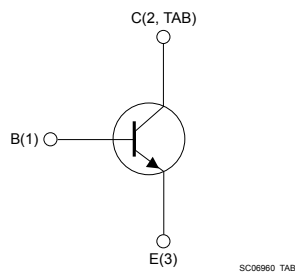
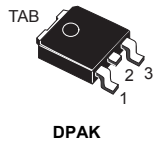


## High voltage fast-switching NPN power transistor



### Features

- High voltage capability
- Low spread of dynamic parameters
- Minimum lot-to-lot spread for reliable operation
- Very high switching speed

### Applications

- Electronic ballast for fluorescent lighting
- Switch mode power supplies

### Description

The BULD741T4 is manufactured using high voltage multi-epitaxial planar technology to enhance switching speeds and high voltage capability.

Thanks to an increased intermediate layer, it has an intrinsic ruggedness which enables the transistor to withstand a high collector current level during breakdown condition, without using the transil protection usually necessary in typical converters for lamp ballast.



#### Product status link

[BULD741T4](#)

#### Product summary

<b>Order code</b>	BULD741T4
<b>Marking</b>	BULD741
<b>Package</b>	DPAK
<b>Packing</b>	Tape and reel

## 1 Electrical ratings

**Table 1. Absolute maximum rating**

Symbol	Parameter	Value	Unit
$V_{EBO}$	Emitter-base voltage ( $I_C = 0$ A, $I_B = 2$ A, $t_p < 10$ ms)	$V_{(BR)EBO}$	V
$V_{CES}$	Collector-emitter voltage ( $V_{BE} = 0$ V)	1050	V
$V_{CEO}$	Collector-emitter voltage ( $I_B = 0$ A)	400	V
$I_C$	Collector current	2.5	A
$I_{CM}$	Collector peak current ( $t_p < 5$ ms)	5	A
$I_B$	Base current	1.5	A
$I_{BM}$	Base peak current ( $t_p < 5$ ms)	3	A
$P_{TOT}$	Total power dissipation at $T_C = 25$ °C	30	W
$T_{stg}$	Storage temperature range	-65 to 150	°C
$T_J$	Maximum operating junction temperature	150	°C

**Table 2. Thermal data**

Symbol	Parameter	Value	Unit
$R_{thJC}$	Thermal resistance, junction-to-case	4.16	°C/W

## 2 Electrical characteristics

$T_C = 25\text{ °C}$  unless otherwise specified.

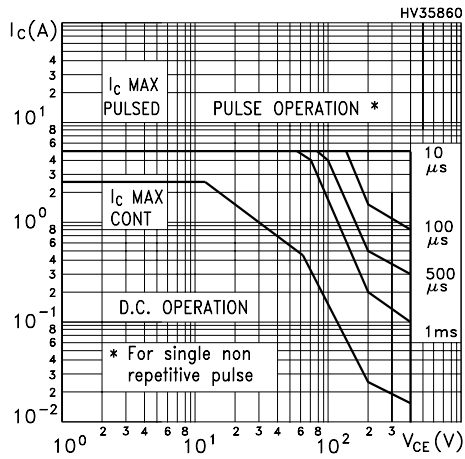
**Table 3. Electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{CES}$	Collector cut-off current	$V_{CE} = 1050\text{ V}, V_{BE} = 0\text{ V}$		0.2	10	$\mu\text{A}$
$I_{CEO}$	Collector cut-off current	$V_{CE} = 400\text{ V}, I_B = 0\text{ A}$		10	250	$\mu\text{A}$
$V_{CEO(sus)}^{(1)}$	Collector-emitter sustaining voltage	$I_C = 10\text{ mA}, I_B = 0\text{ A}$	400	450		V
$V_{(BR)EBO}$	Emitter-base breakdown voltage	$I_C = 0\text{ A}, I_E = 1\text{ mA}$	15	19	24	V
$V_{CE(sat)}^{(1)}$	Collector-emitter saturation voltage	$I_C = 0.7\text{ A}, I_B = 0.14\text{ A}$		0.15	0.5	V
		$I_C = 2\text{ A}, I_B = 0.6\text{ A}$		0.5	1.5	
$V_{BE(sat)}^{(1)}$	Base-emitter saturation voltage	$I_C = 2\text{ A}, I_B = 0.6\text{ A}$		1.1	1.5	V
$h_{FE}^{(1)}$	DC current gain	$I_C = 0.1\text{ A}, V_{CE} = 5\text{ V}$	48	70	100	
		$I_C = 0.45\text{ A}, V_{CE} = 3\text{ V}$	25	35	50	
	Resistive load	$V_{CC} = 125\text{ V}, I_C = 1\text{ A},$				
$t_s$	Storage time	$I_{B(on)} = -I_{B(off)} = 0.2\text{ A},$		2.5	3.5	$\mu\text{s}$
$t_f$	Fall time	$t_p = 300\text{ }\mu\text{s}, V_{BE(off)} = -5\text{ V}$		350	500	ns
$E_{AR}$	Repetitive avalanche energy	$L = 2\text{ mH}, C = 1.8\text{ nF},$ $V_{BE(off)} = -5\text{ V}$	5			mJ

