

Descriptions

The S1117 series of positive fixed regulators are designed to provide 1A with higher efficiency than currently available devices. All internal circuitry is designed to operate down to 700mV input to output differential and the dropout voltage is fully specified as a function of load current. Dropout voltage of the device is 100mV at light loads and rising to 700mV at maximum output current. A second low current input is required to achieve this dropout. The S1117 can also be used as a single supply device.

Features

- Output Current of 1A
- 1.3V Maximum Dropout voltage at 1A Output Current
- 100% Thermal Limit Burn-In
- Fast Transient Response

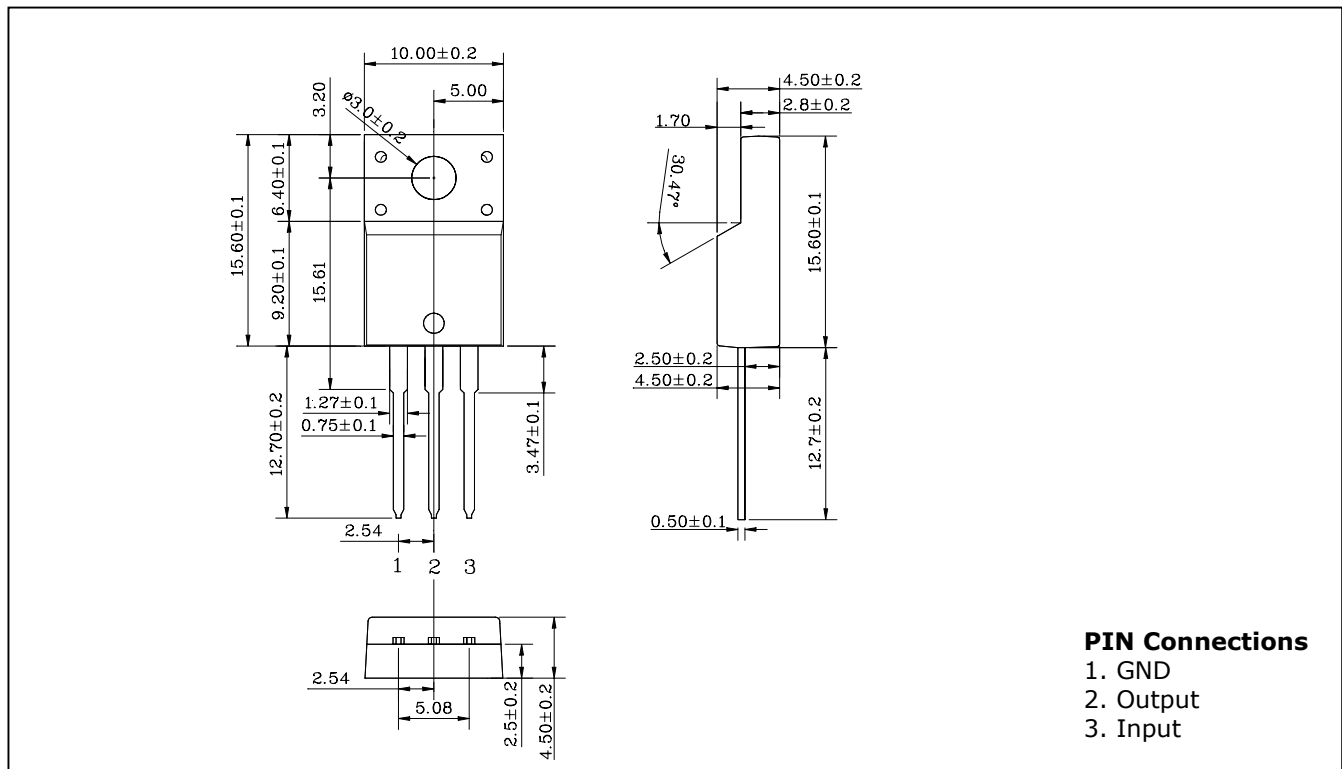
Ordering Information

Type NO.	Marking	Package Code
S1117xxPI	S1117□□PI	TO-220F

□□: Voltage Code (15:1.5V, 18V:1.8V, 25:2.5V, 285:2.85V, 33:3.3V, 50:5.0V)

Outline Dimensions

unit : mm



Absolute Maximum Ratings

Ta=25°C

Characteristic	Symbol	Ratings	Unit
Operating Input voltage	V _{IN}	V _{out} =1.5,1.8	16
		V _{out} = 2.5 2.8 3.3 5.0	20
Power Dissipation (Tc=25°C)	P _D	20.8	W
Power Dissipation (without Heatsink)	P _D	2.0	W
Operating Junction Temperature	T _{OPR}	-30 ~ 125	°C
Storage Temperature	T _{STG}	-55 ~ 150	°C

Electrical Characteristics

(T_j = 0 to 125°C, C_{in}=10uF, C_{out}=10uF unless otherwise specified.)

