

Features

- 1.4V Maximum Dropout at Full Load Current
- Fast Transient Response
- Output Current Limiting
- Built-in Thermal Shutdown
- Good Noise Rejection
- 3-Terminal Adjustable or Fixed 1.5V, 1.8V, 1.9V, 2.5V, 3.3V, 5.0V
- 3-Pin SOT223-3L, TO263-3L, TO252-3L, TO220-3L, SOT89-3L Packages

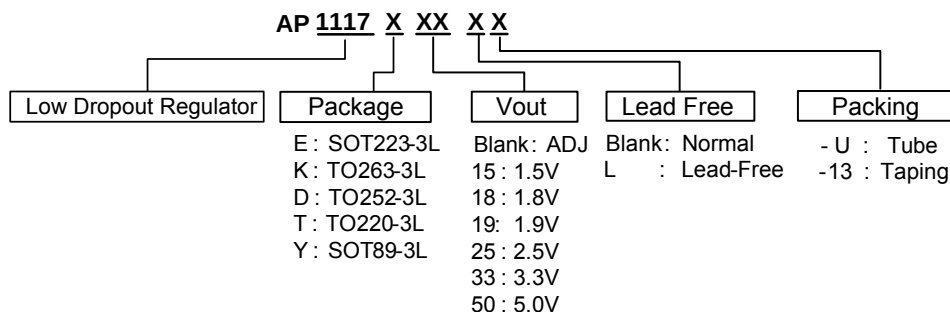
General Description

AP1117 is a low dropout positive adjustable or fixed-mode regulator with 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 18V input supply.

Applications

- PC Peripheral
- Communication

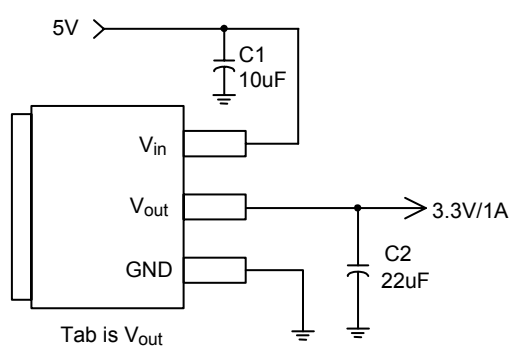
Ordering Information



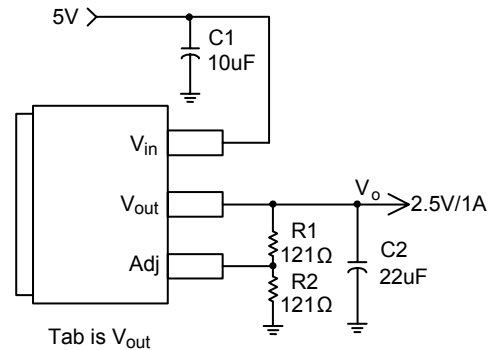
Device	Package Code	Packaging (Note 1)	Tube/Bulk		13" Tape and Reel	
			Quantity	Part Number Suffix	Quantity	Part Number Suffix
AP1117E	E	SOT223-3L	75	-U	2500/Tape & Reel	-13
AP1117K	K	TO263-3L	50	-U	800/Tape & Reel	-13
AP1117D	D	TO252-3L	80	-U	2500/Tape & Reel	-13
AP1117T	T	TO220-3L	50	-U	—	—
AP1117Y	Y	SOT89-3L	—	—	2500/Tape & Reel	-13

Notes: 1. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.

Typical Application Circuit



(5V/3.3V fixed output)

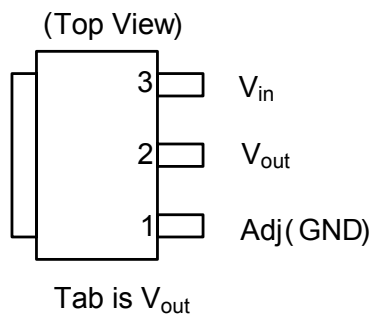


(5V/2.5V ADJ output)

