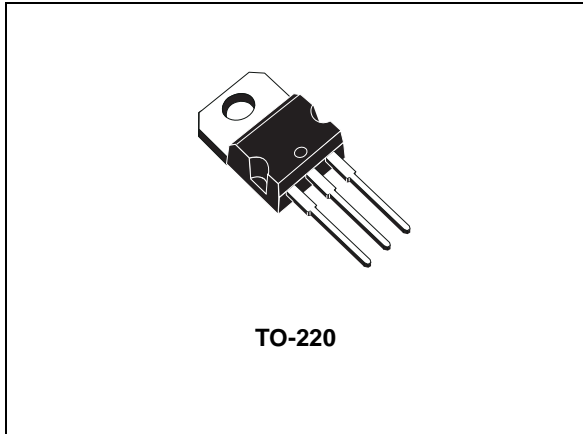


## 5 A low-drop positive voltage regulator adjustable

Datasheet - production data



LD1084 quiescent current flows into the load, so to increase the efficiency. A minimum capacitor of 10  $\mu$ F is needed for stability.

The device is supplied in TO-220. The on-chip trimming allows the regulator to reach a very tight output voltage tolerance, within  $\pm 1\%$  at 25 °C.

**Table 1. Device summary**

Order code	Output voltage
LD1084V	adjustable

### Features

- Typical dropout 1.3 V (at 5 A)
- Three-terminal adjustable output voltage
- Guaranteed output current up to 5 A
- Output tolerance  $\pm 1\%$  at 25 °C and  $\pm 2\%$  in full temperature range
- Internal power and thermal limit
- Wide operating temperature range -40 °C to 125 °C
- Package available: TO-220
- Pinout compatibility with standard adjustable VREG

### Description

The LD1084 is a low-drop voltage regulator providing up to 5 A of output current. Dropout is guaranteed at a maximum of 1.5 V at the maximum output current, decreasing at lower loads. The LD1084 is pin-to-pin compatible with the older 3-terminal adjustable regulators, but it has better performances in terms of drop and output tolerance.

Unlike PNP regulators, where a part of the output current is wasted as quiescent current, the

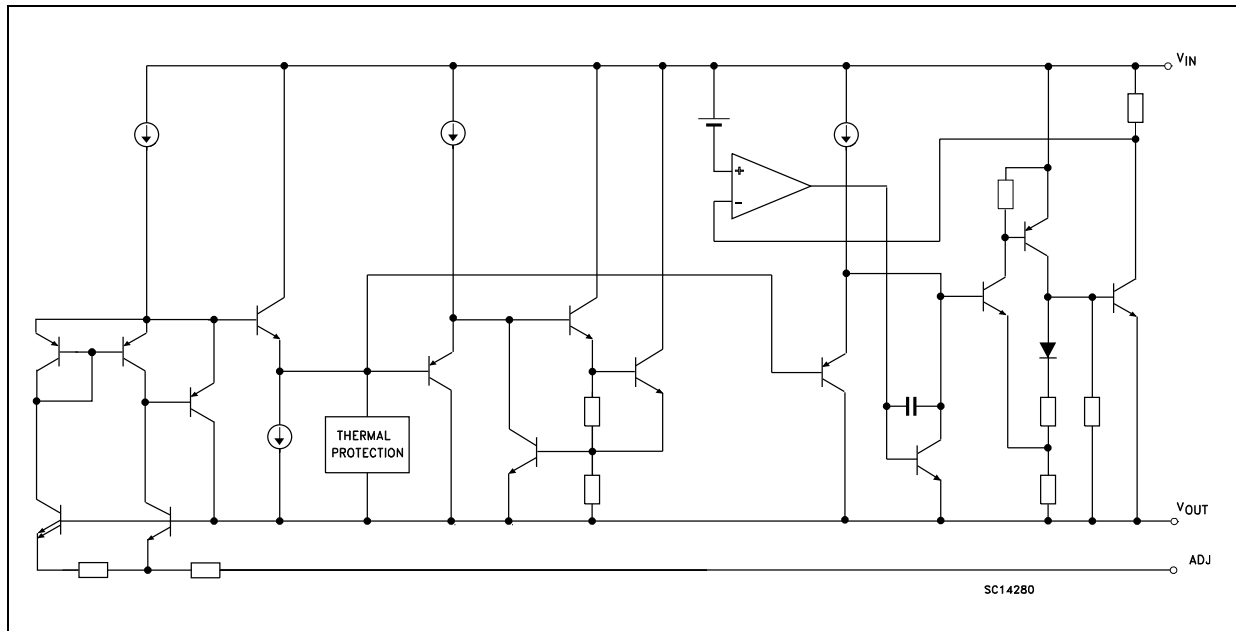
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## Contents

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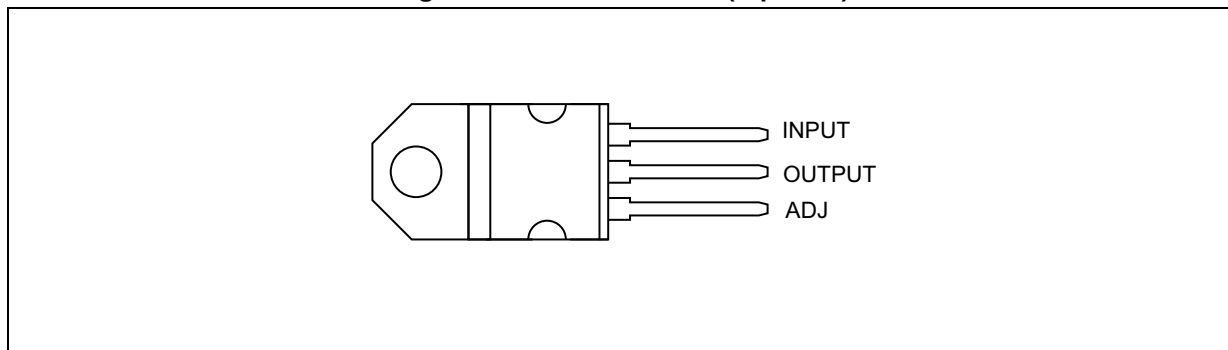
# 1 Diagram

