

◆ DESCRIPTION

The MT1118A series of fixed output low dropout linear regulators are designed for portable battery powered applications, which require low power consumption, low noise environment, and low dropout voltage.

Each device contains a bandgap voltage reference, an error amplifier, a PMOS power transistor, and resistors for setting output voltage, and current limit and temperature limit protection circuits.

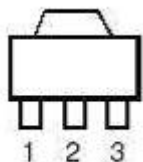
The MT1118A has been designed to be used with low cost capacitors and requires a minimum output capacitor of 1.0 μ F. Standard voltage versions are 1.5, 1.8, 2.5, 2.8, 3.0, 3.3 and 3.6V.

◆ FEATURES

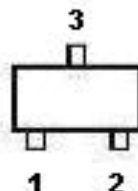
- Excellent Line and Load Regulation
- High Accuracy Output Voltage of 2%
- Ultra-Low Ground Current at 25 μ A (Typ.)
- Over Current and thermal Protection
- Typical 175mV Dropout Voltage at 150mA

◆ APPLICATIONS

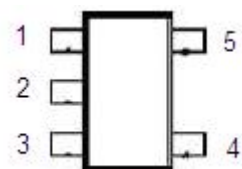
- USB removable devices
- MPEG4 devices
- Portable DVD players
- Wireless LAN's
- Hand-Held Instrumentation
- Digital camera

◆ PIN CONFIGURATIONS
SOT-89 (Top View)

MT11181A-X.XJ 1:OUT, 2:GND 3:IN

MT11182A-X.XJ 1:GND, 2:IN, 3:OUT

SOT-23 (Top View)

MT11181A-X.XS 1:OUT, 2:IN, 3:GND

MT11182A-X.XS 1:GND, 2:OUT, 3:IN

SOT-23-5L (Top View)

MT11182A-X.XN

1:IN 2:GND 3:ENABLE 4:BP 5:OUT

600mA LDO Linear Voltage Regulator
◆ ABSOLUTE MAXIMUM RATINGS(1)

Parameter	Symbol	Maximum	Unit
Input supply voltage	V_{IN}	6	V
Thermal resistance junction to ambient	θ_{JA}		$^{\circ}\text{C/W}$
SOT-89		180	
SOT-23		230	
Junction temperature	T_J	150	$^{\circ}\text{C}$
Storage temperature range	T_{STG}	-40 to 150	$^{\circ}\text{C}$
Lead temperature (soldering) 10sec	T_{LEAD}	260	$^{\circ}\text{C}$

Note:

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	T_A ($^{\circ}\text{C}$)
MT11181A-X.XJ	J	SOT-89	X.X_1.5/1.8/2.5/2.8/3.0/3.3/3.6	0 ~ 70
MT11182A-X.XJ				
MT11181A-X.XS	S	SOT-23	X.X_1.5/1.8/2.5/2.8/3.0/3.3/3.6	0 ~ 70
MT11182A-X.XS				
MT11182A-X.XN	N	SOT-23-5	X.X_1.5/1.8/2.5/2.8/3.0/3.3/3.6	0 ~ 70

◆ POWER DISSIPATION TABLE(3)

Package	θ_{JA} ($^{\circ}\text{C/W}$)	$T_A \leq 25^{\circ}\text{C}$ Power rating(Mw)	$T_A = 70^{\circ}\text{C}$ Power rating(Mw)	$T_A = 85^{\circ}\text{C}$ Power rating (Mw)
J	180	694	444	361
S	230	543	348	283
N	230	543	348	283

◆ RECOMMENDED OPERATING CONDITIONS(2)

Parameter	Symbol	Operating Conditions			Unit
		Min.	Typ.	Max.	
Input Voltage	V_{IN}	-	-	5.5	V
Junction temperature	T_J	0	-	125	$^{\circ}\text{C}$

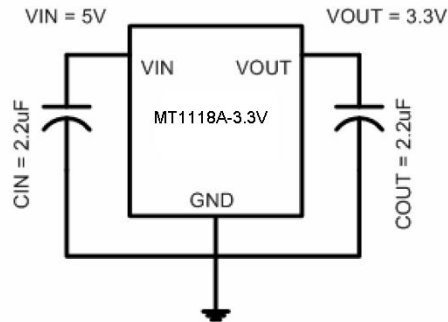
◆ ELECTRICAL CHARACTERISTICS

Operating Conditions: $V_{IN} = 5V$; $I_{OUT} = 10mA$; $T_J = 25^\circ C$, unless otherwise specified. ($C_{OUT} = 2.2\mu F$, $C_{IN} = 2.2\mu F$).

