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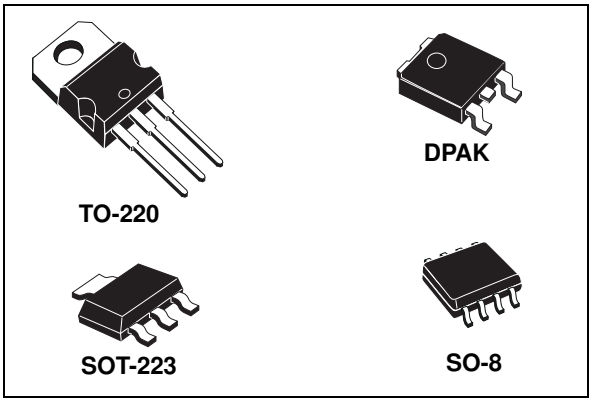
LD1117

Adjustable and fixed low drop positive voltage regulator

Datasheet - production data



Features

- Low dropout voltage (1 V typ.)
- 2.85 V device performances are suitable for SCSI-2 active termination
- Output current up to 800 mA
- Fixed output voltage of: 1.2 V, 1.8 V, 2.5 V, 3.3 V, 5.0 V
- Adjustable version availability (V_{REF} = 1.25 V)
- Internal current and thermal limit
- Available in ± 1 % (at 25 °C) and 2 % in full temperature range
- Supply voltage rejection: 75 dB (typ.)

Description

The LD1117 is a low drop voltage regulator able to provide up to 800 mA of output current, available even in adjustable version (V_{REF} = 1.25 V). Concerning fixed versions, are offered the following output voltages: 1.2 V, 1.8 V, 2.5 V, 2.85 V, 3.3 V and 5.0 V. The device is supplied in: SOT-223, DPAK, SO-8 and TO-220. The SOT-223 and DPAK surface mount packages optimize the thermal characteristics even offering a relevant space saving effect. High efficiency is assured by NPN pass transistor. In fact in this case, unlike than PNP one, the quiescent current flows mostly into the load. Only a very common 10 µF minimum capacitor is needed for stability. On chip trimming allows the regulator to reach a very tight output voltage tolerance, within ± 1 % at 25 °C. The adjustable LD1117 is pin to pin compatible with the other standard. Adjustable voltage regulators maintaining the better performances in terms of drop and tolerance.

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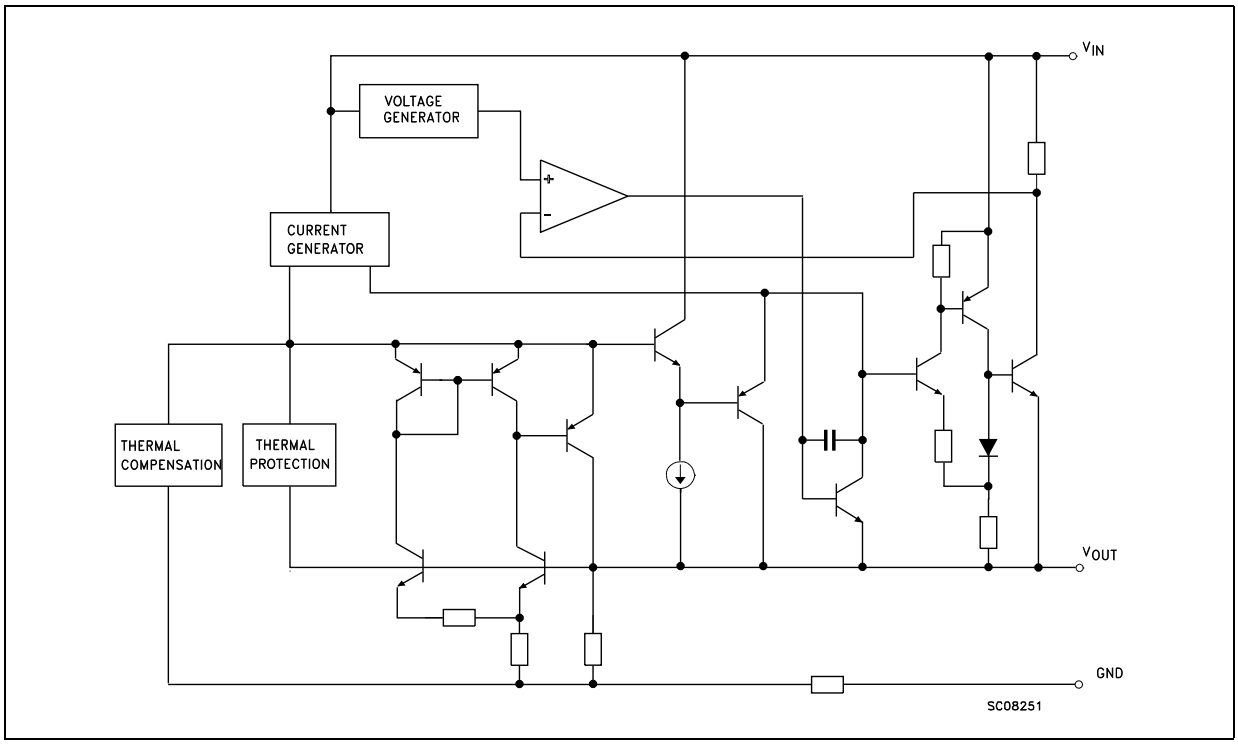
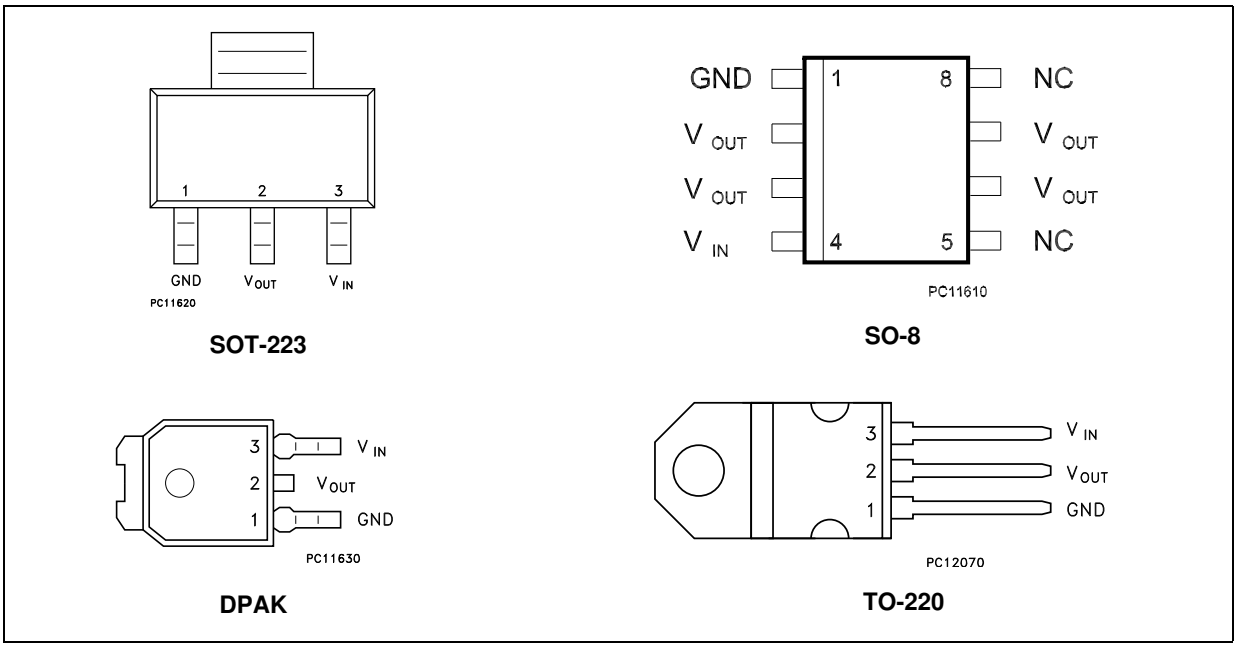
1 Diagram

