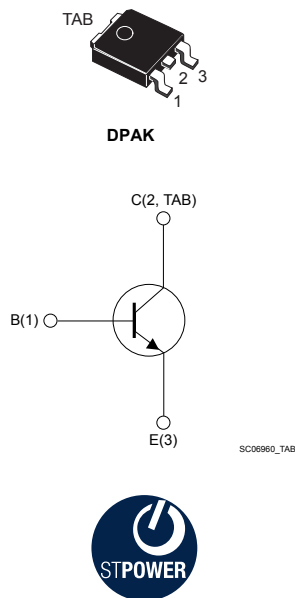


Automotive-grade low voltage NPN power transistor



Features

- AEC-Q101 qualified 
- Surface-mounting TO-252 power package in tape and reel
- Complementary to the PNP type [MJD32CT4-A](#)

Application

- General purpose linear and switching equipment

Description

The device is manufactured in planar technology with a “base island” layout. The resulting transistor shows exceptional high gain performance coupled with very low saturation voltage.

Product status link

[MJD31CT4-A](#)

Product summary

Order code	MJD31CT4-A
Marking	MJD31C
Package	DPAK
Packing	Tape and reel

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base voltage ($I_E = 0$ A)	100	V
V_{CEO}	Collector-emitter voltage ($I_B = 0$ A)	100	V
V_{EBO}	Collector-base voltage ($I_C = 0$ A)	5	V
I_C	Collector current	3	A
I_{CM}	Collector peak current	5	A
I_B	Base current	1	A
P_{TOT}	Total power dissipation at $T_C = 25$ °C	15	W
T_{stg}	Storage temperature range	-65 to 150	°C
T_J	Operating junction temperature range		°C

Table 2. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance, junction-to-case	8.3	°C/W
$R_{thJA}^{(1)}$	Thermal resistance, junction-to-ambient	50	°C/W

1. When mounted on a standard 1 inch² area of FR-4 PCB with 2-oz copper.

2 Electrical characteristics

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

Table 3. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current	$V_{CE} = 100\text{ V}, V_{BE} = 0\text{ V}$		-	20	μA
I_{CEO}	Collector cut-off current	$V_{CB} = 60\text{ V}, I_B = 0\text{ A}$		-	50	μA
I_{EBO}	Emitter cut-off current	$V_{EB} = 5\text{ V}, I_C = 0\text{ A}$		-	0.1	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	$I_C = 3\text{ A}, I_B = 375\text{ mA}$		-	1.2	V
$V_{BE(on)}^{(1)}$	Base-emitter on voltage	$I_C = 3\text{ A}, V_{CE} = 4\text{ V}$		-	1.8	V
h_{FE}	DC current gain	$I_C = 1\text{ A}, V_{CE} = 4\text{ V}$	25	-		
		$I_C = 3\text{ A}, V_{CE} = 4\text{ V}$	10	-	50	

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

2.1 Electrical characteristics (curves)

Figure 1. Safe operating area

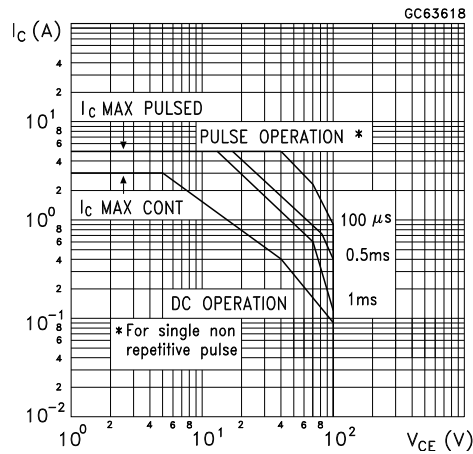


Figure 2. Derating curve

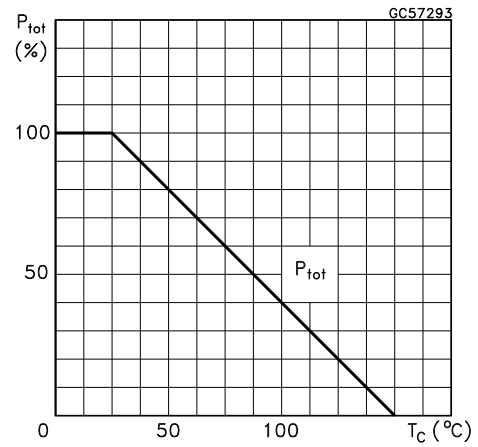


Figure 3. DC current gain ($V_{CE} = 2\text{ V}$)

