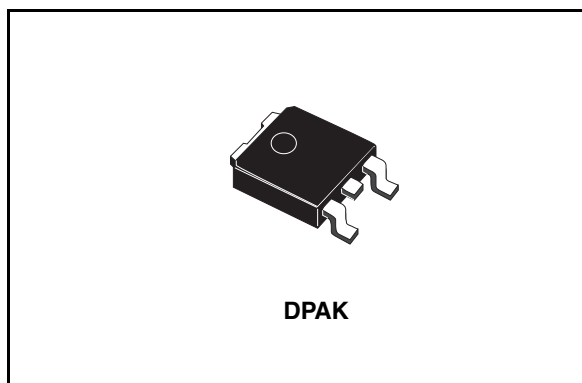


3 A low-drop, adjustable positive voltage regulator

Features

- Typical dropout 1.3 V (at 3 A)
- Three 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 able to provide up to 3 A of output current. Dropout is guaranteed at a maximum of 1.5 V at the maximum output current, decreasing at lower loads. The LD1085C is pin to pin compatible with the older 3-terminal adjustable regulators, but has better performances in term of drop and output tolerance.

A 2.85 V output version is suitable for SCSI-2 active termination. Unlike PNP regulators, where a part of the output current is wasted as quiescent current, the LD1085C quiescent current flows into the load, so increase efficiency. Only a 10 μ F minimum capacitor is need for stability.

The device is supplied in DPAK. 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 codes	Packages
LD1085CDT-R	DPAK (tape and reel)