Figure 1. Block diagram



2 Pin configuration

Figure 2. Pin connections (top view)



Note: The TAB is connected to the V_{OUT}.

3 Maximum ratings

Table 1. Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{IN} (1)	DC input voltage		15	V
P_{TOT}	Power dissipation		12	W
T_{STG}	Storage temperature range		-40 to +150	°C
T_{OP}	Operating junction temperature range	for C version	-40 to +125	°C
		for standard version	0 to +125	°C

1. Absolute maximum rating of V_{IN} = 18 V, when I_{OUT} is lower than 20 mA.

Table 2. Thermal data

Symbol	Parameter	SOT-223	SO-8	DPAK	TO-220	Unit
R_{thJC}	Thermal resistance junction-case	15	20	8	5	°C/W
R_{thJA}	Thermal resistance junction-ambient	110	55	100	50	°C/W

4 Schematic application

Figure 3. Application circuit (for 1.2 V)

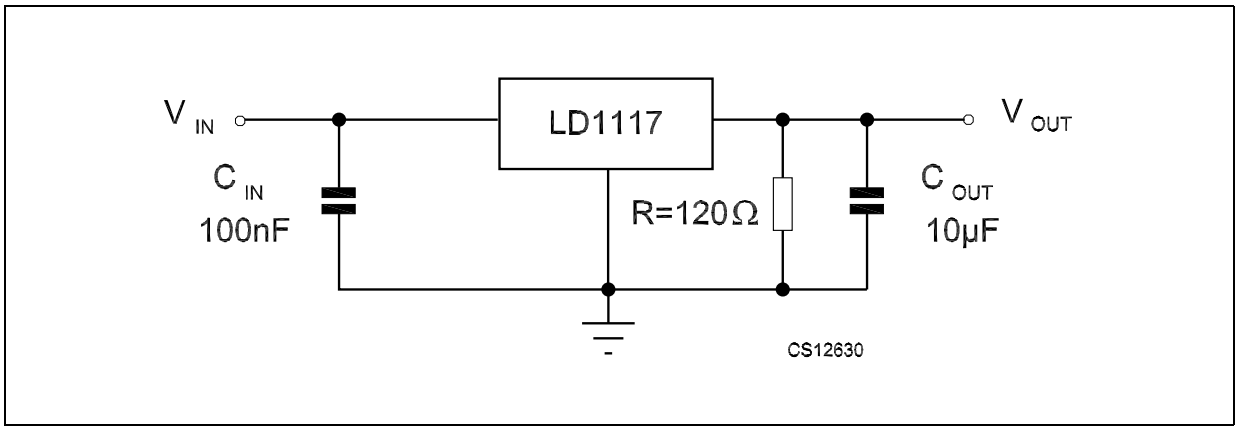
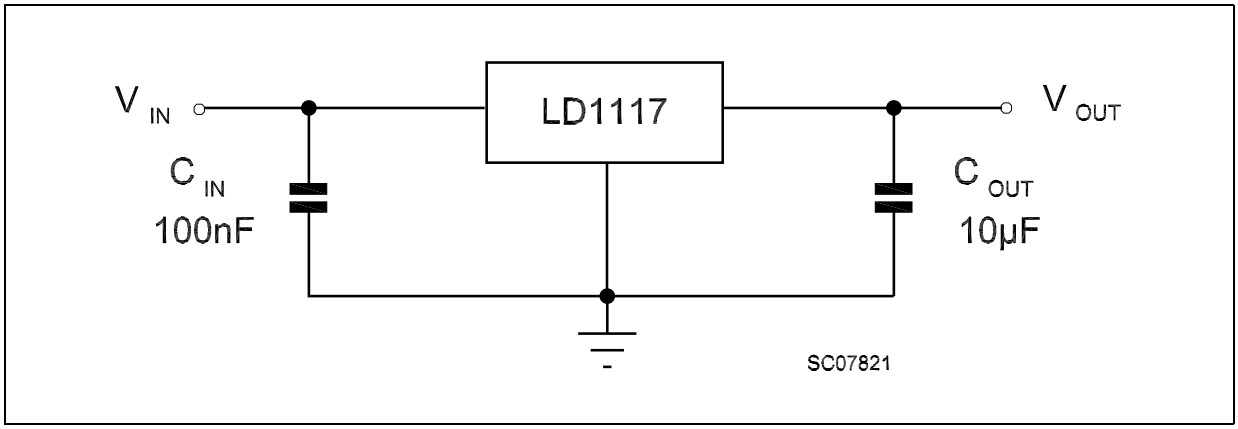


Figure 4. Application circuit (for other fixed output voltages)



5 Electrical characteristics

Refer to the test circuits, T_J = 0 to 125 °C, C_O = 10 µF, R = 120 Ω between GND and OUT pins, unless otherwise specified.

