

# PNP Epitaxial Silicon Transistor

## BD136 Series

### BD136 / BD138 / BD140

#### 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 BD136 BD138 BD140	V <sub>CB0</sub>	-45 -60 -80	V
Collector-Emitter Voltage BD136 BD138 BD140	V <sub>CEO</sub>	-45 -60 -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.

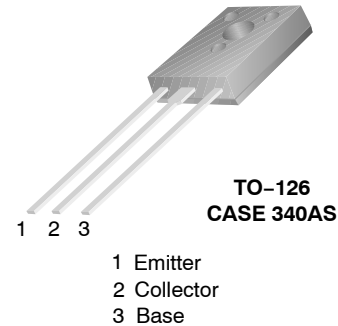
#### THERMAL CHARACTERISTICS

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

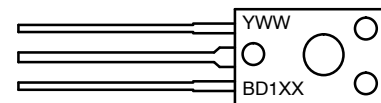


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#### MARKING DIAGRAM



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

#### ORDERING INFORMATION

Device	Package	Shipping
BD13610STU	TO-126 (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) BD136 BD138 BD140	$I_C = -30\text{ mA}, I_B = 0$	-45 -60 -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			
$h_{FE2}$		$V_{CE} = -2\text{ V}, I_C = -150\text{ mA}$ BD13610/BD13810/BD14010 BD13616/BD13816/BD14016	63 100		160 250	
$h_{FE3}$		$V_{CE} = -2\text{ V}, I_C = -500\text{ mA}$	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