Contents

1 **Diagram 3**

2 **Pin configuration 4**

3 **Maximum ratings 5**

4 **Schematic application 6**

5 **Electrical characteristics 7**

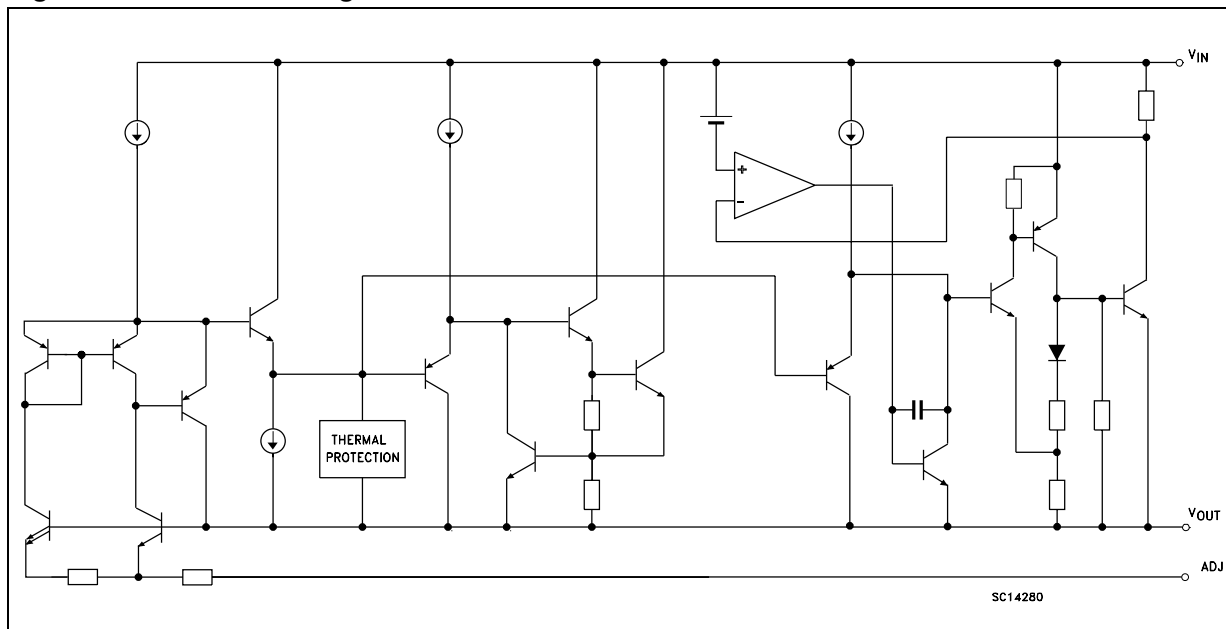
6 **Typical application 8**

7 **Package mechanical data 12**

8 **Revision history 15**

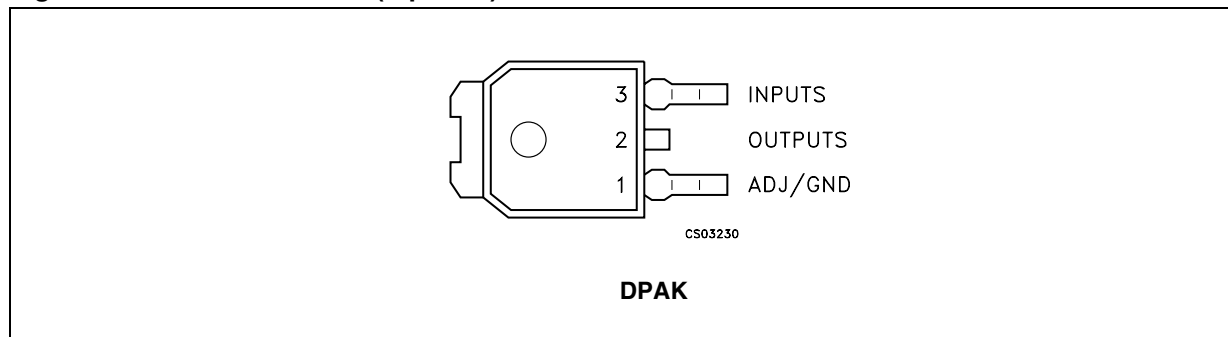
1 Diagram

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

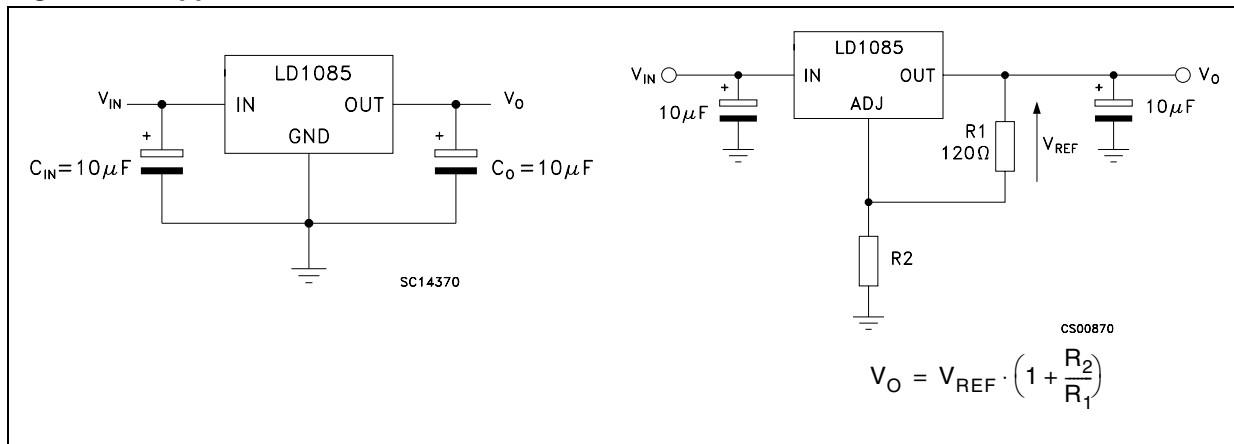
Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

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

Table 4. Electrical characteristics of LD1085CDT
($V_I = 4.25\text{ V}$, $C_I = C_O = 10\text{ }\mu\text{F}$, $T_A = -40\text{ to }125\text{ }^\circ\text{C}$, unless otherwise specified).

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_O	Output voltage ⁽¹⁾	$I_O = 10\text{mA}$, $T_J = 25^\circ\text{C}$	1.225	1.25	1.275	V
		$I_O = 10\text{mA}$ to 3A , $V_I = 2.85\text{ to }30\text{V}$ ⁽¹⁾	1.213	1.25	1.288	V
ΔV_O	Line regulation	$I_O = 10\text{mA}$, $V_I = 2.85\text{ to }16.5\text{V}$, $T_J = 25^\circ\text{C}$		0.015	0.2	%
		$I_O = 10\text{mA}$, $V_I = 2.85\text{ to }16.5\text{V}$		0.035	0.2	%
ΔV_O	Load regulation	$I_O = 10\text{mA}$ to 5A , $T_J = 25^\circ\text{C}$		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
$I_{O(\min)}$	Minimum load current	$V_I = 30\text{V}$		3	10	mA
I_{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	$T_A = 25^\circ\text{C}$, 30ms pulse		0.003	0.015	%/W
SVR	Supply voltage rejection	$f = 120\text{ Hz}$, $C_O = 25\mu\text{F}$, $C_{ADJ} = 25\text{ }\mu\text{F}$, $I_O = 3\text{A}$, $V_I = 6.25 \pm 3\text{V}$	60	75		dB
I_{ADJ}	Adjust pin current	$V_I = 4.25\text{V}$, $I_O = 10\text{ mA}$		55	120	μA
ΔI_{ADJ}	Adjust pin current change	$I_O = 10\text{mA}$ to 3A , $V_I = 2.75\text{ to }16.5\text{V}$ ⁽¹⁾		0.2	5	μA
eN	RMS output noise voltage (% of V_O)	$T_A = 25^\circ\text{C}$, $f = 10\text{Hz to }10\text{kHz}$		0.003		%
S	Temperature stability			0.5		%
S	Long term stability	$T_A = 125^\circ\text{C}$, 1000Hrs		0.5		%

