

NPN power transistors

Features

- NPN transistors

Applications

- Audio, linear and switching applications

Description

The devices are manufactured in Planar technology with “Base Island” layout. The resulting transistor shows exceptional high gain performance coupled with very low saturation voltage. The PNP types are TIP30A and TIP30C.

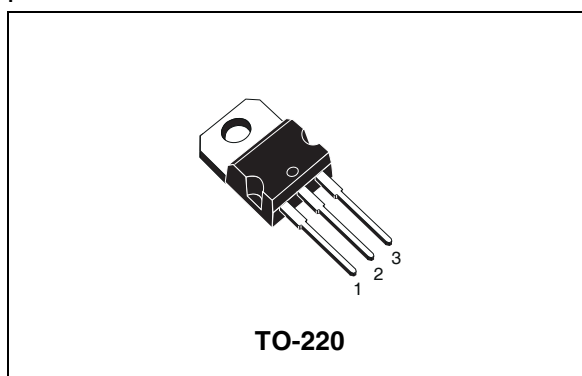


Figure 1. Internal schematic diagram

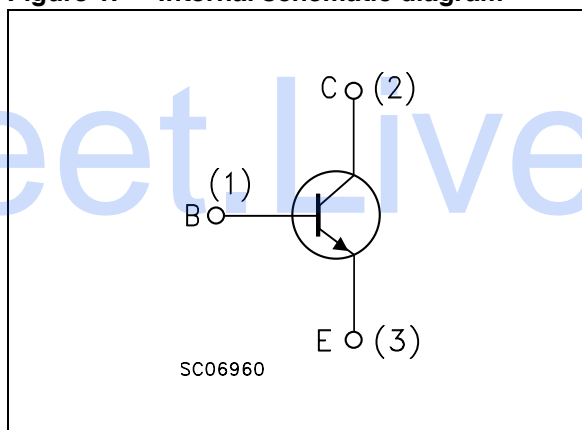


Table 1. Device summary

| Order codes | Marking | Package | Packaging |
|-------------|---------|---------|-----------|
| TIP29A | TIP29A | TO-220 | Tube |
| TIP29C | TIP29C | TO-220 | Tube |

1 Absolute maximum ratings

Table 2. Absolute maximum ratings

| Symbol | Parameter | Value | | Unit |
|-----------|--|------------|--------|------------------|
| | | TIP29A | TIP29C | |
| V_{CBO} | Collector-base voltage ($I_E = 0$) | 60 | 100 | V |
| V_{CEO} | Collector-emitter voltage ($I_B = 0$) | 60 | 100 | V |
| V_{EBO} | Emitter-base voltage ($I_C = 0$) | 5 | | V |
| I_C | Collector current | 1 | | A |
| I_{CM} | Collector peak current ($t_p < \text{ms}$) | 3 | | A |
| I_B | Base current | 0.4 | | A |
| P_{TOT} | Total dissipation at $T_c \leq 25^\circ\text{C}$ | 30 | | W |
| | Total dissipation at $T_{amb} \leq 25^\circ\text{C}$ | 2 | | W |
| T_{stg} | Storage temperature | -65 to 150 | | $^\circ\text{C}$ |
| T_J | Max. operating junction temperature | 150 | | $^\circ\text{C}$ |

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_{CEO} | Collector cut-off current ($I_{\text{B}} = 0$) | for TIP29A $V_{\text{CE}} = 30\text{V}$ for TIP29C $V_{\text{CE}} = 60\text{V}$ | | | 0.3 0.3 | mA mA |
| I_{CES} | Collector cut-off current ($V_{\text{BE}} = 0$) | for TIP29A $V_{\text{CE}} = 60\text{V}$ for TIP29C $V_{\text{CE}} = 100\text{V}$ | | | 0.2 0.2 | mA mA |
| I_{EBO} | Emitter cut-off current ($I_{\text{C}} = 0$) | $V_{\text{EB}} = 5\text{V}$ | | | 1 | mA |
| $V_{\text{CEO(sus)}}^{(1)}$ | Collector-emitter sustaining voltage ($I_{\text{B}} = 0$) | $I_{\text{C}} = 30\text{mA}$ for TIP29A for TIP29C | 60 100 | | | V V |
| $V_{\text{CE(sat)}}^{(1)}$ | Collector-emitter saturation voltage | $I_{\text{C}} = 1\text{A}$ $I_{\text{B}} = 125\text{mA}$ | | | 0.7 | V |
| $V_{\text{BE}}^{(1)}$ | Base-emitter voltage | $I_{\text{C}} = 1\text{A}$ $V_{\text{CE}} = 4\text{V}$ | | | 1.3 | V |
| $h_{\text{FE}}^{(1)}$ | DC current gain | $I_{\text{C}} = 0.2\text{A}$ $V_{\text{CE}} = 4\text{V}$ $I_{\text{C}} = 1\text{A}$ $V_{\text{CE}} = 4\text{V}$ | 40 15 | | 75 | |