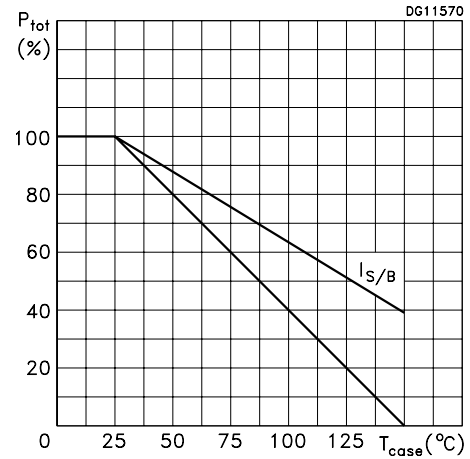
1. Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle  $\leq 1.5\%$ .

## 2.1 Electrical characteristics (curves)

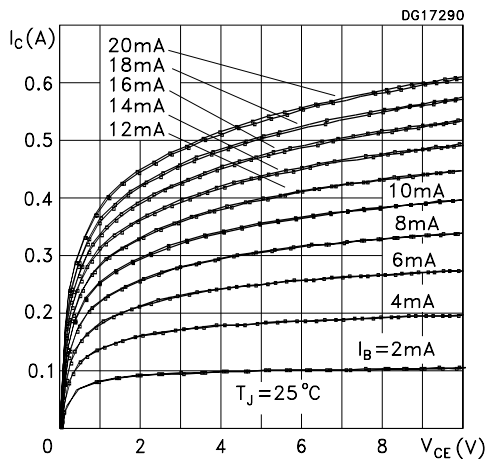
**Figure 1. Safe operating area**



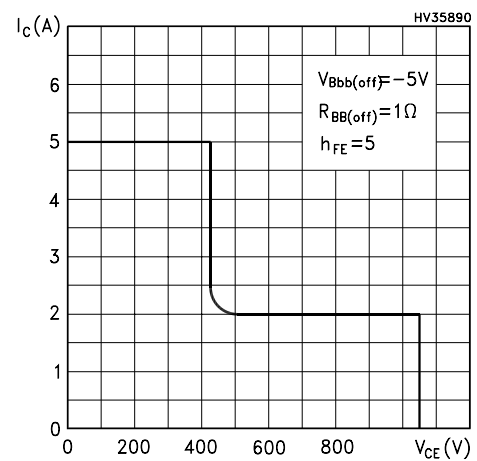
**Figure 2. Derating curve**



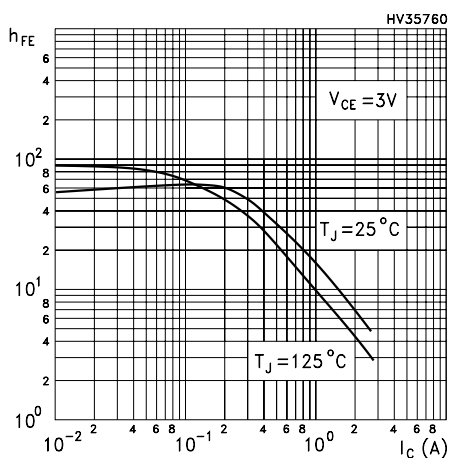
