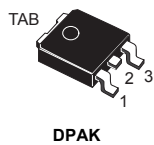


Complementary power Darlington transistors



Features

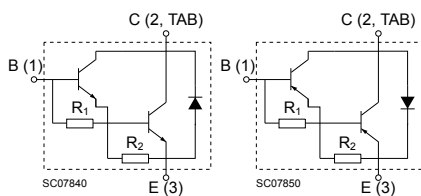
- Low collector-emitter saturation voltage
- Monolithic Darlington configuration with integrated antiparallel collector-emitter diode

Application

- Linear and switching industrial equipment

Description

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



NPN: $R_1 = 7 \text{ k}\Omega$, $R_2 = 70 \Omega$ PNP: $R_1 = 16 \text{ k}\Omega$, $R_2 = 60 \Omega$



Product status links

[MJD122T4](#)

[MJD127T4](#)

Product summary

Order code	MJD122T4
Marking	MJD122
Polarity	NPN
Package	DPAK
Packing	Tape and reel
Order code	MJD127T4
Marking	MJD127
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	8	A
I_{CM}	Collector peak current	16	A
I_B	Base current	120	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_{CBO}	Collector cut-off current	$V_{CB} = 100\text{ V}, I_E = 0\text{ A}$		-	10	μA
I_{CEO}	Collector cut-off current	$V_{CE} = 50\text{ V}, I_B = 0\text{ A}$		-	10	μA
I_{EBO}	Emitter cut-off current	$V_{EB} = 5\text{ V}, I_C = 0\text{ A}$		-	2	mA
$V_{CEO(sus)}^{(1)}$	Collector-emitter sustaining voltage	$I_C = 30\text{ mA}, I_B = 0\text{ A}$	100	-		V
$V_{CE(sat)}^{(1)}$	Collector-emitter saturation voltage	$I_C = 4\text{ A}, I_B = 16\text{ mA}$		-	2	V
		$I_C = 8\text{ A}, I_B = 80\text{ mA}$		-	4	
$V_{BE(sat)}^{(1)}$	Base-emitter saturation voltage	$I_C = 8\text{ A}, I_B = 80\text{ mA}$		-	4.5	V
$V_{BE(on)}$	Base-emitter on voltage	$I_C = 4\text{ A}, V_{CE} = 4\text{ V}$		-	2.8	V
$h_{FE}^{(1)}$	DC current gain	$I_C = 4\text{ A}, V_{CE} = 4\text{ V}$	1000	-	12000	
		$I_C = 8\text{ A}, V_{CE} = 4\text{ V}$	100	-		

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

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

2.1 Electrical characteristics (curves)

Figure 1. Safe operating area

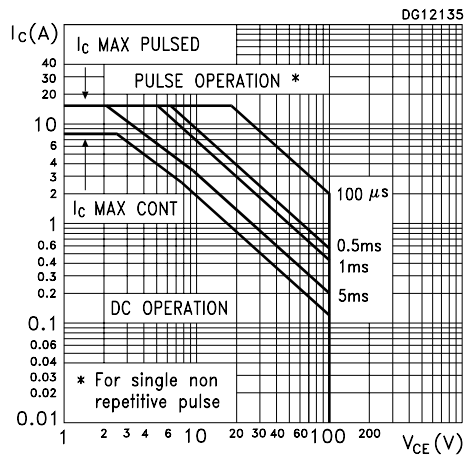


Figure 2. Derating curve

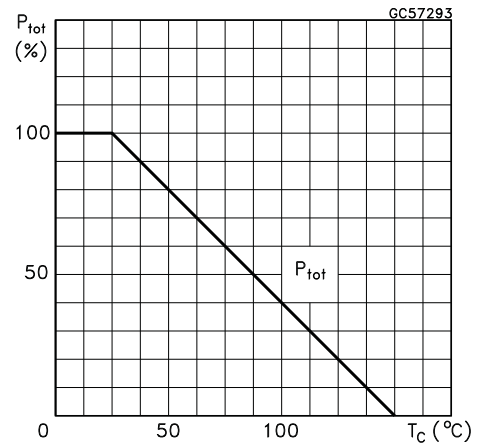


Figure 3. DC current gain (NPN)

