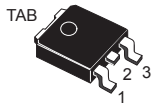
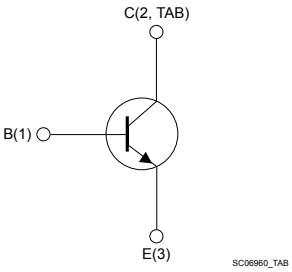
BULD741T4

Datasheet

High voltage fast-switching NPN power transistor



DPAK



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	
Order code	BULD741T4
Marking	BULD741
Package	DPAK
Packing	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 °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 V, V_{BE} = 0 V		0.2	10	µA
I_{CEO}	Collector cut-off current	V_{CE} = 400 V, I_B = 0 A		10	250	µA
$V_{CEO(sus)}$ (1)	Collector-emitter sustaining voltage	I_C = 10 mA, I_B = 0 A	400	450		V
$V_{(BR)EBO}$	Emitter-base breakdown voltage	I_C = 0 A, I_E = 1 mA	15	19	24	V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 0.7 A, I_B = 0.14 A		0.15	0.5	V
		I_C = 2 A, I_B = 0.6 A		0.5	1.5	
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 2 A, I_B = 0.6 A		1.1	1.5	V
h_{FE} (1)	DC current gain	I_C = 0.1 A, V_{CE} = 5 V	48	70	100	
		I_C = 0.45 A, V_{CE} = 3 V	25	35	50	
	Resistive load	V_{CC} = 125 V, I_C = 1 A,				
t_s	Storage time	$I_{B(on)}$ = -$I_{B(off)}$ = 0.2 A,		2.5	3.5	µs
t_f	Fall time	t_p= 300 µs, $V_{BE(off)}$ = -5 V		350	500	ns
E_{AR}	Repetitive avalanche energy	L= 2 mH, C= 1.8 nF, $V_{BE(off)}$= -5 V	5			mJ