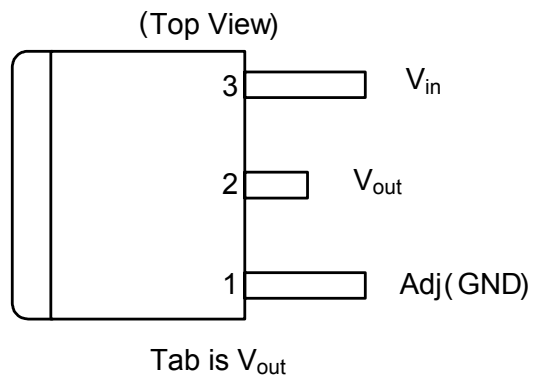
Note: $V_o = V_{REF} * (1 + \frac{R_2}{R_1})$

Connection Diagram

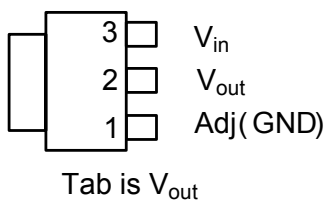
3 PIN SOT223



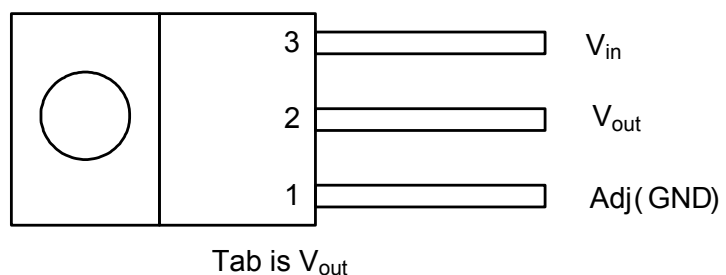
3 PIN TO252 / TO263



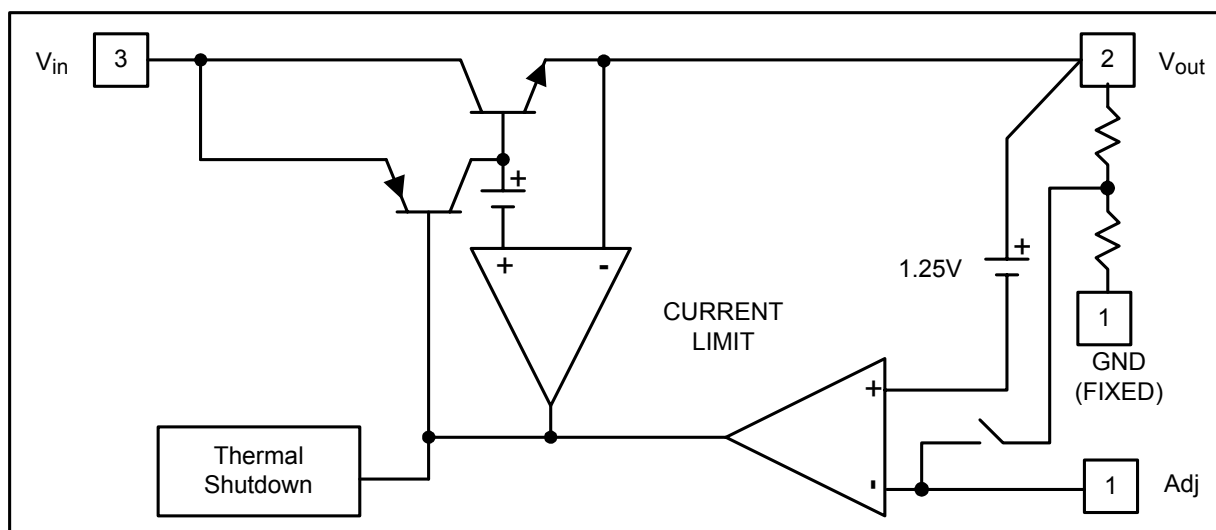
3 PIN SOT89



3 PIN TO220



Block Diagram



Pin Descriptions

NAME	I/O	PIN #	FUNCTION
Adj (GND)	I	1	A resistor divider from this pin to the V_{out} pin and ground sets the output voltage (Ground only for Fixed-Mode).
V_{out}	O	2	The output of the regulator. A minimum of 10uF capacitor ($0.15\Omega \leq ESR \leq 20\Omega$) must be connected from this pin to ground to insure stability.
V_{in}	I	3	The input pin of regulator. Typically a large storage capacitor ($0.15\Omega \leq ESR \leq 20\Omega$) 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 V_{out} in order for the device to regulate properly.

