

# NPN Darlington Transistor

## BC517

### Features

- This Device is Designed for Applications Requiring Extremely High Current Gain at Currents to 1.0 A
- Sourced from Process 05
- This is a Pb-Free Device

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted) (Note 1, 2)

| Symbol         | Parameter                                        | Value       | Unit             |
|----------------|--------------------------------------------------|-------------|------------------|
| $V_{CEO}$      | Collector-Emitter Voltage                        | 30          | V                |
| $V_{CBO}$      | Collector-Base Voltage                           | 40          | V                |
| $V_{EBO}$      | Emitter-Base Voltage                             | 10          | V                |
| $I_C$          | Collector Current – Continuous                   | 1.2         | A                |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range | -55 to +150 | $^\circ\text{C}$ |

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.

1. These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
2. These are steady-state limits. onsemi should be consulted on applications involving pulsed or low-duty cycle operations.

### THERMAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted) (Note 3)

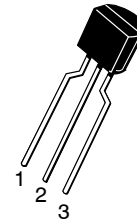
| Symbol          | Parameter                                          | Max (Note 3) | Unit                      |
|-----------------|----------------------------------------------------|--------------|---------------------------|
| $P_D$           | Total Device Dissipation, $T_A = 25^\circ\text{C}$ | 625          | mW                        |
|                 | Derate Above $25^\circ\text{C}$                    | 5.0          | mW/ $^\circ\text{C}$      |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case               | 83.3         | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient            | 200          | $^\circ\text{C}/\text{W}$ |

3. PCB size: FR-4 76 x 114 x 1.57 mm<sup>3</sup> (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

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

| Symbol        | Parameter                            | Conditions                                  | Min    | Typ | Max | Unit |
|---------------|--------------------------------------|---------------------------------------------|--------|-----|-----|------|
| $V_{CEO}$     | Collector-Emitter Breakdown Voltage  | $I_C = 2.0\text{ mA}, I_B = 0$              | 30     | –   | –   | V    |
| $V_{CBO}$     | Collector-Base Breakdown Voltage     | $I_C = 10\text{ }\mu\text{A}, I_E = 0$      | 40     | –   | –   | V    |
| $V_{EBO}$     | Emitter-Base Breakdown Voltage       | $I_E = 100\text{ nA}, I_C = 0$              | 10     | –   | –   | V    |
| $I_{CBO}$     | Base Cut-Off Current                 | $V_{CB} = 30\text{ V}, I_E = 0$             | –      | –   | 100 | nA   |
| $h_{FE}$      | DC Current Gain                      | $V_{CE} = 2\text{ V}, I_C = 20\text{ mA}$   | 30,000 | –   | –   |      |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C = 100\text{ mA}, I_B = 0.1\text{ mA}$  | –      | –   | 1   | V    |
| $V_{BE(on)}$  | Base-Emitter On Voltage              | $I_C = 10\text{ mA}, V_{CE} = 5.0\text{ V}$ | –      | –   | 1.4 | V    |

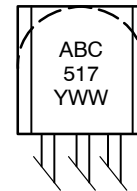
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.



1. Collector
2. Base
3. Emitter

TO-92 3 4.825x4.76  
LEADFORMER  
CASE 135AR

### MARKING DIAGRAM

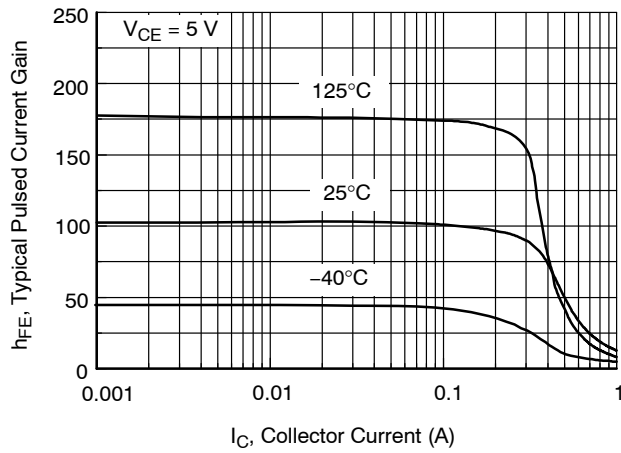


BC517 = Specific Device Code  
A = Assembly Site  
Y = Year of Production  
WW = Work Week Number