TYPICAL PERFORMANCE CHARACTERISTICS

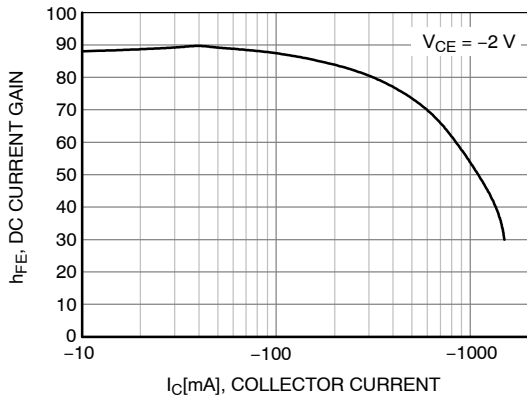


Figure 1. DC Current Gain

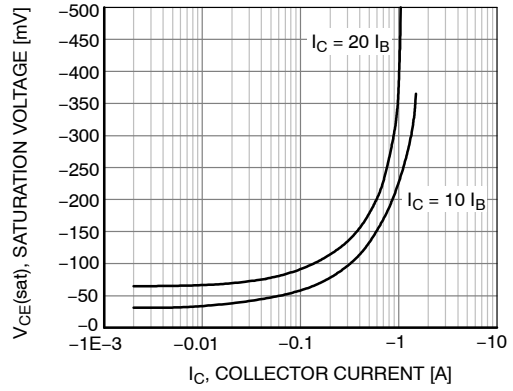


Figure 2. Collector-Emitter Saturation Voltage

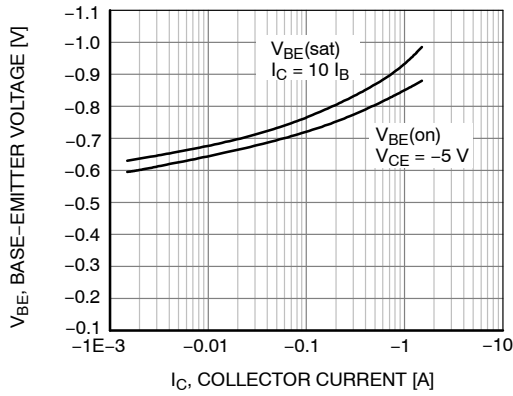


Figure 3. Base-Emitter Voltage

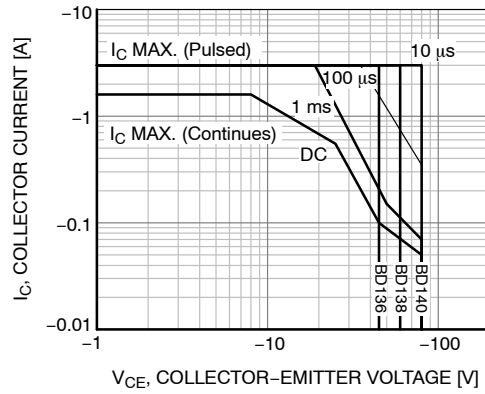


Figure 4. Safe Operating Area

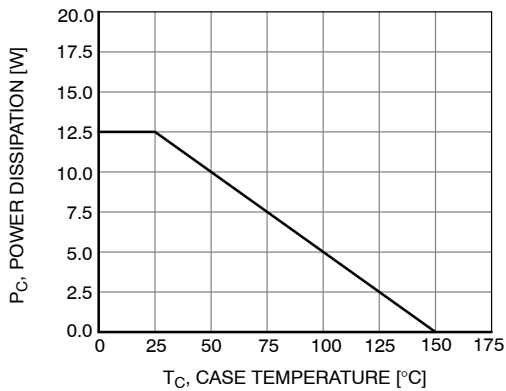


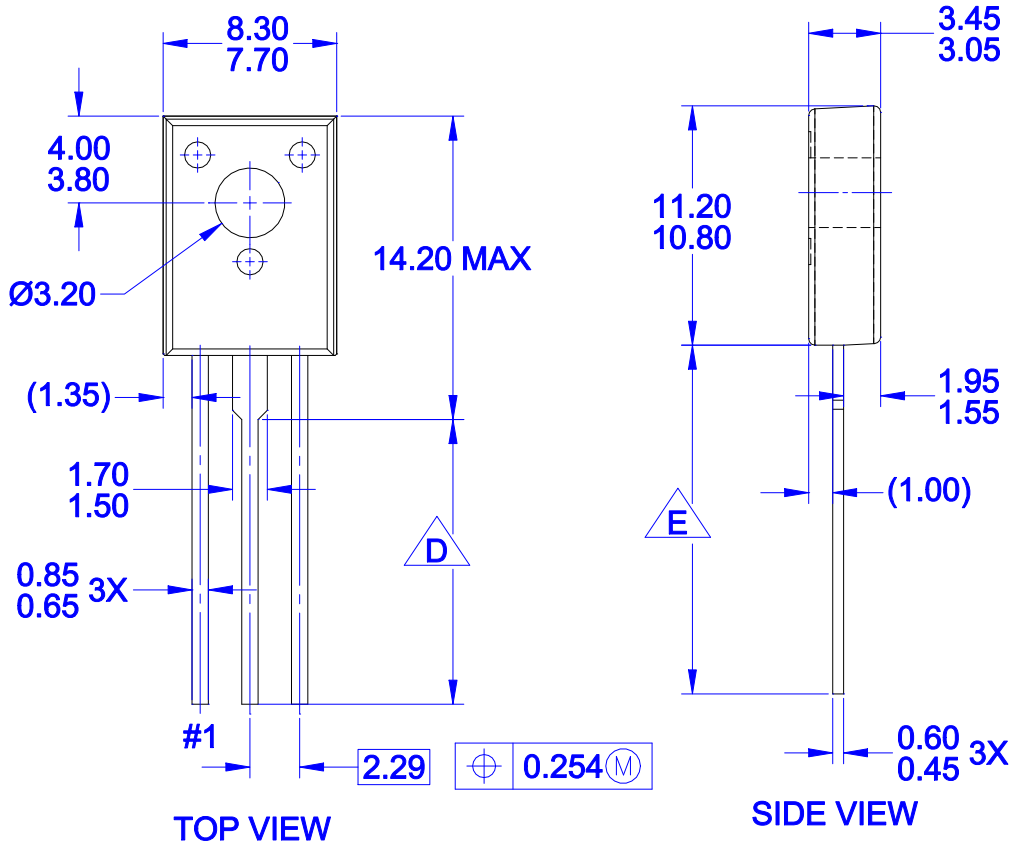
Figure 5. Power Derating

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



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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