Absolute Maximum Ratings

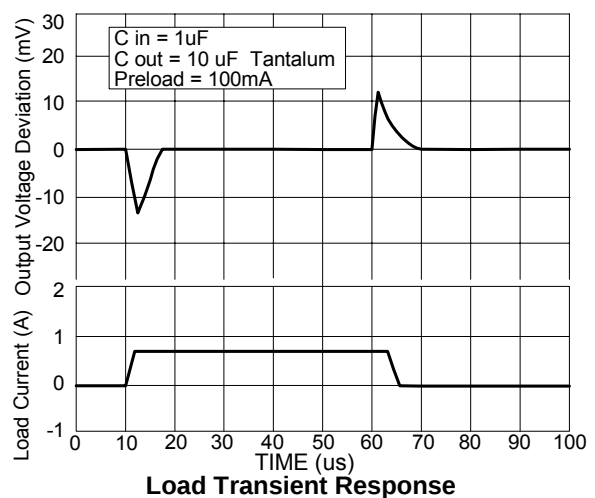
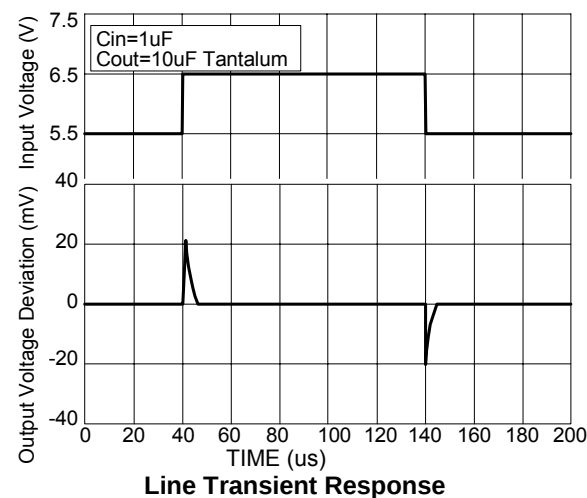
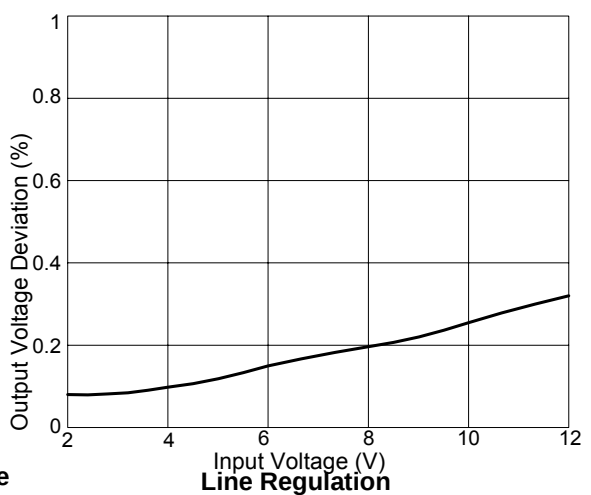
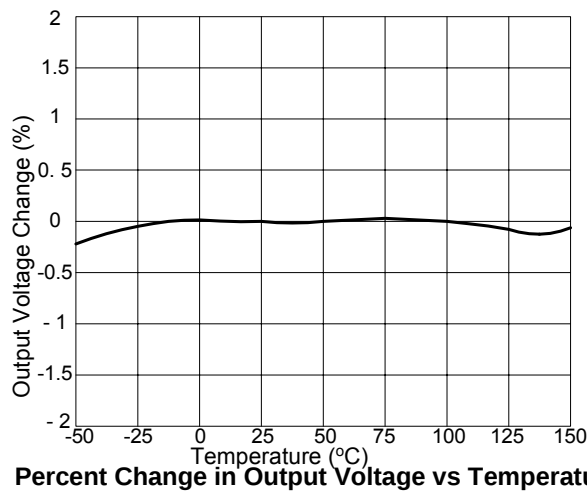
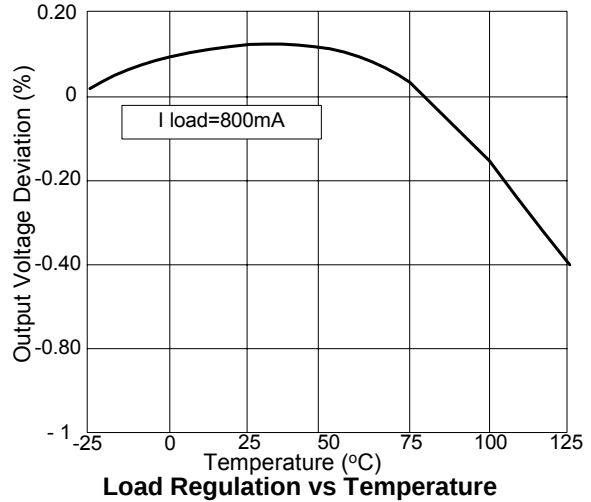
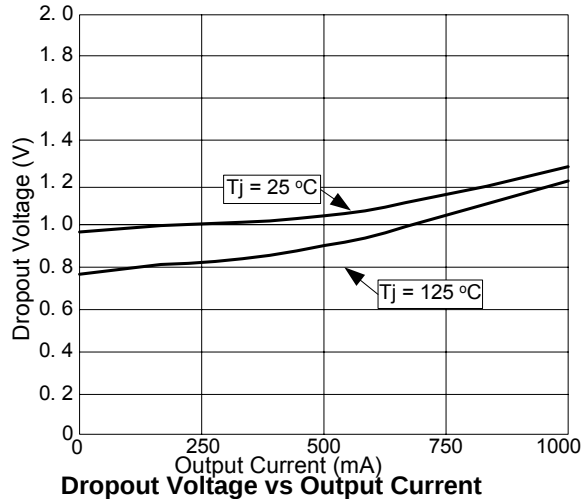
Symbol	Parameter	Rating	Unit
V_{in}	DC Supply Voltage	-0.3 to 18	V
T_{OP}	Operating Junction Temperature Range	0 to +125	°C
T_{MJ}	Maximum Junction Temperature	150	°C
P_D	Power Dissipation (No heat sink; No air flow) $T_A = 25^{\circ}C$, $T_J = 125^{\circ}C$ SOT-223 SOT-89 TO-252 TO-220/263	 650 330 1050 1150	 mW
T_{ST}	Storage Temperature	-65 to +150	°C

