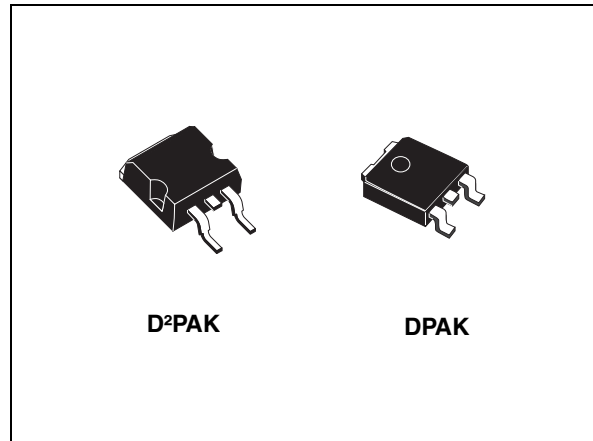


5 A low drop positive voltage regulator adjustable and fixed

Features

- Typical dropout 1.3 V (at 5 A)
- Three terminal adjustable or fixed output voltage 1.8 V, 3.3 V.
- Guaranteed output current up to 5 A
- Output tolerance $\pm 1\%$ at 25 °C and $\pm 2\%$ in full temperature range for the "A" version
- Output tolerance $\pm 2\%$ at 25 °C and $\pm 3\%$ in full temperature range internal power and thermal limit
- Wide operating temp. range -40 °C to 125 °C
- Package available: D²PAK and DPAK
- Pinout compatibility with standard adjustable VREG



"A" version and $\pm 2\%$ at 25 °C for standard version.

Description

The KD1084 is a low drop voltage regulator able to provide 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 KD1084 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 KD1084 quiescent current flows into the load, so increase efficiency. Only a 10 μ F minimum capacitor is need for stability. The devices are supplied in D²PAK and DPAK. On chip trimming allows the regulator to reach a very tight output voltage tolerance, within $\pm 1\%$ at 25 °C for

Table 1. Device summary

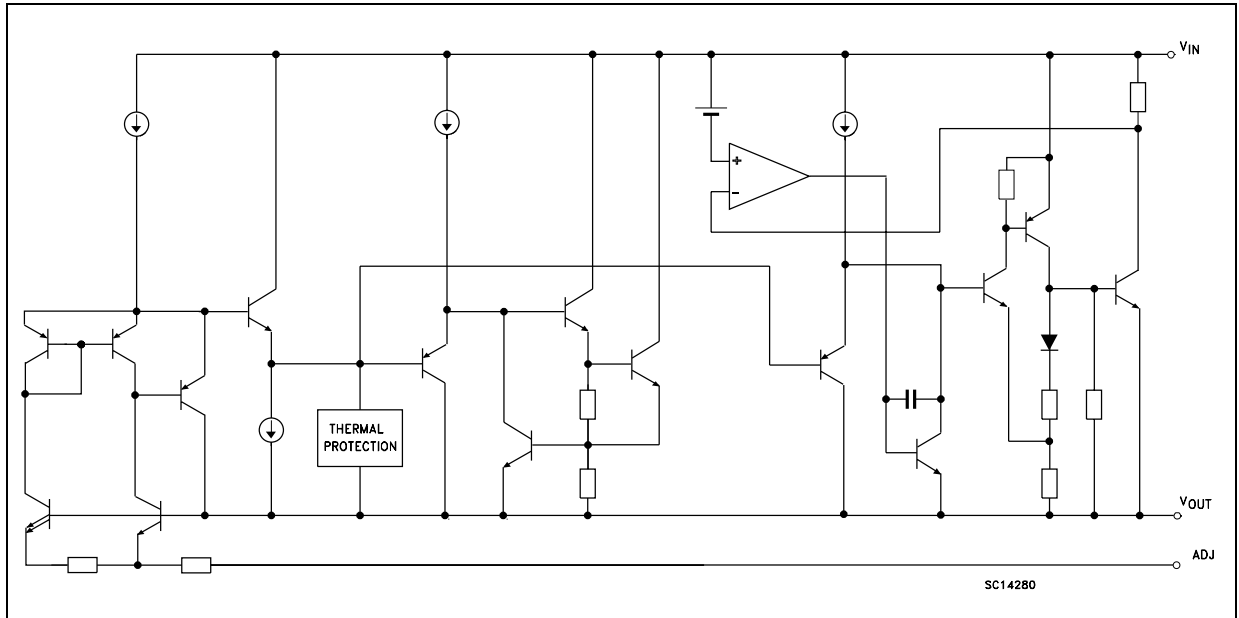
Order codes			
D ² PAK	DPAK	Output voltage	Tolerance
KD1084AD2T18R		1.8 V	1%
	KD1084ADT-R	ADJ	1%

