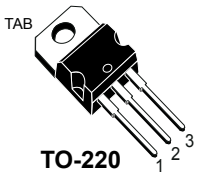
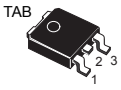
ST901T, STD901T

Datasheet

High voltage NPN Darlington transistor for ignition coil



TO-220



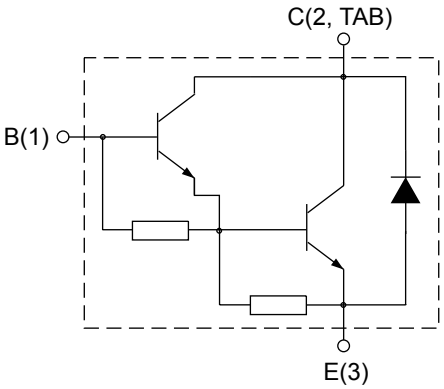
DPAK

Features

- High voltage special Darlington structure
- Very rugged Bipolar technology
- High DC current gain

Application

- High ruggedness electronic ignition for small engines



B1C2TABE3

Description

The device is a high voltage NPN transistor in monolithic special Darlington configuration, designed for applications such as electronic ignition for small engines (scooters, lawnmowers, chainsaws).

STPOWER

Product status links
ST901T
STD901T

Product summary	
Order code	**ST901T**
Marking	901T
Package	TO-220
Packing	Tube
Order code	**STD901T**
Marking	D901T
Package	DPAK
Packing	Tape and reel

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage (V_{BE} = 0)	500	V
V_{CEO}	Collector-emitter voltage (I_B = 0)	350	V
V_{EBO}	Emitter-base voltage (I_C = 0)	5	V
I_C	Collector current	4	A
I_{CM}	Collector peak current (t_p < 5 ms)	8	A
I_B	Base current	0.5	A
I_{BM}	Base peak current (t_p < 5 ms)	2.5	A
P_{TOT}	Total power dissipation at T_C = 25 °C for ST901T	100	W
	Total power dissipation at T_C = 25 °C for STD901T	35	
T_{stg}	Operating junction temperature range	-65 to 150	°C
T_J	Storage temperature range		°C

Table 2. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance, junction-to-case for ST901T	1.25	°C/W
	Thermal resistance, junction-to-case for STD901T	3.57	

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_{BE} = 0 V, V_{CE} = 500 V			100	µA
		V_{BE} = 0 V, V_{CE} = 500 V, T_C = 125 °C (1)			500	
I_{CEO}	Collector cut-off current	I_B = 0 A, V_{CE} = 350 V			100	µA
		I_B = 0 A, V_{CE} = 350 V, T_C = 125 °C (1)			500	
I_{EBO}	Emitter cut-off current	I_C= 0 A, V_{EB} = 5 V			10	µA
$V_{CEO(sus)}$ (2)	Collector-emitter sustaining voltage	I_B= 0 A, I_C = 10 mA	350			V
$V_{CE(sat)}$ (2)	Collector-emitter saturation voltage	I_C = 2 A, I_B = 20 mA			2	V
$V_{BE(sat)}$ (2)	Base-emitter saturation voltage	I_C = 2 A, I_B = 20 mA			1.8	V
h_{FE}	DC current gain	I_C = 2 A, V_{CE} = 2 V	1800		3800	
		I_C = 4 A, V_{CE} = 2 V	500			
	Functional test	V_{CC} = 24 V, L = 4 mH, V_{clamp} = 350 V	4			A
t_s	Storage time	V_{CC}= 12 V, L = 4 mH, I_C = 2 A, V_{clamp} = 250 V, $I_{B(on)}$ = 20 mA, $V_{BE(off)}$ = -3 V		15		µs
t_f	Fall time			1.5		µs

1. *Specified by design, not tested in production.*
2. *Pulse test: pulse duration ≤ 300 µs, duty cycle ≤ 2 %.*

2.1 Electrical characteristics (curves)

Figure 1. Collector-emitter saturation voltage (h_{FE} = 100)

