

# EVVOSEMI<sup>®</sup>

THINK CHANGE DO



ESD



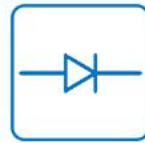
TVS



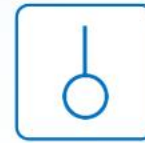
MOS



LDO



Diode



Sensor



DC-DC

## Product Specification

▶ Domestic	Part Number	AMS1117
▶ Overseas	Part Number	AMS1117
▶ Equivalent	Part Number	AMS1117

EV is the abbreviation of name EVVO

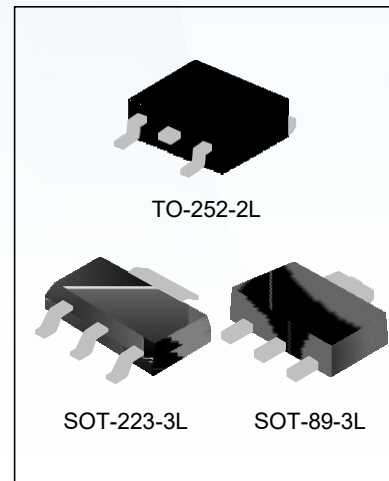
## 1A LDO Voltage Regulator

### DESCRIPTION

The AMS1117 is a positive low voltage dropout regulator; typical voltage dropout is only 1.2V at 1A.

AMS1117 provides two versions: fixed and adjustable versions. VOUT has a tolerance of less than 1.5% for fixed versions 1.2V, 1.5V, 1.8V, 2.5V, 3.3V, 5.0V and adjustable version or 2% output accuracy for fixed version 1.2V.

The AMS1117 offers some key features include thermal shutdown and current limiting. It is suitable for all electronic products.



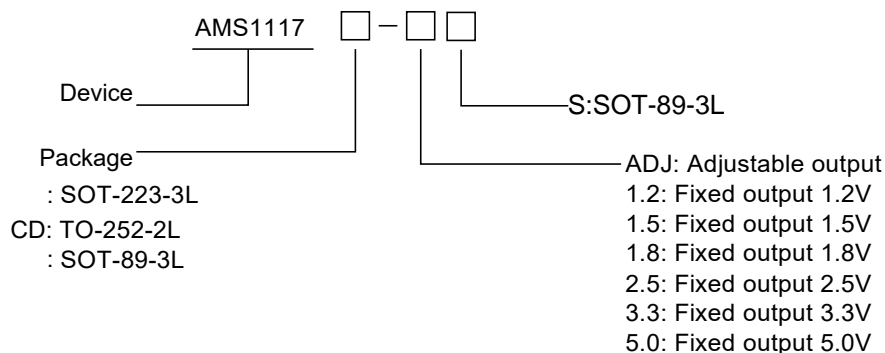
### FEATURES

- ◆ 1.5% output accuracy for fixed versions 1.2V, 1.5V, 1.8V, 2.5V, 3.3V, 5.0V and adjustable version
- ◆ Adjustable output voltage
- ◆ Low Dropout Voltage: Typical 1.2V@1A
- ◆ Current Limiting
- ◆ Thermal Shutdown
- ◆ Temperature Range: -40°C to 125°C

