

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 and PowerDI™5 (Under Development) packages

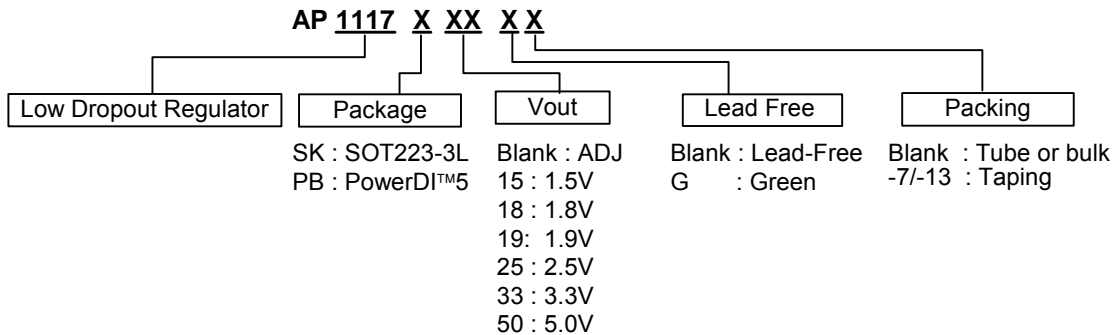
General Description

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.

Pin Connections

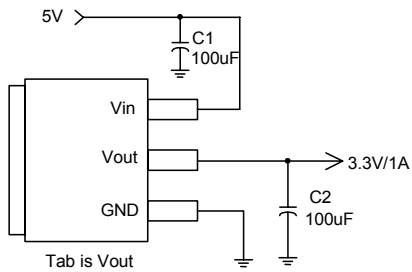
- PC peripheral
- Communication

Ordering Information

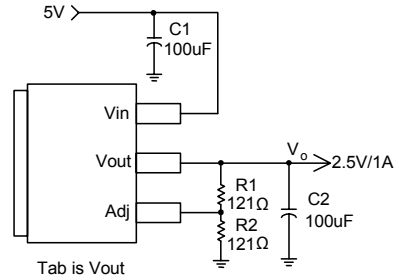


Device (Note 1)	Package Code	Packaging (Note 2)	7" Tape and Reel		13" Tape and Reel	
			Quantity	Part Number Suffix	Quantity	Part Number Suffix
AP1117SK	SK	SOT-223	500/Tape & Reel	-7	2500/Tape & Reel	-13
AP1117SK15	SK	SOT-223	500/Tape & Reel	-7	2500/Tape & Reel	-13
AP1117SK18	SK	SOT-223	500/Tape & Reel	-7	2500/Tape & Reel	-13
AP1117SK19	SK	SOT-223	500/Tape & Reel	-7	2500/Tape & Reel	-13
AP1117SK25	SK	SOT-223	500/Tape & Reel	-7	2500/Tape & Reel	-13
AP1117SK33	SK	SOT-223	500/Tape & Reel	-7	2500/Tape & Reel	-13
AP1117SK50	SK	SOT-223	500/Tape & Reel	-7	2500/Tape & Reel	-13
AP1117PB	PB	PowerDI™5	NA	NA	2500/Tape & Reel	-13
AP1117PB15	PB	PowerDI™5	NA	NA	2500/Tape & Reel	-13
AP1117PB18	PB	PowerDI™5	NA	NA	2500/Tape & Reel	-13
AP1117PB19	PB	PowerDI™5	NA	NA	2500/Tape & Reel	-13
AP1117PB25	PB	PowerDI™5	NA	NA	2500/Tape & Reel	-13
AP1117PB33	PB	PowerDI™5	NA	NA	2500/Tape & Reel	-13
AP1117PB50	PB	PowerDI™5	NA	NA	2500/Tape & Reel	-13

Typical Application Circuit



(5V/3.3V fixed output)



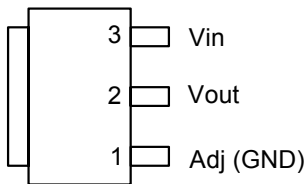
(5V/2.5V ADJ output)

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

Connection Diagram

3 PIN SOT223

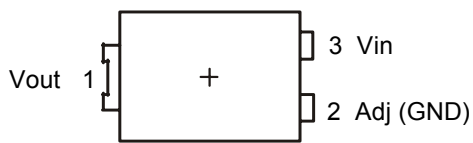
(Top View)



