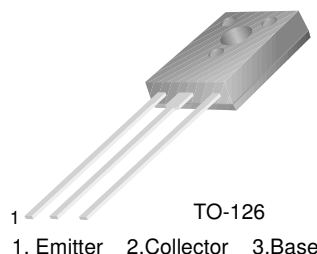


# BD676A/678A/680A/682

## Medium Power Linear and Switching Applications

- Medium Power Darlington TR
- Complement to BD675A, BD677A, BD679A and BD681 respectively



## PNP Epitaxial Silicon Transistor

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

| Symbol          | Parameter                                        | Value      | Units              |
|-----------------|--------------------------------------------------|------------|--------------------|
| $V_{CBO}$       | Collector-Base Voltage : BD676A                  | - 45       | V                  |
|                 | : BD678A                                         | - 60       | V                  |
|                 | : BD680A                                         | - 80       | V                  |
|                 | : BD682                                          | - 100      | V                  |
|                 |                                                  |            |                    |
| $V_{CEO}$       | Collector-Emitter Voltage : BD676A               | - 45       | V                  |
|                 | : BD678A                                         | - 60       | V                  |
|                 | : BD680A                                         | - 80       | V                  |
|                 | : BD682                                          | - 100      | V                  |
|                 |                                                  |            |                    |
| $V_{EBO}$       | Emitter-Base Voltage                             | - 5        | V                  |
| $I_C$           | Collector Current (DC)                           | - 4        | A                  |
| $I_{CP}$        | *Collector Current (Pulse)                       | - 6        | A                  |
| $I_B$           | Base Current                                     | - 100      | mA                 |
| $P_C$           | Collector Dissipation ( $T_C=25^\circ\text{C}$ ) | 14         | W                  |
| $R_{\theta ja}$ | Thermal Resistance (Junction to Ambient)         | 88         | $^\circ\text{C/W}$ |
| $T_J$           | 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 : BD676A             | $I_C = - 50\text{mA}, I_B = 0$              | - 45  |      |       |               |
|                | : BD678A                                                  |                                             | - 60  |      |       |               |
|                | : BD680A                                                  |                                             | - 80  |      |       |               |
|                | : BD682                                                   |                                             | - 100 |      |       |               |
|                |                                                           |                                             |       |      |       |               |
| $I_{CBO}$      | Collector-Base Voltage : BD676A                           | $V_{CB} = - 45\text{V}, I_E = 0$            |       |      | - 200 | $\mu\text{A}$ |
|                | : BD678A                                                  | $V_{CB} = - 60\text{V}, I_E = 0$            |       |      | - 200 | $\mu\text{A}$ |
|                | : BD680A                                                  | $V_{CB} = - 80\text{V}, I_E = 0$            |       |      | - 200 | $\mu\text{A}$ |
|                | : BD682                                                   | $V_{CB} = - 100\text{V}, V_{BE} = 0$        |       |      | - 200 | $\mu\text{A}$ |
|                |                                                           |                                             |       |      |       |               |
| $I_{CEO}$      | Collector Cut-off Current : BD676A                        | $V_{CE} = - 45\text{V}, V_{BE} = 0$         |       |      | - 500 | $\mu\text{A}$ |
|                | : BD678A                                                  | $V_{CE} = - 60\text{V}, V_{BE} = 0$         |       |      | - 500 | $\mu\text{A}$ |
|                | : BD680A                                                  | $V_{CE} = - 80\text{V}, V_{BE} = 0$         |       |      | - 500 | $\mu\text{A}$ |
|                | : BD682                                                   | $V_{CE} = - 100\text{V}, V_{BE} = 0$        |       |      | - 500 | $\mu\text{A}$ |
|                |                                                           |                                             |       |      |       |               |
| $I_{EBO}$      | Emitter Cut-off Current                                   | $V_{EB} = - 5\text{V}, I_C = 0$             |       |      | - 2   | mA            |
| $h_{FE}$       | * DC Current Gain : BD676A/678A/680A                      | $V_{CE} = - 3\text{V}, I_C = - 2\text{A}$   | 750   |      |       |               |
|                | : BD682                                                   | $V_{CE} = - 3\text{V}, I_C = - 1.5\text{A}$ | 750   |      |       |               |
| $V_{CE(sat)}$  | * Collector-Emitter Saturation Voltage : BD676A/678A/680A | $I_C = - 2\text{A}, I_B = - 40\text{mA}$    |       |      | - 2.8 | V             |
|                | : BD682                                                   | $I_C = - 1.5\text{A}, I_B = - 30\text{mA}$  |       |      | - 2.5 | V             |
|                |                                                           |                                             |       |      |       |               |
| $V_{BE(on)}$   | * Base-Emitter On Voltage : BD676A/678A/680A              | $V_{CE} = - 3\text{V}, I_C = - 2\text{A}$   |       |      | - 2.5 | V             |
|                | : BD682                                                   | $V_{CE} = - 3\text{V}, I_C = - 1.5\text{A}$ |       |      | - 2.5 | V             |

