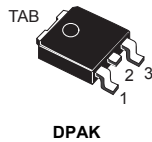


Complementary power Darlington transistors



Features

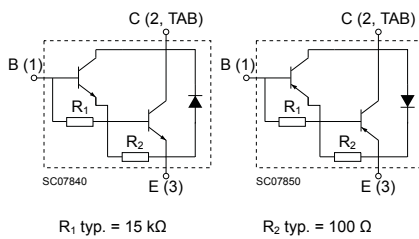
- Good h_{FE} linearity
- High f_T frequency
- Monolithic Darlington configuration with integrated antiparallel collector-emitter diode

Application

- Linear and switching industrial equipment

Description

These devices are manufactured in planar technology with “base island” layout and monolithic Darlington configuration.



Product status links

[MJD112T4](#)

[MJD117T4](#)

Product summary

Order code	MJD112T4
Marking	MJD112
Polarity	NPN
Package	DPAK
Packing	Tape and reel
Order code	MJD117T4
Marking	MJD117
Polarity	PNP
Package	DPAK
Packing	Tape and reel

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CEO}	Collector-emitter voltage ($I_B = 0$ A)	100	V
V_{CBO}	Collector-base voltage ($I_E = 0$ A)		V
V_{EBO}	Emitter-base voltage ($I_C = 0$ A)	5	V
I_C	Collector current	2	A
I_{CM}	Collector peak current	4	A
I_B	Base current	50	mA
P_{TOT}	Total power dissipation at $T_C = 25$ °C	20	W
T_{stg}	Storage temperature range	-65 to 150	°C
T_J	Operating junction temperature range		

Note: For PNP types voltage and current values are negative.

Table 2. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance, junction-to-case	6.25	°C/W

2 Electrical characteristics

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

Table 3. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CEV}	Collector cut-off current	$V_{CE} = 80\text{ V}, V_{BE} = -1.5\text{ V}$		-	10	μA
		$V_{CE} = 80\text{ V}, V_{BE} = -1.5\text{ V}, T_C = 125^\circ\text{C}^{(1)}$		-	500	
I_{CBO}	Collector cut-off current	$V_{CB} = 80\text{ V}, I_E = 0\text{ A}$		-	10	μA
		$V_{CB} = 100\text{ V}, I_E = 0\text{ A}$		-	20	
I_{CEO}	Collector cut-off current	$V_{CE} = 50\text{ V}, I_B = 0\text{ A}$		-	20	μA
I_{EBO}	Emitter cut-off current	$V_{EB} = 5\text{ V}, I_C = 0\text{ A}$		-	2	mA
$V_{CEO(sus)}^{(2)}$	Collector-emitter sustaining voltage	$I_C = 30\text{ V}, I_B = 0\text{ A}$	100	-		V
$V_{CE(sat)}^{(2)}$	Collector-emitter saturation voltage	$I_C = 2\text{ A}, I_B = 8\text{ mA}$		-	2	V
		$I_C = 4\text{ A}, I_B = 40\text{ mA}$		-	3	
$V_{BE(sat)}^{(2)}$	Base-emitter saturation voltage	$I_C = 4\text{ A}, I_B = 40\text{ mA}$		-	4	V
$V_{BE(on)}$	Base-emitter on voltage	$I_C = 0.5\text{ A}, V_{CE} = 3\text{ V}$		-	2.8	V
$h_{FE}^{(2)}$	DC current gain	$I_C = 0.5\text{ A}, V_{CE} = 3\text{ V}$	500	-		
		$I_C = 2\text{ A}, V_{CE} = 3\text{ V}$	1000	-	12000	
		$I_C = 4\text{ A}, V_{CE} = 3\text{ V}$	200	-		
f_T	Transition frequency	$I_C = 0.75\text{ A}, V_{CE} = 10\text{ V}, f = 1\text{ MHz}$	25	-		MHz
C_{CBO}	Collector base capacitance	$V_{CB} = 10\text{ V}, I_E = 0\text{ A}, f = 0.1\text{ MHz}$ for MJD112T4		-	100	pF
		$V_{CB} = 10\text{ V}, I_E = 0\text{ A}, f = 0.1\text{ MHz}$ for MJD117T4		-	200	

1. Specified by design, not tested in production.

2. Pulse test: pulse duration $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

Note: For PNP types voltage and current values are negative.