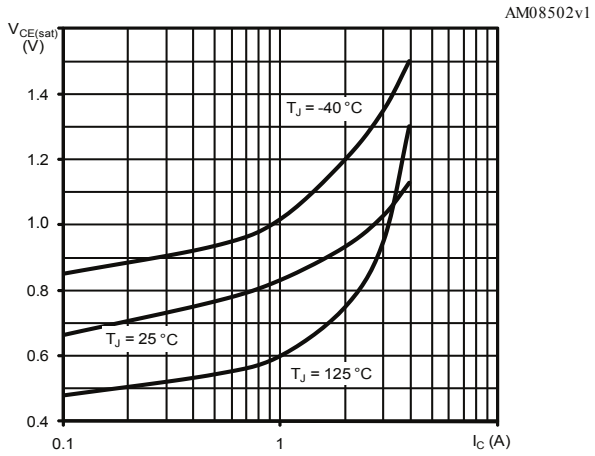


Figure 2. Base-emitter saturation voltage (h_{FE} = 100)

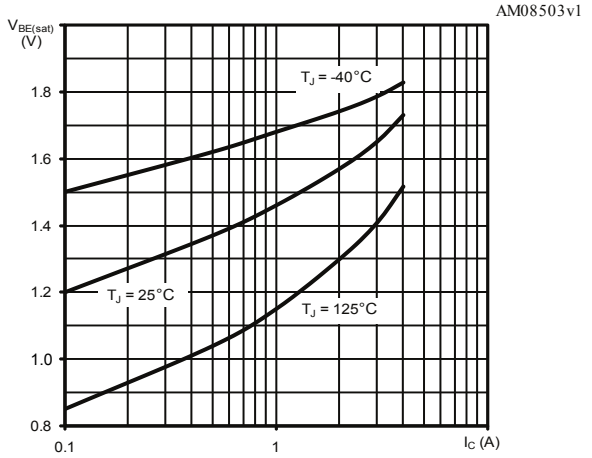


Figure 3. DC current gain (V_{CE} = 2 V)

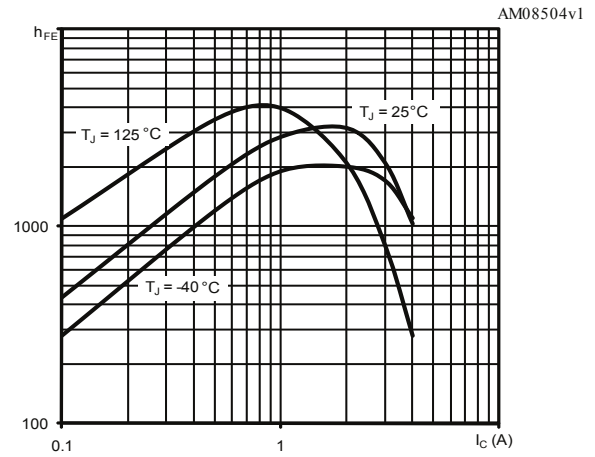
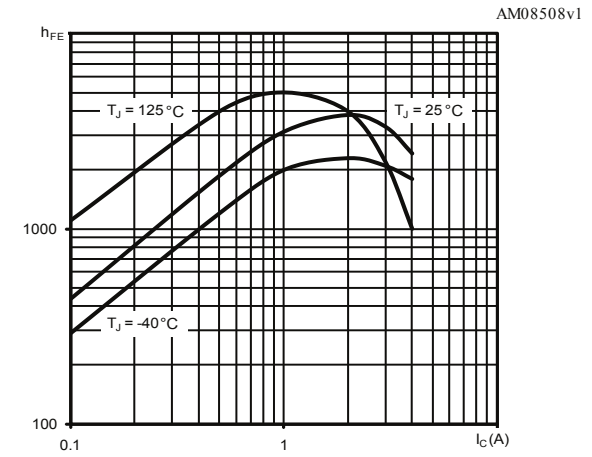


Figure 4. DC current gain (V_{CE} = 5 V)



3 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.

