Contents LD1117

## **Contents**

1	Diagram5
2	Pin configuration6
3	Maximum ratings
4	Schematic application
5	Electrical characteristics9
6	Typical application
7	LD1117 adjustable: application note
3	Package information
9	Packaging mechanical data
10	Order codes
11	Revision history



LD1117 List of tables

### List of tables

Table 1.	Absolute maximum ratings	7
Table 2.	Thermal data	
Table 3.	Electrical characteristics of LD1117#12	. 9
Table 4.	Electrical characteristics of LD1117#18	10
Table 5.	Electrical characteristics of LD1117#25	11
Table 6.	Electrical characteristics of LD1117#33	12
Table 7.	Electrical characteristics of LD1117#50	13
Table 8.	Electrical characteristics of LD1117 (adjustable)	14
Table 9.	Electrical characteristics of LD1117#12C	15
Table 10.	Electrical characteristics of LD1117#18C	16
Table 11.	Electrical characteristics of LD1117#25C	17
Table 12.	Electrical characteristics of LD1117#33C	18
Table 13.	Electrical characteristics of LD1117#50C	19
Table 14.	Electrical characteristics of LD1117C (adjustable)	20
Table 15.	TO-220 mechanical data (type STD-ST Dual Gauge)	25
Table 16.	TO-220 mechanical data (type STD-ST Single Gauge)	27
Table 17.	SOT-223 mechanical data	29
Table 18.	SO-8 mechanical data	30
Table 19.	DPAK (TO-252) mechanical data (type A)	31
Table 20.	DPAK (TO-252) mechanical data (type E)	33
Table 21.	DPAK (TO-252) mechanical data type I	35
Table 22.	Footprint data	
Table 23.	SOT-223 tape and reel mechanical data	39
Table 24.	SO-8 tape and reel mechanical data	41
Table 25.	DPAK tape and reel mechanical data	42
Table 26.	Order codes	44
Table 27.	Document revision history	45



List of figures LD1117

# **List of figures**

Figure 1.	Block diagram	5
Figure 2.	Pin connections (top view)	
Figure 3.	Application circuit (for 1.2 V)	
Figure 4.	Application circuit (for other fixed output voltages)	
Figure 5.	Negative supply	
Figure 6.	Circuit for increasing output voltage	
Figure 7.	Voltage regulator with reference	21
Figure 8.	Battery backed-up regulated supply	22
Figure 9.	Post-regulated dual supply	23
Figure 10.	Adjustable output voltage application	24
Figure 11.	Adjustable output voltage application with improved ripple rejection	
Figure 12.	Drawing dimension TO-220 (type STD-ST Dual Gauge)	26
Figure 13.	Drawing dimension TO-220 (type STD-ST Single Gauge)	28
Figure 14.	Drawing dimension SOT-223	29
Figure 15.	Drawing dimension SO-8	30
Figure 16.	DPAK (TO-252) package outline A	32
Figure 17.	DPAK (TO-252) package outline E	34
Figure 18.	DPAK (TO-252) package outline I	36
Figure 19.	DPAK footprint recommended data	37
Figure 20.	Drawing dimension tube for TO-220 Dual Gauge (mm.)	38
Figure 21.	Drawing dimension tube for TO-220 Single Gauge (mm.)	38
Figure 22.	Tape for SOT-223 (dimensions are in mm)	39
Figure 23.	Reel for SOT-223 (dimensions are in mm)	
Figure 24.	SO-8 tape and reel dimensions	41
Figure 25.	Tape for DPAK	43
Figure 26	Real for DPAK	13



LD1117 Diagram

# 1 Diagram

THERMAL COMPENSATION THERMAL PROTECTION

VOLTAGE GENERATOR

CURRENT GENERATOR

Figure 1. Block diagram

Vоит

GND

SC08251

Pin configuration LD1117

## 2 Pin configuration

Figure 2. Pin connections (top view)

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

LD1117 Maximum ratings

## 3 Maximum ratings

Table 1. Absolute maximum ratings

Symbol	Parameter		Value	Unit
V <sub>IN</sub> <sup>(1)</sup>	DC input voltage		15	V
P <sub>TOT</sub>	Power dissipation	12	W	
T <sub>STG</sub>	Storage temperature range	Storage temperature range		
т		for C version	-40 to +125	°C
T <sub>OP</sub>	Operating junction temperature range	for standard version	0 to +125	°C

<sup>1.</sup> Absolute maximum rating of  $V_{\text{IN}}$  = 18 V, when  $I_{\text{OUT}}$  is lower than 20 mA.

Table 2. Thermal data

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

## 4 Schematic application

Figure 3. Application circuit (for 1.2 V)

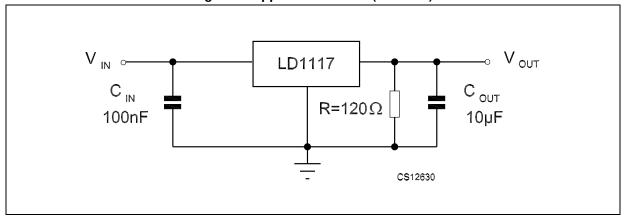
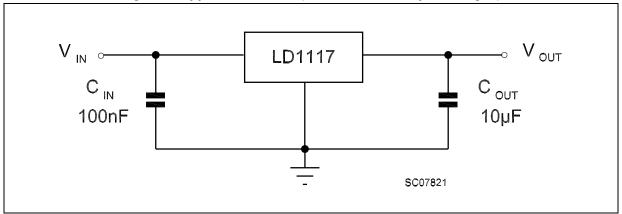


Figure 4. Application circuit (for other fixed output voltages)



#### 5 Electrical characteristics

Refer to the test circuits, T  $_J$  = 0 to 125 °C, C  $_O$  = 10  $\mu\text{F},$  R = 120  $\Omega$  between GND and OUT pins, unless otherwise specified.

Table 3. Electrical characteristics of LD1117#12

Symbol	Parameter	Test condition	Min.	Тур.	Max.	Unit
V <sub>O</sub>	Output voltage	$V_{in} = 3.2 \text{ V}, I_{O} = 10 \text{ mA}, T_{J} = 25 \text{ °C}$	1.188	1.20	1.212	V
V <sub>O</sub>	Output voltage	I <sub>O</sub> = 10 to 800 mA V <sub>in</sub> - V <sub>O</sub> = 1.4 to 10 V	1.140	1.20	1.260	V
$\Delta V_{O}$	Line regulation	$V_{in} - V_{O} = 1.5 \text{ to } 13.75 \text{ V}, I_{O} = 10 \text{ mA}$		0.035	0.2	%
$\Delta V_{O}$	Load regulation	$V_{in} - V_{O} = 3 \text{ V}, I_{O} = 10 \text{ to } 800 \text{ mA}$		0.1	0.4	%
$\Delta V_{O}$	Temperature stability			0.5		%
$\Delta V_{O}$	Long term stability	1000 hrs, T <sub>J</sub> = 125 °C		0.3		%
V <sub>in</sub>	Operating input voltage				15	V
I <sub>adj</sub>	Adjustment pin current	V <sub>in</sub> ≤ 15 V		60	120	μΑ
$\Delta I_{adj}$	Adjustment pin current change	V <sub>in</sub> - V <sub>O</sub> = 1.4 to 10 V I <sub>O</sub> = 10 to 800 mA		1	5	μΑ
I <sub>O(min)</sub>	Minimum load current	V <sub>in</sub> = 15 V		2	5	mA
Io	Output current	V <sub>in</sub> - V <sub>O</sub> = 5 V, T <sub>J</sub> = 25 °C	800	950	1300	mA
eN	Output noise (%V <sub>O</sub> )	B = 10 Hz to 10 kHz, T <sub>J</sub> = 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
		I <sub>O</sub> = 100 mA		1	1.1	
$V_{d}$	Dropout voltage	I <sub>O</sub> = 500 mA		1.05	1.15	V
		I <sub>O</sub> = 800 mA		1.10	1.2	
	Thermal regulation	T <sub>a</sub> = 25 °C, 30 ms Pulse		0.01	0.1	%/W

Electrical characteristics LD1117

Refer to the test circuits,  $T_J$  = 0 to 125 °C,  $C_O$  = 10  $\mu F$ , unless otherwise specified.

