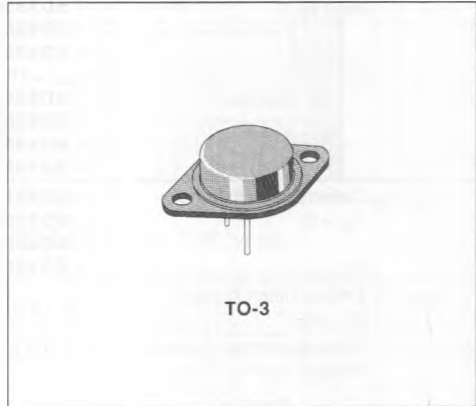


## POWER DARLINGTONS

### DESCRIPTION

The BDX 85, BDX 85A, BDX 85B and BDX 85C are silicon epitaxial-base NPN power transistors in monolithic Darlington configuration and are mounted in Jedec TO-3 metal case. They are intended for use in power linear and switching applications.

The complementary PNP types are the BDX 86, BDX 86A, BDX 86B and BDX 86C respectively.



### INTERNAL SCHEMATIC DIAGRAMS



### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter   | NPN<br>PNP* | Value          |                  |                  |                  | Unit             |
|-----------|---|-------------|----------------|------------------|------------------|------------------|------------------|
|           |   |             | BDX85<br>BDX86 | BDX85A<br>BDX86A | BDX85B<br>BDX86B | BDX85C<br>BDX86C |                  |
| $V_{CBO}$ | Collector-base Voltage ( $I_E = 0$ )                        |             | 45             | 60               | 80               | 100              | V                |
| $V_{CEO}$ | Collector-emitter Voltage ( $I_B = 0$ )                     |             | 45             | 60               | 80               | 100              | V                |
| $V_{EBO}$ | Emitter-base Voltage ( $I_C = 0$ )                          |             | 5              |                  |                  |                  | V                |
| $I_C$     | Collector Current   |             | 10             |                  |                  |                  | A                |
| $I_{CM}$  | Collector Peak Current (repetitive)                         |             | 15             |                  |                  |                  | A                |
| $I_B$     | Base Current  |             | 0.1            |                  |                  |                  | A                |
| $P_{Tot}$ | Total Power Dissipation at $T_{case} \leq 25^\circ\text{C}$ |             | 100            |                  |                  |                  | W                |
| $T_{stg}$ | Storage Temperature   |             | - 65 to 200    |                  |                  |                  | $^\circ\text{C}$ |
| $T_J$     | Junction Temperature  |             | 200            |                  |                  |                  | $^\circ\text{C}$ |

\* For PNP types voltage and current values are negative.

**THERMAL DATA**

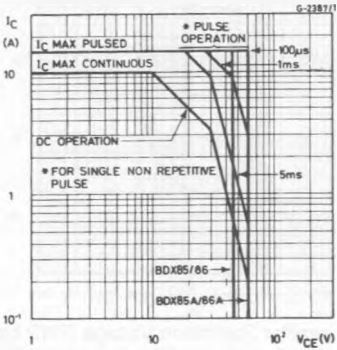
|                  |                                  |     |      |      |
|------------------|----------------------------------|-----|------|------|
| $R_{th(j-case)}$ | Thermal Resistance Junction-case | Max | 1.75 | °C/W |
|------------------|----------------------------------|-----|------|------|

