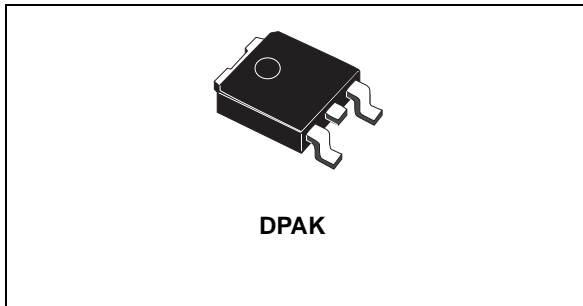


## 3 A low-drop, adjustable positive voltage regulator

Datasheet - production data



The device is supplied in DPAK. The on-chip trimming allows the regulator to reach a very tight output voltage tolerance, within  $\pm 2\%$  at 25 °C.

**Table 1. Device summary**

Order code	Package
LD1085CDT-R	DPAK (tape and reel)

### Features

- Typical dropout 1.3 V (at 3 A)
- 3-terminal adjustable output voltage
- Guaranteed output current up to 3 A
- Output tolerance  $\pm 2\%$  at 25 °C and  $\pm 3\%$  in full temperature range
- Internal power and thermal limit
- Wide operating temperature range -40 °C to 125 °C
- Package available: DPAK
- Pinout compatibility with standard adjustable VREG

### Description

The LD1085C is a low-drop voltage regulator, providing up to 3 A of output current. The dropout is guaranteed to be as low as 1.5 V at the maximum current and it decreases at lower loads. The LD1085C is pin-to-pin compatible with the old 3-terminal adjustable regulators, but it has better performances in terms of drop and output tolerance.

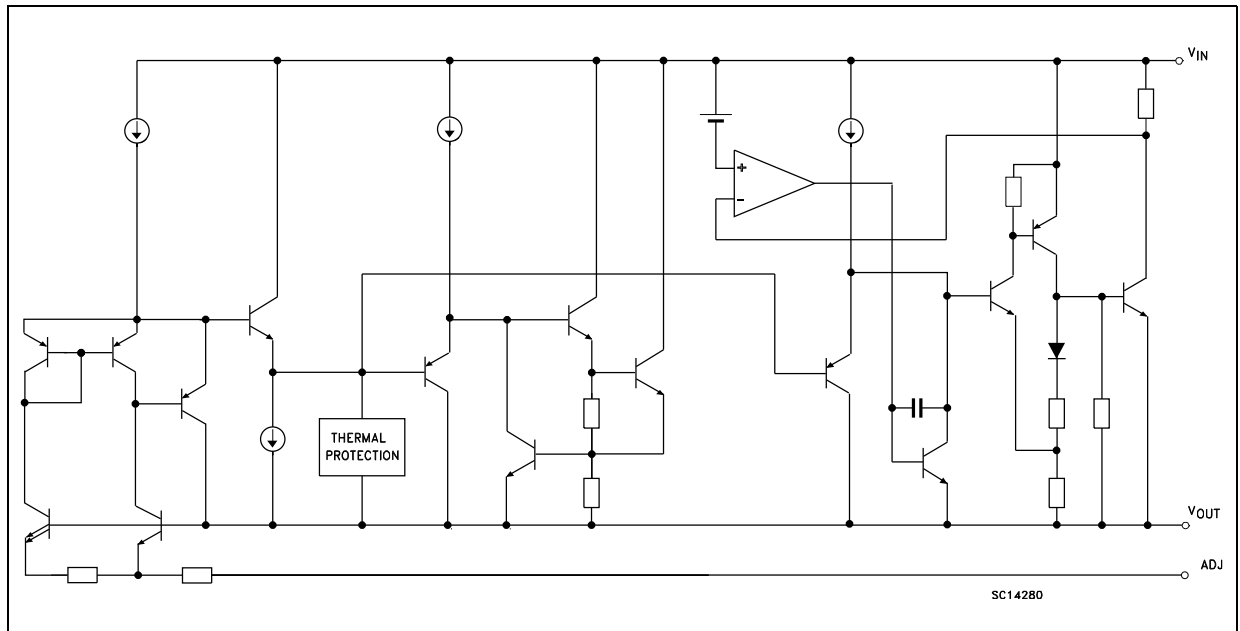
Unlike PNP regulators, where a part of the output current is wasted as quiescent current, the LD1085C quiescent current flows into the load, so to increase the efficiency. A minimum capacitor of 10  $\mu\text{F}$  is needed for stability.