Figure 1. Schematic diagram



## 2 Pin configuration

Figure 2. Pin connections (top view)



### 3 Maximum ratings

**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_I$	DC input voltage	30	V
$I_O$	Output current	Internally limited	mA
$P_D$	Power dissipation	Internally limited	mW
$T_{STG}$	Storage temperature range	-55 to +150	°C
$T_{OP}$	Operating junction temperature range	-40 to +125	°C

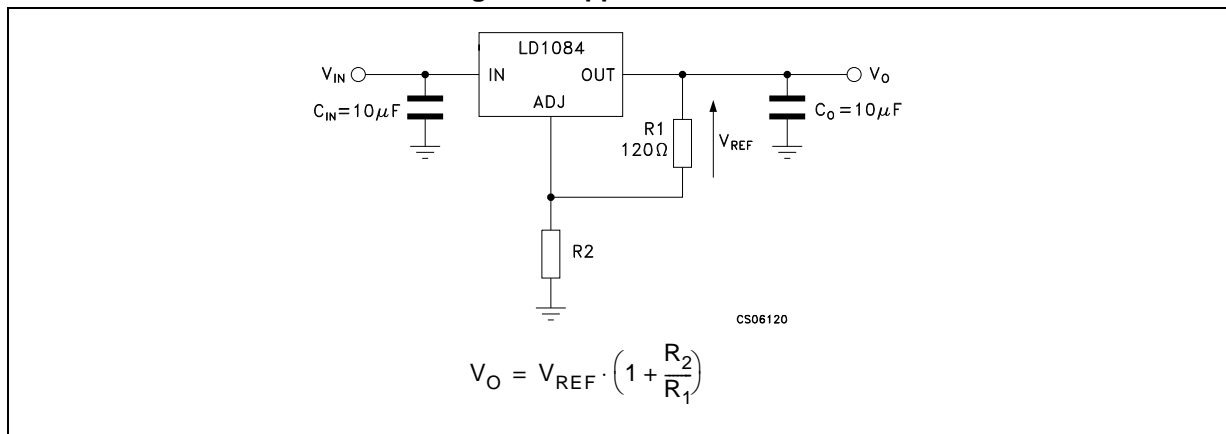
*Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.*

**Table 3. Thermal data**

Symbol	Parameter	TO-220	Unit
$R_{thJC}$	Thermal resistance junction-case	3	°C/W
$R_{thJA}$	Thermal resistance junction-ambient	50	°C/W

## 4 Schematic application

Figure 3. Application circuit



## 5 Electrical characteristics

$V_I = 4.25\text{ V}$ ,  $C_I = C_O = 10\ \mu\text{F}$ ,  $T_A = -40\text{ to }125\text{ }^\circ\text{C}$ , unless otherwise specified.

**Table 4. LD1084 electrical characteristics**

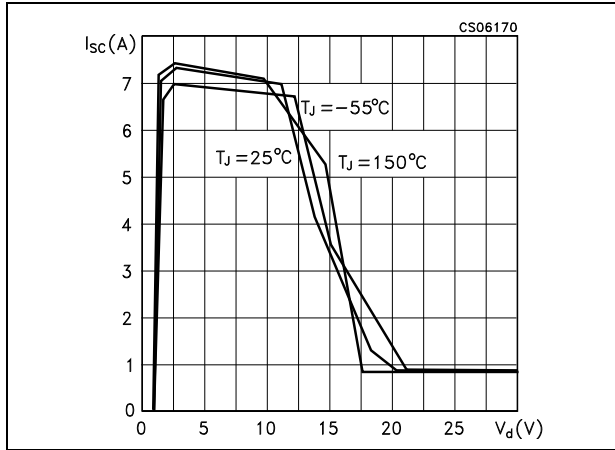
Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{\text{ref}}$	Reference voltage <sup>(1)</sup>	$I_O = 10\text{ mA}$ , $T_J = 25\text{ }^\circ\text{C}$	1.237	1.25	1.263	V
		$I_O = 10\text{ mA to }3\text{ A}$ , $V_I = 2.85\text{ to }30\text{ V}$	1.225	1.25	1.275	V
$\Delta V_O$	Line regulation	$I_O = 10\text{ mA}$ , $V_I = 2.85\text{ to }16.5\text{ V}$ , $T_J = 25\text{ }^\circ\text{C}$		0.015	0.2	%
		$I_O = 10\text{ mA}$ , $V_I = 2.85\text{ to }16.5\text{ V}$		0.035	0.2	%
$\Delta V_O$	Load regulation	$I_O = 10\text{ mA to }5\text{ A}$ , $T_J = 25\text{ }^\circ\text{C}$		0.1	0.3	%
		$I_O = 0\text{ to }5\text{ A}$		0.2	0.4	%
$V_d$	Dropout voltage	$I_O = 5\text{ A}$		1.3	1.5	V
$I_{O(\text{min})}$	Minimum load current	$V_I = 30\text{ V}$		3	10	mA
$I_{\text{sc}}$	Short-circuit current	$V_I - V_O = 5\text{ V}$	5.5	6.5		A
		$V_I - V_O = 25\text{ V}$	0.5	0.7		A
	Thermal regulation	$T_A = 25\text{ }^\circ\text{C}$ , 30 ms pulse		0.003	0.015	%/W
SVR	Supply voltage rejection	$f = 120\text{ Hz}$ , $C_O = 25\ \mu\text{F}$ , $C_{\text{ADJ}} = 25\ \mu\text{F}$ , $I_O = 5\text{ A}$ , $V_I = 6.25 \pm 3\text{ V}$	60	72		dB
$I_{\text{ADJ}}$	Adjust pin current	$V_I = 4.25\text{ V}$ , $I_O = 10\text{ mA}$		55	120	$\mu\text{A}$
$\Delta I_{\text{ADJ}}$	Adjust pin current change <sup>(1)</sup>	$I_O = 10\text{ mA to }5\text{ A}$ , $V_I = 2.85\text{ to }16.5\text{ V}$		0.2	5	$\mu\text{A}$
eN	RMS output noise voltage (% of $V_O$ )	$T_A = 25\text{ }^\circ\text{C}$ , $f = 10\text{ Hz to }10\text{ kHz}$		0.003		%
S	Temperature stability			0.5		%
S	Long term stability	$T_A = 125\text{ }^\circ\text{C}$ , 1000 hrs		0.5		%

