

# 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).

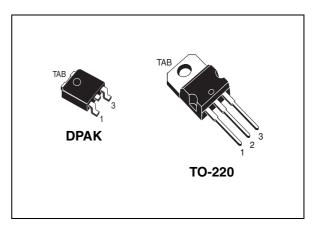
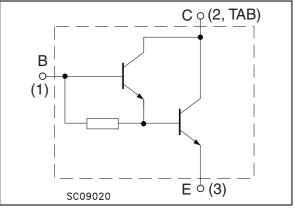


Figure 1. Internal schematic diagram



#### Table 1. Device summary

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

### Contents

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## 1 Electrical ratings

Table 2.	Absoluto movimum ratings
Table 2.	Absolute maximum ratings

Symbol	Parameter	Value	Unit
V <sub>CES</sub>	Collector-emitter voltage (V <sub>BE</sub> = 0)	500	V
V <sub>CEO</sub>	Collector-emitter voltage $(I_B = 0)$	350	V
V <sub>EBO</sub>	Emitter-base voltage ( $I_C = 0$ )	5	V
۱ <sub>C</sub>	Collector current	4	А
I <sub>CM</sub>	Collector peak current (tp < 5 ms)	8	А
Ι <sub>Β</sub>	Base current	0.5	А
I <sub>BM</sub>	Base peak current (tp < 5 ms)	2.5	А
P <sub>tot</sub>	Total dissipation at $T_{C}$ = 25 °C for ST901T	100	W
P <sub>tot</sub>	Total dissipation at $T_{C}$ = 25 °C for STD901T	35	W
T <sub>stg</sub>	Storage temperature	-65 to 150	°C
Τ <sub>J</sub>	Max. operating junction temperature	150	°C

#### Table 3.Thermal data

Symbol	Parameter	Value	Unit
R <sub>thj-case</sub>	Thermal resistance junction-case max for ST901T	1.25	°C/W
R <sub>thj-case</sub>	Thermal resistance junction-case max for STD901T	3.57	°C/W



## 2 Electrical characteristics

(T<sub>case</sub> = 25°C unless otherwise specified).

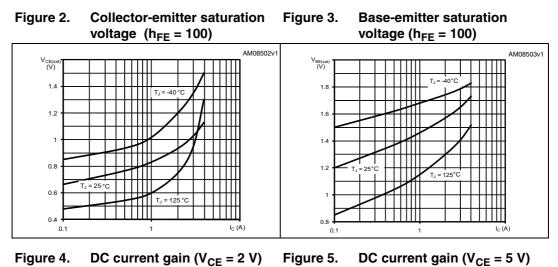
Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
I <sub>CES</sub>	Collector cut-off current $(I_E = 0)$	$V_{CE} = 500 V$ $V_{CE} = 500 V T_{case} = 125 °C$			100 500	μA μA
I <sub>CEO</sub>	Collector cut-off current $(I_B = 0)$	V <sub>CE</sub> = 350 V V <sub>CE</sub> = 350 V T <sub>case</sub> = 125 °C			100 500	μΑ μΑ
I <sub>EBO</sub>	Emitter cut-off current $(I_{\rm C} = 0)$	V <sub>EB</sub> = 5 V			10	μA
V <sub>CEO(sus)</sub> <sup>(1)</sup>	Collector-emitter sustaining voltage $(I_B = 0)$	I <sub>C</sub> = 10 mA	350			V
V <sub>CE(sat)</sub> <sup>(1)</sup>	Collector-emitter saturation voltage	$I_{\rm C} = 2  {\rm A}$ $I_{\rm B} = 20  {\rm mA}$			2	V
V <sub>BE(sat)</sub> <sup>(1)</sup>	Base-emitter saturation voltage	$I_{\rm C} = 2  {\rm A}$ $I_{\rm B} = 20  {\rm mA}$			1.8	V
h <sub>FE</sub>	DC current gain	$    I_C = 2 A \qquad V_{CE} = 2 V \\ I_C = 4 A \qquad V_{CE} = 2 V $	1800 500		3800	
	Functional test	$V_{CC} = 24 \text{ V}$ $V_{clamp} = 350 \text{ V}$ L = 4 mH	4			A
t <sub>s</sub> t <sub>f</sub>	Inductive load storage time fall time	$ \begin{array}{ll} 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 \end{array} $		15 1.5		μs μs

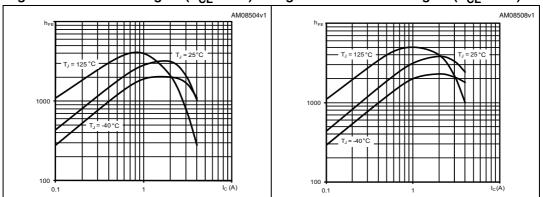
#### Table 4. Electrical characteristics

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



### 2.1 Electrical characteristics (curves)







## 3 Package mechanical data

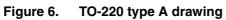
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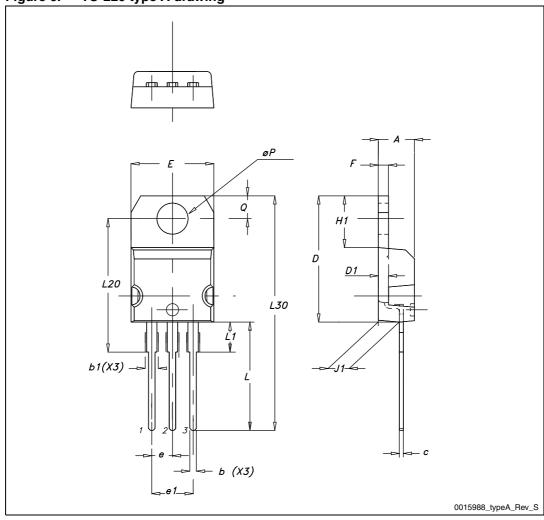


Dim	mm		
Dim.	Min.	Тур.	Max.
А	4.40		4.60
b	0.61		0.88
b1	1.14		1.70
С	0.48		0.70
D	15.25		15.75
D1		1.27	
E	10		10.40
е	2.40		2.70
e1	4.95		5.15
F	1.23		1.32
H1	6.20		6.60
J1	2.40		2.72
L	13		14
L1	3.50		3.93
L20		16.40	
L30		28.90	
ØР	3.75		3.85
Q	2.65		2.95

Table 5.TO-220 type A mechanical data









Dim.		mm	
	Min.	Тур.	Max.
А	2.20		2.40
A1	0.90		1.10
A2	0.03		0.23
b	0.64		0.90
b4	5.20		5.40
с	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	
е		2.28	
e1	4.40		4.60
Н	9.35		10.10
L	1		
L1		2.80	
L2		0.80	
L4	0.60		1
R		0.20	
V2	0°		8°

Table 6. DPAK (TO-252) mechanical data



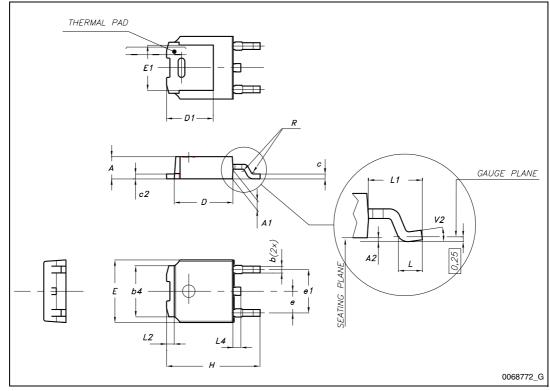


Figure 7. TO-252 (DPAK) drawings



## 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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