

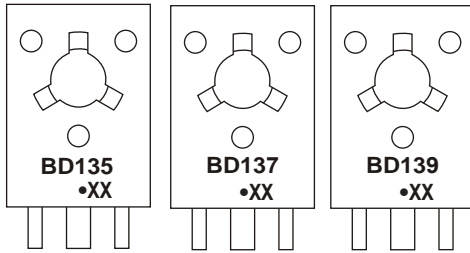
# TO-126 Plastic-Encapsulate Transistors

## BD135 / BD137 / BD139 TRANSISTOR (NPN)

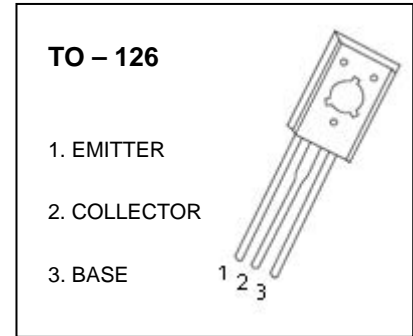
### FEATURES

- High Current
- Complement To BD136, BD138 And BD140

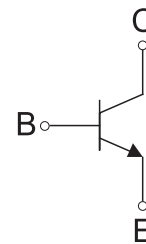
### MARKING



BD135, BD137, BD139 = 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 |
|-------------|---------|----------------|---------------|
| BD135       | TO-126  | Bulk           | 200pcs/Bag    |
| BD137       | TO-126  | Bulk           | 200pcs/Bag    |
| BD139       | TO-126  | Bulk           | 200pcs/Bag    |
| BD135-TU    | TO-126  | Tube           | 60pcs/Tube    |
| BD137-TU    | TO-126  | Tube           | 60pcs/Tube    |
| BD139-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                           | BD135    | 45   |
|                                   |  | BD137    | 60   |
|                                   |  | BD139    | 80   |
| V <sub>CEO</sub>                  | Collector-Emitter Voltage                        | BD135    | 45   |
|                                   |  | BD137    | 60   |
|                                   |  | BD139    | 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> | Operation Junction and Storage Temperature Range | -55~+150 | °C   |