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

## Typical Characteristics

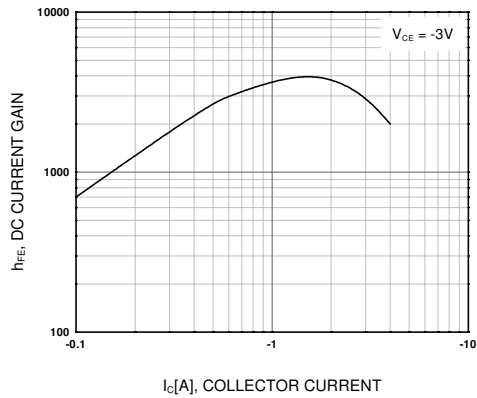


Figure 1. DC current Gain

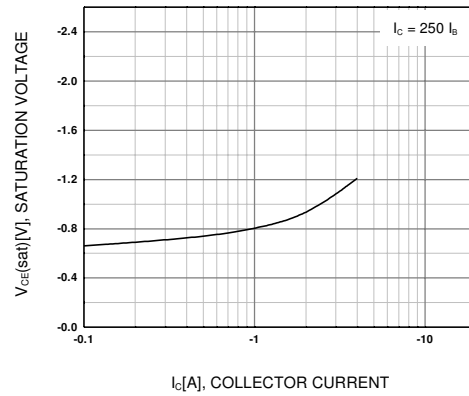


Figure 2. Collector-Emitter Saturation Voltage

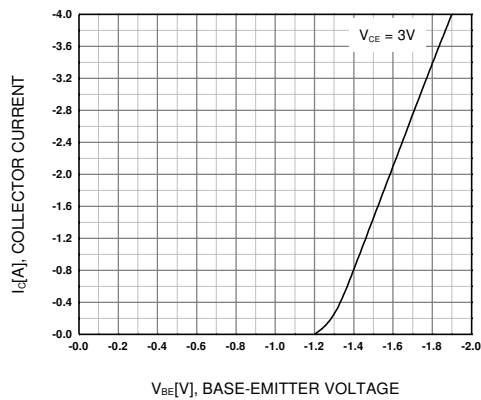


Figure 3. Base-Emitter On Voltage

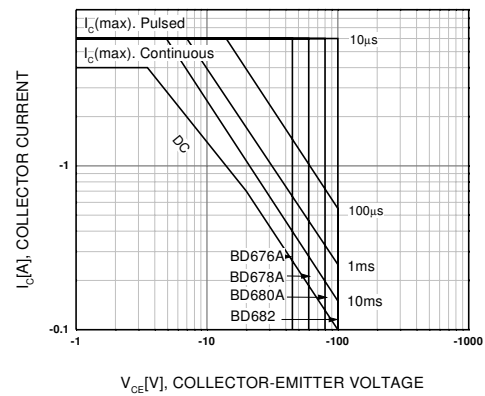


Figure 4. Safe Operating Area

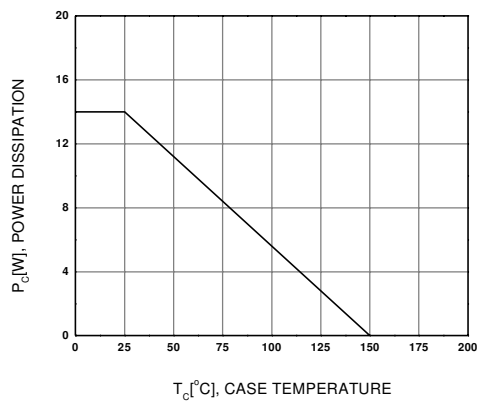
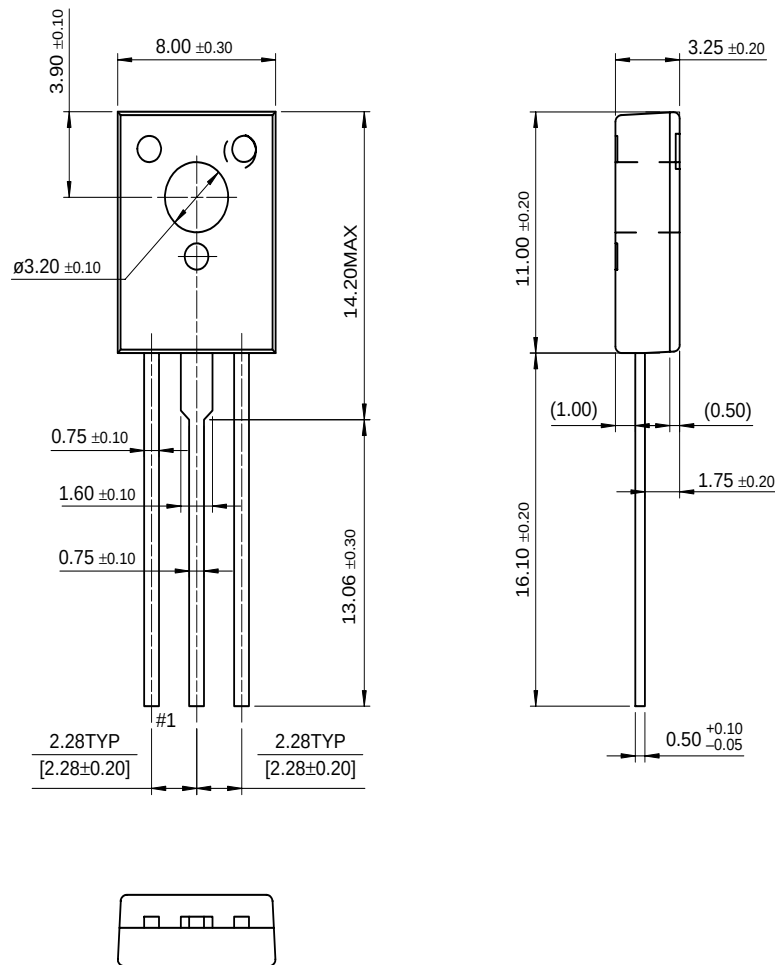


Figure 5. Power Derating

# Package Dimensions

## TO-126



Dimensions in Millimeters

BD676A/678A/680A/682

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| Bottomless™                          | FAST®               | LittleFET™         | Power247™           | SuperSOT™-3     |
| CoolFET™                             | FAST <sub>r</sub> ™ | MicroFET™          | PowerTrench®        | SuperSOT™-6     |
| CROSSVOL <sup>T</sup> ™              | FRFET™              | MicroPak™          | QFET™               | SuperSOT™-8     |
| DOME™                                | GlobalOptoisolator™ | MICROWIRE™         | QS™                 | SyncFET™        |
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| EnSigna™                             | I <sup>2</sup> C™   | OCX™               | RapidConfigure™     | UHC™            |
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| Programmable Active Droop™           |                     | OPTOPLANAR™        | SMART START™        |                 |

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