



March 2015

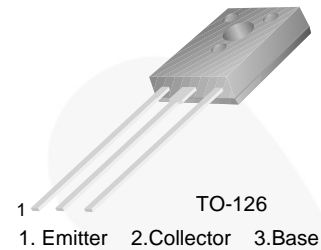
# BD136 / BD138 / BD140 PNP Epitaxial Silicon Transistor

## 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 <sup>(1)</sup>	BD136	-45			V
		BD138	-60			
		BD140	-80			
$I_{CBO}$	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 <sup>(1)</sup>	$V_{CE} = -2\text{ V}, I_C = -5\text{ mA}$	25			
$h_{FE2}$	DC Current Gain <sup>(1)</sup>	$V_{CE} = -2\text{ V}, I_C = -0.5\text{ A}$	25			
$h_{FE3}$	DC Current Gain <sup>(1)</sup>	$V_{CE} = -2\text{ V}, I_C = -150\text{ mA}$	40		250	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage <sup>(1)</sup>	$I_C = -500\text{ mA}, I_B = -50\text{ mA}$			-0.5	V
$V_{BE(on)}$	Base-Emitter On Voltage <sup>(1)</sup>	$V_{CE} = -2\text{ V}, I_C = -0.5\text{ A}$			-1	V

### Note:

1. Pulse test: pulse width = 350  $\mu\text{s}$ , duty cycle = 2.0% pulsed.

