

## Low voltage fast-switching PNP power transistor

Preliminary Data

### 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")
- Through-hole IPAK (TO-251) power package in tube (suffix "-1")

### Description

The device is manufactured in PNP Planar technology by using a "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

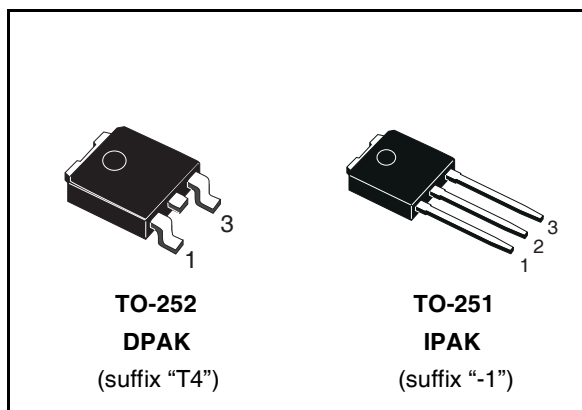


Figure 1. Internal schematic diagram

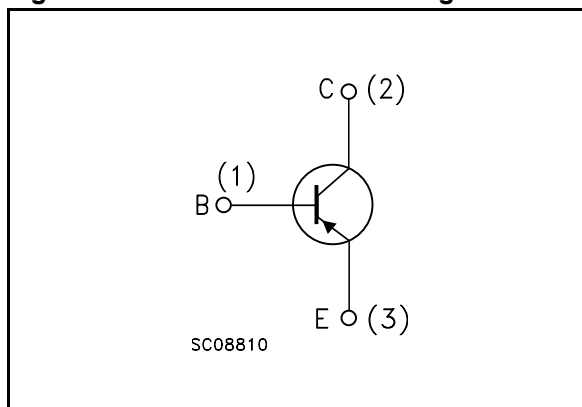


Table 1. Devices summary

Order codes	Marking	Package	Packaging
STD2805T4	D2805	DPAK	Tape & reel
STD2805-1	D2805	IPAK	Tube

# 1 Electrical ratings

**Table 1. Absolute maximum rating**

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-base voltage ( $I_E = 0$ )	-60	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	-5	A
$I_{CM}$	Collector peak current ( $t_P < 5\text{ms}$ )	-10	A
$I_B$	Base current	-2	A
$P_{tot}$	Total dissipation at $T_c \leq 25^\circ\text{C}$	15	W
$T_{stg}$	Storage temperature	-65 to 150	$^\circ\text{C}$
$T_J$	Max. operating junction temperature	150	$^\circ\text{C}$

**Table 2. Thermal data**

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case max	8.33	$^\circ\text{C/W}$

