1A Low Dropout Positive Adjustable or Fixed-Mode Regulator

■ Features

- 1.4V maximum dropout at full load current
- Fast transient response
- Output current limiting
- Built-in thermal shutdown
- Packages: SOT223, TO263, TO252, TO220, SOT89
- Good noise rejection
- 3-Terminal Adjustable or Fixed 1.5V, 1.8V, 1.9V, 2.5V, 3.3V, 5.0V

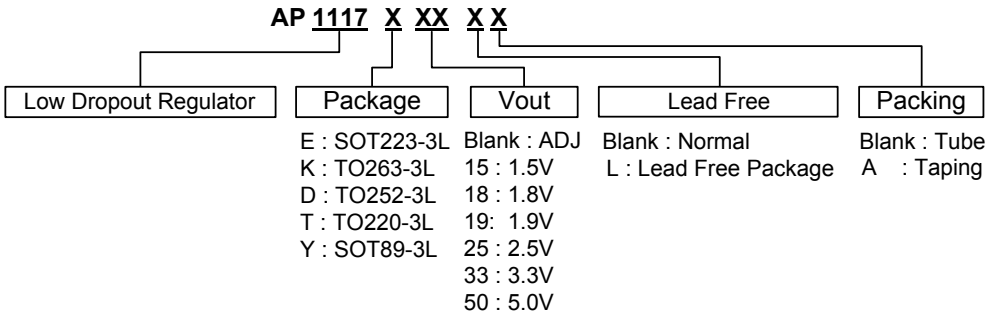
■ Applications

- PC peripheral
- Communication

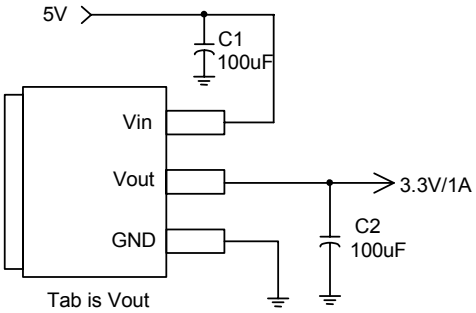
■ General Description

AP1117 is a low dropout positive adjustable or fixed-mode regulator with minimum of 1A output current capability. The product is specifically designed to provide well-regulated supply for low voltage IC applications such as high-speed bus termination and low current 3.3V logic supply. AP1117 is also well suited for other applications such as VGA cards. AP1117 is guaranteed to have lower than 1.4V dropout at full load current making it ideal to provide well-regulated outputs of 1.25 to 5.0 with 6.4V to 12V input supply.

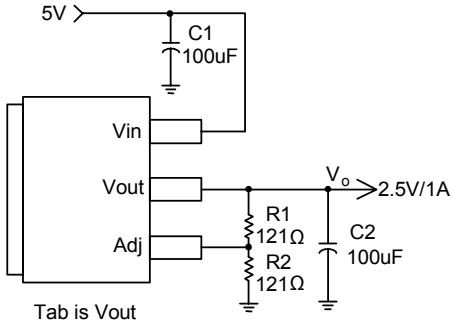
■ Ordering Information



■ Typical Circuit



(5V/3.3V fixed output)



(5V/2.5V ADJ output)

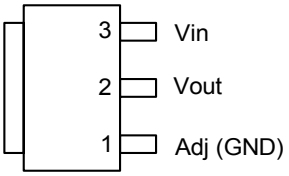
Note: $V_o = V_{REF} * (1 + \frac{R_2}{R_1})$

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■ Connection Diagram

3 PIN SOT223

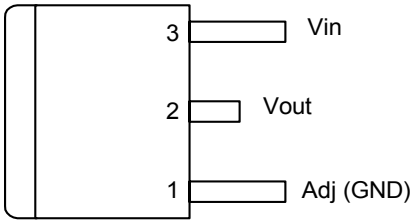
(Top View)



Tab is Vout

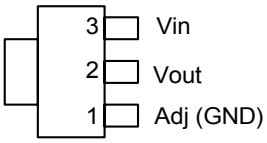
3 PIN TO252 / TO263

(Top View)