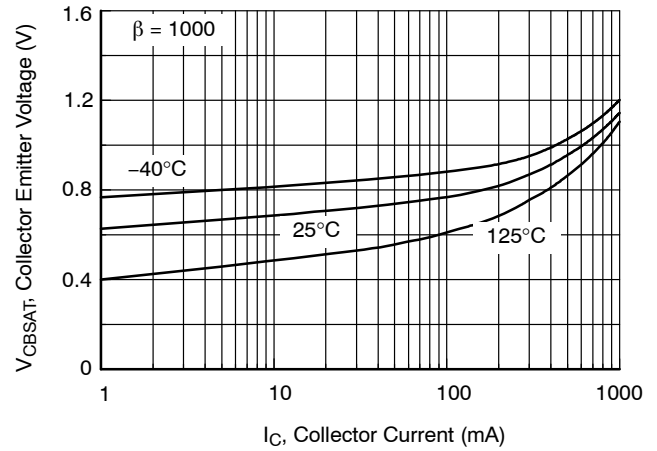
### ORDERING INFORMATION

| Device     | Package    | Shipping              |
|------------|------------|-----------------------|
| BC517-D74Z | TO-92-3 LF | 2000 Units / Fan-Fold |

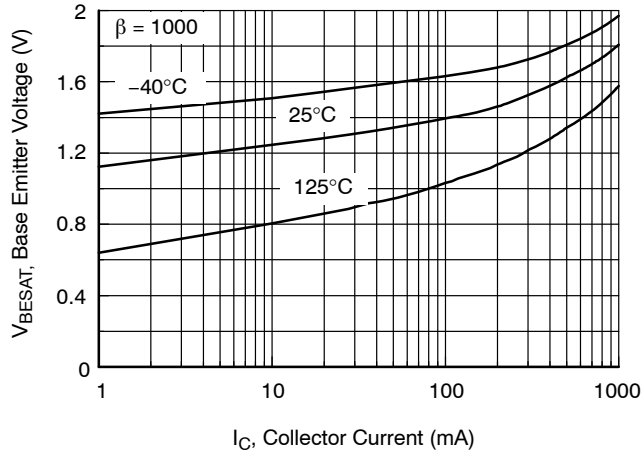
## TYPICAL PERFORMANCE CHARACTERISTICS



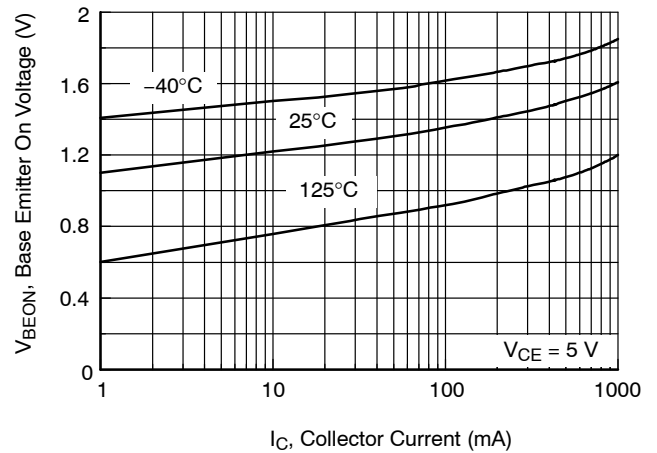
**Figure 1. Typical Pulsed Current Gain vs. Collector Current**



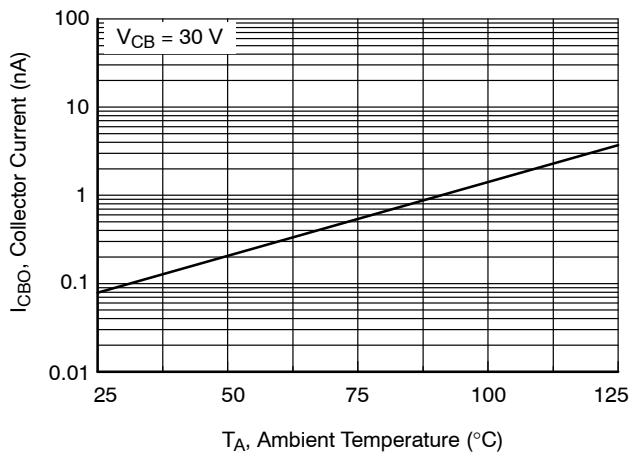
**Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current**



