

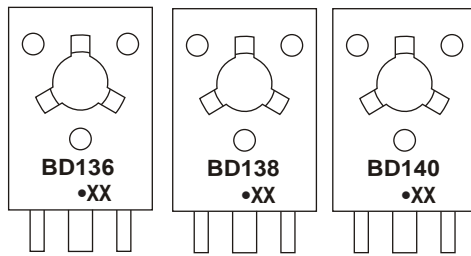
# TO-126 Plastic-Encapsulate Transistors

## BD136 / BD138 / BD140 TRANSISTOR (PNP)

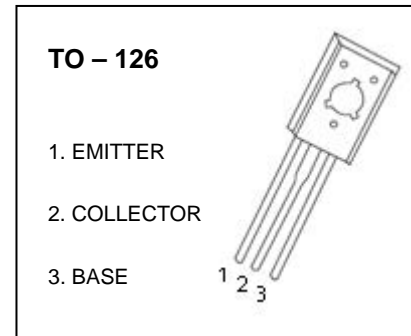
### FEATURES

- High Current
- Complement To BD135, BD137 And BD139

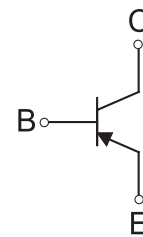
### MARKING



BD136, BD138, BD140 = Device code  
 Solid dot = Green molding compound device,  
 if none, the normal device  
 XX = Code



### Equivalent Circuit



### ORDERING INFORMATION

| Part Number | Package | Packing Method | Pack Quantity |
|-------------|---------|----------------|---------------|
| BD136       | TO-126  | Bulk           | 200pcs/Bag    |
| BD138       | TO-126  | Bulk           | 200pcs/Bag    |
| BD140       | TO-126  | Bulk           | 200pcs/Bag    |
| BD136-TU    | TO-126  | Tube           | 60pcs/Tube    |
| BD138-TU    | TO-126  | Tube           | 60pcs/Tube    |
| BD140-TU    | TO-126  | Tube           | 60pcs/Tube    |

### MAXIMUM RATINGS (T<sub>a</sub>=25°C unless otherwise noted)

| Symbol                            | Parameter                                   | Value    | Unit |
|-----------------------------------|---|----------|------|
| V <sub>CBO</sub>                  | Collector-Base Voltage                      | BD136    | -45  |
|                                   |   | BD138    | -60  |
|                                   |   | BD140    | -80  |
| V <sub>CEO</sub>                  | Collector-Emitter Voltage                   | BD136    | -45  |
|                                   |   | BD138    | -60  |
|                                   |   | BD140    | -80  |
| V <sub>EBO</sub>                  | Emitter-Base Voltage                        | -5       | V    |
| I <sub>C</sub>                    | Collector Current                           | -1.5     | A    |
| P <sub>C</sub>                    | Collector Power Dissipation                 | 1.25     | W    |
| R <sub>θJA</sub>                  | Thermal Resistance From Junction To Ambient | 100      | °C/W |
| T <sub>J</sub> , T <sub>stg</sub> | Junction Temperature                        | -55~+150 | °C   |