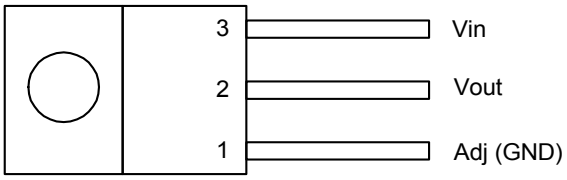
Tab is Vout

3 PIN SOT89



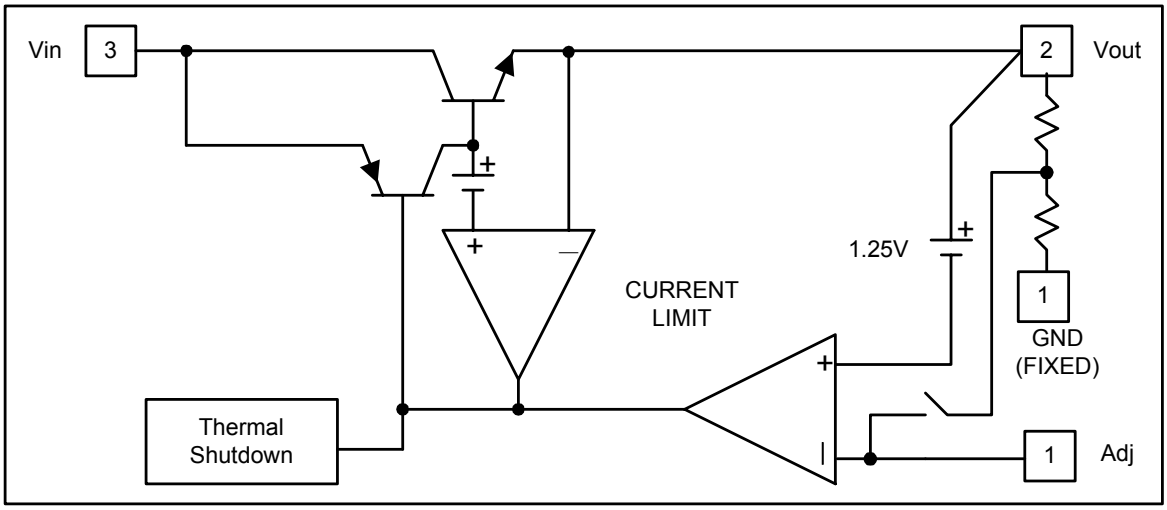
Tab is Vout

3 PIN TO220



Tab is Vout

■ Block Diagram



■ Pin Descriptions

NAME	I/O	PIN #	FUNCTION
Adj (GND)	I	1	A resistor divider from this pin to the Vout pin and ground sets the output voltage. (Ground only for Fixed-Mode)
Vout	O	2	The output of the regulator. A minimum of 10uF capacitor (0.15Ω ≤ ESR ≤ 20Ω) must be connected from this pin to ground to insure stability.
Vin	I	3	The input pin of regulator. Typically a large storage capacitor (0.15Ω ≤ ESR ≤ 20Ω) is connected from this pin to ground to insure that the input voltage does not sag below the minimum dropout voltage during the load transient response. This pin must always be 1.3V higher than Vout in order for the device to regulate properly.

■ Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
Vin	DC Supply Voltage	-0.3 to 12	V
P_D	Power Dissipation	Internally Limited	
T_{ST}	Storage Temperature	-65 to +150	^oC
T_{OP}	Operating Junction Temperature Range	0 to +150	^oC

■ Electrical Characteristics (Under Operating Conditions)