3.1 TO-220 type A package information

Figure 5. TO-220 type A package outline

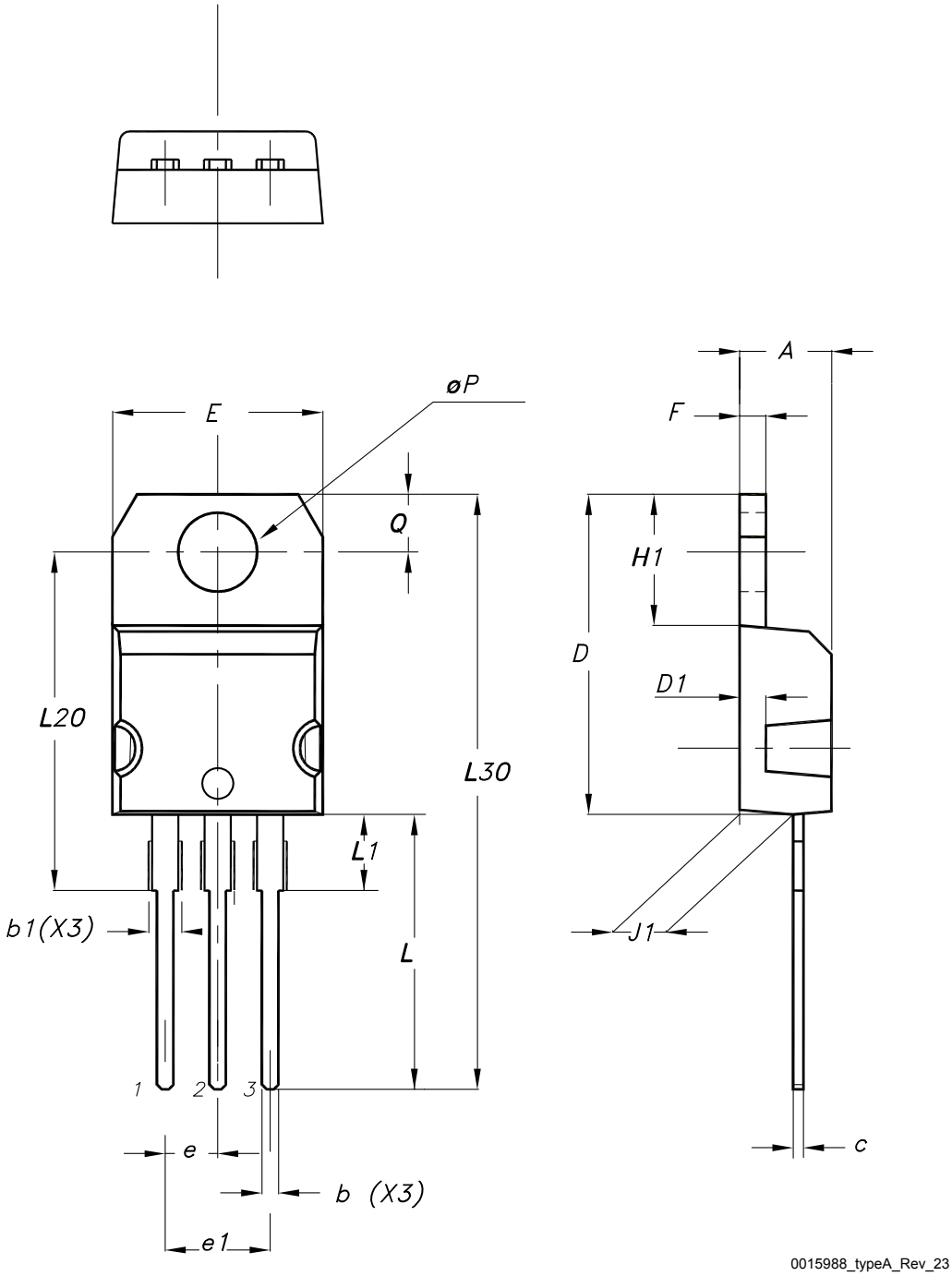


Table 4. **TO-220 type A package mechanical data**

Dim.	mm		
	Min.	Typ.	Max.
A	4.40		4.60
b	0.61		0.88
b1	1.14		1.55
c	0.48		0.70
D	15.25		15.75
D1		1.27	
E	10.00		10.40
e	2.40		2.70
e1	4.95		5.15
F	1.23		1.32
H1	6.20		6.60
J1	2.40		2.72
L	13.00		14.00
L1	3.50		3.93
L20		16.40	
L30		28.90	
øP	3.75		3.85
Q	2.65		2.95
Slug flatness		0.03	0.10