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

6 Typical application

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

Figure 4. Output voltage vs temperature

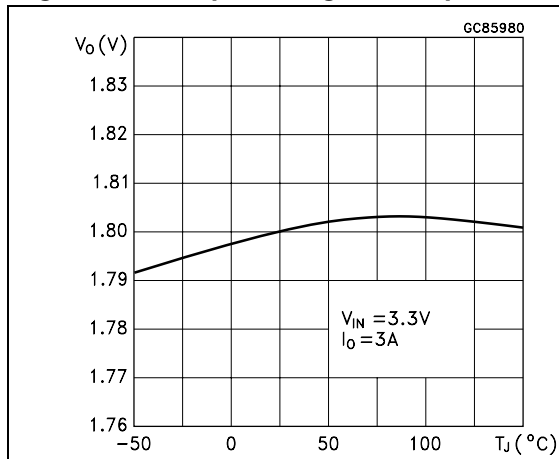


Figure 5. Output voltage vs temperature

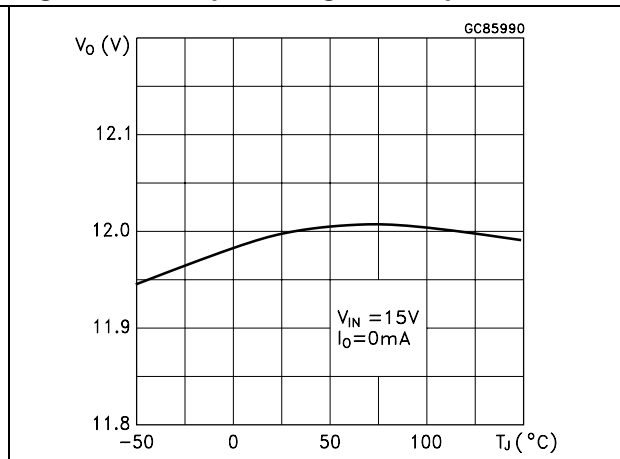


Figure 6. Output voltage vs temperature

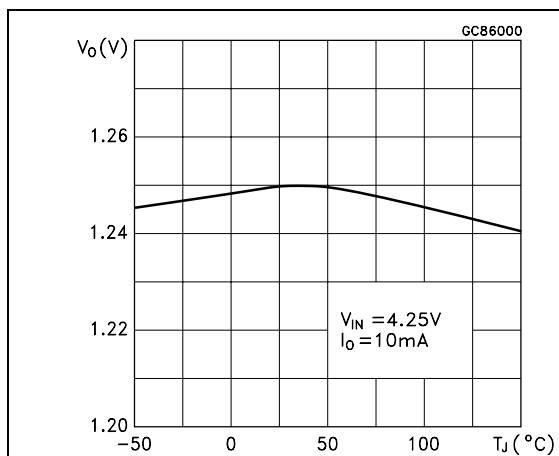