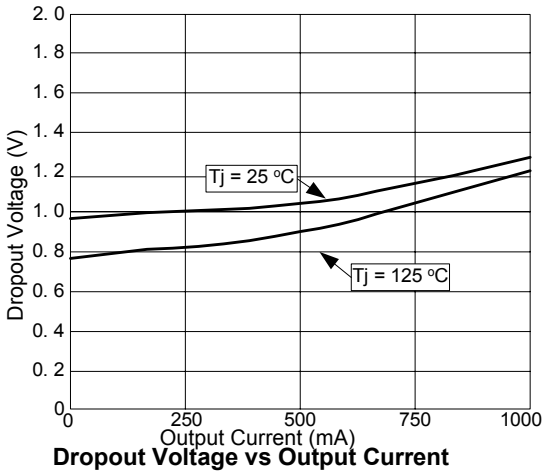
PARAMETER	CONDITIONS		MIN	TYP	MAX	UNIT
Reference Voltage	AP1117-ADJ	T_J=25°C,(V_{IN-OUT})=1.5V I_O=10mA	1.225	1.250	1.275	V
Output Voltage	AP1117-1.5	I_{OUT} = 10mA, T_J = 25°C, 3V≦V_{IN}≦12V	1.470	1.500	1.530	V
	AP1117-1.8	I_{OUT} = 10mA, T_J = 25°C, 3.3V≦V_{IN}≦12V	1.764	1.800	1.836	V
	AP1117-1.9	I_{OUT} = 10mA, T_J = 25°C, 3.3V≦V_{IN}≦12V	1.862	1.900	1.938	V
	AP1117-2.5	I_{OUT} = 10mA, T_J = 25°C, 4V≦V_{IN}≦12V	2.450	2.500	2.550	V
	AP1117-3.3	I_{OUT} = 10mA, T_J = 25°C, 4.8V≦V_{IN}≦12V	3.235	3.300	3.365	V
	AP1117-5.0	I_{OUT} = 10mA, T_J = 25°C, 6.5V≦V_{IN}≦12V	4.900	5.000	5.100	V
Line Regulation	AP1117-XXX	I_O=10mA,V_{OUT}+1.5V<V_{IN}<12V, T_J=25°C			0.2	%
Load Regulation	AP1117-ADJ	V_{IN}=3.3V,Vadj=0,0mA<Io<1A, T_J=25°C (Note 1,2)			1	%
	AP1117-1.5	V_{IN}=3V, 0mA<Io<1A, T_J=25°C (Note 1,2)		12	15	mV
	AP1117-1.8	V_{IN}=3.3V, 0mA<Io<1A, T_J=25°C (Note 1,2)		15	18	mV
	AP1117-1.9	V_{IN}=3.3V, 0mA<Io<1A, T_J=25°C (Note 1,2)		16	19	mV
	AP1117-2.5	V_{IN}=4V, 0mA<Io<1A, T_J=25°C (Note 1,2)		20	25	mV
	AP1117-3.3	V_{IN} = 5V, 0≦I_{OUT}≦1A, T_J=25°C (Note 1,2)		26	33	mV
	AP1117-5.0	V_{IN} = 8V, 0≦I_{OUT}≦1A, T_J=25°C (Note 1,2)		40	50	mV
Dropout Voltage (V_{IN}-V_{OUT})	AP1117-ADJ/1.5/1.8 /1.9/2.5/3.3/5.0	I_{OUT} = 1A ,ΔV_{OUT}=0.1%V_{OUT}		1.3	1.4	V
Current Limit	AP1117-ADJ/1.5/1.8 /1.9/2.5/3.3/5.0	(V_{IN}-V_{OUT}) = 5V	1. 1			A
Minimum Load Current	AP1117-XXX	0°C≦Tj≦125°C		5	10	mA
Thermal Regulation	T_A=25°C, 30ms pulse			0.008	0.04	%/W
Ripple Rejection	F=120Hz,C_{OUT}=25uF Tantalum, I_{OUT}=1A					
	AP1117-XXX	V_{IN}=V_{OUT}+3V		60	70	dB
Temperature Stability	I_O=10mA			0.5		%
θ_{JA} Thermal Resistance Junction-to-Ambient(No heat sink ;No air flow)	SOT89 SOT-223 TO-252 TO-220/263			300 117 92 85		°C/W
θ_{JC} Thermal Resistance Junction-to-Case	SOT89 : Control Circuitry/Power Transistor SOT-223 : Control Circuitry/Power Transistor TO-263 : Control Circuitry/Power Transistor TO-252 : Control Circuitry/Power Transistor TO-220 : Control Circuitry/Power Transistor			100 15 0.65/2.7 10 0.65/2.7		°C/W

Note1: See thermal regulation specifications for changes in output voltage due to heating effects. Line and load regulation are measured at a constant junction temperature by low duty cycle pulse testing. Load regulation is measured at the output lead = 1/18" from the package.

