

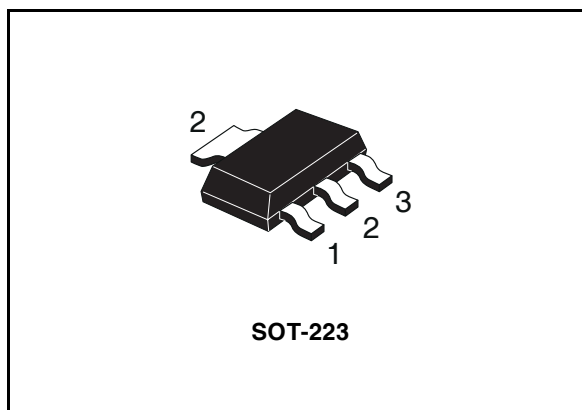
## Low power NPN Transistor

### General features

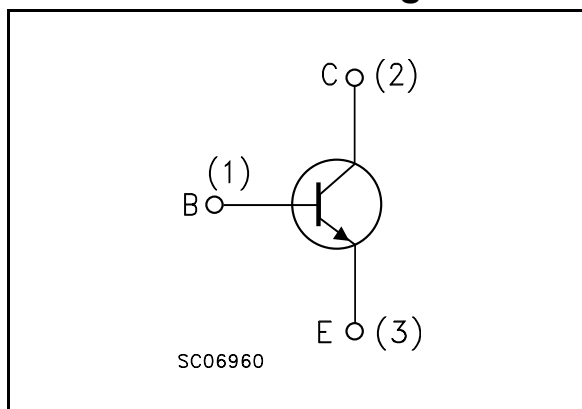
- Silicon epitaxial planar NPN medium voltage transistor
- SOT-223 plastic package for surface mounting circuits
- Available in tape & reel packing
- In compliance with the 2002/93/EC European Directive
- The PNP complementary type is BCP53-16

### Applications

- Medium voltage load switch transistor
- Output stage for audio amplifiers circuits
- Automotive post-voltage regulation



### Internal schematic diagram



### Order codes

| Part Number | Marking | Package | Packing     |
|-------------|---------|---------|-------------|
| BCP56-16    | BCP5616 | SOT-223 | Tape & reel |

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# 1 Electrical ratings

**Table 1. Absolute maximum rating**

| Symbol    | Parameter   | Value      | Unit             |
|-----------|---|------------|------------------|
| $V_{CBO}$ | Collector-base voltage ( $I_E = 0$ )              | 100        | V                |
| $V_{CEO}$ | Collector-emitter voltage ( $I_B = 0$ )           | 80         | V                |
| $V_{EBO}$ | Emitter-base voltage ( $I_C = 0$ )                | 5          | V                |
| $I_C$     | Collector current                                 | 1          | A                |
| $I_{CM}$  | Collector peak current ( $t_P < 5\text{ms}$ )     | 1.5        | A                |
| $I_B$     | Base current                                      | 0.1        | A                |
| $I_{BM}$  | Base peak current ( $t_P < 5\text{ms}$ )          | 0.2        | A                |
| $P_{tot}$ | Total dissipation at $T_{amb} = 25^\circ\text{C}$ | 1.6        | 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               |
|---------------|--|-------|--------------------|
| $R_{thj-amb}$ | Thermal resistance junction-ambient <sup>(1)</sup> max | 78    | $^\circ\text{C/W}$ |

1. Device mounted on PCB area of 1 cm<sup>2</sup>.

## 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<br>( $I_{\text{E}} = 0$ )              | $V_{\text{CB}} = 30\text{V}$<br>$V_{\text{CB}} = 30\text{V}; T_{\text{j}} = 125^{\circ}\text{C}$  |                 |      | 100<br>10 | nA<br>$\mu\text{A}$ |
| $V_{(\text{BR})\text{CEO}}^{(2)}$ | Collector-emitter<br>breakdown voltage<br>( $I_{\text{B}} = 0$ ) | $I_{\text{C}} = 20\text{mA}$  | 80              |      |           | V                   |
| $V_{(\text{BR})\text{CBO}}$       | Collector-base<br>breakdown voltage<br>( $I_{\text{E}} = 0$ )    | $I_{\text{C}} = 100\mu\text{A}$   | 100             |      |           | V                   |
| $V_{(\text{BR})\text{EBO}}$       | Emitter-base breakdown<br>voltage ( $I_{\text{C}} = 0$ )         | $I_{\text{E}} = 10\mu\text{A}$  | 5               |      |           | V                   |
| $V_{\text{CE}(\text{sat})}^{(2)}$ | Collector-emitter<br>saturation voltage                          | $I_{\text{C}} = 500\text{mA}$ $I_{\text{B}} = 50\text{mA}$  |                 |      | 0.5       | V                   |
| $V_{\text{BE}(\text{on})}^{(2)}$  | Base-emitter on voltage  | $I_{\text{C}} = 500\text{mA}$ $V_{\text{CE}} = 2\text{V}$   |                 |      | 1         | V                   |
| $h_{\text{FE}}^{(2)}$             | DC current gain  | $I_{\text{C}} = 5\text{mA}$ $V_{\text{CE}} = 2\text{V}$<br>$I_{\text{C}} = 150\text{mA}$ $V_{\text{CE}} = 2\text{V}$<br>$I_{\text{C}} = 500\text{mA}$ $V_{\text{CE}} = 2\text{V}$ | 40<br>100<br>25 |      | 250       |                     |