## $h_{FE}$ Classification

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

## Typical Performance Characteristics

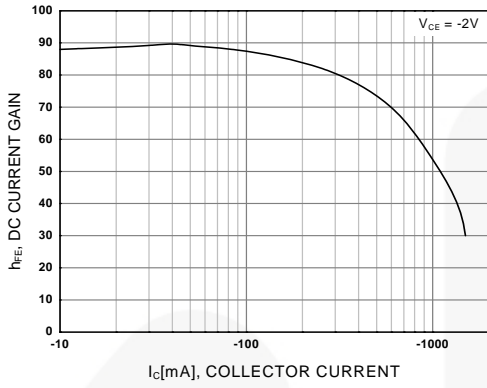


Figure 1. DC Current Gain

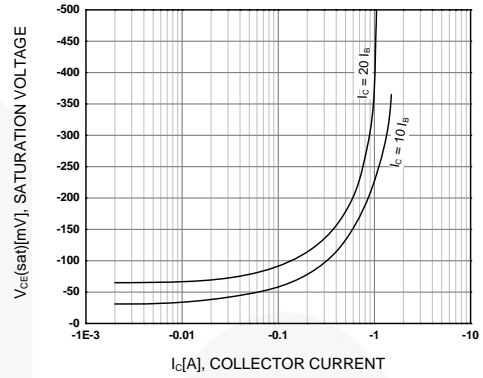


Figure 2. Collector-Emitter Saturation Voltage

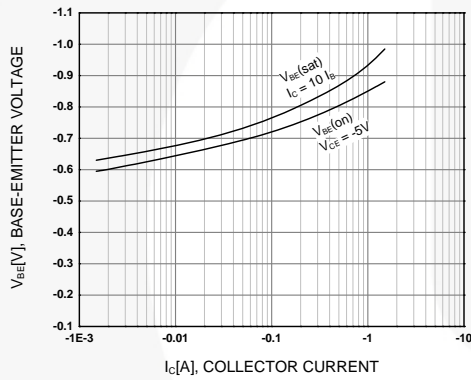


Figure 3. Base-Emitter Voltage

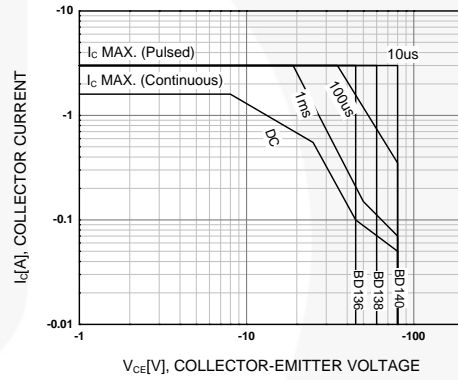


Figure 4. Safe Operating Area

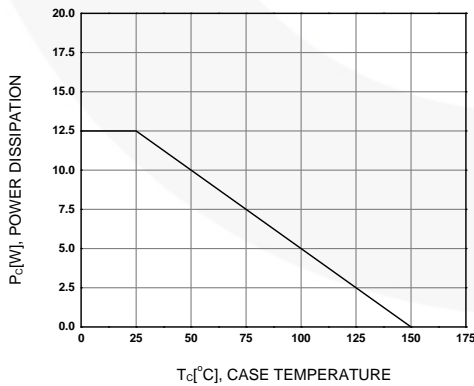
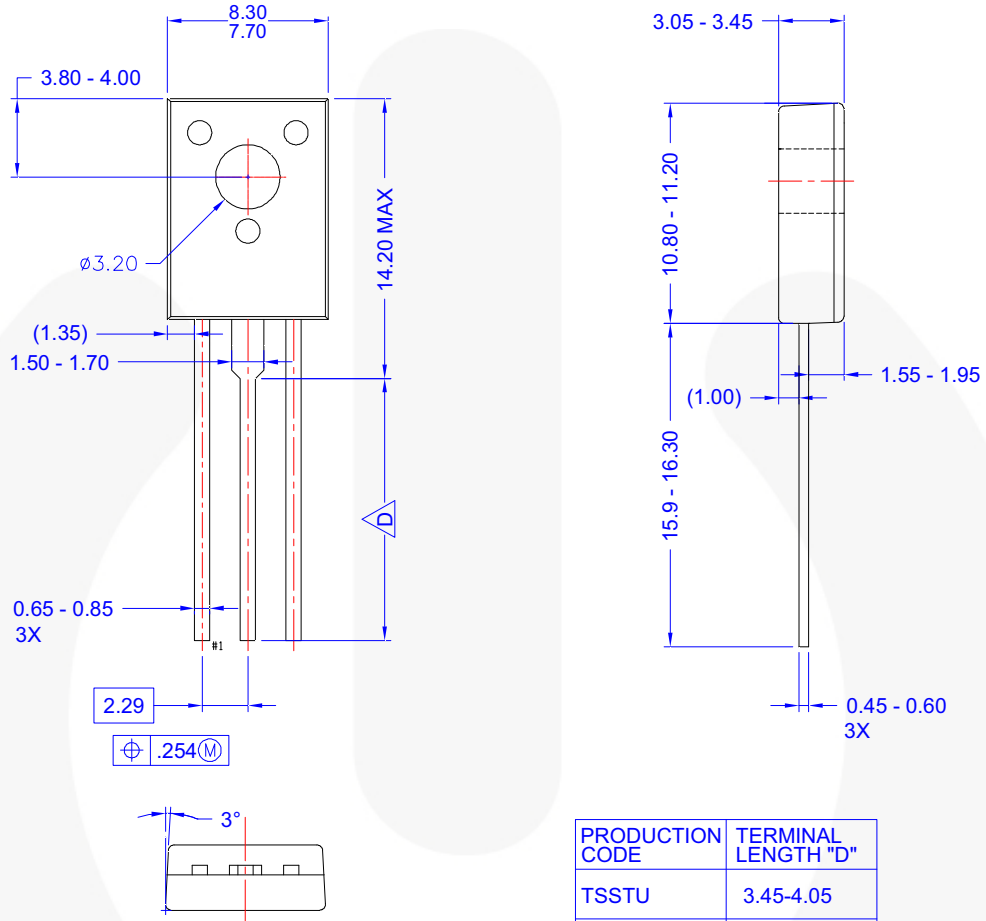


Figure 5. Power Derating

Physical Dimensions



- NOTES:
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  - B) ALL DIMENSIONS ARE IN MILLIMETERS.
  - C) DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
  - 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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