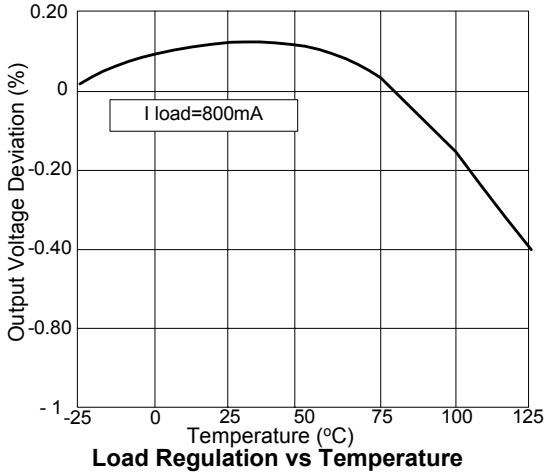
Note2: Line and load regulation are guaranteed up to the maximum power dissipation of 15W. Power dissipation is determined by the difference between input and output differential and the output current. Guaranteed maximum power dissipation will not be available over the full input/output range.

Note3: Quiescent current is defined as the minimum output current required in maintaining regulation. At 12V input/output differential the device is guaranteed to regulate if the output current is greater than 10mA.

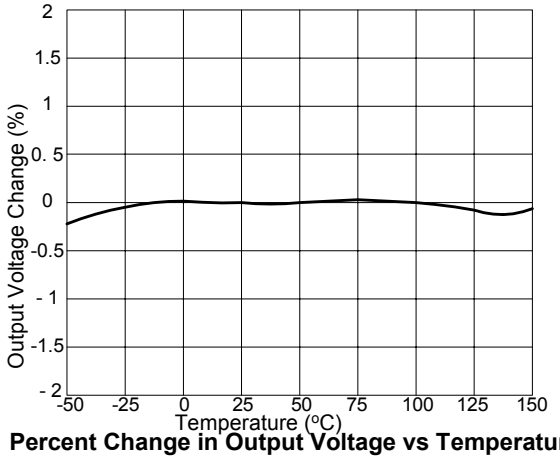
■ Typical Performance Characteristics



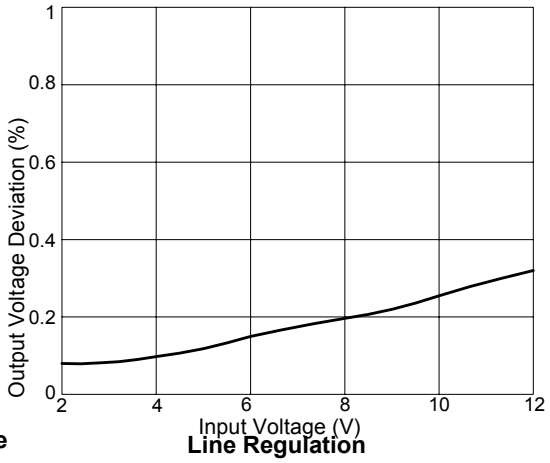
Dropout Voltage vs Output Current



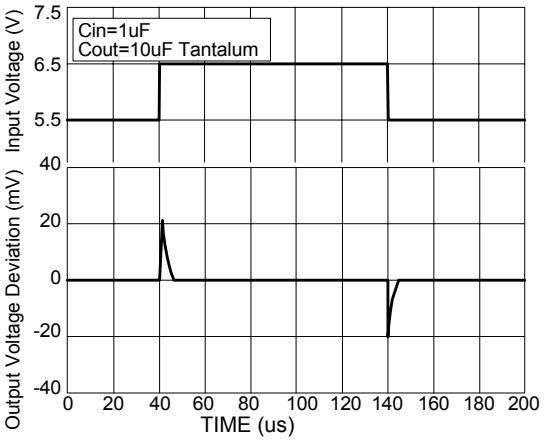
Load Regulation vs Temperature



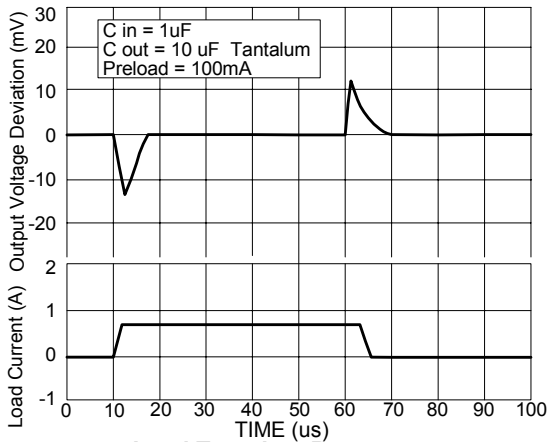
Percent Change in Output Voltage vs Temperature