Table 4. Electrical characteristics of LD1117#18

Symbol	Parameter	Test condition	Min.	Тур.	Max.	Unit
V <sub>O</sub>	Output voltage	$V_{in} = 3.8 \text{ V}, I_{O} = 10 \text{ mA}, T_{J} = 25 \text{ °C}$	1.78	1.8	1.82	V
V <sub>O</sub>	Output voltage	$I_{O} = 0$ to 800 mA, $V_{in} = 3.3$ to 8 V	1.76		1.84	٧
$\Delta V_{O}$	Line regulation	$V_{in} = 3.3 \text{ to } 8 \text{ V}, I_{O} = 0 \text{ mA}$		1	6	mV
$\Delta V_{O}$	Load regulation	$V_{in} = 3.3 \text{ V}, I_{O} = 0 \text{ to } 800 \text{ mA}$		1	10	mV
$\Delta V_{O}$	Temperature stability			0.5		%
$\Delta V_{O}$	Long term stability	1000 hrs, T <sub>J</sub> = 125 °C		0.3		%
V <sub>in</sub>	Operating input voltage	I <sub>O</sub> = 100 mA			15	٧
I <sub>d</sub>	Quiescent current	V <sub>in</sub> ≤ 8 V		5	10	mA
Io	Output current	V <sub>in</sub> = 6.8 V, T <sub>J</sub> = 25 °C	800	950	1300	mA
eN	Output noise voltage	B = 10 Hz to 10 kHz, T <sub>J</sub> = 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
		I <sub>O</sub> = 100 mA		1	1.1	
$V_d$	Dropout voltage	I <sub>O</sub> = 500 mA		1.05	1.15	٧
		I <sub>O</sub> = 800 mA		1.10	1.2	
	Thermal regulation	T <sub>a</sub> = 25 °C, 30 ms Pulse		0.01	0.1	%/W

Refer to the test circuits,  $T_J$  = 0 to 125 °C,  $C_O$  = 10  $\mu F$ , unless otherwise specified.

Table 5. Electrical characteristics of LD1117#25

Symbol	Parameter	Test condition	Min.	Тур.	Max.	Unit
V <sub>O</sub>	Output voltage	$V_{in} = 4.5 \text{ V}, I_{O} = 10 \text{ mA}, T_{J} = 25 \text{ °C}$	2.475	2.5	2.525	V
V <sub>O</sub>	Output voltage	$I_{O} = 0$ to 800 mA, $V_{in} = 3.9$ to 10 V	2.45		2.55	٧
$\Delta V_{O}$	Line regulation	$V_{in} = 3.9 \text{ to } 10 \text{ V}, I_O = 0 \text{ mA}$		1	6	mV
$\Delta V_{O}$	Load regulation	$V_{in} = 3.9 \text{ V}, I_O = 0 \text{ to } 800 \text{ mA}$		1	10	mV
$\Delta V_{O}$	Temperature stability			0.5		%
$\Delta V_{O}$	Long term stability	1000 hrs, T <sub>J</sub> = 125 °C		0.3		%
V <sub>in</sub>	Operating input voltage	I <sub>O</sub> = 100 mA			15	٧
I <sub>d</sub>	Quiescent current	V <sub>in</sub> ≤ 10 V		5	10	mA
Io	Output current	V <sub>in</sub> = 7.5 V T <sub>J</sub> = 25 °C	800	950	1300	mA
eN	Output noise voltage	B = 10 Hz to 10 kHz, T <sub>J</sub> = 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
		I <sub>O</sub> = 100 mA		1	1.1	
$V_d$	Dropout voltage	I <sub>O</sub> = 500 mA		1.05	1.15	V
V <sub>O</sub> V <sub>O</sub> ΔV <sub>O</sub> ΔV <sub>O</sub> ΔV <sub>O</sub> ΔV <sub>O</sub> V <sub>in</sub> I <sub>d</sub> I <sub>O</sub> eN SVR		I <sub>O</sub> = 800 mA		1.10	1.2	
	Thermal regulation	T <sub>a</sub> = 25 °C, 30 ms Pulse		0.01	0.1	%/W

Electrical characteristics LD1117

Refer to the test circuits,  $T_J$  = 0 to 125 °C,  $C_O$  = 10  $\mu F,$  unless otherwise specified.

Table 6. Electrical characteristics of LD1117#33

Symbol	Parameter	Test condition	Min.	Тур.	Max.	Unit
V <sub>O</sub>	Output voltage	$V_{in} = 5.3 \text{ V}, I_O = 10 \text{ mA}, T_J = 25 \text{ °C}$	3.267	3.3	3.333	V
V <sub>O</sub>	Output voltage	$I_{O} = 0$ to 800 mA, $V_{in} = 4.75$ to 10 V	3.235		3.365	V
$\Delta V_{O}$	Line regulation	$V_{in} = 4.75 \text{ to } 15 \text{ V}, I_{O} = 0 \text{ mA}$		1	6	mV
$\Delta V_{O}$	Load regulation	$V_{in} = 4.75 \text{ V}, I_{O} = 0 \text{ to } 800 \text{ mA}$		1	10	mV
$\Delta V_{O}$	Temperature stability			0.5		%
$\Delta V_{O}$	Long term stability	1000 hrs, T <sub>J</sub> = 125 °C		0.3		%
V <sub>in</sub>	Operating input voltage	I <sub>O</sub> = 100 mA			15	V
I <sub>d</sub>	Quiescent current	V <sub>in</sub> ≤ 15 V		5	10	mA
I <sub>O</sub>	Output current	V <sub>in</sub> = 8.3 V, T <sub>J</sub> = 25 °C	800	950	1300	mA
eN	Output noise voltage	B = 10 Hz to 10 kHz, T <sub>J</sub> = 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
		I <sub>O</sub> = 100 mA		1	1.1	
$V_d$	Dropout voltage	I <sub>O</sub> = 500 mA		1.05	1.15	V
		Ulation $V_{in} = 4.75$ to 15 V, $I_O = 0$ mA       1         Itulation $V_{in} = 4.75$ V, $I_O = 0$ to 800 mA       1         Iture stability       0.5         In stability       1000 hrs, $T_J = 125$ °C       0.3         In ginput voltage $I_O = 100$ mA       5         Int current $V_{in} \le 15$ V       5         Iurrent $V_{in} = 8.3$ V, $T_J = 25$ °C       800       950         oise voltage $B = 10$ Hz to $10$ kHz, $T_J = 25$ °C       100         oltage rejection $I_O = 40$ mA, $f = 120$ Hz, $T_J = 25$ °C       60       75 $I_O = 100$ mA       1 $I_O = 100$ mA       1 $I_O = 500$ mA       1.05 $I_O = 800$ mA       1.10	1.2			
	Thermal regulation	T <sub>a</sub> = 25 °C, 30 ms Pulse		0.01	0.1	%/W

12/46 DocID2572 Rev 37

Refer to the test circuits,  $T_J$  = 0 to 125 °C,  $C_O$  = 10  $\mu F$ , unless otherwise specified.

