

NPN power transistor

Features

- NPN transistor

Applications

- General purpose switching and amplifier transistor

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. The PNP type is the BD240C.

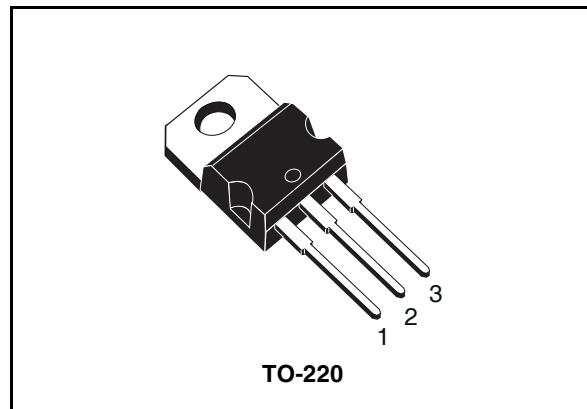


Figure 1. Internal schematic diagram

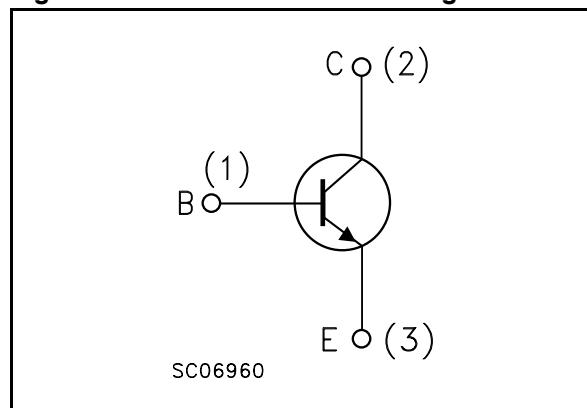


Table 1. Device summary

| Order code | Marking | Package | Packaging |
|------------|---------|---------|-----------|
| BD239C | BD239C | TO-220 | Tube |

1 Electrical ratings

Table 2. Absolute maximum rating

| Symbol | Parameter | Value | Unit |
|-----------|--|------------|------|
| V_{CER} | Collector-emitter voltage ($R_{BE} = 100\Omega$) | 115 | V |
| V_{CEO} | Collector-base voltage ($I_B = 0$) | 100 | V |
| V_{EBO} | Emitter-base voltage ($I_C = 0$) | 5 | V |
| I_C | Collector current | 2 | A |
| I_{CM} | Collector peak current | 4 | A |
| I_B | Base current | 0.6 | A |
| P_{TOT} | Total dissipation at $T_{case} \leq 25^\circ C$ | 30 | W |
| P_{TOT} | Total dissipation at $T_{amb} \leq 25^\circ C$ | 2 | W |
| T_{stg} | Storage temperature | -65 to 150 | °C |
| T_J | Max. operating junction temperature | 150 | °C |

2 Electrical characteristics

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

Table 3. Electrical characteristics

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------|--|--|------|------|------|------|
| I_{CES} | Collector cut-off current ($V_{BE} = 0$) | $V_{CE} = 100\text{V}$ | | | 0.2 | mA |
| I_{CEO} | Collector cut-off current ($I_B = 0$) | $V_{CE} = 60\text{V}$ | | | 0.3 | mA |
| I_{EBO} | Emitter cut-off current ($I_C = 0$) | $V_{EB} = 5\text{V}$ | | | 1 | mA |
| $V_{CEO(sus)}$ ⁽¹⁾ | Collector-emitter sustaining voltage ($I_B = 0$) | $I_C = 30\text{mA}$ | 100 | | | V |
| $V_{CE(sat)}$ ⁽¹⁾ | Collector-emitter saturation voltage | $I_C = 1\text{A}$ $I_B = 0.2\text{A}$ | | | 0.7 | V |
| V_{BE} ⁽¹⁾ | Base-emitter voltage | $I_C = 1\text{A}$ $V_{CE} = 4\text{V}$ | | | 1.3 | V |
| h_{FE} | DC current gain | $I_C = 0.2\text{A}$ $V_{CE} = 4\text{V}$ $I_C = 1\text{A}$ $V_{CE} = 4\text{V}$ | 40 | | | |
| | | | 15 | | | |