### APPLICATIONS

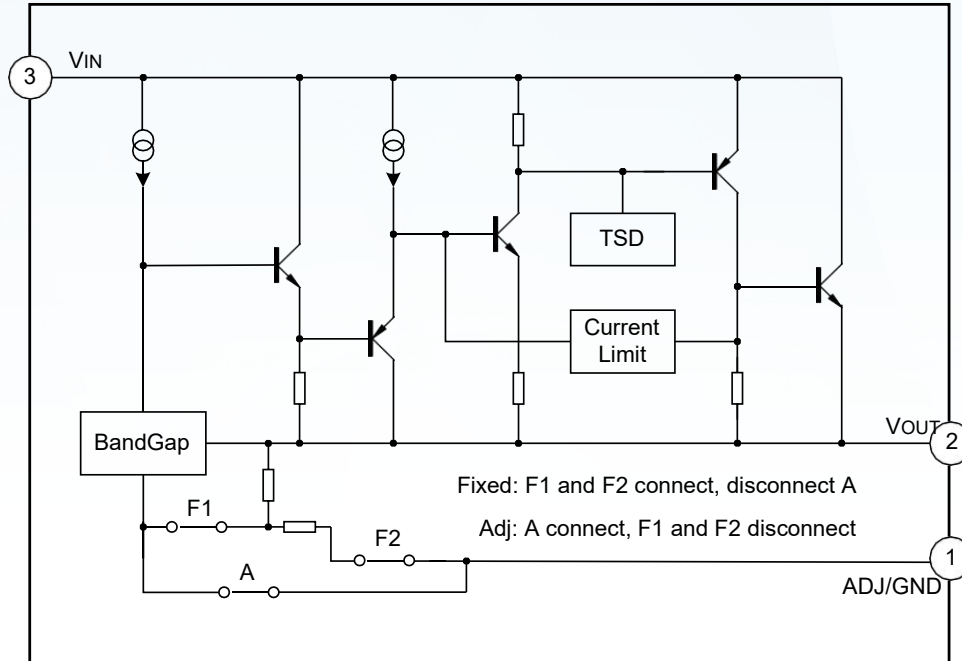
- ◆ Laptop, Palmtop, and Notebook Computers
- ◆ Battery Charger
- ◆ SCSI-II Active Terminator
- ◆ Cellular Phone
- ◆ Cordless Telephones
- ◆ Battery Powered Systems
- ◆ Portable Instrumentation
- ◆ SMPS Post-Regulator

### NOMENCLATURE



BLOCK DIAGRAM

1A LDO Voltage Regulator



ABSOLUTE MAXIMUM RATINGS

Characteristics		Symbol	Rating	Unit
Input Supply Voltage		$V_{IN}$	18	V
Lead Temperature (Soldering, 5 seconds)		$T_{Lead}$	260	°C
Operating Junction Temperature Range		$T_J$	150	°C
Storage Temperature Range		$T_{stg}$	-65 ~ +150	V
Power Dissipation		$P_D$	Internally Limited (Note1)	mW
Thermal Resistance from Junction to Ambient	SOT-223-3L	$R_{ja}$	88	°C/W
	TO-252-2L		86	
	SOT-89-3L		102	
ESD Tolerance (Minimum)		ESD	2000	V

**Note1:** The maximum allowable power dissipation is a function of maximum operating junction temperature,  $T_J$  (max), the junction to ambient thermal resistance,  $R_{ja}$ , and the ambient temperature  $T_{amb}$ . The maximum allowable power dissipation at any ambient temperature is given:  $P_{D(max)} = (T_J(max) - T_{amb}) / R_{ja}$ , exceeding the maximum allowable power limit will result in excessive die temperature; thus, the regulator will go into thermal shutdown. The junction to ambient thermal resistance,  $\theta_{JA}$  of some packages may be different, The value of  $\theta_{JA}$  depends on mounting technique.

RECOMMENDED OPERATING CONDITIONS

Characteristics	Symbol	Rating	Unit
Input voltage	$V_{IN}$	12	V
Operating Junction Temperature Range	$T_J$	-40 ~ +125	°C