**Figure 3. Output characteristics**



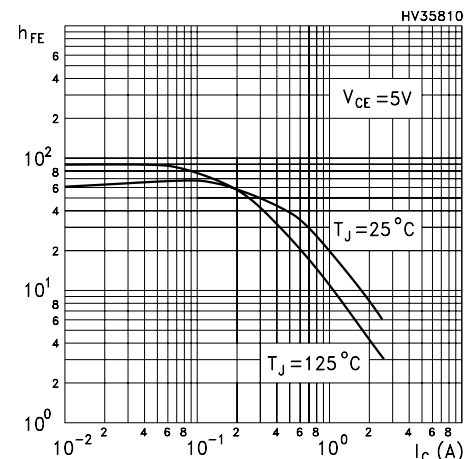
**Figure 4. Reverse biased safe operating area**

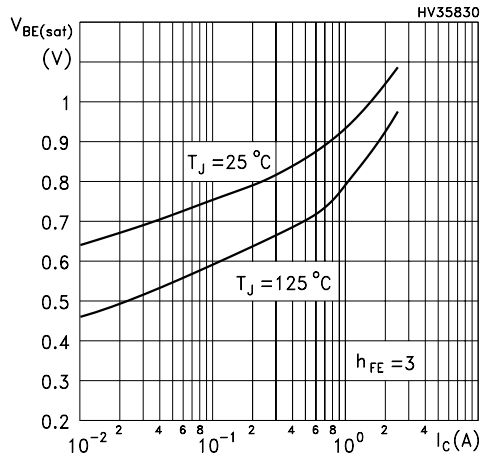
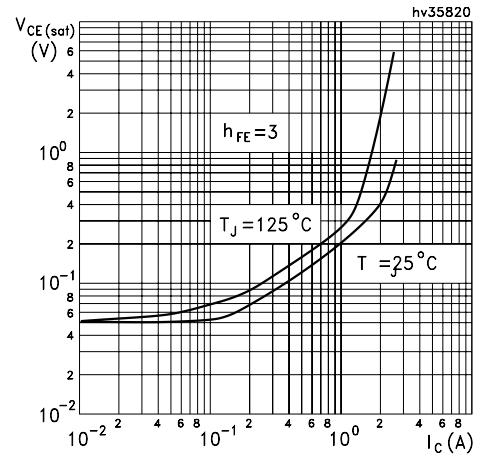
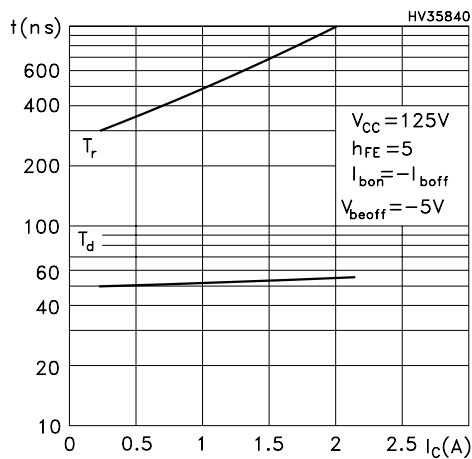
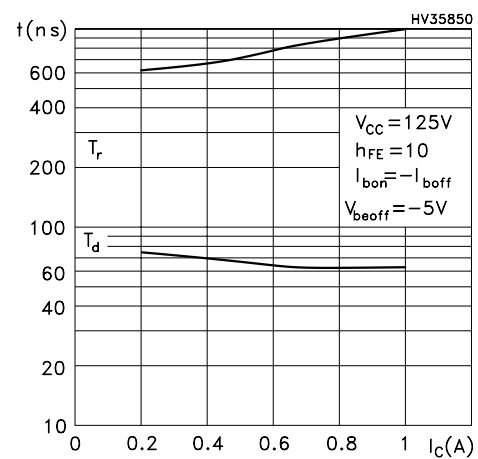
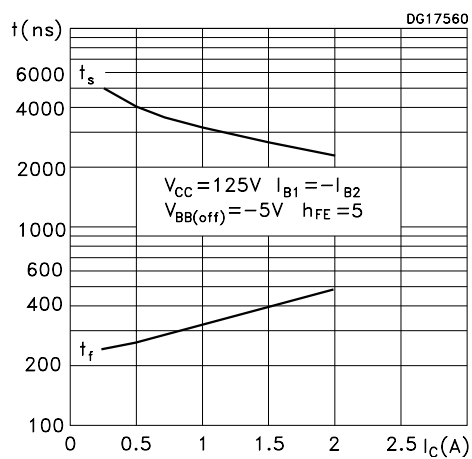
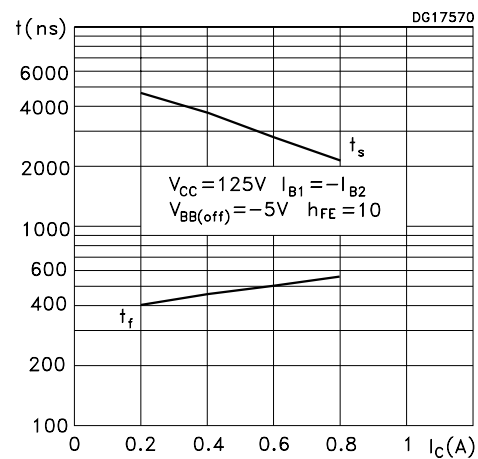