Contents

1	Diagram	3
2	Pin configuration	4
3	Maximum ratings	5
4	Schematic application	6
5	Electrical characteristics	7
6	Typical application	9
7	Package mechanical data	11
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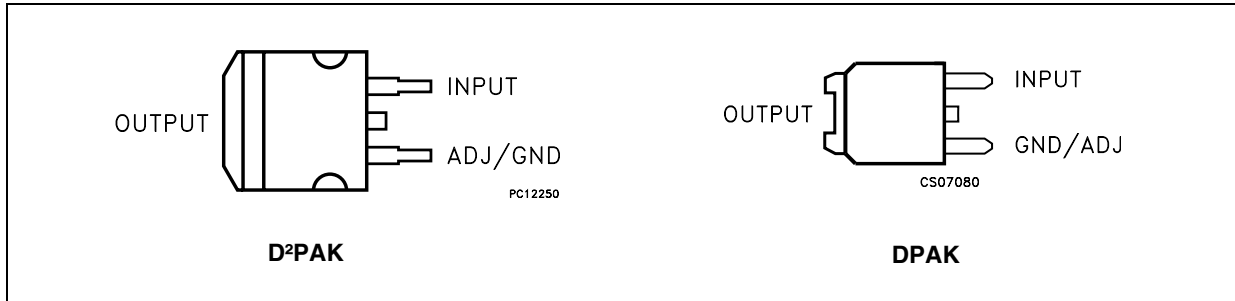
1 Diagram

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	12	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

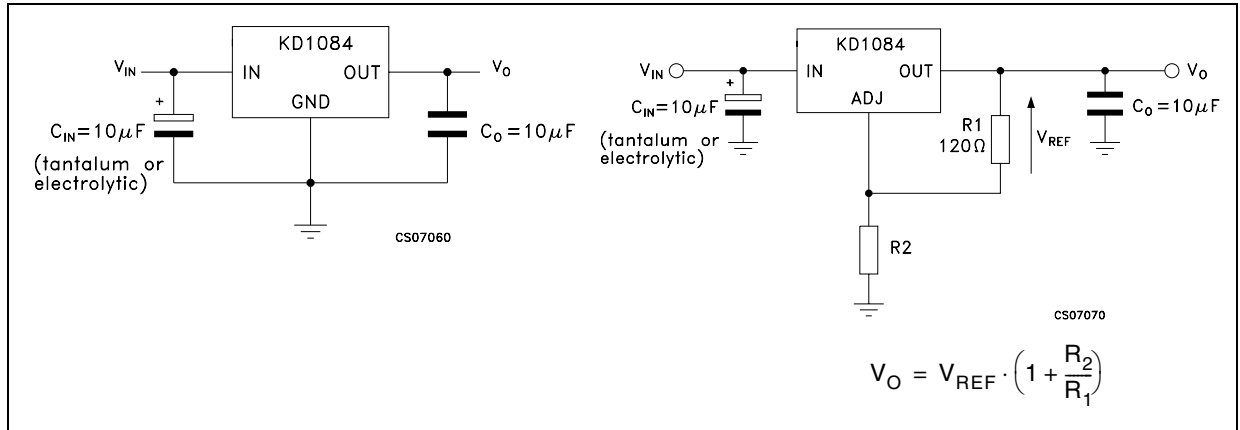
Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

Table 3. Thermal data

Symbol	Parameter	DPAK	D ² PAK	Unit
R_{thJC}	Thermal resistance junction-case	8	3	°C/W
R_{thJA}	Thermal resistance junction-ambient	100	62.5	°C/W

4 Schematic application

Figure 3. Application circuit



5 Electrical characteristics

$V_I = 4.8\text{ V}$, $C_I = C_O = 10\ \mu\text{F}$ (tant.), $T_A = -40\text{ to }125\text{ }^\circ\text{C}$, unless otherwise specified.

Table 4. Electrical characteristics of KD1084AXX18

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 0\text{ mA}$, $T_J = 25\text{ }^\circ\text{C}$	1.782	1.8	1.818	V
		$I_O = 0\text{ to }5\text{ A}$, $V_I = 3.4\text{ to }10\text{ V}$	1.764	1.8	1.836	V
ΔV_O	Line regulation	$I_O = 0\text{ mA}$, $V_I = 3.4\text{ to }10\text{ V}$ $T_J = 25\text{ }^\circ\text{C}$		0.5	6	mV
		$I_O = 0\text{ mA}$, $V_I = 3.4\text{ to }10\text{ V}$		1	6	mV
ΔV_O	Load regulation	$I_O = 0\text{ to }5\text{ A}$, $T_J = 25\text{ }^\circ\text{C}$		3	15	mV
		$I_O = 0\text{ to }5\text{ A}$		7	20	mV
V_d	Dropout voltage	$I_O = 5\text{ A}$		1.3	1.5	V
I_q	Quiescent current	$V_I \leq 10\text{ V}$		5	10	mA
I_{sc}	Short circuit current	$V_I - V_O = 5\text{ V}$	5.5	7		A
	Thermal regulation	$T_A = 25\text{ }^\circ\text{C}$, 30 ms pulse		0.003	0.015	%/W
SVR	Supply voltage rejection	$f = 120\text{ Hz}$, $C_O = 25\ \mu\text{F}$, $I_O = 5\text{ A}$ $V_I = 5.3 \pm 1.5\text{ V}$	60	75		dB
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		%

