ST901T
STD901T

High voltage NPN Darlington transistor for ignition coil

Features

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

Application

- High ruggedness electronic ignition for small engines

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).

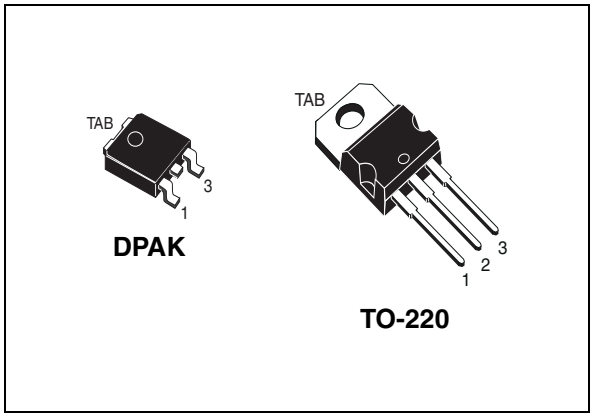

Figure 1. Internal schematic diagram

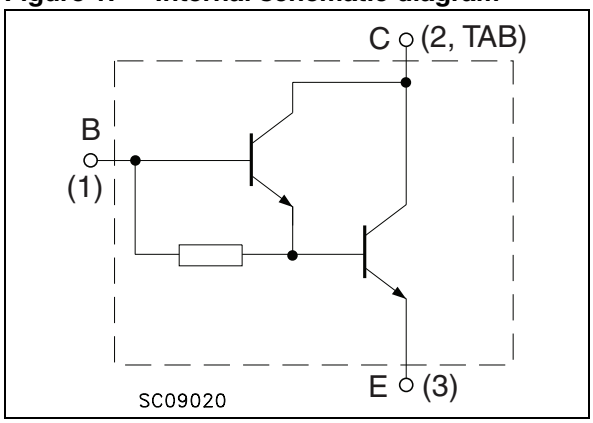

Table 1. Device summary

Order code	Marking	Packages	Packaging
ST901T	901T	TO-220	Tube
STD901T	D901T	DPAK	Tape and reel

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1 Electrical ratings

Table 2. 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 (tp < 5 ms)	8	A
I_B	Base current	0.5	A
I_{BM}	Base peak current (tp < 5 ms)	2.5	A
P_{tot}	Total dissipation at T_C = 25 °C for ST901T	100	W
P_{tot}	Total dissipation at T_C = 25 °C for STD901T	35	W
T_{stg}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	°C

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj\text{-}case}$	Thermal resistance junction-case max for ST901T	1.25	°C/W
$R_{thj\text{-}case}$	Thermal resistance junction-case max for STD901T	3.57	°C/W

2 Electrical characteristics

(T_{case} = 25°C unless otherwise specified).

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current (I_E = 0)	V_{CE} = 500 V V_{CE} = 500 V T_{case}=125 °C			100 500	µA µA
I_{CEO}	Collector cut-off current (I_B = 0)	V_{CE} = 350 V V_{CE} = 350 V T_{case} = 125 °C			100 500	µA µA
I_{EBO}	Emitter cut-off current (I_C = 0)	V_{EB} = 5 V			10	µA
$V_{CEO(sus)}$ (1)	Collector-emitter sustaining voltage (I_B = 0)	I_C = 10 mA	350			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 2 A I_B = 20 mA			2	V
$V_{BE(sat)}$ (1)	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 I_C = 4 A V_{CE} = 2 V	1800 500		3800	
	Functional test	V_{CC} = 24 V V_{clamp} = 350 V L = 4 mH	4			A
 t_s t_f	Inductive load storage time fall 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 1.5		 µs µs

1. Pulse test: pulse duration ≤ 300 µs, duty cycle ≤ 2 %

2.1 Electrical characteristics (curves)

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

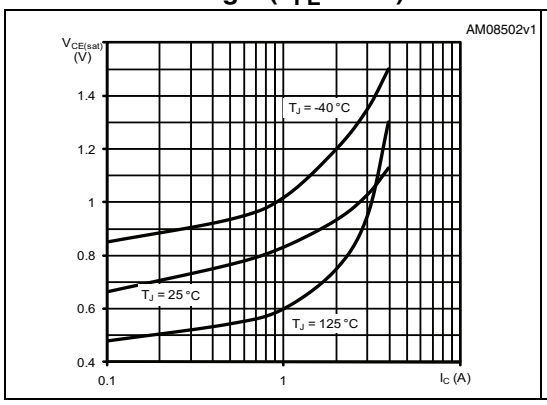


Figure 3. Base-emitter saturation voltage (h_{FE} = 100)