Table 3. Electrical characteristics of LD1117#12

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_O	Output voltage	V_{in} = 3.2 V, I_O = 10 mA, T_J = 25 °C	1.188	1.20	1.212	V
V_O	Output voltage	I_O = 10 to 800 mA V_{in} - V_O = 1.4 to 10 V	1.140	1.20	1.260	V
ΔV_O	Line regulation	V_{in} - V_O = 1.5 to 13.75 V, I_O = 10 mA		0.035	0.2	%
ΔV_O	Load regulation	V_{in} - V_O = 3 V, I_O = 10 to 800 mA		0.1	0.4	%
ΔV_O	Temperature stability			0.5		%
ΔV_O	Long term stability	1000 hrs, T_J = 125 °C		0.3		%
V_{in}	Operating input voltage				15	V
I_{adj}	Adjustment pin current	$V_{in} \leq$ 15 V		60	120	µA
ΔI_{adj}	Adjustment pin current change	V_{in} - V_O = 1.4 to 10 V I_O = 10 to 800 mA		1	5	µA
$I_{O(min)}$	Minimum load current	V_{in} = 15 V		2	5	mA
I_O	Output current	V_{in} - V_O = 5 V, T_J = 25 °C	800	950	1300	mA
eN	Output noise (%V_O)	B = 10 Hz to 10 kHz, T_J = 25 °C		0.003		%
SVR	Supply voltage rejection	I_O = 40 mA, f = 120 Hz, T_J = 25 °C V_{in} - V_O = 3 V, V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout voltage	I_O = 100 mA		1	1.1	V
		I_O = 500 mA		1.05	1.15	
		I_O = 800 mA		1.10	1.2	
	Thermal regulation	T_a = 25 °C, 30 ms Pulse		0.01	0.1	%/W

Refer to the test circuits, T_J = 0 to 125 °C, C_O = 10 µF, unless otherwise specified.

Table 4. Electrical characteristics of LD1117#18

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_O	Output voltage	V_{in} = 3.8 V, I_O = 10 mA, T_J = 25 °C	1.78	1.8	1.82	V
V_O	Output voltage	I_O = 0 to 800 mA, V_{in} = 3.3 to 8 V	1.76		1.84	V
ΔV_O	Line regulation	V_{in} = 3.3 to 8 V, I_O = 0 mA		1	6	mV
ΔV_O	Load regulation	V_{in} = 3.3 V, I_O = 0 to 800 mA		1	10	mV
ΔV_O	Temperature stability			0.5		%
ΔV_O	Long term stability	1000 hrs, T_J = 125 °C		0.3		%
V_{in}	Operating input voltage	I_O = 100 mA			15	V
I_d	Quiescent current	$V_{in} \leq 8$ V		5	10	mA
I_O	Output current	V_{in} = 6.8 V, T_J = 25 °C	800	950	1300	mA
eN	Output noise voltage	B = 10 Hz to 10 kHz, T_J = 25 °C		100		µV
SVR	Supply voltage rejection	I_O = 40 mA, f = 120 Hz, T_J = 25 °C V_{in} = 5.5 V, V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout voltage	I_O = 100 mA		1	1.1	V
		I_O = 500 mA		1.05	1.15	
		I_O = 800 mA		1.10	1.2	
	Thermal regulation	T_a = 25 °C, 30 ms Pulse		0.01	0.1	%/W

Refer to the test circuits, T_J = 0 to 125 °C, C_O = 10 µF, unless otherwise specified.

Table 5. Electrical characteristics of LD1117#25

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_O	Output voltage	V_{in} = 4.5 V, I_O = 10 mA, T_J = 25 °C	2.475	2.5	2.525	V
V_O	Output voltage	I_O = 0 to 800 mA, V_{in} = 3.9 to 10 V	2.45		2.55	V
ΔV_O	Line regulation	V_{in} = 3.9 to 10 V, I_O = 0 mA		1	6	mV
ΔV_O	Load regulation	V_{in} = 3.9 V, I_O = 0 to 800 mA		1	10	mV
ΔV_O	Temperature stability			0.5		%
ΔV_O	Long term stability	1000 hrs, T_J = 125 °C		0.3		%
V_{in}	Operating input voltage	I_O = 100 mA			15	V
I_d	Quiescent current	$V_{in} \leq 10$ V		5	10	mA
I_O	Output current	V_{in} = 7.5 V T_J = 25 °C	800	950	1300	mA
eN	Output noise voltage	B = 10 Hz to 10 kHz, T_J = 25 °C		100		µV
SVR	Supply voltage rejection	I_O = 40 mA, f = 120 Hz, T_J = 25 °C V_{in} = 5.5 V, V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout voltage	I_O = 100 mA		1	1.1	V
		I_O = 500 mA		1.05	1.15	
		I_O = 800 mA		1.10	1.2	
	Thermal regulation	T_a = 25 °C, 30 ms Pulse		0.01	0.1	%/W

Refer to the test circuits, T_J = 0 to 125 °C, C_O = 10 µF, unless otherwise specified.

Table 6. Electrical characteristics of LD1117#33

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_O	Output voltage	V_{in} = 5.3 V, I_O = 10 mA, T_J = 25 °C	3.267	3.3	3.333	V
V_O	Output voltage	I_O = 0 to 800 mA, V_{in} = 4.75 to 10 V	3.235		3.365	V
ΔV_O	Line regulation	V_{in} = 4.75 to 15 V, I_O = 0 mA		1	6	mV
ΔV_O	Load regulation	V_{in} = 4.75 V, I_O = 0 to 800 mA		1	10	mV
ΔV_O	Temperature stability			0.5		%
ΔV_O	Long term stability	1000 hrs, T_J = 125 °C		0.3		%
V_{in}	Operating input voltage	I_O = 100 mA			15	V
I_d	Quiescent current	$V_{in} \leq 15$ V		5	10	mA
I_O	Output current	V_{in} = 8.3 V, T_J = 25 °C	800	950	1300	mA
eN	Output noise voltage	B = 10 Hz to 10 kHz, T_J = 25 °C		100		µV
SVR	Supply voltage rejection	I_O = 40 mA, f = 120 Hz, T_J = 25 °C V_{in} = 6.3 V, V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout voltage	I_O = 100 mA		1	1.1	V
		I_O = 500 mA		1.05	1.15	
		I_O = 800 mA		1.10	1.2	
	Thermal regulation	T_a = 25 °C, 30 ms Pulse		0.01	0.1	%/W

Refer to the test circuits, T_J = 0 to 125 °C, C_O = 10 µF, unless otherwise specified.