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

Table 5. Electrical characteristics of KD1084AXX

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 10\text{ mA}$, $T_J = 25^\circ\text{C}$	1.237	1.25	1.263	V
		$I_O = 10\text{ mA to }5\text{ A}$, $V_I = 2.85\text{ to }10\text{ V}$	1.225	1.25	1.275	V
ΔV_O	Line regulation	$I_O = 10\text{ mA}$, $V_I = 2.85\text{ to }10\text{ V}$ $T_J = 25^\circ\text{C}$		0.015	0.2	%
		$I_O = 10\text{ mA}$, $V_I = 2.85\text{ to }10\text{ V}$		0.035	0.2	
ΔV_O	Load regulation	$I_O = 10\text{ mA to }5\text{ A}$, $T_J = 25^\circ\text{C}$		0.1	0.3	
		$I_O = 10\text{ mA to }5\text{ A}$		0.2	0.4	
V_d	Dropout voltage	$I_O = 5\text{ A}$		1.3	1.5	V
$I_{O(\text{min})}$	Quiescent current	$V_I \leq 10\text{ V}$		3	10	mA
I_{sc}	Short circuit current	$V_I - V_O = 5\text{ V}$	5.5	7		A
	Thermal regulation	$T_A = 25^\circ\text{C}$, 30 ms pulse		0.003	0.015	%/W
SVR	Supply voltage rejection	$f = 120\text{ Hz}$, $C_O = 25\ \mu\text{F}$, $C_{\text{ADJ}} = 25\ \mu\text{F}$, $I_O = 5\text{ A}$, $V_I = 4.75 \pm 1.5\text{ V}$	60	72		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	$V_I = 2.85\text{ to }10\text{ V}$, $I_O = 10\text{ mA to }5\text{ A}$		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	$T_A = 125^\circ\text{C}$, 1000 Hrs		0.5		%

6 Typical application

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

Figure 4. Dropout voltage vs. output current **Figure 5. Dropout voltage vs. temperature**

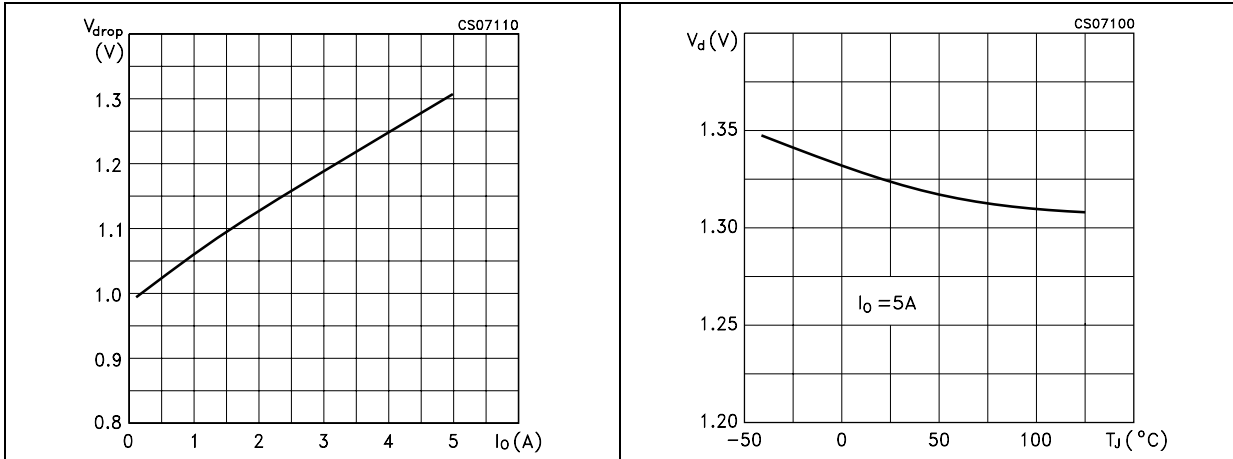


Figure 6. Short circuit current vs. dropout voltage **Figure 7. Line regulation vs. temperature**