Characteristic	Symbol	Test Condition	S1117-15PI			Unit
			Min	Typ	Max	
Output Voltage	V _{OUT}	V _{IN} = (V _{out} +1.5V), I _{OUT} = 10mA, T _j = 25°C V _{IN} = (V _{out} +1.5V) to 12V I _{OUT} = 0 to 1000mA	1.47 1.44	1.5	1.53 1.56	V
Line Regulation	ΔV _{OUT}	(V _{out} +1.5V) ≤ V _{in} ≤ 12V, I _{OUT} =10mA	-	10	30	mV
Load Regulation	ΔV _{OUT}	(V _{IN} - V _{out})=2V, 10mA ≤ I _{OUT} ≤ 1A	-	10	30	mV
Quiescent Current	I _Q	V _{IN} = 11.5V, I _{OUT} =0mA	-	3.6	10	mA
Dropout Voltage	V _D	I _{OUT} = 1000mA	-	1.2	1.3	V
Ripple Rejection	RR	V _{IN} -V _{OUT} =3V, f=120Hz, I _{OUT} =1000mA	60	72	-	dB
Output Noise Voltage	eN	f=10 to 10KHz, T _j = 25°C	-	100	-	uV
Output Current	I _{OUT}	V _{IN} -V _{OUT} = 3V, T _j = 25°C	1000	1500	-	mA

* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

Electrical Characteristics

($T_j = 0$ to 125°C , $C_{in}=10\mu\text{F}$, $C_{out}=10\mu\text{F}$ unless otherwise specified.)

Characteristic	Symbol	Test Condition	S1117-18PI			Unit
			Min	Typ	Max	
Output Voltage	V_{OUT}	$V_{IN} = (V_{out}+1.5V)$, $I_{OUT} = 10\text{mA}$, $T_j = 25^\circ\text{C}$ $V_{IN} = (V_{out}+1.5V)$ to 12V $I_{OUT} = 0$ to 1000mA	1.764 1.728	1.8	1.836 1.872	V
Line Regulation	ΔV_{OUT}	$(V_{out}+1.5V) \leq V_{in} \leq 12\text{V}$, $I_{OUT}=10\text{mA}$	-	10	30	mV
Load Regulation	ΔV_{OUT}	$(V_{IN} - V_{out})=2\text{V}$, $10\text{mA} \leq I_{OUT} \leq 1\text{A}$	-	10	30	mV
Quiescent Current	I_Q	$V_{IN}= 11.8\text{V}$, $I_{OUT}=0\text{mA}$	-	4.2	10	mA
Dropout Voltage	V_D	$I_{OUT} = 1000\text{mA}$	--	1.2	1.3	V
Ripple Rejection	RR	$V_{IN}-V_{OUT}=3\text{V}$, $f=120\text{Hz}$, $I_{OUT}=1000\text{mA}$	60	72	-	dB
Output Noise Voltage	eN	$f=10$ to 10KHz , $T_j = 25^\circ\text{C}$	-	100	-	μV
Output Current	I_{OUT}	$V_{IN}-V_{OUT} = 3\text{V}$, $T_j = 25^\circ\text{C}$	1000	1500	-	mA

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Electrical Characteristics

($T_j = 0$ to 125°C , $C_{in}=10\mu\text{F}$, $C_{out}=10\mu\text{F}$ unless otherwise specified.)