Note (2) Pulsed duration = 300  $\mu\text{s}$ , duty cycle  $\leq 1.5\%$

## 2.1 Electrical characteristics (curves)

Figure 1. DC current gain

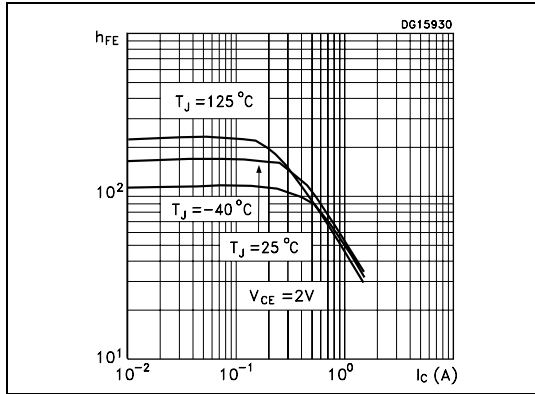


Figure 2. Collector-emitter saturation voltage

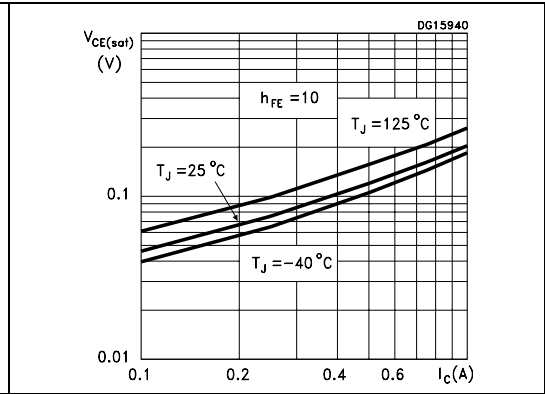
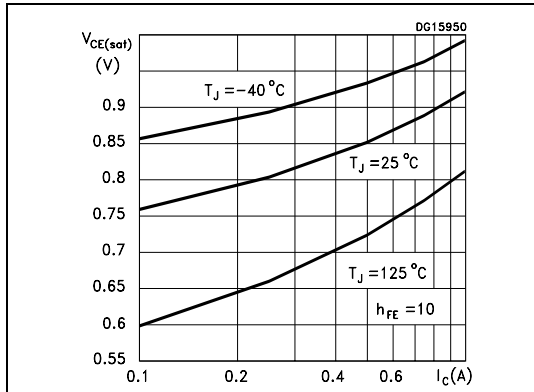


Figure 3. Base-emitter saturation voltage

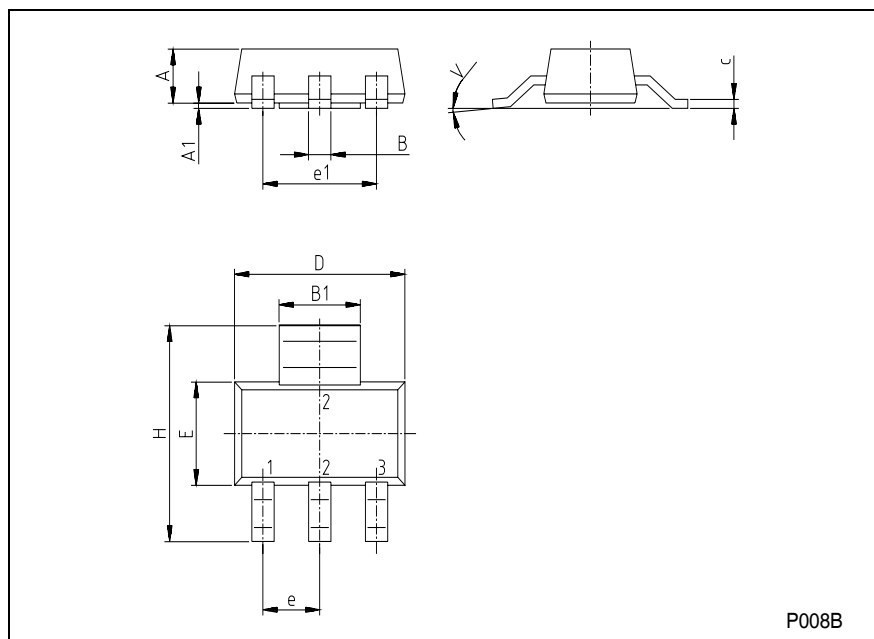


### 3 Package mechanical data

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)

## SOT-223 MECHANICAL DATA

| DIM. | mm   |      |      | inch  |       |       |
|------|------|------|------|-------|-------|-------|
|      | MIN. | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    |      |      | 1.80 |       |       | 0.071 |
| B    | 0.60 | 0.70 | 0.80 | 0.024 | 0.027 | 0.031 |
| B1   | 2.90 | 3.00 | 3.10 | 0.114 | 0.118 | 0.122 |
| c    | 0.24 | 0.26 | 0.32 | 0.009 | 0.010 | 0.013 |
| D    | 6.30 | 6.50 | 6.70 | 0.248 | 0.256 | 0.264 |
| e    |      | 2.30 |      |       | 0.090 |       |
| e1   |      | 4.60 |      |       | 0.181 |       |
| E    | 3.30 | 3.50 | 3.70 | 0.130 | 0.138 | 0.146 |
| H    | 6.70 | 7.00 | 7.30 | 0.264 | 0.276 | 0.287 |
| V    |      |      | 10°  |       |       | 10°   |
| A1   |      | 0.02 |      |       |       |       |



## 4 Revision history

**Table 4. Revision history**

| <b>Date</b> | <b>Revision</b> | <b>Changes</b>                         |
|-------------|-----------------|--|
| 02-Sep-2004 | 1               | Initial release.                       |
| 26-May-2006 | 2               | New template                           |
| 14-Jun-2006 | 3               | Three curves has been added on page 5. |



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