1. See short-circuit current curve for available output current at fixed dropout.

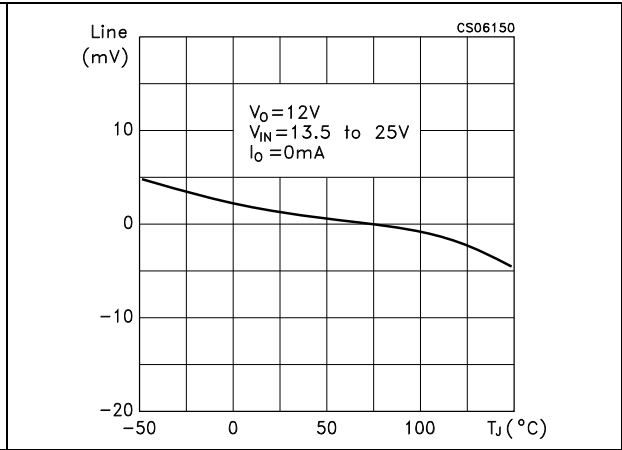
## 6 Typical performance characteristics

Unless otherwise specified  $T_J = 25\text{ }^\circ\text{C}$ ,  $C_I = 10\text{ }\mu\text{F}$  (tant.),  $C_O = 22\text{ }\mu\text{F}$  (tant.)

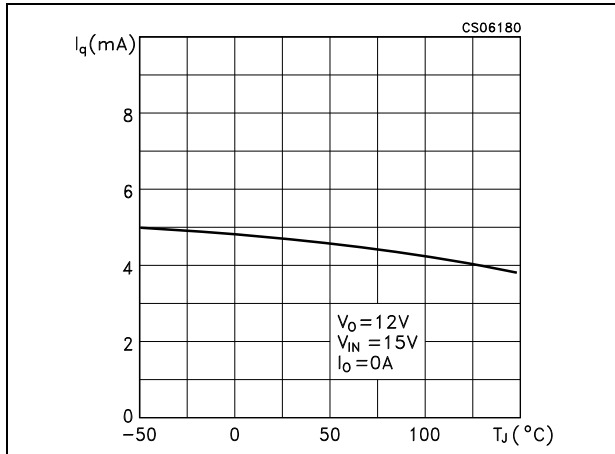
**Figure 4. Short-circuit current vs. dropout voltage**



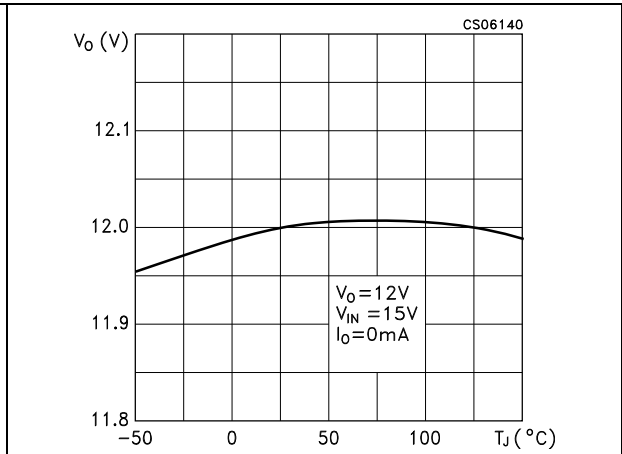
**Figure 5. Line regulation vs. temperature**



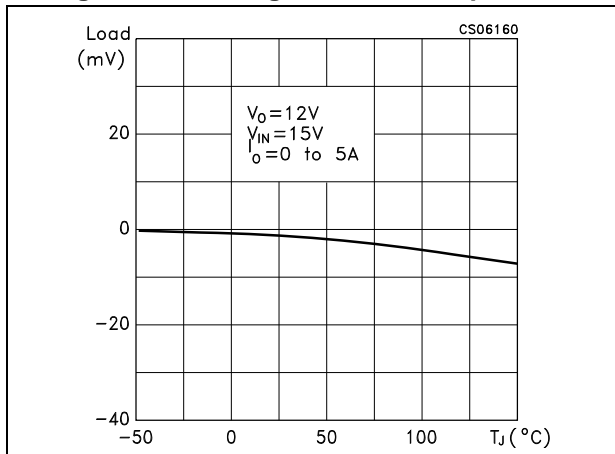
**Figure 6. Quiescent current vs. temperature**