Table 7. Electrical characteristics of LD1117#50

Symbol	Parameter	Test condition	Min.	Тур.	Max.	Unit
V <sub>O</sub>	Output voltage	$V_{in} = 7 \text{ V}, I_{O} = 10 \text{ mA}, T_{J} = 25 \text{ °C}$	4.95	5	5.05	٧
V <sub>O</sub>	Output voltage	$I_{O} = 0$ to 800 mA, $V_{in} = 6.5$ to 15 V	4.9		5.1	V
$\Delta V_{O}$	Line regulation	$V_{in} = 6.5 \text{ to } 15 \text{ V}, I_{O} = 0 \text{ mA}$		1	10	mV
$\Delta V_{O}$	Load regulation	$V_{in} = 6.5 \text{ V}, I_{O} = 0 \text{ to } 800 \text{ mA}$		1	15	mV
$\Delta V_{O}$	Temperature stability			0.5		%
$\Delta V_{O}$	Long term stability	1000 hrs, T <sub>J</sub> = 125 °C		0.3		%
V <sub>in</sub>	Operating input voltage	I <sub>O</sub> = 100 mA			15	V
I <sub>d</sub>	Quiescent current	V <sub>in</sub> ≤ 15 V		5	10	mA
Io	Output current	V <sub>in</sub> = 10 V, T <sub>J</sub> = 25 °C	800	950	1300	mA
eN	Output noise voltage	B = 10 Hz to 10 kHz, T <sub>J</sub> = 25 °C		100		μV
SVR	Supply voltage rejection	I <sub>O</sub> = 40 mA, f = 120 Hz, T <sub>J</sub> = 25 °C V <sub>in</sub> = 8 V, V <sub>ripple</sub> = 1 V <sub>PP</sub>	60	75		dB
		I <sub>O</sub> = 100 mA		1	1.1	
$V_d$	Dropout voltage	I <sub>O</sub> = 500 mA		1.05	1.15	V
V <sub>O</sub> V <sub>O</sub> ΔV <sub>O</sub> ΔV <sub>O</sub> ΔV <sub>O</sub> ΔV <sub>O</sub> V <sub>in</sub> I <sub>d</sub> I <sub>O</sub> eN SVR		I <sub>O</sub> = 800 mA		1.10	1.2	
	Thermal regulation	T <sub>a</sub> = 25 °C, 30 ms Pulse		0.01	0.1	%/W

Electrical characteristics LD1117

Refer to the test circuits,  $T_J$  = 0 to 125 °C,  $C_O$  = 10  $\mu F$ , unless otherwise specified.

Table 8. Electrical characteristics of LD1117 (adjustable)

Symbol	Parameter	Test condition	Min.	Тур.	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 <sub>ref</sub>	Reference voltage	$I_{O}$ = 10 to 800 mA, $V_{in}$ - $V_{O}$ = 1.4 to 10 V	1.225		1.275	V
$\Delta V_{O}$	Line regulation	$V_{in} - V_{O} = 1.5 \text{ to } 13.75 \text{ V}, I_{O} = 10 \text{ mA}$		0.035	0.2	%
$\Delta V_{O}$	Load regulation	$V_{in} - V_{O} = 3 \text{ V}, I_{O} = 10 \text{ to } 800 \text{ mA}$		0.1	0.4	%
$\Delta V_{O}$	Temperature stability			0.5		%
$\Delta V_{O}$	Long term stability	1000 hrs, T <sub>J</sub> = 125 °C		0.3		%
V <sub>in</sub>	Operating input voltage				15	٧
l <sub>adj</sub>	Adjustment pin current	V <sub>in</sub> ≤ 15 V		60	120	μΑ
$\Delta I_{adj}$	Adjustment pin current change	$V_{in} - V_{O} = 1.4 \text{ to } 10 \text{ V}, I_{O} = 10 \text{ to } 800 \text{ mA}$		1	5	μΑ
I <sub>O(min)</sub>	Minimum load current	V <sub>in</sub> = 15 V		2	5	mA
I <sub>O</sub>	Output current	$V_{in}$ - $V_O$ = 5 V, $T_J$ = 25 °C	800	950	1300	mA
eN	Output noise (%V <sub>O</sub> )	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
		I <sub>O</sub> = 100 mA		1	1.1	
$V_d$	Dropout voltage	I <sub>O</sub> = 500 mA		1.05	1.15	٧
		I <sub>O</sub> = 800 mA		1.10	1.2	
	Thermal regulation	T <sub>a</sub> = 25 °C, 30 ms Pulse		0.01	0.1	%/W

Refer to the test circuits, T<sub>J</sub> = -40 to 125 °C, C<sub>O</sub> = 10  $\mu$ F, R = 120  $\Omega$  between GND and OUT pins, unless otherwise specified.

Table 9. Electrical characteristics of LD1117#12C

Symbol	Parameter	Test condition	Min.	Тур.	Max.	Unit
V <sub>O</sub>	Output voltage	$V_{in} - V_{O} = 2 \text{ V}, I_{O} = 10 \text{ mA}, T_{J} = 25 \text{ °C}$	1.176	1.20	1.224	V
V <sub>O</sub>	Output voltage	$I_O = 10 \text{ to } 800 \text{ mA}, V_{in} - V_O = 1.4 \text{ to } 10 \text{ V}$	1.120	1.20	1.280	V
$\Delta V_{O}$	Line regulation	$V_{in} - V_{O} = 1.5 \text{ to } 13.75 \text{ V}, I_{O} = 10 \text{ mA}$			1	%
$\Delta V_{O}$	Load regulation	$V_{in} - V_{O} = 3 \text{ V}, I_{O} = 10 \text{ to } 800 \text{ mA}$			1	%
$\Delta V_{O}$	Temperature stability			0.5		%
$\Delta V_{O}$	Long term stability	1000 hrs, T <sub>J</sub> = 125 °C		0.3		%
V <sub>in</sub>	Operating input voltage				15	٧
I <sub>adj</sub>	Adjustment pin current	V <sub>in</sub> ≤ 15 V		60	120	μΑ
$\Delta I_{adj}$	Adjustment pin current change	$V_{in} - V_{O} = 1.4 \text{ to } 10 \text{ V}$ $I_{O} = 10 \text{ to } 800 \text{ mA}$		1	5	μΑ
I <sub>O(min)</sub>	Minimum load current	V <sub>in</sub> = 15 V		2	5	mA
I <sub>O</sub>	Output current	$V_{in}$ - $V_O$ = 5 V, $T_J$ = 25 °C	800	950	1300	mA
eN	Output noise (%V <sub>O</sub> )	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 <sub>PP</sub>	60	75		dB
		I <sub>O</sub> = 100 mA, T <sub>J</sub> = 0 to 125 °C		1	1.1	
$V_{d}$	Dropout voltage	$I_{O} = 500 \text{ mA}, T_{J} = 0 \text{ to } 125 \text{ °C}$		1.05	1.2	٧
		$I_O$ = 800 mA, $T_J$ = 0 to 125 °C		1.10	1.3	
	Thermal regulation	T <sub>a</sub> = 25 °C, 30 ms Pulse		0.01	0.1	%/W

Electrical characteristics LD1117

Refer to the test circuits,  $T_J$  = -40 to 125 °C,  $C_O$  = 10  $\mu F$ , unless otherwise specified.

Table 10. Electrical characteristics of LD1117#18C

Symbol	Parameter	Test condition	Min.	Тур.	Max.	Unit
V <sub>O</sub>	Output voltage	$V_{in} = 3.8 \text{ V}, I_O = 10 \text{ mA}, T_J = 25 \text{ °C}$	1.76	1.8	1.84	V
V <sub>O</sub>	Output voltage	$I_O = 0$ to 800 mA, $V_{in} = 3.9$ to 10 V	1.73		1.87	V
$\Delta V_{O}$	Line regulation	$V_{in} = 3.3 \text{ to } 8 \text{ V}, I_{O} = 0 \text{ mA}$		1	30	mV
$\Delta V_{O}$	Load regulation	$V_{in} = 3.3 \text{ V}, I_{O} = 0 \text{ to } 800 \text{ mA}$		1	30	mV
$\Delta V_{O}$	Temperature stability			0.5		%
$\Delta V_{O}$	Long term stability	1000 hrs, T <sub>J</sub> = 125 °C		0.3		%
V <sub>in</sub>	Operating input voltage	I <sub>O</sub> = 100 mA			15	٧
I <sub>d</sub>	Quiescent current	$V_{in} \le 8 V$		5	10	mA
I <sub>O</sub>	Output current	V <sub>in</sub> = 6.8 V T <sub>J</sub> = 25 °C	800	950	1300	mA
eN	Output noise voltage	B = 10 Hz to 10 kHz, T <sub>J</sub> = 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
		I <sub>O</sub> = 100 mA, T <sub>J</sub> = 0 to 125 °C		1	1.1	
$V_d$	Dropout voltage	I <sub>O</sub> = 500 mA, T <sub>J</sub> = 0 to 125 °C		1.05	1.15	V
		I <sub>O</sub> = 800 mA, T <sub>J</sub> = 0 to 125 °C		1.10	1.2	
		I <sub>O</sub> = 100 mA			1.1	
$V_d$	Dropout voltage	I <sub>O</sub> = 500 mA			1.2	V
		I <sub>O</sub> = 800 mA			1.3	
	Thermal regulation	T <sub>a</sub> = 25 °C, 30 ms Pulse		0.01	0.1	%/W

16/46 DocID2572 Rev 37

Refer to the test circuits,  $T_J$  = -40 to 125 °C,  $C_O$  = 10  $\mu F$ , unless otherwise specified.