1. *Pulsed: Pulse duration = 300 µs, duty cycle ≤1.5%.*

2.1 Electrical characteristics (curves)

Figure 1. Safe operating area

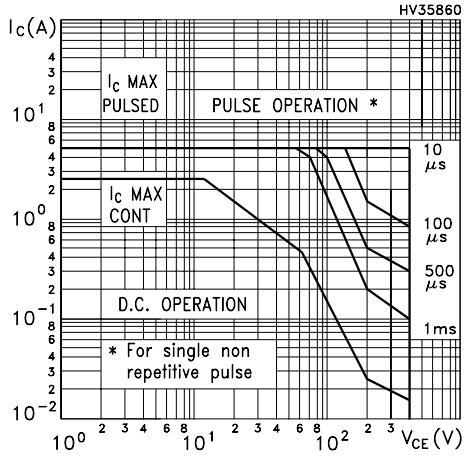


Figure 2. Derating curve

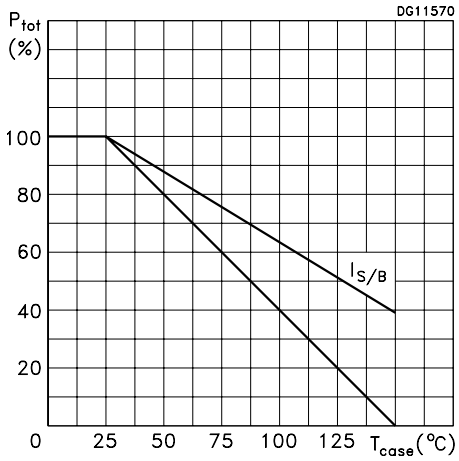


Figure 3. Output characteristics

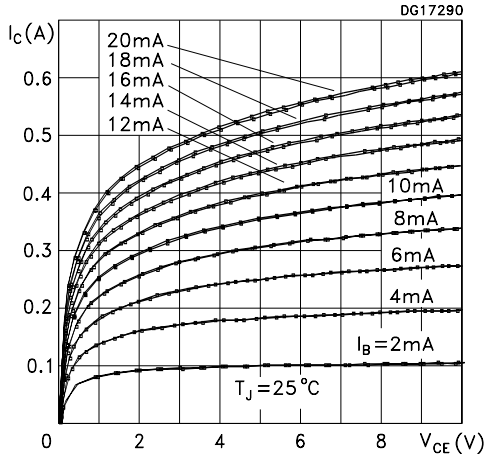


Figure 4. Reverse biased safe operating area

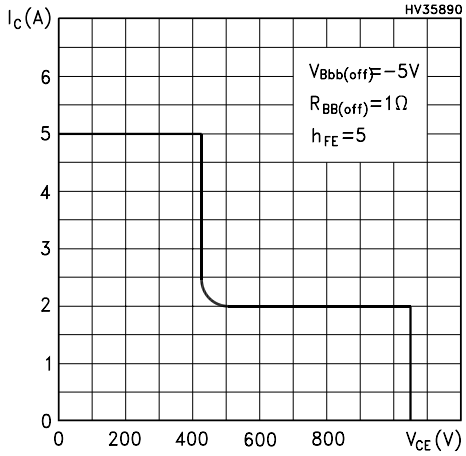


Figure 5. DC current gain (V_{CE} = 3 V)

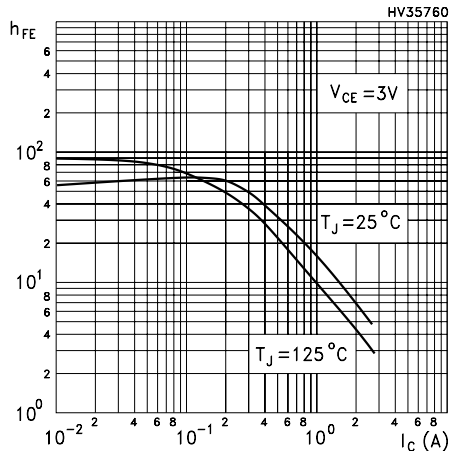


Figure 6. DC current gain (V_{CE} = 5 V)

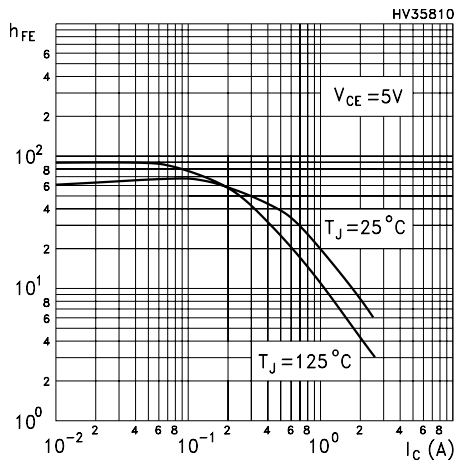


Figure 7. Base-emitter saturation voltage

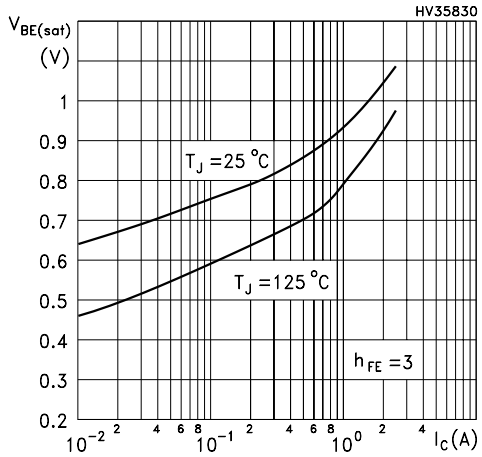


Figure 8. Collector-emitter saturation voltage

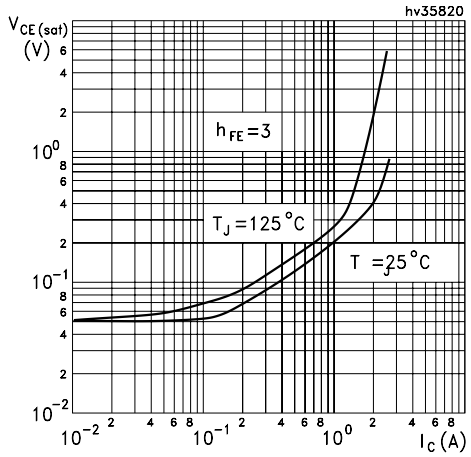


Figure 9. Resistive load switching on times (h_{FE} = 5)

