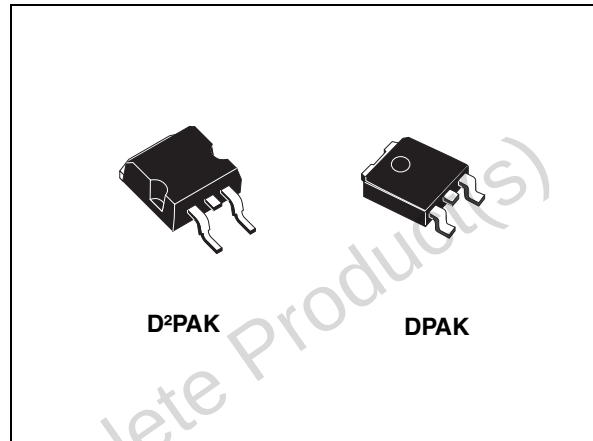


5 A low drop positive voltage regulator adjustable and fixed

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

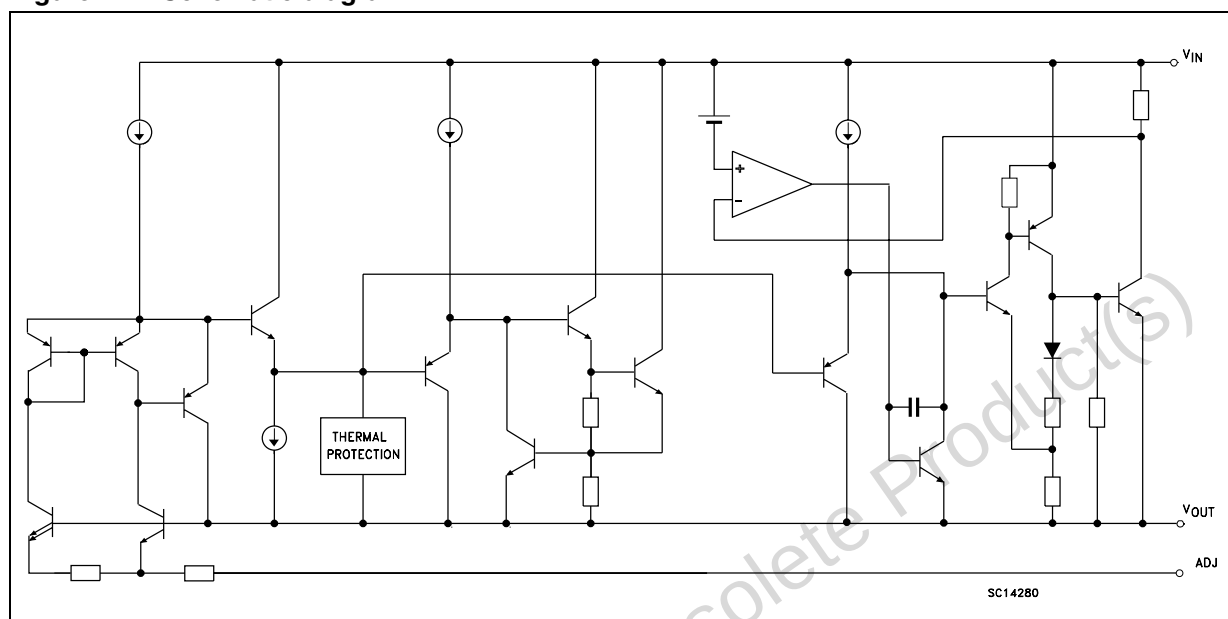
Order codes			
D ² PAK	DPAK	Output voltage	Tolerance
KD1084AD2T18R		1.8 V	1%
	KD1084ADT-R	ADJ	1%