Characteristic	Symbol	Test Condition	S1117-25PI			Unit
			Min	Typ	Max	
Output Voltage	V_{OUT}	$V_{IN} = (V_{out}+1.5V)$, $I_{OUT} = 10\text{mA}$, $T_j = 25^\circ\text{C}$ $V_{IN} = (V_{out}+1.5V)$ to 12V $I_{OUT} = 0$ to 1000mA	2.45 2.4	2.5	2.55 2.6	V
Line Regulation	ΔV_{OUT}	$(V_{out}+1.5V) \leq V_{in} \leq 12\text{V}$, $I_{OUT}=10\text{mA}$	-	10	30	mV
Load Regulation	ΔV_{OUT}	$(V_{IN} - V_{out})=2\text{V}$, $10\text{mA} \leq I_{OUT} \leq 1\text{A}$	-	10	30	mV
Quiescent Current	I_Q	$V_{IN}= 10\text{V}$, $I_{OUT}=0\text{mA}$	-	5.2	10	mA
Dropout Voltage	V_D	$I_{OUT} = 1000\text{mA}$	-	1.2	1.3	V
Ripple Rejection	RR	$V_{IN}-V_{OUT}=3\text{V}$, $f=120\text{Hz}$, $I_{OUT}=1000\text{mA}$	60	72	-	dB
Output Noise Voltage	eN	$f=10$ to 10KHz , $T_j = 25^\circ\text{C}$	-	100	-	μV
Output Current	I_{OUT}	$V_{IN}-V_{OUT} = 3\text{V}$, $T_j = 25^\circ\text{C}$	1000	1500	-	mA

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Thermal effects must be taken into separately.

Electrical Characteristics

($T_j = 0$ to 125°C , $C_{in}=10\mu\text{F}$, $C_{out}=10\mu\text{F}$ unless otherwise specified.)

Characteristic	Symbol	Test Condition	S1117-285PI			Unit
			Min	Typ	Max	
Output Voltage	V_{OUT}	$V_{IN} = (V_{out}+1.5V)$, $I_{OUT} = 10\text{mA}$, $T_j = 25^\circ\text{C}$ $V_{IN} = (V_{out}+1.5V)$ to 12V $I_{OUT} = 0$ to 1000mA	2.793 2.736	2.85	2.907 2.964	V
Line Regulation	ΔV_{OUT}	$(V_{out}+1.5V) \leq V_{in} \leq 12\text{V}$, $I_{OUT}=10\text{mA}$	-	10	30	mV
Load Regulation	ΔV_{OUT}	$(V_{IN} - V_{out})=2\text{V}$, $10\text{mA} \leq I_{OUT} \leq 1\text{A}$	-	10	30	mV
Quiescent Current	I_Q	$V_{IN}= 10\text{V}$, $I_{OUT}=0\text{mA}$	-	5.5	10	mA
Dropout Voltage	V_D	$I_{OUT} = 1000\text{mA}$	-	1.2	1.3	V
Ripple Rejection	RR	$V_{IN}-V_{OUT}=3\text{V}$, $f=120\text{Hz}$, $I_{OUT}=1000\text{mA}$	60	72	-	dB
Output Noise Voltage	eN	$f=10$ to 10KHz , $T_j = 25^\circ\text{C}$	-	100	-	μV
Output Current	I_{OUT}	$V_{IN}-V_{OUT} = 3\text{V}$, $T_j = 25^\circ\text{C}$	1000	1500	-	mA

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Thermal effects must be taken into separately.

Electrical Characteristics

($T_j = 0$ to 125°C , $C_{in}=10\mu\text{F}$, $C_{out}=10\mu\text{F}$ unless otherwise specified.)

Characteristic	Symbol	Test Condition	S1117-33PI			Unit
			Min	Typ	Max	
Output Voltage	V_{OUT}	$V_{IN} = (V_{out}+1.5V)$, $I_{OUT} = 10\text{mA}$, $T_j = 25^\circ\text{C}$ $V_{IN} = (V_{out}+1.5V)$ to 12V $I_{OUT} = 0$ to 1000mA	3.234 3.168	3.3	3.366 3.432	V
Line Regulation	ΔV_{OUT}	$(V_{out}+1.5V) \leq V_{in} \leq 12\text{V}$, $I_{OUT}=10\text{mA}$	-	10	30	mV
Load Regulation	ΔV_{OUT}	$(V_{IN} - V_{out})=2\text{V}$, $10\text{mA} \leq I_{OUT} \leq 1\text{A}$	-	10	30	mV
Quiescent Current	I_Q	$V_{IN}= 15\text{V}$, $I_{OUT}=0\text{mA}$	-	5.0	10	mA
Dropout Voltage	V_D	$I_{OUT} = 1000\text{mA}$	-	1.2	1.3	V
Ripple Rejection	RR	$V_{IN}-V_{OUT}=3\text{V}$, $f=120\text{Hz}$, $I_{OUT}=1000\text{mA}$	60	72	-	dB
Output Noise Voltage	eN	$f=10$ to 10KHz , $T_j = 25^\circ\text{C}$	-	100	-	μV
Output Current	I_{OUT}	$V_{IN}-V_{OUT} = 3\text{V}$, $T_j = 25^\circ\text{C}$	1000	1500	-	mA