**Figure 7. Output voltage vs. temperature**



**Figure 8. Load regulation vs. temperature**



**Figure 9. Quiescent current vs. output voltage**

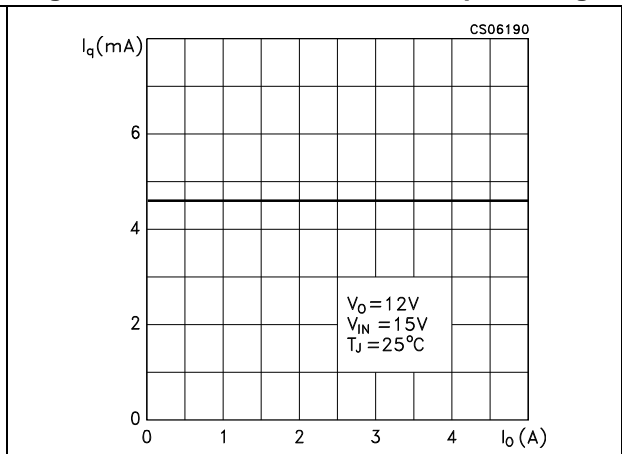




Figure 10. Quiescent current vs. input voltage

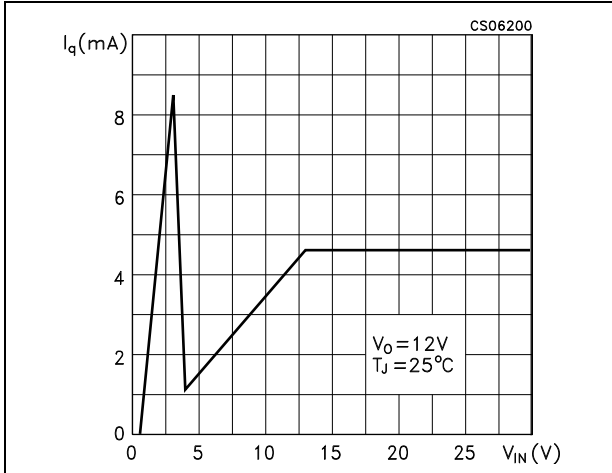


Figure 11. Dropout voltage vs. output current

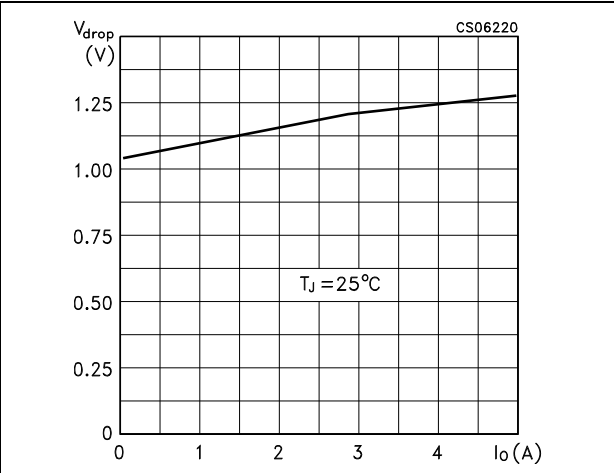


Figure 12. Supply voltage rejection vs. output current

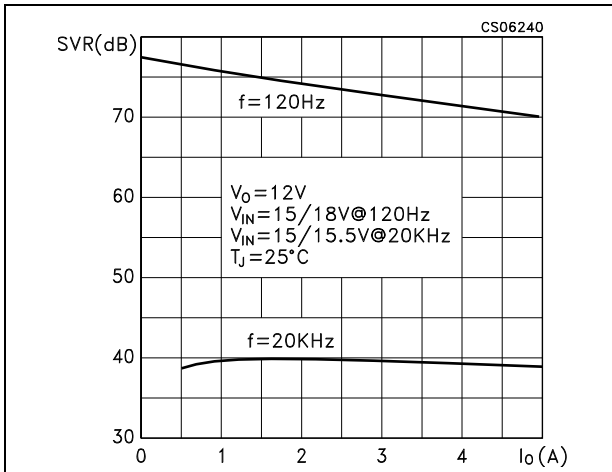


Figure 13. Dropout voltage vs. temperature