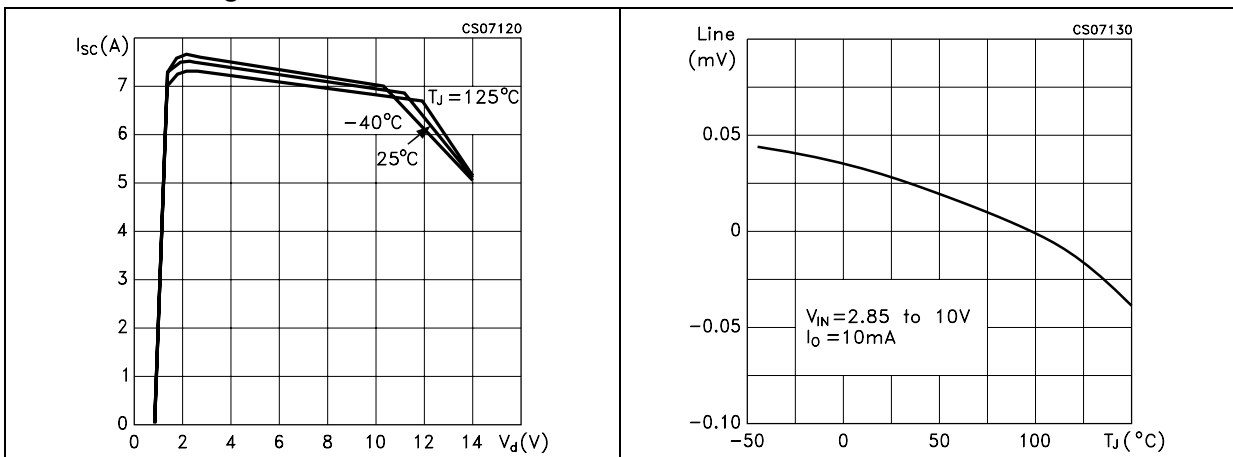


Figure 8. Output voltage vs. temperature **Figure 9. Load regulation vs. temperature**