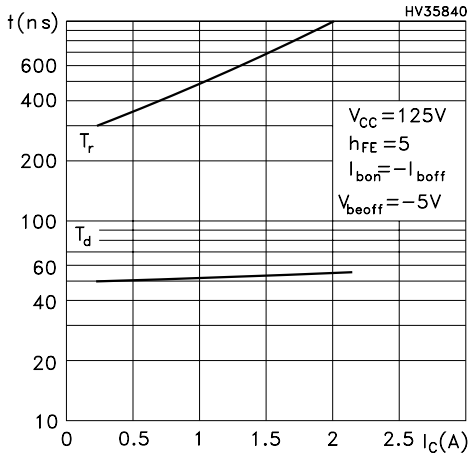


Figure 10. Resistive load switching on times (h_{FE} = 10)

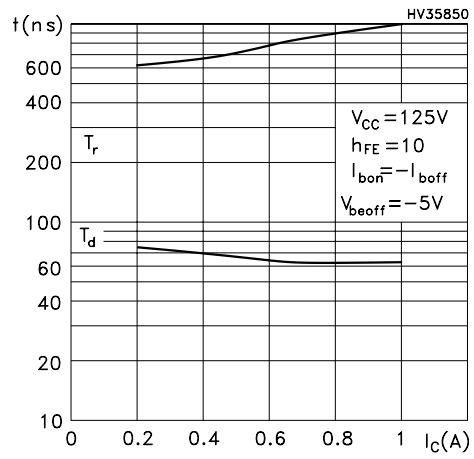


Figure 11. Resistive load switching off times (h_{FE} = 5)

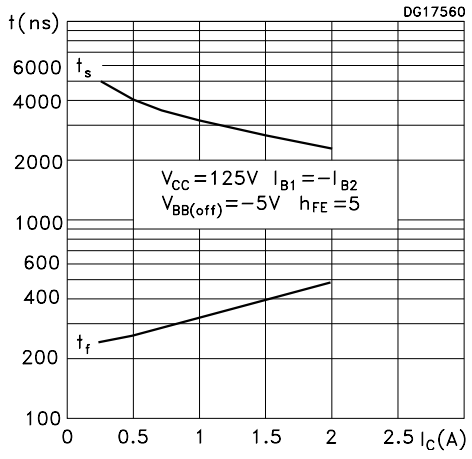
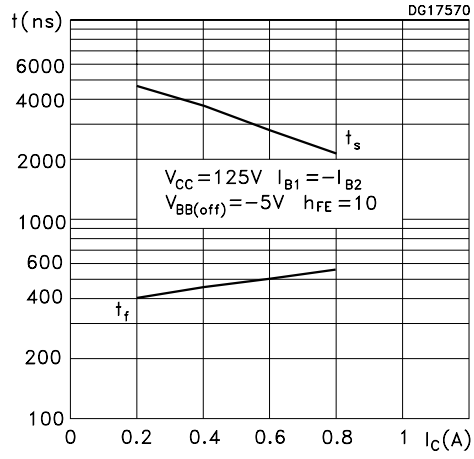


Figure 12. Resistive load switching off times (h_{FE} = 10)



3 Test circuits

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

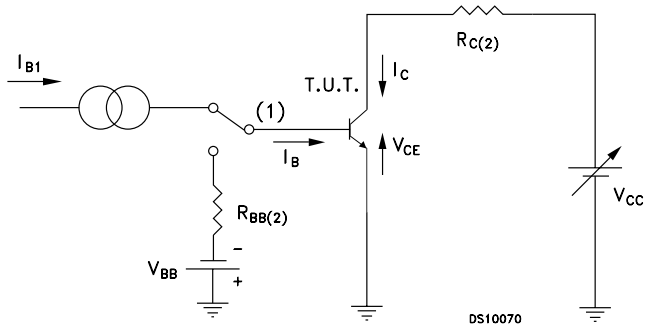
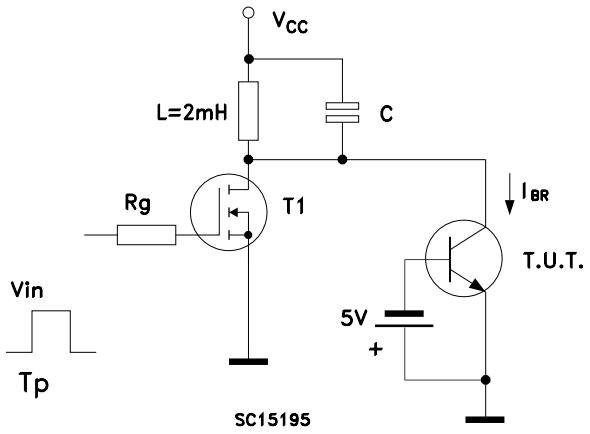


Figure 14. **Energy rating test circuit**



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. ECOPACK is an ST trademark.