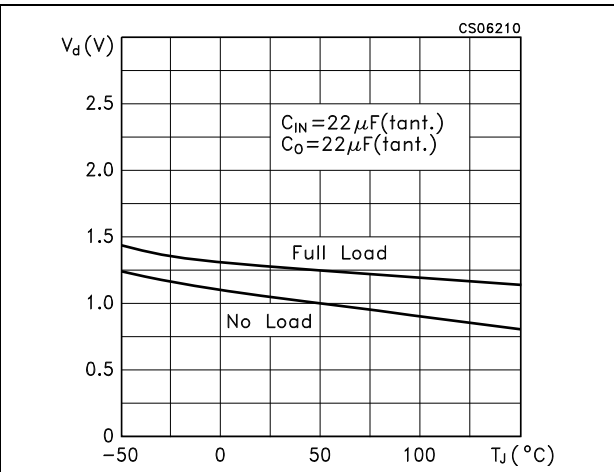


Figure 14. Supply voltage rejection vs. temperature

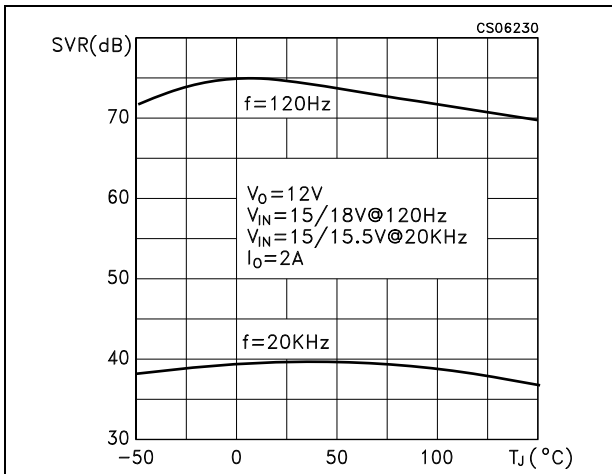


Figure 15. Supply voltage rejection vs. frequency

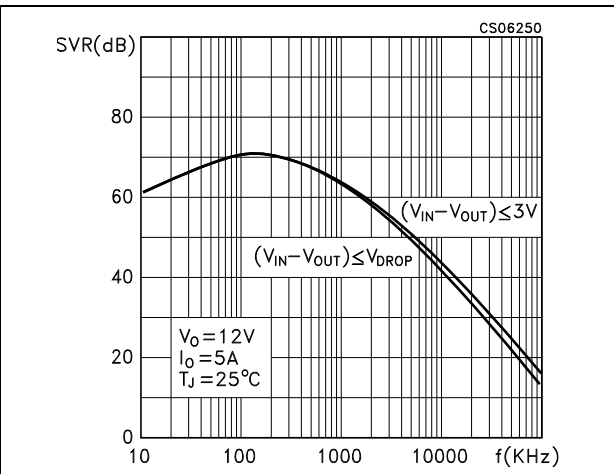


Figure 16. Adjust pin current vs. output current

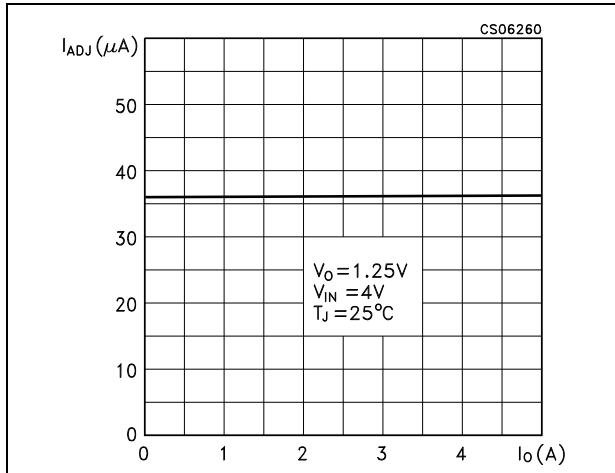


Figure 17. Reference voltage vs. temperature

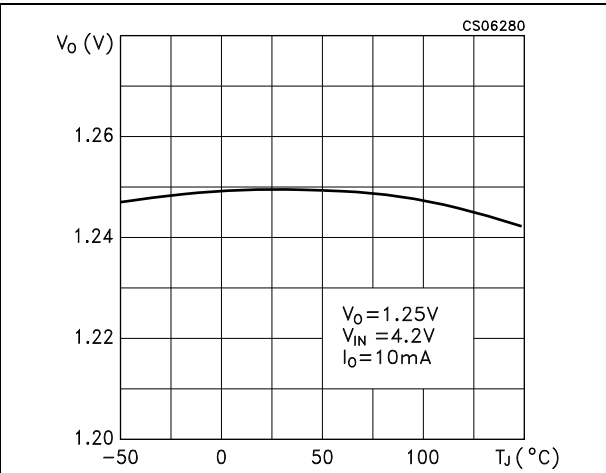


Figure 18. Load regulation vs. temperature

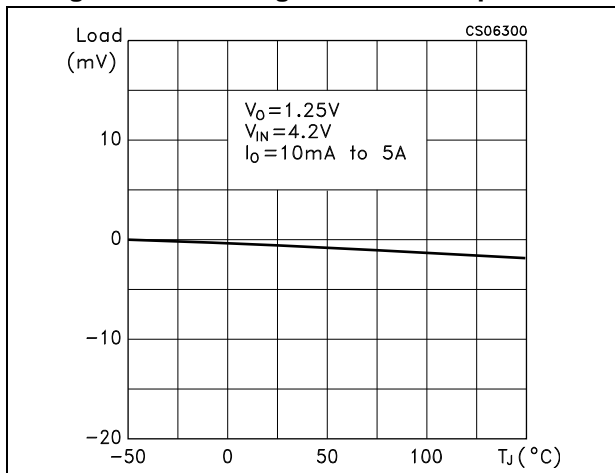


Figure 19. Adjust pin current vs. temperature