Line Regulation



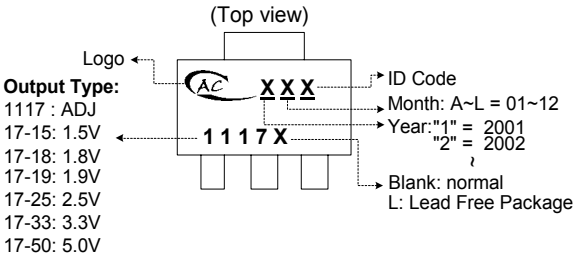
Line Transient Response



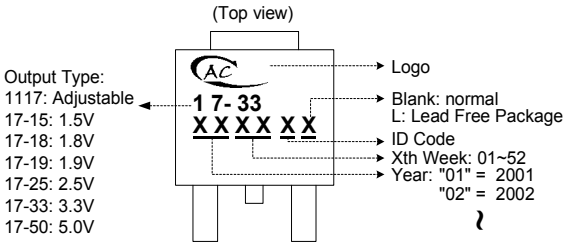
Load Transient Response

■ Marking Information

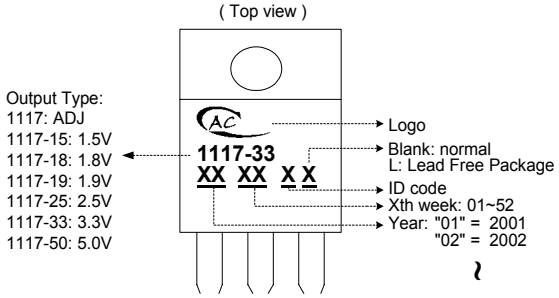
(1) SOT223-3L



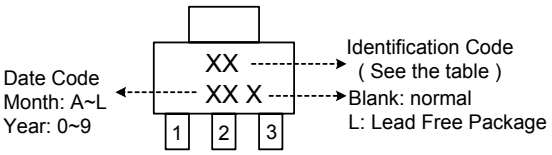
(2) TO252-3L



(3) TO220-3L

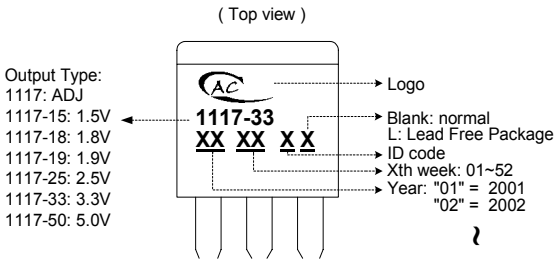


(4) SOT89-3L



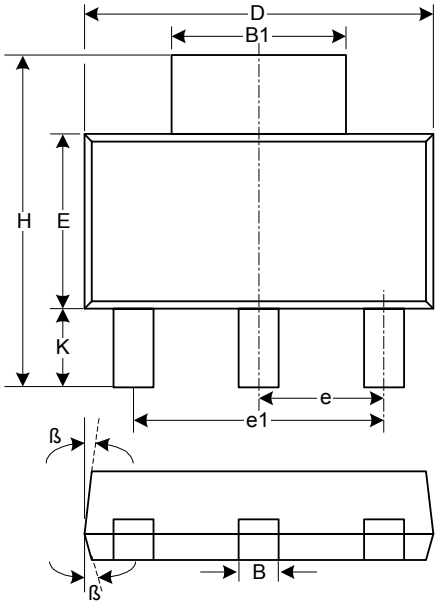
Identification code	Output version
DA	AP1117-ADJ
DB	AP1117-1.5V
DC	AP1117-1.8V
DG	AP1117-1.9V
DD	AP1117-2.5V
DE	AP1117-3.3V
DF	AP1117-5.0V