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
8	Revision history	16

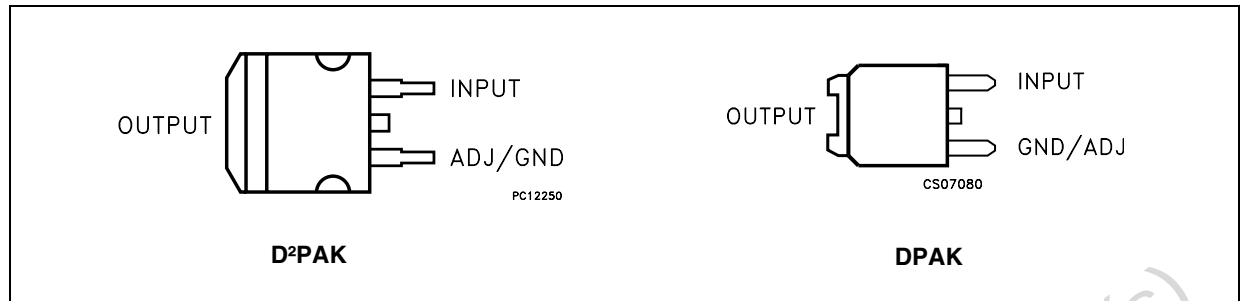
1 Diagram

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

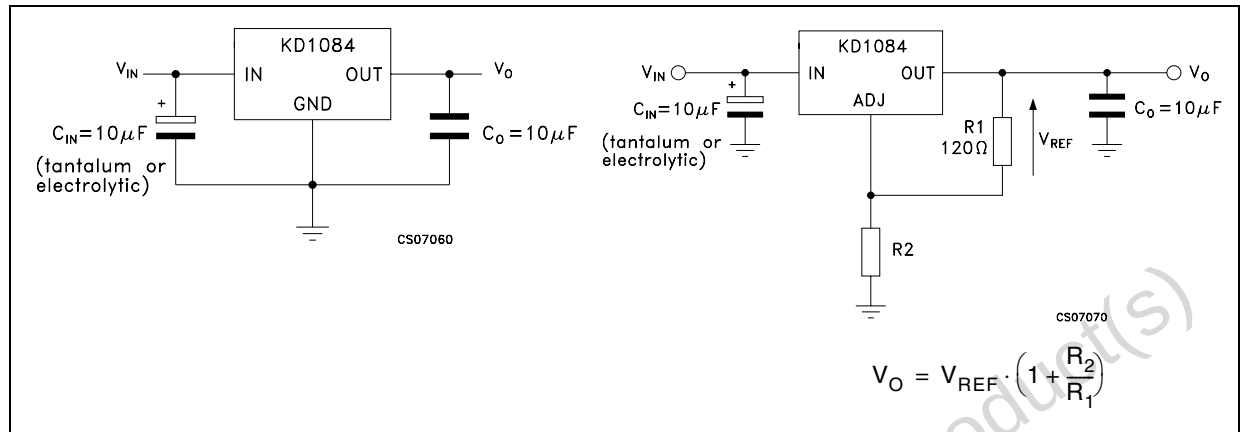
Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

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

$V_I = 4.8\text{ V}$, $C_I = C_O = 10\text{ }\mu\text{F}$ (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	$f = 120\text{ Hz}$, $C_O = 25\text{ }\mu\text{F}$, $I_O = 5\text{ A}$ $V_I = 5.3 \pm 1.5\text{ V}$	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		%

$V_I = 4.25\text{ V}$, $C_I = C_O = 10\text{ }\mu\text{F}$ (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
$I_{O(\min)}$	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	$f = 120\text{ Hz}$, $C_O = 25\text{ }\mu\text{F}$, $C_{ADJ} = 25\text{ }\mu\text{F}$, $I_O = 5\text{ A}$, $V_I = 4.75 \pm 1.5\text{ V}$	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 $T_J = 25^\circ\text{C}$, $C_I = C_O = 10\ \mu\text{F}$ (tant.)