Figure 7. Short circuit current vs dropout voltage

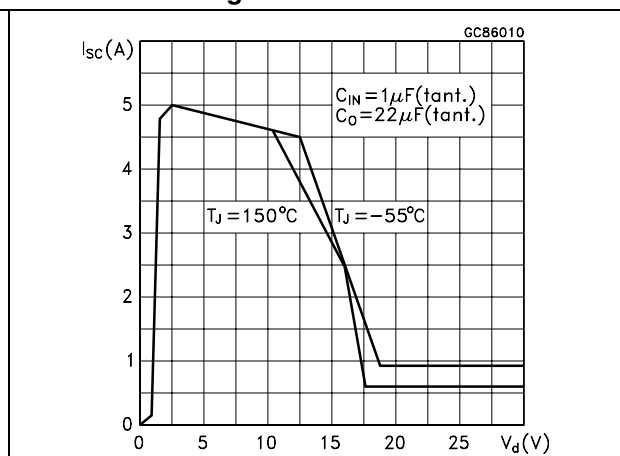


Figure 8. Line regulation vs temperature

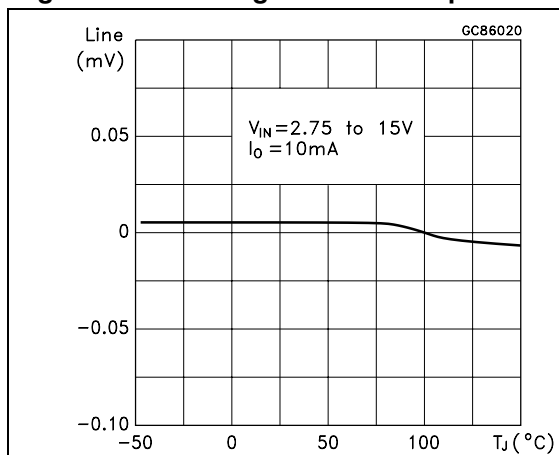


Figure 9. Load regulation vs temperature

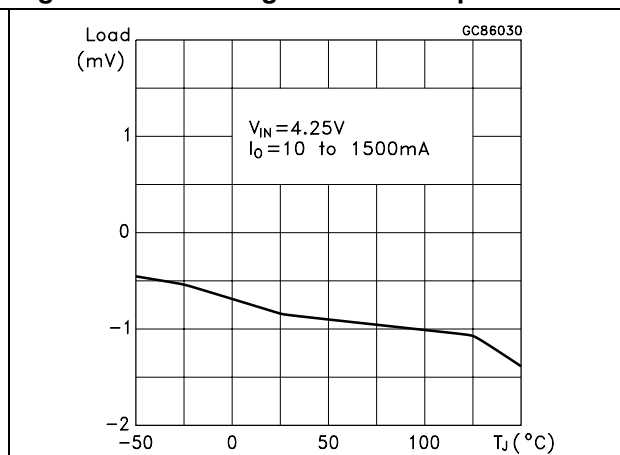


Figure 10. Dropout voltage vs temperature

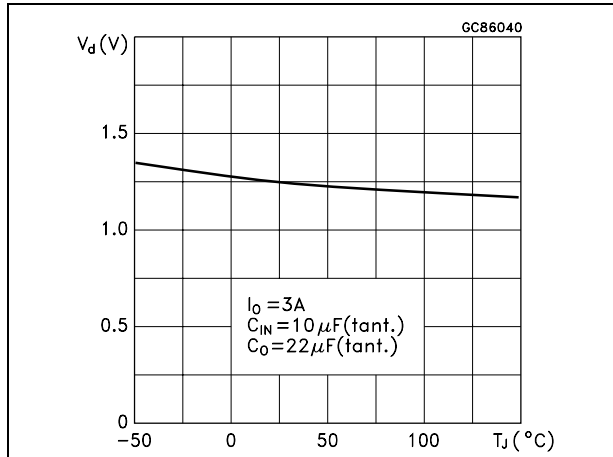


Figure 11. Dropout voltage vs output current

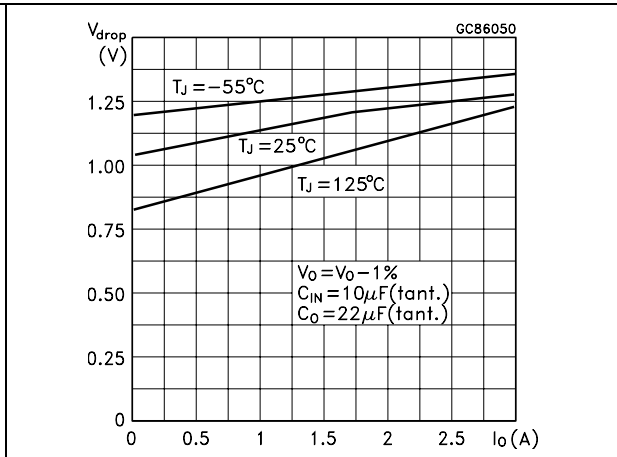


