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March 2015

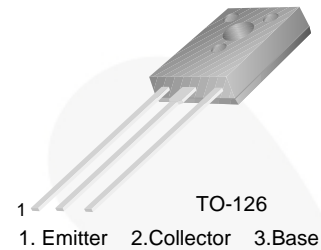
BD136 / BD138 / BD140 PNP Epitaxial Silicon Transistor

Features

- Complement to BD135, BD137 and BD139 respectively

Applications

- Medium Power Linear and Switching



Ordering Information

| Part Number | Marking | Package | Packing Method |
|-------------|----------|-----------|----------------|
| BD13610S | BD136-10 | TO-126 3L | Bulk |
| BD13610STU | BD136-10 | TO-126 3L | Rail |
| BD13616S | BD136-16 | TO-126 3L | Bulk |
| BD13616STU | BD136-16 | TO-126 3L | Rail |
| BD13810STU | BD138-10 | TO-126 3L | Rail |
| BD13816STU | BD138-16 | TO-126 3L | Rail |
| BD14010STU | BD140-10 | TO-126 3L | Rail |
| BD14016S | BD140-16 | TO-126 3L | Bulk |
| BD14016STU | BD140-16 | TO-126 3L | Rail |

BD136 / BD138 / BD140 — PNP Epitaxial Silicon Transistor

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

| Symbol | Parameter | Value | Unit | |
|-----------|---------------------------|--------------------------|------------------|---|
| V_{CBO} | Collector-Base Voltage | BD136 | -45 | V |
| | | BD138 | -60 | |
| | | BD140 | -80 | |
| V_{CEO} | Collector-Emitter Voltage | BD136 | -45 | V |
| | | BD138 | -60 | |
| | | BD140 | -80 | |
| V_{EBO} | Emitter-Base Voltage | -5 | V | |
| I_C | Collector Current (DC) | -1.5 | A | |
| I_C | Collector Current (Pulse) | -3.0 | A | |
| I_B | Base Current | -0.5 | A | |
| P_C | Collector Dissipation | $T_C = 25^\circ\text{C}$ | 12.5 | W |
| | | $T_A = 25^\circ\text{C}$ | 1.25 | |
| T_J | Junction Temperature | 150 | $^\circ\text{C}$ | |
| T_{STG} | Storage Temperature | -55 to +150 | $^\circ\text{C}$ | |

Electrical Characteristics

Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|----------------|---|--|--------------------------------|------|------|---------------|
| $V_{CEO(sus)}$ | Collector-Emitter Sustaining Voltage ⁽¹⁾ | BD136 | $I_C = -30\text{ mA}, I_B = 0$ | -45 | | V |
| | | BD138 | | -60 | | |
| | | BD140 | | -80 | | |
| I_{CBO} | Collector Cut-Off Current | $V_{CB} = -30\text{ V}, I_E = 0$ | | | -0.1 | μA |
| I_{EBO} | Emitter Cut-Off Current | $V_{EB} = -5\text{ V}, I_C = 0$ | | | -10 | μA |
| h_{FE1} | DC Current Gain ⁽¹⁾ | $V_{CE} = -2\text{ V}, I_C = -5\text{ mA}$ | 25 | | | |
| h_{FE2} | DC Current Gain ⁽¹⁾ | $V_{CE} = -2\text{ V}, I_C = -0.5\text{ A}$ | 25 | | | |
| h_{FE3} | DC Current Gain ⁽¹⁾ | $V_{CE} = -2\text{ V}, I_C = -150\text{ mA}$ | 40 | | 250 | |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage ⁽¹⁾ | $I_C = -500\text{ mA}, I_B = -50\text{ mA}$ | | | -0.5 | V |
| $V_{BE(on)}$ | Base-Emitter On Voltage ⁽¹⁾ | $V_{CE} = -2\text{ V}, I_C = -0.5\text{ A}$ | | | -1 | V |

Note:

1. Pulse test: pulse width = 350 μs , duty cycle = 2.0% pulsed.

h_{FE} Classification

| Classification | 10 | 16 |
|----------------|----------|-----------|
| h_{FE3} | 63 ~ 160 | 100 ~ 250 |