**Figure 5. DC current gain ( $V_{CE} = 3V$ )**



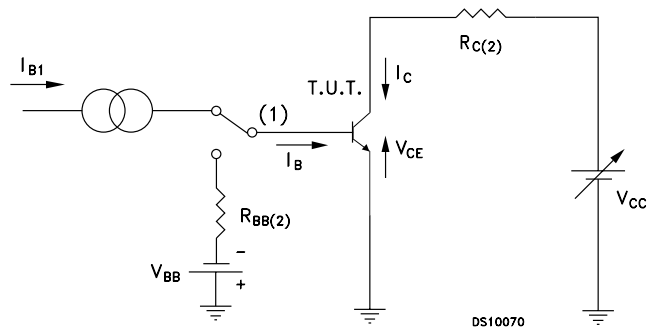
**Figure 6. DC current gain ( $V_{CE} = 5V$ )**



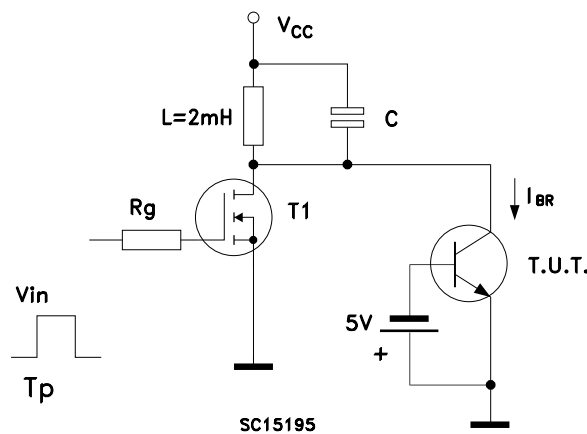
**Figure 7. Base-emitter saturation voltage**