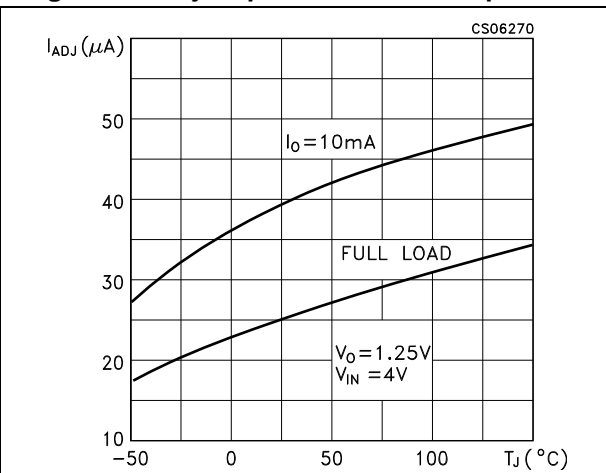


Figure 20. Line regulation vs. temperature

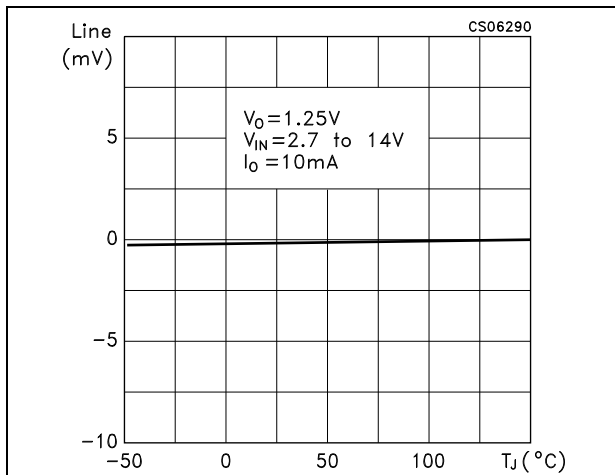


Figure 21. Minimum load current vs. temperature

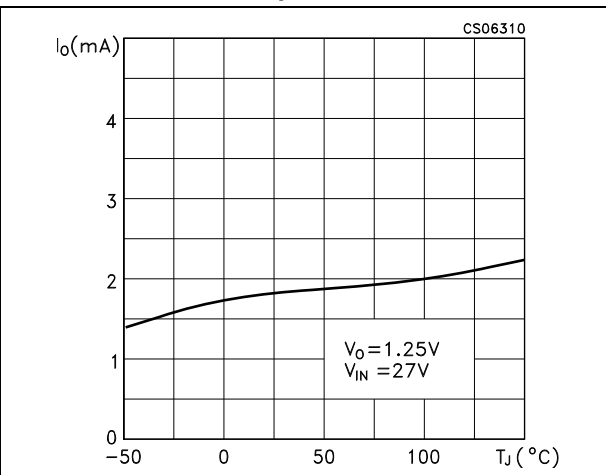


Figure 22. Supply voltage rejection vs. temperature

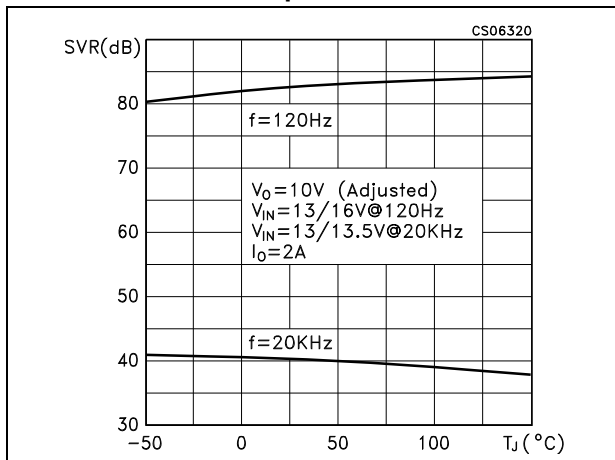


Figure 24. Stability

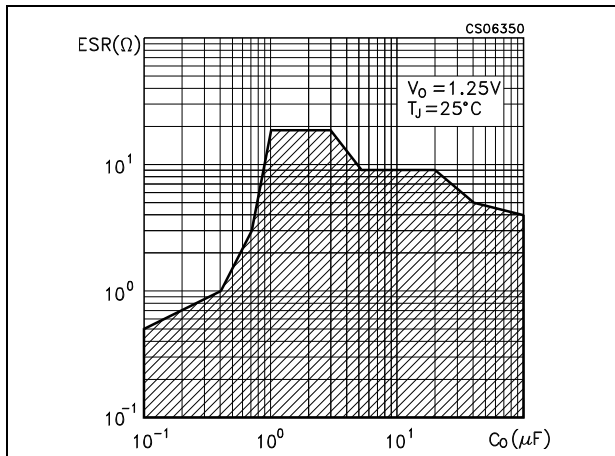


Figure 26. Stability

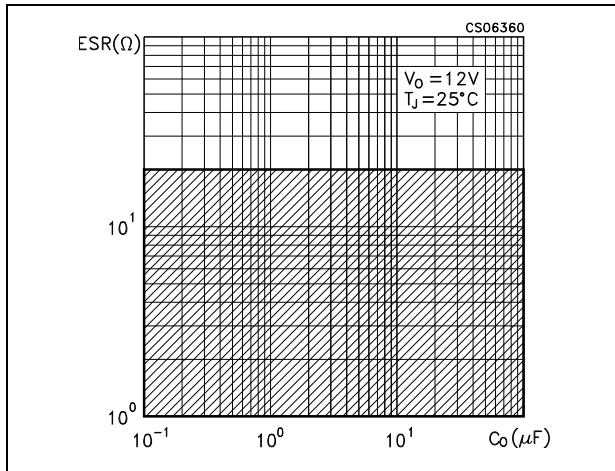


Figure 23. Supply voltage rejection vs. frequency