Table 7. Electrical characteristics of LD1117#50

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_O	Output voltage	V_{in} = 7 V, I_O = 10 mA, T_J = 25 °C	4.95	5	5.05	V
V_O	Output voltage	I_O = 0 to 800 mA, V_{in} = 6.5 to 15 V	4.9		5.1	V
ΔV_O	Line regulation	V_{in} = 6.5 to 15 V, I_O = 0 mA		1	10	mV
ΔV_O	Load regulation	V_{in} = 6.5 V, I_O = 0 to 800 mA		1	15	mV
ΔV_O	Temperature stability			0.5		%
ΔV_O	Long term stability	1000 hrs, T_J = 125 °C		0.3		%
V_{in}	Operating input voltage	I_O = 100 mA			15	V
I_d	Quiescent current	$V_{in} \leq 15$ V		5	10	mA
I_O	Output current	V_{in} = 10 V, T_J = 25 °C	800	950	1300	mA
eN	Output noise voltage	B = 10 Hz to 10 kHz, T_J = 25 °C		100		µV
SVR	Supply voltage rejection	I_O = 40 mA, f = 120 Hz, T_J = 25 °C V_{in} = 8 V, V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout voltage	I_O = 100 mA		1	1.1	V
		I_O = 500 mA		1.05	1.15	
		I_O = 800 mA		1.10	1.2	
	Thermal regulation	T_a = 25 °C, 30 ms Pulse		0.01	0.1	%/W

Refer to the test circuits, T_J = 0 to 125 °C, C_O = 10 µF, unless otherwise specified.

Table 8. Electrical characteristics of LD1117 (adjustable)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_{ref}	Reference voltage	V_{in} - V_O = 2 V, I_O = 10 mA, T_J = 25 °C	1.238	1.25	1.262	V
V_{ref}	Reference voltage	I_O = 10 to 800 mA, V_{in} - V_O = 1.4 to 10 V	1.225		1.275	V
ΔV_O	Line regulation	V_{in} - V_O = 1.5 to 13.75 V, I_O = 10 mA		0.035	0.2	%
ΔV_O	Load regulation	V_{in} - V_O = 3 V, I_O = 10 to 800 mA		0.1	0.4	%
ΔV_O	Temperature stability			0.5		%
ΔV_O	Long term stability	1000 hrs, T_J = 125 °C		0.3		%
V_{in}	Operating input voltage				15	V
I_{adj}	Adjustment pin current	$V_{in} \leq$ 15 V		60	120	µA
ΔI_{adj}	Adjustment pin current change	V_{in} - V_O = 1.4 to 10 V, I_O = 10 to 800 mA		1	5	µA
$I_{O(min)}$	Minimum load current	V_{in} = 15 V		2	5	mA
I_O	Output current	V_{in} - V_O = 5 V, T_J = 25 °C	800	950	1300	mA
eN	Output noise (%V_O)	B = 10 Hz to 10 kHz, T_J = 25 °C		0.003		%
SVR	Supply voltage rejection	I_O = 40 mA, f = 120 Hz, T_J = 25 °C V_{in} - V_O = 3 V, V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout voltage	I_O = 100 mA		1	1.1	V
		I_O = 500 mA		1.05	1.15	
		I_O = 800 mA		1.10	1.2	
	Thermal regulation	T_a = 25 °C, 30 ms Pulse		0.01	0.1	%/W

Refer to the test circuits, T_J = -40 to 125 °C, C_O = 10 µF, R = 120 Ω between GND and OUT pins, unless otherwise specified.

Table 9. Electrical characteristics of LD1117#12C

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_O	Output voltage	V_{in} - V_O = 2 V, I_O = 10 mA, T_J = 25 °C	1.176	1.20	1.224	V
V_O	Output voltage	I_O = 10 to 800 mA, V_{in} - V_O = 1.4 to 10 V	1.120	1.20	1.280	V
ΔV_O	Line regulation	V_{in} - V_O = 1.5 to 13.75 V, I_O = 10 mA			1	%
ΔV_O	Load regulation	V_{in} - V_O = 3 V, I_O = 10 to 800 mA			1	%
ΔV_O	Temperature stability			0.5		%
ΔV_O	Long term stability	1000 hrs, T_J = 125 °C		0.3		%
V_{in}	Operating input voltage				15	V
I_{adj}	Adjustment pin current	$V_{in} \leq$ 15 V		60	120	µA
ΔI_{adj}	Adjustment pin current change	V_{in} - V_O = 1.4 to 10 V I_O = 10 to 800 mA		1	5	µA
$I_{O(min)}$	Minimum load current	V_{in} = 15 V		2	5	mA
I_O	Output current	V_{in} - V_O = 5 V, T_J = 25 °C	800	950	1300	mA
eN	Output noise (%V_O)	B = 10 Hz to 10 kHz, T_J = 25 °C		0.003		%
SVR	Supply voltage rejection	I_O = 40 mA, f = 120 Hz, T_J = 25 °C V_{in} - V_O = 3 V, V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout voltage	I_O = 100 mA, T_J = 0 to 125 °C		1	1.1	V
		I_O = 500 mA, T_J = 0 to 125 °C		1.05	1.2	
		I_O = 800 mA, T_J = 0 to 125 °C		1.10	1.3	
	Thermal regulation	T_a = 25 °C, 30 ms Pulse		0.01	0.1	%/W

Refer to the test circuits, T_J = -40 to 125 °C, C_O = 10 µF, unless otherwise specified.

Table 10. Electrical characteristics of LD1117#18C

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_O	Output voltage	V_{in} = 3.8 V, I_O = 10 mA, T_J = 25 °C	1.76	1.8	1.84	V
V_O	Output voltage	I_O = 0 to 800 mA, V_{in} = 3.9 to 10 V	1.73		1.87	V
ΔV_O	Line regulation	V_{in} = 3.3 to 8 V, I_O = 0 mA		1	30	mV
ΔV_O	Load regulation	V_{in} = 3.3 V, I_O = 0 to 800 mA		1	30	mV
ΔV_O	Temperature stability			0.5		%
ΔV_O	Long term stability	1000 hrs, T_J = 125 °C		0.3		%
V_{in}	Operating input voltage	I_O = 100 mA			15	V
I_d	Quiescent current	$V_{in} \leq 8$ V		5	10	mA
I_O	Output current	V_{in} = 6.8 V T_J = 25 °C	800	950	1300	mA
eN	Output noise voltage	B = 10 Hz to 10 kHz, T_J = 25 °C		100		µV
SVR	Supply voltage rejection	I_O = 40 mA, f = 120 Hz, T_J = 25 °C V_{in} = 5.5 V, V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout voltage	I_O = 100 mA, T_J = 0 to 125 °C		1	1.1	V
		I_O = 500 mA, T_J = 0 to 125 °C		1.05	1.15	
		I_O = 800 mA, T_J = 0 to 125 °C		1.10	1.2	
V_d	Dropout voltage	I_O = 100 mA			1.1	V
		I_O = 500 mA			1.2	
		I_O = 800 mA			1.3	
	Thermal regulation	T_a = 25 °C, 30 ms Pulse		0.01	0.1	%/W

Refer to the test circuits, T_J = -40 to 125 °C, C_O = 10 µF, unless otherwise specified.