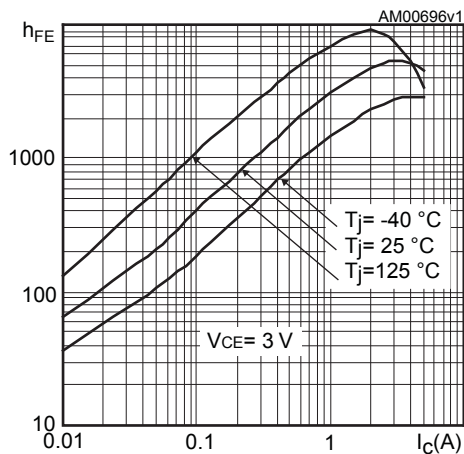


Figure 4. DC current gain (PNP)

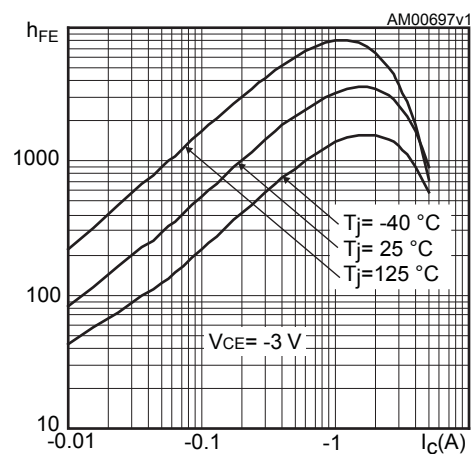


Figure 5. Collector-emitter saturation voltage (NPN)

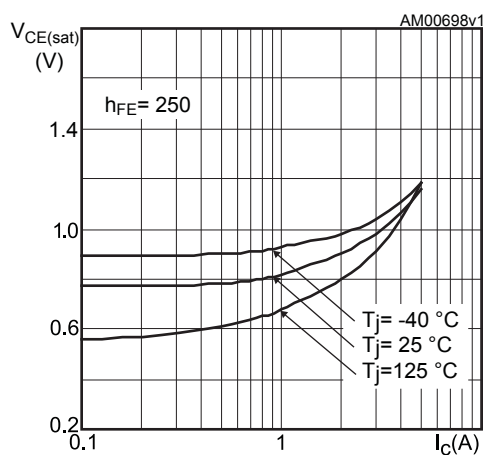


Figure 6. Collector-emitter saturation voltage (PNP)

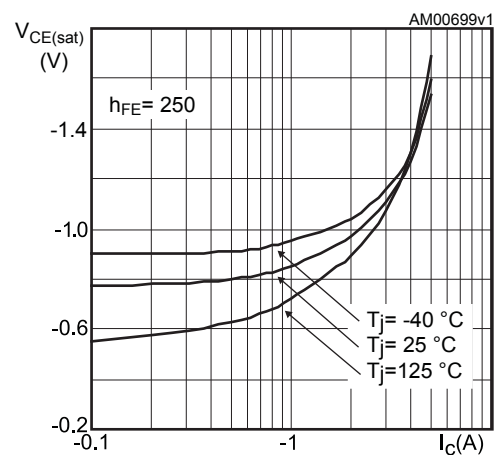


Figure 7. Base-emitter saturation voltage (NPN)

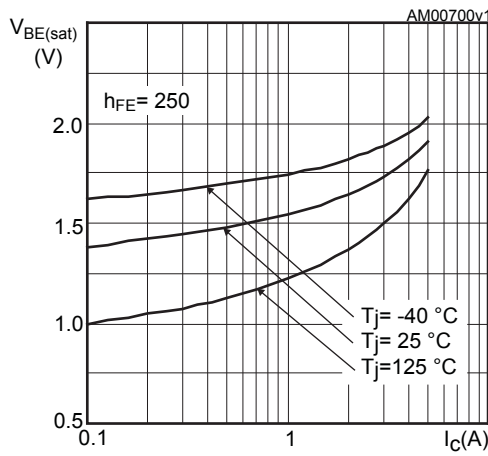


Figure 8. Base-emitter saturation voltage (PNP)