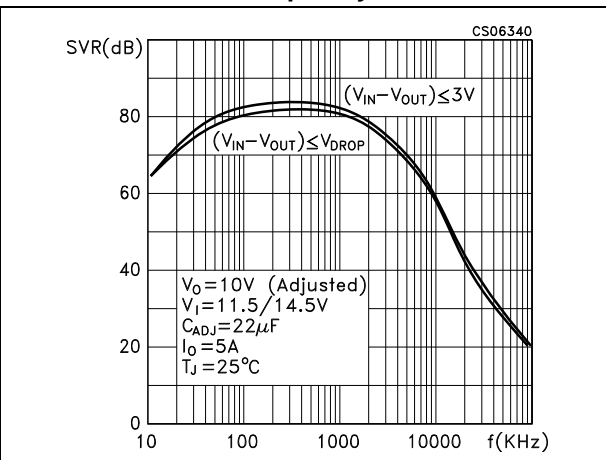


Figure 25. Supply voltage rejection vs. output current

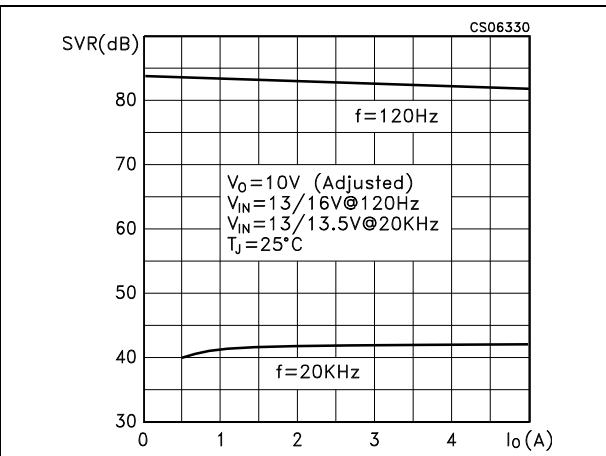


Figure 27. Line transient

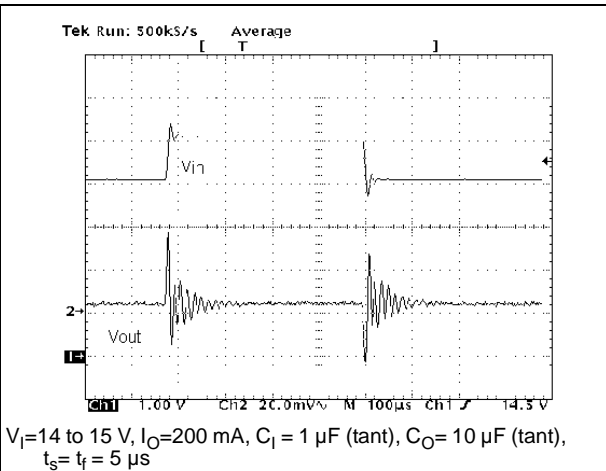


Figure 28. Line transient

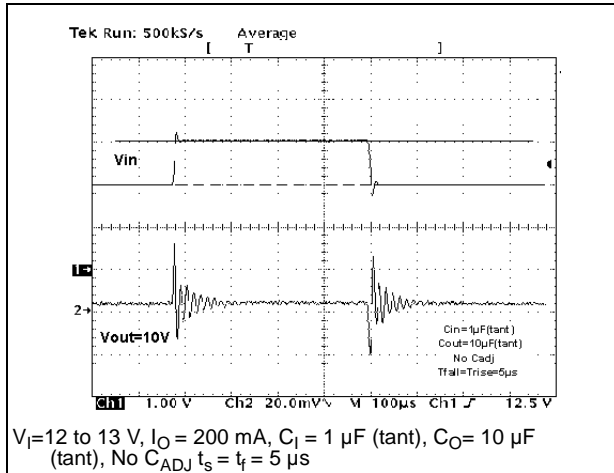


Figure 29. Load transient

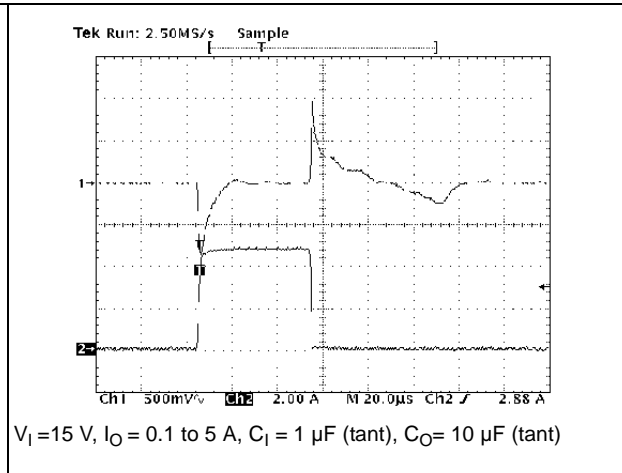


Figure 30. Load transient

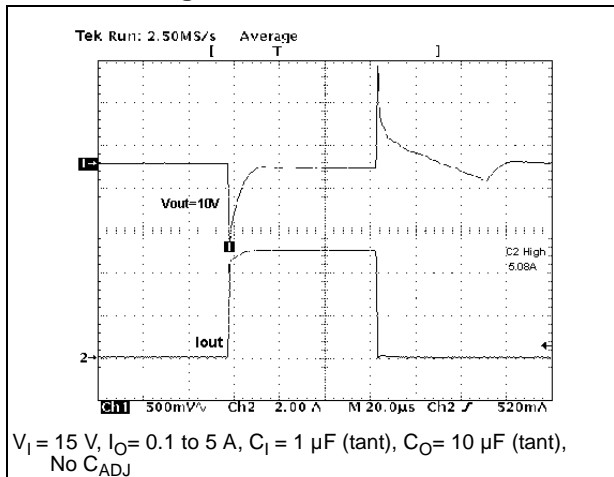


Figure 31. Line transient

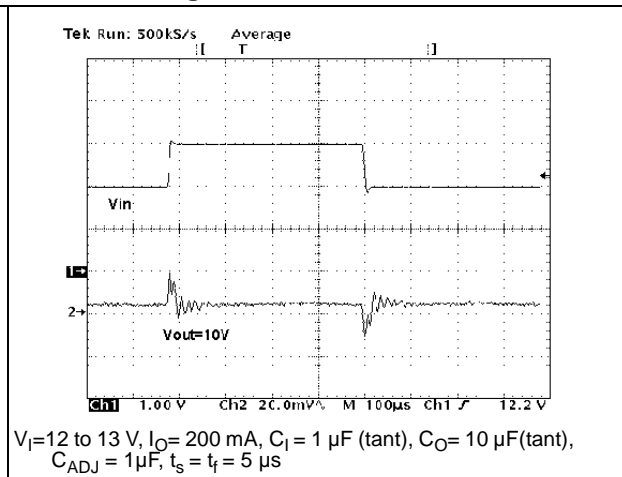
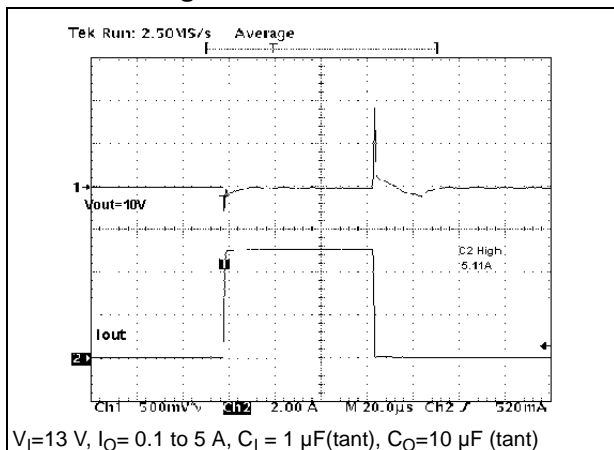


