

# NPN Epitaxial Silicon Transistor

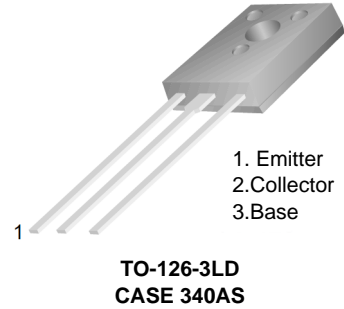
## BD135, 137, 139

### Features

- Complement to BD136, BD138 and BD140 Respectively
- These are Pb-Free Devices

### Applications

- Medium Power Linear and Switching



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

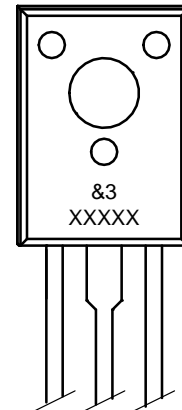
Symbol	Parameter		Ratings	Units
V <sub>CBO</sub>	Collector-Base Voltage	BD135	45	V
		BD137	60	
		BD139	80	
V <sub>CEO</sub>	Collector-Emitter Voltage	BD135	45	V
		BD137	60	
		BD139	80	
V <sub>EBO</sub>	Emitter-Base Voltage		5	V
I <sub>C</sub>	Collector Current (DC)		1.5	A
I <sub>CP</sub>	Collector Current (Pulse)		3.0	A
I <sub>B</sub>	Base Current		0.5	A
P <sub>C</sub>	Device Dissipation	T <sub>C</sub> = 25 °C	12.5	W
		T <sub>A</sub> = 25 °C	1.25	W
T <sub>J</sub>	Junction Temperature		150	°C
T <sub>STG</sub>	Storage Temperature		-55 to +150	°C

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

Symbol	Parameter	Max	Units
R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case	10	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient	100	°C/W

### MARKING DIAGRAM



&3 = 3-Digit Date Code  
XXXXX = Specific Device Code

### ORDERING INFORMATION

See detailed ordering, marking and shipping information on page 4 of this data sheet.

NOTE: Some of the devices on this data sheet have been **DISCONTINUED**. Please refer to the table on page 4.

## BD135, 137, 139

### ELECTRICAL CHARACTERISTICS ( $T_C = 25\text{ }^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage	BD135	$I_C = 30\text{ mA}, I_B = 0$			V
		BD137				
		BD139				
$I_{CBO}$	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	$V_{CE} = 2\text{ V}, I_C = 5\text{ mA}$	25			
$h_{FE2}$		$V_{CE} = 2\text{ V}, I_C = 0.5\text{ A}$	25			
$h_{FE3}$		$V_{CE} = 2\text{ V}, I_C = 150\text{ mA}$	40		250	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 500\text{ mA}, I_B = 50\text{ mA}$			0.5	V
$V_{BE(on)}$	Base-Emitter On Voltage	$V_{CE} = 2\text{ V}, I_C = 0.5\text{ A}$			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.