Electrical Characteristics (Under Operating Conditions)

PARAMETER	CONDITIONS		MIN	TYP	MAX	UNIT
Reference Voltage	AP1117-ADJ	$T_A = 25^\circ\text{C}$, $(V_{IN-OUT}) = 1.5\text{V}$ $I_O = 10\text{mA}$	1.225	1.250	1.275	V
Output Voltage	AP1117-1.5	$I_{OUT} = 10\text{mA}$, $T_A = 25^\circ\text{C}$, $3\text{V} \leq V_{IN} \leq 12\text{V}$	1.470	1.500	1.530	V
	AP1117-1.8	$I_{OUT} = 10\text{mA}$, $T_A = 25^\circ\text{C}$, $3.3\text{V} \leq V_{IN} \leq 12\text{V}$	1.764	1.800	1.836	V
	AP1117-1.9	$I_{OUT} = 10\text{mA}$, $T_A = 25^\circ\text{C}$, $3.3\text{V} \leq V_{IN} \leq 12\text{V}$	1.862	1.900	1.938	V
	AP1117-2.5	$I_{OUT} = 10\text{mA}$, $T_A = 25^\circ\text{C}$, $4\text{V} \leq V_{IN} \leq 12\text{V}$	2.450	2.500	2.550	V
	AP1117-3.3	$I_{OUT} = 10\text{mA}$, $T_A = 25^\circ\text{C}$, $4.8\text{V} \leq V_{IN} \leq 12\text{V}$	3.235	3.300	3.365	V
	AP1117-5.0	$I_{OUT} = 10\text{mA}$, $T_A = 25^\circ\text{C}$, $6.5\text{V} \leq V_{IN} \leq 12\text{V}$	4.900	5.000	5.100	V
Line Regulation	AP1117-XXX	$I_O = 10\text{mA}$, $V_{OUT} + 1.5\text{V} < V_{IN} < 12\text{V}$, $T_A = 25^\circ\text{C}$			0.2	%
Load Regulation	AP1117-ADJ	$V_{IN} = 3.3\text{V}$, $V_{adj} = 0$, $0\text{mA} < I_O < 1\text{A}$, $T_A = 25^\circ\text{C}$ (Note 2, 3)			1	%
	AP1117-1.5	$V_{IN} = 3\text{V}$, $0\text{mA} < I_O < 1\text{A}$, $T_A = 25^\circ\text{C}$ (Note 2, 3)		18	15	mV
	AP1117-1.8	$V_{IN} = 3.3\text{V}$, $0\text{mA} < I_O < 1\text{A}$, $T_A = 25^\circ\text{C}$ (Note 2, 3)		15	18	mV
	AP1117-1.9	$V_{IN} = 3.3\text{V}$, $0\text{mA} < I_O < 1\text{A}$, $T_A = 25^\circ\text{C}$ (Note 2, 3)		16	19	mV