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

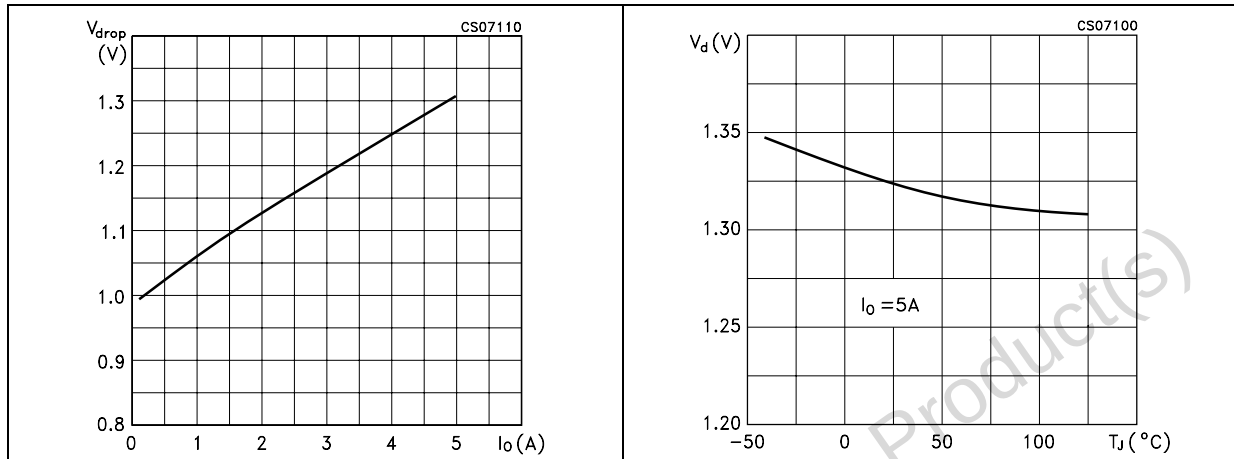


Figure 6. Short circuit current vs. dropout voltage

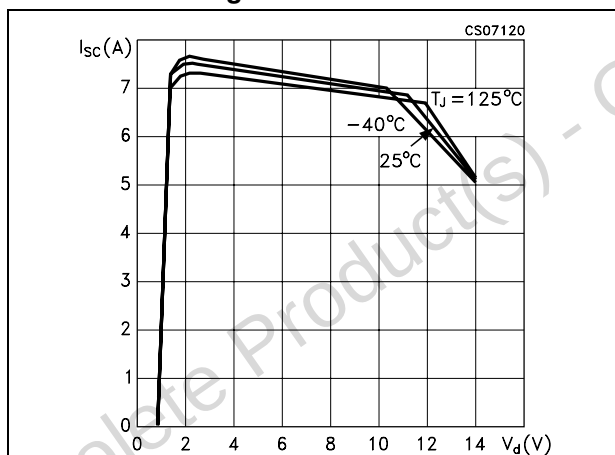


Figure 7. Line regulation vs. temperature

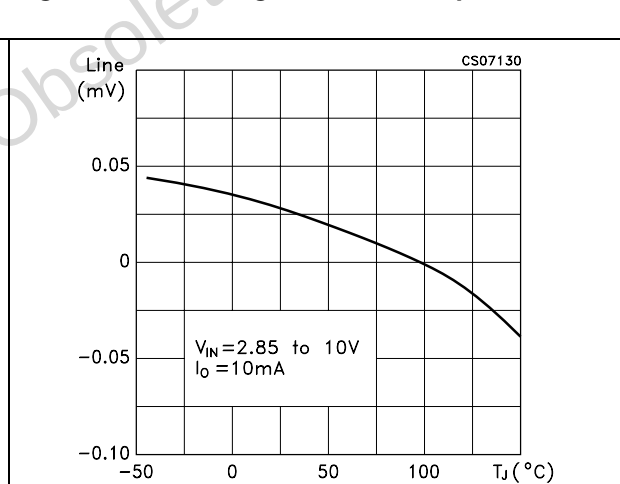


Figure 8. Output voltage vs. temperature

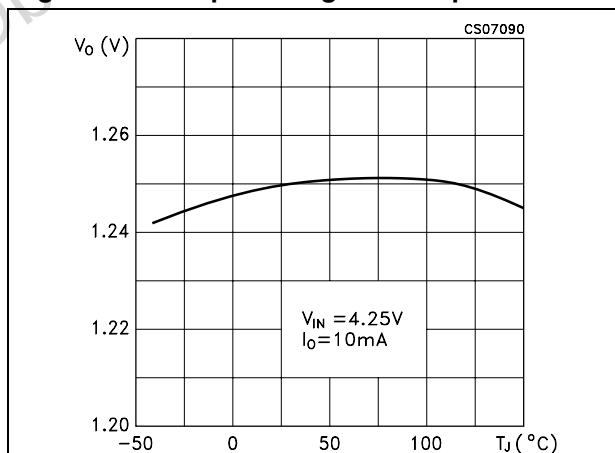