TYPICAL PERFORMANCE CHARACTERISTICS

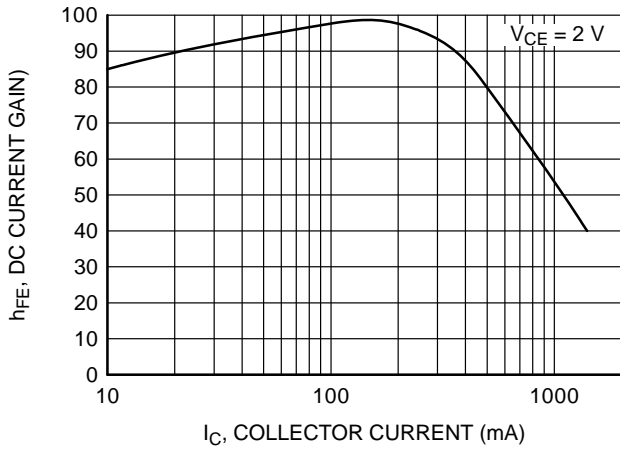


Figure 1. DC Current Gain

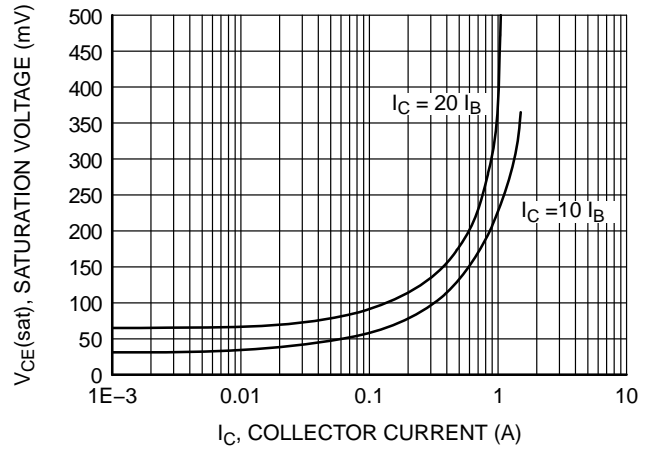


Figure 2. Collector-Emitter Saturation Voltage

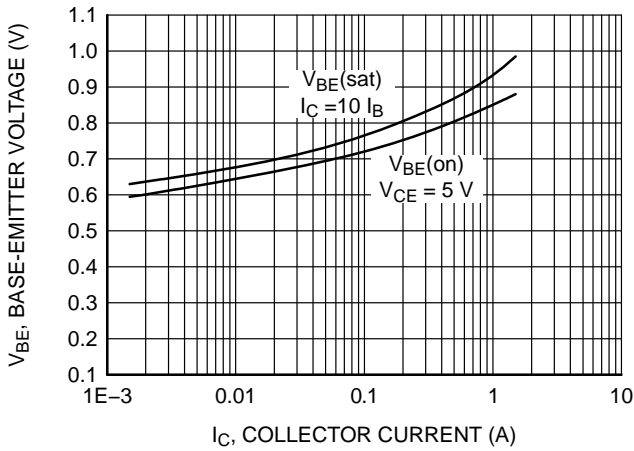


Figure 3. Base-Emitter Voltage

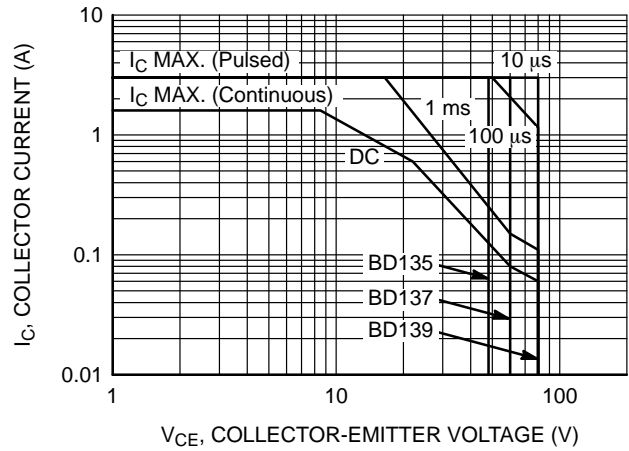


Figure 4. Safe Operating Area

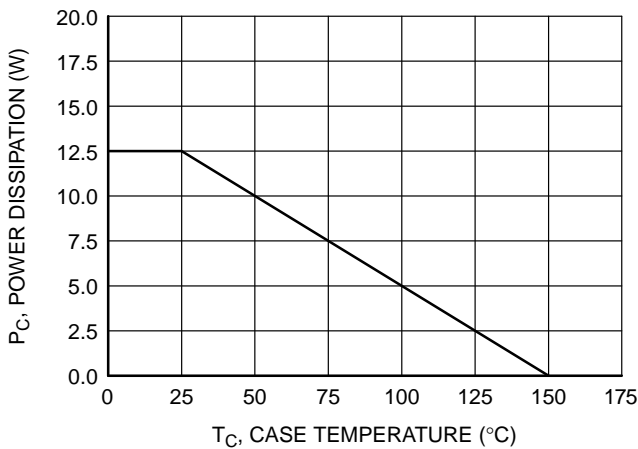


Figure 5. Power Derating

## BD135, 137, 139

### ORDERING INFORMATION

Part Number	Marking	Package	Packing Method
BD13516STU	BD135-16	TO-126-3LD (Pb-Free)	Rail
BD13716STU	BD137-16		
BD13916STU	BD139-16		