3.2 DPAK (TO-252) type A package information

Figure 6. **DPAK (TO-252) type A package outline**

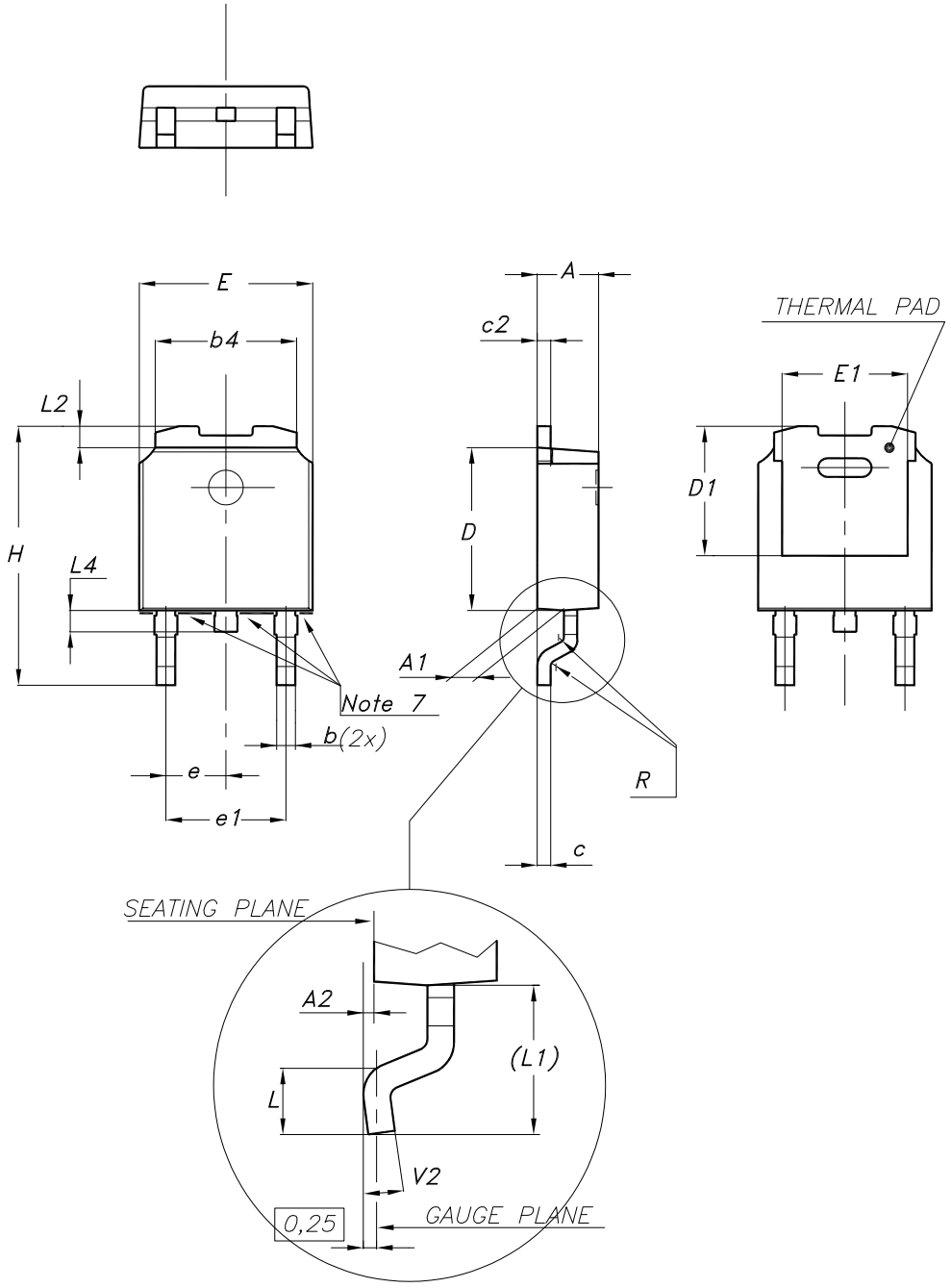


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Table 5. **DPAK (TO-252) type A mechanical data**