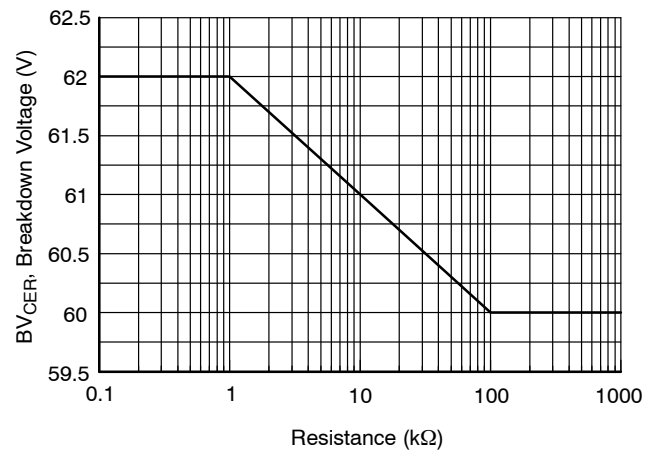
**Figure 3. Base-Emitter Saturation Voltage vs. Collector Current**



**Figure 4. Base-Emitter On Voltage vs. Collector Current**



**Figure 5. Collector Cut-Off Current vs. Ambient Temperature**



**Figure 6. Collector-Emitter Breakdown Voltage with Resistance Between Emitter-Base**

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

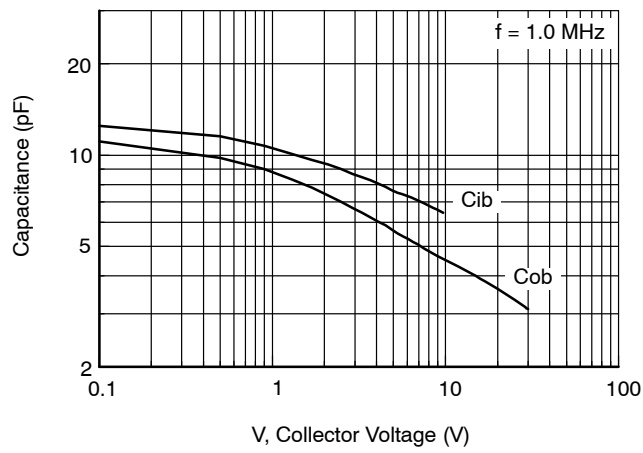


Figure 7. Input and Output Capacitance vs. Reverse Voltage

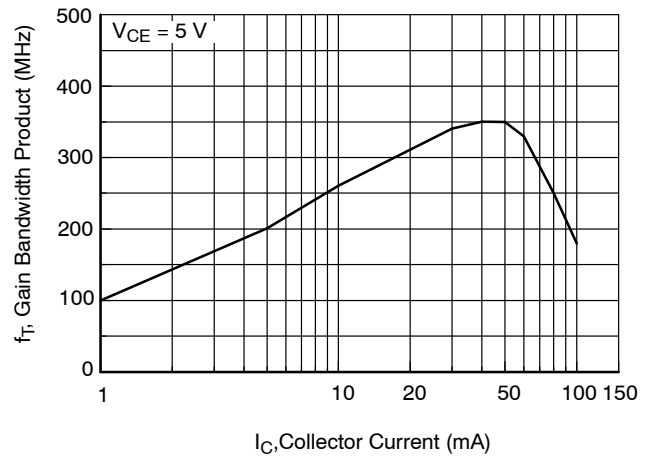


Figure 8. Gain Bandwidth Product vs. Collector Current

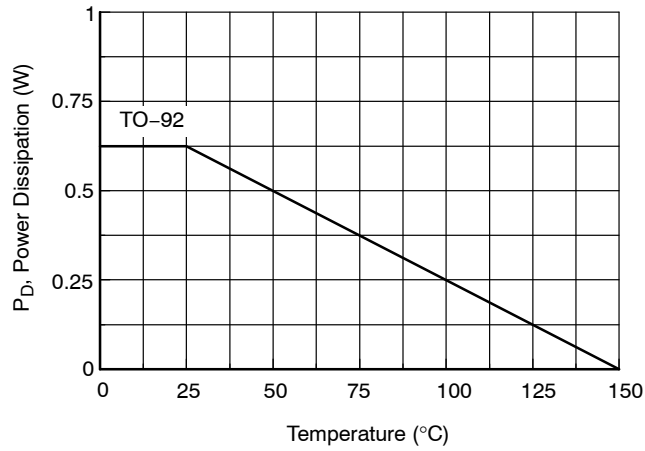