4.1 DPAK (TO-252) type C package information

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

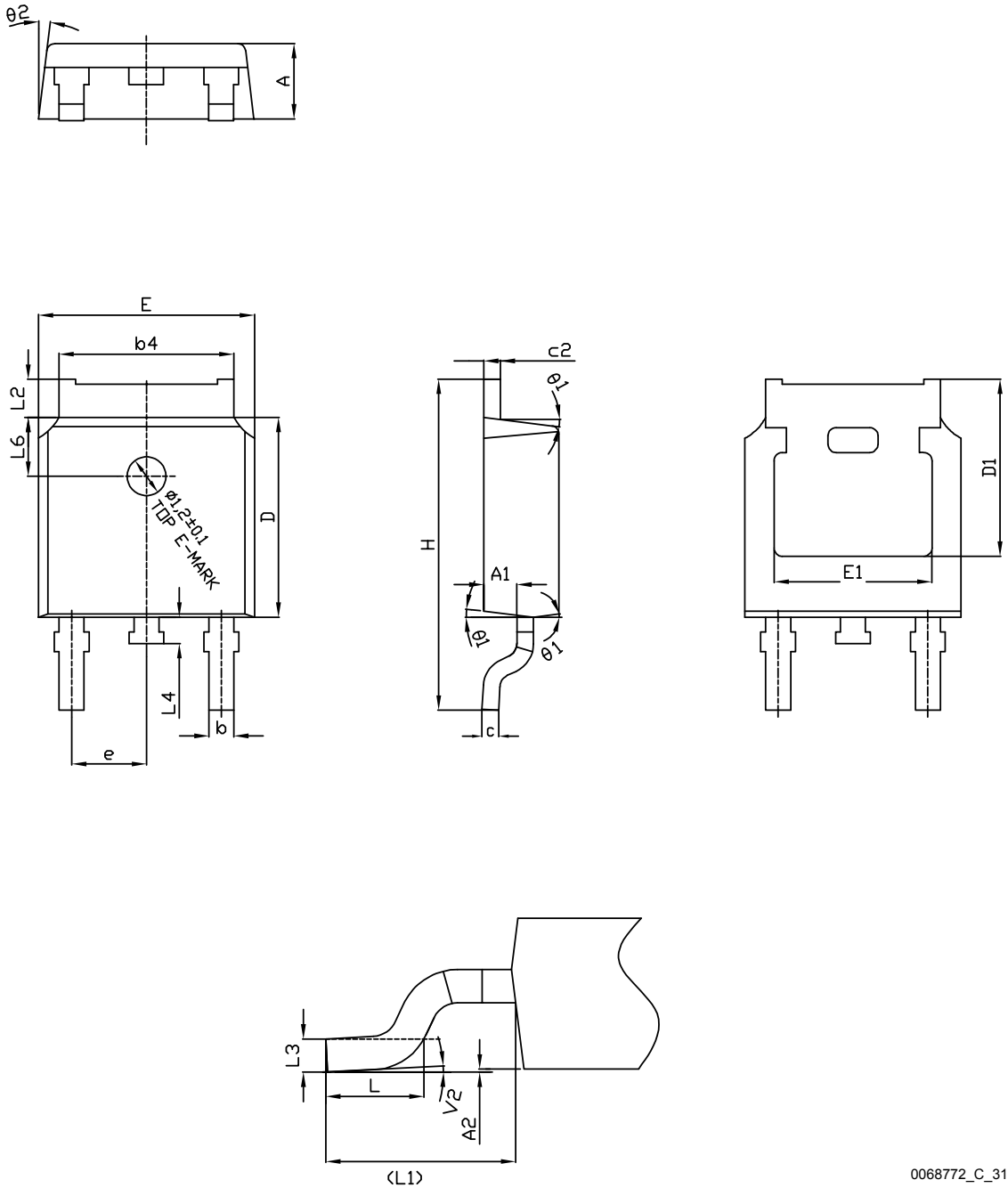
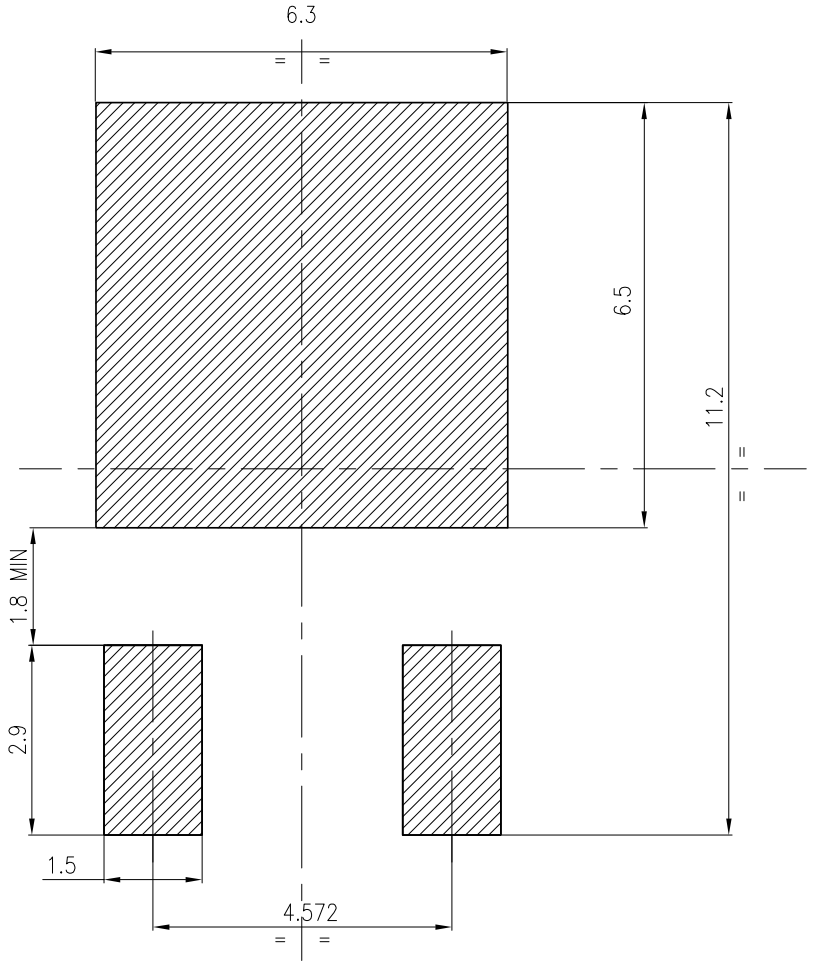