Table 11. Electrical characteristics of LD1117#25C

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_O	Output voltage	V_{in} = 4.5 V, I_O = 10 mA, T_J = 25 °C	2.45	2.5	2.55	V
V_O	Output voltage	I_O = 0 to 800 mA, V_{in} = 3.9 to 10 V	2.4		2.6	V
ΔV_O	Line regulation	V_{in} = 3.9 to 10 V, I_O = 0 mA		1	30	mV
ΔV_O	Load regulation	V_{in} = 3.9 V, I_O = 0 to 800 mA		1	30	mV
ΔV_O	Temperature stability			0.5		%
ΔV_O	Long term stability	1000 hrs, T_J = 125 °C		0.3		%
V_{in}	Operating input voltage	I_O = 100 mA			15	V
I_d	Quiescent current	$V_{in} \leq 10$ V		5	10	mA
I_O	Output current	V_{in} = 7.5 V T_J = 25 °C	800	950	1300	mA
eN	Output noise voltage	B = 10 Hz to 10 kHz, T_J = 25 °C		100		µV
SVR	Supply voltage rejection	I_O = 40 mA, f = 120 Hz, T_J = 25 °C V_{in} = 5.5 V, V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout voltage	I_O = 100 mA, T_J = 0 to 125 °C		1	1.1	V
		I_O = 500 mA, T_J = 0 to 125 °C		1.05	1.15	
		I_O = 800 mA, T_J = 0 to 125 °C		1.10	1.2	
V_d	Dropout voltage	I_O = 100 mA			1.1	V
		I_O = 500 mA			1.2	
		I_O = 800 mA			1.3	
	Thermal regulation	T_a = 25 °C, 30 ms Pulse		0.01	0.1	%/W

Refer to the test circuits, T_J = -40 to 125 °C, C_O = 10 µF, unless otherwise specified.

Table 12. Electrical characteristics of LD1117#33C

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_O	Output voltage	V_{in} = 5.3 V, I_O = 10 mA, T_J = 25 °C	3.24	3.3	3.36	V
V_O	Output voltage	I_O = 0 to 800 mA, V_{in} = 4.75 to 10 V	3.16		3.44	V
ΔV_O	Line regulation	V_{in} = 4.75 to 15 V, I_O = 0 mA		1	30	mV
ΔV_O	Load regulation	V_{in} = 4.75 V, I_O = 0 to 800 mA		1	30	mV
ΔV_O	Temperature stability			0.5		%
ΔV_O	Long term stability	1000 hrs, T_J = 125 °C		0.3		%
V_{in}	Operating input voltage	I_O = 100 mA			15	V
I_d	Quiescent current	$V_{in} \leq$ 15 V		5	10	mA
I_O	Output current	V_{in} = 8.3 V, T_J = 25 °C	800	950	1300	mA
eN	Output noise voltage	B = 10 Hz to 10 kHz, T_J = 25 °C		100		µV
SVR	Supply voltage rejection	I_O = 40 mA, f = 120 Hz, T_J = 25 °C V_{in} = 6.3 V, V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout voltage	I_O = 100 mA, T_J = 0 to 125 °C		1	1.1	V
		I_O = 500 mA, T_J = 0 to 125 °C		1.05	1.15	
		I_O = 800 mA, T_J = 0 to 125 °C		1.10	1.2	
V_d	Dropout voltage	I_O = 100 mA			1.1	V
		I_O = 500 mA			1.2	
		I_O = 800 mA			1.3	
	Thermal regulation	T_a = 25 °C, 30 ms Pulse		0.01	0.1	%/W

Refer to the test circuits, T_J = -40 to 125 °C, C_O = 10 µF, unless otherwise specified.

Table 13. Electrical characteristics of LD1117#50C

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_O	Output voltage	V_{in} = 7 V, I_O = 10 mA, T_J = 25 °C	4.9	5	5.1	V
V_O	Output voltage	I_O = 0 to 800 mA, V_{in} = 6.5 to 15 V	4.8		5.2	V
ΔV_O	Line regulation	V_{in} = 6.5 to 15 V, I_O = 0 mA		1	50	mV
ΔV_O	Load regulation	V_{in} = 6.5 V, I_O = 0 to 800 mA		1	50	mV
ΔV_O	Temperature stability			0.5		%
ΔV_O	Long term stability	1000 hrs, T_J = 125 °C		0.3		%
V_{in}	Operating input voltage	I_O = 100 mA			15	V
I_d	Quiescent current	$V_{in} \leq 15$ V		5	10	mA
I_O	Output current	V_{in} = 10 V, T_J = 25 °C	800	950	1300	mA
eN	Output noise voltage	B = 10 Hz to 10 kHz, T_J = 25 °C		100		µV
SVR	Supply voltage rejection	I_O = 40 mA, f = 120 Hz, T_J = 25 °C V_{in} = 8 V, V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout voltage	I_O = 100 mA, T_J = 0 to 125 °C		1	1.1	V
		I_O = 500 mA, T_J = 0 to 125 °C		1.05	1.15	
		I_O = 800 mA, T_J = 0 to 125 °C		1.10	1.2	
V_d	Dropout voltage	I_O = 100 mA			1.1	V
		I_O = 500 mA			1.2	
		I_O = 800 mA			1.3	
	Thermal regulation	T_a = 25 °C, 30 ms Pulse		0.01	0.1	%/W

Refer to the test circuits, T_J = -40 to 125 °C, C_O = 10 µF, unless otherwise specified.