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	MT1118A-1.5 ($V_{IN} = 3.3V$)	1.470	1.5	1.530	V
		MT1118A-1.8 ($V_{IN} = 3.3V$)	1.764	1.8	1.836	
		MT1118A-2.5	2.450	2.5	2.550	
		MT1118A-2.8	2.744	2.8	2.856	
		MT1118A-3.0	2.940	3.0	3.060	
		MT1118A-3.3	3.234	3.3	3.366	
		MT1118A-3.6	3.528	3.6	3.672	
Line Regulation	V_{SR}	$V_{IN} = (V_{OUT} + 0.8)V$ to 5.5V	-	0.2	-	%/V
Load Regulation ⁽⁴⁾	V_{LR}	$V_{IN} = (V_{OUT} + 0.8)V$ to 2.5V $I_{OUT} = 10mA$ to 600mA	-	2.0	-	%
Dropout Voltage ⁽⁵⁾	V_D	$I_{OUT} = 10mA$	-	5	-	mV
		$I_{OUT} = 150mA$	-	175	-	
		$I_{OUT} = 250mA$	-	300	-	
		$I_{OUT} = 600mA$	-	800	-	
Quiescent Current	I_Q	$I_{OUT} = 10mA$	-	25	-	μA
Current Limit	I_{LIMIT}		600	-	-	mA
Thermal Protection	T_{PRO}	Thermal Protection Temperature	-	150	-	$^\circ C$
		Protection Hysterisys	-	20	-	
Ripple Rejection Ratio	PSRR	$f = 120Hz$	-	60	-	dB

Note:

- Exceeding the absolute maximum rating may damage the device.
- The device is not guaranteed to function outside its operating rating.
- The maximum allowable power dissipation at any T_A (ambient temperature) is calculated using: $P_{D(MAX)} = (T_{J(MAX)} - T_A)/\theta_{JA}$. Exceeding the maximum allowable power dissipation will result in excessive die temperature, and the regulator will go into thermal shutdown. See "Thermal Consideration" section for details
- Regulation is measured at constant junction temperature using low duty cycle pulse testing. Parts are tested for load regulation in the load range from 0.1mA to 600mA. Changes in output voltage due to heating effects are covered by the thermal regulation specification.
- Dropout voltage is defined as the input to output differential at which the output voltage drops 2% below its nominal value measured at 1V differential.

◆ TYPICAL APPLICATIONS

◆ APPLICATION NOTE
Application Hints

Like any low dropout regulator, MT1118A requires external capacitors to ensure stability. The external capacitors must be carefully selected to ensure performance.

Input Capacitor

An input capacitor of at least 1 μ F is required. Ceramic or Tantalum can be used. The value can be increased without upper limit.

Output Capacitor

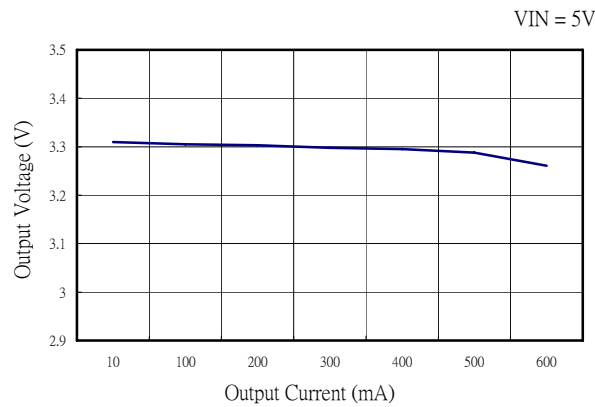
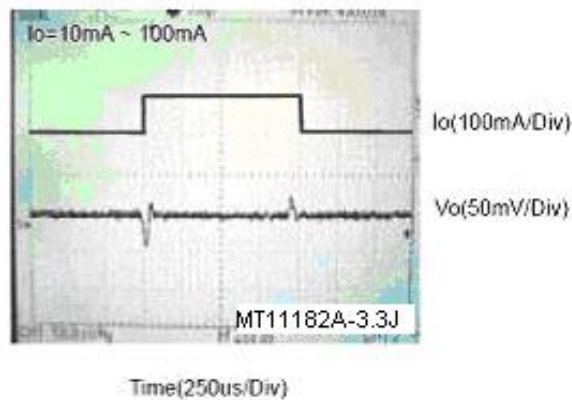
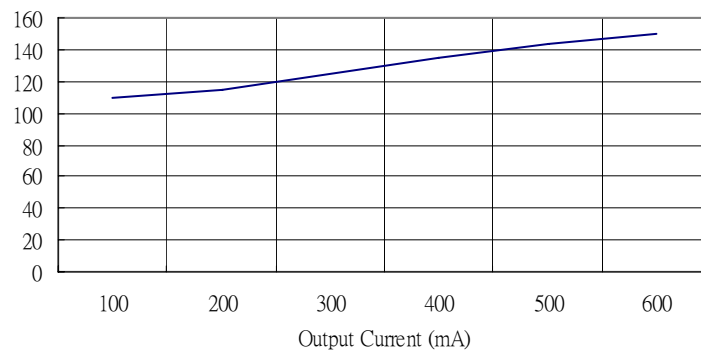
An output capacitor is required for stability. It must be placed no more than 1 cm away from the V_{OUT} pin, and connected directly between V_{OUT} and GND pins. The minimum value is 1 μ F but may be increased without limit.

