

## Electrical characteristics

( $T_a=25^\circ\text{C}$ )

| Symbol        | NPN           |     |     |               |                                                                              | PNP           |     |      |               |                                                                                |
|---------------|---------------|-----|-----|---------------|------------------------------------------------------------------------------|---------------|-----|------|---------------|--------------------------------------------------------------------------------|
|               | Specification |     |     | Unit          | Conditions                                                                   | Specification |     |      | Unit          | Conditions                                                                     |
|               | min           | typ | max |               |                                                                              | min           | typ | max  |               |                                                                                |
| $I_{CBO}$     |               |     | 100 | $\mu\text{A}$ | $V_{CB}=80\text{V}$                                                          |               |     | -100 | $\mu\text{A}$ | $V_{CB}=-60\text{V}$                                                           |
| $I_{EBO}$     |               |     | 10  | $\text{mA}$   | $V_{EB}=6\text{V}$                                                           |               |     | -10  | $\text{mA}$   | $V_{EB}=-6\text{V}$                                                            |
| $V_{CEO}$     | 60            |     |     | $\text{V}$    | $I_C=10\text{mA}$                                                            | -60           |     |      | $\text{V}$    | $I_C=-10\text{mA}$                                                             |
| $h_{FE}$      | 1000          |     |     |               | $V_{CE}=4\text{V}, I_C=3\text{A}$                                            | 1000          |     |      |               | $V_{CE}=-4\text{V}, I_C=-3\text{A}$                                            |
| $V_{CE(sat)}$ |               |     | 2.0 | $\text{V}$    | $I_C=3\text{A}, I_B=10\text{mA}$                                             |               |     | -2.0 | $\text{V}$    | $I_C=-2\text{A}, I_B=-10\text{mA}$                                             |
| $t_{on}$      |               | 1.0 |     | $\mu\text{s}$ | $V_{CC}\div 30\text{V},$<br>$I_C=3\text{A},$<br>$I_{B1}=-I_{B2}=10\text{mA}$ |               | 0.4 |      | $\mu\text{s}$ | $V_{CC}\div 30\text{V},$<br>$I_C=-3\text{A},$<br>$I_{B1}=-I_{B2}=-10\text{mA}$ |
| $t_{stg}$     |               | 4.0 |     | $\mu\text{s}$ |                                                                              |               | 0.8 |      | $\mu\text{s}$ |                                                                                |
| $t_f$         |               | 1.5 |     | $\mu\text{s}$ |                                                                              |               | 0.6 |      | $\mu\text{s}$ |                                                                                |

## Characteristic curves