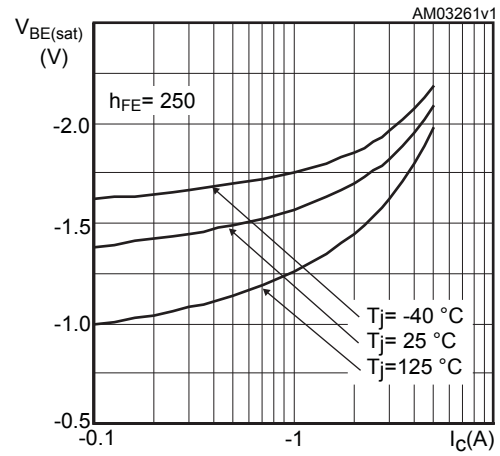


Figure 9. Base-emitter on voltage (NPN)

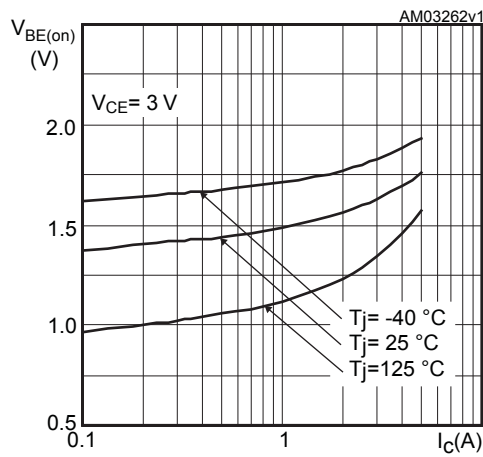


Figure 10. Base-emitter on voltage (PNP)

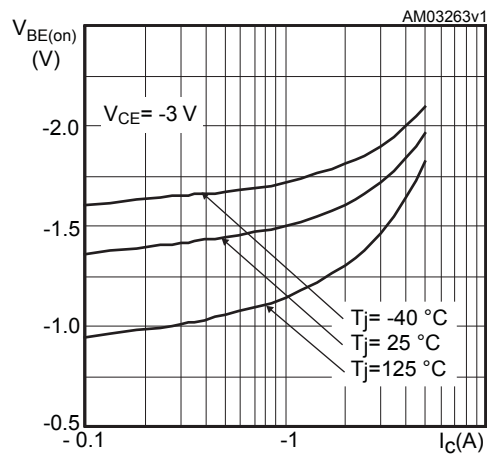


Figure 11. Resistive load switching time (NPN, on)

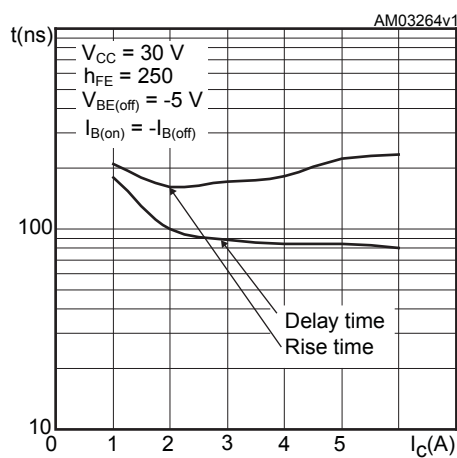


Figure 12. Resistive load switching time (PNP, on)

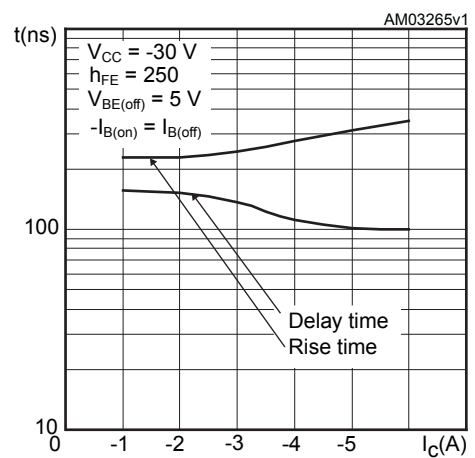


Figure 13. Resistive load switching time (NPN, off)

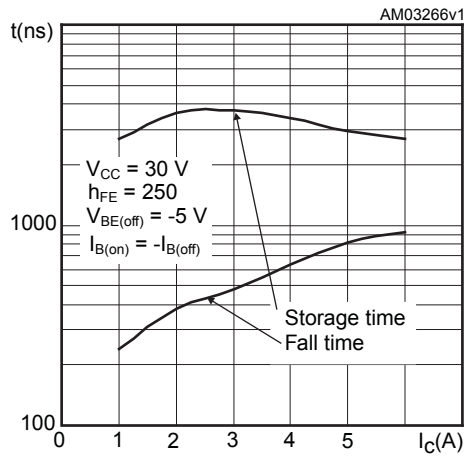


Figure 14. Resistive load switching time (PNP, off)