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°

3.3 DPAK (TO-252) type C3 package information

Figure 7. **DPAK (TO-252) type C3 package outline**

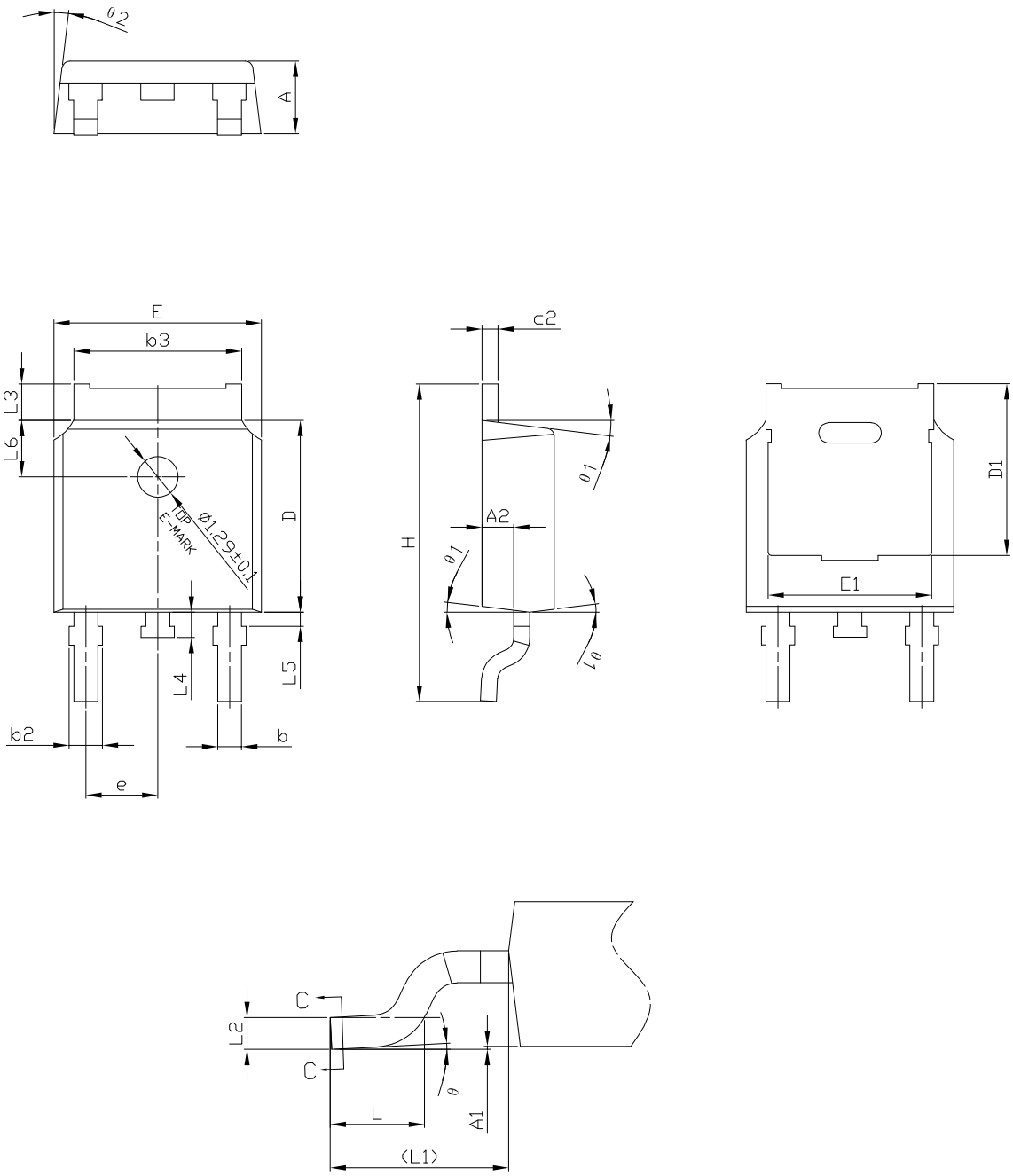

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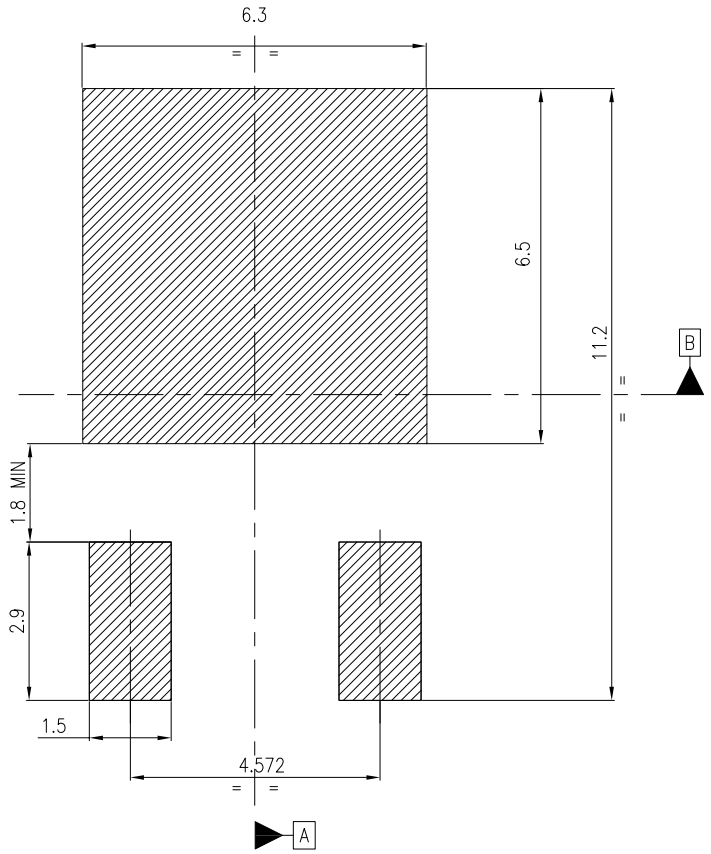
Table 6. DPAK (TO-252) type C3 mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	2.20	2.30	2.38
A1	0.00		0.10
A2	0.90	1.01	1.10
b	0.72		0.85
b2	0.72		1.10
b3	5.13	5.33	5.46
c	0.47		0.60
c2	0.47		0.60
D	6.00	6.10	6.20
D1	5.20	5.45	5.70
E	6.50	6.60	6.70
E1	5.00	5.20	5.40
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	0.51 BSC		
L3	0.90		1.25
L4	0.60	0.80	1.00
L5	0.15		0.75
L6	1.80 REF		
θ	0°		8°
θ1	5°	7°	9°
θ2	5°	7°	9°

Figure 8. 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 ⌖ 0.05 A B

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Revision history

Table 7. **Document revision history**

Date	Version	Changes
14-Oct-2004	1	First release.
15-Jan-2005	2	DC current gain range has been modified.
25-Feb-2005	3	Added four drawings on page 3.
13-Oct-2005	4	Updated package mechanical data
11-Feb-2011	5	Inserted new order code STD901T
18-May-2023	6	Updated Section 3.1 TO-220 type A package information and Section 3.2 DPAK (TO-252) type A package information. Added Section 3.3 DPAK (TO-252) type C3 package information. Minor text changes.

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