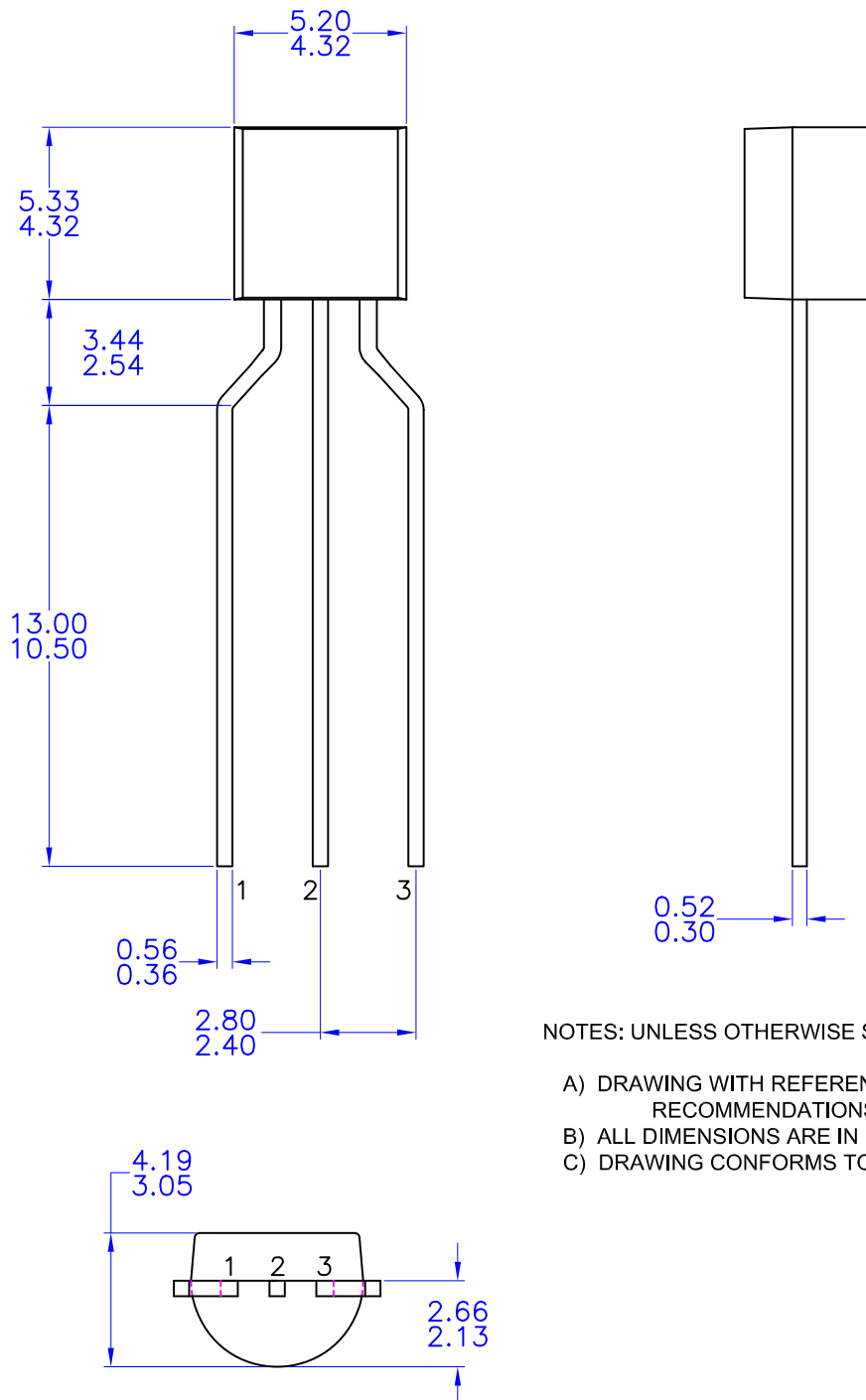


Figure 9. Power Dissipation vs. Ambient Temperature

**TO-92 3 4.83x4.76 LEADFORMED**  
**CASE 135AR**  
**ISSUE O**

DATE 30 SEP 2016



NOTES: UNLESS OTHERWISE SPECIFIED

- A) DRAWING WITH REFERENCE TO JEDEC TO-92 RECOMMENDATIONS.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DRAWING CONFORMS TO ASME Y14.5M-1994

|                         |                                     |                                                                                                                                                                                  |
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