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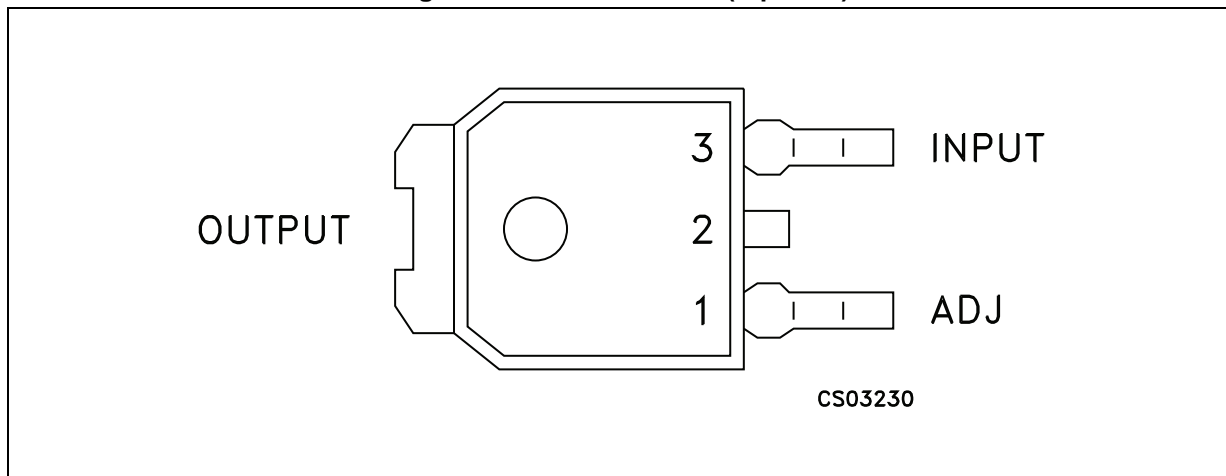
# 1 Diagram

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	
$P_D$	Power dissipation	Internally limited	
$T_{STG}$	Storage temperature range	-55 to +150	°C
$T_{OP}$	Operating junction temperature range	-40 to +125	°C

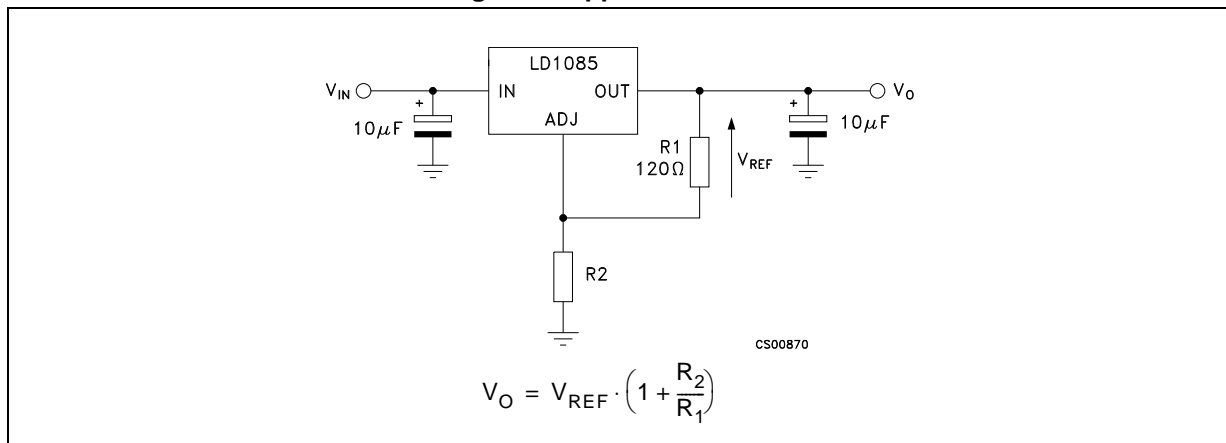
*Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.*

**Table 3. Thermal data**

Symbol	Parameter	DPAK	Unit
$R_{thJC}$	Thermal resistance junction-case	3	°C/W
$R_{thJA}$	Thermal resistance junction-ambient	62.5	°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. LD1085CDT electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{\text{Ref}}$	Reference voltage <sup>(1)</sup>	$I_O = 10\text{ mA}$ , $T_J = 25\text{ }^\circ\text{C}$	1.225	1.25	1.275	V
		$I_O = 10\text{ mA to }3\text{ A}$ , $V_I = 2.85\text{ to }30\text{ V}$ <sup>(1)</sup>	1.213	1.25	1.288	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	$V_I - V_O = 5\text{ V}$	3.2	4.5		A
		$V_I - V_O = 25\text{ V}$	0.2	0.5		A
	Thermal regulation	$T_A = 25\text{ }^\circ\text{C}$ , 30 ms pulse		0.003	0.015	%/W
SVR	Supply voltage rejection	$f = 120\text{ Hz}$ , $C_O = 25\ \mu\text{F}$ , $C_{\text{ADJ}} = 25\ \mu\text{F}$ , $I_O = 3\text{ A}$ , $V_I = 6.25 \pm 3\text{ V}$	60	75		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	$I_O = 10\text{ mA to }3\text{ A}$ , $V_I = 2.75\text{ to }16.5\text{ V}$ <sup>(1)</sup>		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 applications