Figure 9. Load regulation vs. temperature

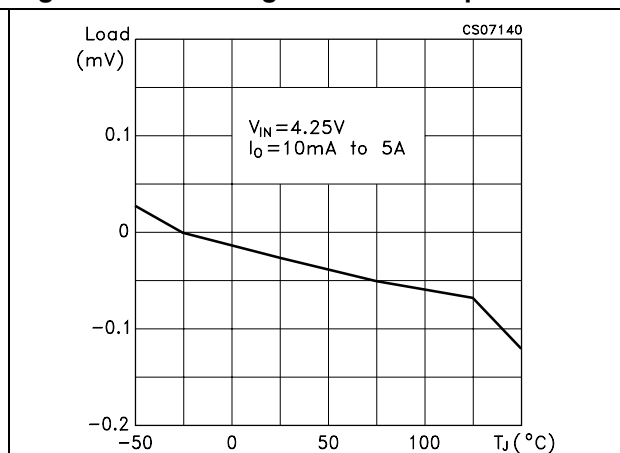


Figure 10. Supply voltage rejection vs. frequency

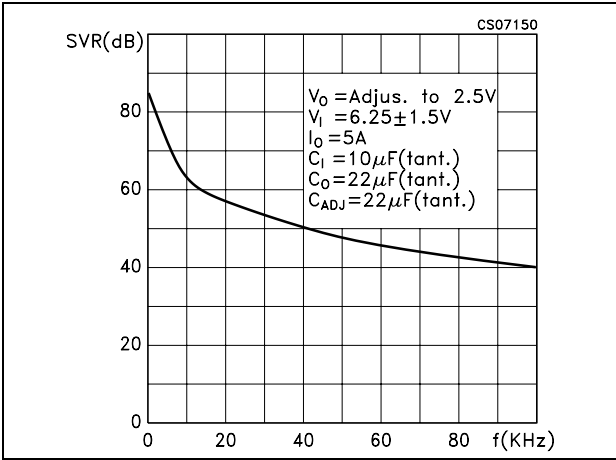


Figure 11. Adjust pin current vs. output current

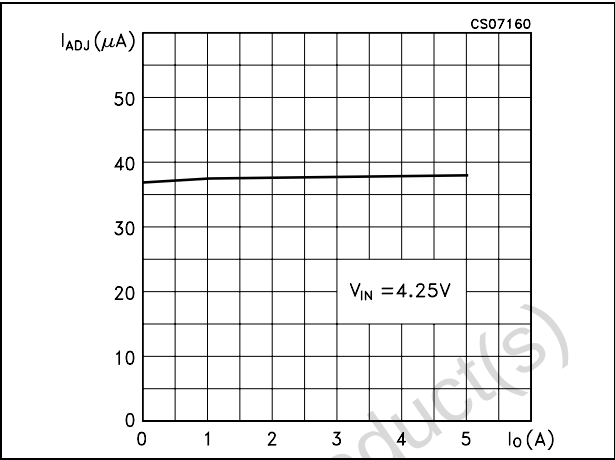


Figure 12. Line transient

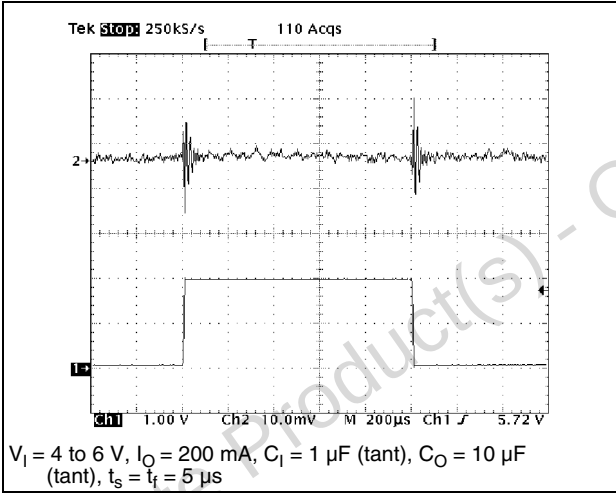
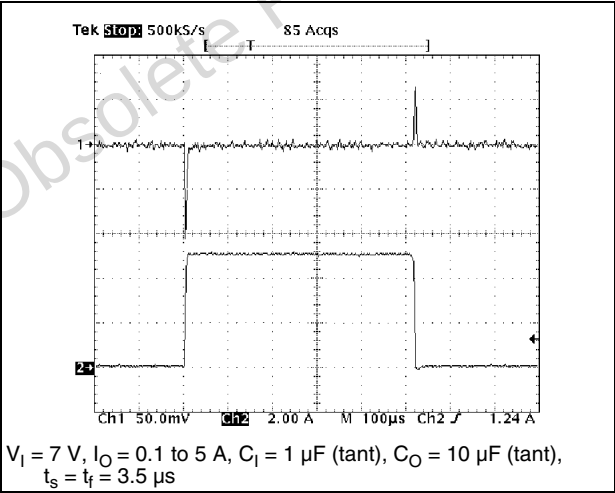