**Figure 8. Collector-emitter saturation voltage**

**Figure 9. Resistive load switching on times ( $h_{FE} = 5$ )**

**Figure 10. Resistive load switching on times ( $h_{FE} = 10$ )**

**Figure 11. Resistive load switching off times ( $h_{FE} = 5$ )**

**Figure 12. Resistive load switching off times ( $h_{FE} = 10$ )**


### 3 Test circuits

**Figure 13. Resistive load switching test circuit**



**Figure 14. Energy rating test circuit**

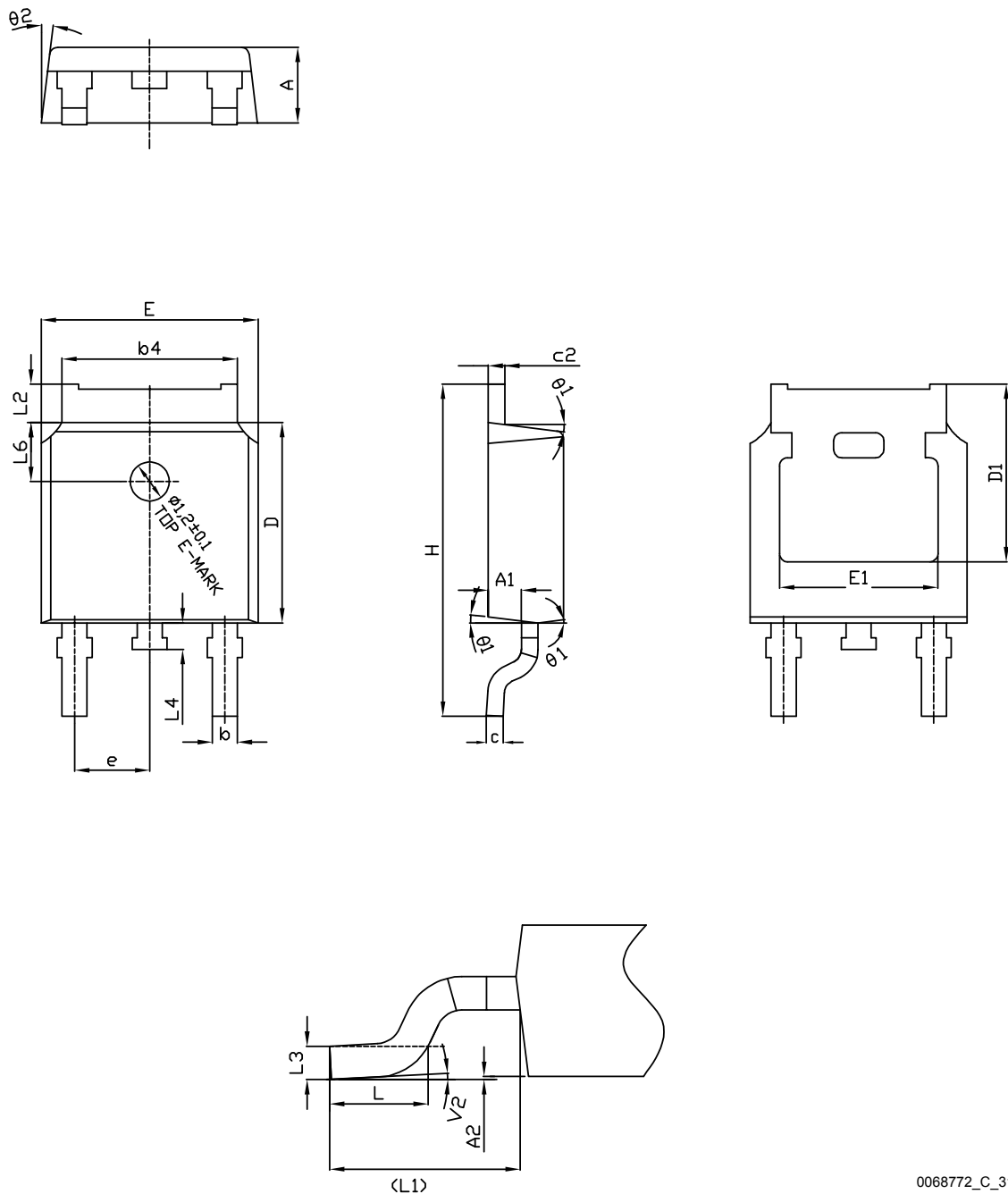


## 4 Package information

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](http://www.st.com). ECOPACK is an ST trademark.