## 1A LDO Voltage Regulator

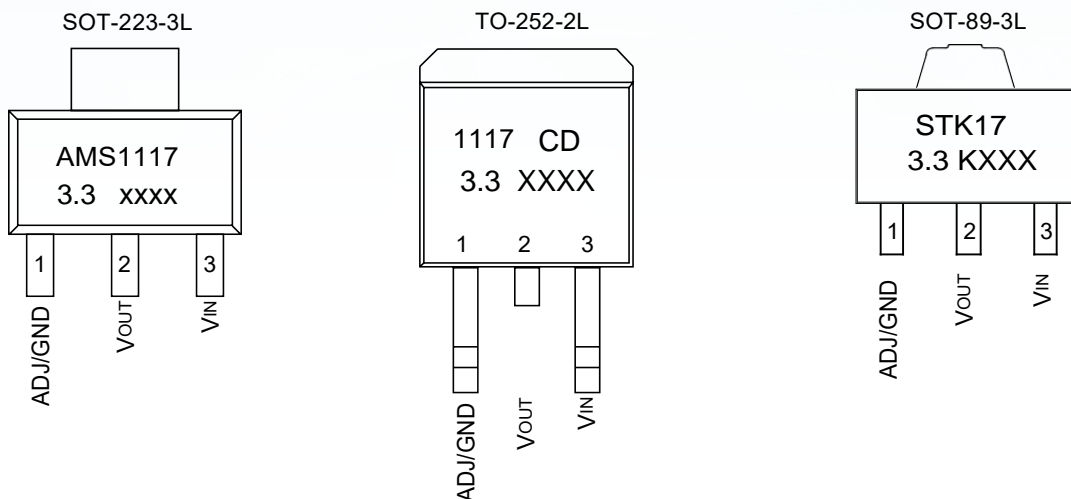
## ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
Reference Voltage	$V_{REF}$	AMS1117-ADJ, $I_{OUT}=10mA$ , $V_{IN}-V_{OUT}=2V$ , $T_J=25^{\circ}C$ $10mA \leq I_{OUT} \leq 1A$ , $1.4V \leq V_{IN}-V_{OUT} \leq 10V$	1.231 1.225	1.250 1.250	1.268 1.275	V
Output Voltage	$V_{OUT}$	AMS1117-1.2, $I_{OUT}=10mA$ , $V_{IN}=3.2V$ , $T_J=25^{\circ}C$ $10mA \leq I_{OUT} \leq 1A$ , $3.0V \leq V_{IN} \leq 10V$	1.176 1.152	1.2 1.2	1.224 1.248	V
		AMS1117-1.5, $I_{OUT}=10mA$ , $V_{IN}=3.5V$ , $T_J=25^{\circ}C$ $10mA \leq I_{OUT} \leq 1A$ , $3.0V \leq V_{IN} \leq 10V$	1.477 1.470	1.500 1.500	1.5221 .530	V
		AMS1117-1.8, $I_{OUT}=10mA$ , $V_{IN}=3.8V$ , $T_J=25^{\circ}C$ , $0 \leq I_{OUT} \leq 1A$ , $3.2V \leq V_{IN} \leq 10V$	1.7731 .746	1.800 1.800	1.827 1.854	V
		AMS1117-2.5, $I_{OUT}=10mA$ , $V_{IN}=4.5V$ , $T_J=25^{\circ}C$ , $0 \leq I_{OUT} \leq 1A$ , $3.9V \leq V_{IN} \leq 10V$	2.462 2.450	2.500 2.500	2.538 2.550	V
		AMS1117-3.3, $I_{OUT}=10mA$ , $V_{IN}=5V$ , $T_J=25^{\circ}C$ , $0 \leq I_{OUT} \leq 1A$ , $4.75V \leq V_{IN} \leq 10V$	3.250 3.235	3.300 3.300	3.349 3.365	V
		AMS1117-5.0, $I_{OUT}=10mA$ , $V_{IN}=7V$ , $T_J=25^{\circ}C$ , $0 \leq I_{OUT} \leq 1A$ , $6.5V \leq V_{IN} \leq 12V$	4.925 4.900	5.000 5.000	5.075 5.10	V
		Output Voltage Temperature Stability	$TS_{OUT}$		--	0.3
Line Regulation	$R_{line}$	$V_{INMIN} \leq V_{IN} \leq 12V$ , $V_{OUT} = \text{Fixed/Adj}$ , $I_{OUT} = 10mA$	--	9	18	mV
Load Regulation	$R_{load}$	$10mA \leq I_{OUT} \leq 1A$ , $V_{OUT} = \text{Fixed/Adj}$	--	10	18	mV
Dropout Voltage	$V_{drop}$	$I_{OUT} = 100mA$	--	1.00	1.20	V
		$I_{OUT} = 500mA$	--	1.05	1.25	
		$I_{OUT} = 1A$	--	1.20	1.30	
Quiescent Current	$I_q$	$4.25V \leq V_{IN} \leq 6.5V$	--	5	10	mA
Ripple Rejection	$P_{SRR}$	$f_{RIPPLE} = 120Hz$ , $(V_{IN}-V_{OUT}) = 3V$ , $V_{RIPPLE} = 1V_{PP}$	60	75	--	dB
Adjust pin Current	$I_{adj}$		--	60	120	$\mu A$
Adjust pin Current Change		$0 \leq I_{OUT} \leq 1A$ , $1.4V \leq V_{IN}-V_{OUT} \leq 10V$	--	0.2	5	$\mu A$
Thermal shutdown	TSD		--	150	--	$^{\circ}C$
Current limiting	$I_{limit}$		2.1	--	2.5	A
Temperature Stability			--	0.5	--	%
Long Term Stability		$T_A = 125^{\circ}C$ , 1000Hrs	--	0.3	--	%