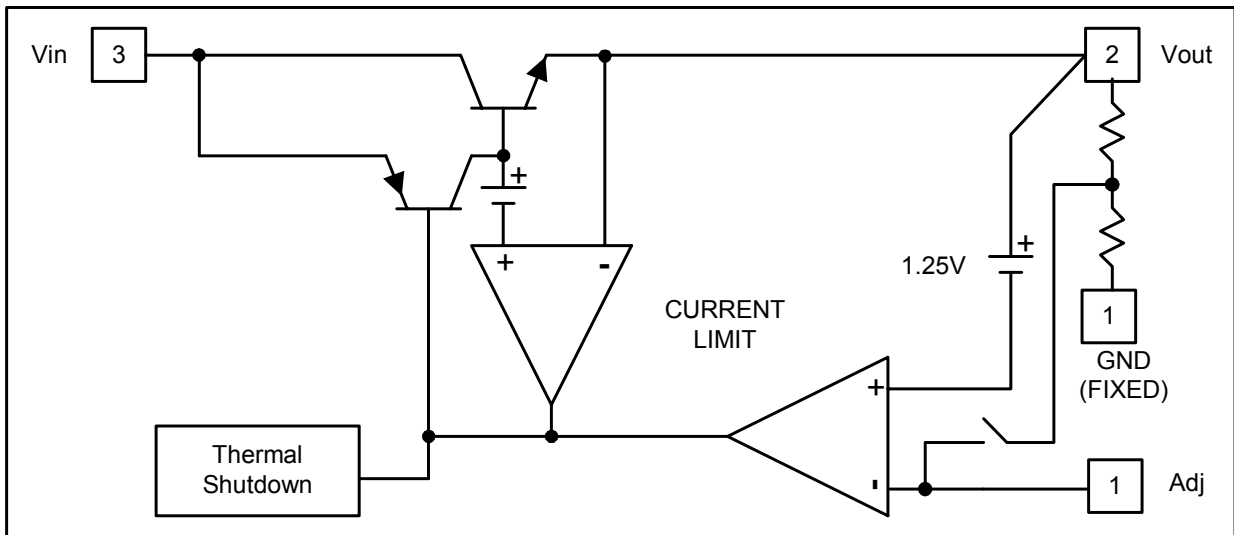
Tab is Vout

3 PIN PowerDI™5

(Top View)



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 ($0.15\Omega \leq ESR \leq 20\Omega$) must be connected from this pin to ground to insure stability.
Vin	I	3	The input pin of regulator. Typically a large storage capacitor ($0.15\Omega \leq ESR \leq 20\Omega$) 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 Vout in order for the device to regulate properly.

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V _{in}	DC Supply Voltage	12 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) <i>T_A=25°C, T_J=125°C</i> SOT-223 PowerDI™5	650 TBD	mW
T _{ST}	Storage Temperature	-65 to +150	°C

Electrical Characteristics (Under Operating Conditions)