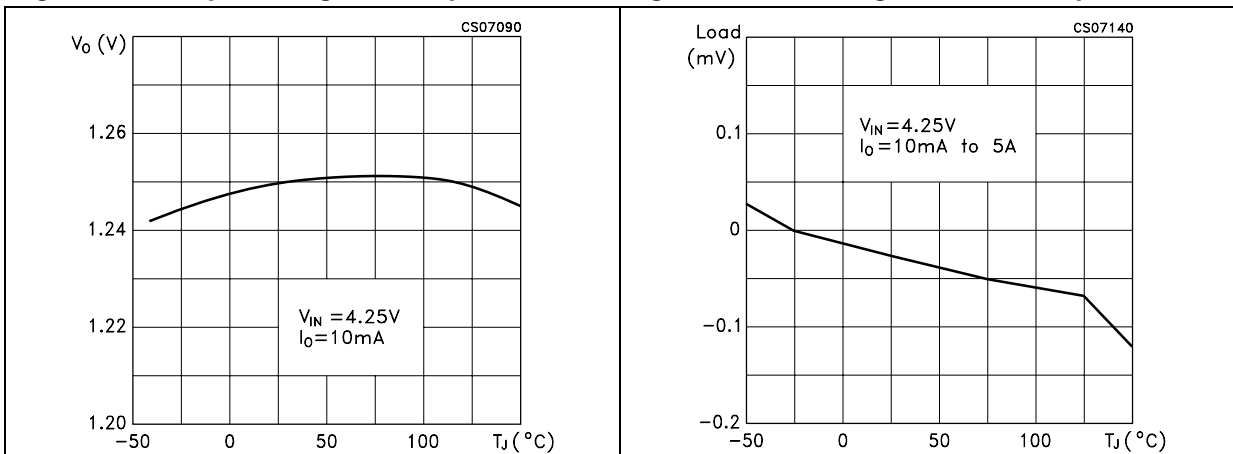


Figure 10. Supply voltage rejection vs. frequency

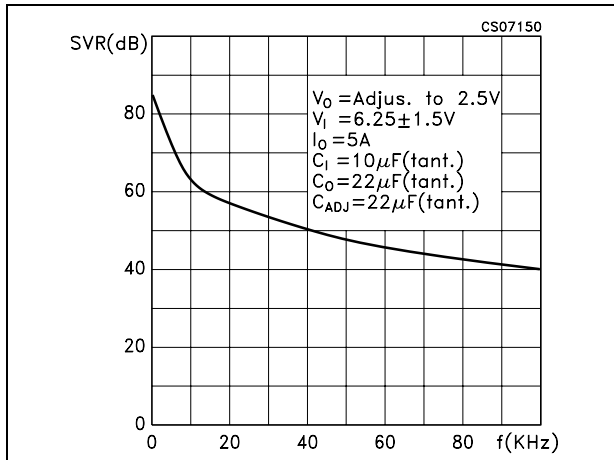


Figure 11. Adjust pin current vs. output current

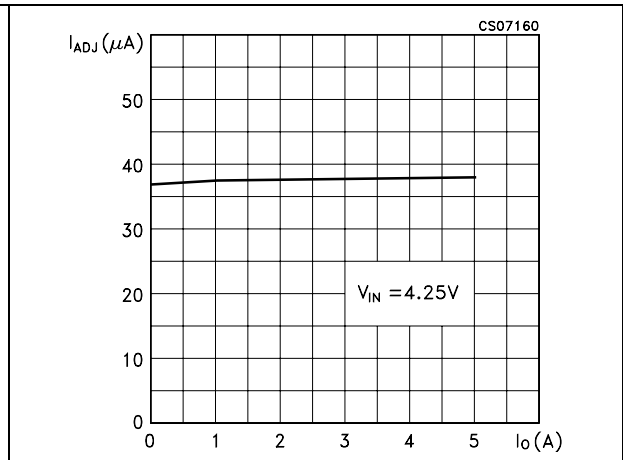


Figure 12. Line transient

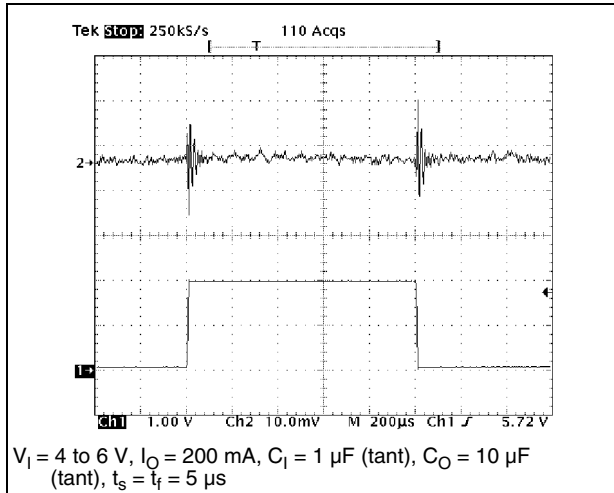
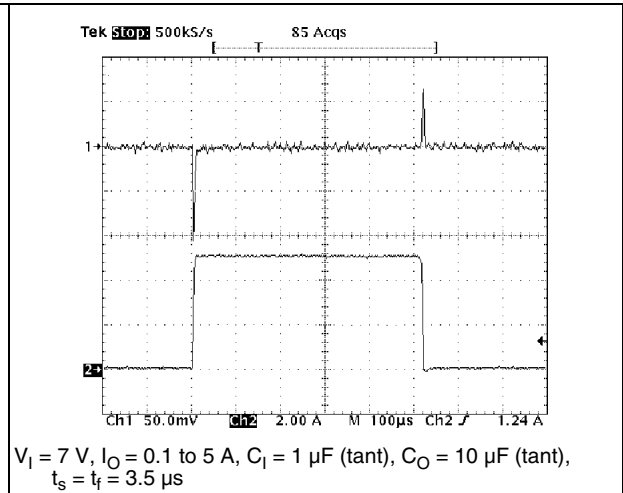