2.1 Electrical characteristics (curves)

Figure 1. DC current gain ($V_{CE} = 3\text{ V NPN}$)

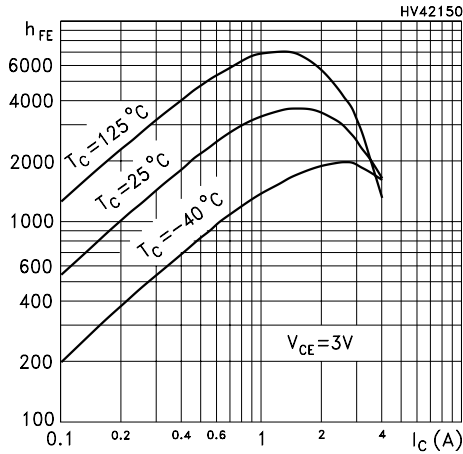


Figure 2. DC current gain ($V_{CE} = -3\text{ V PNP}$)

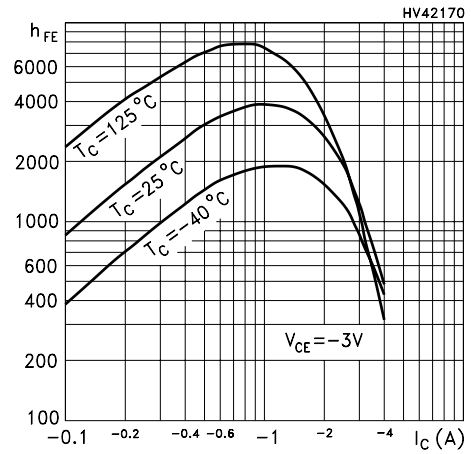


Figure 3. DC current gain ($V_{CE} = 5\text{ V NPN}$)

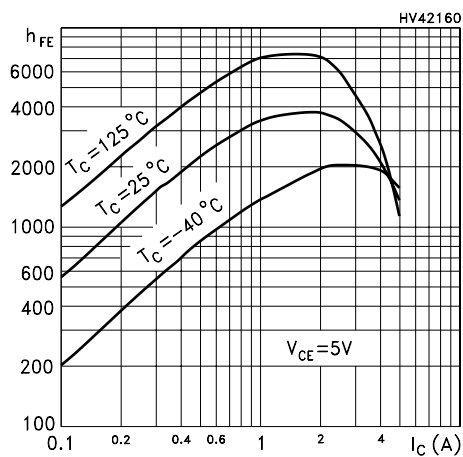


Figure 4. DC current gain ($V_{CE} = -5\text{ V PNP}$)

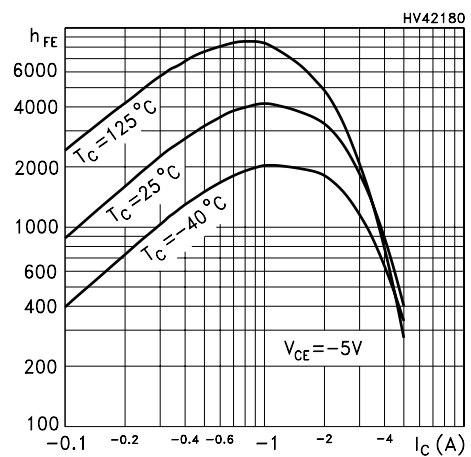


Figure 5. Collector-emitter saturation voltage (NPN)