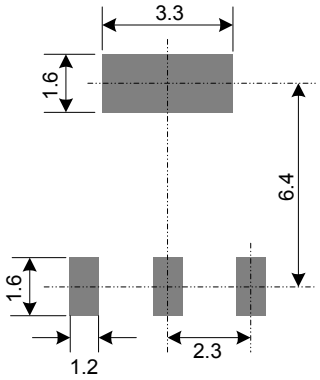
(5) TO263-3L



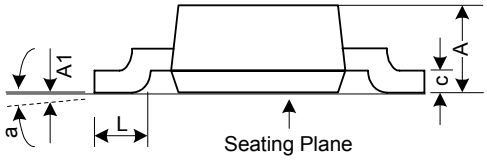
■ Package Dimension

(1) SOT223



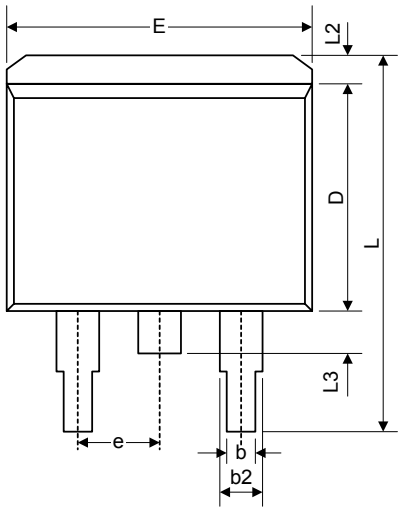


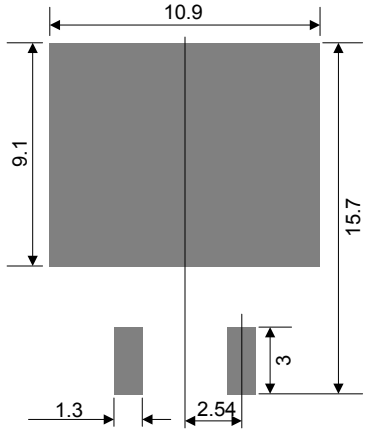
Land Pattern Recommendation (Unit: mm)



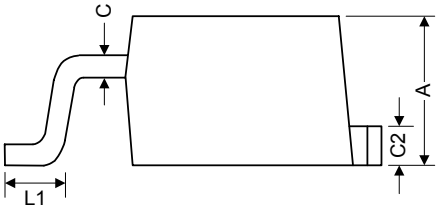
Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.50	1.65	1.80	0.059	0.065	0.071
A1	0.02	0.05	0.08	0.001	0.002	0.003
B	0.60	0.70	0.80	0.024	0.028	0.031
B1	2.90	-	3.15(Ref.)	0.114	-	0.124(Ref.)
c	0.28	0.30	0.32	0.011	0.012	0.013
D	6.30	6.50	6.70	0.248	0.256	0.264
E	3.30	3.50	3.70	0.130	0.138	0.146
e	2.3 Basic			0.091 Basic		
e1	4.6 Basic			0.181 Basic		
H	6.70	7.00	7.30	0.264	0.276	0.287
L	0.91	1.00	1.10	0.036	0.039	0.043
K	1.50	1.75	2.00	0.059	0.069	0.079
α	0°	5°	10°	0°	5°	10°
β	-	13°	-	-	13°	-