Table 14. Electrical characteristics of LD1117C (adjustable)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_{ref}	Reference voltage	V_{in} - V_O = 2 V, I_O = 10 mA, T_J = 25 °C	1.225	1.25	1.275	V
V_{ref}	Reference voltage	I_O = 10 to 800 mA, V_{in} - V_O= 1.4 to 10 V	1.2		1.3	V
ΔV_O	Line regulation	V_{in} - V_O = 1.5 to 13.75 V, I_O = 10 mA			1	%
ΔV_O	Load regulation	V_{in} - V_O = 3 V, I_O = 10 to 800 mA			1	%
ΔV_O	Temperature stability			0.5		%
ΔV_O	Long term stability	1000 hrs, T_J = 125 °C		0.3		%
V_{in}	Operating input voltage				15	V
I_{adj}	Adjustment pin current	$V_{in} \leq$ 15 V		60	120	µA
ΔI_{adj}	Adjustment pin current change	V_{in} - V_O = 1.4 to 10 V, I_O = 10 to 800 mA		1	10	µA
$I_{O(min)}$	Minimum load current	V_{in} = 15 V		2	5	mA
I_O	Output current	V_{in} - V_O = 5 V, T_J = 25 °C	800	950	1300	mA
eN	Output noise (%V_O)	B = 10 Hz to 10 kHz, T_J = 25 °C		0.003		%
SVR	Supply voltage rejection	I_O = 40 mA, f = 120 Hz, T_J = 25 °C V_{in} - V_O = 3 V, V_{ripple} = 1 V_{PP}	60	75		dB
V_d	Dropout voltage	I_O = 100 mA, T_J = 0 to 125 °C		1	1.1	V
		I_O = 500 mA, T_J = 0 to 125 °C		1.05	1.15	
		I_O = 800 mA, T_J = 0 to 125 °C		1.10	1.2	
V_d	Dropout voltage	I_O = 100 mA			1.1	V
		I_O = 500 mA			1.2	
		I_O = 800 mA			1.3	
	Thermal regulation	T_a = 25 °C, 30 ms Pulse		0.01	0.1	%/W