## 1A LDO Voltage Regulator

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
RMS Output Noise		% of $V_{OUT}$ , $10\text{Hz} \leq f \leq 10\text{kHz}$	--	0.003	--	%

## PIN CONFIGURATION



## PIN DESCRIPTION

Pin No.	Pin name	I/O	Functions
1	GND/ADJ	--/O	Ground/ADJ
2	V <sub>OUT</sub>	O	Output voltage
3	V <sub>IN</sub>	I	Input supply voltage

## FUNCTION DESCRIPTION

The AMS1117 is a LDO regulator, its pass transistor is made up of a single NPN transistor being driven by a PNP.

The dropout voltage is defined as:  $V_{DROP} = V_{BE} + V_{SAT}$ .

The AMS1117 series of fixed and adjustable regulators are easy to use. Output voltages are 1.2V, 1.5V, 1.8V, 2.5V, 3.3V, and 5.0V. On-chip thermal shut down provides protection against any combination of overload and ambient temperature that would create excessive junction temperature.

The AMS1117 requires an output capacitor for device stability. Its value of 22 $\mu$ F tantalum covers all cases of bypassing the adjustment terminal. Without bypassing the adjustment terminal smaller capacitors can be used with equally good results which depend upon the application circuit. In general, linear regulator stability decreases with higher output currents.