1. Pulsed duration = 300 ms, duty cycle $\geq 1.5\%$.

2.1 Electrical characteristic (curves)

Figure 2. DC current gain

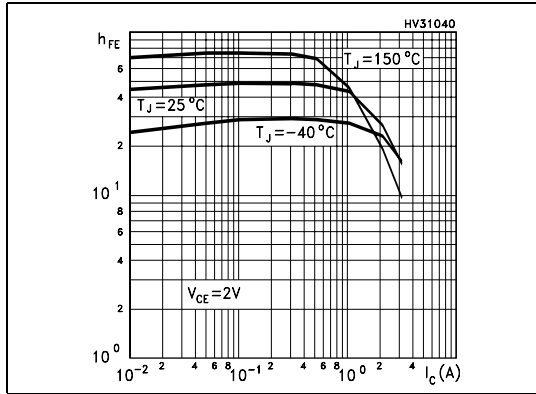


Figure 3. DC current gain

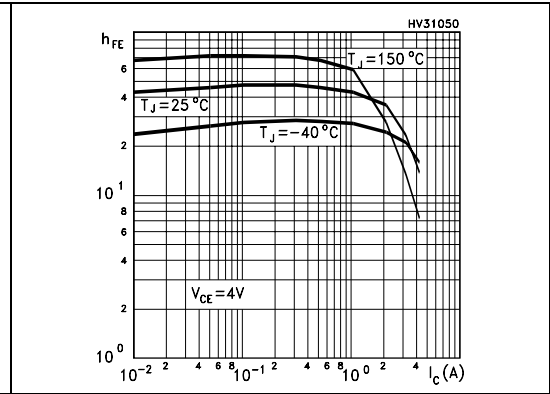


Figure 4. Collector-emitter saturation voltage

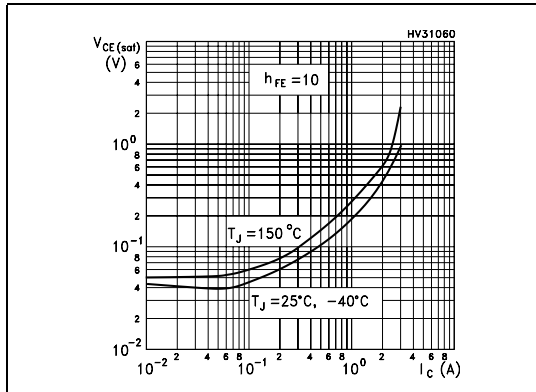


Figure 5. Base-emitter saturation voltage

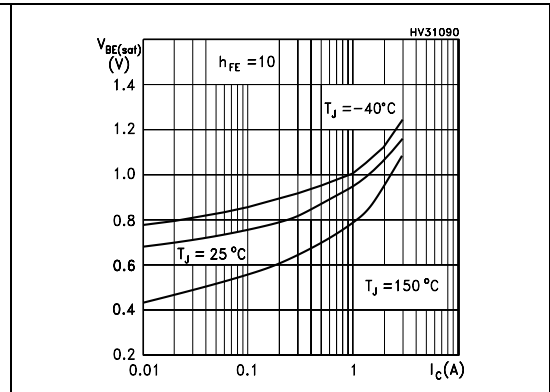


Figure 6. Base-emitter on voltage

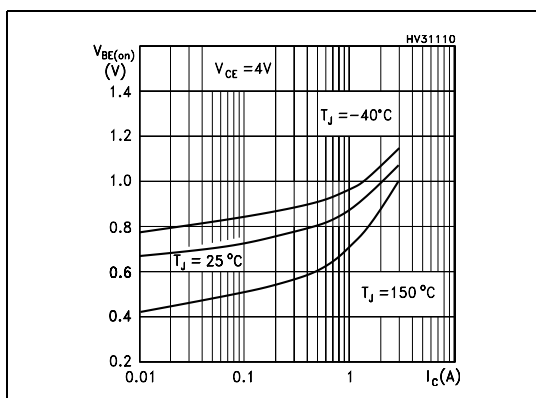
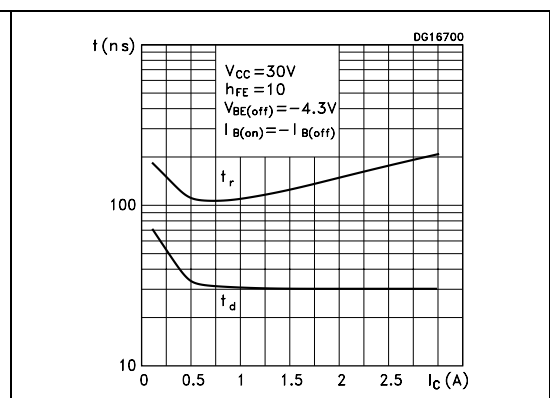


Figure 7. Resistive load switching time

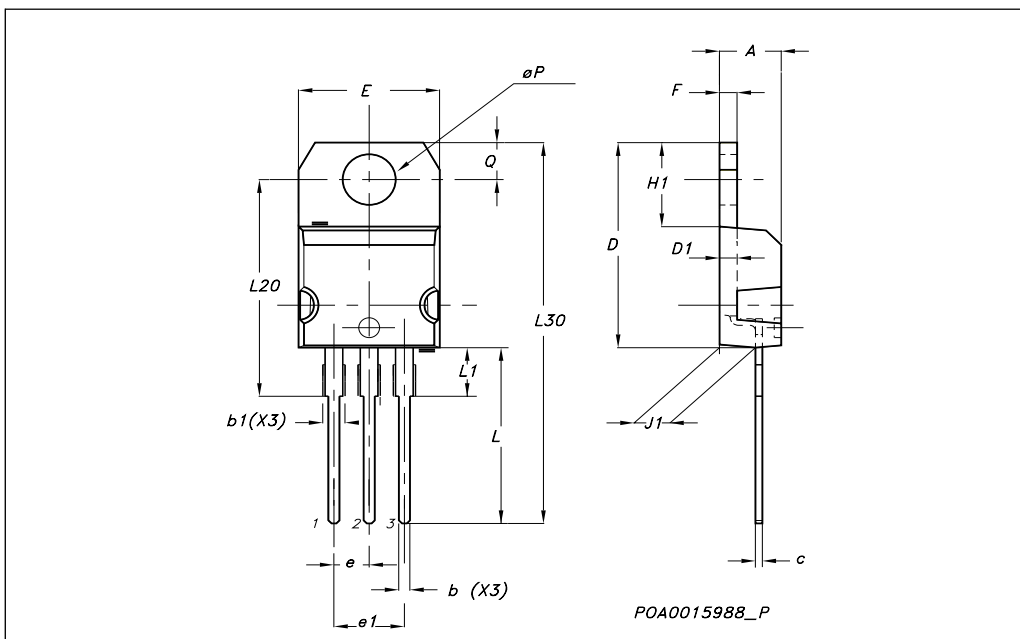


3 Package mechanical data

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

TO-220 Mechanical data

| DIM. | mm. | | |
|------|-------|-------|-------|
| | MIN. | TYP | MAX. |
| A | 4.40 | | 4.60 |
| b | 0.61 | | 0.88 |
| b1 | 1.14 | | 1.70 |
| c | 0.49 | | 0.70 |
| D | 15.25 | | 15.75 |
| D1 | | 1.27 | |
| E | 10 | | 10.40 |
| e | 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 | |
| øP | 3.75 | | 3.85 |
| Q | 2.65 | | 2.95 |



4 Revision history

Table 4. Revision history

| Date | Revision | Changes |
|-------------|----------|---|
| 01-Jan-2000 | 1 | Initial Release |
| 11-Jul-2007 | 2 | Figures 1,2,3,4,5,6,7,8 and figure 9 have been added. |

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