Table 11. Electrical characteristics of LD1117#25C

Symbol	Parameter	Test condition	Min.	Тур.	Max.	Unit
V <sub>O</sub>	Output voltage	$V_{in} = 4.5 \text{ V}, I_{O} = 10 \text{ mA}, T_{J} = 25 \text{ °C}$	2.45	2.5	2.55	V
V <sub>O</sub>	Output voltage	$I_{O} = 0$ to 800 mA, $V_{in} = 3.9$ to 10 V	2.4		2.6	V
$\Delta V_{O}$	Line regulation	$V_{in}$ = 3.9 to 10 V, $I_O$ = 0 mA		1	30	mV
$\Delta V_{O}$	Load regulation	V <sub>in</sub> = 3.9 V, I <sub>O</sub> = 0 to 800 mA		1	30	mV
$\Delta V_{O}$	Temperature stability			0.5		%
$\Delta V_{O}$	Long term stability	1000 hrs, T <sub>J</sub> = 125 °C		0.3		%
V <sub>in</sub>	Operating input voltage	I <sub>O</sub> = 100 mA			15	V
I <sub>d</sub>	Quiescent current	V <sub>in</sub> ≤ 10 V		5	10	mA
I <sub>O</sub>	Output current	V <sub>in</sub> = 7.5 V T <sub>J</sub> = 25 °C	800	950	1300	mA
eN	Output noise voltage	B = 10 Hz to 10 kHz, T <sub>J</sub> = 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 <sub>PP</sub>	60	75		dB
		I <sub>O</sub> = 100 mA, T <sub>J</sub> = 0 to 125 °C		1	1.1	
$V_d$	Dropout voltage	I <sub>O</sub> = 500 mA, T <sub>J</sub> = 0 to 125 °C		1.05	1.15	V
		I <sub>O</sub> = 800 mA, T <sub>J</sub> = 0 to 125 °C		1.10	1.2	
		I <sub>O</sub> = 100 mA			1.1	
$V_{d}$	Dropout voltage	I <sub>O</sub> = 500 mA			1.2	V
		I <sub>O</sub> = 800 mA			1.3	
	Thermal regulation	T <sub>a</sub> = 25 °C, 30 ms Pulse		0.01	0.1	%/W

Electrical characteristics LD1117

Refer to the test circuits,  $T_J$  = -40 to 125 °C,  $C_O$  = 10  $\mu F$ , unless otherwise specified.

Table 12. Electrical characteristics of LD1117#33C

Symbol	Parameter	Test condition	Min.	Тур.	Max.	Unit
V <sub>O</sub>	Output voltage	$V_{in}$ = 5.3 V, $I_O$ = 10 mA, $T_J$ = 25 °C	3.24	3.3	3.36	V
V <sub>O</sub>	Output voltage	$I_{O} = 0$ to 800 mA, $V_{in} = 4.75$ to 10 V	3.16		3.44	V
$\Delta V_{O}$	Line regulation	$V_{in} = 4.75 \text{ to } 15 \text{ V}, I_{O} = 0 \text{ mA}$		1	30	mV
$\Delta V_{O}$	Load regulation	V <sub>in</sub> = 4.75 V, I <sub>O</sub> = 0 to 800 mA		1	30	mV
$\Delta V_{O}$	Temperature stability			0.5		%
$\Delta V_{O}$	Long term stability	1000 hrs, T <sub>J</sub> = 125 °C		0.3		%
V <sub>in</sub>	Operating input voltage	I <sub>O</sub> = 100 mA			15	V
I <sub>d</sub>	Quiescent current	V <sub>in</sub> ≤ 15 V		5	10	mA
Io	Output current	V <sub>in</sub> = 8.3 V, T <sub>J</sub> = 25 °C	800	950	1300	mA
eN	Output noise voltage	B = 10 Hz to 10 kHz, T <sub>J</sub> = 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
		I <sub>O</sub> = 100 mA, T <sub>J</sub> = 0 to 125 °C		1	1.1	
$V_d$	Dropout voltage	I <sub>O</sub> = 500 mA, T <sub>J</sub> = 0 to 125 °C		1.05	1.15	V
		I <sub>O</sub> = 800 mA, T <sub>J</sub> = 0 to 125 °C		1.10	1.2	
		I <sub>O</sub> = 100 mA			1.1	
$V_d$	Dropout voltage	I <sub>O</sub> = 500 mA			1.2	V
		I <sub>O</sub> = 800 mA			1.3	
	Thermal regulation	T <sub>a</sub> = 25 °C, 30 ms Pulse		0.01	0.1	%/W

18/46 DocID2572 Rev 37

Refer to the test circuits,  $T_J$  = -40 to 125 °C,  $C_O$  = 10  $\mu F$ , unless otherwise specified.

Table 13. Electrical characteristics of LD1117#50C

Symbol	Parameter	Test condition	Min.	Тур.	Max.	Unit
V <sub>O</sub>	Output voltage	$V_{in} = 7 \text{ V}, I_{O} = 10 \text{ mA}, T_{J} = 25 \text{ °C}$	4.9	5	5.1	V
Vo	Output voltage	$I_{O} = 0$ to 800 mA, $V_{in} = 6.5$ to 15 V	4.8		5.2	V
$\Delta V_{O}$	Line regulation	$V_{in} = 6.5 \text{ to } 15 \text{ V}, I_{O} = 0 \text{ mA}$		1	50	mV
$\Delta V_{O}$	Load regulation	$V_{in} = 6.5 \text{ V}, I_O = 0 \text{ to } 800 \text{ mA}$		1	50	mV
$\Delta V_{O}$	Temperature stability			0.5		%
$\Delta V_{O}$	Long term stability	1000 hrs, T <sub>J</sub> = 125 °C		0.3		%
V <sub>in</sub>	Operating input voltage	I <sub>O</sub> = 100 mA			15	V
I <sub>d</sub>	Quiescent current	V <sub>in</sub> ≤ 15 V		5	10	mA
I <sub>O</sub>	Output current	V <sub>in</sub> = 10 V, T <sub>J</sub> = 25 °C	800	950	1300	mA
eN	Output noise voltage	B = 10 Hz to 10 kHz, T <sub>J</sub> = 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 <sub>PP</sub>	60	75		dB
		I <sub>O</sub> = 100 mA, T <sub>J</sub> = 0 to 125 °C		1	1.1	
$V_d$	Dropout voltage	I <sub>O</sub> = 500 mA, T <sub>J</sub> = 0 to 125 °C		1.05	1.15	V
		I <sub>O</sub> = 800 mA, T <sub>J</sub> = 0 to 125 °C		1.10	1.2	
		I <sub>O</sub> = 100 mA			1.1	
$V_d$	Dropout voltage	I <sub>O</sub> = 500 mA			1.2	V
		I <sub>O</sub> = 800 mA			1.3	
	Thermal regulation	T <sub>a</sub> = 25 °C, 30 ms Pulse		0.01	0.1	%/W

Electrical characteristics LD1117

Refer to the test circuits,  $T_J$  = -40 to 125 °C,  $C_O$  = 10  $\mu F$ , unless otherwise specified.