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

2.1 Electrical characteristic (curves)

Figure 2. Safe operating area

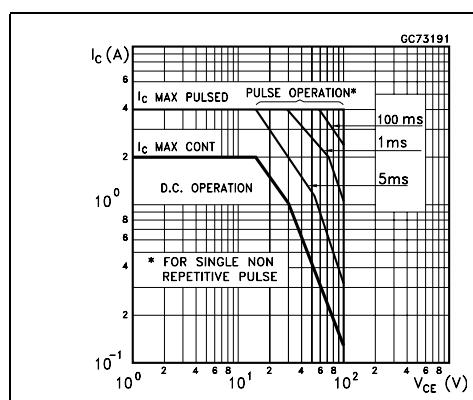


Figure 3. Derating curve

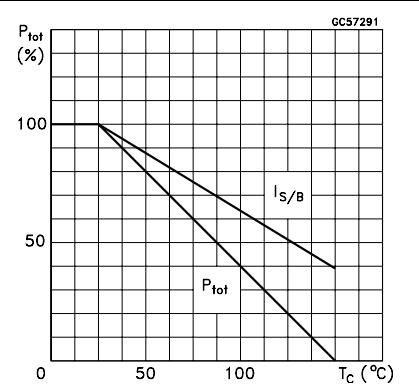


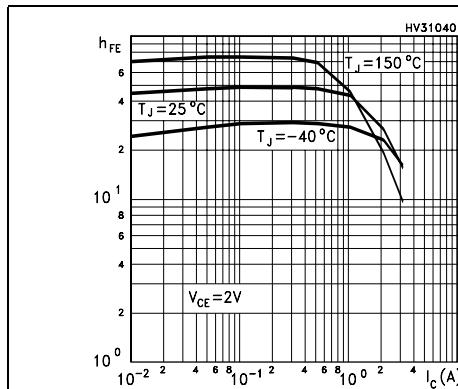
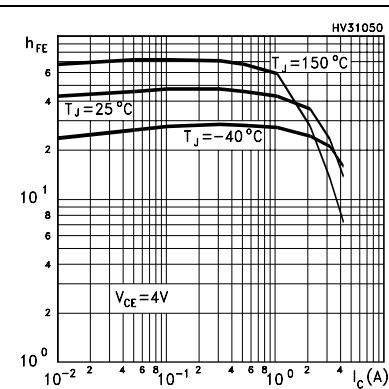
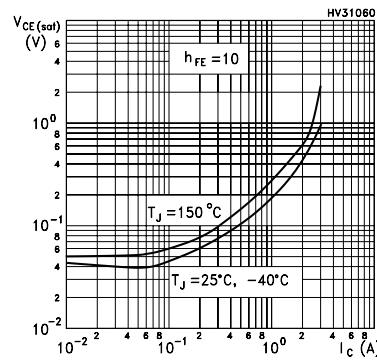
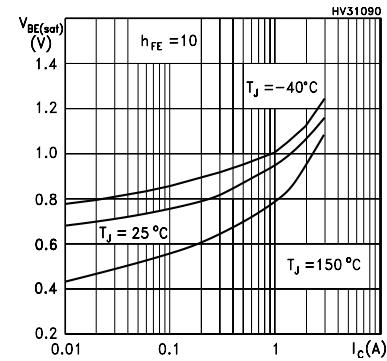
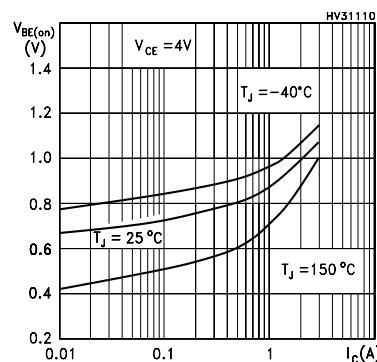
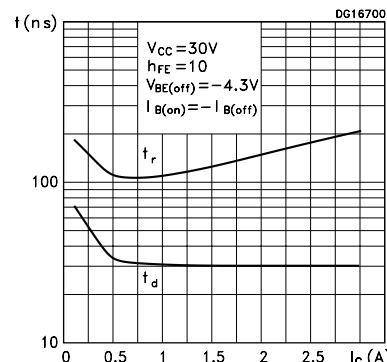
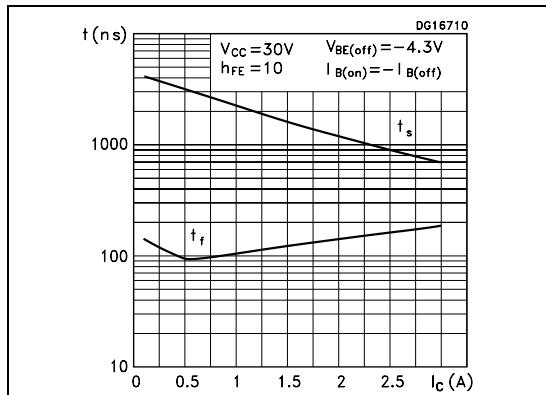
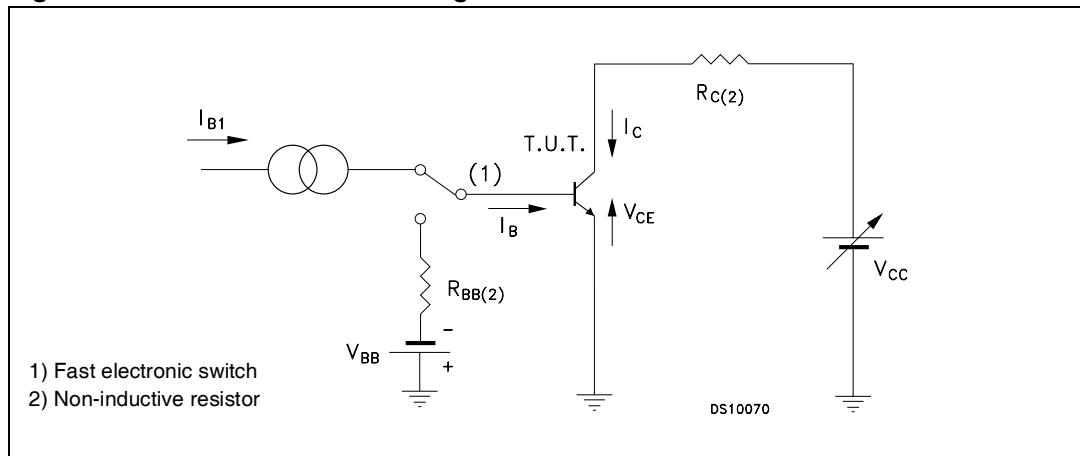
Figure 4. DC current gain**Figure 5. DC current gain****Figure 6. Collector-emitter saturation voltage****Figure 7. Base-emitter saturation voltage****Figure 8. Base-emitter on voltage****Figure 9. Resistive load switching time**

