SIRECT
ELECTRONIC

MT1117

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.

◆ 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

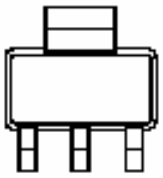
◆ APPLICATIONS

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

◆ PIN CONFIGURATIONS

SOT-223

(Top View)



1: GND, 2: OUT, 3: IN

◆ ABSOLUTE MAXTMUM RETINGS

SYMBOL	PARAMETER	MAXIMUM	UNITS
V_{IN}	Input supply voltage	7	V
θ_{JC}	Thermal resistance junction to case SOT-223 TO-252	 15 10	 ^{O}C/W
θ_{JA}	Thermal resistance junction to ambient SOT-223 TO-252	 156 90	 ^{O}C/W
T_J	Operating junction temperature range	0 to 125	^{O}C
T_{STG}	Storage temperature range	- 40 to 150	^{O}C
T_{LEAD}	Lead temperature (soldering) 10sec	260	^{O}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		VOUT VOLTS	TA (°C)
MT1117A MT1117-X.X A	A	SOT-223	X.X_ 1.5 / 1.8 / 2.5 / 2.8 / 3.0 / 3.3	0~70

◆ POWER DISSIPATION TABLE:

Package	θ_{JA} (°C /W)	Df(mW/°C) $T_A \geq 25$°C	$T_A \leq 25$°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, Po: Power consumption.

Junction Temperature Calculation:

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

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, θ_{JT} = 15.0°C /W.

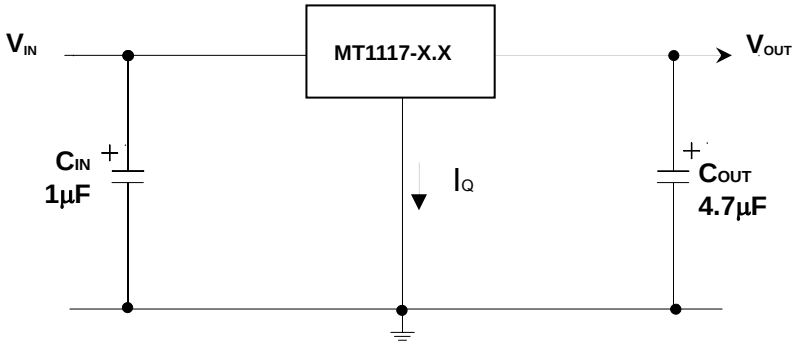
For B package, θ_{JT} = 7.0°C /W.

◆ 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≦ V_{IN} ≦ 6V, T_J = 0～125 °C unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNITS
V_O	Output Voltage (1)	10mA≤ I_{OUT}≤ 1A T_A=25 °C, MT1117-1.5, 3V ≤ V_{IN} ≤ 5.5V MT1117-1.8, 3V ≤ V_{IN} ≤ 5.5V MT1117-2.5, 3.5V ≤ V_{IN} ≤ 5.5V MT1117-2.8, 3.8V ≤ V_{IN} ≤ 5.5V MT1117-3.0, 4V ≤ V_{IN} ≤ 5.5V MT1117-3.3, 4.3V ≤ V_{IN} ≤ 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) ≤ V_{IN} ≤ 5.5V I_{OUT}=10mA		0.005	1.0	%
V_{LR}	Load Regulation (1)	10mA≤ I_{OUT}≤ 1A		0.5		%
V_D	Dropout Voltage (2)	V_{IN}≥2V, I_{OUT}=1A		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≤ (V_{IN}-V_{OUT}) ≤ 5.75V	0.1			mA
RA	Ripple Rejection Ratio	f = 120Hz,		75		dB

NOTES:

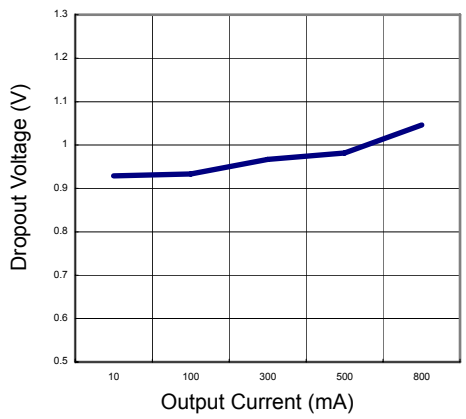
(1) Low duty cycle pulse testing with which T_J remain unchanged.

(2) Δ V_{OUT}, ΔV_{REF} = 1%

◆ TYPICAL PERFORMANCE CHARACTERISTICS:

V_{IN}= 5V，C_{IN}=10μF，C_{OUT}= 22μF，T_A=25 °C unless otherwise specified.

DROPOUT VOLTAGE vs. OUTPUT CURRENT



◆ APPLICATION NOTE:

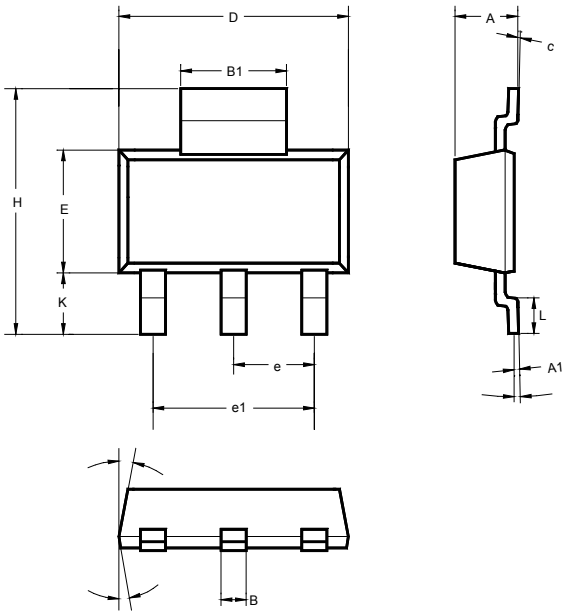
1. **Maximum Power Dissipation Calculation:**

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

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

◆ 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°	