Figure 13. Load transient

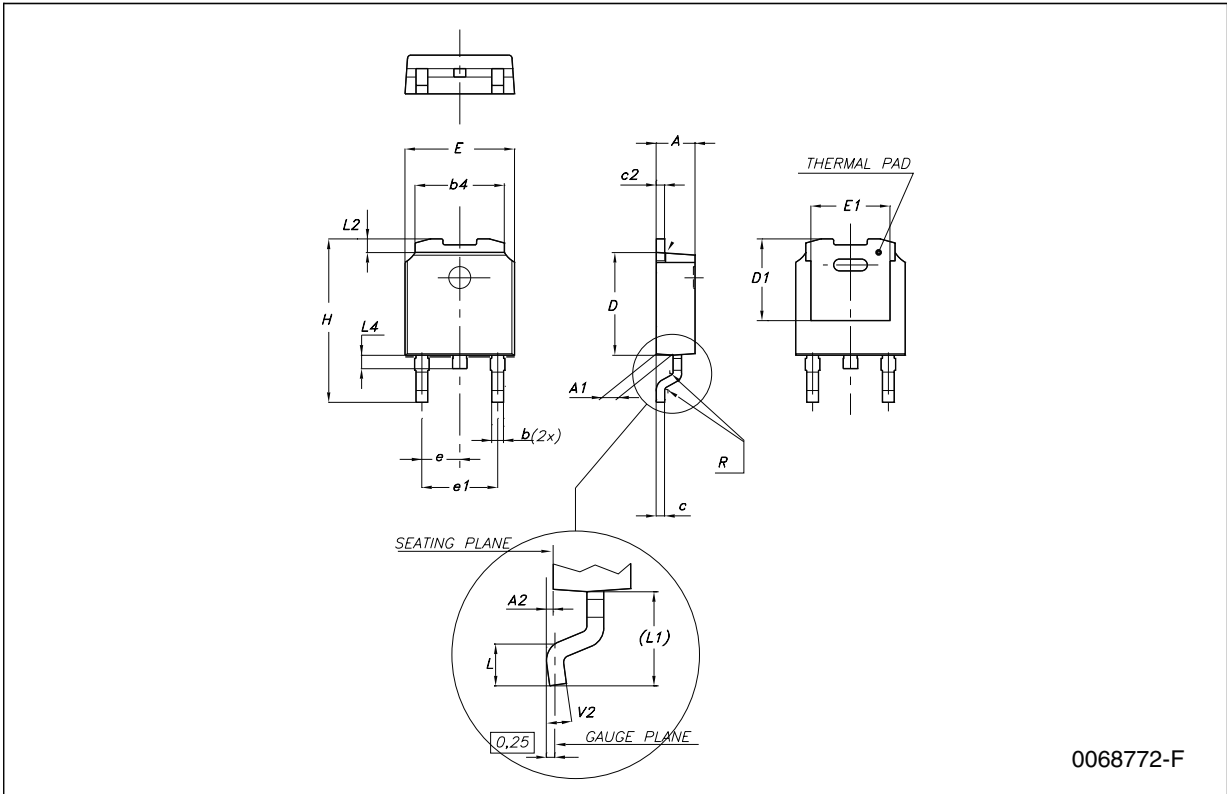


7 Package mechanical data

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.

DPAK mechanical data

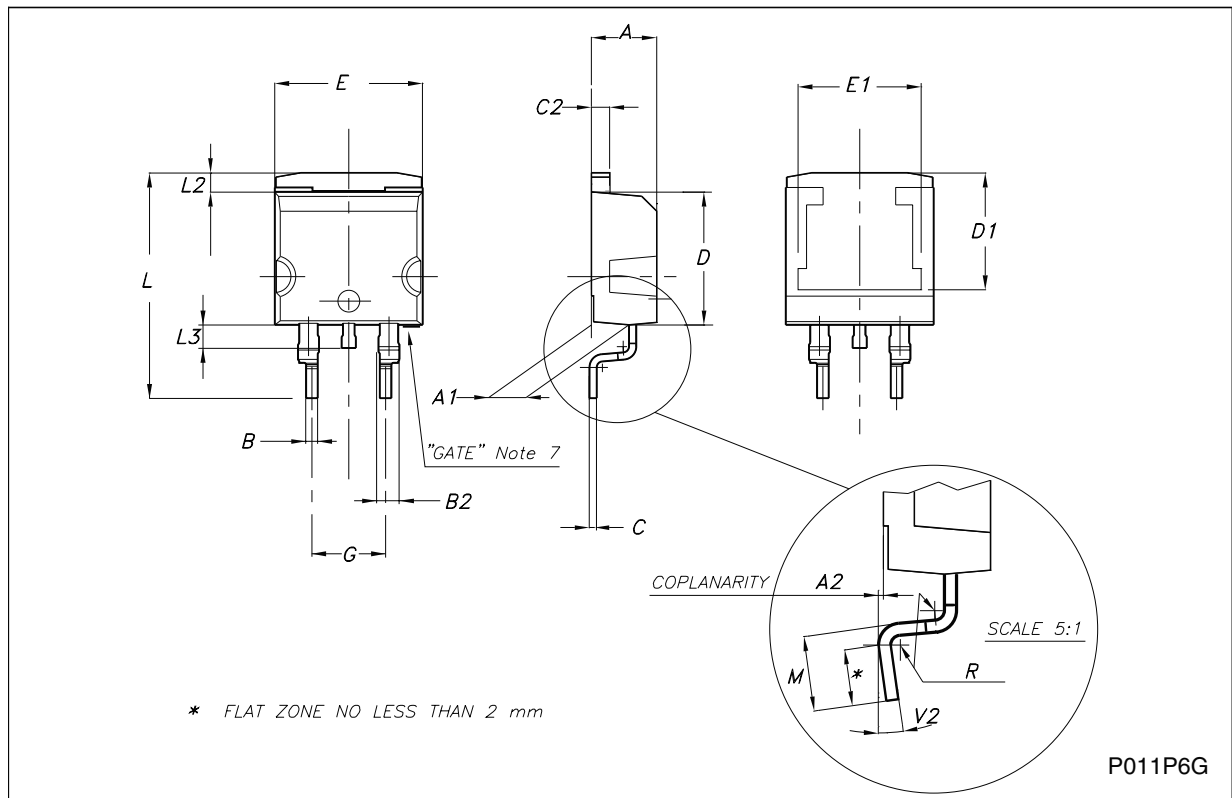
Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A2	0.03		0.23	0.001		0.009
b	0.64		0.9	0.025		0.035
b4	5.2		5.4	0.204		0.212
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
D1		5.1			0.200	
E	6.4		6.6	0.252		0.260
E1		4.7			0.185	
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