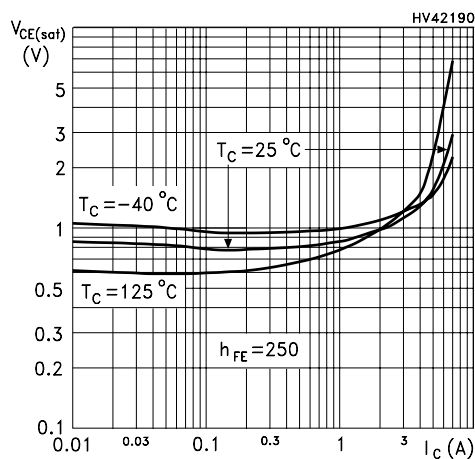


Figure 6. Collector-emitter saturation voltage (PNP)

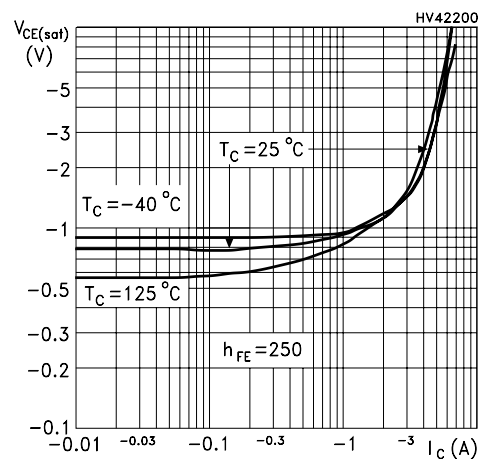


Figure 7. Base-emitter saturation voltage (NPN)

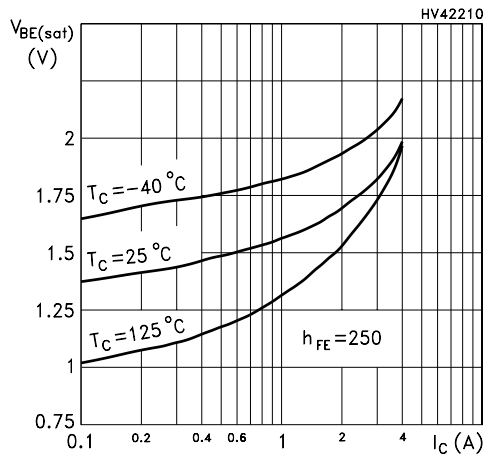


Figure 8. Base-emitter saturation voltage (PNP)

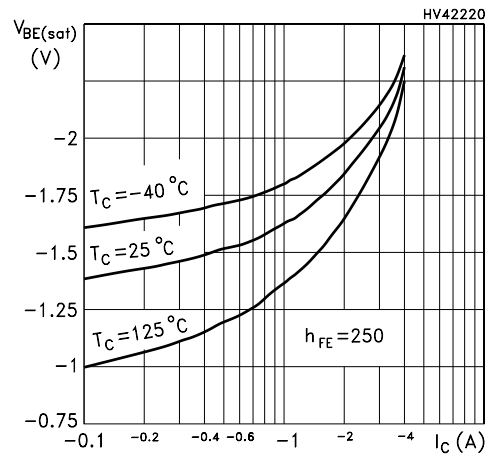


Figure 9. Base-emitter on voltage (NPN)

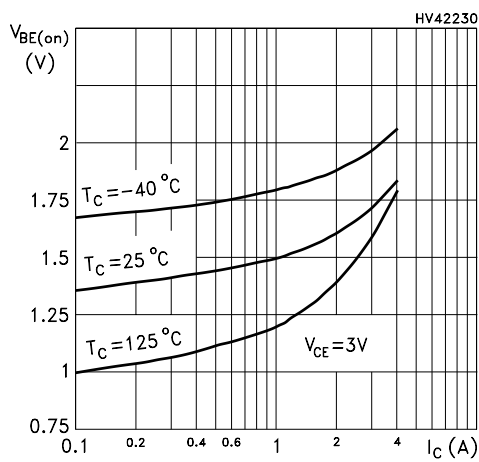


Figure 10. Base-emitter on voltage (PNP)