## ELECTRICAL CHARACTERISTICS

$T_a=25\text{ }^\circ\text{C}$  unless otherwise specified

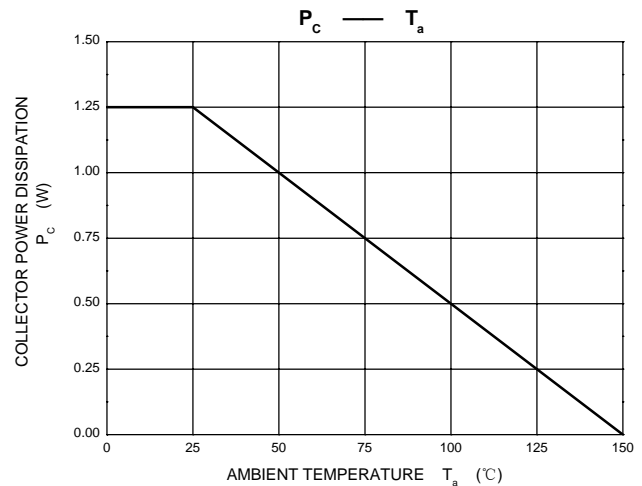
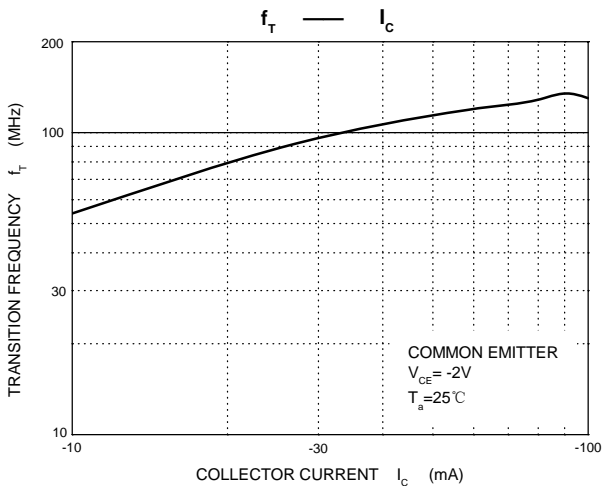
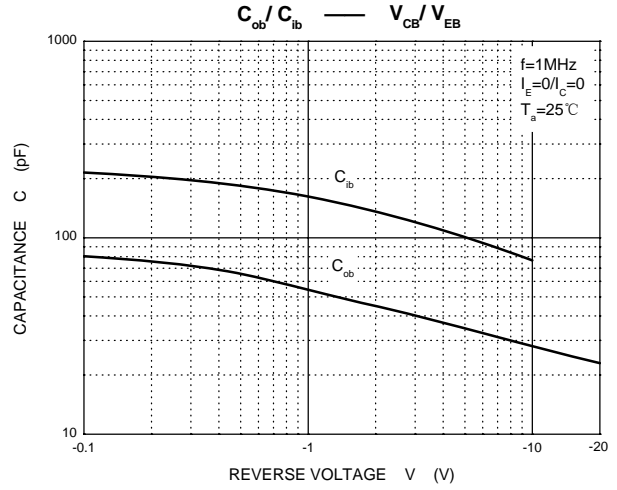
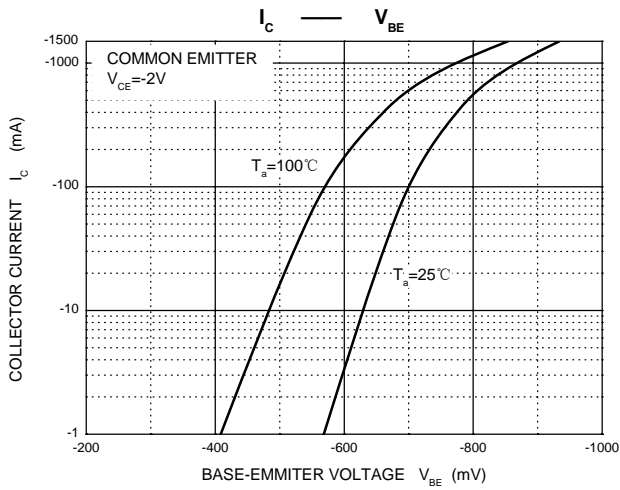
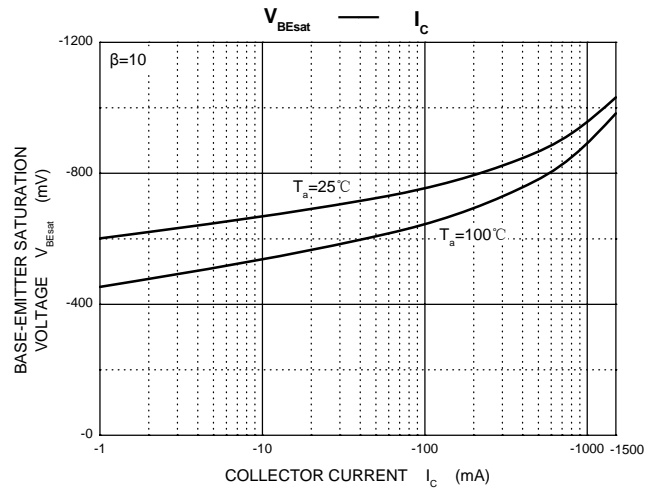
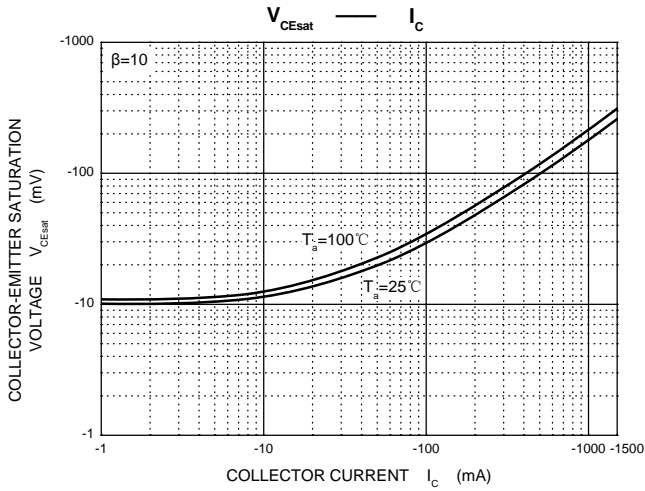
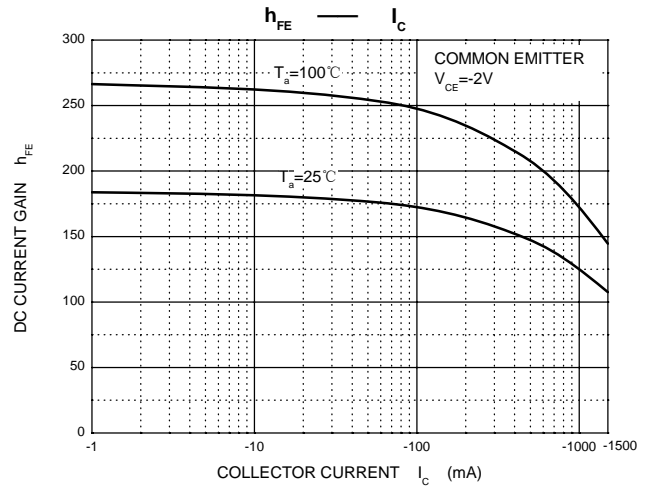
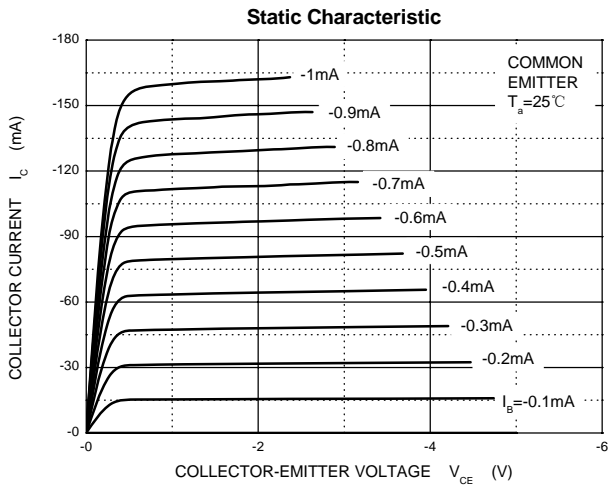
| Parameter   | Symbol           | Test conditions                        | Min               | Typ | Max  | Unit          |
|---|------------------|--|-------------------|-----|------|---------------|
| Collector-base breakdown voltage<br>BD136<br>BD138<br>BD140     | $V_{(BR)CBO}$    | $I_C=-0.1\text{mA}, I_E=0$             | -45<br>-60<br>-80 |     |      | V             |
| Collector-emitter sustaining voltage<br>BD136<br>BD138<br>BD140 | $V_{CEO(SUS)}^*$ | $I_C=-0.03\text{A}, I_B=0$             | -45<br>-60<br>-80 |     |      | V             |
| Emitter-base breakdown voltage                                  | $V_{(BR)EBO}$    | $I_E=-0.1\text{mA}, I_C=0$             | -5                |     |      | V             |
| Collector cut-off current                                       | $I_{CBO}$        | $V_{CB}=-30\text{V}, I_E=0$            |                   |     | -0.1 | $\mu\text{A}$ |
| Emitter cut-off current   | $I_{EBO}$        | $V_{EB}=-5\text{V}, I_C=0$             |                   |     | -10  | $\mu\text{A}$ |
| DC current gain   | $h_{FE(1)}^*$    | $V_{CE}=-2\text{V}, I_C=-150\text{mA}$ | 40                |     | 250  |               |
|   | $h_{FE(2)}^*$    | $V_{CE}=-2\text{V}, I_C=-5\text{mA}$   | 25                |     |      |               |
|   | $h_{FE(3)}^*$    | $V_{CE}=-2\text{V}, I_C=-500\text{mA}$ | 25                |     |      |               |
| Collector-emitter saturation voltage                            | $V_{CE(sat)}^*$  | $I_C=-500\text{mA}, I_B=-50\text{mA}$  |                   |     | -0.5 | V             |
| Base-emitter voltage  | $V_{BE}^*$       | $V_{CE}=-2\text{V}, I_C=-500\text{mA}$ |                   |     | -1   | V             |