1A LDO Voltage Regulator

TYPICAL APPLICATION CIRCUIT

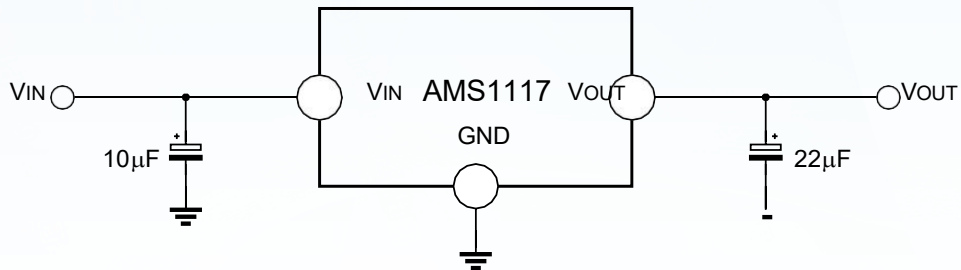


Figure 1. Typical Fixed Output Voltage

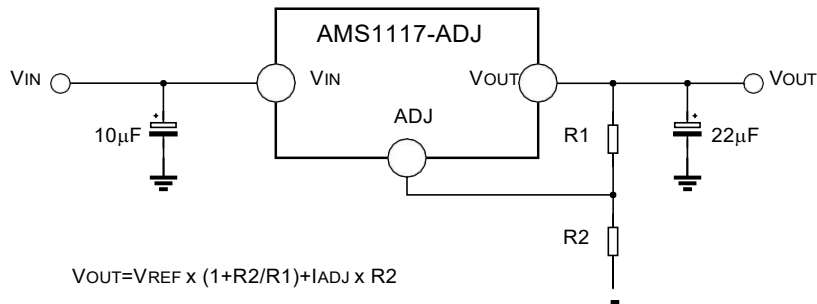
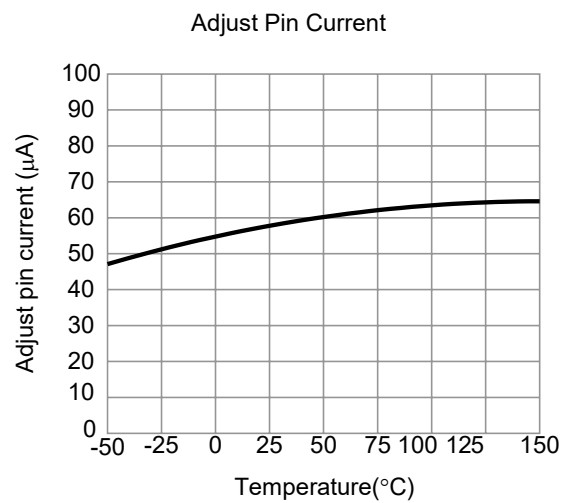
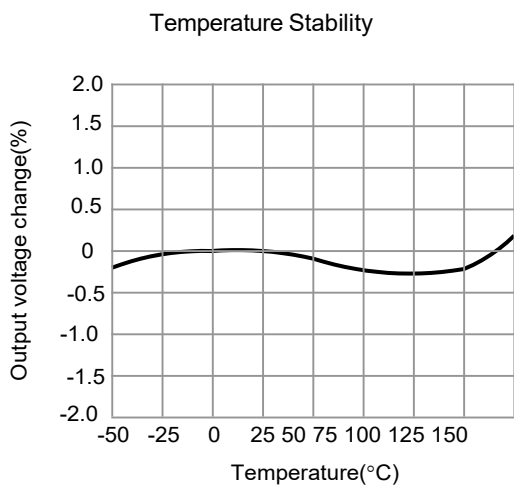


Figure 2. Typical Adjustable Output Voltage

**Note:** The circuit and parameters are reference only, please set the parameters of the real application circuit based on the real test.

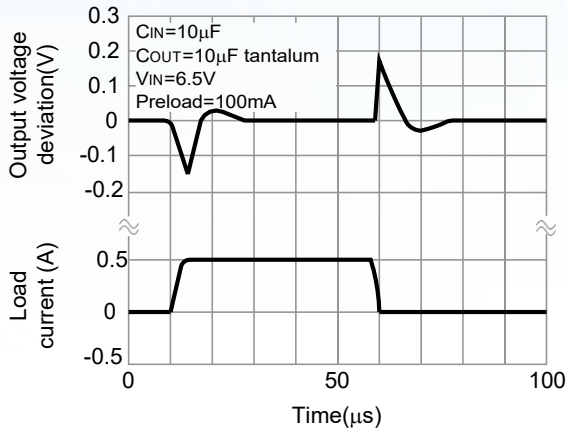
TYPICAL CHARACTERISTICS



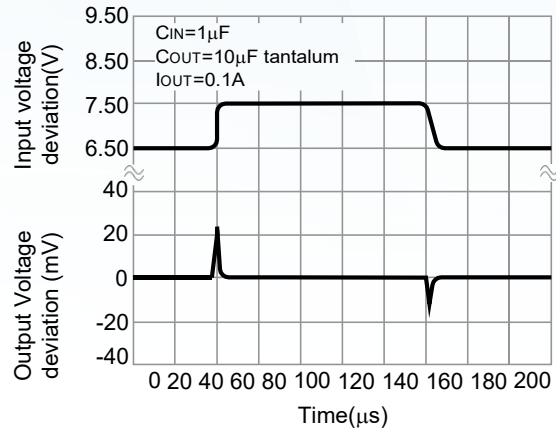
1A LDO Voltage Regulator

TYPICAL CHARACTERISTICS CURVES(continued)

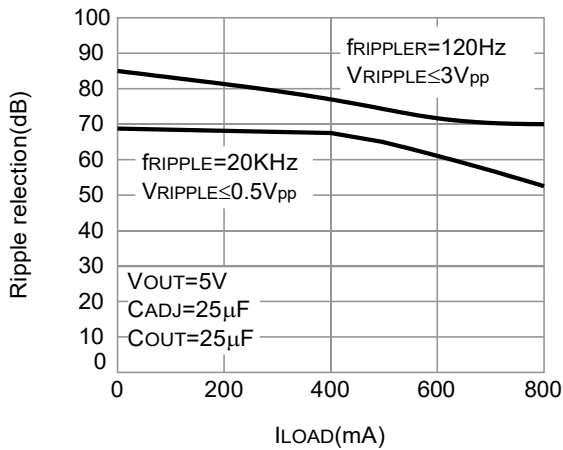
V<sub>OUT</sub>=5 V Load Transient Response



