

## BD433/435/437

### Medium Power Linear and Switching Applications

- Complement to BD434, BD436 and BD438 respectively



### NPN Epitaxial Silicon Transistor

#### Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise noted

| Symbol    | Parameter  | Value      | Units            |
|-----------|--|------------|------------------|
| $V_{CBO}$ | Collector-Base Voltage                           |            |                  |
|           | : BD433  | 22         | V                |
|           | : BD435  | 32         | V                |
|           | : BD437  | 45         | V                |
| $V_{CES}$ | Collector-Emitter Voltage                        |            |                  |
|           | : BD433  | 22         | V                |
|           | : BD435  | 32         | V                |
|           | : BD437  | 45         | V                |
| $V_{CEO}$ | Collector-Emitter Voltage                        |            |                  |
|           | : BD433  | 22         | V                |
|           | : BD435  | 32         | V                |
|           | : BD437  | 45         | V                |
| $V_{EBO}$ | Emitter-Base Voltage                             | 5          | V                |
| $I_C$     | Collector Current (DC)                           | 4          | A                |
| $I_{CP}$  | *Collector Current (Pulse)                       | 7          | A                |
| $I_B$     | Base Current                                     | 1          | A                |
| $P_C$     | Collector Dissipation ( $T_C=25^\circ\text{C}$ ) | 36         | W                |
| $T_J$     | Junction Temperature                             | 150        | $^\circ\text{C}$ |
| $T_{STG}$ | Storage Temperature                              | - 65 ~ 150 | $^\circ\text{C}$ |

**Electrical Characteristics**  $T_C=25^\circ\text{C}$  unless otherwise noted

| Symbol         | Parameter                                | Test Condition                           | Min. | Typ. | Max. | Units         |
|----------------|--|--|------|------|------|---------------|
| $V_{CEO(sus)}$ | Collector-Emitter Sustaining Voltage     | $I_C = 100\text{mA}, I_B = 0$            | 22   |      |      | V             |
|                | : BD433                                  |  |      |      |      |               |
|                | : BD435                                  |  |      |      |      |               |
|                | : BD437                                  | 45                                       |      |      | V    |               |
| $I_{CBO}$      | Collector Cut-off Current                | $V_{CB} = 22\text{V}, I_E = 0$           |      |      | 100  | $\mu\text{A}$ |
|                | : BD433                                  |  |      |      |      |               |
|                | : BD435                                  |  |      |      |      |               |
|                | : BD437                                  | $V_{CB} = 32\text{V}, I_E = 0$           |      |      | 100  | $\mu\text{A}$ |
|                |  | $V_{CB} = 45\text{V}, I_E = 0$           |      |      | 100  | $\mu\text{A}$ |
| $I_{CEO}$      | Collector Cut-off Current                | $V_{CE} = 22\text{V}, V_{BE} = 0$        |      |      | 100  | $\mu\text{A}$ |
|                | : BD433                                  |  |      |      |      |               |
|                | : BD435                                  |  |      |      |      |               |
|                | : BD437                                  | $V_{CE} = 32\text{V}, V_{BE} = 0$        |      |      | 100  | $\mu\text{A}$ |
|                |  | $V_{CE} = 45\text{V}, V_{BE} = 0$        |      |      | 100  | $\mu\text{A}$ |
| $I_{EBO}$      | Emitter Cut-off Current                  | $V_{EB} = 5\text{V}, I_C = 0$            |      |      | 1    | mA            |
| $h_{FE}$       | * DC Current Gain                        | $V_{CE} = 5\text{V}, I_C = 10\text{mA}$  | 40   | 130  |      |               |
|                | : BD433/435                              |  |      |      |      |               |
|                | : BD437                                  |  |      |      |      |               |
|                | : ALL DEVICE                             |  |      |      |      |               |
|                | : BD433/435                              |  |      |      |      |               |
| : BD437        | $V_{CE} = 1\text{V}, I_C = 500\text{mA}$ | 85                                       | 140  |      |      |               |
|                |  | $V_{CE} = 1\text{V}, I_C = 2\text{A}$    | 50   |      |      |               |
|                |  |  | 40   |      |      |               |
| $V_{CE(sat)}$  | * Collector-Emitter Saturation Voltage   | $I_C = 2\text{A}, I_B = 0.2\text{A}$     |      |      | 0.2  | 0.5           |
|                | : BD433                                  |  |      |      |      |               |
|                | : BD435                                  |  |      |      |      |               |
|                | : BD437                                  | 0.2                                      | 0.6  | V    |      |               |
| $V_{BE(on)}$   | * Base-Emitter ON Voltage                | $V_{CE} = 1\text{V}, I_C = 2\text{A}$    |      |      | 1.1  | V             |
|                | : BD433                                  |  |      |      |      |               |
|                | : BD435                                  |  |      |      |      |               |
|                | : BD437                                  | 1.1                                      | 1.2  | V    |      |               |
| $f_T$          | Current Gain Bandwidth Product           | $V_{CE} = 1\text{V}, I_C = 250\text{mA}$ | 3    |      |      | MHz           |