Table 14. Electrical characteristics of LD1117C (adjustable)

Symbol	Parameter	Test condition	Min.	Тур.	Max.	Unit	
$V_{ref}$	Reference voltage	$V_{in} - V_{O} = 2 \text{ V}, I_{O} = 10 \text{ mA}, T_{J} = 25 \text{ °C}$	1.225	1.25	1.275	V	
V <sub>ref</sub>	Reference voltage	$I_{O}$ = 10 to 800 mA, $V_{in}$ - $V_{O}$ = 1.4 to 10 V	1.2		1.3	V	
$\Delta V_{O}$	Line regulation	$V_{in} - V_{O} = 1.5 \text{ to } 13.75 \text{ V}, I_{O} = 10 \text{ mA}$			1	%	
$\Delta V_{O}$	Load regulation	$V_{in} - V_{O} = 3 \text{ V}, I_{O} = 10 \text{ to } 800 \text{ mA}$			1	%	
$\Delta V_{O}$	Temperature stability			0.5		%	
$\Delta V_{O}$	Long term stability	1000 hrs, T <sub>J</sub> = 125 °C		0.3		%	
V <sub>in</sub>	Operating input voltage				15	V	
I <sub>adj</sub>	Adjustment pin current	V <sub>in</sub> ≤ 15 V		60	120	μΑ	
$\Delta I_{adj}$	Adjustment pin current change	$V_{in} - V_{O} = 1.4 \text{ to } 10 \text{ V}, I_{O} = 10 \text{ to } 800 \text{ mA}$		1	10	μΑ	
I <sub>O(min)</sub>	Minimum load current	V <sub>in</sub> = 15 V		2	5	mA	
I <sub>O</sub>	Output current	$V_{in} - V_{O} = 5 \text{ V}, T_{J} = 25 \text{ °C}$	800	950	1300	mA	
eN	Output noise (%V <sub>O</sub> )	B = 10 Hz to 10 kHz, T <sub>J</sub> = 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 <sub>PP</sub>	60	75		dB	
		I <sub>O</sub> = 100 mA, T <sub>J</sub> = 0 to 125 °C		1	1.1		
$V_d$	Dropout voltage	I <sub>O</sub> = 500 mA, T <sub>J</sub> = 0 to 125 °C		1.05	1.15	V	
		I <sub>O</sub> = 800 mA, T <sub>J</sub> = 0 to 125 °C		1.10	1.2		
		I <sub>O</sub> = 100 mA			1.1		
$V_d$	Dropout voltage	I <sub>O</sub> = 500 mA			1.2	V	
		I <sub>O</sub> = 800 mA			1.3		
	Thermal regulation	T <sub>a</sub> = 25 °C, 30 ms Pulse		0.01	0.1	%/W	

20/46 DocID2572 Rev 37

LD1117 Typical application

### 6 Typical application

Figure 5. Negative supply

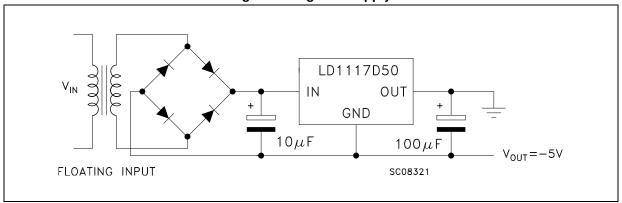


Figure 6. Circuit for increasing output voltage

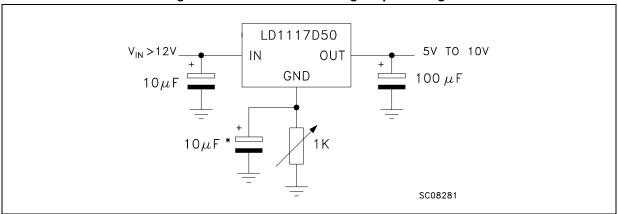
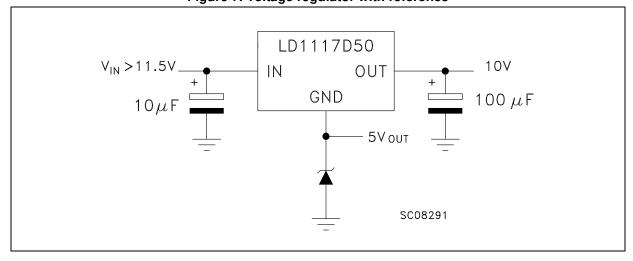


Figure 7. Voltage regulator with reference



Typical application LD1117

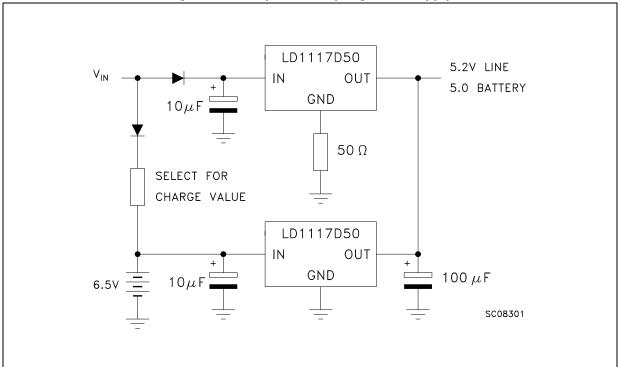


Figure 8. Battery backed-up regulated supply



LD1117 Typical application

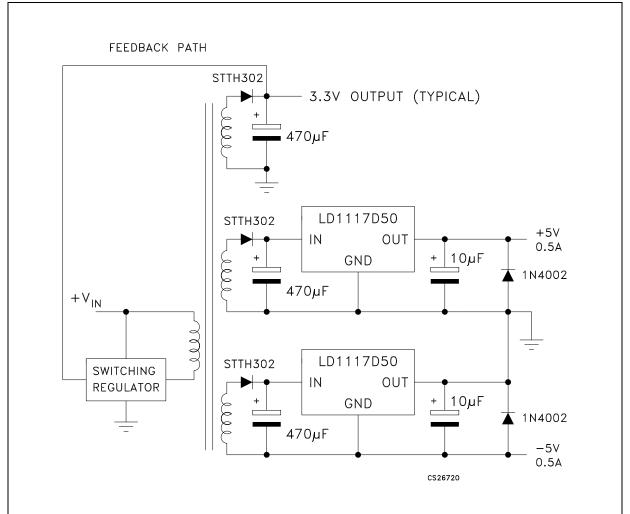


Figure 9. Post-regulated dual supply

#### 7 LD1117 adjustable: application note

The LD1117 adjustable has a thermal stabilized 1.25  $\pm$  0.012 V reference voltage between the OUT and ADJ pins. I<sub>ADJ</sub> is 60  $\mu$ A typ. (120  $\mu$ A max.) and  $\Delta$ I<sub>ADJ</sub> is 1  $\mu$ A typ. (5  $\mu$ A max.).

 $R_1$  is normally fixed to 120  $\Omega$ . 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  $k\Omega$ , 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  $\mu$ F electrolytic capacitor placed in parallel to the  $R_2$  resistor (see *Figure 10*).