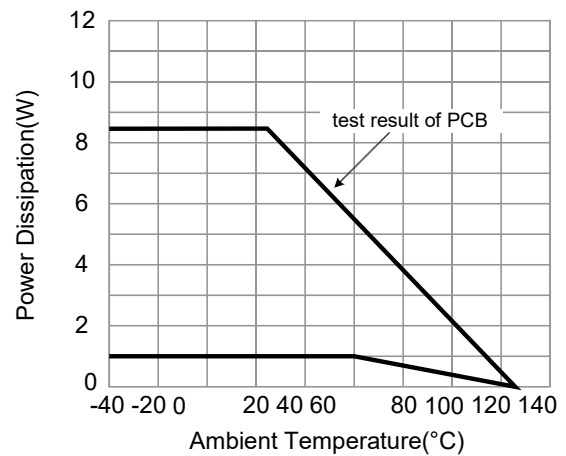
V<sub>OUT</sub>=5 V Line Transient Response



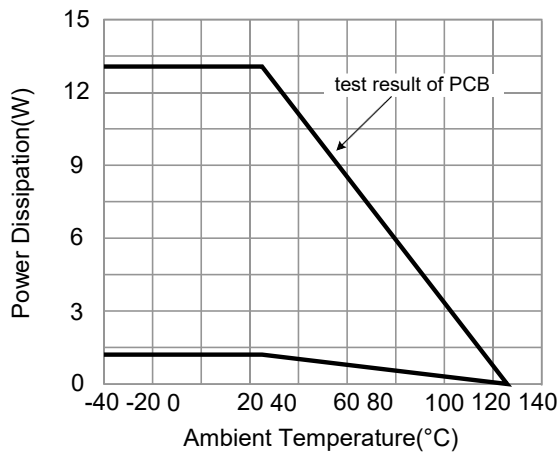
Ripple Rejection VS Current



Power Dissipation VS Ambient Temperature(SOT-223)