Figure 12. Adjust pin current vs temperature

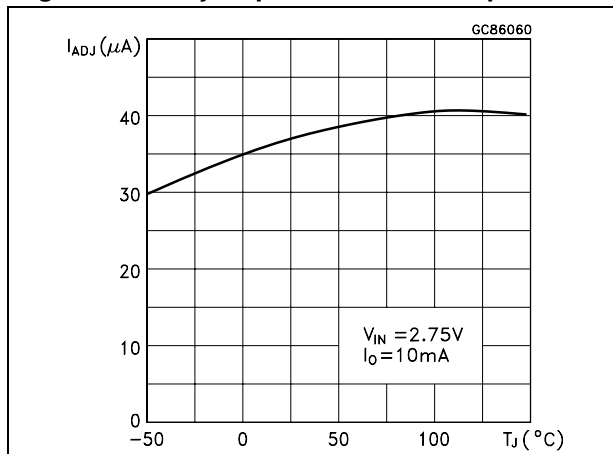


Figure 13. Quiescent current vs temperature

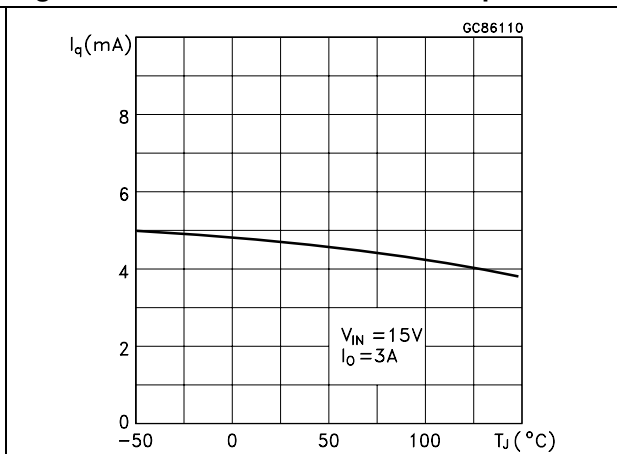


Figure 14. Line regulation vs temperature

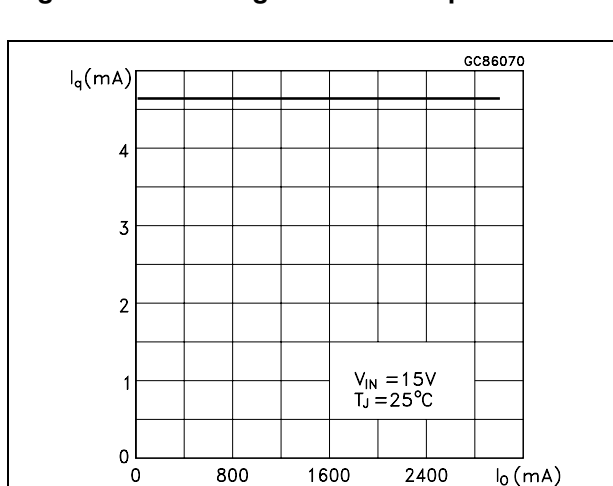


Figure 15. Supply voltage rejection vs output current

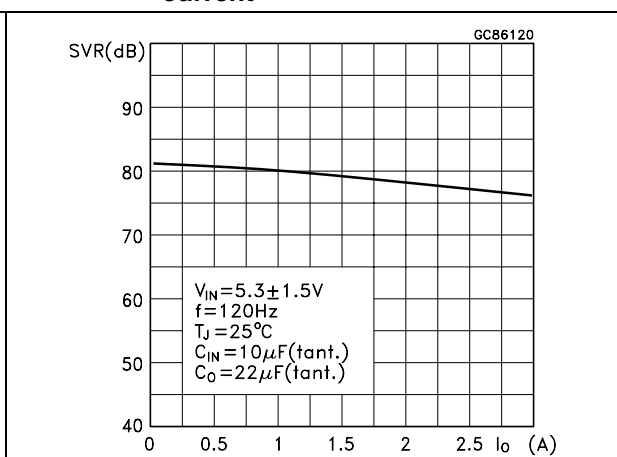


Figure 16. Supply voltage rejection vs frequency