Figure 13. Load transient



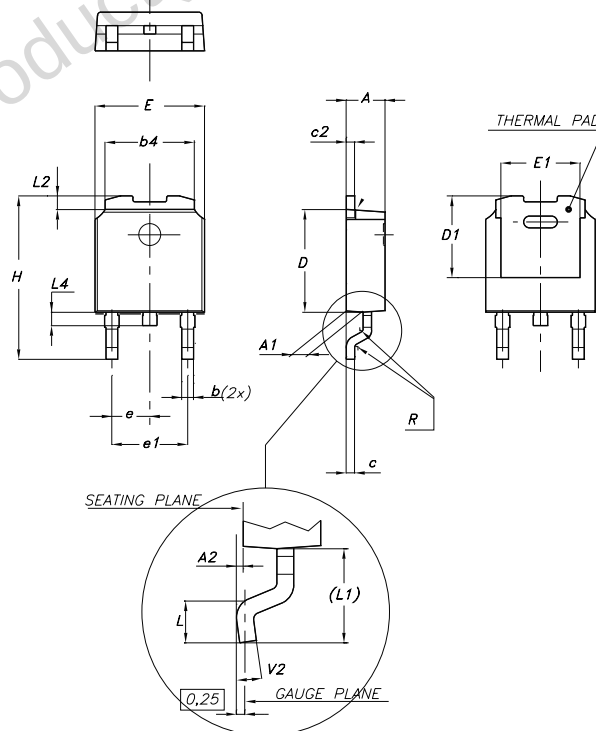
7 Package mechanical data

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.

Obsolete Product(s) - Obsolete Product(s)

DPAK mechanical data

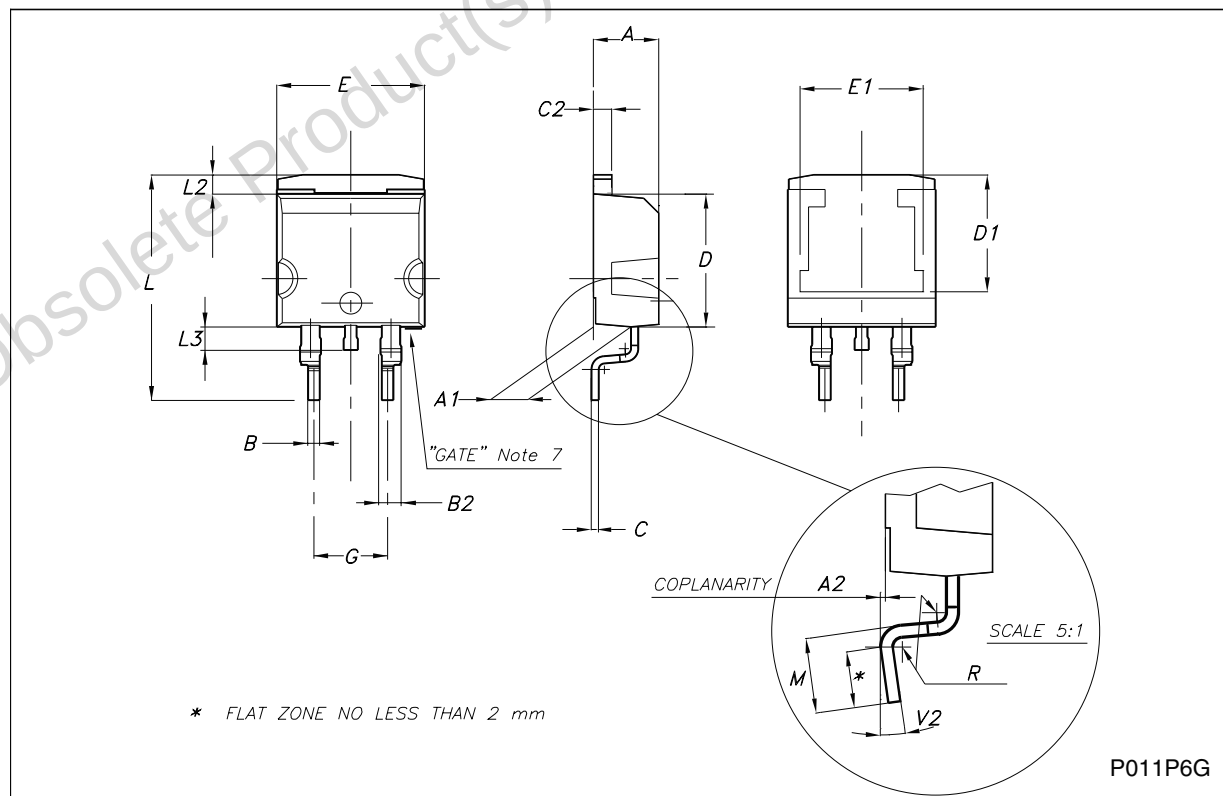
Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A2	0.03		0.23	0.001		0.009
b	0.64		0.9	0.025		0.035
b4	5.2		5.4	0.204		0.212
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
D1		5.1			0.200	
E	6.4		6.6	0.252		0.260
E1		4.7			0.185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