## 2 Electrical characteristics

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

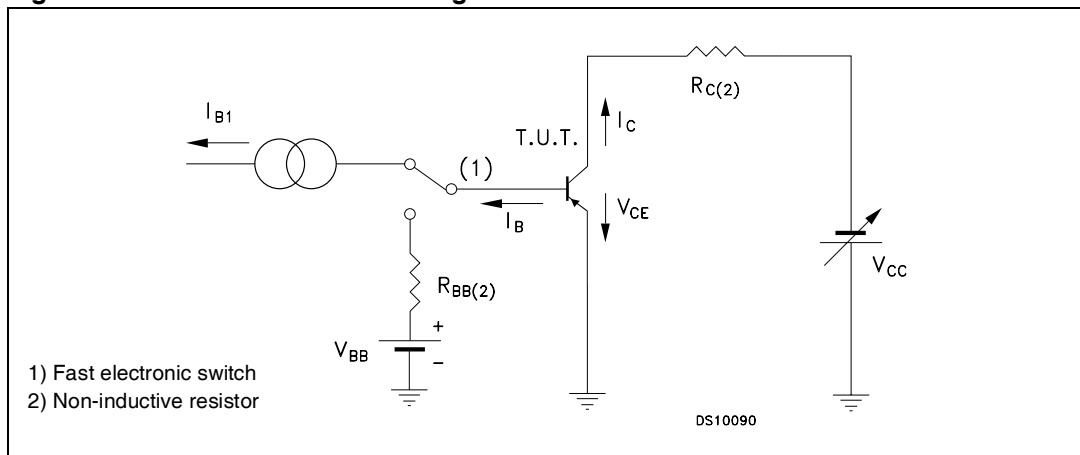
**Table 3. Electrical characteristics**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{\text{CBO}}$	Collector cut-off current ( $I_{\text{E}} = 0$ )	$V_{\text{CB}} = -60\text{V}$			0.1	$\mu\text{A}$
$I_{\text{EBO}}$	Emitter cut-off current ( $I_{\text{C}} = 0$ )	$V_{\text{EB}} = -5\text{V}$			0.1	$\mu\text{A}$
$V_{(\text{BR})\text{CBO}}$	Collector-base breakdown voltage ( $I_{\text{E}} = 0$ )	$I_{\text{C}} = -100\mu\text{A}$	-60			V
$V_{(\text{BR})\text{CEO}}$	Collector-emitter breakdown voltage ( $I_{\text{B}} = 0$ )	$I_{\text{C}} = -1\text{mA}$	-60			V
$V_{(\text{BR})\text{EBO}}$	Emitter-base breakdown voltage ( $I_{\text{C}} = 0$ )	$I_{\text{E}} = -100\mu\text{A}$	-6			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = -100\text{mA}$ $I_{\text{B}} = -5\text{mA}$			-50	mV
		$I_{\text{C}} = -2\text{A}$ $I_{\text{B}} = -50\text{mA}$		-150	-300	mV
		$I_{\text{C}} = -3\text{A}$ $I_{\text{B}} = -150\text{mA}$		-200	-400	mV
		$I_{\text{C}} = -5\text{A}$ $I_{\text{B}} = -200\text{mA}$			-600	mV
$V_{\text{BE(sat)}}^{(1)}$	Base-emitter saturation voltage	$I_{\text{C}} = -2\text{A}$ $I_{\text{B}} = -50\text{mA}$		-0.9	-1.2	V
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = -100\text{mA}$ $V_{\text{CE}} = -2\text{V}$	200		400	
		$I_{\text{C}} = -5\text{A}$ $V_{\text{CE}} = -2\text{V}$	85			
		$I_{\text{C}} = -10\text{A}$ $V_{\text{CE}} = -2\text{V}$	20			
$f_{\text{T}}$	Transition frequency	$V_{\text{CE}} = -10\text{V}$ $I_{\text{C}} = -50\text{mA}$		150		MHz
$C_{\text{CBO}}$	Collector-base capacitance	$V_{\text{CB}} = -10\text{V}$ $f = 1\text{MHz}$		60		pF
$t_{\text{ON}}$	Resistive load Turn-on time	$V_{\text{CC}} = -30\text{V}$ $I_{\text{C}} = -1\text{A}$ $I_{\text{B1}} = -I_{\text{B2}} = -0.1\text{A}$		80		ns
$t_{\text{s}}$	Storage time			600		ns
$t_{\text{f}}$	Fall time			70		ns