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

Figure 4. Output voltage vs temperature

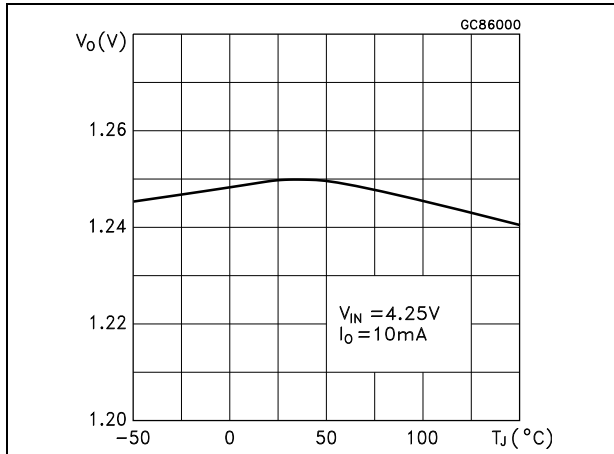


Figure 5. Short-circuit current vs dropout voltage

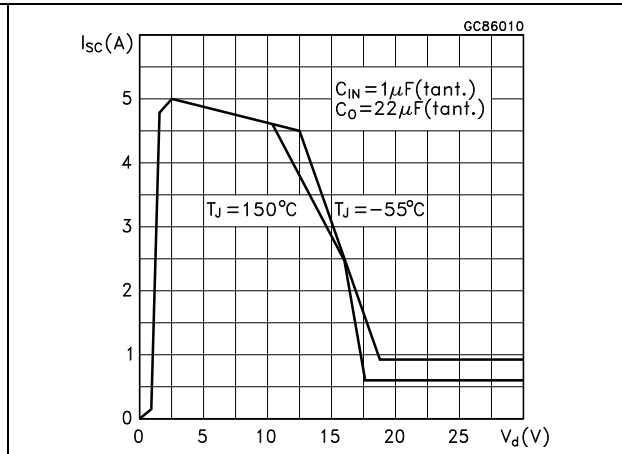


Figure 6. Line regulation vs temperature

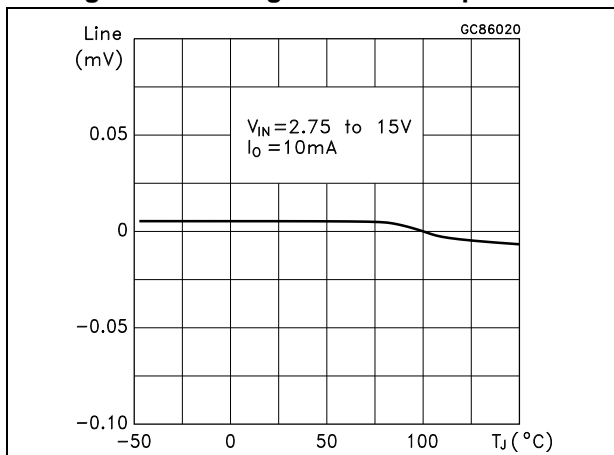


Figure 7. Load regulation vs temperature

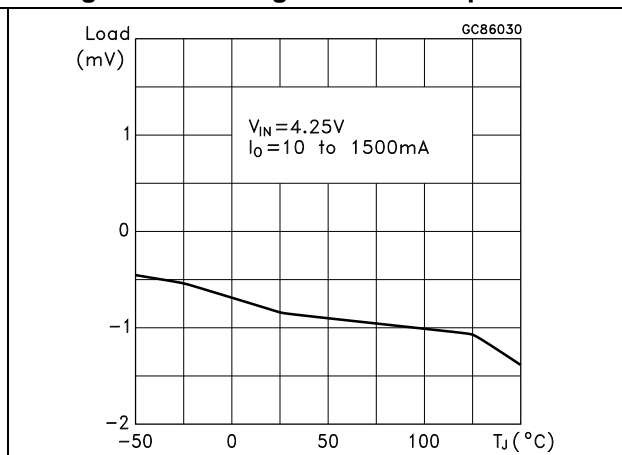




Figure 8. Dropout voltage vs temperature