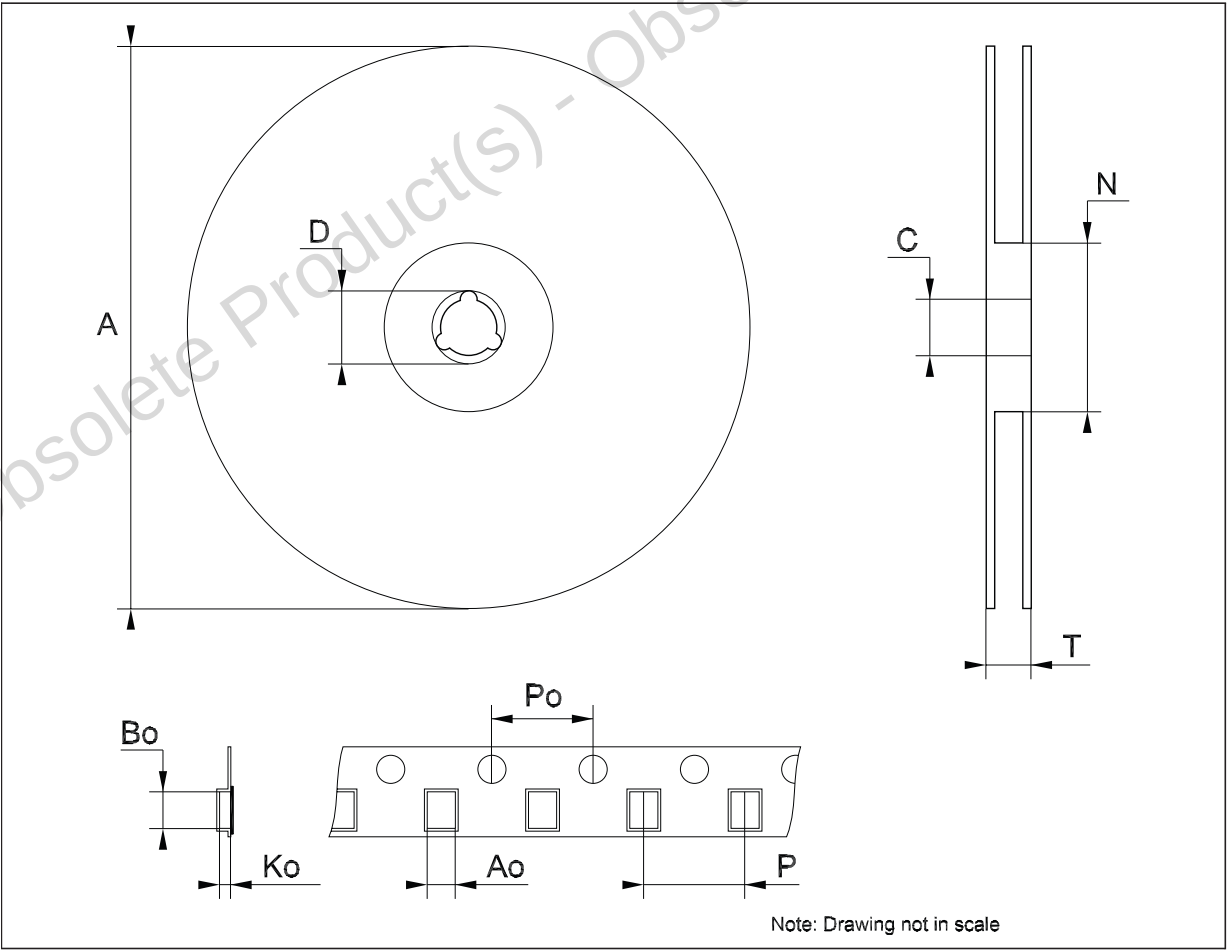
D²PAK mechanical data

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°



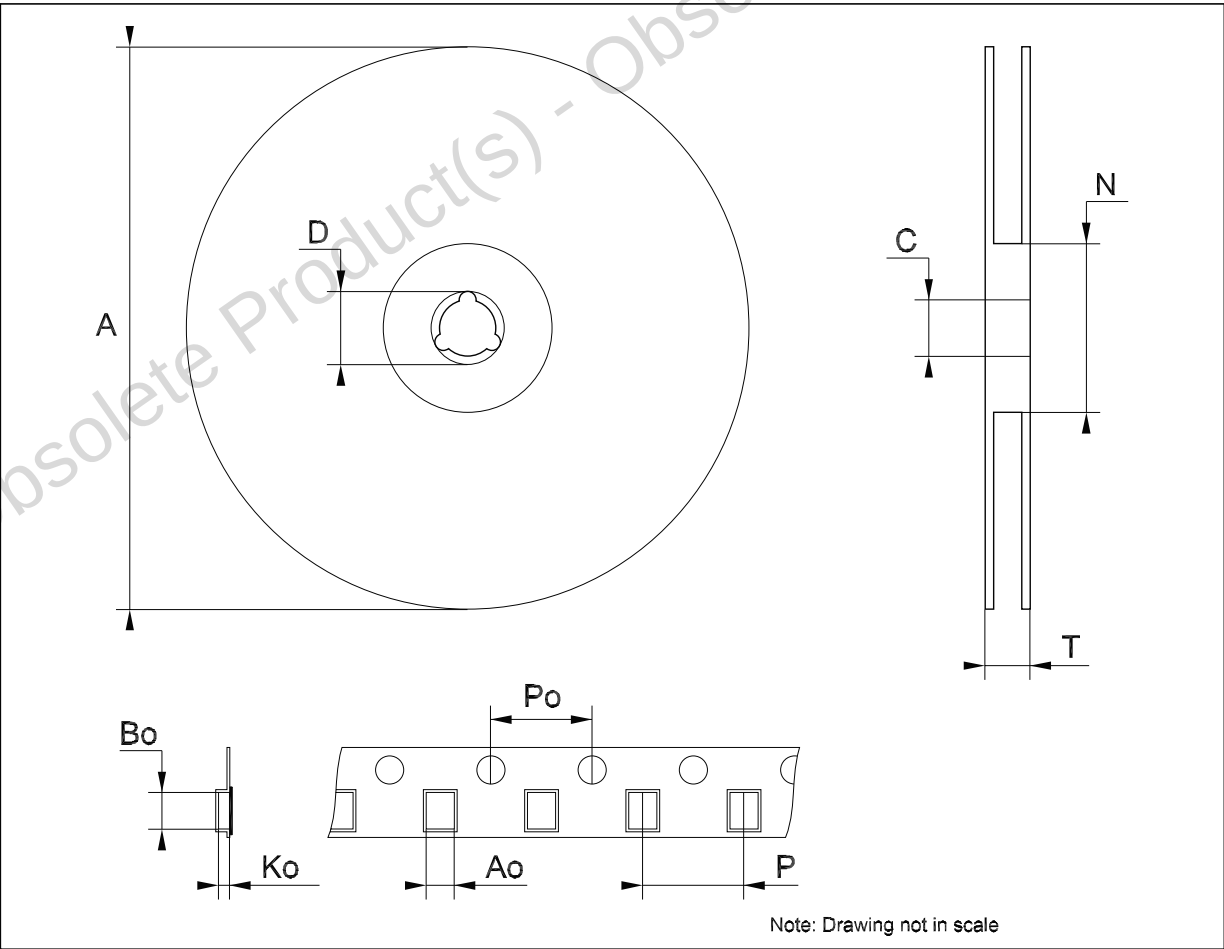
Tape & reel DPAK-PPAK mechanical data

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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