6 Typical application

Figure 5. Negative supply

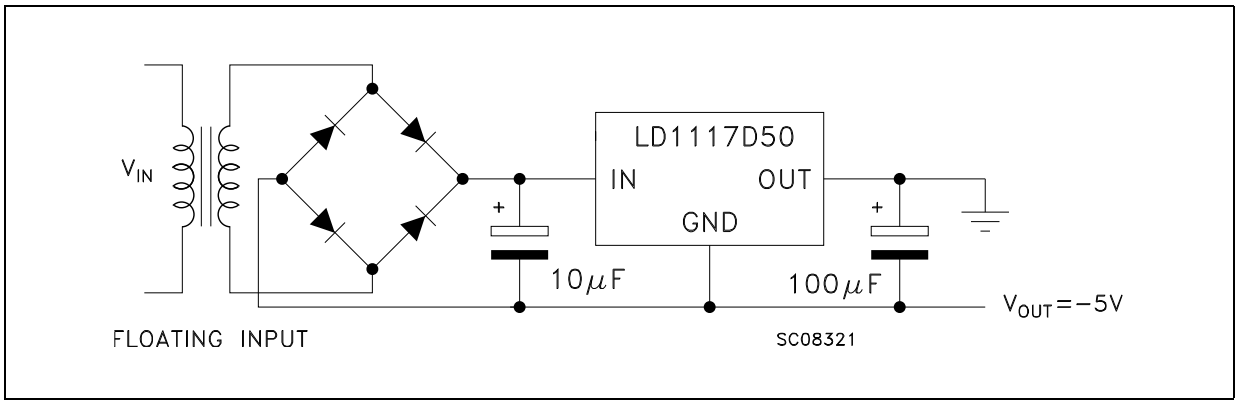


Figure 6. Circuit for increasing output voltage

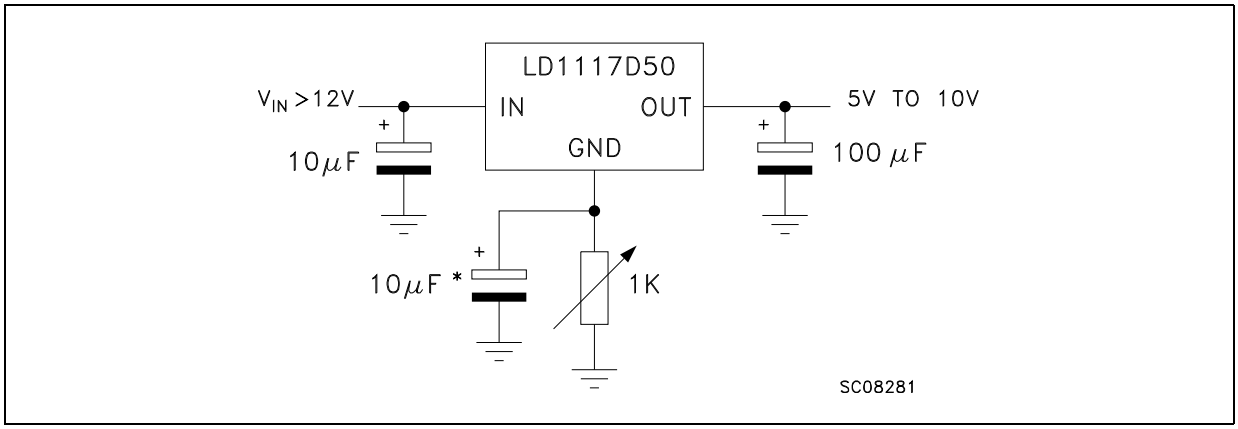


Figure 7. Voltage regulator with reference

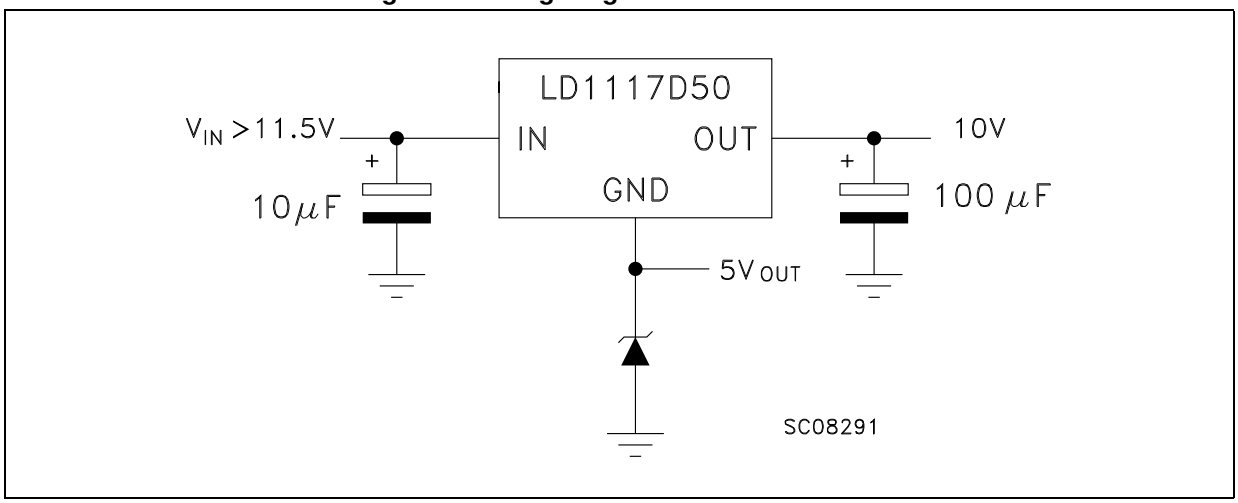


Figure 8. Battery backed-up regulated supply

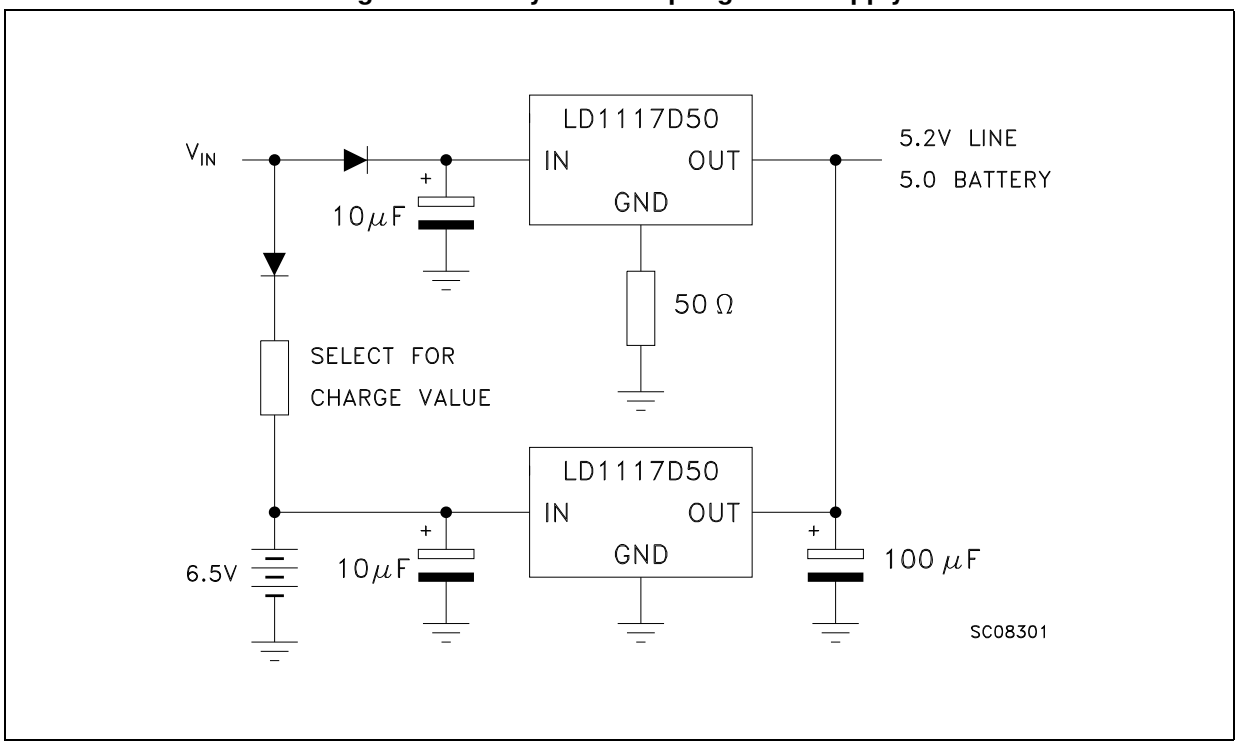
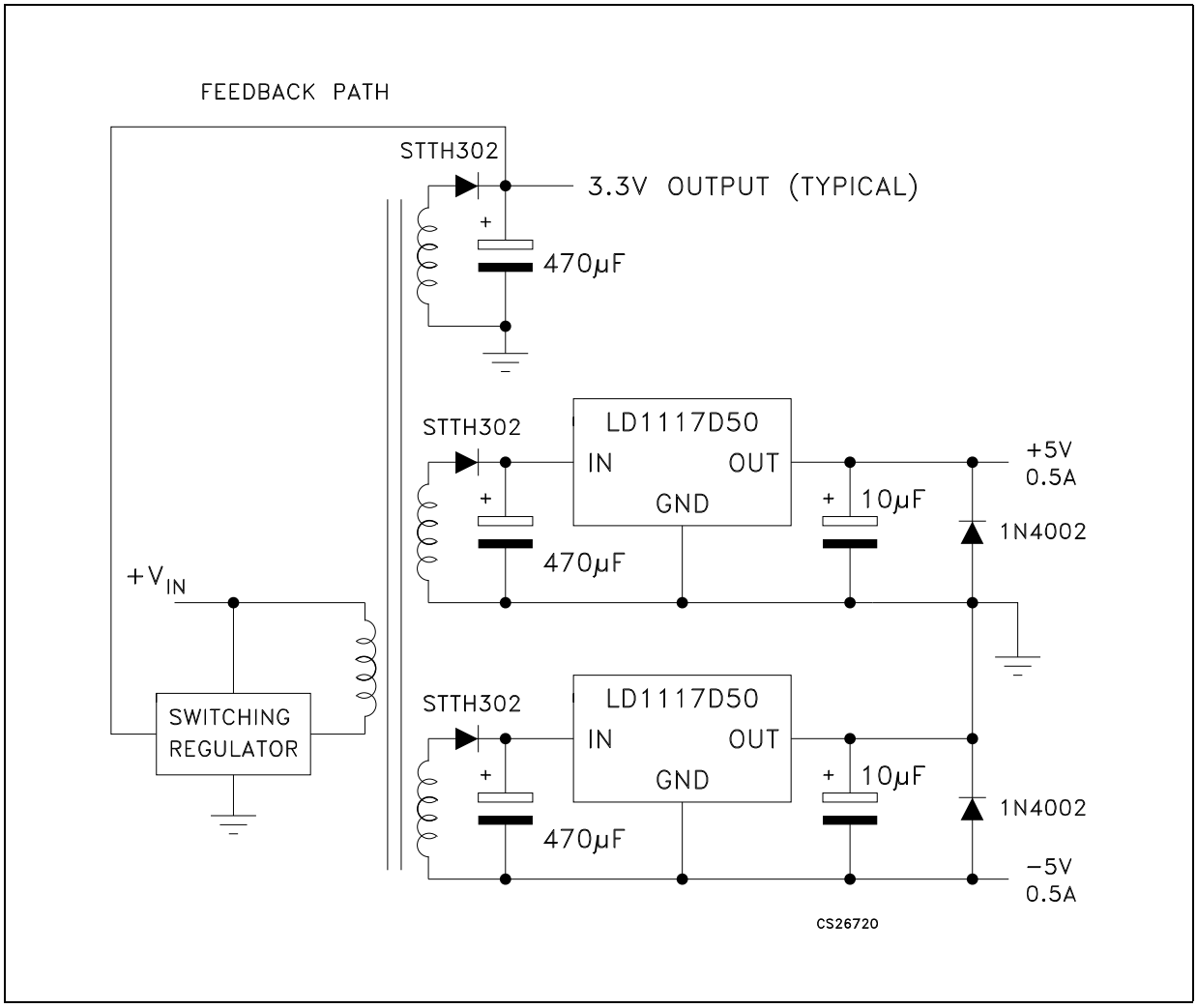


Figure 9. Post-regulated dual supply



7 LD1117 adjustable: application note

The LD1117 adjustable has a thermal stabilized 1.25 ± 0.012 V reference voltage between the OUT and ADJ pins. I_{ADJ} is 60 µA typ. (120 µA max.) and ΔI_{ADJ} is 1 µA typ. (5 µA max.).