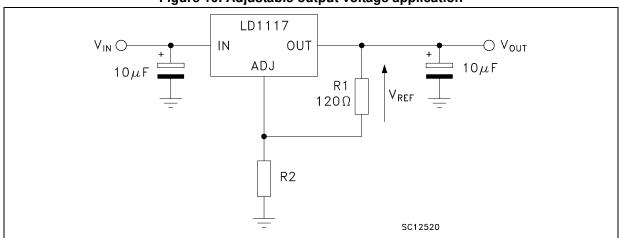
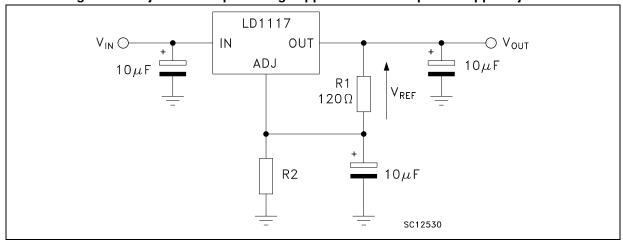


Figure 10. Adjustable output voltage application

Figure 11. Adjustable output voltage application with improved ripple rejection



24/46 DocID2572 Rev 37

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: <a href="https://www.st.com">www.st.com</a>. ECOPACK is an ST trademark.

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

Dim.		mm				
Diiii.	Min.	Тур.	Max.			
Α	4.40		4.60			
b	0.61		0.88			
b1	1.14		1.70			
С	0.48		0.70			
D	15.25		15.75			
D1		1.27				
E	10		10.40			
е	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				
ØP	3.75		3.85			
Q	2.65		2.95			

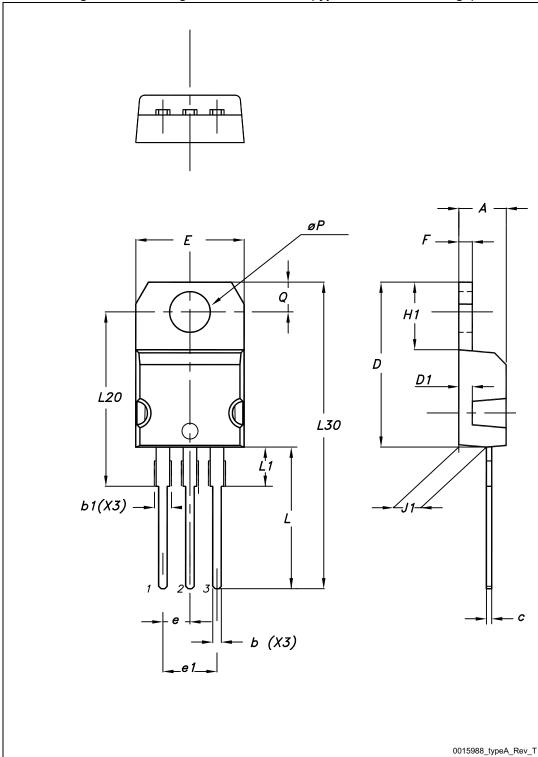


Figure 12. Drawing dimension TO-220 (type STD-ST Dual Gauge)

Table 16. TO-220 mechanical data (type STD-ST Single Gauge)

D:	mm				
Dim.	Min.	Тур.	Max.		
Α	4.40		4.60		
b	0.61		0.88		
b1	1.14		1.70		
С	0.48		0.70		
D	15.25		15.75		
E	10		10.40		
е	2.40		2.70		
e1	4.95		5.15		
F	0.51		0.60		
H1	6.20		6.60		
J1	2.40		2.72		
L	13		14		
L1	3.50		3.93		
L20		16.40			
L30		28.90			
ØP	3.75		3.85		
Q	2.65		2.95		

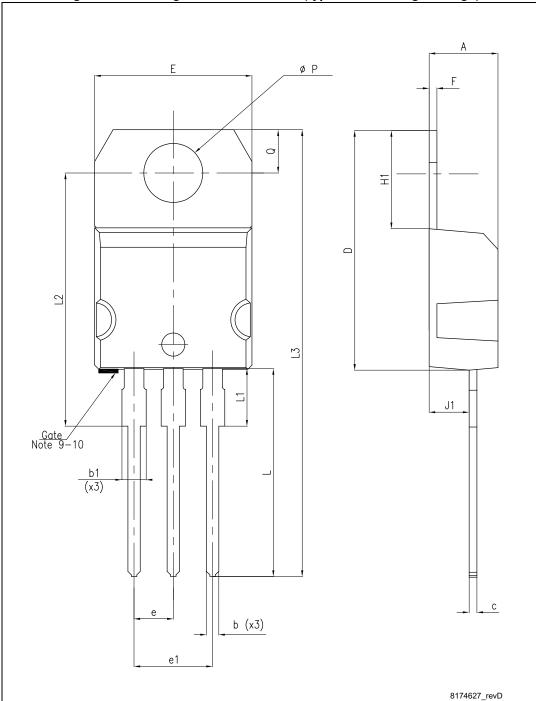


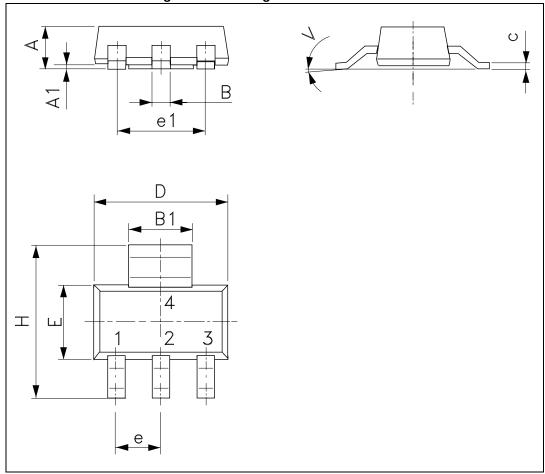
Figure 13. Drawing dimension TO-220 (type STD-ST Single Gauge)

**T** 

Table 17. SOT-223 mechanical data

Dim.		mm				
Diili.	Min.	Тур.	Max.			
А			1.80			
A1	0.02		0.10			
В	0.60	0.70	0.85			
B1	2.90	3.00	3.15			
С	0.24	0.26	0.35			
D	6.30	6.50	6.70			
е		2.30				
e1		4.60				
E	3.30	3.50	3.70			
Н	6.70	7.00	7.30			
V			10°			

Figure 14. Drawing dimension SOT-223

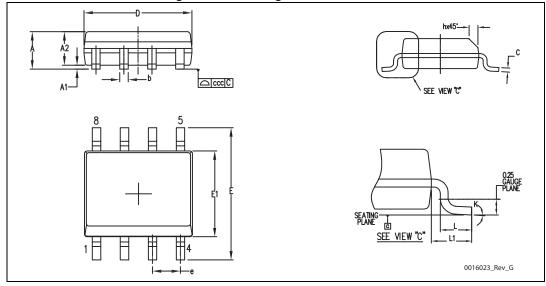


Ay/

Table 18. SO-8 mechanical data

D:		mm				
Dim.	Min.	Тур.	Max.			
А			1.75			
A1	0.10		0.25			
A2	1.25					
b	0.28		0.48			
С	0.17		0.23			
D	4.80	4.90	5.00			
E	5.80	6.00	6.20			
E1	3.80	3.90	4.00			
е		1.27				
h	0.25		0.50			
L	0.40		1.27			
L1		1.04				
k	0°		8°			
ccc			0.10			

Figure 15. Drawing dimension SO-8



30/46 DocID2572 Rev 37

Table 19. DPAK (TO-252) mechanical data (type A)

Dim	mm			
Dim.	Min.	Тур.	Max.	
Α	2.20		2.40	
A1	0.90		1.10	
A2	0.03		0.23	
b	0.64		0.90	
b4	5.20		5.40	
С	0.45		0.60	
c2	0.48		0.60	
D	6.00		6.20	
D1	4.95	5.10	5.25	
Е	6.40		6.60	
E1	4.60	4.70	4.80	
е	2.159	2.286	2.143	
e1	4.445	4.572	4.699	
Н	9.35		10.10	
L	1.00		1.50	
L1	2.60	2.80	1.50	
L2			3.00	
L4	0.60		1.00	
R		0.20		
V2	0°		8°	