(2) TO263



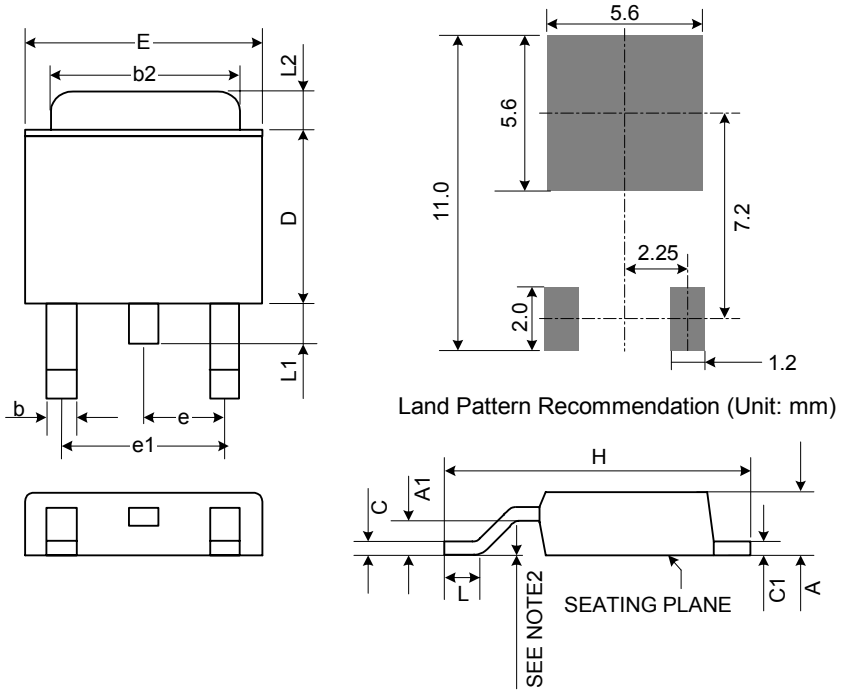


Land Pattern Recommendation (Unit: mm)



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	4.06	4.45	4.83	0.160	0.175	0.190
b	0.51	0.75	0.99	0.020	0.030	0.039
b2	1.14	1.27	1.40	0.045	0.050	0.055
C	0.38 TYP.			0.015 TYP.		
C2	1.14	1.27	1.40	0.045	0.050	0.055
D	8.65	9.15	9.65	0.341	0.360	0.380
E	9.65	9.97	10.29	0.380	0.393	0.405
e	2.54 BSC.			0.100 BSC.		
L	14.61	15.24	15.88	0.575	0.600	0.625
L1	2.28	2.54	2.80	0.090	0.100	0.110
L2	-	1.30	2.92	-	0.051	0.115
L3	1.27	1.52	1.78	0.050	0.060	0.070

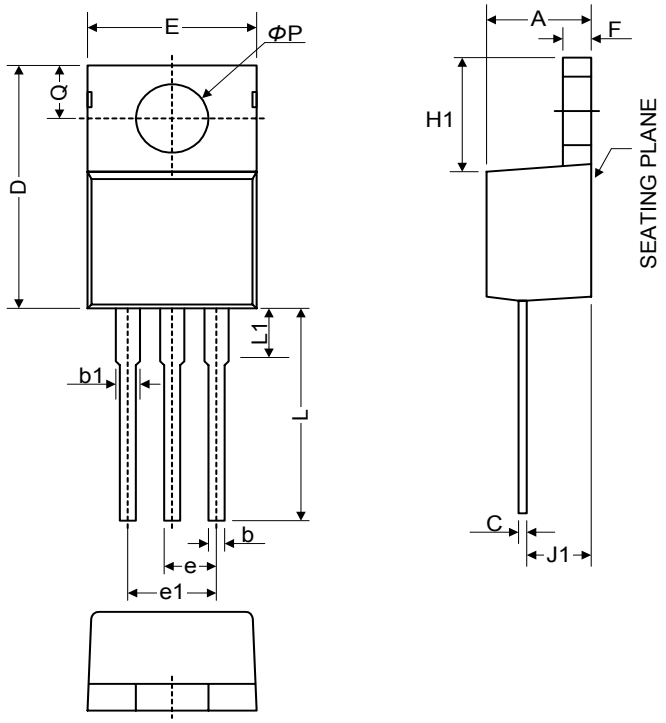
(3) TO252



Notes:
1. JEDEC Outline: TO-252 AB
2. Mils suggested for positive contact at mounting.