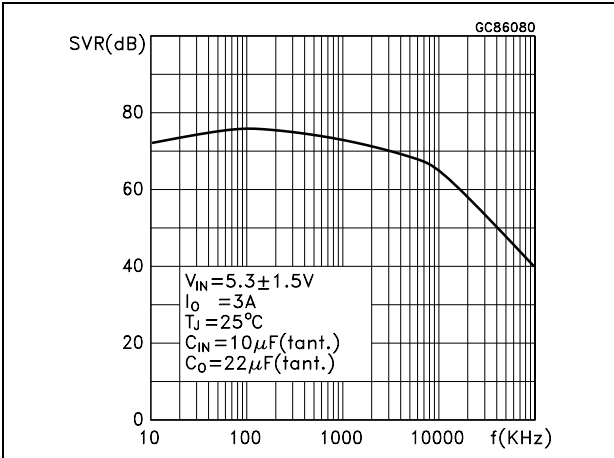


Figure 17. Supply voltage rejection vs temperature

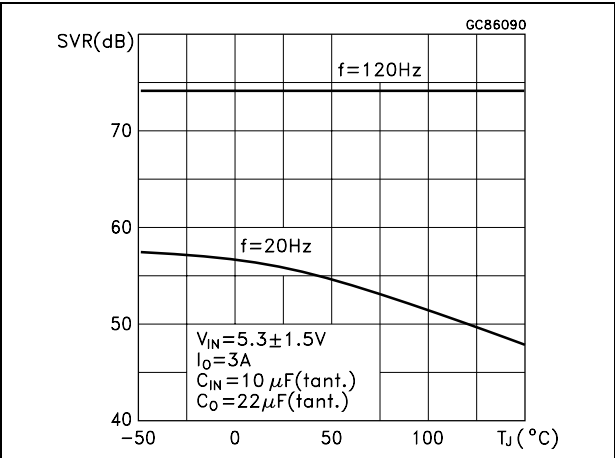


Figure 18. Minimum load current vs temperature

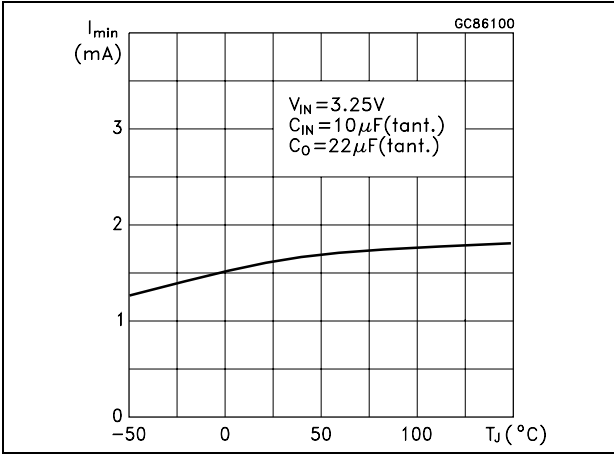


Figure 19. Stability

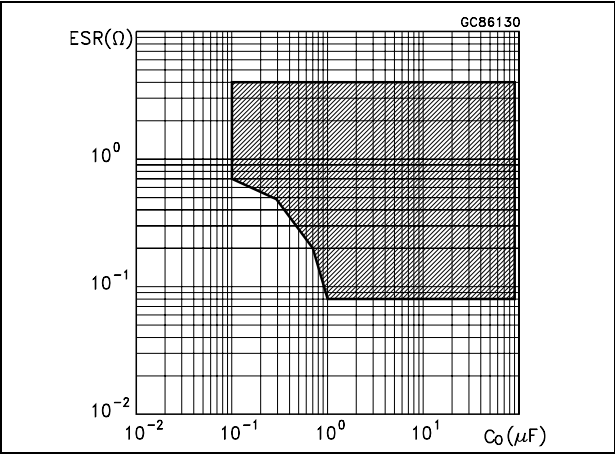


Figure 20. Stability

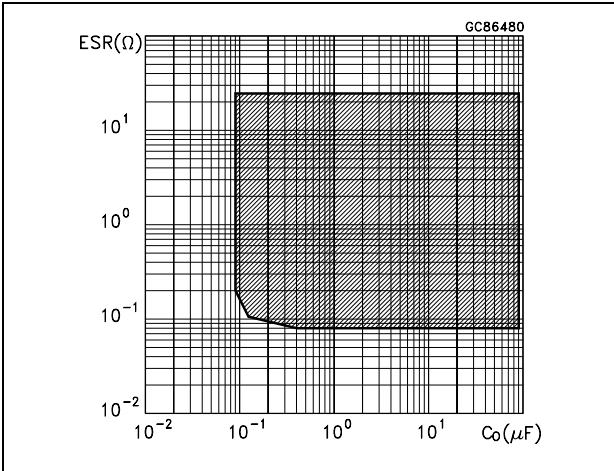


Figure 21. Line transient