### DISCONTINUED (Note 1)

BD13516S	BD135-16	TO-126-3LD (Pb-Free)	Rail
BD1356STU	BD135-6		
BD13510STU	BD135-10		
BD13710STU	BD137-10		Bulk
BD13716S	BD137-16		
BD13910S	BD139-10		
BD13916S	BD139-16		Rail
BD1396STU	BD139-6		
BD13910STU	BD139-10		

1. **DISCONTINUED:** These devices are not available. Please contact your **onsemi** representative for information. The most current information on these devices may be available on [www.onsemi.com](http://www.onsemi.com).

# BD135, 137, 139

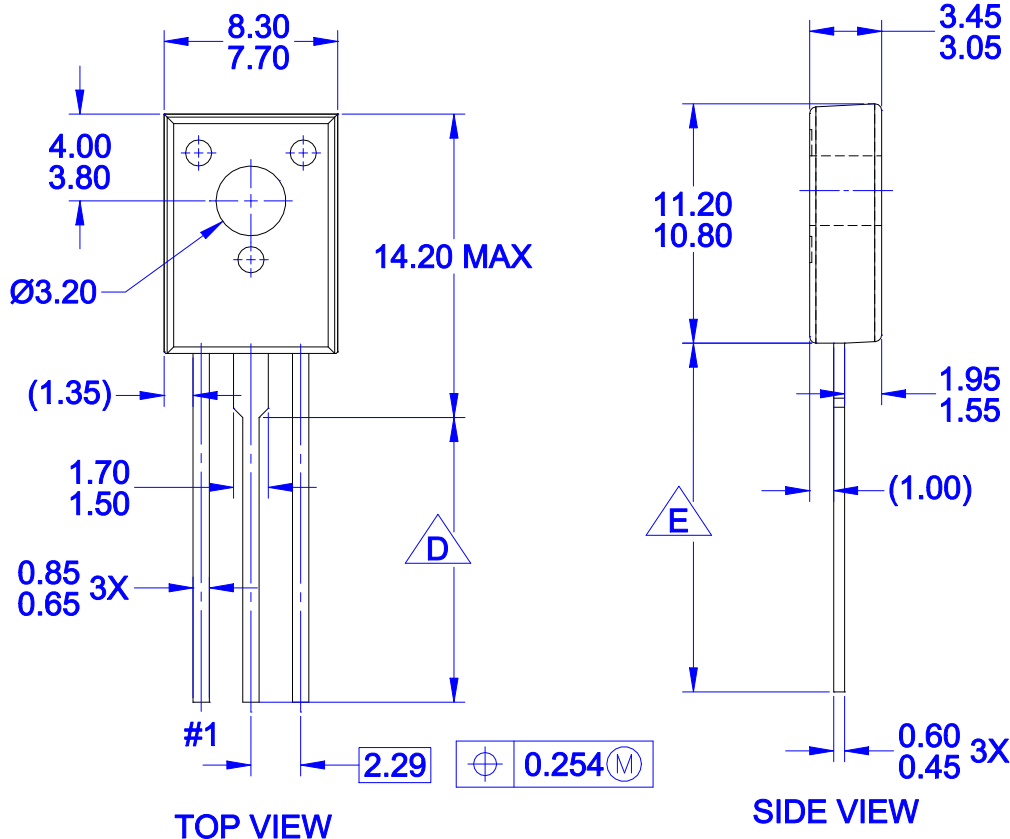
## REVISION HISTORY

Revision	Description of Changes	Date
3	Document converted to <b>onsemi</b> format. Added Thermal Characteristics, removed $h_{FE}$ Classification. BD13516S, BD1356STU, BD13510STU, BD13710STU, BD13716S, BD13910S, BD13916S, BD1396STU, BD13910STU OPNs marked as Discontinued.	4/28/2026

This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.

TO-126-3LD  
CASE 340AS  
ISSUE O

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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