	AP1117-2.5	$V_{IN} = 4\text{V}$, $0\text{mA} < I_O < 1\text{A}$, $T_A = 25^\circ\text{C}$ (Note 2, 3)		20	25	mV
	AP1117-3.3	$V_{IN} = 5\text{V}$, $0 \leq I_{OUT} \leq 1\text{A}$, $T_A = 25^\circ\text{C}$ (Note 2, 3)		26	33	mV
	AP1117-5.0	$V_{IN} = 8\text{V}$, $0 \leq I_{OUT} \leq 1\text{A}$, $T_A = 25^\circ\text{C}$ (Note 2, 3)		40	50	mV
Dropout Voltage ($V_{IN} - V_{OUT}$)	AP1117-ADJ/1.5/1.8 /1.9/2.5/3.3/5.0	$I_{OUT} = 1\text{A}$, $\Delta V_{OUT} = 0.1\% V_{OUT}$		1.3	1.4	V
Current Limit	AP1117-ADJ/1.5/1.8 /1.9/2.5/3.3/5.0	$(V_{IN} - V_{OUT}) = 5\text{V}$	1.1			A
Minimum Load Current (Note 4)	AP1117-XXX	$0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$		5	10	mA
Thermal Regulation	$T_A = 25^\circ\text{C}$, 30ms pulse			0.008	0.04	%/W
Ripple Rejection	$F = 180\text{Hz}$, $C_{OUT} = 25\mu\text{F}$ Tantalum, $I_{OUT} = 1\text{A}$					
	AP1117-XXX	$V_{IN} = V_{OUT} + 3\text{V}$		60	70	dB
Temperature Stability	$I_O = 10\text{mA}$			0.5		%
θ_{JA} Thermal Resistance Junction-to-Ambient (No heat sink; No air flow)	SOT-223: Control Circuitry/Power Transistor			117		$^\circ\text{C/W}$

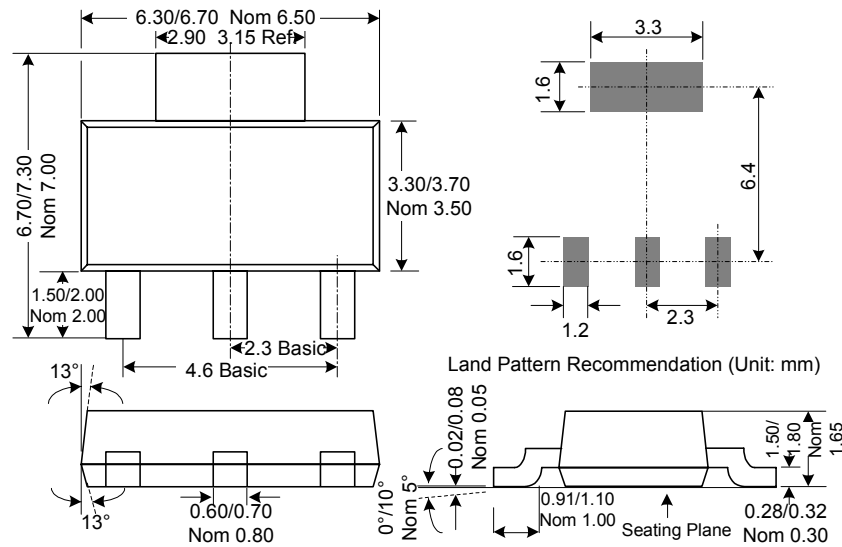
- Notes:
- See thermal regulation specifications for changes in output voltage due to heating effects. Line and load regulation are measured at a constant junction temperature by low duty cycle pulse testing. Load regulation is measured at the output lead = 1/18" from the package.
 - Line and load regulation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