Figure 32. Load transient



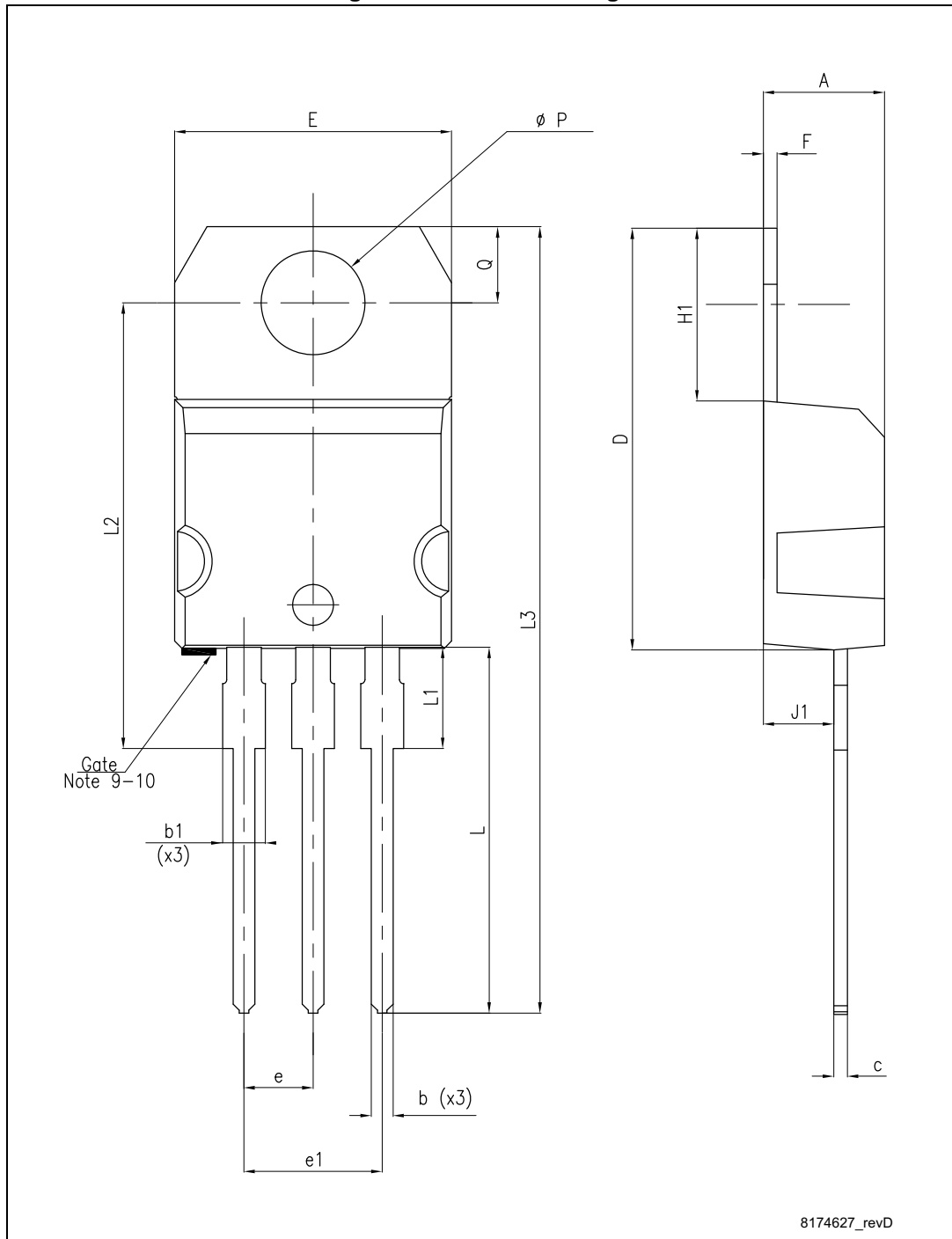
## 7 Package mechanical data

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**Table 5. TO-220 mechanical data**

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
E	10		10.40
e	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 33. TO-220 drawings



8174627\_revD

## 8 Revision history

**Table 6. Document revision history**

Date	Revision	Changes
07-Oct-2004	3	Mistake order codes - Table 1.
08-Feb-2005	4	Mistake U.M. Load Regulation - V ==> mV.
16-Jun-2005	5	Order codes updated.
04-Apr-2007	6	Order code updated.
07-Jun-2007	7	Order codes updated.
08-Apr-2008	8	Modified: <a href="#">Table 1 on page 1</a> . Removed: packages D <sup>2</sup> PAK, D <sup>2</sup> PAK/A and mechanical data.
29-Jul-2009	9	Modified: <a href="#">Table 1 on page 1</a> .
04-Sep-2013	10	RPN LD1084XX changed to LD1084. Updated the Description in cover page, <a href="#">Section 7: Package mechanical data</a> , <a href="#">Figure 2: Pin connections (top view)</a> and <a href="#">Figure 3: Application circuit</a> . Minor text changes.

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