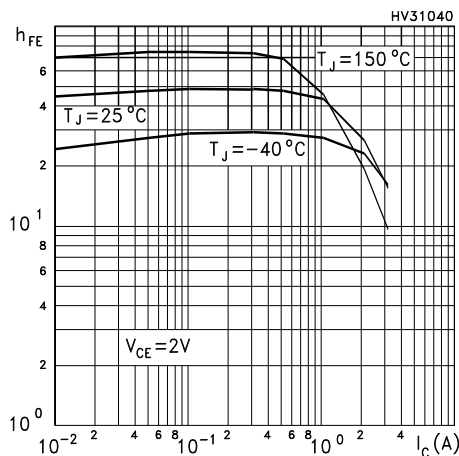


Figure 4. DC current gain ($V_{CE} = 4\text{ V}$)

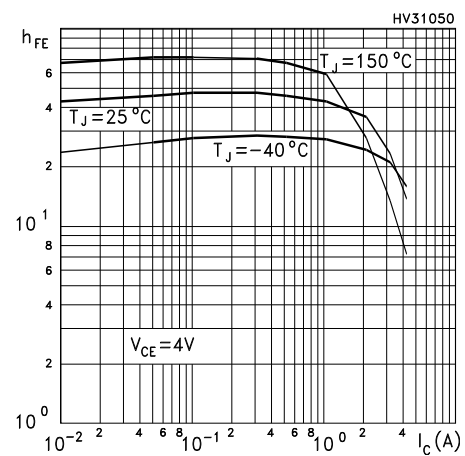


Figure 5. Collector-emitter saturation voltage

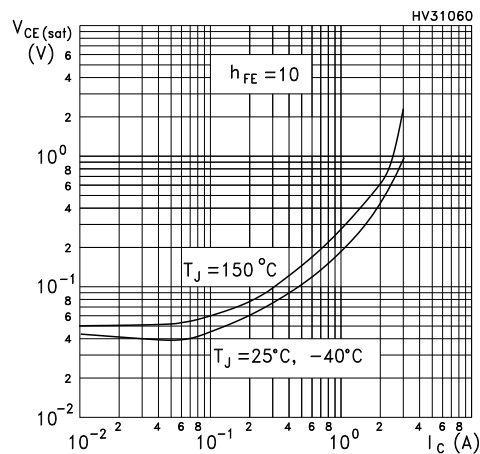


Figure 6. Base-emitter saturation voltage

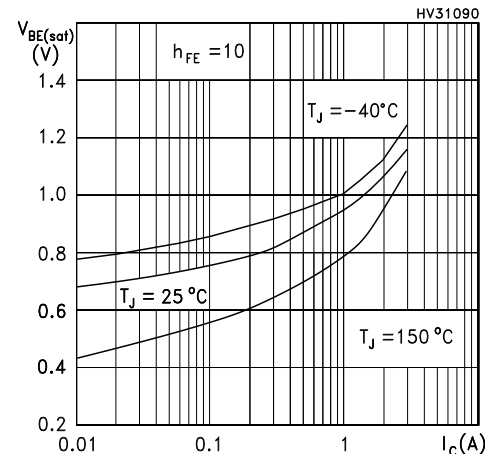


Figure 7. Base-emitter on voltage

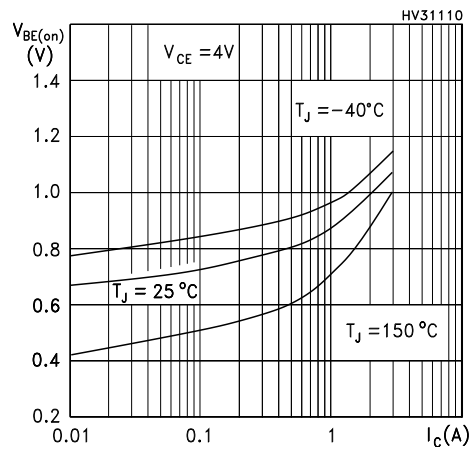


Figure 8. Resistive load switching time (on)