Thermal Considerations

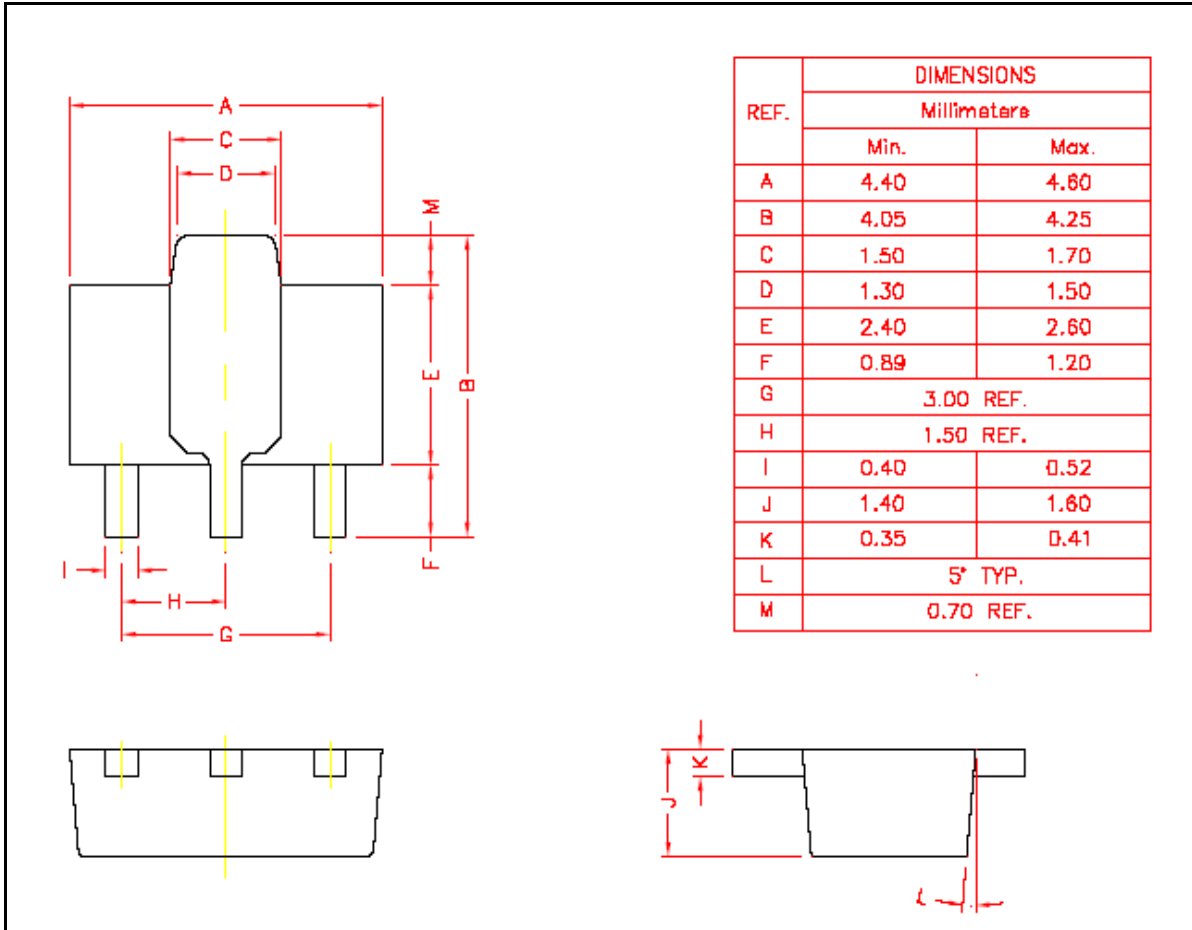
It is important that the thermal limit of the package is not exceeded. The MT1118A has built-in thermal protection. When the thermal limit is exceeded, the IC will enter protection, and V_{OUT} will be pulled to ground. The power dissipation for a given application can be calculated as following:

$$\text{The power dissipation (P}_D\text{) is } P_D = I_{OUT} * [V_{IN} - V_{OUT}]$$