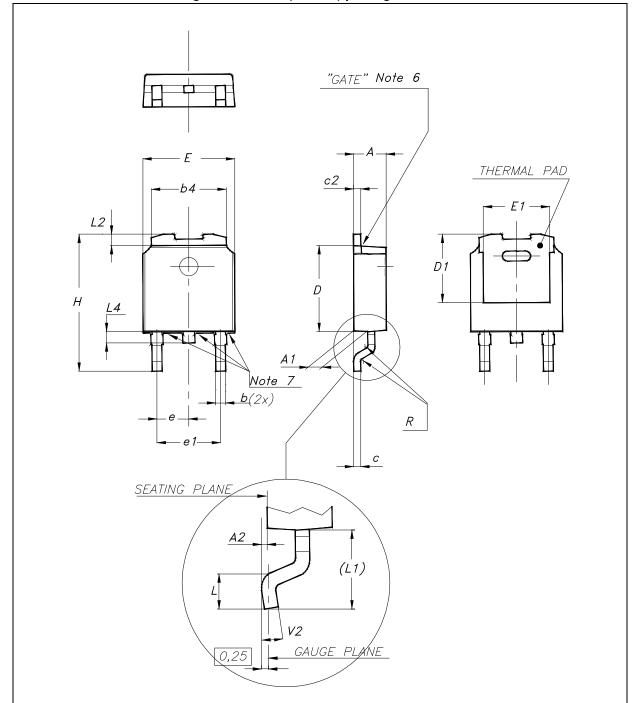


Figure 16. DPAK (TO-252) package outline A



Table 20. DPAK (TO-252) mechanical data (type E)

Dim.	mm				
Diili.	Min.	Тур.	Max.		
Α	2.18		2.39		
A2			0.13		
b	0.65		0.884		
b4	4.95		5.46		
С	0.46		0.61		
c2	0.46		0.60		
D	5.97		6.22		
D1	5.21				
E	6.35		6.73		
E1	4.32				
е		2.286			
e1		4.572			
Н	9.94		10.34		
L	1.50		1.78		
L1		2.74			
L2	0.89		1.27		
L4			1.02		

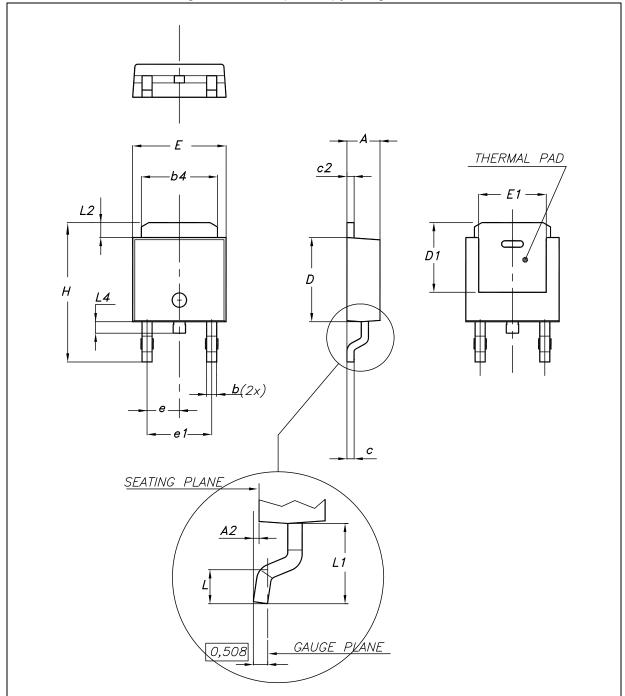


Figure 17. DPAK (TO-252) package outline E



Table 21. DPAK (TO-252) mechanical data type I

Dim	mm				
Dim.	Min.	Тур.	Max.		
А	2.20	2.30	2.38		
A1	0.90	1.01	1.10		
A2	0.00	-	0.10		
b	0.77	-	0.89		
b1	0.76	0.81	0.86		
b2	0.77	-	1.10		
b3	5.23	5.33	5.43		
С	0.47	-	0.60		
c1	0.46	0.51	0.56		
c2	0.47	-	0.60		
D	6.00	6.10	6.20		
D1	5.25	5.40	5.60		
E	6.50	6.60	6.70		
E1	4.70	4.85	5.00		
е		2.286 BSC			
Н	9.80	10.10	10.40		
L	1.40	1.50	1.70		
L1		2.90 REF			
L2	0.90	-	1.25		
L3		0.51 BSC			
L4	0.60	0.80	1.00		
L5	0.90	-	1.50		
L6		1.80 BSC			
Θ	0°	-	8°		
Θ 1	3°	5°	7°		
Θ 2	1°	3°	5°		

b3 <u>C2</u> P P Ø1.2±0.1 TOP E-MARK LJ <u>b2</u> PLATING BASE METAL b1 (L1) SECTION C-C

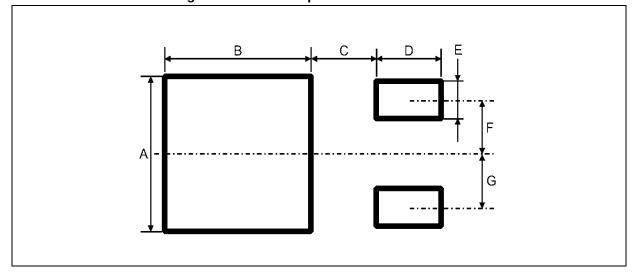
Figure 18. DPAK (TO-252) package outline I



Table 22. Footprint data

Values				
	mm.	inch.		
A	6.70	0.264		
В	6.70	0.64		
С	1.8	0.070		
D	3.0	0.118		
Е	1.60	0.063		
F	2.30	0.091		
G	2.30	0.091		

Figure 19. DPAK footprint recommended data

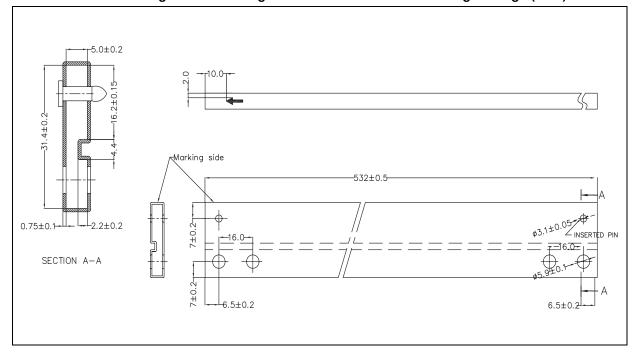


### 9 Packaging mechanical data

® 5.5 MARKING SIDE 11 532 ±0.5 ±0.2 (6) 3 (4) (6) (5) (9) 10 13 6.5 ±0.2 6.5 ±0.2 (12) PRINTING AREA – SEE SPEC. DOC. Nr. 0062566 PRINT HEIGHT "A" = 3mm. SECTION A-A 10 16) (18) 113 (15)

Figure 20. Drawing dimension tube for TO-220 Dual Gauge (mm.)