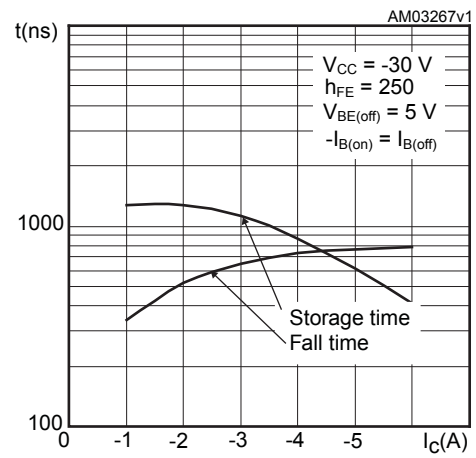


Figure 15. Capacitance characteristics (NPN)

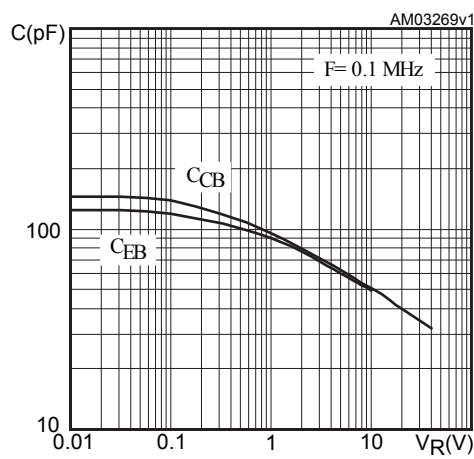
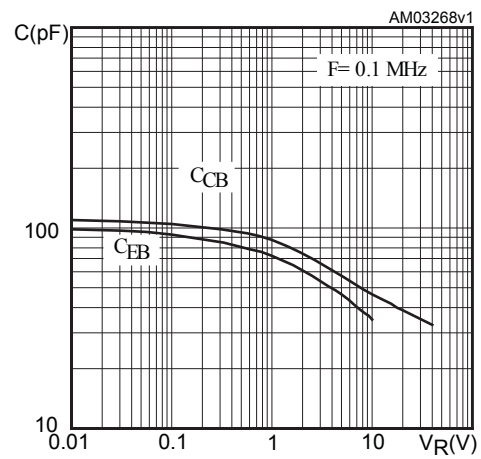
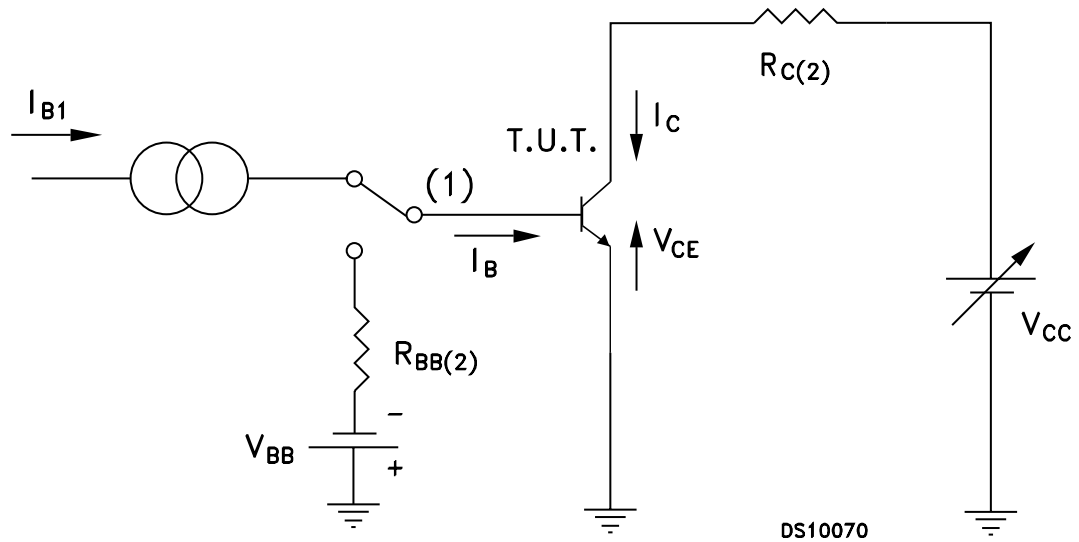