**ELECTRICAL CHARACTERISTICS** ( $T_{case} = 25\text{ °C}$  unless otherwise specified)

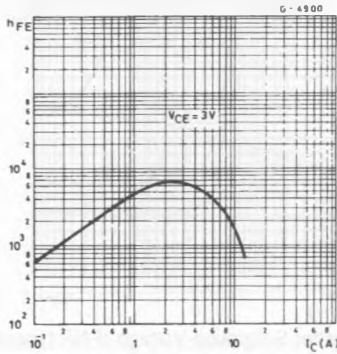
| Symbol           | Parameter  | Test Conditions  | Min.                  | Typ. | Max. | Unit             |  |
|------------------|--|--|-----------------------|------|------|------------------|--|
| $I_{CBO}$        | Collector Cutoff Current<br>( $I_E = 0$ )          | for <b>BDX85/86</b> $V_{CB} = 45\text{ V}$   |                       |      | 500  | $\mu\text{A}$    |  |
|                  |  | for <b>BDX85A/86A</b> $V_{CB} = 60\text{ V}$   |                       |      | 500  | $\mu\text{A}$    |  |
|                  |  | for <b>BDX85B/86B</b> $V_{CB} = 80\text{ V}$   |                       |      | 500  | $\mu\text{A}$    |  |
|                  |  | for <b>BDX85C/86C</b> $V_{CB} = 100\text{ V}$  |                       |      | 500  | $\mu\text{A}$    |  |
|                  |  | $T_{case} = 150\text{ °C}$   |                       |      |      |                  |  |
|                  |  | for <b>BDX85/86</b> $V_{CB} = 45\text{ V}$   |                       |      | 5    | $\text{mA}$      |  |
| $I_{CEO}$        | Collector Cutoff Current<br>( $I_B = 0$ )          | for <b>BDX85/86</b> $V_{CE} = 22\text{ V}$   |                       |      | 1    | $\text{mA}$      |  |
|                  |  | for <b>BDX85A/86A</b> $V_{CE} = 30\text{ V}$   |                       |      | 1    | $\text{mA}$      |  |
|                  |  | for <b>BDX85B/86B</b> $V_{CE} = 40\text{ V}$   |                       |      | 1    | $\text{mA}$      |  |
|                  |  | for <b>BDX85C/86C</b> $V_{CE} = 50\text{ V}$   |                       |      | 1    | $\text{mA}$      |  |
| $I_{EBO}$        | Emitter Cutoff Current<br>( $I_C = 0$ )            | $V_{EB} = 5\text{ V}$  |                       |      | 2    | $\text{mA}$      |  |
| $V_{CEO(sus)}^*$ | Collector-emitter Sustaining Voltage ( $I_B = 0$ ) | $I_C = 100\text{ mA}$ for <b>BDX85/86</b><br>for <b>BDX85A/86A</b><br>for <b>BDX85B/86B</b><br>for <b>BDX85C/86C</b> | 45<br>60<br>80<br>100 |      |      | V<br>V<br>V<br>V |  |
| $V_{CE(sat)}^*$  | Collector-emitter Saturation Voltage               | $I_C = 4\text{ A}$   | $I_B = 16\text{ mA}$  |      | 2    | V                |  |
|                  |  | $I_C = 8\text{ A}$   | $I_B = 40\text{ mA}$  |      | 4    | V                |  |
| $V_{BE(sat)}^*$  | Base-emitter Saturation Voltage                    | $I_C = 8\text{ A}$   | $I_B = 80\text{ mA}$  |      | 4    | V                |  |
| $V_{BE}^*$       | Base-emitter Voltage                               | $I_C = 4\text{ A}$   | $V_{CE} = 3\text{ V}$ |      | 2.8  | V                |  |
| $h_{FE}^*$       | DC Current Gain                                    | $I_C = 3\text{ A}$   | $V_{CE} = 3\text{ V}$ | 1000 |      |                  |  |
|                  |  | $I_C = 4\text{ A}$   | $V_{CE} = 3\text{ V}$ | 750  |      | 18000            |  |
|                  |  | $I_C = 8\text{ A}$   | $V_{CE} = 4\text{ V}$ | 200  |      |                  |  |
| $V_F$            | Parallel-diode Forward Voltage                     | $I_F = 3\text{ A}$   |                       |      |      | 1.8              |  |
|                  |  | $I_F = 8\text{ A}$   |                       |      | 2.5  | V                |  |
| $h_{fe}$         | Small Signal Current Gain                          | $I_C = 3\text{ A}$<br>$f = 1\text{ MHz}$   | $V_{CE} = 3\text{ V}$ |      | 10   |                  |  |

\* Pulsed : pulse duration = 300 ms, duty cycle = 1.5 %.  
For PNP type voltage and current values are negative.

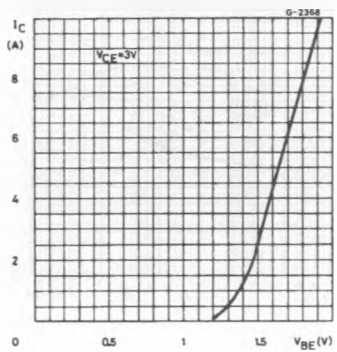
Safe Operating Areas (for BDX85, BDX85A, BDX86, BDX86A).



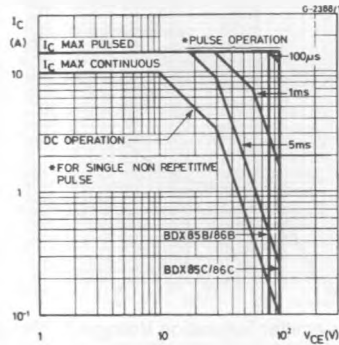
DC Current Gain (NPN types).



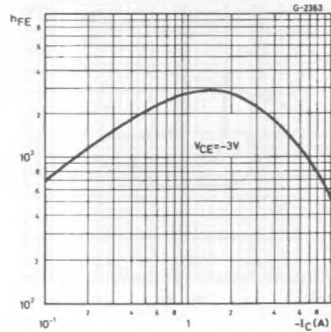
DC Transconductance (NPN types).



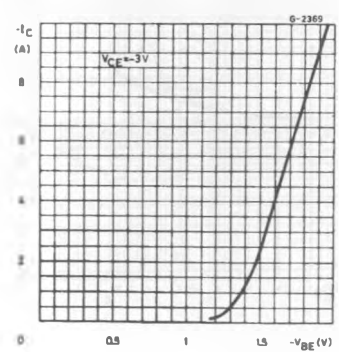
Safe Operating Areas (for BDX85B, BDX85C, BDX86B, BDX86C).