### 4.1 DPAK (TO-252) type C package information

Figure 15. DPAK (TO-252) type C package outline



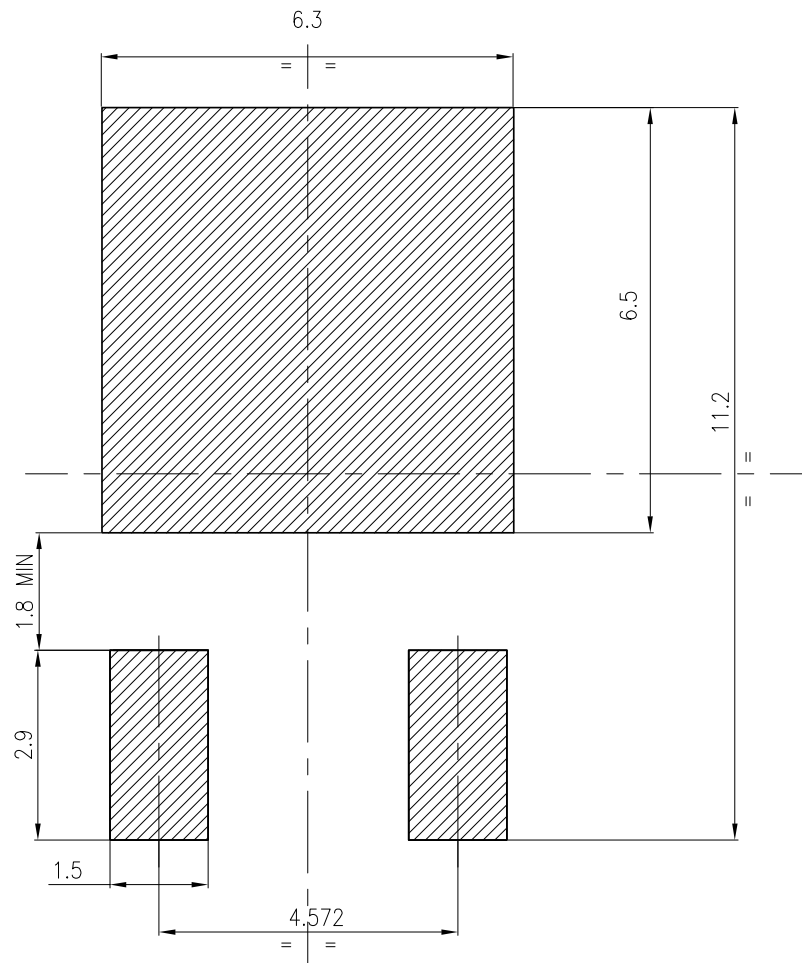
0068772\_C\_31

**Table 4. DPAK (TO-252) type C mechanical data**

Dim.	mm		
	Min.	Typ.	Max.
A	2.20	2.30	2.38
A1	0.90	1.01	1.10
A2	0.00		0.10
b	0.72		0.85
b4	5.13	5.33	5.46
c	0.47		0.60
c2	0.47		0.60
D	6.00	6.10	6.20
D1	5.15	5.40	5.65
E	6.50	6.60	6.70
E1	4.70	4.85	5.00
e	2.186	2.286	2.386
H	9.80	10.10	10.40
L	1.40	1.50	1.70
L1	2.90 REF		
L2	0.90		1.25
L3	0.51 BSC		
L4	0.60	0.80	1.00
L6	1.80 BSC		
θ1	5°	7°	9°
θ2	5°	7°	9°
V2	0°		8°



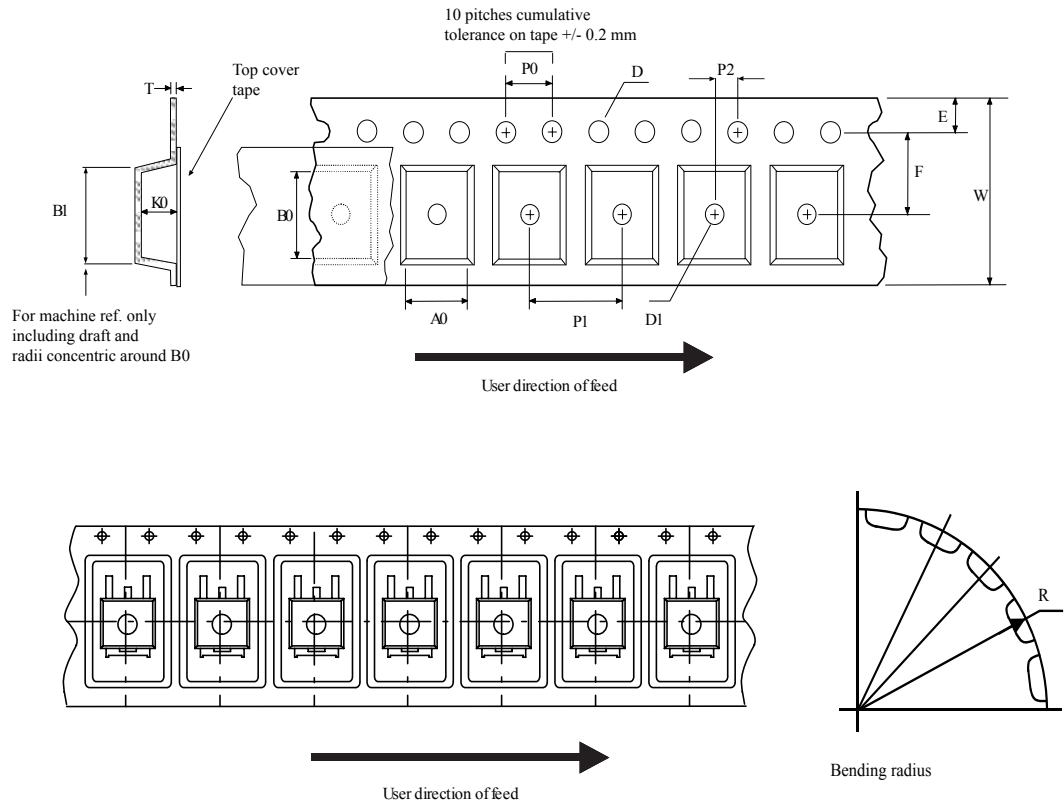
**Figure 16. DPAK (TO-252) recommended footprint (dimensions are in mm)**