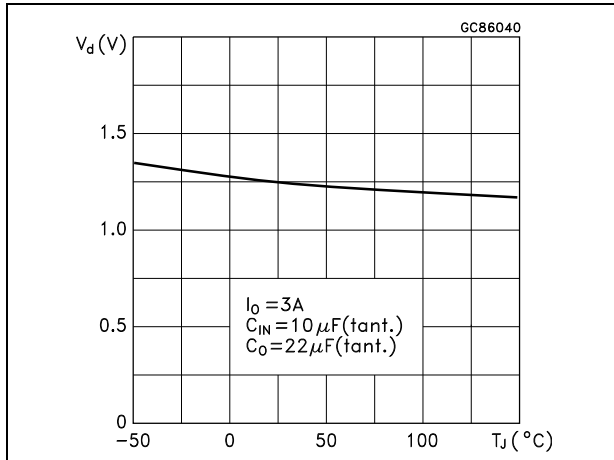


Figure 9. Dropout voltage vs output current

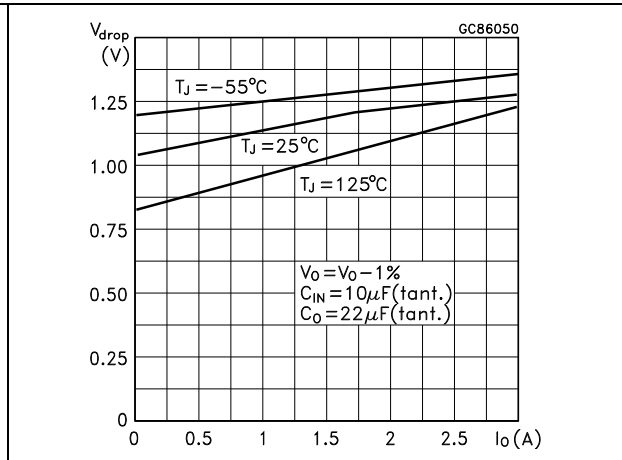


Figure 10. Adjust pin current vs temperature

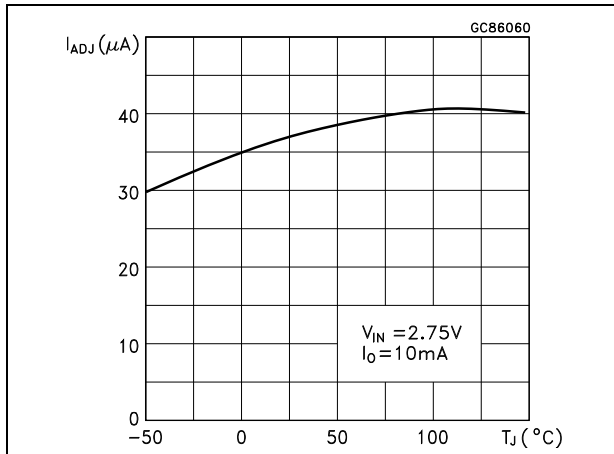


Figure 11. Quiescent current vs temperature

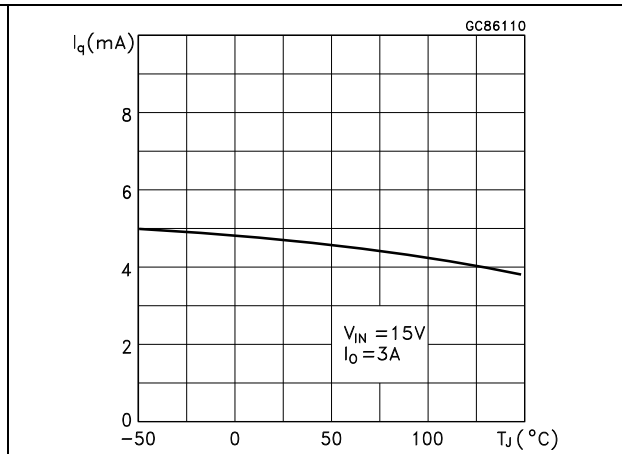


Figure 12. Supply voltage rejection vs output current

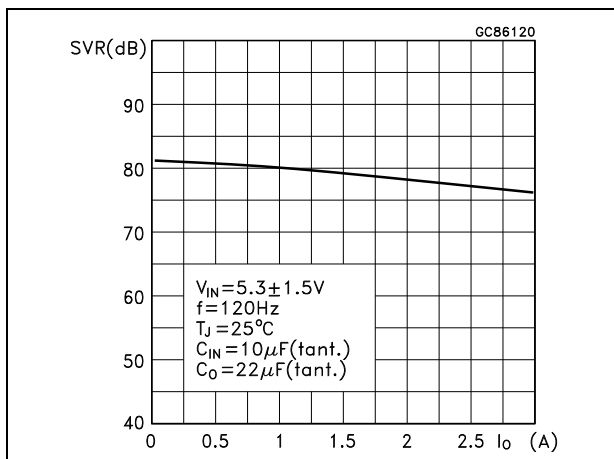


Figure 13. Supply voltage rejection vs frequency