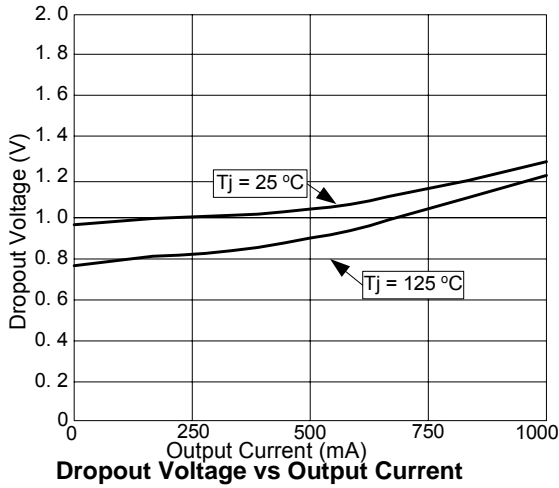
PARAMETER	CONDITIONS		MIN	TYP	MAX	UNIT
Reference Voltage	AP1117-ADJ	$T_J = 25^\circ\text{C}$, $(V_{IN}-V_{OUT}) = 1.5\text{V}$ $I_O = 10\text{mA}$	1.225	1.250	1.275	V
Output Voltage	AP1117-1.5	$I_{OUT} = 10\text{mA}$, $T_J = 25^\circ\text{C}$, $3\text{V} \leq V_{IN} \leq 12\text{V}$	1.470	1.500	1.530	V
	AP1117-1.8	$I_{OUT} = 10\text{mA}$, $T_J = 25^\circ\text{C}$, $3.3\text{V} \leq V_{IN} \leq 12\text{V}$	1.764	1.800	1.836	V
	AP1117-1.9	$I_{OUT} = 10\text{mA}$, $T_J = 25^\circ\text{C}$, $3.3\text{V} \leq V_{IN} \leq 12\text{V}$	1.862	1.900	1.938	V
	AP1117-2.5	$I_{OUT} = 10\text{mA}$, $T_J = 25^\circ\text{C}$, $4\text{V} \leq V_{IN} \leq 12\text{V}$	2.450	2.500	2.550	V
	AP1117-3.3	$I_{OUT} = 10\text{mA}$, $T_J = 25^\circ\text{C}$, $4.8\text{V} \leq V_{IN} \leq 12\text{V}$	3.235	3.300	3.365	V
	AP1117-5.0	$I_{OUT} = 10\text{mA}$, $T_J = 25^\circ\text{C}$, $6.5\text{V} \leq V_{IN} \leq 12\text{V}$	4.900	5.000	5.100	V
Line Regulation	AP1117-XXX	$I_O = 10\text{mA}$, $V_{OUT} + 1.5\text{V} < V_{IN} < 12\text{V}$, $T_J = 25^\circ\text{C}$			0.2	%
Load Regulation	AP1117-ADJ	$V_{IN} = 3.3\text{V}$, $V_{adj} = 0$, $0\text{mA} < I_O < 1\text{A}$, $T_J = 25^\circ\text{C}$ (Note 1,2)			1	%
	AP1117-1.5	$V_{IN} = 3\text{V}$, $0\text{mA} < I_O < 1\text{A}$, $T_J = 25^\circ\text{C}$ (Note 1,2)		12	15	mV
	AP1117-1.8	$V_{IN} = 3.3\text{V}$, $0\text{mA} < I_O < 1\text{A}$, $T_J = 25^\circ\text{C}$ (Note 1,2)		15	18	mV
	AP1117-1.9	$V_{IN} = 3.3\text{V}$, $0\text{mA} < I_O < 1\text{A}$, $T_J = 25^\circ\text{C}$ (Note 1,2)		16	19	mV
	AP1117-2.5	$V_{IN} = 4\text{V}$, $0\text{mA} < I_O < 1\text{A}$, $T_J = 25^\circ\text{C}$ (Note 1,2)		20	25	mV
	AP1117-3.3	$V_{IN} = 5\text{V}$, $0 \leq I_{OUT} \leq 1\text{A}$, $T_J = 25^\circ\text{C}$ (Note 1,2)		26	33	mV
	AP1117-5.0	$V_{IN} = 8\text{V}$, $0 \leq I_{OUT} \leq 1\text{A}$, $T_J = 25^\circ\text{C}$ (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	$I_{OUT} = 1\text{A}$, $\Delta V_{OUT} = 0.1\% V_{OUT}$		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	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	$F = 120\text{Hz}$, $C_{OUT} = 25\mu\text{F}$ 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 PowerDI™5 : Control Circuitry/Power Transistor			117 TBD		$^\circ\text{C/W}$
θ_{JC} Thermal Resistance Junction-to-Case	SOT-223 : Control Circuitry/Power Transistor PowerDI™5 : Control Circuitry/Power Transistor			15 TBD		$^\circ\text{C/W}$

Notes: 2. 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.

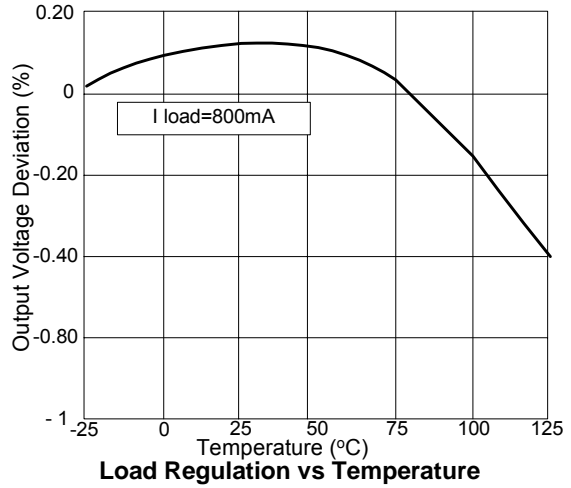
3. Line and load regulation are guaranteed up to the maximum power dissipation of 15W. Power dissipation is determined by the difference between input and output differential and the output current. Guaranteed maximum power dissipation will not be available over the full input/output range.