## ELECTRICAL CHARACTERISTICS

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

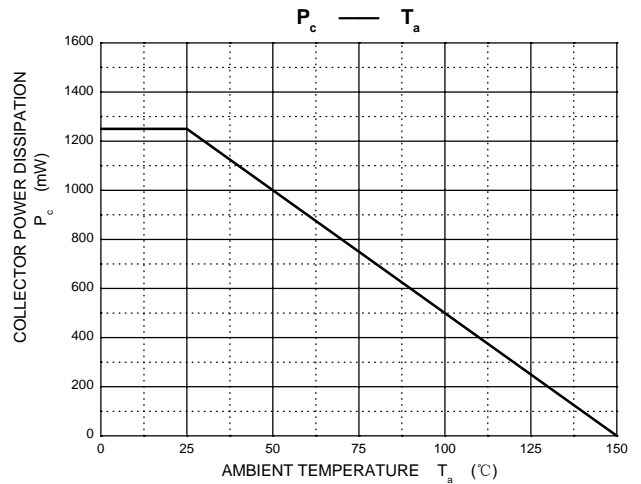
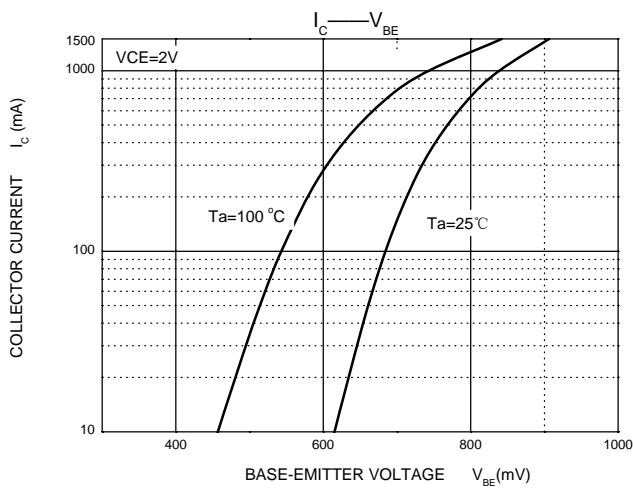
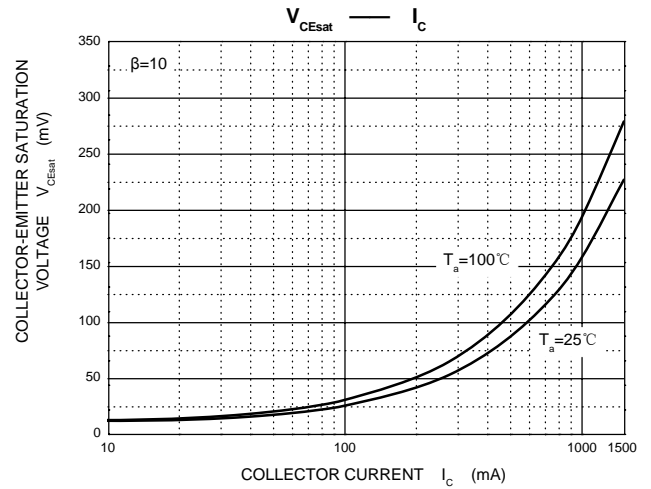
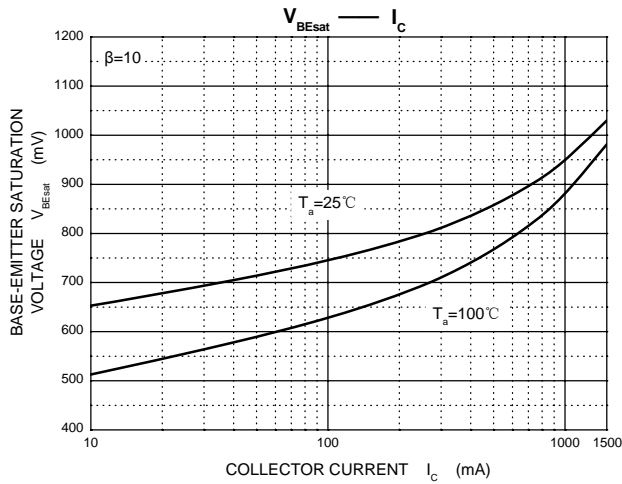
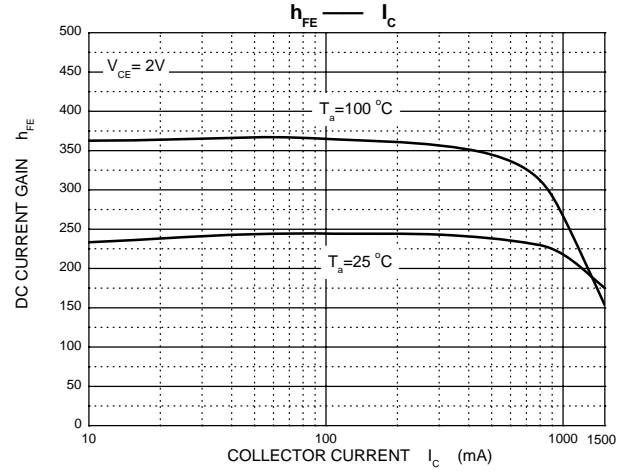
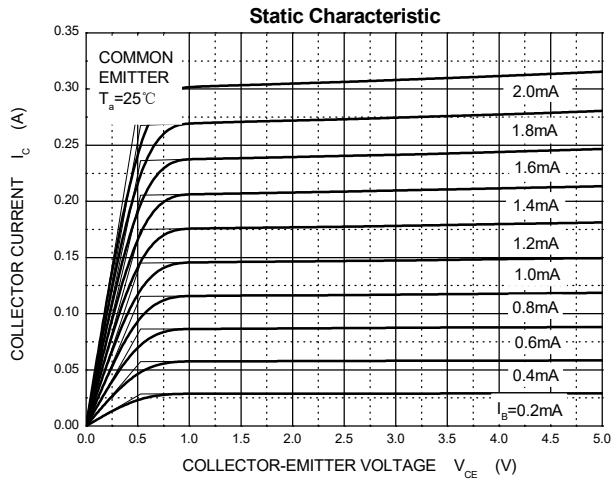
| Parameter  | Symbol           | Test conditions                      | Min            | Typ | Max | Unit          |
|--|------------------|--------------------------------------|----------------|-----|-----|---------------|
| <b>Collector-base breakdown voltage</b><br>BD135<br>BD137<br>BD139     | $V_{(BR)CBO}$    | $I_C=0.1\text{mA}, I_E=0$            | 45<br>60<br>80 |     |     | V             |
| <b>Collector-emitter sustaining voltage</b><br>BD135<br>BD137<br>BD139 | $V_{CEO(SUS)}^*$ | $I_C=0.03\text{A}, I_B=0$            | 45<br>60<br>80 |     |     | V             |
| <b>Emitter-base breakdown voltage</b>                                  | $V_{(BR)EBO}$    | $I_E=0.1\text{mA}, I_C=0$            | 5              |     |     | V             |
| <b>Collector cut-off current</b>                                       | $I_{CBO}$        | $V_{CB}=30\text{V}, I_E=0$           |                |     | 0.1 | $\mu\text{A}$ |
| <b>Emitter cut-off current</b>   | $I_{EBO}$        | $V_{EB}=5\text{V}, I_C=0$            |                |     | 10  | $\mu\text{A}$ |
| <b>DC current gain</b>   | $h_{FE(1)}^*$    | $V_{CE}=2\text{V}, I_C=150\text{mA}$ | 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             |     |     |               |
| <b>Collector-emitter saturation voltage</b>                            | $V_{CE(sat)}^*$  | $I_C=500\text{mA}, I_B=50\text{mA}$  |                |     | 0.5 | V             |
| <b>Base-emitter voltage</b>  | $V_{BE}^*$       | $V_{CE}=2\text{V}, I_C=500\text{mA}$ |                |     | 1   | V             |

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

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

|              |          |           |           |
|--------------|----------|-----------|-----------|
| <b>RANK</b>  | <b>6</b> | <b>10</b> | <b>16</b> |
| <b>RANGE</b> | 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 |
| Φ      | 3.000                     | 3.200  | 0.118                | 0.126 |

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