

1A LDO LINEAR VOLTAGE / REGULATORS

◆ DESCRIPTION

The MT1117 series are low-drop-out (LDO) linear regulators. The devices have been optimized for applications where fast transient response and minimum input voltages are critical. The internal over-current protection and thermal protection ,makes the device extremely easy to use in a wide range of applications.

◆ APPLICATIONS

- * Active SCSI terminators
- * High efficiency linear regulators
- * Motherboard clock supplies

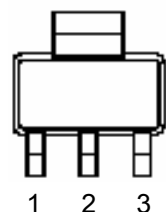
◆ FEATURES

- * Low dropout performance
- * Output current of 800mA typical
- * Wide range input supply voltage
- * Thermal shutdown protection
- * Fixed 1.8V, 2.5V, 3.3V output voltages available
- * SOT-223 packages available

◆ PIN CONFIGURATIONS

SOT-223

(Top View)



1: GND, 2: OUT, 3: IN

◆ ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	MAXIMUM	UNITS
V_{IN}	Input supply voltage	7	V
θ_{JC}	Thermal resistance junction to case SOT-223 TO-252	15 10	$^{\circ}\text{C}/\text{W}$
θ_{JA}	Thermal resistance junction to ambient SOT-223 TO-252	156 90	$^{\circ}\text{C}/\text{W}$
T_J	Operating junction temperature range	0 to 125	$^{\circ}\text{C}$
T_{STG}	Storage temperature range	- 40 to 150	$^{\circ}\text{C}$
T_{LEAD}	Lead temperature (soldering) 10sec	260	$^{\circ}\text{C}$

Note 1: Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of the specified terminal.

◆ ORDERING INFORMATION

DEVICE	PACKAGE		V _{OUT} VOLTS	T _A (°C)
MT1117A	A	SOT-223	X.X_ 1.5 / 1.8 / 2.5 / 2.8 / 3.0 / 3.3	0~70
MT1117-X.XA				

◆ POWER DISSIPATION TABLE:

Package	θ_{JA} (°C /W)	Df(mW/°C) T _A ≥ 25 °C	T _A ≤ 25 °C Power rating(mW)	T _A = 70 °C Power rating(mW)	T _A = 85 °C Power rating (mW)
A	156	7.35	919	588	478

Note :

1. θ_{JA} : Thermal Resistance-Junction to Ambient, D_F : Derating factor, P_O: Power consumption.

Junction Temperature Calculation:

$$T_J = T_A + (P_D \times \theta_{JA}), P_O = D_F \times (T_J - T_A)$$

The θ_{JA} numbers are guidelines for the thermal performance of the device/PC-board system.

All of the above assume no ambient airflow.

2. θ_{JT} : Thermal Resistance-Junction to Ambient, T_C: case(Tab) temperature, $T_J = T_C + (P_D \times \theta_{JT})$

For A package, $\theta_{JT} = 15.0^\circ\text{C} / \text{W}$.

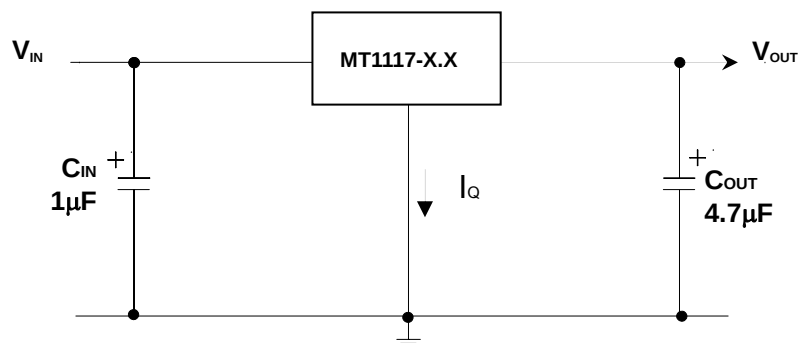
For B package, $\theta_{JT} = 7.0^\circ\text{C} / \text{W}$.

◆ RECOMMENDED OPERATING CONDITIONS:

Symbol	Parameter	Recommended Operating			Units
		Min.	Typ.	Max.	
V _{IN}	Input Voltage	3		6	V
I _O	Load Current (with adequate heatsinking)	0.1			mA
C _{IN}	Input Capacitor (V _{IN} to GND)	1.0			μF
C _{OUT}	Output Capacitor with ESR of 10Ω max., (V _{OUT} to GND)	4.7			μF
T _J	Junction temperature			125	°C

◆ TYPICAL APPLICATIONS:

Fixed Voltage Regulator:



◆ ELECTRICAL CHARACTERISTICS:

Operating Conditions: $3V \leq V_{IN} \leq 6V$, $T_J = 0 \sim 125^\circ\text{C}$ unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNITS
V_O	Output Voltage (1)	$10\text{mA} \leq I_{OUT} \leq 1\text{A}$ $T_A = 25^\circ\text{C}$, MT1117-1.5, $3V \leq V_{IN} \leq 5.5V$ MT1117-1.8, $3V \leq V_{IN} \leq 5.5V$ MT1117-2.5, $3.5V \leq V_{IN} \leq 5.5V$ MT1117-2.8, $3.8V \leq V_{IN} \leq 5.5V$ MT1117-3.0, $4V \leq V_{IN} \leq 5.5V$ MT1117-3.3, $4.3V \leq V_{IN} \leq 5.5V$	1.764 2.450 3.234	1.8 2.5 3.3	1.836 2.550 3.366	V V V
V_{SR}	Line Regulation (1)	$(V_{OUT}+1V) \leq V_{IN} \leq 5.5V$ $I_{OUT}=10\text{mA}$		0.005	1.0	%
V_{LR}	Load Regulation (1)	$10\text{mA} \leq I_{OUT} \leq 1\text{A}$		0.5		%
V_D	Dropout Voltage (2)	$V_{IN} \geq 2V$, $I_{OUT}=1\text{A}$		0.65		V
I_{CL}	Current Limit	$(V_{IN}-V_{OUT})=2V$		1.5		A
I_Q	Quiescent Current	$V_{IN}=V_{OUT}+1.25$		1		mA
I_O	Minimum Load Current	$1.5V \leq (V_{IN}-V_{OUT}) \leq 5.75V$	0.1			mA
RA	Ripple Rejection Ratio	$f = 120\text{Hz}$,		75		dB

NOTES:

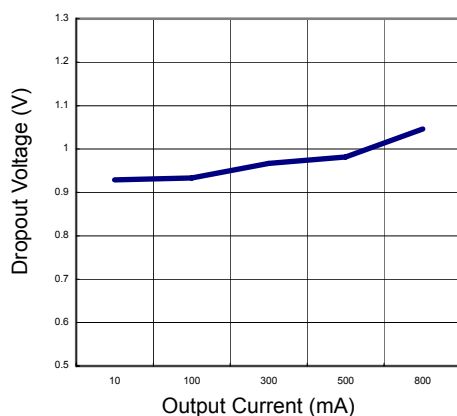
(1) Low duty cycle pulse testing with which T_J remain unchanged.

(2) ΔV_{OUT} , $\Delta V_{REF} = 1\%$

◆ TYPICAL PERFORMANCE CHARACTERISTICS:

$V_{IN}=5V$, $C_{IN}=10\mu\text{F}$, $C_{OUT}=22\mu\text{F}$, $T_A=25^\circ\text{C}$ unless otherwise specified.

DROPOUT VOLTAGE vs. OUTPUT CURRENT



◆ APPLICATION NOTE:

1. Maximum Power Dissipation Calculation:

$$P_{D(max)} = [(V_{IN(max)} - V_{O(nom)})] \times I_{O(nom)} + V_{IN(max)} \times I_Q$$

Where: $V_{O(nom)}$: The nominal output voltage

$I_{O(nom)}$: The nominal output current, and

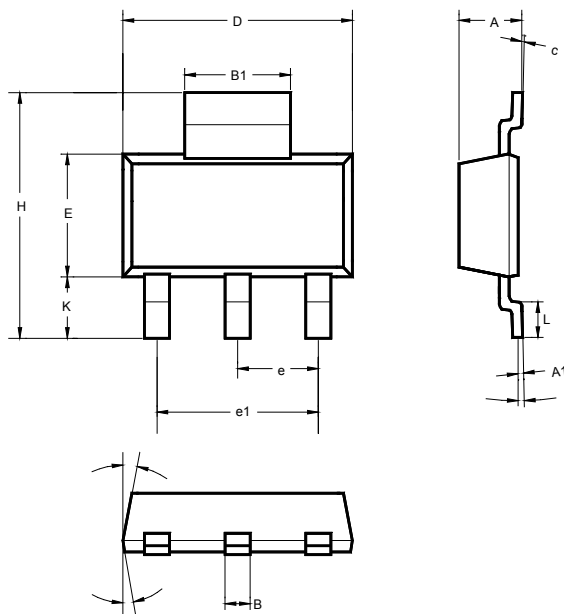
I_Q : The quiescent current the regulator consumes at $I_{O(MAX)}$

$V_{IN(max)}$: The maximum input voltage

Then $\theta_{JA} = (150^{\circ}\text{C} - T_A) / P_D$

◆ PHYSICAL DIMENSIONS:

3-Pin Surface Mount SOT-223(A)



	MILLIMETERS		
	MIN	TYP	MAX
A	1.50	1.65	1.80
A1	0.02	0.05	0.08
B	0.60	0.70	0.80
B1	2.90	-	3.15
c	0.28	0.30	0.32
D	6.30	6.50	6.70
E	3.30	3.50	3.70
e	2.3 BSC		
e1	4.6 BSC		
H	6.70	7.00	7.30
L	0.91	1.00	1.10
K	1.50	1.75	2.00
α	0°	5°	10°
β		3°	