

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

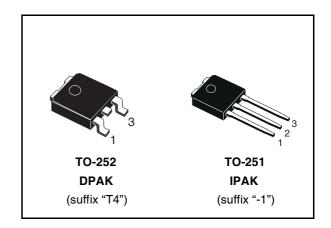


Figure 1. Internal schematic diagram

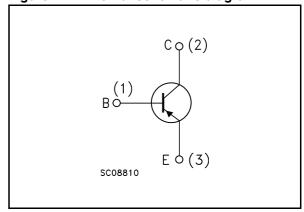


Table 1. Devices summary

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

Electrical ratings STD2805

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 | Α |
| I _{CM} | Collector peak current (t _P < 5ms) | -10 | Α |
| I _B | Base current | -2 | 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 2. 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 3. Electrical characteristics

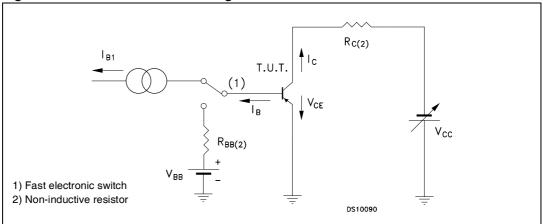
| Symbol | Parameter | Test Conditions | Min. | Тур. | Max. | Unit |
|-----------------------------------|--|--|-----------------|-----------------|-----------------------------|----------------|
| I _{CBO} | Collector cut-off current (I _E =0) | V _{CB} = -60V | | | 0.1 | μА |
| I _{EBO} | Emitter cut-off current (I _C =0) | V _{EB} = -5V | | | 0.1 | μА |
| V _{(BR)CBO} | Collector-base breakdown voltage (I _E = 0) | I _C =-100μA | -60 | | | 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 | $\begin{split} & _{\text{C}} = -100 \text{mA} & _{\text{B}} = -5 \text{mA} \\ & _{\text{C}} = -2 \text{A} & _{\text{B}} = -50 \text{mA} \\ & _{\text{C}} = -3 \text{A} & _{\text{B}} = -150 \text{mA} \\ & _{\text{C}} = -5 \text{A} & _{\text{B}} = -200 \text{mA} \end{split}$ | | -150 -200 | -50 -300 -400 -600 | mV mV mV |
| V _{BE(sat)} (1) | Base-emitter saturation voltage | I _C =-2A I _B =-50mA | | -0.9 | -1.2 | V |
| h _{FE} ⁽¹⁾ | DC current gain | $\begin{split} & I_{\text{C}} = -100 \text{mA} & V_{\text{CE}} = -2V \\ & I_{\text{C}} = -5 \text{A} & V_{\text{CE}} = -2V \\ & I_{\text{C}} = -10 \text{A} & V_{\text{CE}} = -2V \end{split}$ | 200 85 20 | | 400 | |
| f _T | Transition frequency | V _{CE} =-10V I _C =-50mA | ۸ . | 150 | | MHz |
| C _{CBO} | Collector-base capacitance | V _{CB} =-10V f =1MHz | | 60 | | pF |
| t _{ON} t _s | Resistive load Turn-on time Storage time Fall time | $V_{CC} = -30V$ $I_{C} = -1A$ $I_{B1} = -I_{B2} = -0.1A$ | | 80 600 70 | | ns ns ns |

Note (1) Pulsed duration = 300 μ s, duty cycle \leq 1.5%

Electrical characteristics STD2805

2.1 Test circuit

Figure 2. Resistive load switching test circuit



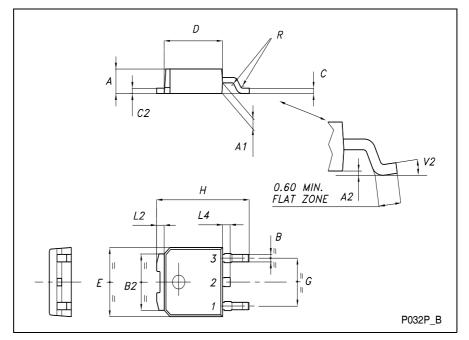
3 Package mechanical data

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

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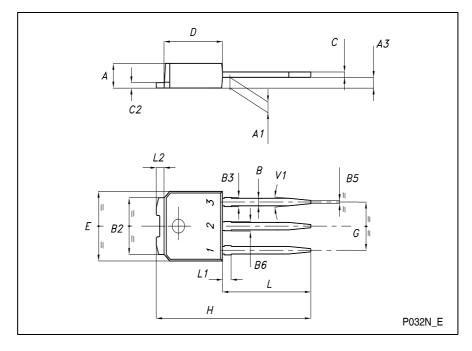
TO-252 (DPAK) MECHANICAL DATA

| DIM. | mm | | | inch | | |
|------|------|------|-------|-------|-------|-------|
| | 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° |



TO-251 (IPAK) MECHANICAL DATA

| DIM. | mm | | | inch | | | |
|------|-------|------|-------|-------|-------|-------|--|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. | |
| Α | 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 | |
| В | 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 | |
| С | 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 | |
| Е | 6.40 | | 6.60 | 0.252 | | 0.260 | |
| G | 4.40 | | 4.60 | 0.173 | | 0.181 | |
| Н | 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° | | |



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Revision history STD2805

4 Revision history

Table 4. Revision history

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

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