Figure 16. Capacitance characteristics (PNP)



3 Test circuits

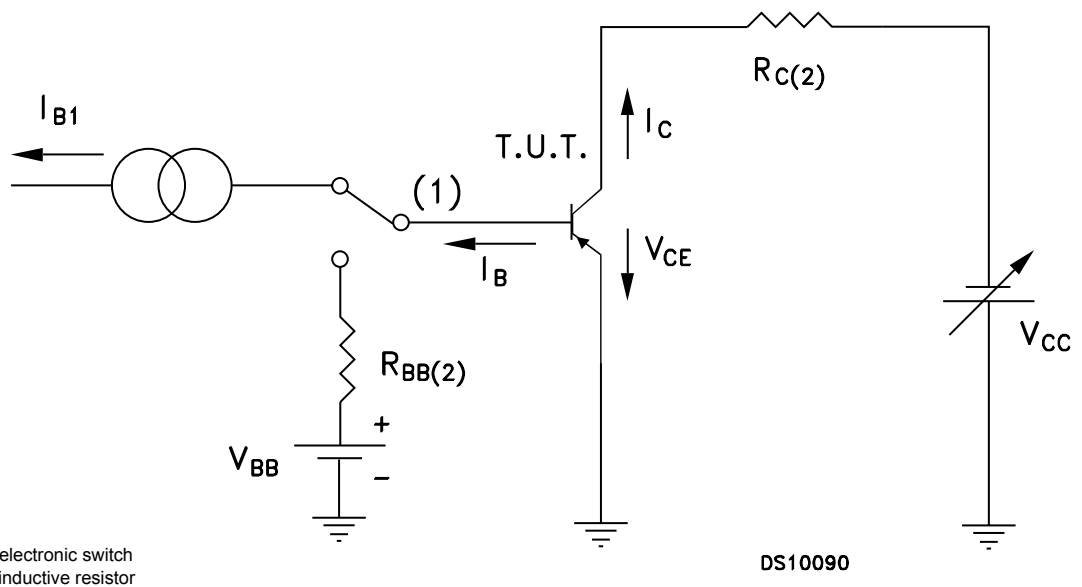
Figure 17. Resistive load switching for NPN type



Note: (1) Fast electronic switch.

Note: (2) Non-inductive resistor.

Figure 18. Resistive load switching for PNP type



Note: (1) Fast electronic switch.