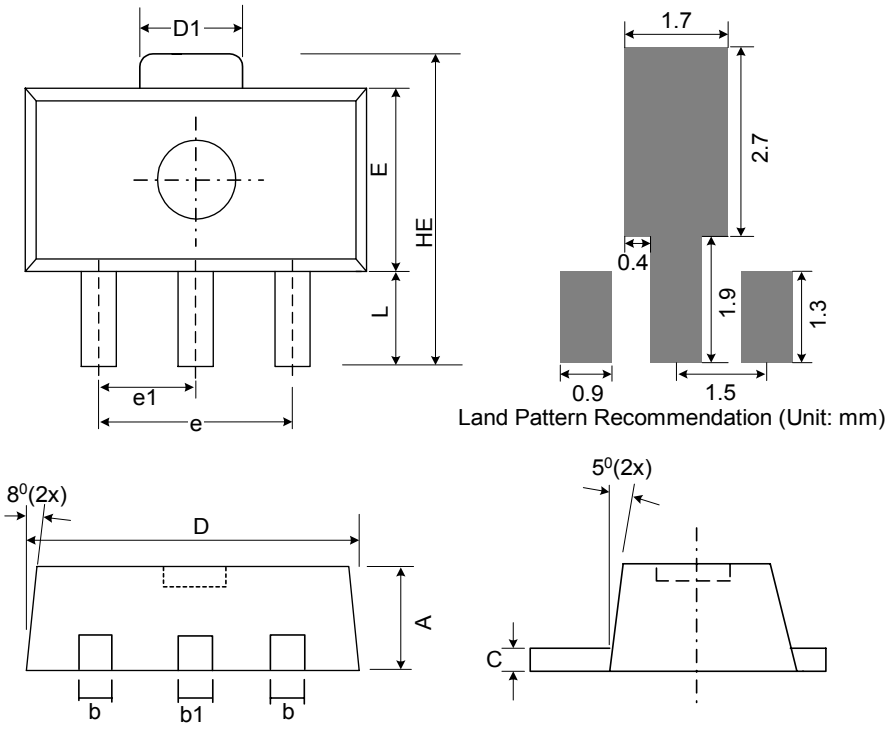
Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	2.18	2.29	2.39	0.086	0.090	0.094
A1	1.02	1.15	1.27	0.040	0.045	0.050
b	0.61 TYP.			0.024 TYP.		
b2	5.20	5.35	5.50	0.205	0.211	0.217
C	0.46	0.52	0.58	0.018	0.020	0.023
C1	0.46	0.52	0.58	0.018	0.020	0.023
D	5.33	5.57	5.80	0.210	0.219	0.228
E	6.35	6.58	6.80	0.250	0.259	0.268
e	2.25 BSC.			0.089 BSC.		
e1	4.50 BSC.			0.177 BSC.		
H	9.00	9.70	10.40	0.354	0.382	0.409
L	0.51	-	-	0.020	-	-
L1	0.64	0.83	1.02	0.025	0.033	0.040
L2	1.52	1.78	2.03	0.060	0.070	0.080

(4) TO220



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	3.55	4.20	4.85	0.140	0.165	0.191
b1	1.14	1.46	1.78	0.045	0.057	0.070
b	0.51	0.83	1.14	0.020	0.033	0.045
C	0.31	0.72	1.14	0.012	0.028	0.045
D	14.20	15.35	16.50	0.559	0.604	0.650
E	9.70	10.20	10.70	0.382	0.402	0.421
e	2.29	2.54	2.79	0.090	0.100	0.110
e1	4.83	5.08	5.33	0.190	0.200	0.210
F	0.51	0.95	1.40	0.020	0.037	0.055
H1	5.84	6.35	6.86	0.230	0.250	0.270
J1	2.03	2.48	2.92	0.080	0.098	0.115
L	12.72	13.72	14.72	0.501	0.540	0.580
L1	3.66	5.00	6.35	0.144	0.197	0.250
øP	3.53	3.81	4.09	0.139	0.150	0.161
Q	2.54	2.98	3.43	0.100	0.117	0.135

(5) SOT89



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.40	1.50	1.60	0.055	0.059	0.063
B	0.36	0.42	0.48	0.014	0.016	0.018
b1	0.41	0.47	0.53	0.016	0.043	0.051
C	0.35	0.39	0.43	0.014	0.015	0.017
D	4.40	4.50	4.60	0.173	0.177	0.181
D1	1.40	1.60	1.75	0.055	0.062	0.069
e	2.90	3.00	3.10	0.114	0.118	0.122
e1	1.45	1.50	1.55	0.057	0.059	0.061
E	2.35	2.48	2.60	0.093	0.098	0.102
HE	3.94	-	4.25	0.155	-	0.167
L	0.80	-	1.20	0.031	-	0.047

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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