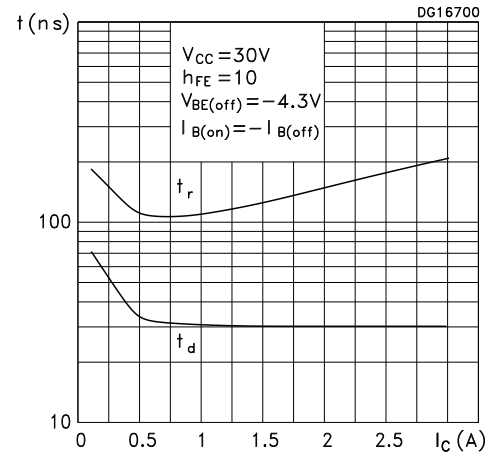
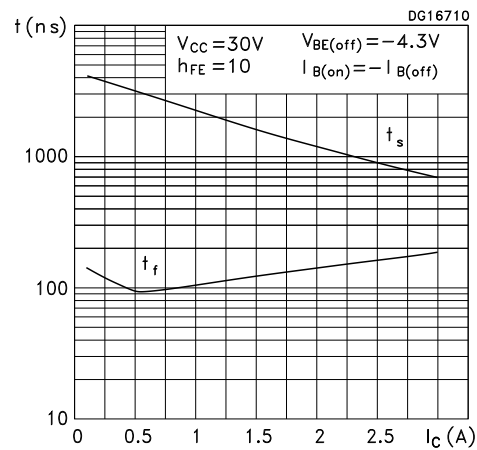


Figure 9. Resistive load switching time (off)