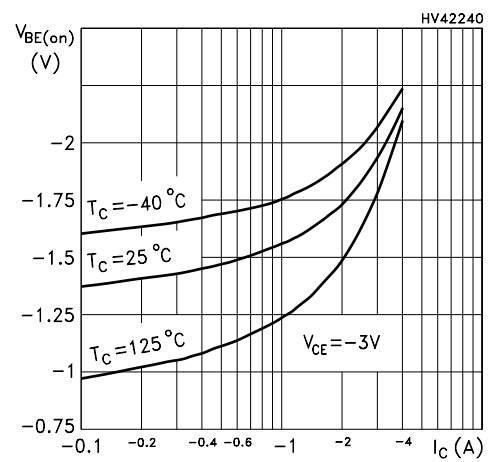


Figure 11. Resistive load switching time (NPN, on)

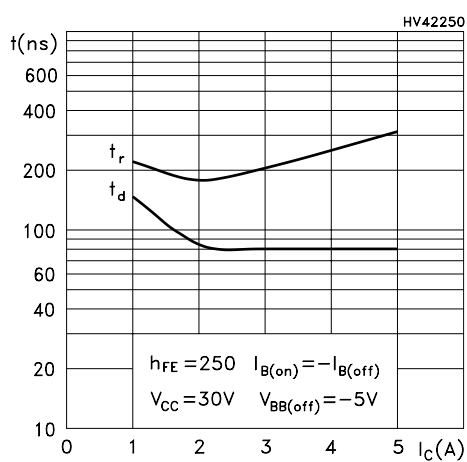


Figure 12. Resistive load switching time (PNP, on)

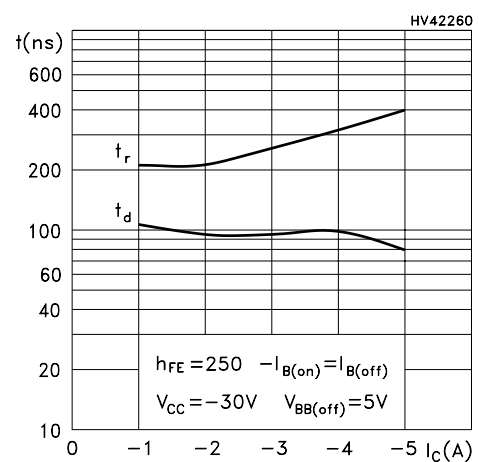


Figure 13. Resistive load switching time (NPN, off)

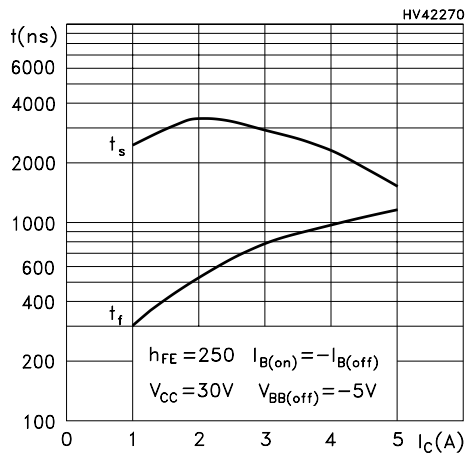
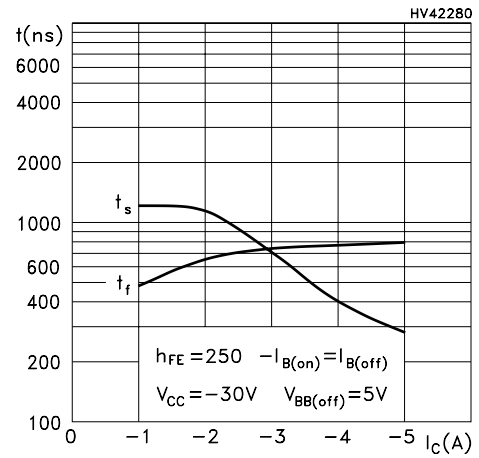