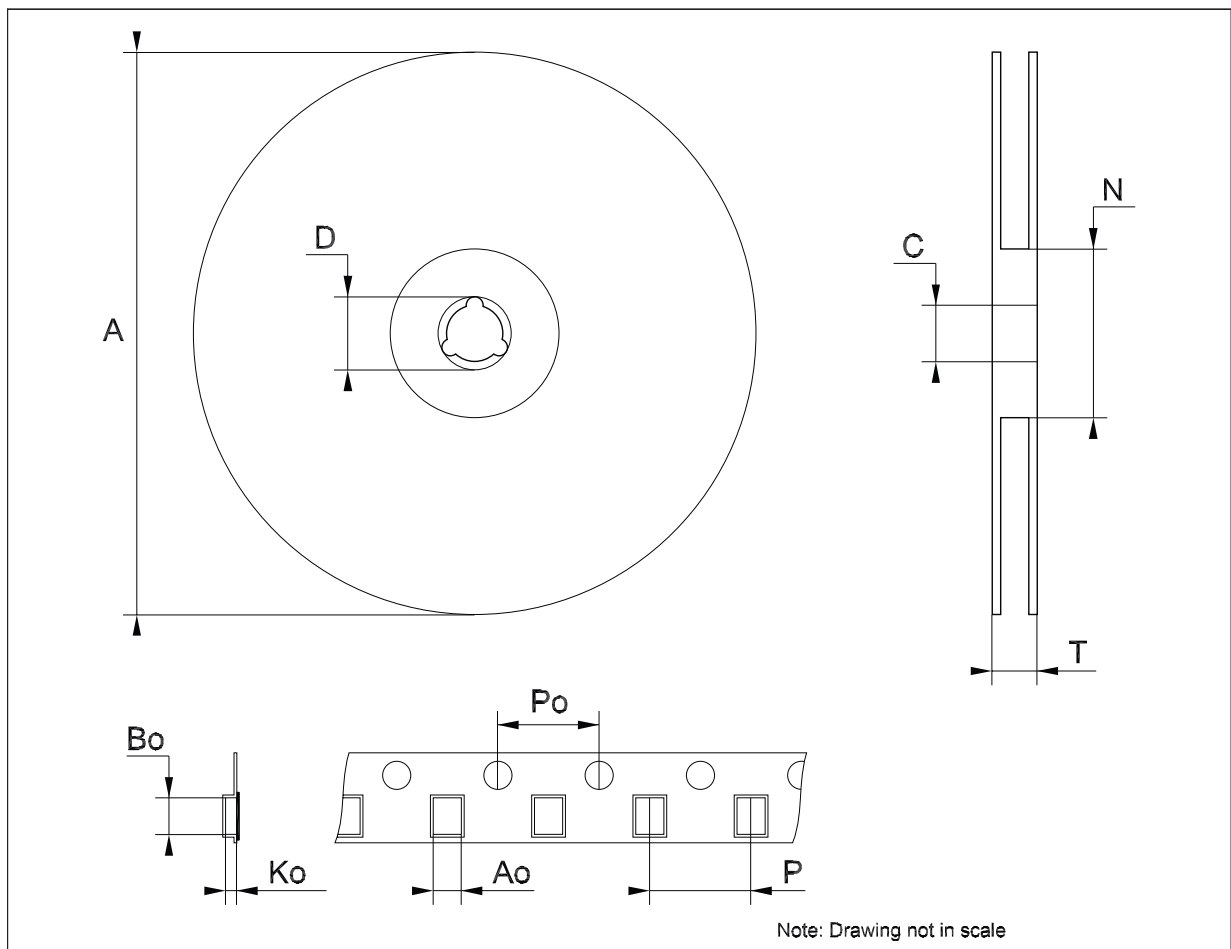
D²PAK mechanical data

Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.4		4.6	0.173		0.181
A1	2.49		2.69	0.098		0.106
A2	0.03		0.23	0.001		0.009
B	0.7		0.93	0.027		0.036
B2	1.14		1.7	0.044		0.067
C	0.45		0.6	0.017		0.023
C2	1.23		1.36	0.048		0.053
D	8.95		9.35	0.352		0.368
D1		8			0.315	
E	10		10.4	0.393		0.409
E1		8.5			0.335	
G	4.88		5.28	0.192		0.208
L	15		15.85	0.590		0.624
L2	1.27		1.4	0.050		0.055
L3	1.4		1.75	0.055		0.068
M	2.4		3.2	0.094		0.126
R		0.4			0.016	
V2	0°		8°	0°		8°