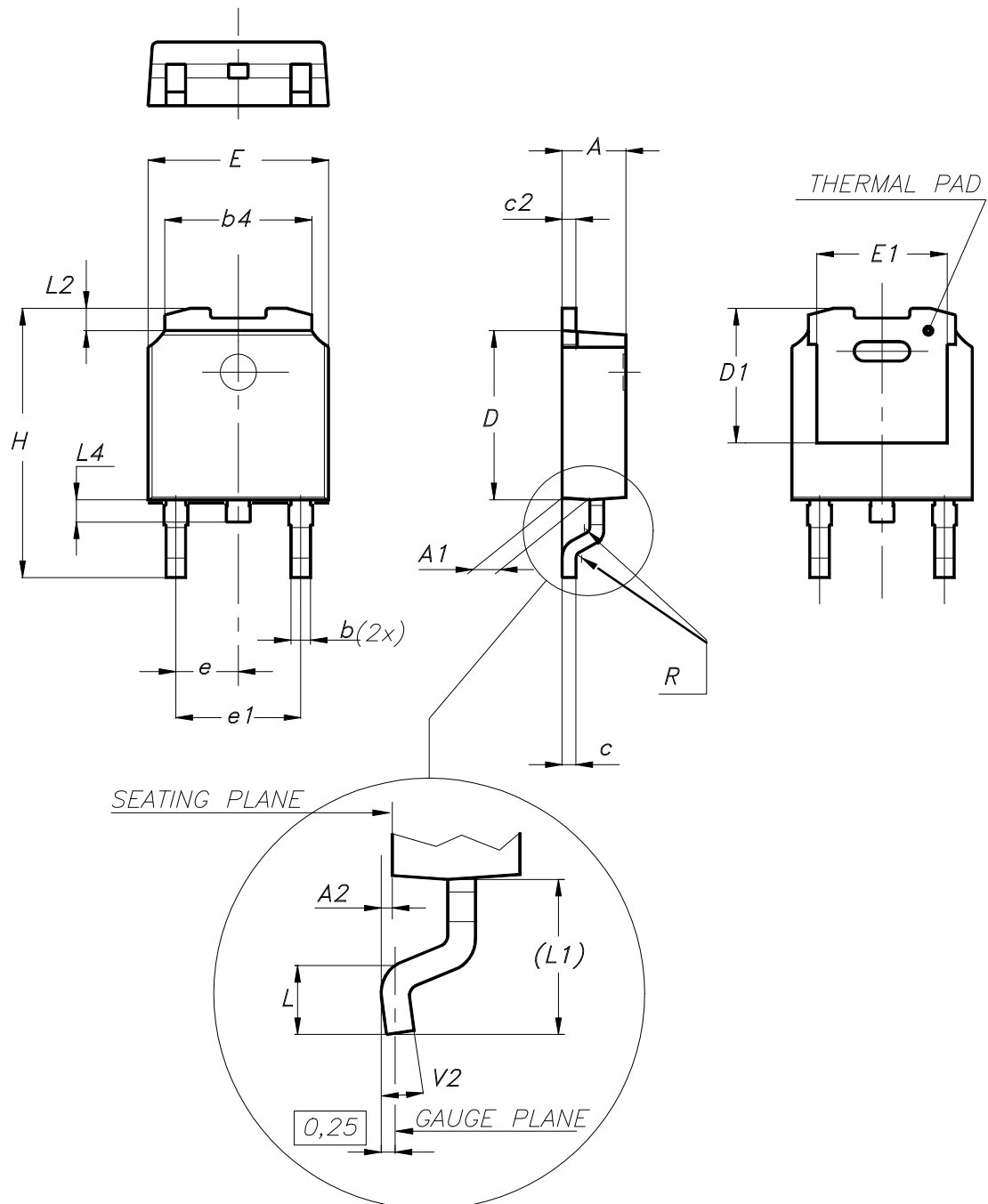


3 Package information

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) package information

Figure 10. DPAK (TO-252) type A package outline



0068772_A_36

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

Dim.	mm		
	Min.	Typ.	Max.
A	2.20		2.40
A1	0.90		1.10
A2	0.03		0.23
b	0.64		0.90
b4	5.20		5.40
c	0.45		0.60
c2	0.48		0.60
D	6.00		6.20
D1	4.95	5.10	5.25
E	6.40		6.60
E1	4.60	4.70	4.80
e	2.159	2.286	2.413
e1	4.445	4.572	4.699
H	9.35		10.10
L	1.00		1.50
(L1)	2.60	2.80	3.00
L2	0.65	0.80	0.95
L4	0.60		1.00
R		0.20	
V2	0°		8°

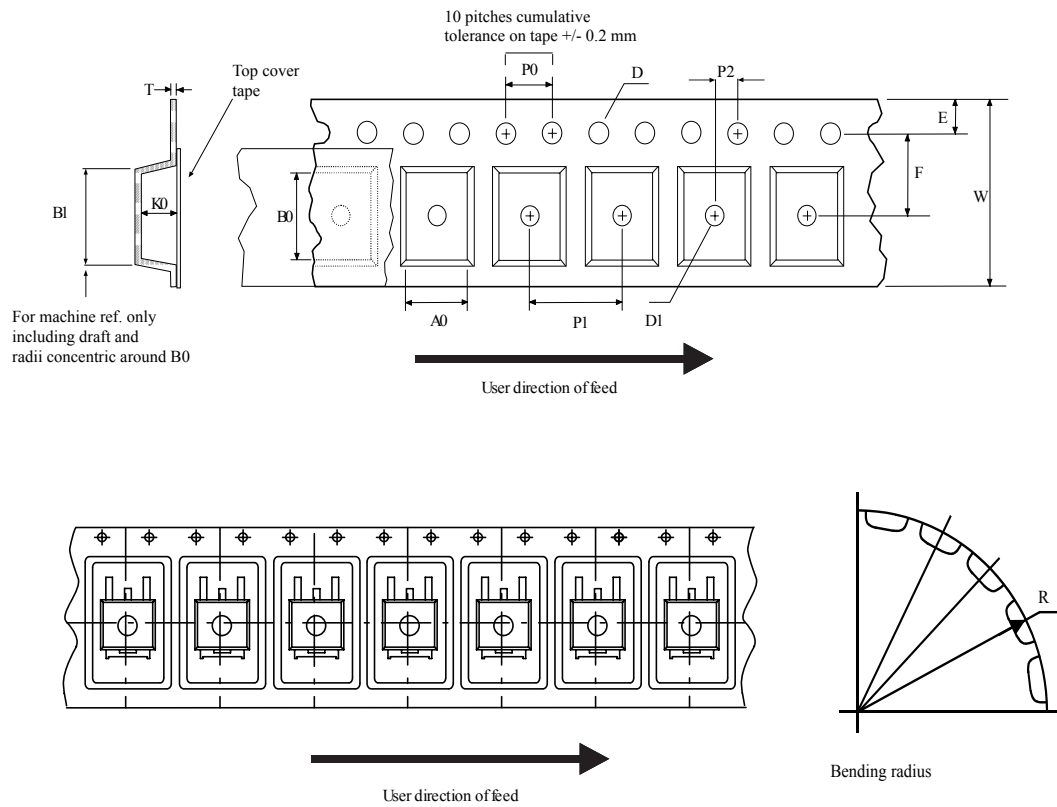
Technical drawing of a mechanical part. The drawing shows a cross-section of a part with a central vertical hole. The overall width is 6.3. The overall height is 11.2. The central hole has a diameter of 4.572. The part has a thickness of 1.5. The distance from the top surface to the center of the hole is 2.9. The distance from the bottom surface to the center of the hole is 1.8 MIN. The part is divided into two halves by a vertical centerline. The left half is hatched with diagonal lines. The right half is also hatched with diagonal lines. The drawing includes dimension lines and section lines. A section line 'A' is shown at the bottom, and a section line 'B' is shown on the right.

