

# PNP Epitaxial Silicon Transistor



## BD136 Series

### BD136 / BD138 / BD140

ON Semiconductor®

[www.onsemi.com](http://www.onsemi.com)

#### Applications

- Complement to BD135, BD137 and BD139 Respectively
- These are Pb-Free Devices

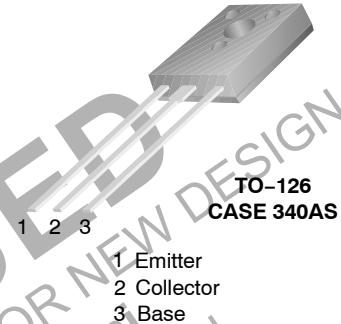
#### ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub> = 25°C unless otherwise noted)

| Rating   | Symbol           | Max               | Unit |
|--|------------------|-------------------|------|
| Collector-Base Voltage<br>BD136<br>BD138<br>BD140    | V <sub>CBO</sub> | -45<br>-60<br>-80 | V    |
| Collector-Emitter Voltage<br>BD136<br>BD138<br>BD140 | V <sub>CEO</sub> | -45<br>-60<br>-80 | V    |
| Emitter-Base Voltage                                 | V <sub>EBO</sub> | -5                | V    |
| Collector Current (DC)                               | I <sub>C</sub>   | -1.5              | A    |
| Collector Current (Pulse)                            | I <sub>CP</sub>  | -3.0              | A    |
| Base Current   | I <sub>B</sub>   | -0.5              | A    |

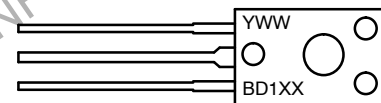
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

#### THERMAL CHARACTERISTICS

| Rating  | Symbol           | Max     | Unit |
|---|------------------|---------|------|
| Collector Dissipation                         | P <sub>C</sub>   | 12.5    | W    |
| Collector Dissipation (T <sub>A</sub> = 25°C) | P <sub>C</sub>   | 1.25    | W    |
| Junction Temperature                          | T <sub>J</sub>   | 150     | °C   |
| Storage Temperature Range                     | T <sub>STG</sub> | -55~150 | °C   |



#### MARKING DIAGRAM



Y = Year  
 WW = Work Week  
 BD1XX = Specific Device Code  
 XX = 36, 38, 40

#### ORDERING INFORMATION

| Device     | Package             | Shipping            |
|------------|---------------------|---------------------|
| BD13610STU | TO-126<br>(Pb-Free) | 60 Units/ Tube      |
| BD13610S   |                     | 500 Units/ Bulk Box |
| BD13616STU |                     | 60 Units/ Tube      |
| BD13616S   |                     | 500 Units/ Bulk Box |
| BD13810STU |                     | 60 Units/ Tube      |
| BD13816STU |                     | 60 Units/ Tube      |
| BD14010STU |                     | 60 Units/ Tube      |
| BD14016STU |                     | 60 Units/ Tube      |
| BD14016S   |                     | 500 Units/ Bulk Box |

## BD136 Series

### 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 (Note 1)<br>BD136<br>BD138<br>BD140 | $I_C = -30\text{ mA}, I_B = 0$   | -45<br>-60<br>-80                         |      |            | V             |
| $I_{CBO}$      | Collector Cut-off Current  | $V_{CB} = -30\text{ V}, I_E = 0$   |   |      | -0.1       | $\mu\text{A}$ |
| $I_{EBO}$      | Emitter Cut-off Current  | $V_{EB} = -5\text{ V}, I_C = 0$  |   |      | -10        | $\mu\text{A}$ |
| $h_{FE1}$      | DC Current Gain (Note 1)   | $V_{CE} = -2\text{ V}, I_C = -5\text{ mA}$   | 25  |      |            |               |
| $h_{FE2}$      |  | $V_{CE} = -2\text{ V}, I_C = -150\text{ mA}$<br><br>BD13610/BD13810/BD14010<br>BD13616/BD13816/BD14016 | 63<br>100                                 |      | 160<br>250 |               |
| $h_{FE3}$      |  | $V_{CE} = -2\text{ V}, I_C = -500\text{ mA}$   | 25  |      |            |               |
| $V_{CE(sat)}$  |  | Collector-Emitter Saturation Voltage (Note 1)  | $I_C = 500\text{ mA}, I_B = 50\text{ mA}$ |      |            | -0.5          |
| $V_{BE(on)}$   | Base-Emitter ON Voltage (Note 1)   | $V_{CE} = -2\text{ V}, I_C = -0.5\text{ A}$  |   |      | 1          | V             |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Pulse Test:  $PW = 350\ \mu\text{s}$ , duty Cycle = 2% Pulsed