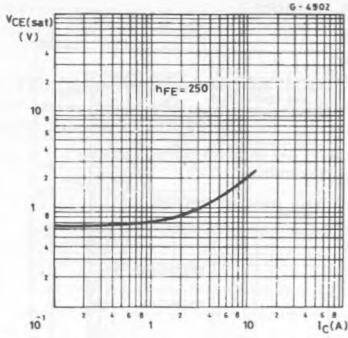
DC Current Gain (PNP types).



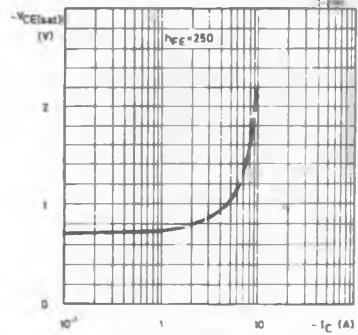
DC Transconductance (PNP types).



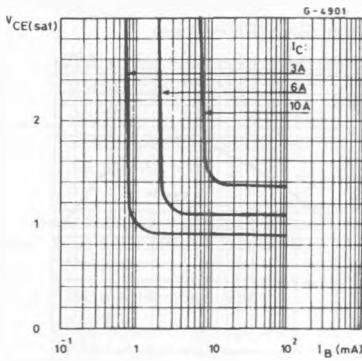
Collector-emitter Saturation Voltage (NPN types).



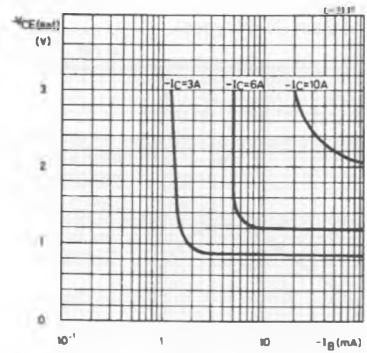
Collector-emitter Saturation Voltage (PNP types).



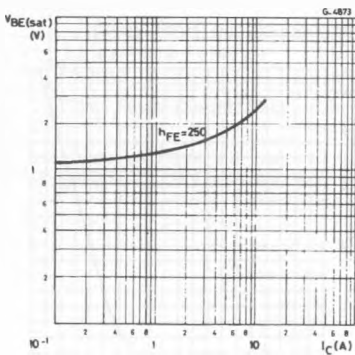
Collector-emitter Saturation Voltage (NPN types).



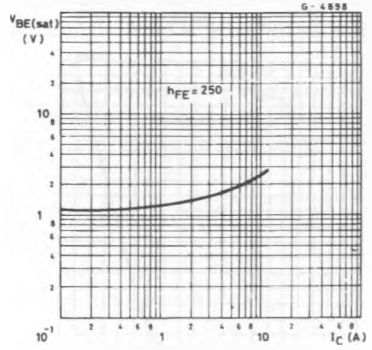
Collector-emitter Saturation Voltage (PNP types).



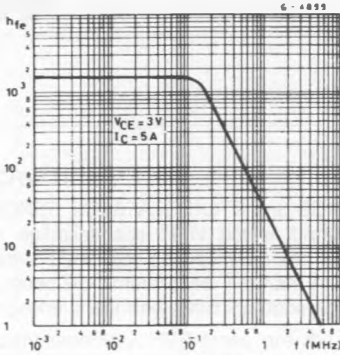
Base-emitter Saturation Voltage (NPN types).



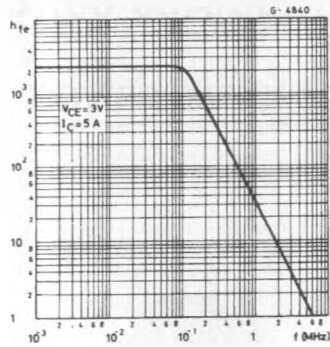
Base-emitter Saturation Voltage (PNP types).



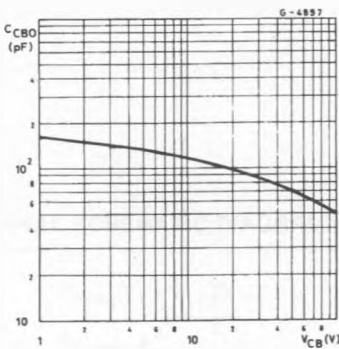
Small Signal Current Gain (NPN types).



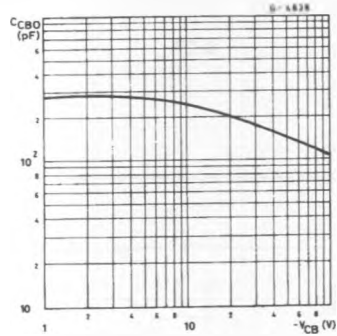
Small Signal Current Gain (PNP types).



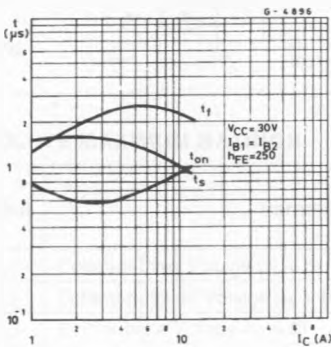
Collector-base Capacitance (NPN types).



Collector-base Capacitance (PNP types).



Saturated Switching Characteristics (NPN types).



Saturated Switching Characteristics (PNP types).