4. 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.

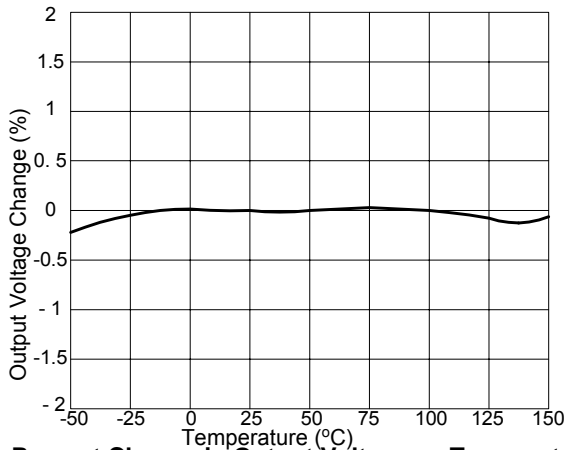
Typical Performance Characteristics



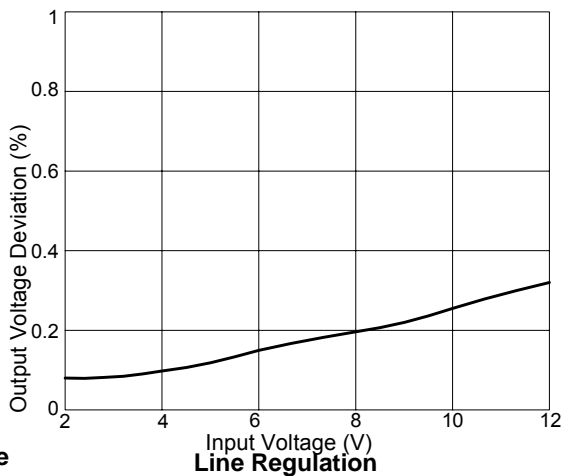
Dropout Voltage vs Output Current



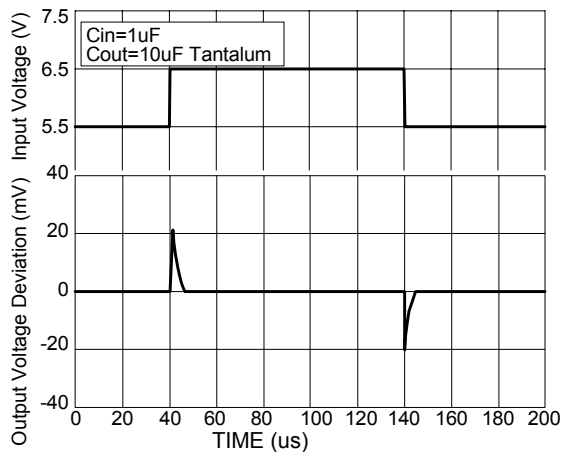
Load Regulation vs Temperature



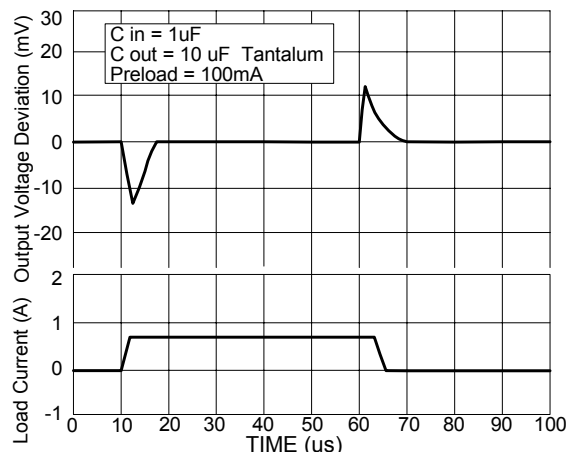
Percent Change in Output Voltage vs Temperature