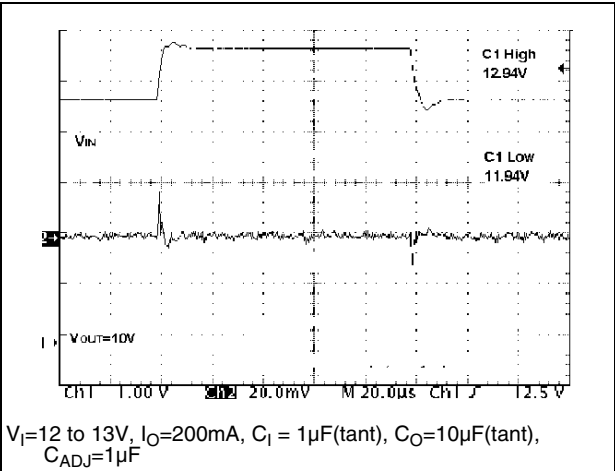


Figure 22. Line transient

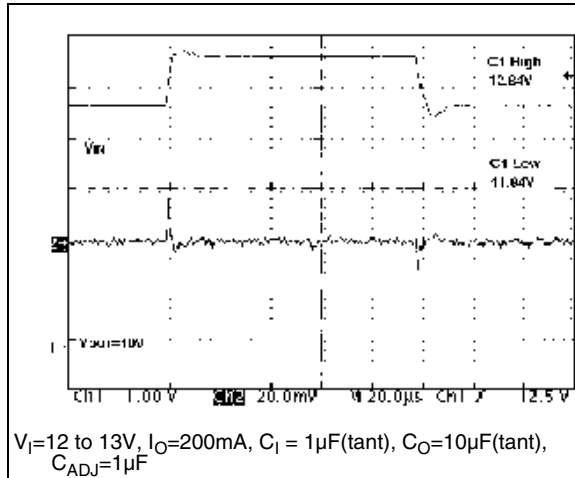


Figure 23. Load transient

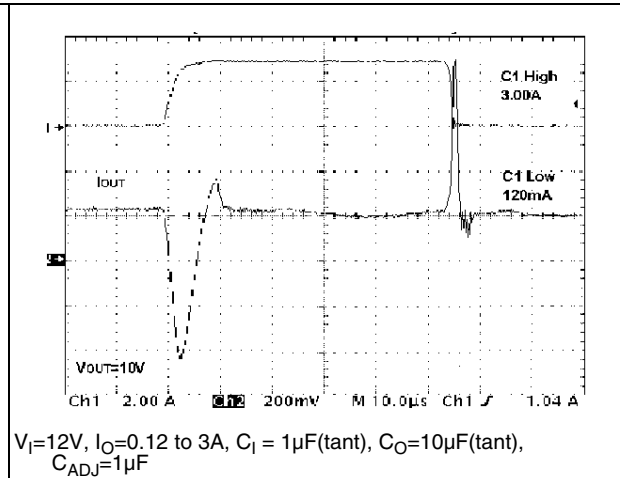
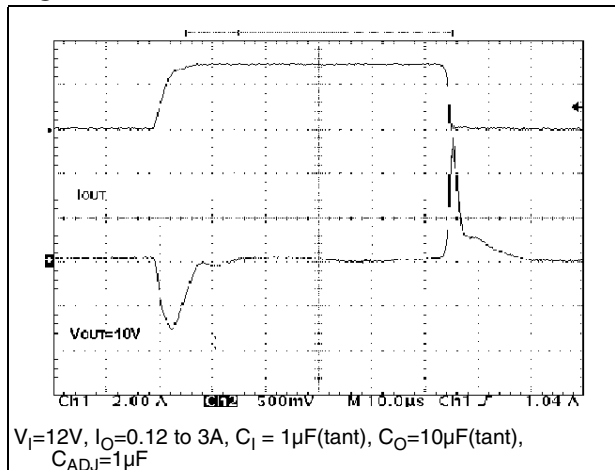


Figure 24. Load transient

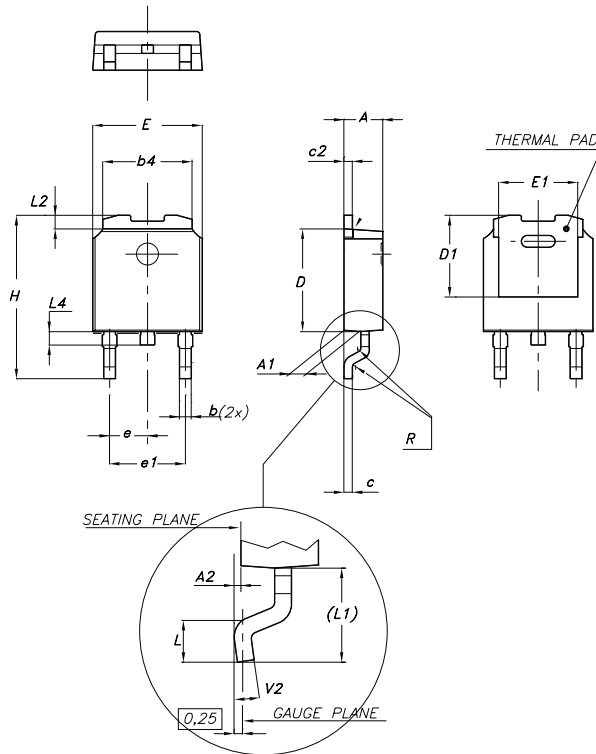


7 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second Level Interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

