

# STD1802T4-A

## Low voltage fast-switching NPN power transistor

### Features

- This device is qualified for automotive application
- Very low collector to emitter saturation voltage
- High current gain characteristic
- Fast-switching speed
- Surface-mounting DPAK (TO-252) power package in tape & reel (suffix "T4)

## Description

The device is manufactured in Planar technology with "Base Island" layout. The resulting transistor shows exceptional high gain performance coupled with very low saturation voltage.

### **Applications**

- CCFL drivers
- Voltage regulators
- Relay drivers
- High efficiency, low voltage, switching applications

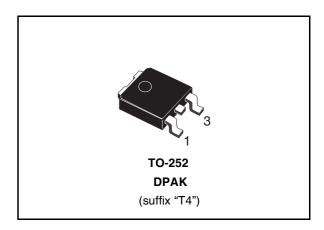
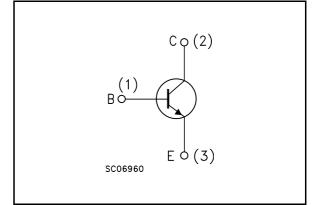


Figure 1. Internal schematic diagram



### Table 1. Device summary

Order code	Marking	Package	Packaging
STD1802T4-A	D1802	DPAK	Tape & reel

# 1 Electrical ratings

Symbol	Parameter	Value	Unit
V <sub>CBO</sub>	Collector-base voltage (I <sub>E</sub> =0)	80	V
V <sub>CEO</sub>	Collector-emitter voltage (I <sub>B</sub> =0)	60	V
V <sub>EBO</sub>	Emitter-base voltage (I <sub>C</sub> =0)	6	V
Ι <sub>C</sub>	Collector current	3	Α
I <sub>CM</sub>	Collector peak current (t <sub>P</sub> < 5ms)	6	Α
Ι <sub>Β</sub>	Base current	1	Α
P <sub>tot</sub>	Total dissipation at $T_c \le 25^{\circ}C$	15	W
T <sub>stg</sub>	Storage temperature	-65 to 150	°C
Т <sub>Ј</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	8.33	°C/W

# 2 Electrical characteristics

( $T_{case} = 25^{\circ}C$  unless otherwise specified)

Table 4.	Electrical characteristics					
Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
I <sub>CBO</sub>	Collector cut-off current (I <sub>E</sub> =0)	V <sub>CB</sub> = 40V			0.1	μA
I <sub>EBO</sub>	Emitter cut-off current (I <sub>C</sub> =0)	V <sub>EB</sub> = 4V			0.1	μA
V <sub>(BR)CBO</sub>	Collector-base breakdown voltage (I <sub>E</sub> = 0)	I <sub>C</sub> =100μA	80			v
V <sub>(BR)CEO</sub>	Collector-emitter breakdown voltage (I <sub>B</sub> = 0)	I <sub>C</sub> =1mA	60			V
V <sub>(BR)EBO</sub>	Emitter-base breakdown voltage (I <sub>C</sub> = 0)	I <sub>E</sub> =100μA	6			V
V <sub>CE(sat)</sub> <sup>(1)</sup>	Collector-emitter saturation voltage	$I_{C} = 2A$ $I_{B} = 100 \text{mA}$ $I_{C} = 3A$ $I_{B} = 150 \text{mA}$		150 200	300 400	mV mV
V <sub>BE(sat)</sub> <sup>(1)</sup>	Base-emitter saturation voltage	I <sub>C</sub> =2A I <sub>B</sub> =100mA		0.9	1.2	V
h <sub>FE</sub> <sup>(1)</sup>	DC current gain	$I_{C} = 100 \text{mA}  V_{CE} = 2V$ $I_{C} = 3A  V_{CE} = 2V$	200 100		400	
f <sub>T</sub>	Transition frequency	V <sub>CE</sub> =10V I <sub>C</sub> =50mA		150		MHz
C <sub>CBO</sub>	Collector-base capacitance	V <sub>CB</sub> =10V f = 1MHz		50		pF
t <sub>ON</sub> t <sub>s</sub> t <sub>f</sub>	Resistive load Turn-on time Storage time Fall time	$I_{C} = 1A$ $V_{CC} = 30V$ $I_{B1} = -I_{B2} = 0.1A$		50 1.35 120		ns μs ns

Table 4.	Electrical	characteristics

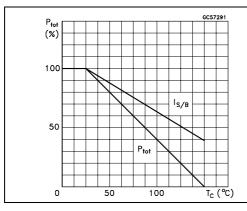
Note (1) Pulsed duration = 300  $\mu s,$  duty cycle  ${\leq}1.5\%$ 



