

Low voltage fast-switching NPN power transistor

Features

- 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

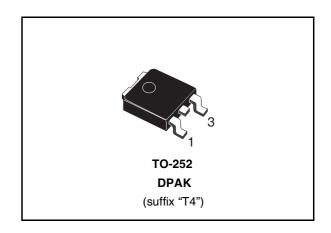


Figure 1. Internal schematic diagram

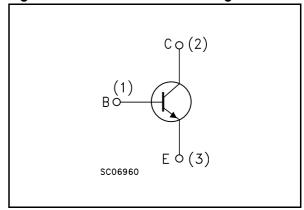


Table 1. Device summary

Order code	Marking	Package	Packaging
STD1802T4	D1802	DPAK	Tape & reel

Electrical ratings STD1802

1 Electrical ratings

Table 2. Absolute maximum rating

Symbol	Parameter	Value	Unit
V _{CBO}	Collector-base voltage (I _E =0)	80	V
V _{CEO}	Collector-emitter voltage (I _B =0)	60	V
V _{EBO}	Emitter-base voltage (I _C =0)	6	V
I _C	Collector current	3	Α
I _{CM}	Collector peak current (t _P < 5ms)	6	Α
I _B	Base current	1	Α
P _{tot}	Total dissipation at T _c ≤ 25°C	15	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-case}	Thermal resistance junction-case max	8.33 °C/W

2 Electrical characteristics

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

Table 4. Electrical characteristics

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
I _{CBO}	Collector cut-off current (I _E =0)	V _{CB} = 40V			0.1	μА
I _{EBO}	Emitter cut-off current (I _C =0)	V _{EB} = 4V			0.1	μА
V _{(BR)CBO}	Collector-base breakdown voltage (I _E = 0)	I _C =100μA	80			V
V _{(BR)CEO}	Collector-emitter breakdown voltage (I _B = 0)	I _C =1mA	60			V
V _{(BR)EBO}	Emitter-base breakdown voltage (I _C = 0)	I _E =100μA	6			V
V _{CE(sat)} (1)	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 _{BE(sat)} (1)	Base-emitter saturation voltage	I _C =2A I _B =100mA		0.9	1.2	V
h _{FE} ⁽¹⁾	DC current gain	I _C =100mA V _{CE} =2V I _C =3A V _{CE} =2V	200 100		400	
f _T	Transition frequency	$V_{CE} = 10V$ $I_{C} = 50mA$		150		MHz
C _{CBO}	Collector-base capacitance	V _{CB} =10V f = 1MHz		50		pF
t _{ON} t _s	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

Note (1) Pulsed duration = 300 μs , duty cycle $\leq 1.5\%$

Electrical characteristics STD1802

2.1 Electrical characteristics (curves)

Figure 2. Derating curve

Figure 3. DC current gain

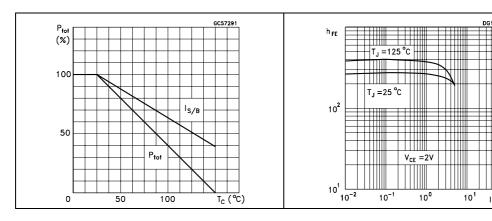


Figure 4. Collector-emitter saturation voltage

Figure 5. Collector-emitter saturation voltage

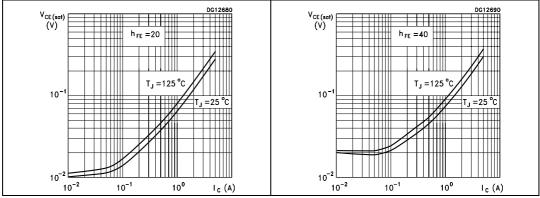
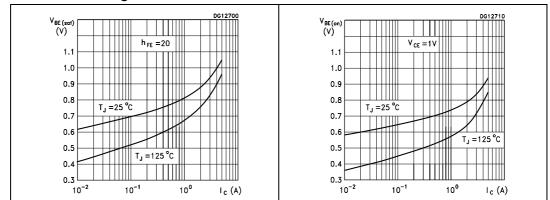


Figure 6. Base-emitter saturation voltage

Figure 7. Base-emitter on voltage

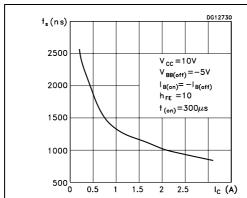


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STD1802 Electrical characteristics

Figure 8. Switching times resistive load

Figure 9. Switching times resistive load



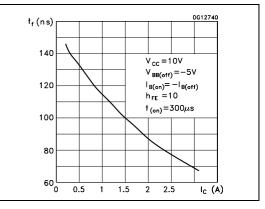
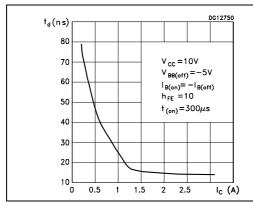


Figure 10. Switching times resistive load

Figure 11. Switching times inductive load



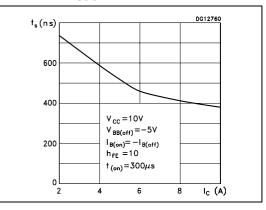
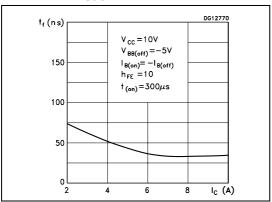


Figure 12. Switching times resistive load

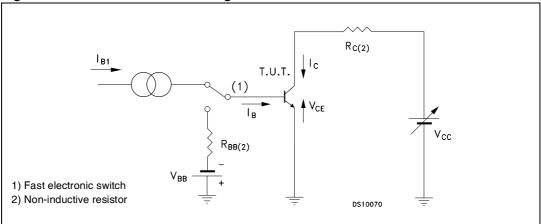


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2.2 Test circuits

Figure 13. Resistive load switching test circuit



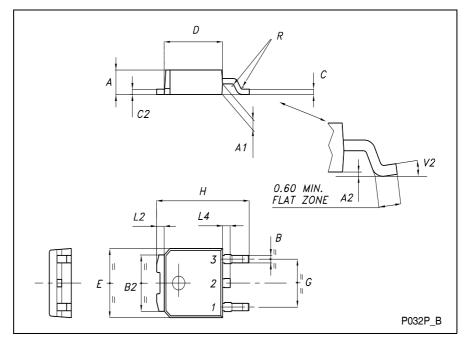
3 Package mechanical data

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

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TO-252 (DPAK) MECHANICAL DATA

DIM.	mm			inch			
DINI.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Α	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	
V2	0°		8°	0°		0°	



STD1802 Revision history

4 Revision history

Table 5. Revision history

Date	Revision	Changes
11-Mar-2003	1	Initial release.
05-Sep-2003	2	Minor text change
12-Jun-2004	3	New disclaimer
12-Jul-2007	4	Package name added on table 1.

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