Figure 14. Resistive load switching time (PNP, off)

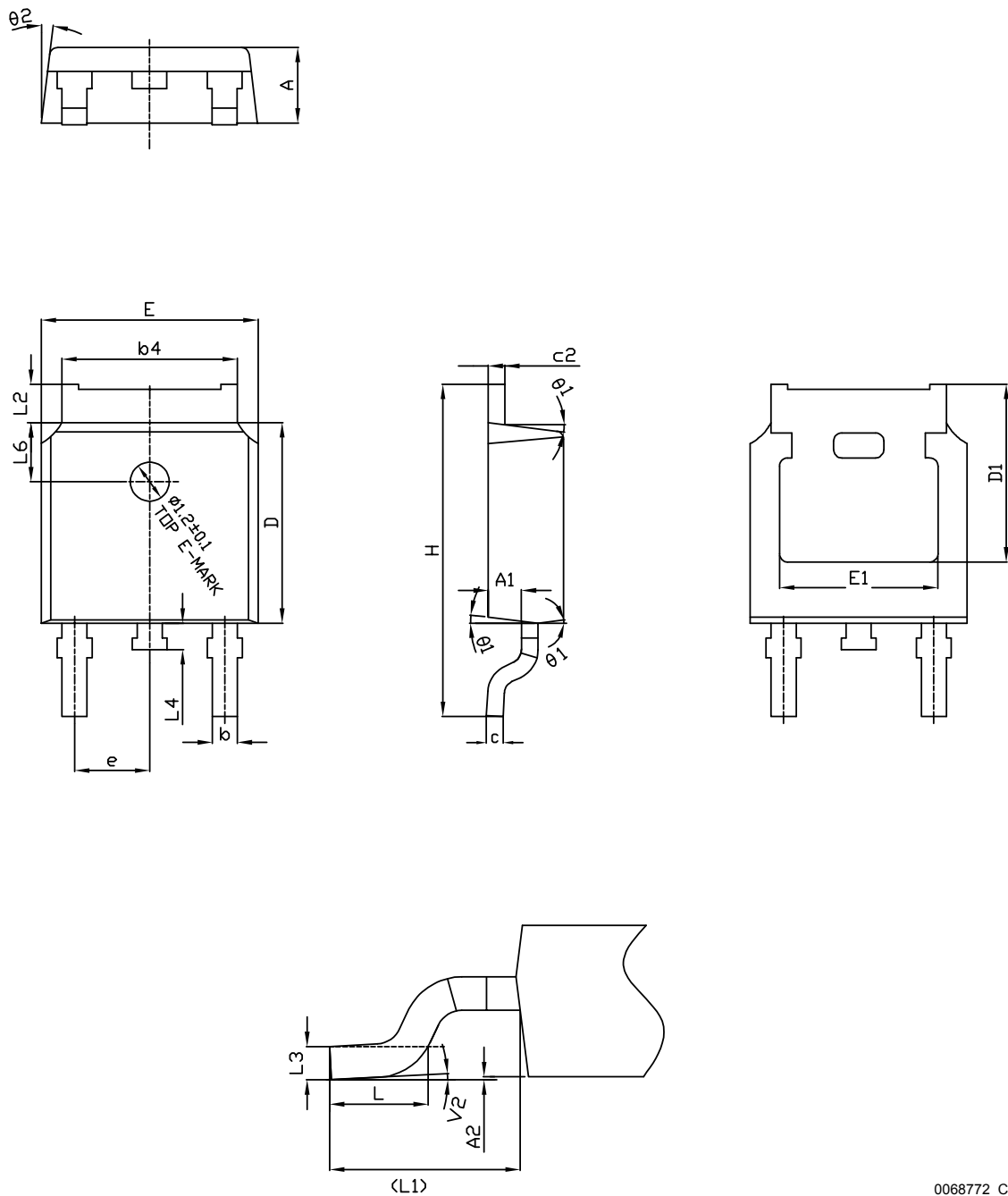


3 Package information

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.