#### 2.1 **Electrical characteristics (curves)**

Figure 2. **Derating curve** 

#### DC current gain Figure 3.



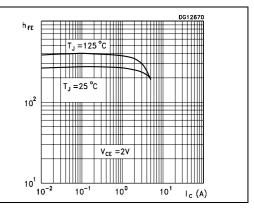


Figure 4. **Collector-emitter saturation** Figure 5. **Collector-emitter saturation** voltage voltage

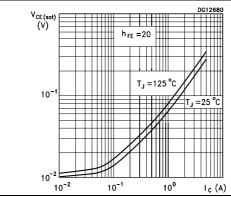
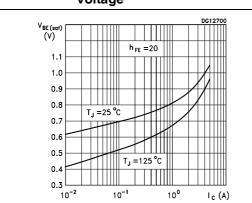
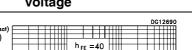


Figure 6. **Base-emitter saturation** voltage





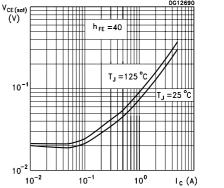
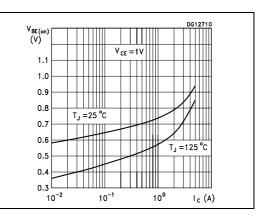
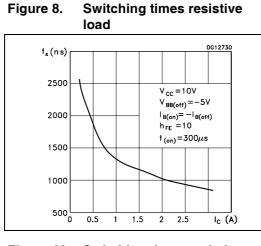
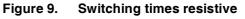


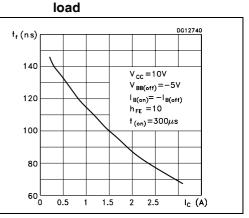
Figure 7. Base-emitter on voltage

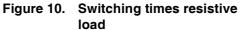


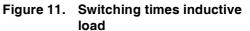
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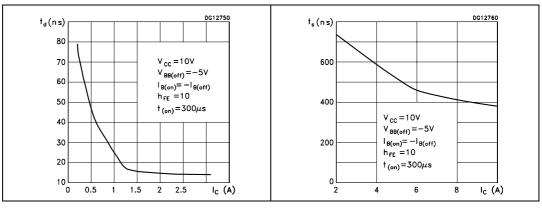
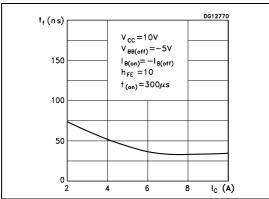
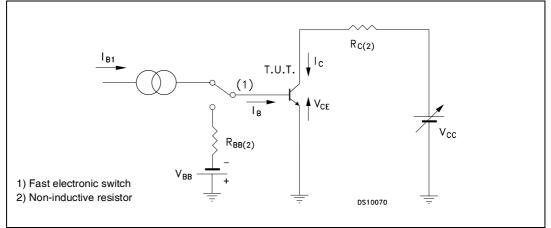


Figure 12. Switching times resistive load



## 2.2 Test circuits







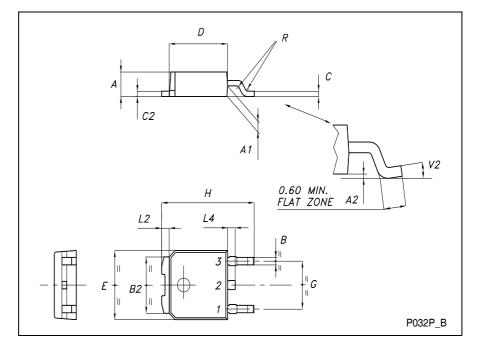
## 3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com



DIM.	mm			inch			
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
А	2.20		2.40	0.087		0.094	
A1	0.90		1.10	0.035		0.043	
A2	0.03		0.23	0.001		0.009	
В	0.64		0.90	0.025		0.035	
B2	5.20		5.40	0.204		0.213	
С	0.45		0.60	0.018		0.024	
C2	0.48		0.60	0.019		0.024	
D	6.00		6.20	0.236		0.244	
E	6.40		6.60	0.252		0.260	
G	4.40		4.60	0.173		0.181	
н	9.35		10.10	0.368		0.398	
L2		0.8			0.031		
L4	0.60		1.00	0.024		0.039	

### TO-252 (DPAK) MECHANICAL DATA



# 4 Revision history

### Table 5. Revision history

Date	Revision	Changes
28-Jun-2007	1	Initial release.



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