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Electrical Characteristics

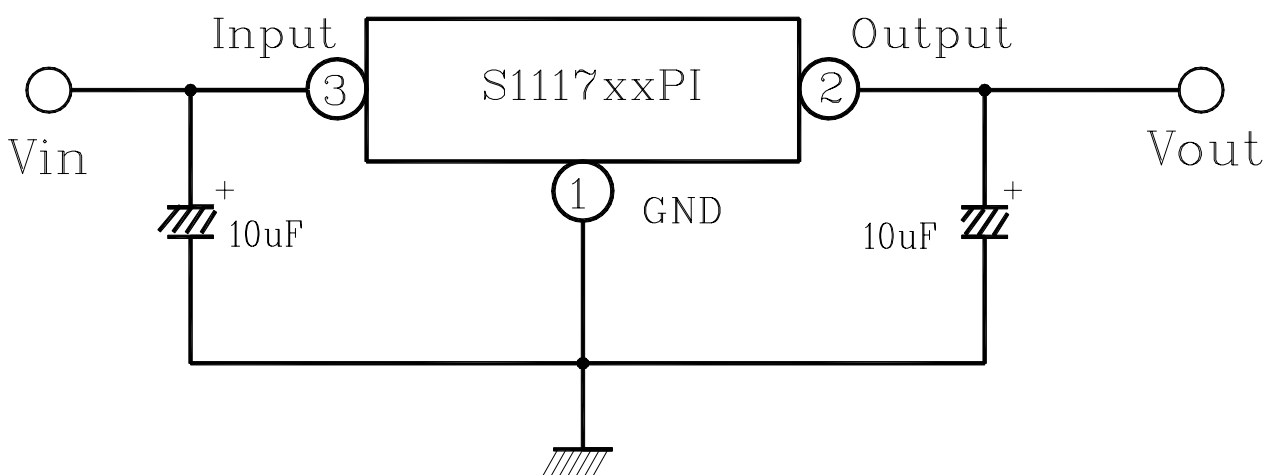
($T_j = 0$ to 125°C , $C_{in}=10\mu\text{F}$, $C_{out}=10\mu\text{F}$ unless otherwise specified.)

Characteristic	Symbol	Test Condition	S1117-50PI			Unit
			Min	Typ	Max	
Output Voltage	V_{OUT}	$V_{IN} = (V_{out}+1.5V)$, $I_{OUT} = 10\text{mA}$, $T_j = 25^\circ\text{C}$ $V_{IN} = (V_{out}+1.5V)$ to 12V $I_{OUT} = 0$ to 1000mA	4.9 4.8	5.0	5.1 5.2	V
Line Regulation	ΔV_{OUT}	$(V_{out}+1.5V) \leq V_{in} \leq 12\text{V}$, $I_{OUT}=10\text{mA}$	-	10	30	mV
Load Regulation	ΔV_{OUT}	$(V_{IN} - V_{out})=2\text{V}$, $10\text{mA} \leq I_{OUT} \leq 1\text{A}$	-	10	30	mV
Quiescent Current	I_Q	$V_{IN} = 15\text{V}$, $I_{OUT} = 0\text{mA}$	-	5.0	10	mA
Dropout Voltage	V_D	$I_{OUT} = 1000\text{mA}$	-	1.2	1.3	V
Ripple Rejection	RR	$V_{IN}-V_{OUT}=3\text{V}$, $f=120\text{Hz}$, $I_{OUT}=1\text{A}$	60	72	-	dB
Output Noise Voltage	eN	$f=10$ to 10KHz , $T_j = 25^\circ\text{C}$	-	100	-	μV
Output Current	I_{OUT}	$V_{IN}-V_{OUT} = 3\text{V}$, $T_j = 25^\circ\text{C}$	1000	1500	-	mA