3.1 DPAK (TO-252) type C package information

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

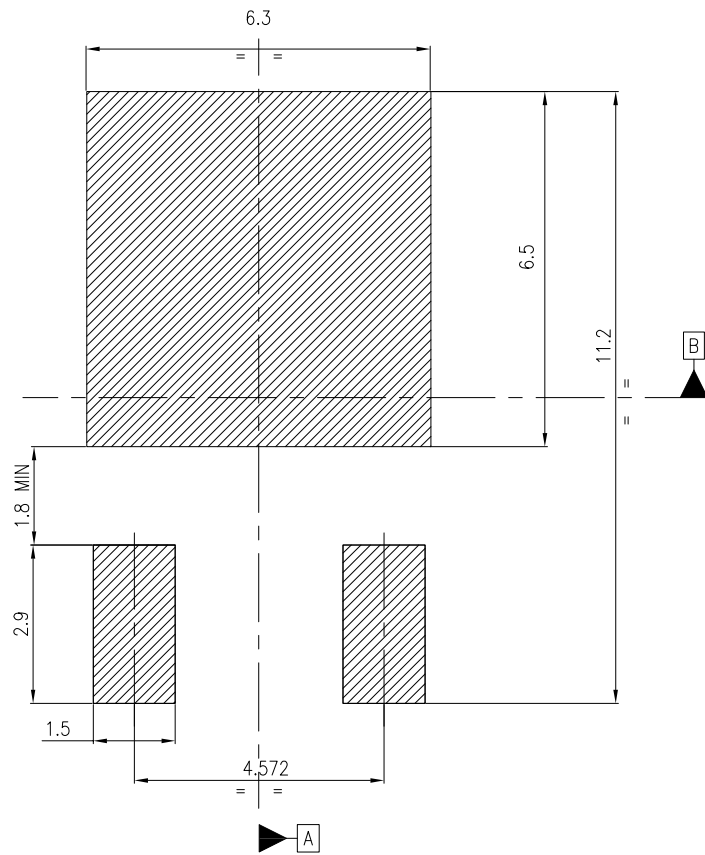


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Table 4. DPAK (TO-252) type C mechanical data

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)



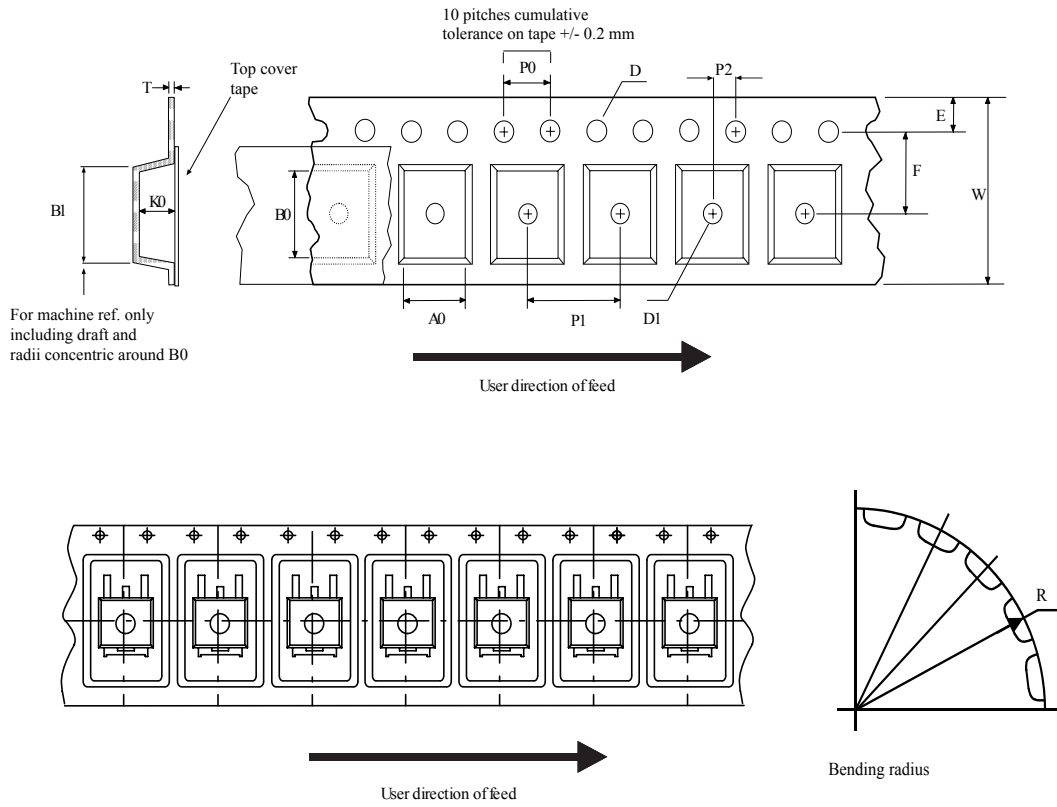
Notes:

