0.23	—	0.35
D	6.30	—	6.70
E	6.70	—	7.30
E1	3.30	—	3.70
e	—	2.3	—
e1	—	4.6	—
L	0.75	—	—
θ	0°	—	10°

Product Tape and Reel Specifications

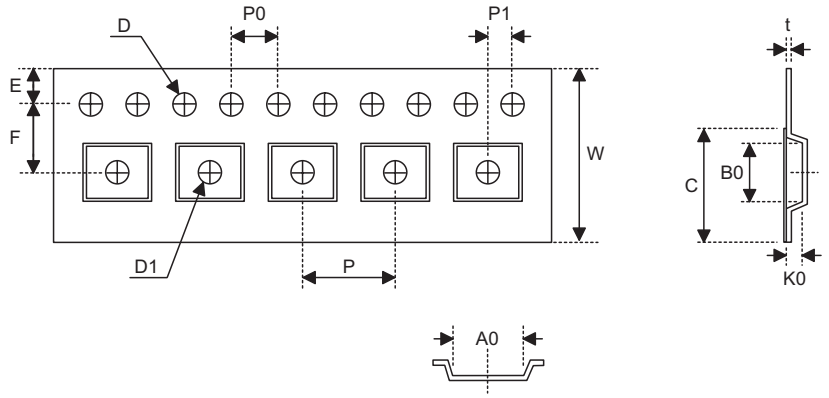
Reel Dimensions



SOT-223

Symbol	Description	Dimensions in mm
A	Reel Outer Diameter	330±1
B	Reel Inner Diameter	62±1.5
C	Spindle Hole Diameter	12.75±0.15
D	Key Slit Width	2+0.6
T1	Space Between Flange	12.4+0.2
T2	Reel Thickness	16.4–0.4

Carrier Tape Dimensions



SOT-223

Symbol	Description	Dimensions in mm
W	Carrier Tape Width	12±0.3
P	Cavity Pitch	8±0.1
E	Perforation Position	1.75±0.1
F	Cavity to Perforation (Width Direction)	5.5±0.05
D	Perforation Diameter	1.5+0.1
D1	Cavity Hole Diameter	1.5+0.1
P0	Perforation Pitch	4±0.1
P1	Cavity to Perforation (Length Direction)	2±0.05
A0	Cavity Length	6.9±0.1
B0	Cavity Width	7.5±0.1
K0	Cavity Depth	2.1±0.1
t	Carrier Tape Thickness	0.3±0.05
C	Cover Tape Width	9.3

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