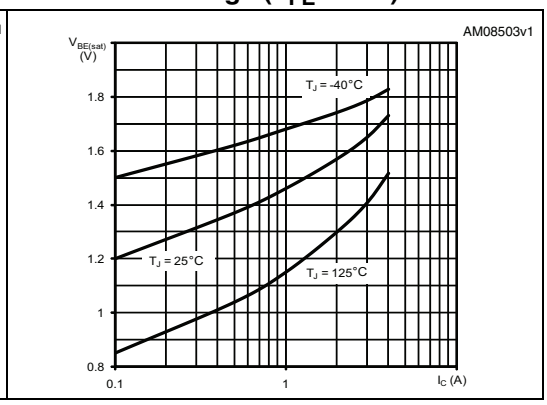


Figure 4. DC current gain (V_{CE} = 2 V)

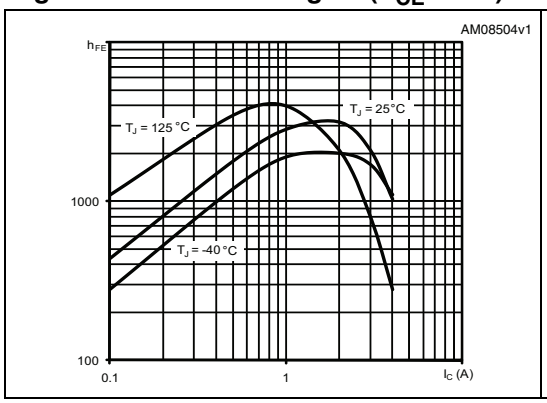
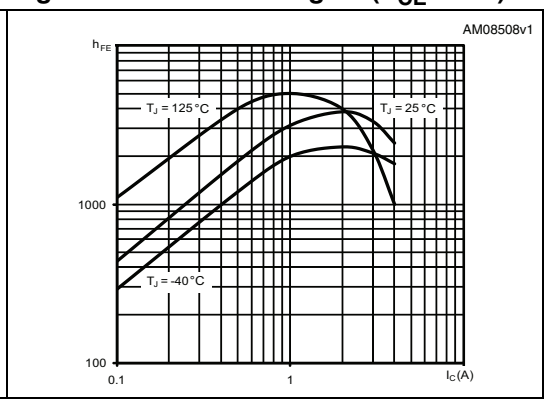


Figure 5. DC current gain (V_{CE} = 5 V)



3 Package mechanical data

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.

Table 5. TO-220 type A mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	4.40		4.60
b	0.61		0.88
b1	1.14		1.70
c	0.48		0.70
D	15.25		15.75
D1		1.27	
E	10		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		14
L1	3.50		3.93
L20		16.40	
L30		28.90	
∅P	3.75		3.85
Q	2.65		2.95