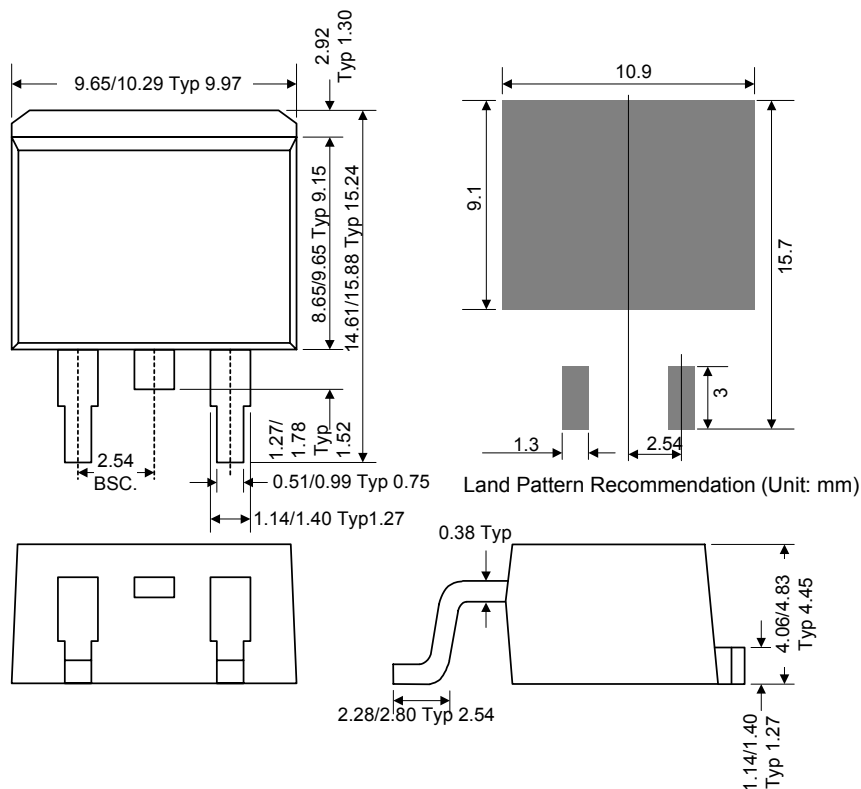


Package Diagrams (All Dimensions in mm)