- 1) This footprint is able to ensure insulation up to 630 Vrms (according to CEI IEC 664-1)
- 2) The device must be positioned within $\boxed{\oplus 0.05 \text{ A B}}$

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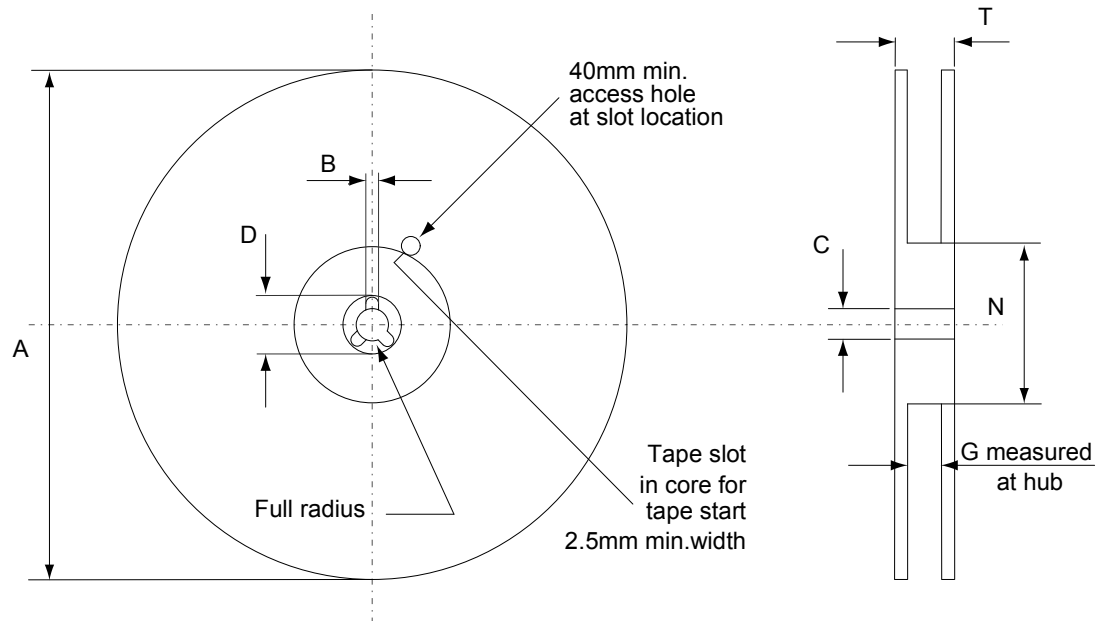
3.2 DPAK (TO-252) packing information

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

Dim.	Tape		Dim.	Reel	
	mm			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
03-Apr-2025	1	First release.
28-Apr-2025	2	Updated Table 3 . Electrical characteristics.

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