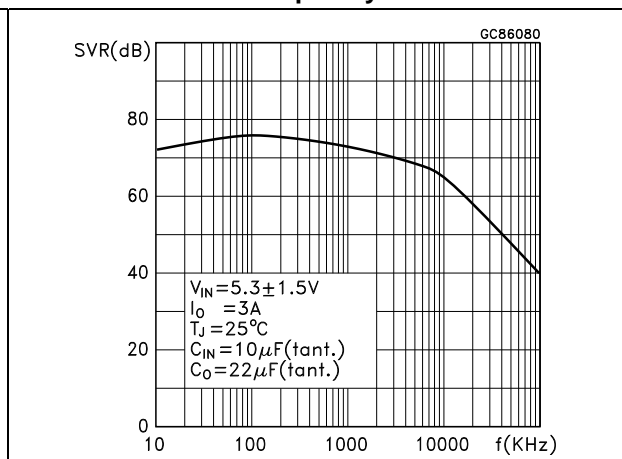


Figure 14. Supply voltage rejection vs temperature

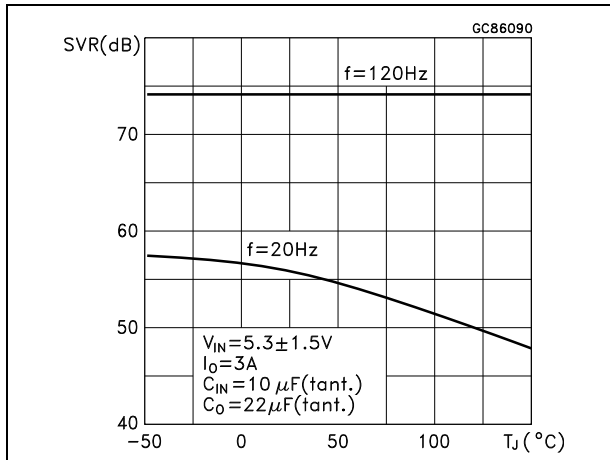


Figure 15. Minimum load current vs temperature

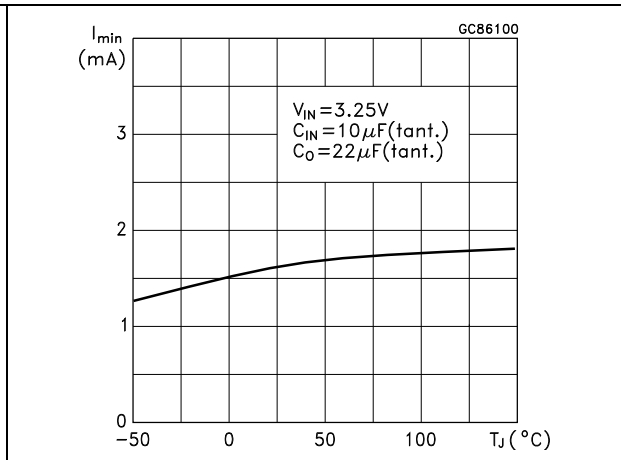


Figure 16. Stability

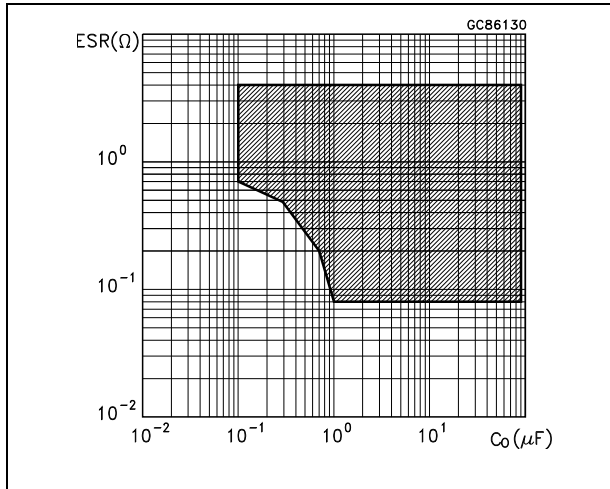


Figure 17. Line transient

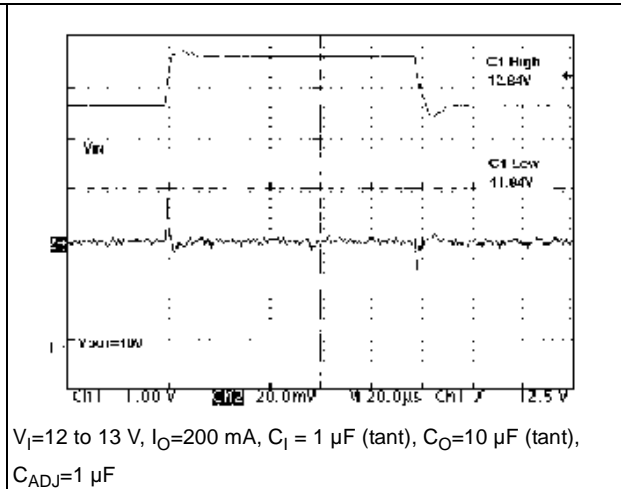


Figure 18. Load transient

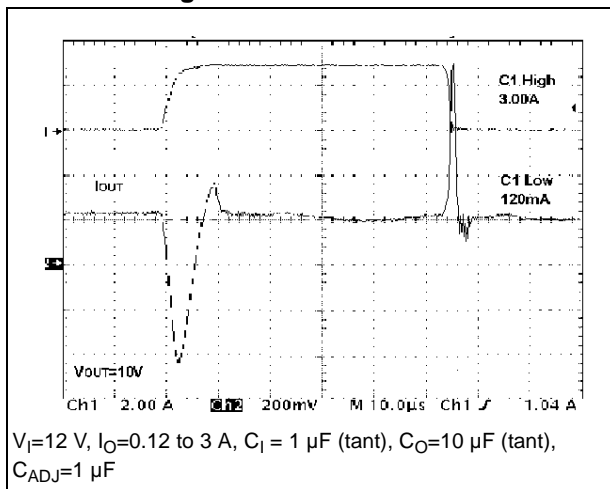
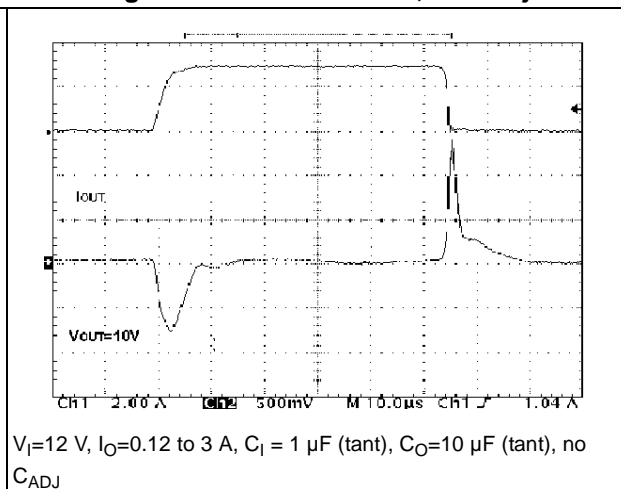