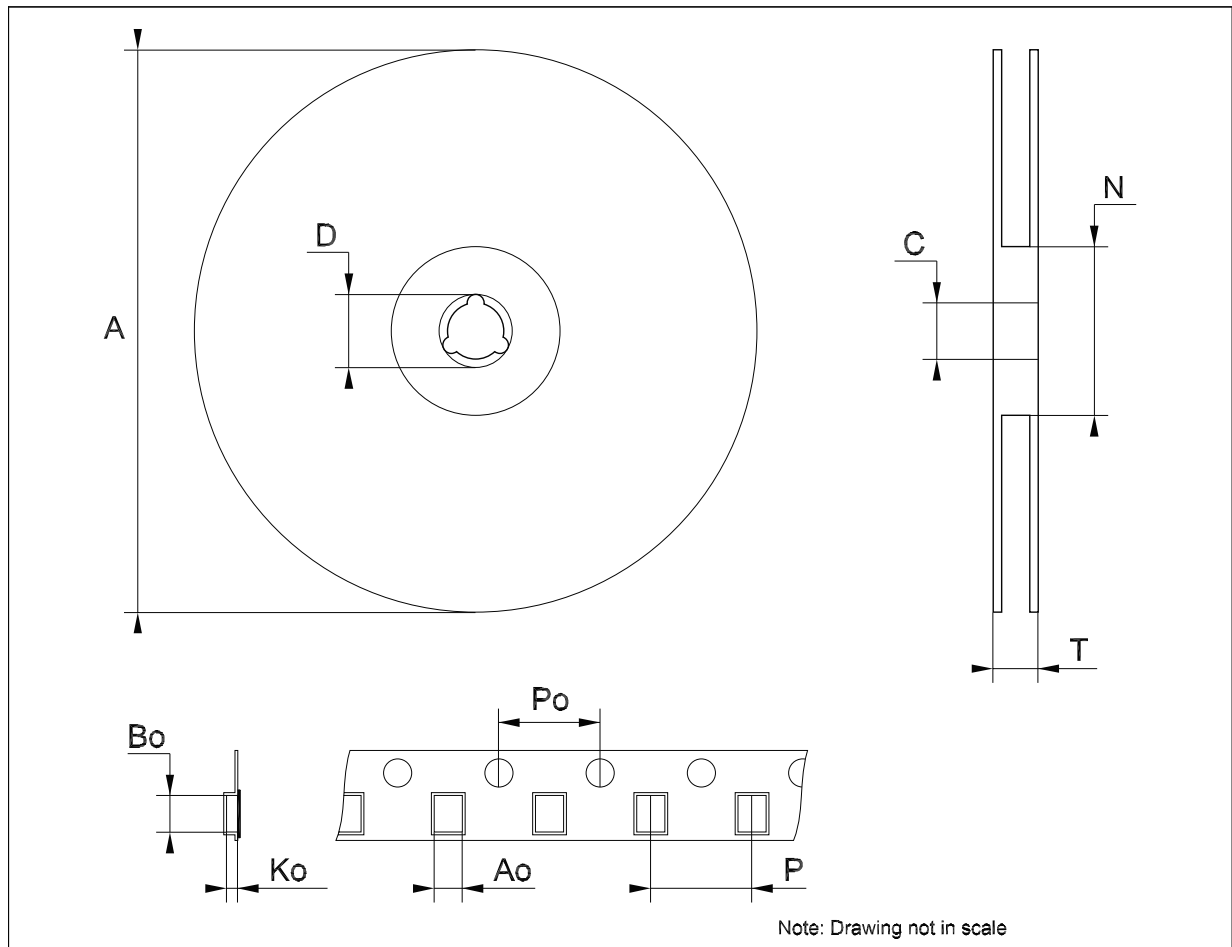
Tape & reel DPAK-PPAK mechanical data

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



Tape & reel D²PAK-P²PAK-D²PAK/A-P²PAK/A mechanical data

Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			180			7.086
C	12.8	13.0	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	60			2.362		
T			14.4			0.567
Ao	10.50	10.6	10.70	0.413	0.417	0.421
Bo	15.70	15.80	15.90	0.618	0.622	0.626
Ko	4.80	4.90	5.00	0.189	0.193	0.197
Po	3.9	4.0	4.1	0.153	0.157	0.161
P	11.9	12.0	12.1	0.468	0.472	0.476



8 Revision history

Table 6. Document revision history

Date	Revision	Changes
06-Sep-2005	4	Order codes updated.
02-Apr-2007	5	Order codes updated.
30-May-2007	6	Order codes updated.
18-Dec-2007	7	Added Table 1 .
21-Feb-2008	8	Modified: Table 1 on page 1 .
16-Jul-2008	9	Modified: Table 1 on page 1 .
28-Jul-2009	10	Modified: Table 1 on page 1 .
12-May-2011	11	Modified: Table 5 on page 8 .

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