Figure 10. Resistive load switching time

2.2 Test circuit

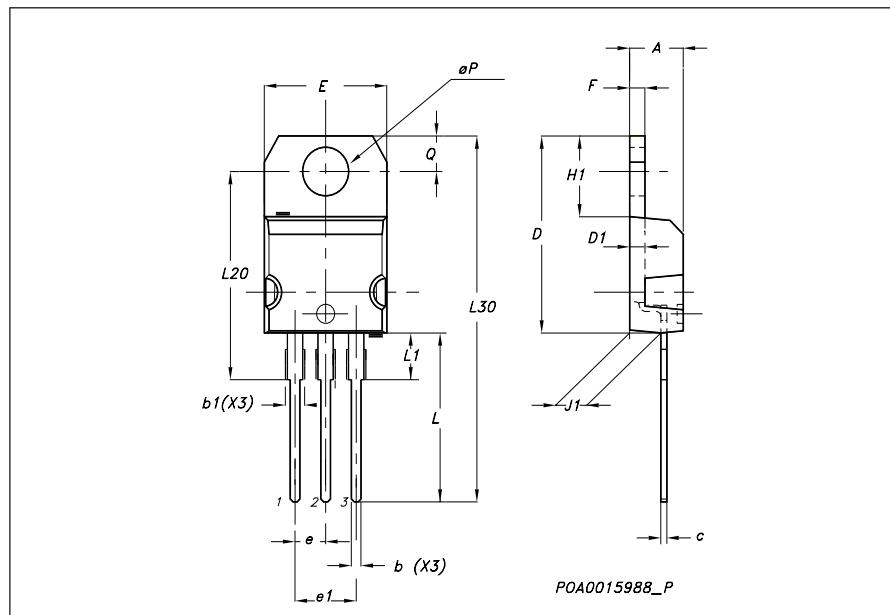
Figure 11. Resistive load switching test circuit

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

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-April-1999 | 1 | Initial release. |
| 02-Jul-2007 | 2 | Figures 2,3,4,5,6,7,8,9 and figure 10 have been added. |

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