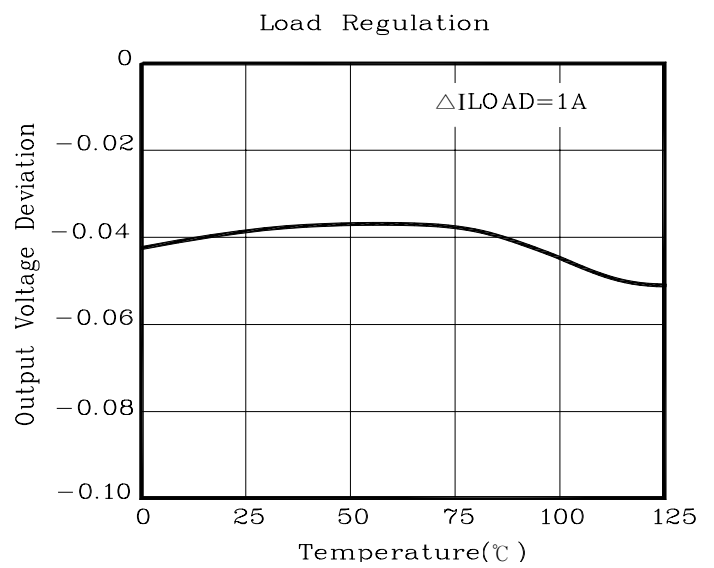
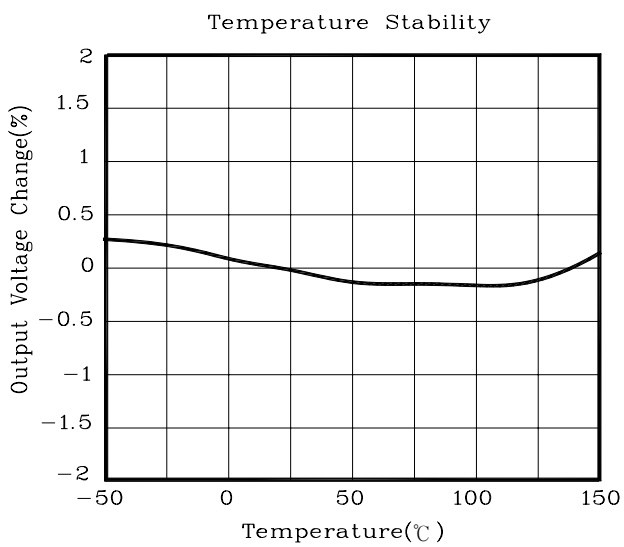
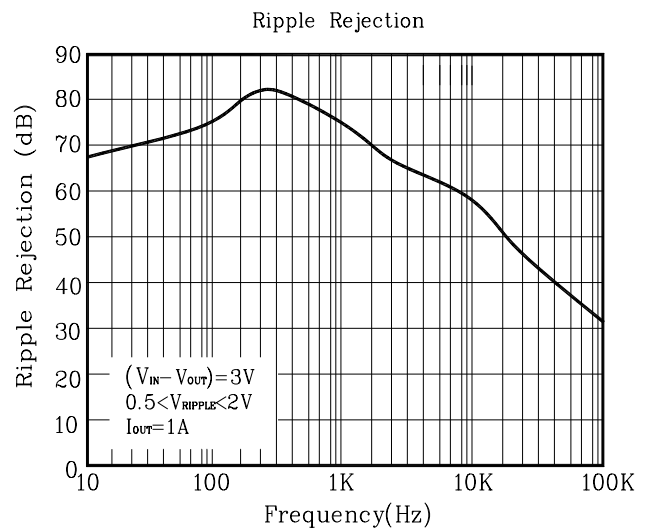
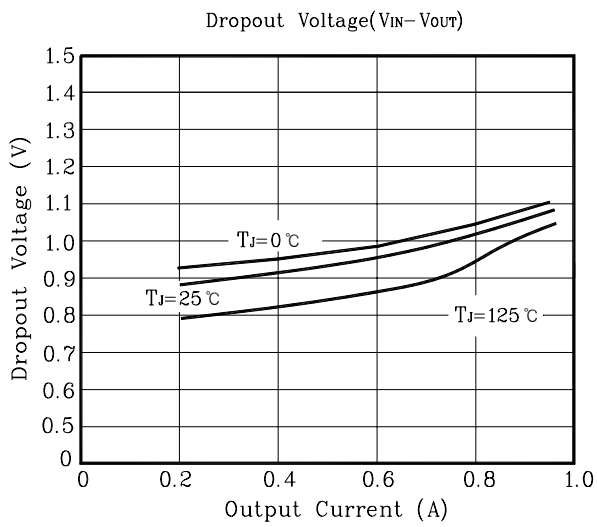
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■ Test circuit



Electrical Characteristic Curves



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