**DISCONTINUED**  
 THIS DEVICE IS NOT RECOMMENDED FOR NEW DESIGN  
 PLEASE CONTACT YOUR onsemi  
 REPRESENTATIVE FOR INFORMATION

TYPICAL PERFORMANCE CHARACTERISTICS

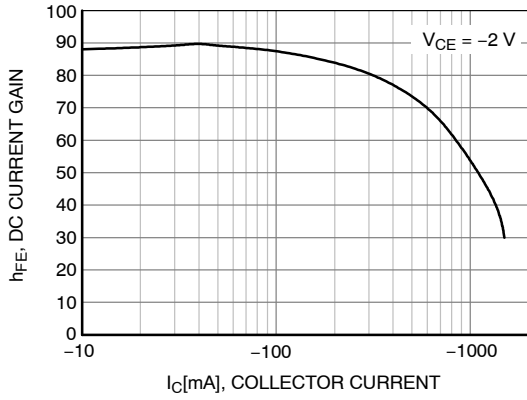


Figure 1. DC Current Gain

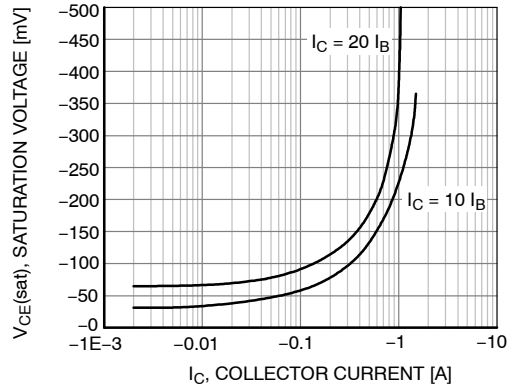


Figure 2. Collector-Emitter Saturation Voltage

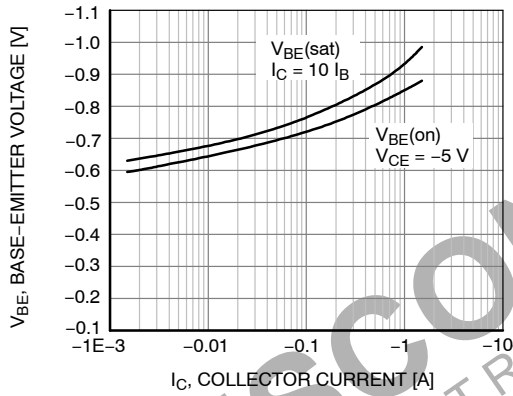


Figure 3. Base-Emitter Voltage

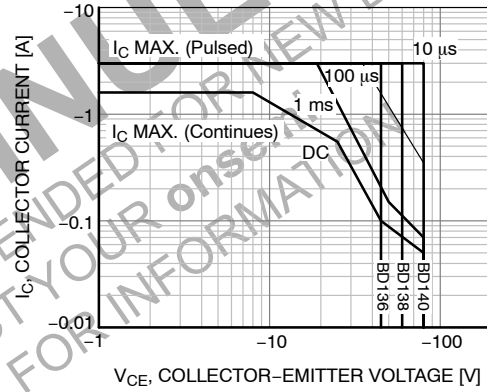


Figure 4. Safe Operating Area

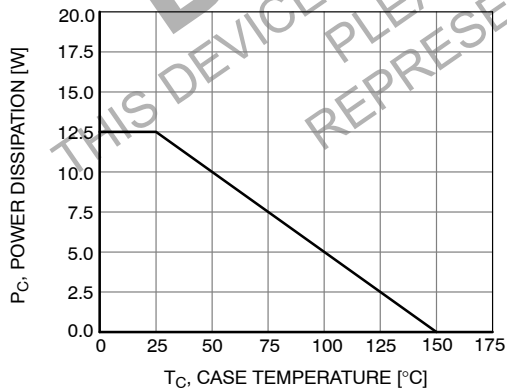


Figure 5. Power Derating

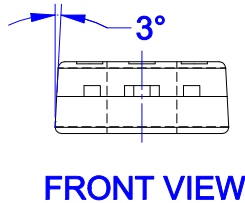
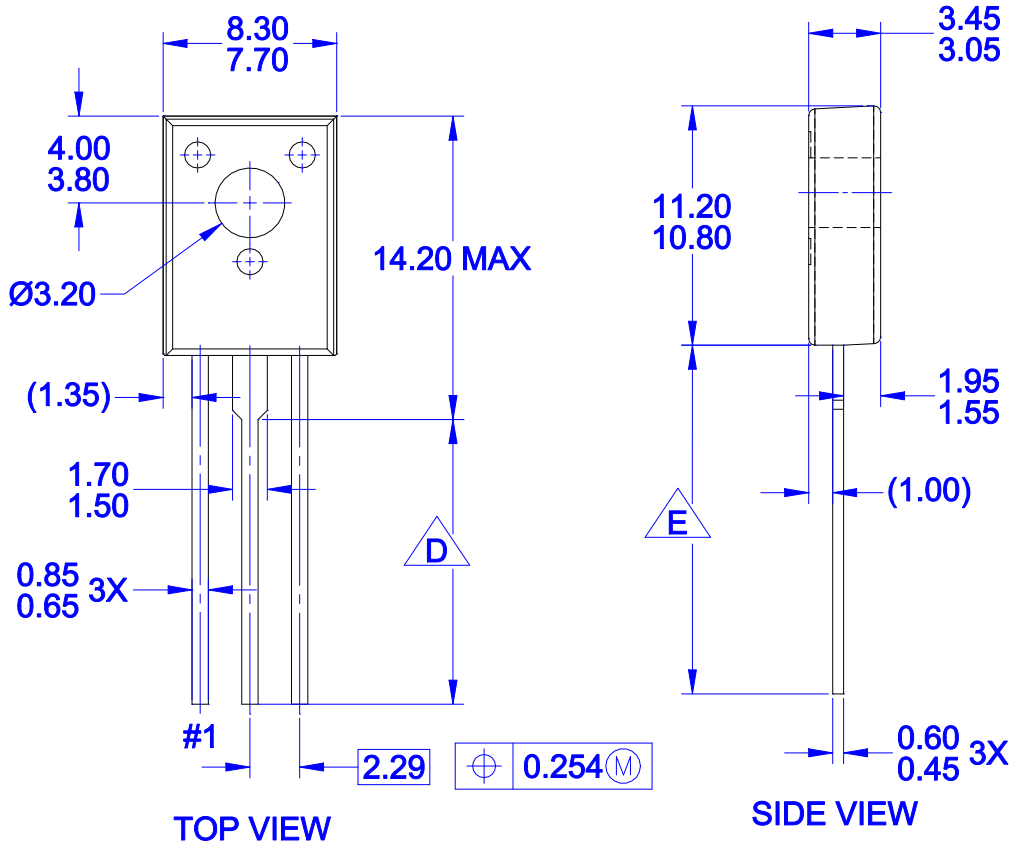
**MECHANICAL CASE OUTLINE**  
**PACKAGE DIMENSIONS**

ON Semiconductor®



TO-126-3LD  
CASE 340AS  
ISSUE 0

DATE 30 SEP 2016



| PRODUCTION CODE   | TERMINAL LENGTH "D" | TERMINAL LENGTH "E" |
|-------------------|---------------------|---------------------|
| TSSTU             | 3.45 - 4.05         | 6.45 - 7.45         |
| TSTU              | 2.36 - 2.96         | 5.36 - 6.36         |
| NONE (STD LENGTH) | 12.76 - 13.36       | 15.76 - 16.76       |

**NOTES:**

- A. NO INDUSTRY STANDARD APPLIES TO THIS PACKAGE
- B. ALL DIMENSIONS ARE IN MILLIMETERS
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR PROTRUSIONS

**△ D FOR TERMINAL LENGTH "D", REFER TO TABLE**

**△ E FOR TERMINAL LENGTH "E", REFER TO TABLE**

|                         |                    |  |
|-------------------------|--------------------|--|
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| <b>DESCRIPTION:</b>     | <b>TO-126-3LD</b>  | <b>PAGE 1 OF 1</b>   |

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