(1) SOT223-3L

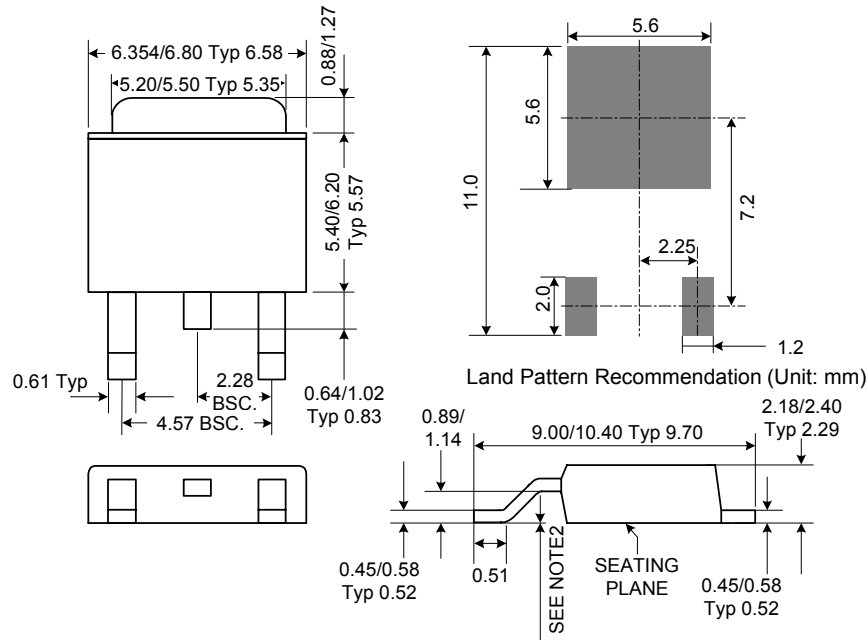


(2) TO263-3L

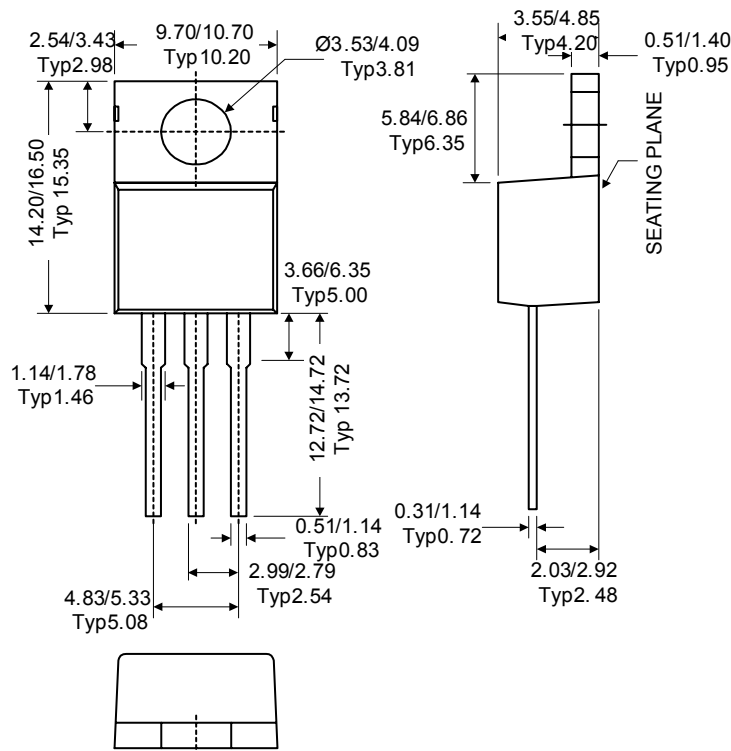


Package Diagrams (Continued) (All Dimensions in mm)