DPAK mechanical data

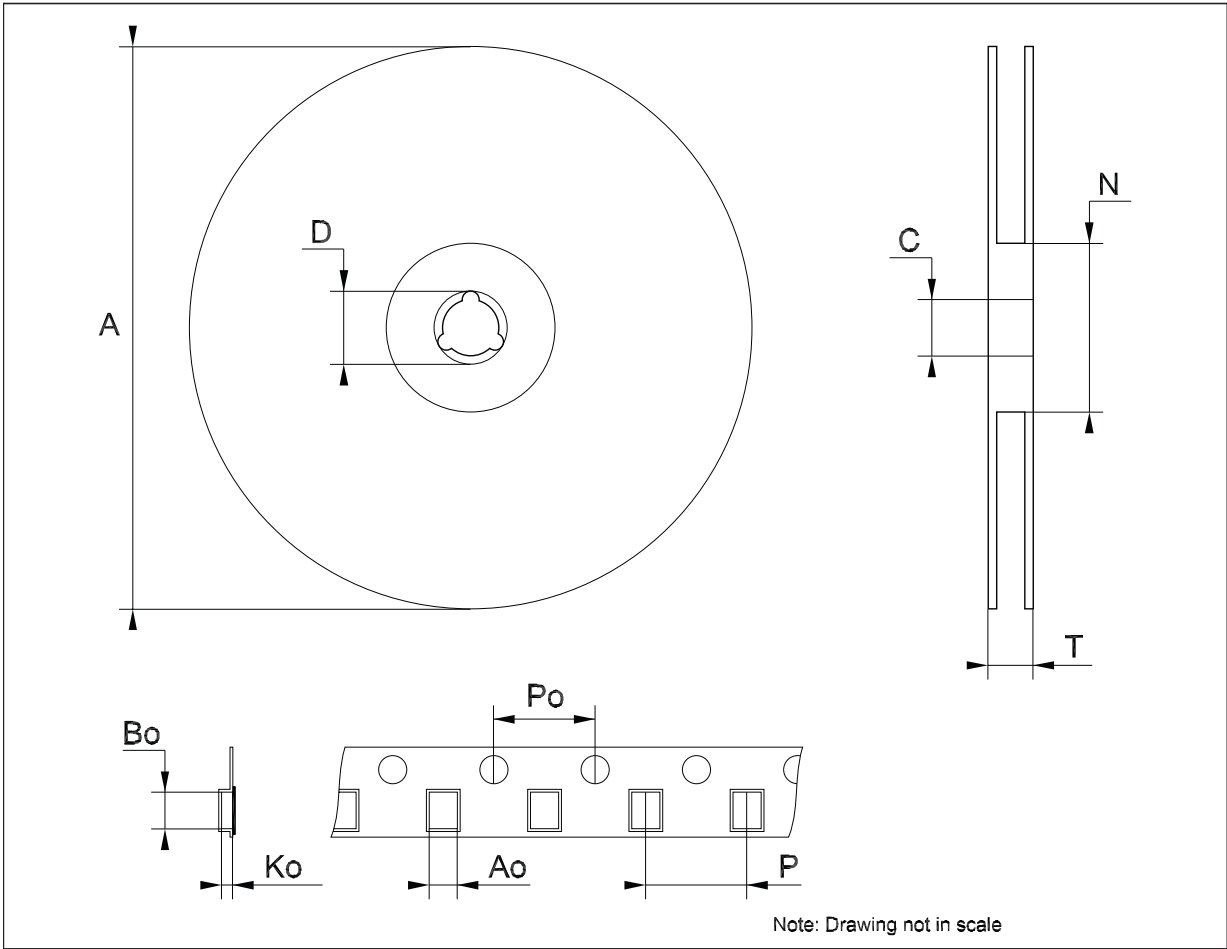
Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.64		0.9	0.025		0.035
b4	5.2		5.4	0.204		0.212
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
D1		5.1			0.200	
E	6.4		6.6	0.252		0.260
E1		4.7			0.185	
e		2.28			0.090	
e1	4.4		4.6	0.173		0.181
H	9.35		10.1	0.368		0.397
L	1			0.039		
(L1)		2.8			0.110	
L2		0.8			0.031	
L4	0.6		1	0.023		0.039
R		0.2			0.008	
V2	0°		8°	0°		8°



0068772-F

Tape & reel DPAK-PPAK mechanical data

Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			330			12.992
C	12.8	13.0	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	60			2.362		
T			22.4			0.882
Ao	6.80	6.90	7.00	0.268	0.272	0.276
Bo	10.40	10.50	10.60	0.409	0.413	0.417
Ko	2.55	2.65	2.75	0.100	0.104	0.105
Po	3.9	4.0	4.1	0.153	0.157	0.161
P	7.9	8.0	8.1	0.311	0.315	0.319



8 Revision history

Table 5. 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: Table 1 on page 1 .

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