Figure 19. Load transient, no Cadj



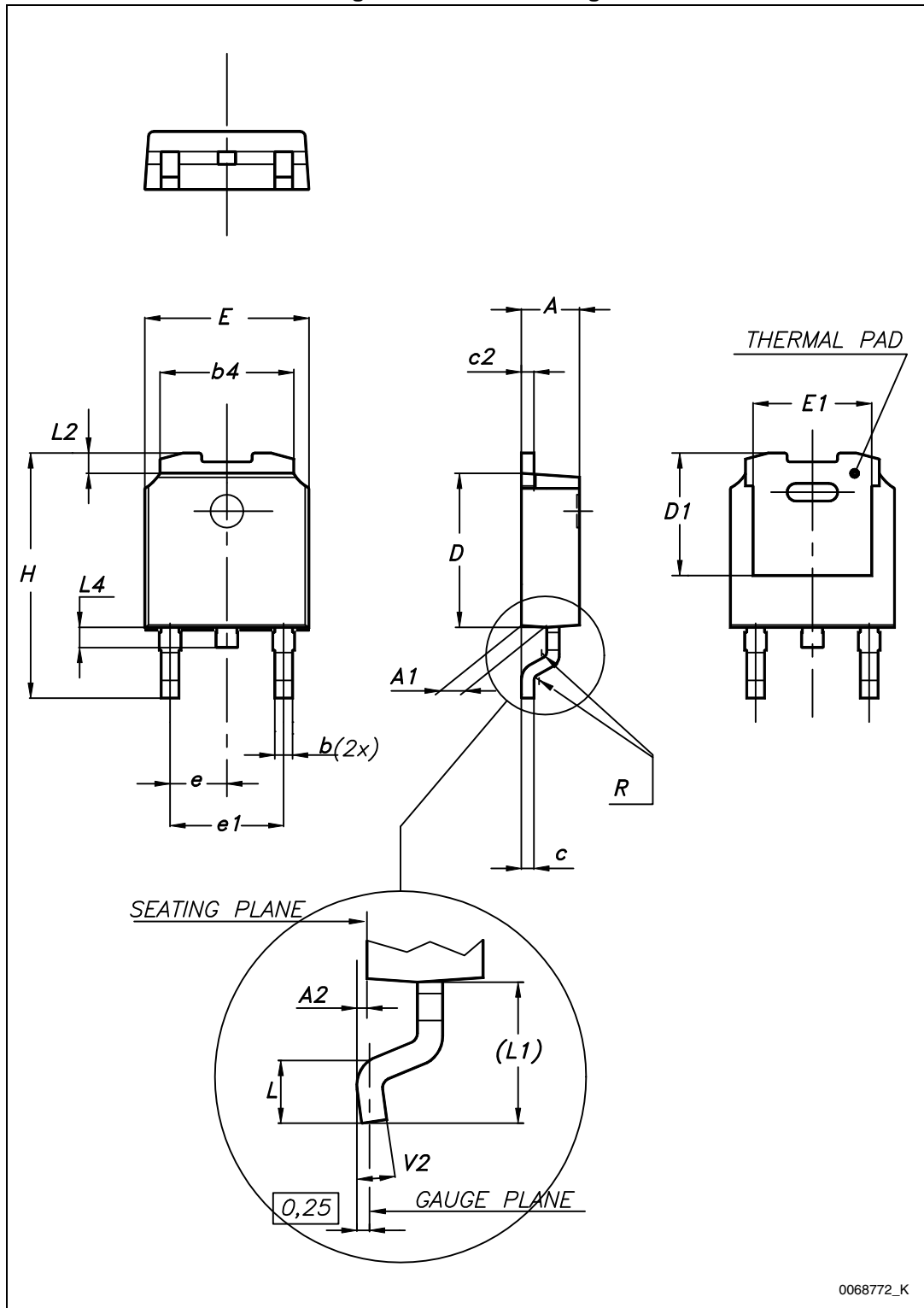
## 7 Package mechanical data

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

**Table 5. DPAK mechanical data**

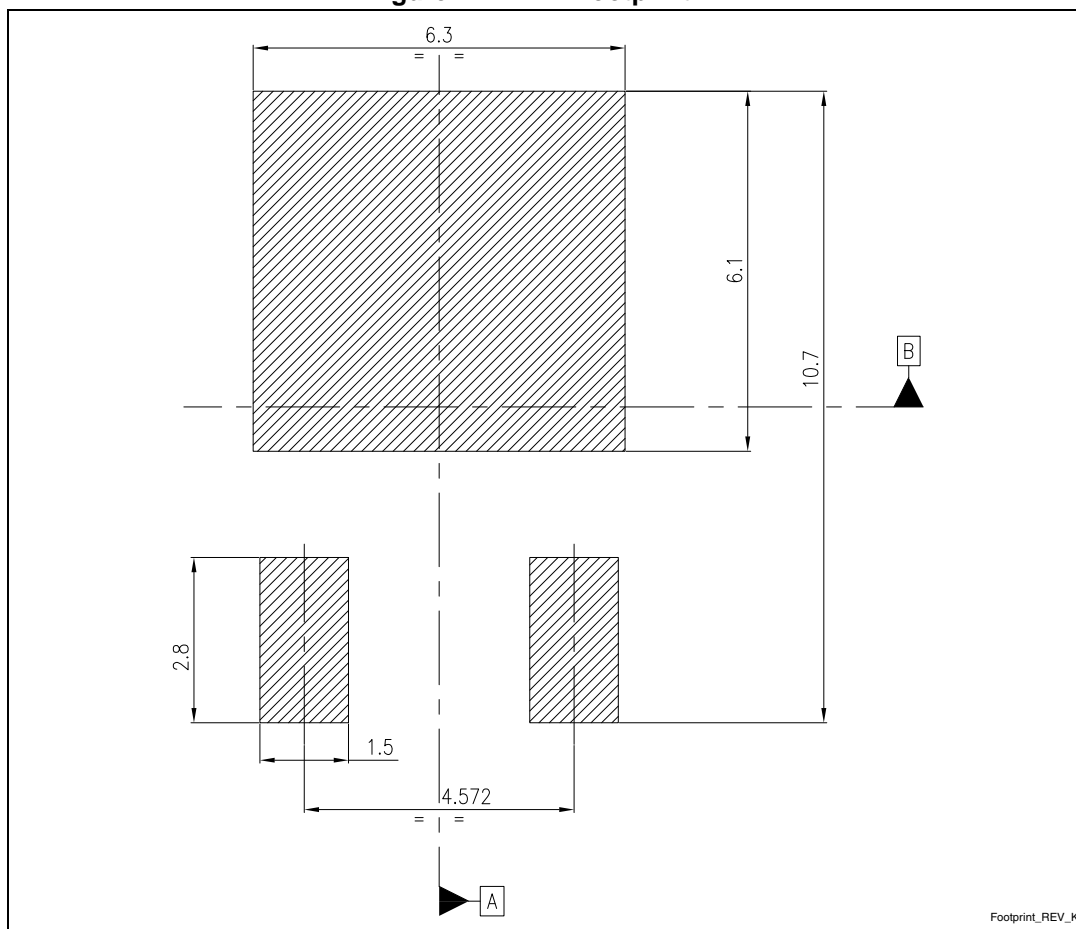
Dim.	mm		
	Min.	Typ.	Max.
A	2.20		2.40
A1	0.90		1.10
A2	0.03		0.23
b	0.64		0.90
b4	5.20		5.40
c	0.45		0.60
c2	0.48		0.60
D	6.00		6.20
D1		5.10	
E	6.40		6.60
E1		4.70	
e		2.28	
e1	4.40		4.60
H	9.35		10.10
L	1.00		1.50
(L1)		2.80	
L2		0.80	
L4	0.60		1.00
R		0.20	
V2	0°		8°

Figure 20. DPAK drawing



0068772\_K

Figure 21. DPAK footprint (a)



a. All dimensions are in millimeters

## 8 Packaging mechanical data

Table 6. DPAK tape and reel mechanical data

Tape			Reel		
Dim.	mm		Dim.	mm	
	Min.	Max.		Min.	Max.
A0	6.8	7	A		330
B0	10.4	10.6	B	1.5	
B1		12.1	C	12.8	13.2
D	1.5	1.6	D	20.2	
D1	1.5		G	16.4	18.4
E	1.65	1.85	N	50	
F	7.4	7.6	T		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				
T	0.25	0.35			
W	15.7	16.3			