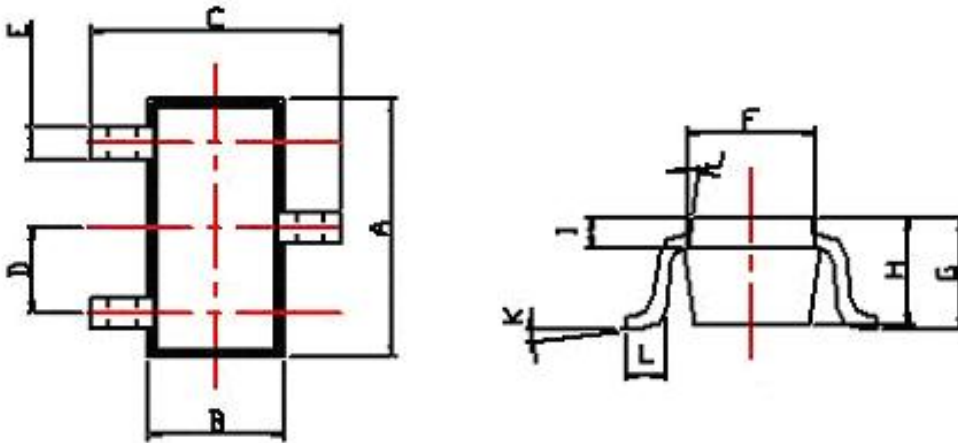
The thermal limit of the package is then limited to $P_{D(MAX)} = [T_J - T_A] / \Theta_{JA}$ where T_J is the junction temperature, T_A is the ambient temperature, and Θ_{JA} is around 180°C/W for MT1118A. MT1118A is designed to enter thermal protection at 150°C. For example, if T_A is 25°C then the maximum P_D is limited to about 0.7W. In other words, if $I_{OUT(MAX)} = 600\text{mA}$, then $[V_{IN} - V_{OUT}]$ cannot exceed 1.7V.

◆ APPLICATION NOTE
LOAD REGULATION

LOAD TRANSIENT RESPONSE

Quiescent Current VS Iout


◆ **PHYSICAL DIMENSIONS**
3-Pin surface Mount SOT-89(J)

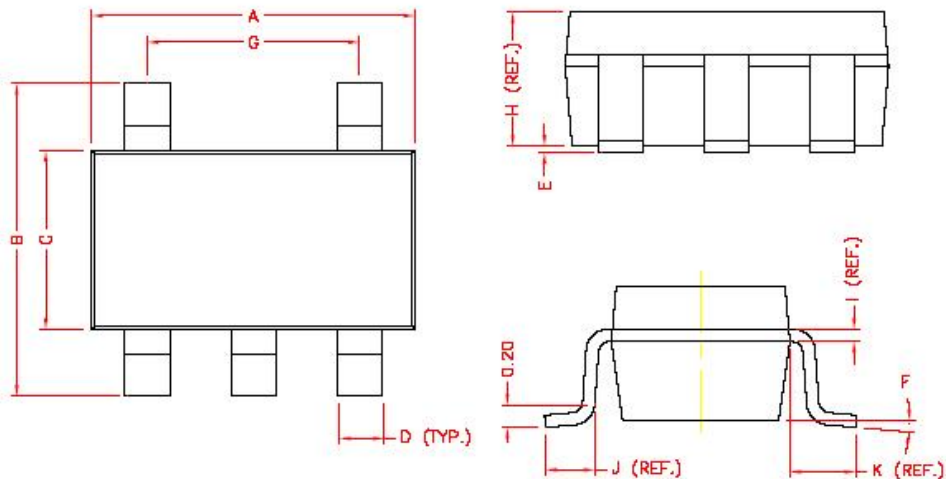


◆ **PHYSICAL DIMENSIONS**
 3-Pin surface Mount SOT-23(S)



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	0.9	1.4
B	1.20	1.66	H	0.8	1.30
C	2.37	2.90	I	0.25	0.7
D	0.85	1.15	J	$7 \pm 2^\circ$	
E	$0.350 + 0.15/-0.05$		K	$0 \sim 10^\circ$	
F	1.07	1.53	L	0.2 (MIN)	

◆ **PHYSICAL DIMENSIONS**
5-Pin surface Mount SOT-23(N)



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	1.90 REF.	
B	2.60	3.00	H	1.20 REF.	
C	1.40	1.80	I	0.12 REF.	
D	0.30	0.55	J	0.37 REF.	
E	0	0.10	K	0.60 REF.	
F	0°	10°			