(3) TO252-3L

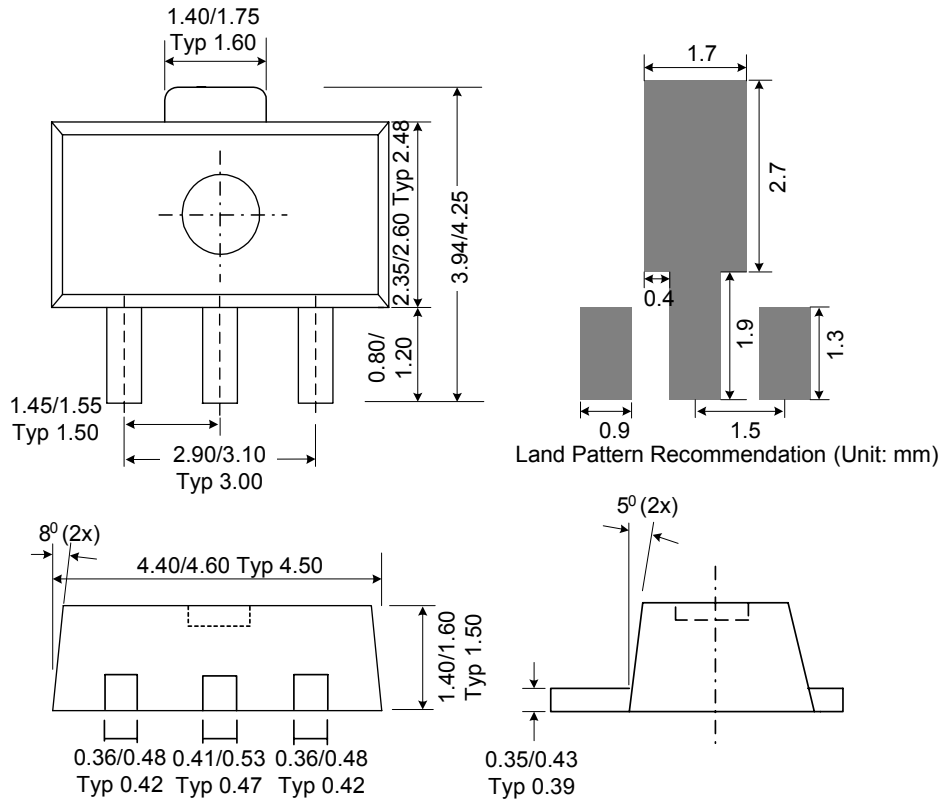


(4) TO220-3L



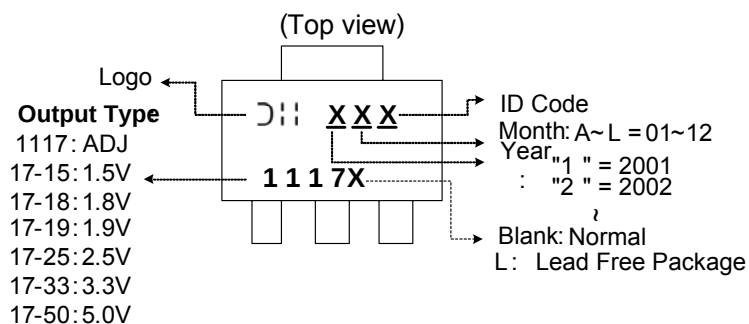
Package Diagrams (Continued) (All Dimensions in mm)

(5) SOT89-3L



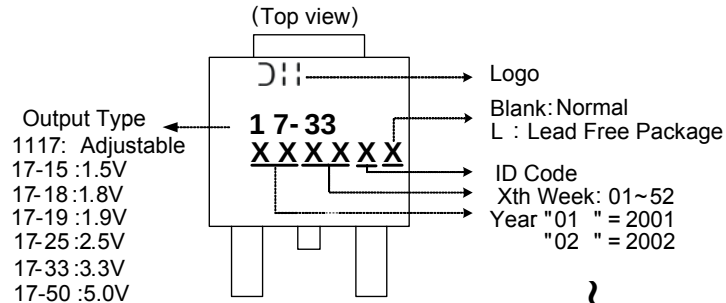
Marking Information

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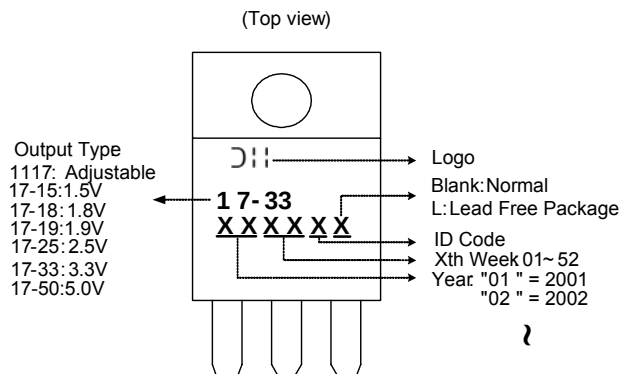


Marking Information (Continued)

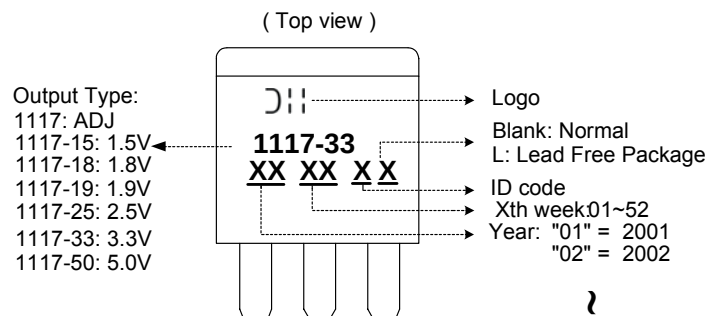
(2) TO252-3L



(3) TO220-3L



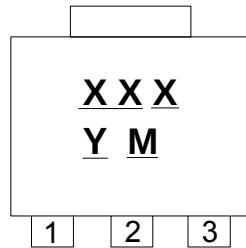
(4) TO263-3L



Marking Information (Continued)

(5) SOT89-3L

(Top View)



XX : Identification code
(See Appendix)
X : Blank : Normal
L : Lead-Free Package
Y : Year: 0-9
M : Month: A~L

Marking Code Table

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

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