Figure 22. Tape for DPAK

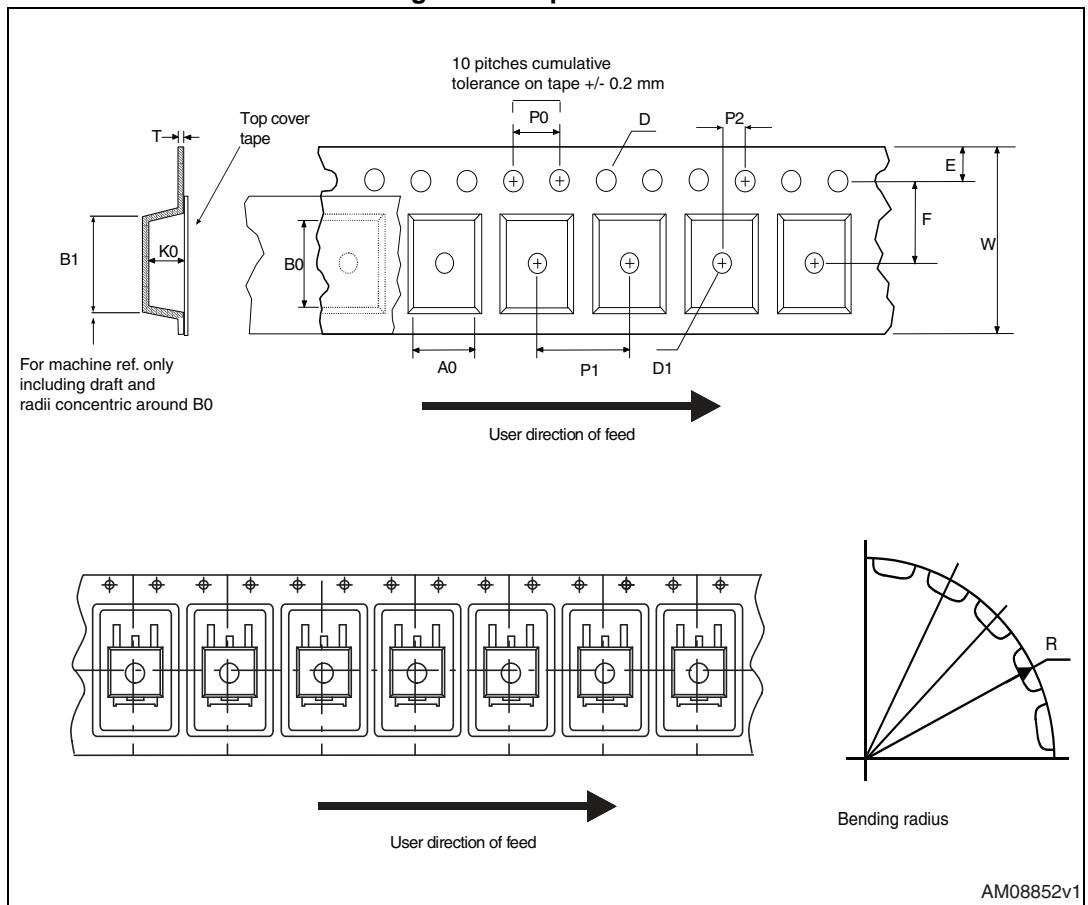
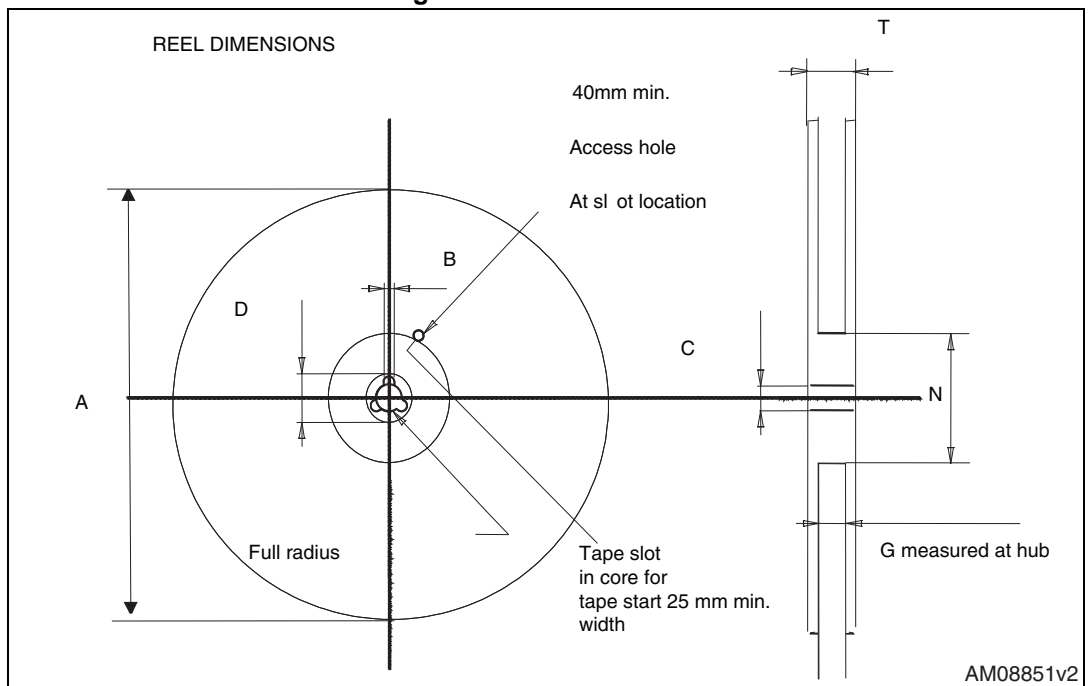


Figure 23. Reel for DPAK



## 9 Revision history

**Table 7. Document revision history**

Date	Revision	Changes
07-Oct-2004	6	Mistake in Table 1.
03-Jul-2007	7	Order codes updated.
09-Apr-2008	8	Modified: <i>Table 1 on page 1</i> .
11-Jul-2013	9	Updated Description in cover page, <i>Figure 2</i> , <i>Figure 3</i> and <i>Table 4</i> . Modified <i>Section 6: Typical applications</i> and <i>Section 7: Package mechanical data</i> . Added <i>Section 8: Packaging mechanical data</i> . Minor text changes.
04-Nov-2013	10	RPN LD1085CXX changed to LD1085C. Updated the Description in cover page. Minor text changes.



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