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

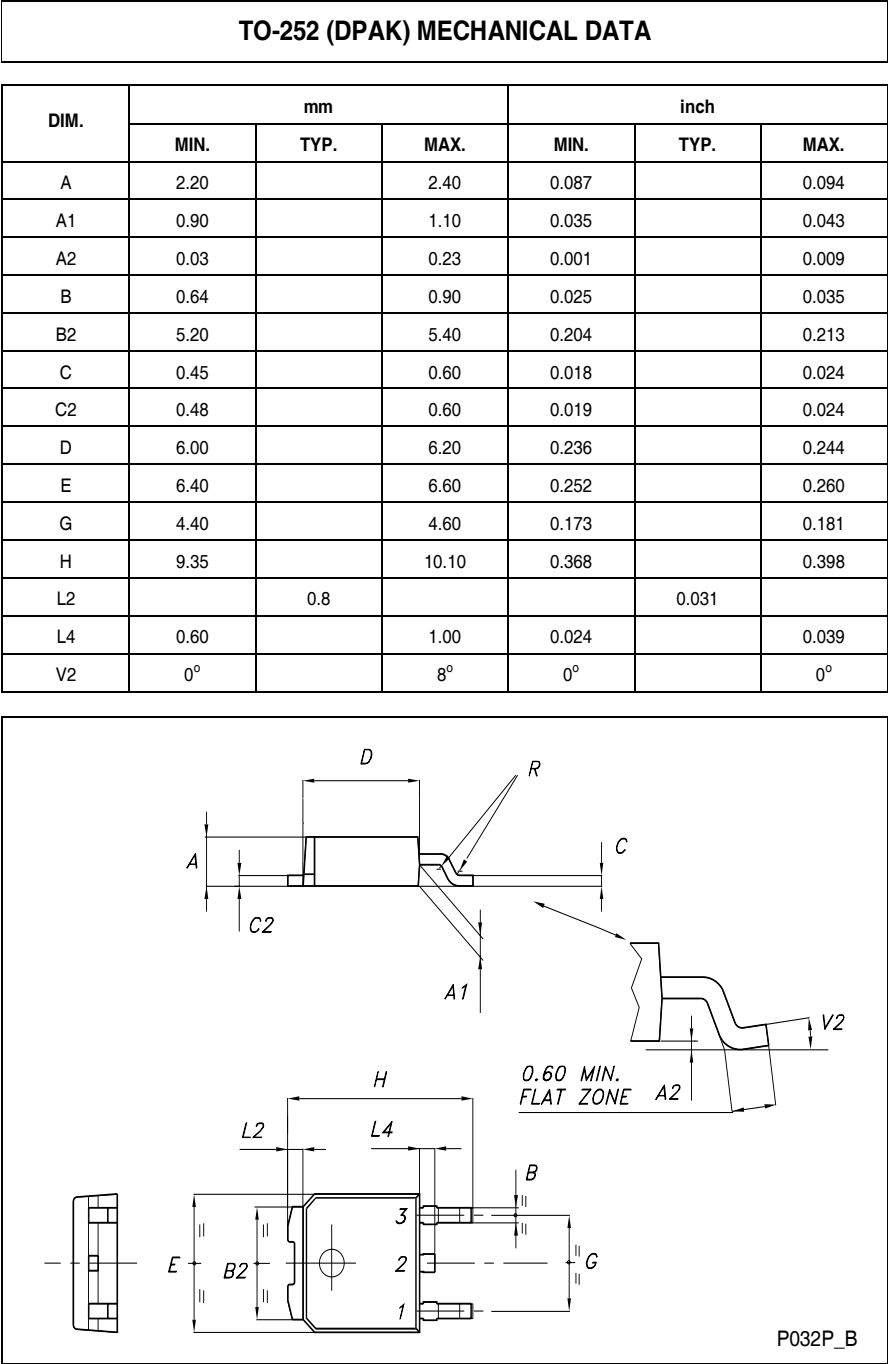
## 2.1 Test circuit

Figure 2. Resistive load switching test circuit



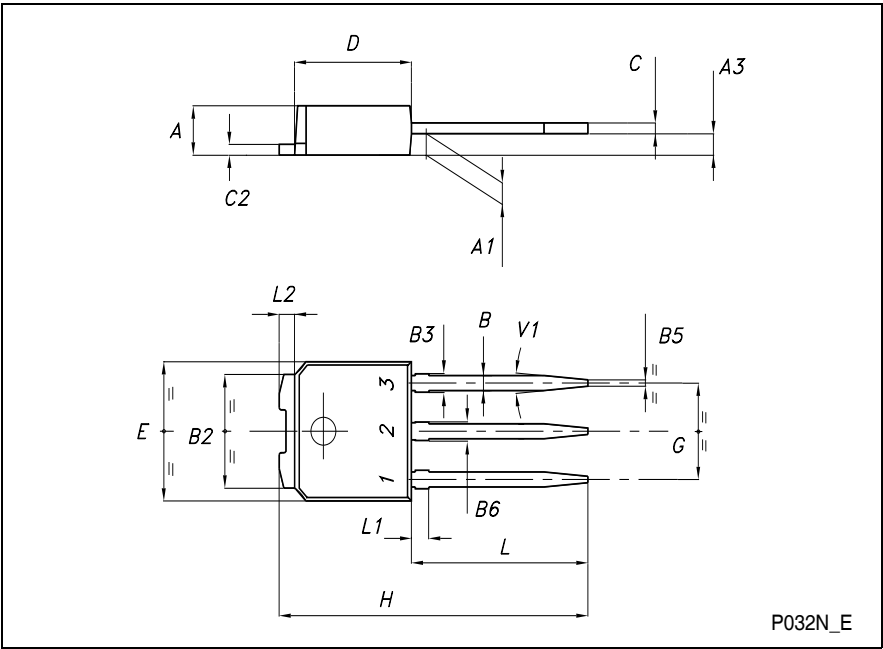
### 3 Package mechanical data

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](http://www.st.com)



TO-251 (IPAK) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.20		2.40	0.087		0.094
A1	0.90		1.10	0.035		0.043
A3	0.70		1.30	0.028		0.051
B	0.64		0.90	0.025		0.035
B2	5.20		5.40	0.204		0.213
B3			0.85			0.033
B5		0.30			0.012	
B6			0.95			0.037
C	0.45		0.60	0.018		0.024
C2	0.48		0.60	0.019		0.024
D	6.00		6.20	0.237		0.244
E	6.40		6.60	0.252		0.260
G	4.40		4.60	0.173		0.181
H	15.90		16.30	0.626		0.642
L	9.00		9.40	0.354		0.370
L1	0.80		1.20	0.031		0.047
L2		0.80	1.00		0.031	0.039
V1		10°			10°	



P032N\_E

## 4 Revision history

**Table 4. Revision history**

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

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