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

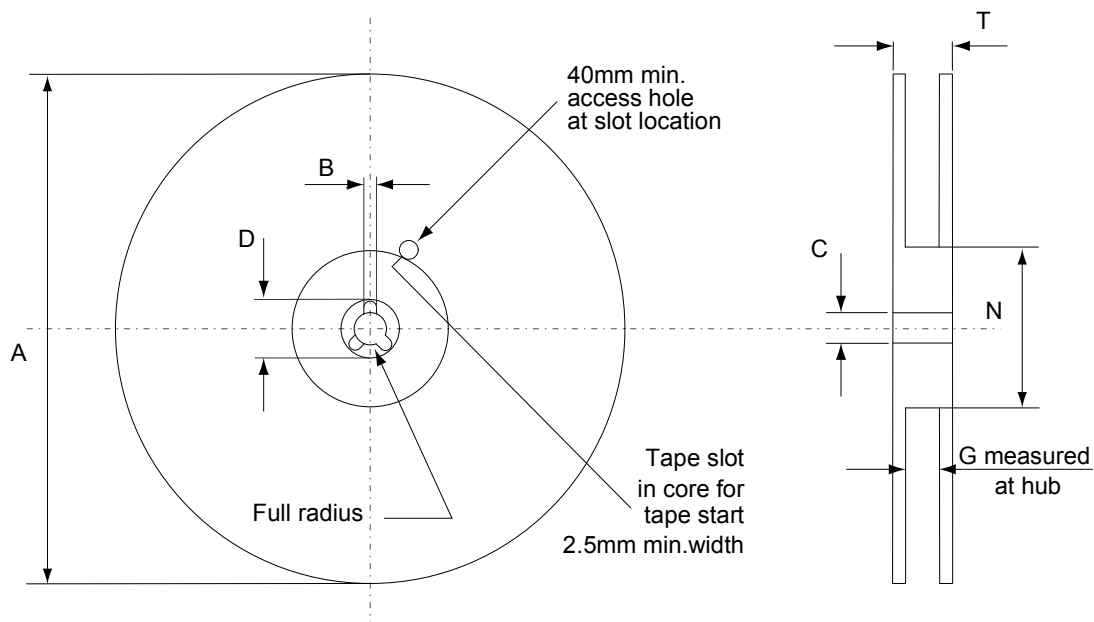
FP_0068772_36

3.2 DPAK (TO-252) packing information

Figure 12. DPAK (TO-252) tape outline



AM08852v1

Figure 13. 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
24-Apr-2007	1	Initial release.
09-Nov-2009	2	Updated package mechanical data.
14-Jan-2010	3	Modified <i>Table 3</i> on <i>page 2</i> .
19-Jun-2012	4	Modified: mechanical data
04-Jul-2024	5	Updated <i>Features</i> on cover page. Removed section test circuits. Updated <i>Section 3.1: DPAK (TO-252) package information</i> . Minor text changes.
16-Jun-2025	6	Updated Table 3. Electrical characteristics . Minor text changes.

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