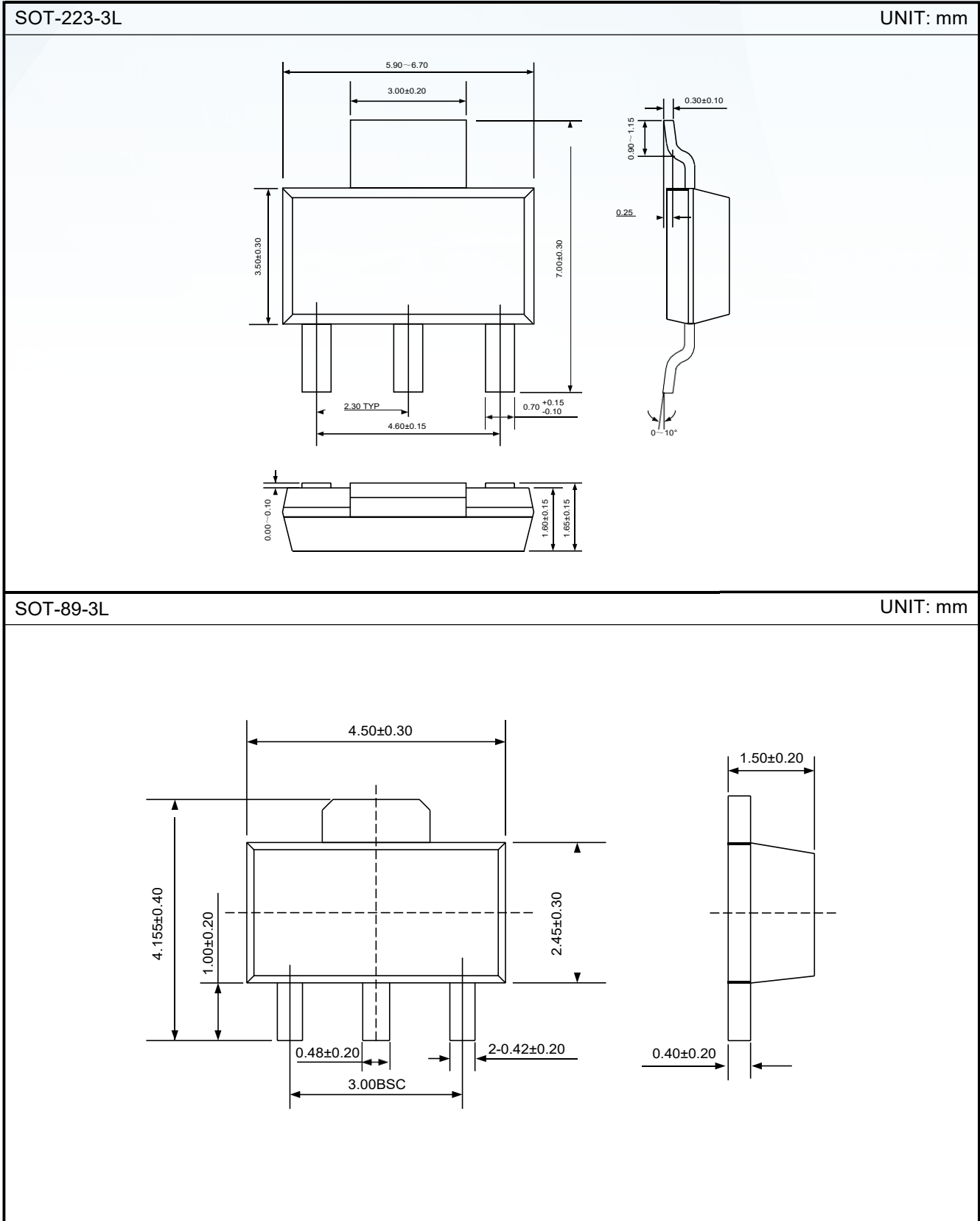


Power Dissipation VS Ambient Temperature(TO-252)



PACKAGE OUTLINE

1A LDO Voltage Regulator





1A LDO Voltage Regulator

PACKAGE OUTLINE (continued)

TO-252-2L UNIT: mm

The drawing shows the TO-252-2L package with dimensions A through O. Dimensions A, B, C, D, F, and H are shown in the top view. Dimensions J, K, L, M, and N are shown in the side view. Dimension O is shown in a detail view of the lead spacing. The package has a central circular feature on the top surface and two leads extending from the bottom.

Unit: mm

Item	Min	Max
A	6.40	6.70
B	5.20	5.40
C	6.00	6.30
D	6.55	6.85
E	0.45	0.60
F	3.07	3.35
G	0.85	1.05
H	0.75	0.95
I	0.55	0.75
J	2.20	2.40
K	0.43	0.58
L	0.43	0.58
M	0.90	1.10
N	0.90	1.10
O	2.20	2.40

NOTE1: There are two conditions for this position:has an eject pin or has no eject pin.

## Disclaimer

EVVOSEMI ("EVVO") reserves the right to make corrections, enhancements, improvements, and other changes to its products and services at any time, and to discontinue any product or service without notice.

EVVO warrants the performance of its hardware products to the specifications applicable at the time of sale in accordance with its standard warranty. Testing and other quality control techniques are used as deemed necessary by EVVO to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

Customers should obtain and confirm the latest product information and specifications before final design, purchase, or use. EVVO makes no warranty, representation, or guarantee regarding the suitability of its products for any particular purpose, nor does EVVO assume any liability for application assistance or customer product design. EVVO does not warrant or accept any liability for products that are purchased or used for any unintended or unauthorized application.

EVVO products are not authorized for use as critical components in life support devices or systems without the express written approval of EVVOSEMI.

The EVVO logo and EVVOSEMI are trademarks of EVVOSEMI or its subsidiaries in relevant jurisdictions. EVVO reserves the right to make changes without further notice to any products herein.