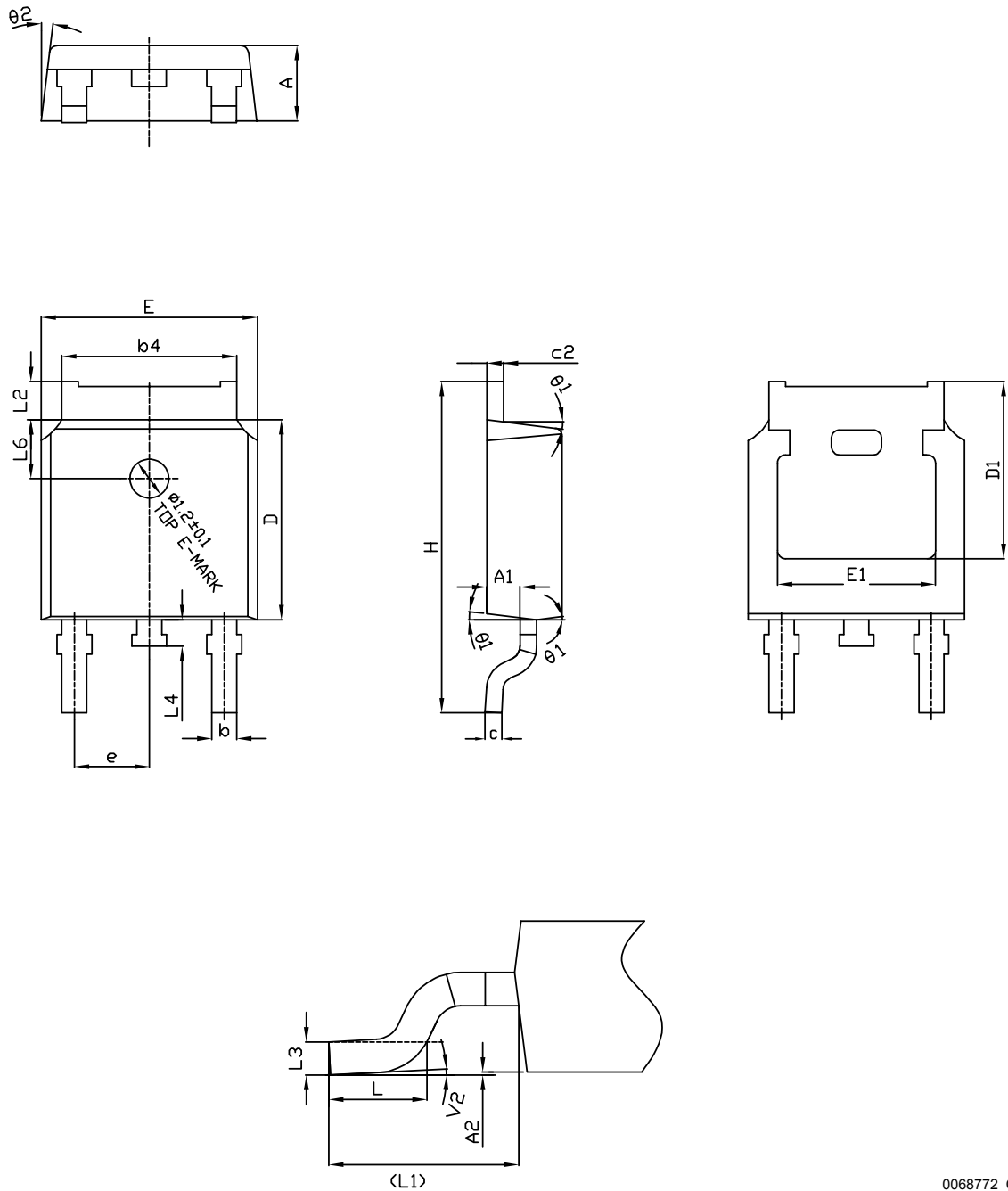
Note: (2) Non-inductive resistor.

4 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.

4.1 DPAK (TO-252) type C package information

Figure 19. DPAK (TO-252) type C package outline



0068772_C_36

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°

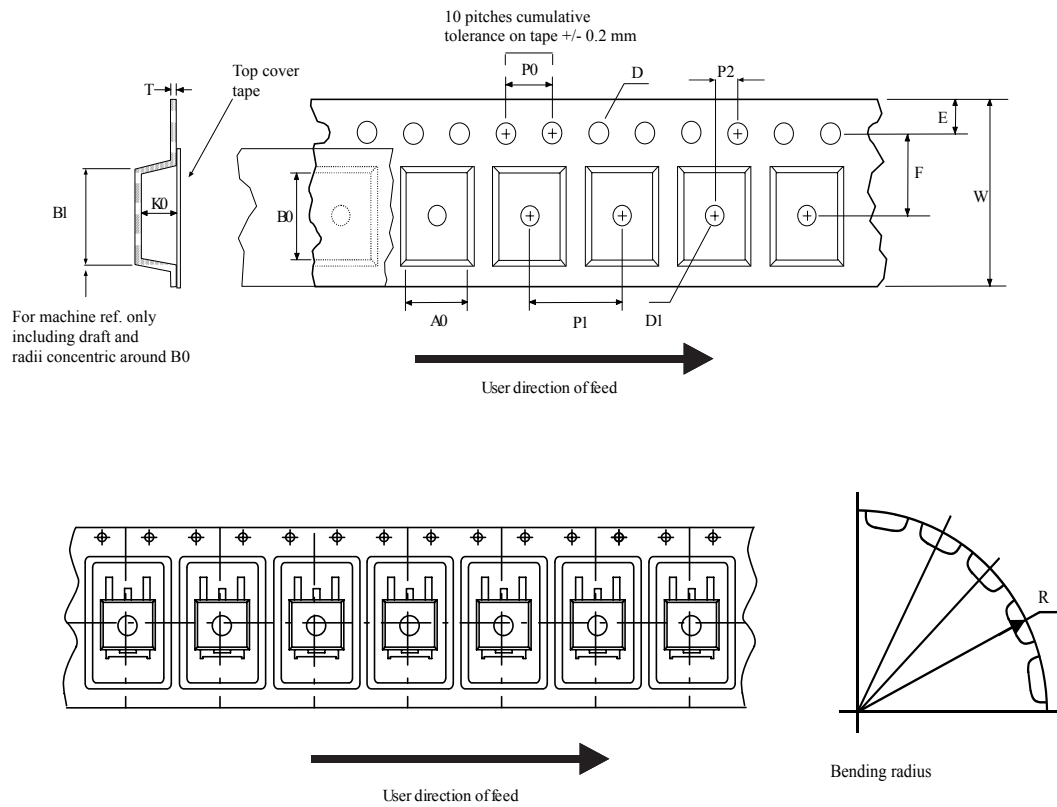
Technical drawing of a mechanical part. The drawing shows a top view and a side view. The top view is a rectangle with a width of 6.3 and a height of 6.5. The side view is a rectangle with a width of 11.2 and a height of 1.8 MIN. The part has two rectangular features on the top surface, each with a width of 1.5 and a height of 2.9. The distance between the centers of these two features is 4.572. The part is shown with section lines (hatching) indicating the material. The drawing includes dimension lines and arrows indicating the measurement of the features.