Figure 6. TO-220 type A drawing

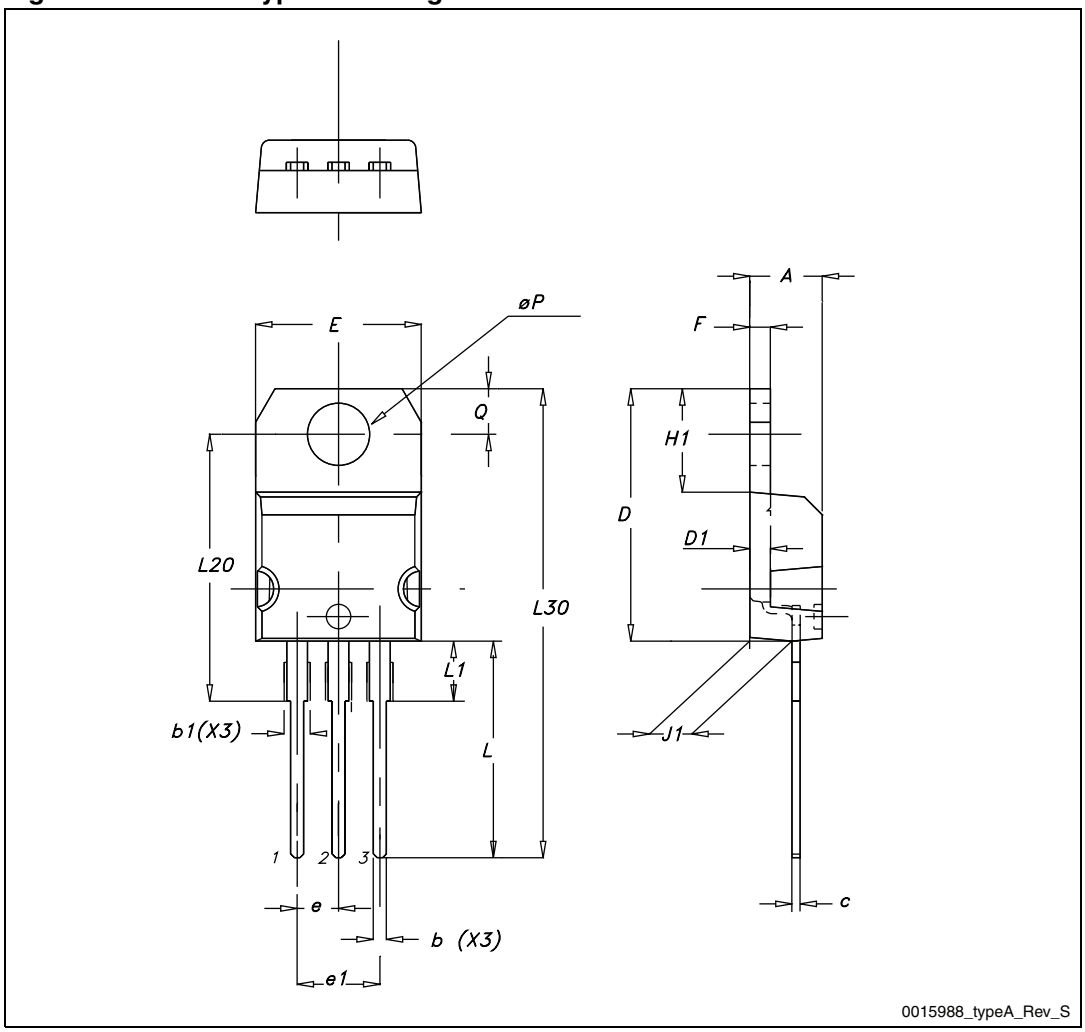
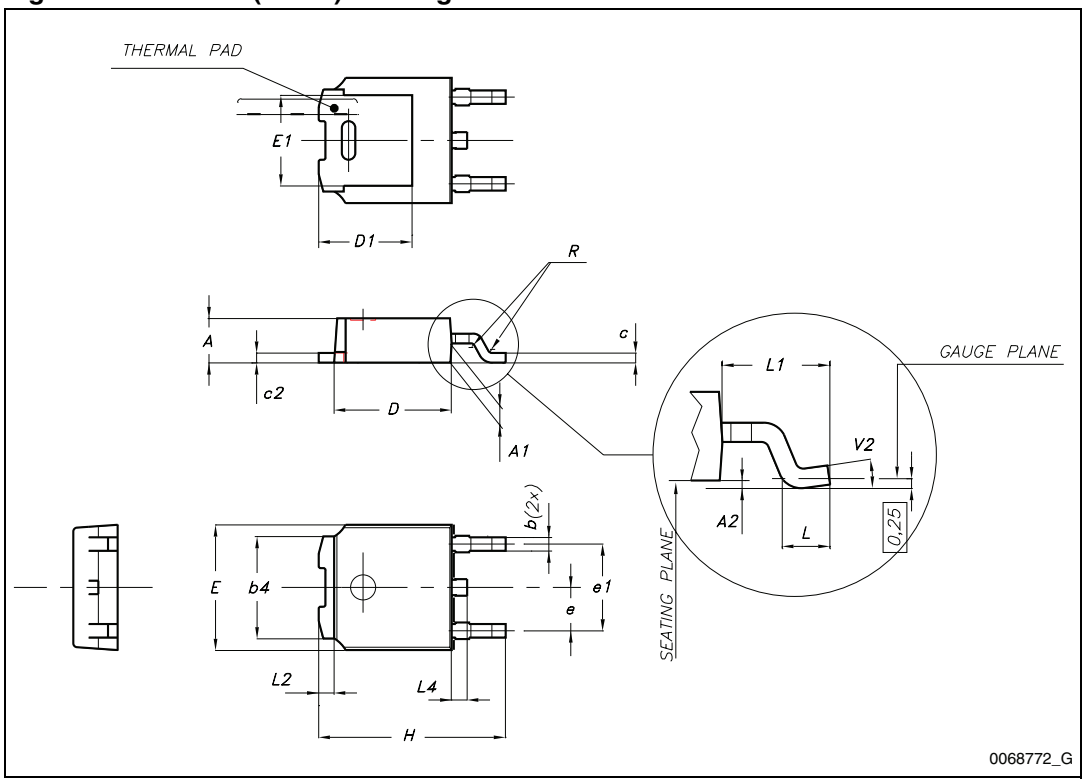


Table 6. DPAK (TO-252) mechanical data

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		5.10	
E	6.40		6.60
E1		4.70	
e		2.28	
e1	4.40		4.60
H	9.35		10.10
L	1		
L1		2.80	
L2		0.80	
L4	0.60		1
R		0.20	
V2	0°		8°

Figure 7. TO-252 (DPAK) drawings



4 Revision history

Table 7. Document revision history

Date	Revision	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

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