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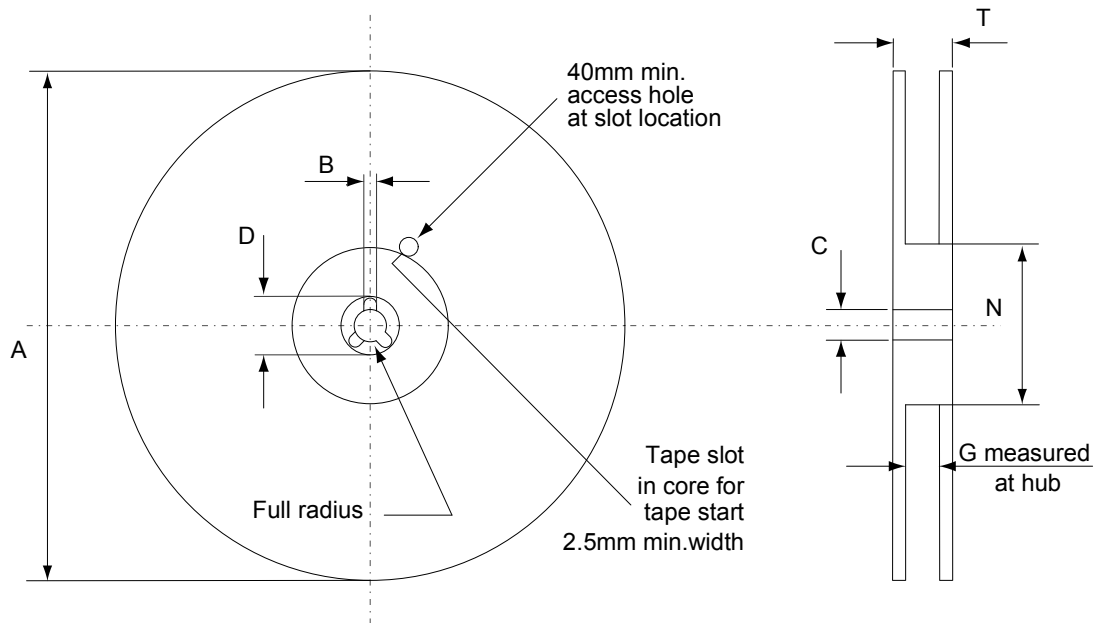
## 4.2 DPAK (TO-252) packing information

**Figure 17. DPAK (TO-252) tape outline**



AM08852v1

Figure 18. DPAK (TO-252) reel outline



AM06038v1

Table 5. DPAK (TO-252) 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			

## Revision history

**Table 6. Document revision history**

Date	Revision	Changes
20-Dec-2006	1	Initial release.
09-Jul-2007	2	Updated package names in page 1, added <i>figure 4</i> , updated <i>figure 12</i> and <i>13</i> .
15-Jul-2022	3	Removed obsolete order code BULD741-1 and updated <a href="#">Section 4.1 DPAK (TO-252) type C package information</a> . Minor text changes.

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