\*Pulse test: pulse width  $\leq 350\mu\text{s}$ , duty cycle  $\leq 2.0\%$ .

### CLASSIFICATION OF $h_{FE(1)}$

| RANK  | 6      | 10     | 16      |
|-------|--------|--------|---------|
| RANGE | 40-100 | 63-160 | 100-250 |

# Typical Characteristics



# TO-126 Package Outline Dimensions



| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min                       | Max    | Min                  | Max   |
| A      | 2.500                     | 2.900  | 0.098                | 0.114 |
| A1     | 1.100                     | 1.500  | 0.043                | 0.059 |
| b      | 0.660                     | 0.860  | 0.026                | 0.034 |
| b1     | 1.170                     | 1.370  | 0.046                | 0.054 |
| c      | 0.450                     | 0.600  | 0.018                | 0.024 |
| D      | 7.400                     | 7.800  | 0.291                | 0.307 |
| E      | 10.600                    | 11.000 | 0.417                | 0.433 |
| e      | 2.290 TYP                 |        | 0.090 TYP            |       |
| e1     | 4.480                     | 4.680  | 0.176                | 0.184 |
| h      | 0.000                     | 0.300  | 0.000                | 0.012 |
| L      | 15.300                    | 15.700 | 0.602                | 0.618 |
| L1     | 2.100                     | 2.300  | 0.083                | 0.091 |
| P      | 3.900                     | 4.100  | 0.154                | 0.161 |
| $\phi$ | 3.000                     | 3.200  | 0.118                | 0.126 |