\* Pulse Test: PW=300 $\mu\text{s}$ , duty Cycle=1.5% Pulsed

# Typical Characteristics

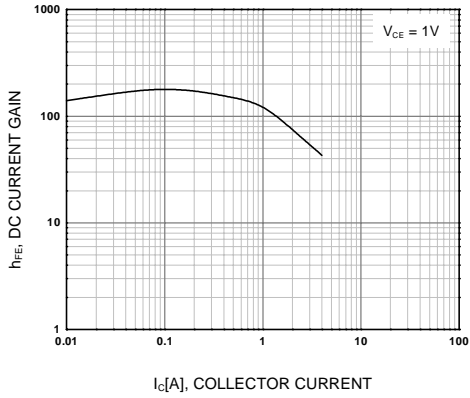


Figure 1. DC current Gain

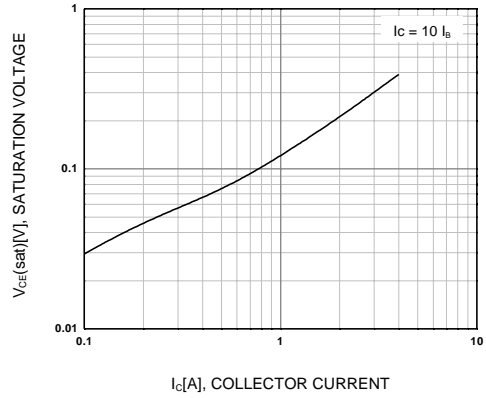


Figure 2. Collector-Emitter Saturation Voltage

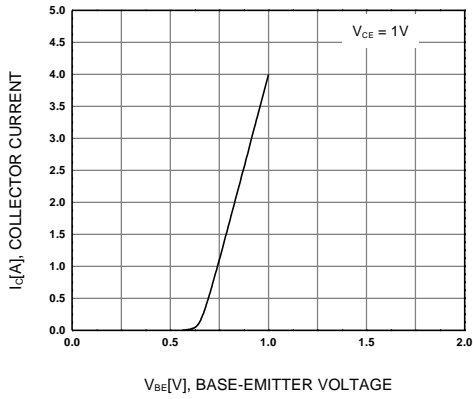


Figure 3. Base-Emitter On Voltage

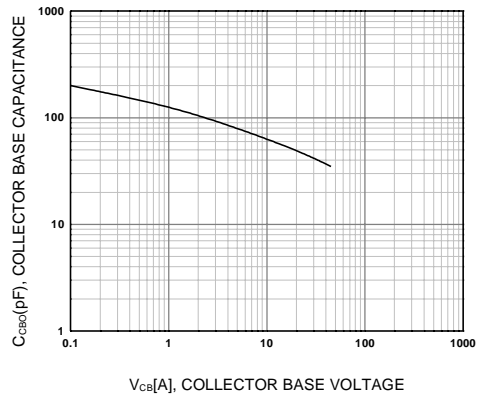


Figure 4. Collector-Base Capacitance

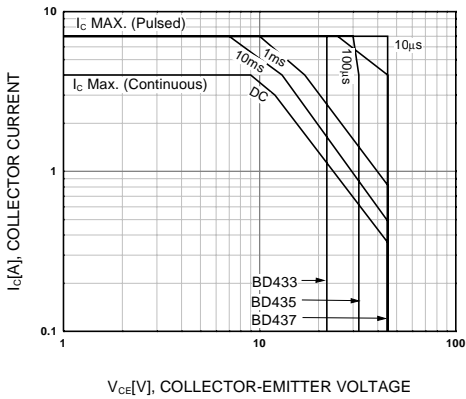


Figure 5. Safe Operating Area

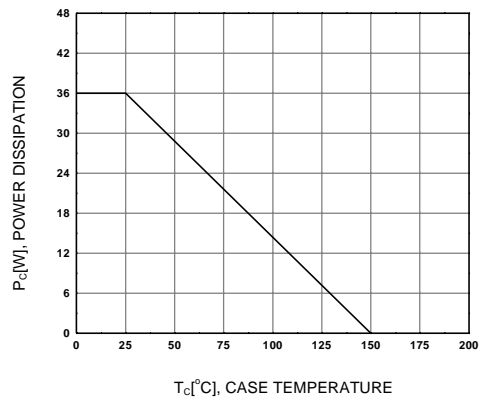


Figure 6. Power Derating

# Package Dimensions

BD433/435/437

## TO-126



Dimensions in Millimeters

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| CROSSVOLT™           | POP™          | UHC™        |
| E <sup>2</sup> CMOS™ | PowerTrench®  | VCX™        |
| FACT™                | QFET™         |             |
| FACT Quiet Series™   | QS™           |             |
| FAST®                | Quiet Series™ |             |
| FASTr™               | SuperSOT™-3   |             |
| GTO™                 | SuperSOT™-6   |             |

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