Table 4. **DPAK (TO-252) type C mechanical data**

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)**



4.2 DPAK (TO-252) packing information

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

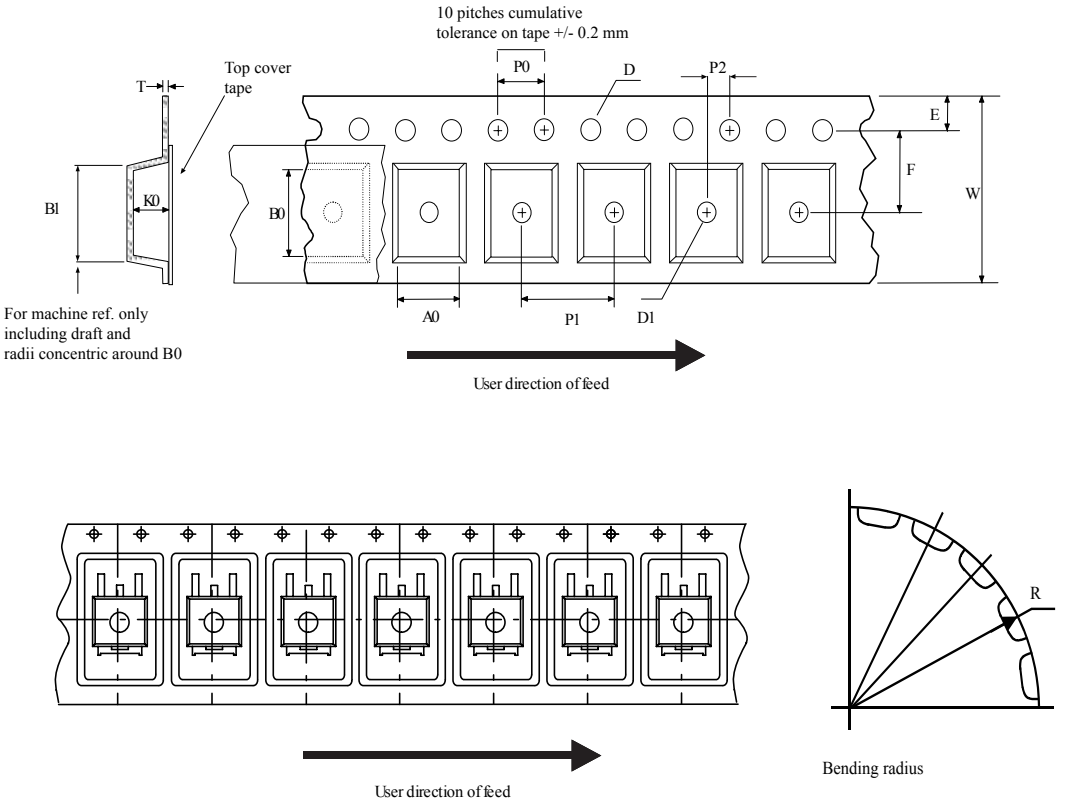


Figure 18. **DPAK (TO-252) reel outline**

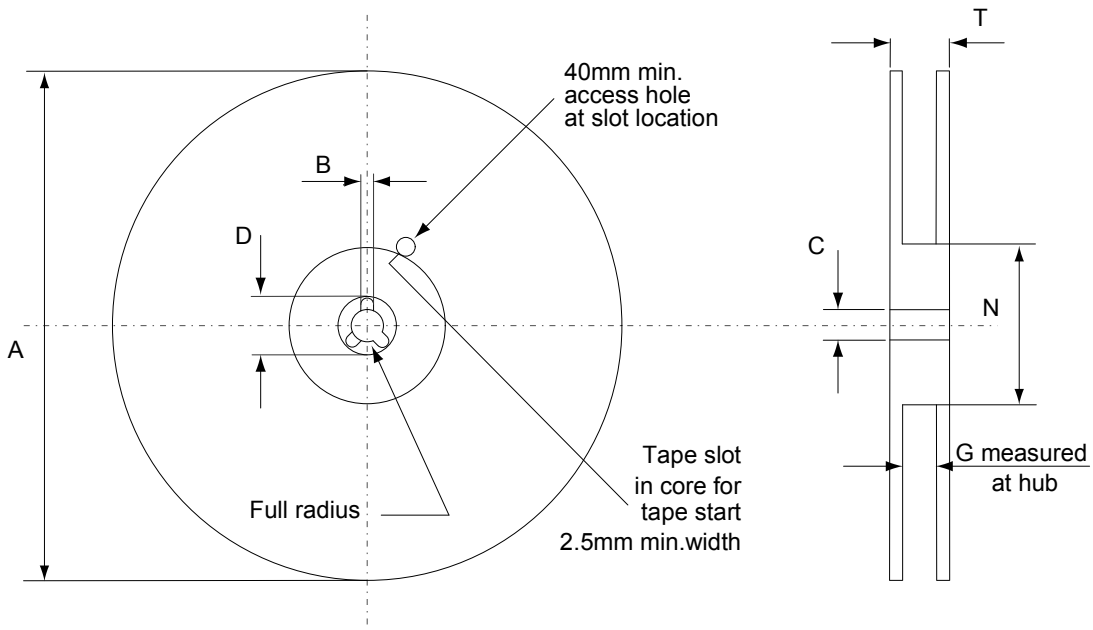


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Table 5. **DPAK (TO-252) tape and reel mechanical data**

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 *figure 4*, updated *figure 12* and *13*.
15-Jul-2022	3	Removed obsolete order code BULD741-1 and updated Section 4.1 DPAK (TO-252) type C package information. Minor text changes.

Contents