2) The device must be positioned within $\oplus 0.05 \text{ A B}$

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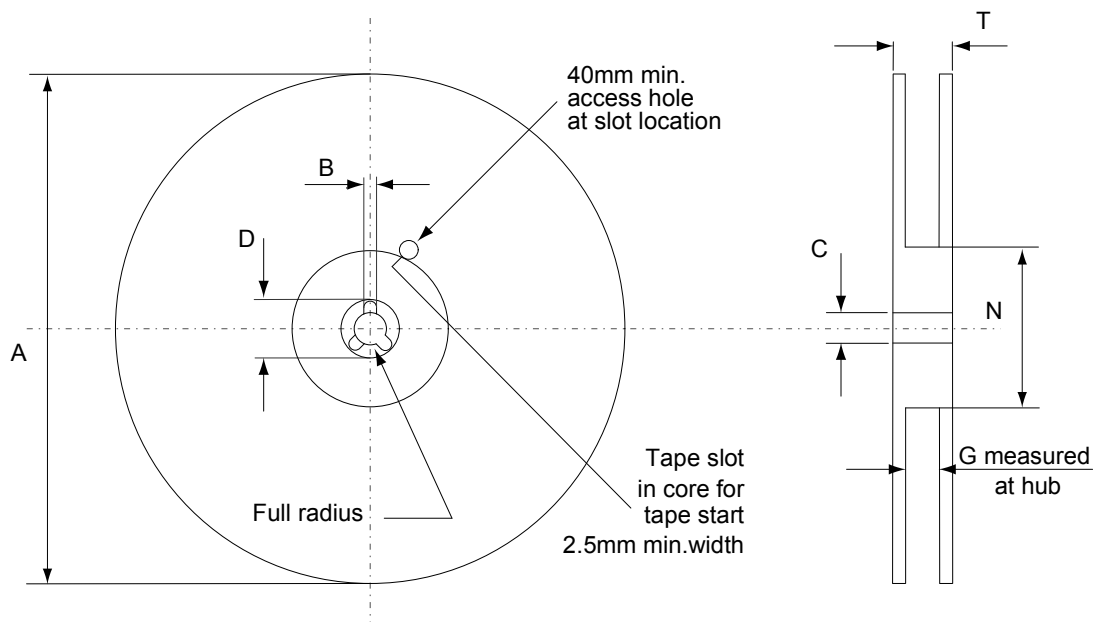
4.2 DPAK (TO-252) packing information

Figure 21. DPAK (TO-252) tape outline



AM08852v1

Figure 22. 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
28-Apr-2025	1	First release.
16-Jun-2025	2	Updated Table 3 . Electrical characteristics. Updated Section 4.1 : DPAK (TO-252) type C package information.

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