R_1 is normally fixed to 120 Ω. From *Figure 9* we obtain:

$V_{OUT} = V_{REF} + R_2 (I_{ADJ} + I_{R1}) = V_{REF} + R_2 (I_{ADJ} + V_{REF} / R_1) = V_{REF} (1 + R_2 / R_1) + R_2 \times I_{ADJ}$.

In normal application R_2 value is in the range of few kΩ, so the $R_2 \times I_{ADJ}$ product could not be considered in the V_{OUT} calculation; then the above expression becomes:

$V_{OUT} = V_{REF} (1 + R_2 / R_1)$.

In order to have the better load regulation it is important to realize a good Kelvin connection of R_1 and R_2 resistors. In particular R_1 connection must be realized very close to OUT and ADJ pin, while R_2 ground connection must be placed as near as possible to the negative Load pin. Ripple rejection can be improved by introducing a 10 µF electrolytic capacitor placed in parallel to the R_2 resistor (see *Figure 10*).

Figure 10. Adjustable output voltage application

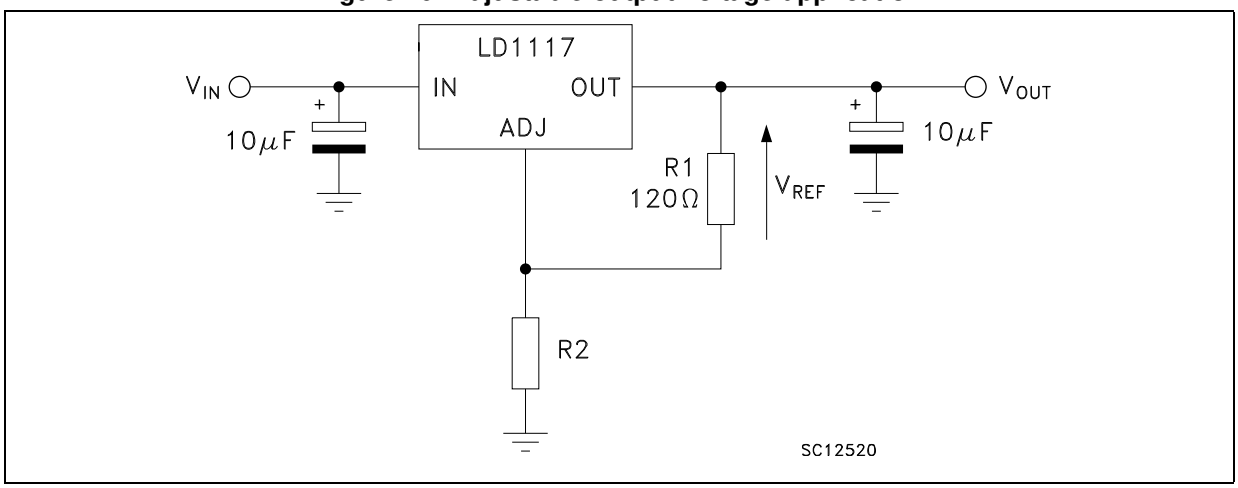
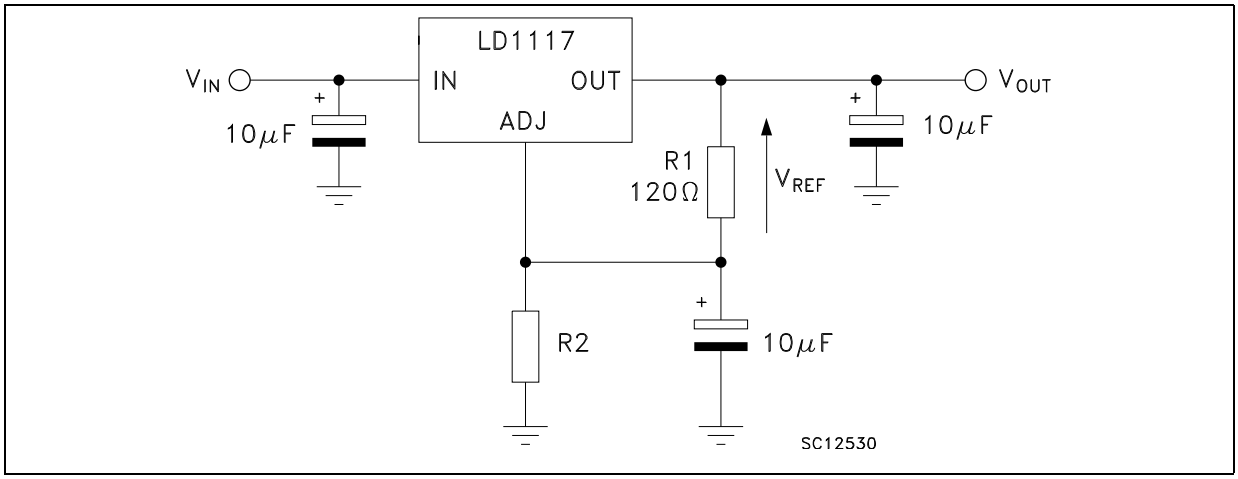


Figure 11. Adjustable output voltage application with improved ripple rejection



8 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK® is an ST trademark.

Table 15. TO-220 mechanical data (type STD-ST Dual Gauge)

Dim.	mm		
	Min.	Typ.	Max.
A	4.40		4.60
b	0.61		0.88
b1	1.14		1.70
c	0.48		0.70
D	15.25		15.75
D1		1.27	
E	10		10.40
e	2.40		2.70
e1	4.95		5.15
F	1.23		1.32
H1	6.20		6.60
J1	2.40		2.72
L	13		14
L1	3.50		3.93
L20		16.40	
L30		28.90	
∅P	3.75		3.85
Q	2.65		2.95