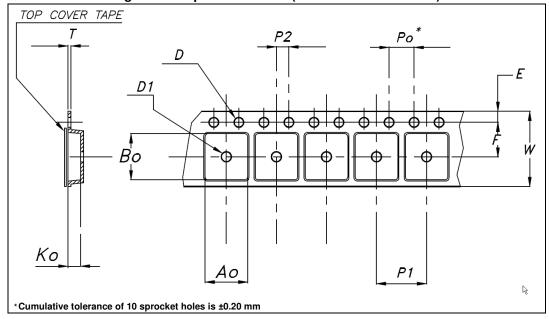


47/

Table 23. SOT-223 tape and reel mechanical data

Таре				Reel		
D:	mm			Dim	mm	
Dim.	Min.	Тур.	Max.	Dim.	Min.	Max.
A0	6.75	6.85	6.95	Α		180
В0	7.30	7.40	7.50	N	60	
K0	1.80	1.90	2.00	W1		12.4
F	5.40	5.50	5.60	W2		18.4
E	1.65	1.75	1.85	W3	11.9	15.4
W	11.7	12	12.3		•	•
P2	1.90	2	2.10	Base qu	antity pcs	1000
P0	3.90	4	4.10	Bulk qua	antity pcs	1000
P1	7.90	8	8.10			<u>-</u>
Т	0.25	0.30	0.35	1		
Dφ	1.50	1.55	1.60	]		
D1¢	1.50	1.60	1.70	]		

Figure 22. Tape for SOT-223 (dimensions are in mm)



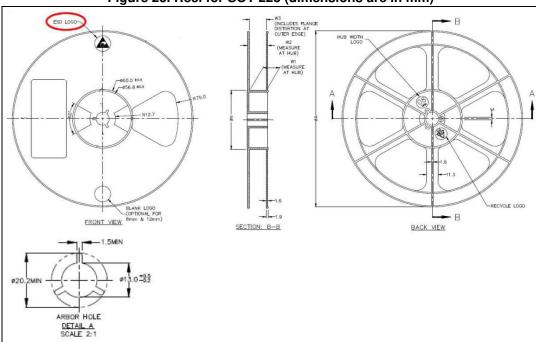


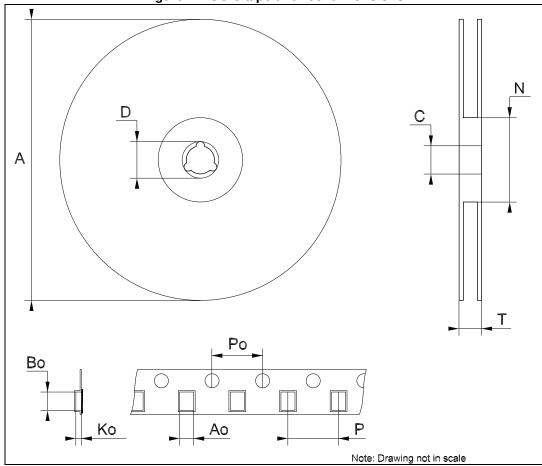
Figure 23. Reel for SOT-223 (dimensions are in mm)



Table 24. SO-8 tape and reel mechanical data

Dim.	mm				
	Min.	Тур.	Max.		
Α			330		
С	12.8		13.2		
D	20.2				
N	60				
Т			22.4		
Ao	8.1		8.5		
Во	5.5		5.9		
Ko	2.1		2.3		
Po	3.9		4.1		
Р	7.9		8.1		

Figure 24. SO-8 tape and reel dimensions



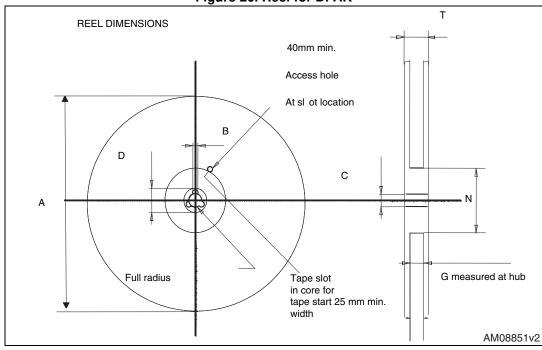
47/

Table 25. DPAK tape and reel mechanical data

Таре			Reel		
Dim	m	mm		mm	
Dim.	Min.	Max.	Dim.	Min.	Max.
A0	6.8	7	Α		330
В0	10.4	10.6	В	1.5	
B1		12.1	С	12.8	13.2
D	1.5	1.6	D	20.2	
D1	1.5		G	16.4	18.4
Е	1.65	1.85	N	50	
F	7.4	7.6	Т		22.4
K0	2.55	2.75			•
P0	3.9	4.1		Base qty.	2500
P1	7.9	8.1		Bulk qty.	2500
P2	1.9	2.1			
R	40				
Т	0.25	0.35			
W	15.7	16.3			

Figure 25. Tape for DPAK 10 pitches cumulative tolerance on tape +/- 0.2 mm P0 Top cover E. B1 ВО For machine ref. only Α0 D1 including draft and radii concentric around B0 User direction of feed Bending radius User direction of feed







DocID2572 Rev 37

43/46

AM08852v1

Order codes LD1117

#### 10 Order codes

Table 26. Order codes

Packages					
SOT-223	SO-8	DPAK (Tape and reel)	TO-220	TO-220 (Dual Gauge)	Output voltages
LD1117S12TR		LD1117DT12TR			1.2 V
LD1117S12CTR		LD1117DT12CTR			1.2 V
LD1117S18TR		LD1117DT18TR	LD1117V18		1.8 V
LD1117S18CTR		LD1117DT18CTR			1.8 V
LD1117S25TR		LD1117DT25TR			2.5 V
LD1117S25CTR		LD1117DT25CTR			2.5 V
LD1117S33TR	LD1117D33TR	LD1117DT33TR	LD1117V33	LD1117V33-DG	3.3 V
				LD1117V33C-DG	3.3 V
LD1117S33CTR	LD1117D33CTR	LD1117DT33CTR	LD1117V33C		3.3 V
LD1117S50TR		LD1117DT50TR	LD1117V50	LD1117V50-DG	5 V
					5 V
LD1117S50CTR		LD1117DT50CTR	LD1117V50C		5 V
LD1117STR		LD1117DTTR	LD1117V	LD1117V-DG	ADJ from 1.25 to 15 V
					ADJ from 1.25 to 15 V
LD1117SC-R		LD1117DTC-R			ADJ from 1.25 to 15 V

44/46 DocID2572 Rev 37

LD1117 Revision history

# 11 Revision history

Table 27. Document revision history

Date	Revision	Changes	
22-Sep-2004	15	Add new part number #12C; typing error: note on table 2.	
25-Oct-2004	16	Add V <sub>ref</sub> reference voltage on table 12.	
18-Jul-2005	17	The DPAK mechanical data updated.	
25-Nov-2005	18	The TO220FM package removed.	
14-Dec-2005	19	The T <sub>op</sub> on table 2 updated.	
06-Dec-2006	20	DPAK mechanical data updated and added footprint data.	
05-Apr-2007	21	Order codes updated.	
30-Nov-2007	22	Added Table 1.	
16-Apr-2008	23	Modified: Table 24 on page 42.	
08-Jul-2008	24	Added note 1. on page 7.	
30-Mar-2009	25	Modified: V <sub>IN</sub> max value Table 4 on page 10 and Figure 9 on page 23	
29-Jul-2009	26	Modified: Table 24 on page 42.	
03-Feb-2010	27	Modified Table 9 on page 15.	
22-Mar-2010	28	Added: Table 16 on page 22, Figure 13 on page 23, Figure 14 on page 24, Figure 17 and Figure 18 on page 33	
15-Nov-2010	29	Modified: R <sub>thJC</sub> value for TO-220 Table 2 on page 7.	
30-Nov-2011	30	Added: order code LD1117V33-DG Table 24 on page 42.	
13-Feb-2012	31	Added: order codes LD1117V50-DG and LD1117V-DG Table 24 on page 42.	
19-Oct-2012	32	Added: R <sub>thJA</sub> value for DPAK, SOT-223 and SO-8 Table 2 on page 7.	
20-Nov-2013	33	Part number LD1117xx changed to LD1117. Updated the Description in cover page, Section 8: Package mechanical data and Table 24: Order codes. Cancelled Table 1: Device summary. Added Section 9: Packaging mechanical data. Minor text changes.	
12-Jun-2019	34	Updated Table 19, Table 20, Figure 16, Figure 17 and Figure 18.	
16-Oct-2019	35	Updated Figure 2: Pin connections (top view).	
04-Dec-2019	36	Added Table 20: DPAK (TO-252) mechanical data (type E). Updated pin 3 DPAK package in Figure 2: Pin connections (top view).	
11-Feb-2020	37	Updated Figure 14: Drawing dimension SOT-223.	

#### **IMPORTANT NOTICE - PLEASE READ CAREFULLY**

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, please refer to www.st.com/trademarks. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2020 STMicroelectronics - All rights reserved

46/46