Line Regulation



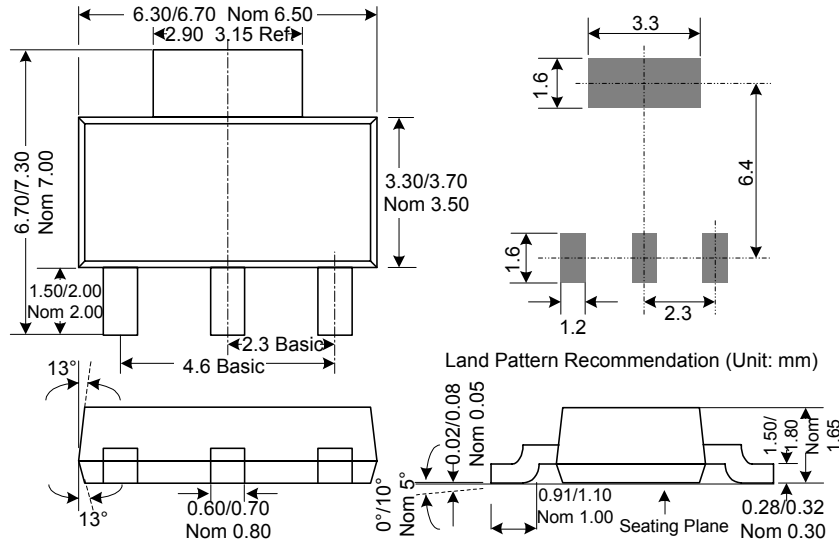
Line Transient Response



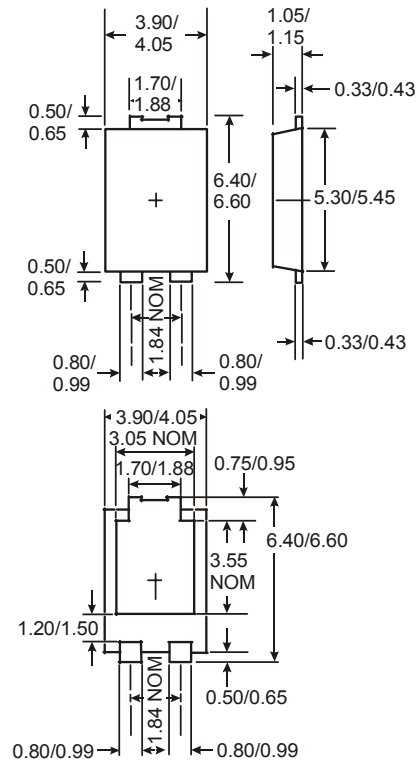
Load Transient Response

Package Diagrams (All Dimensions in mm)

(1) SOT-223



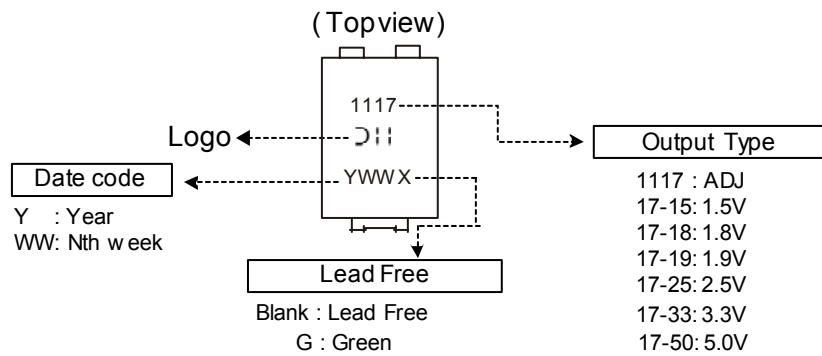
(2) PowerDI™5



Marking Information

(1) SOT-223

(2) PowerDI™5



Date Code Key

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Code	T	U	V	W	X	Y	Z	A	B	C	D	E

Marking Code Table

Device	Package (Note 5)	Marking Code	Date Code
AP1117SK	SOT-223	1117	YWW
AP1117SK15	SOT-223	17-15	YWW
AP1117SK18	SOT-223	17-18	YWW
AP1117SK19	SOT-223	17-19	YWW
AP1117SK25	SOT-223	17-25	YWW
AP1117SK33	SOT-223	17-33	YWW
AP1117SK50	SOT-223	17-50	YWW
AP1117PB	PowerDI™5	1117	YWW
AP1117PB15	PowerDI™5	17-15	YWW
AP1117PB18	PowerDI™5	17-18	YWW
AP1117PB19	PowerDI™5	17-19	YWW
AP1117PB25	PowerDI™5	17-25	YWW
AP1117PB33	PowerDI™5	17-33	YWW
AP1117PB50	PowerDI™5	17-50	YWW

Note: 5. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

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