Typical Performance Characteristics

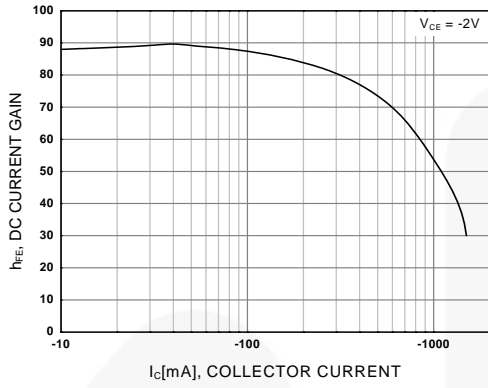


Figure 1. DC Current Gain

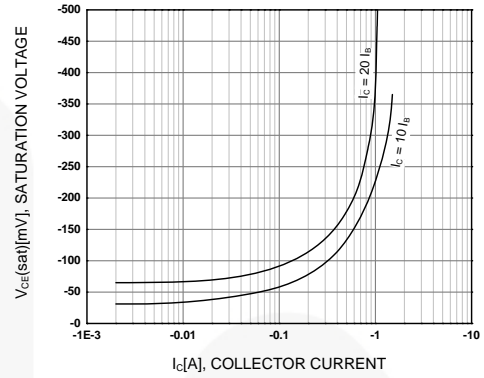


Figure 2. Collector-Emitter Saturation Voltage

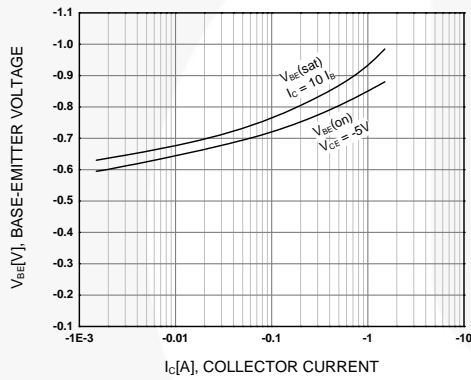


Figure 3. Base-Emitter Voltage

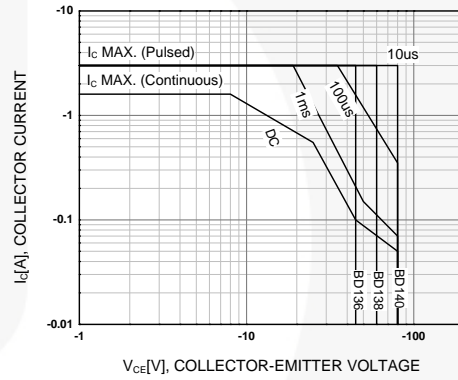


Figure 4. Safe Operating Area

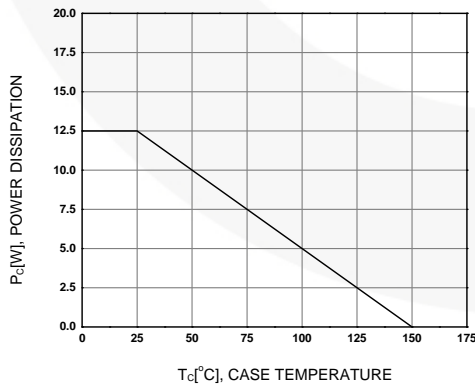
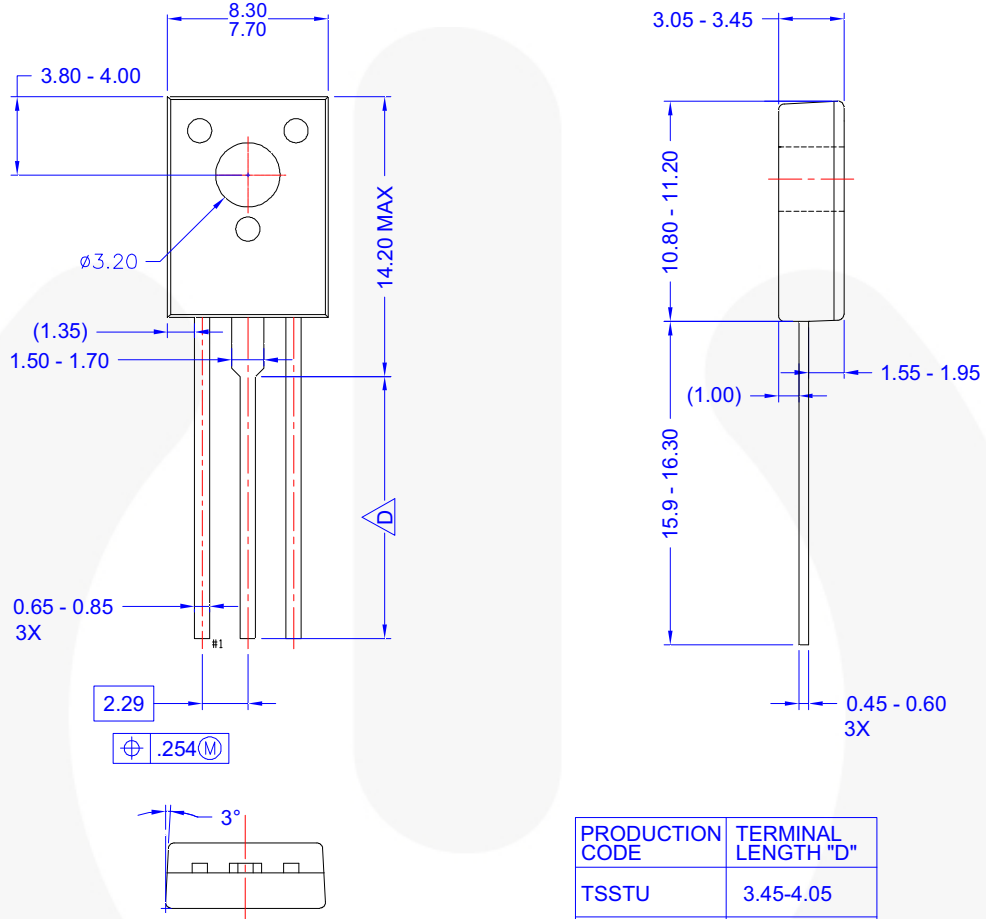


Figure 5. Power Derating

Physical Dimensions



| PRODUCTION CODE | TERMINAL LENGTH "D" |
|-------------------|---------------------|
| TSSTU | 3.45-4.05 |
| TSTU | 2.36-2.96 |
| NONE (STD LENGTH) | 12.76-13.36 |






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 - D) FOR TERMINAL LENGTH SEE TABLE
 - E) DRAWING FILE NAME AND REVISION : MKT-TO126Arev1

Figure 6. TO-126 (SOT-32) UNIFIED DRAWING (TSTU, TSSTU, STANDARD)



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