

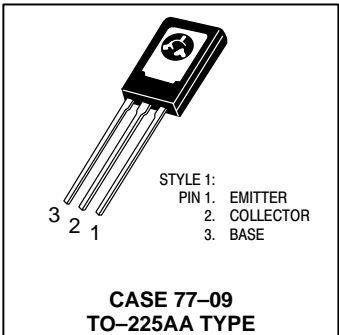
# Plastic Medium Power Silicon PNP Transistor

...designed for use as audio amplifiers and drivers utilizing complementary or quasi complementary circuits.

- DC Current Gain —  $h_{FE} = 40$  (Min) @  $I_C = 0.15$  Adc
- BD 136, 138, 140 are complementary with BD 135, 137, 139

**BD136  
BD138  
BD140  
BD140-10**

**1.5 AMPERE  
POWER TRANSISTORS  
PNP SILICON  
45, 60, 80 VOLTS  
10 WATTS**



## MAXIMUM RATINGS

| Rating   | Symbol         | Type                       | Value           | Unit                          |
|--|----------------|----------------------------|-----------------|-------------------------------|
| Collector–Emitter Voltage  | $V_{CEO}$      | BD 136<br>BD 138<br>BD 140 | 45<br>60<br>80  | Vdc                           |
| Collector–Base Voltage   | $V_{CBO}$      | BD 136<br>BD 138<br>BD 140 | 45<br>60<br>100 | Vdc                           |
| Emitter–Base Voltage   | $V_{EBO}$      |                            | 5               | Vdc                           |
| Collector Current  | $I_C$          |                            | 1.5             | Adc                           |
| Base Current   | $I_B$          |                            | 0.5             | Adc                           |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          |                            | 1.25<br>10      | Watts<br>mW/ $^\circ\text{C}$ |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          |                            | 12.5<br>100     | Watt<br>mW/ $^\circ\text{C}$  |
| Operating and Storage Junction<br>Temperature Range                                    | $T_J, T_{stg}$ |                            | -55 to +150     | $^\circ\text{C}$              |

# BD136 BD138 BD140 BD140-10

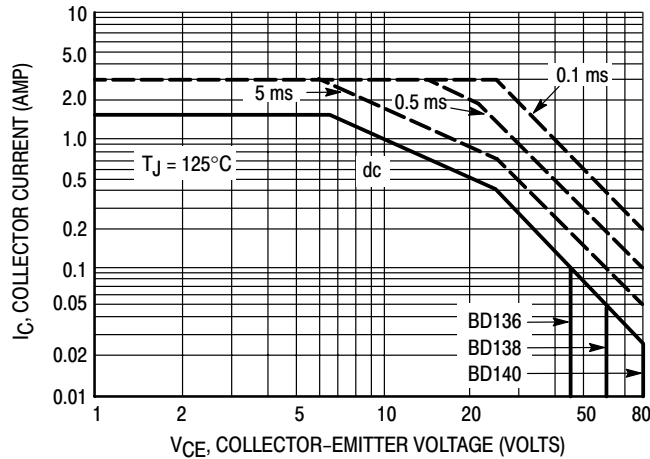
## THERMAL CHARACTERISTICS

| Characteristic                          | Symbol        | Max | Unit                        |
|---|---------------|-----|-----------------------------|
| Thermal Resistance, Junction to Case    | $\theta_{JC}$ | 10  | $^{\circ}\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Ambient | $\theta_{JA}$ | 100 | $^{\circ}\text{C}/\text{W}$ |

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

| Characteristic   | Symbol          | Type                       | Min                  | Max                  | Unit             |
|--|-----------------|----------------------------|----------------------|----------------------|------------------|
| Collector–Emitter Sustaining Voltage*<br>( $I_C = 0.03 \text{ A dc}$ , $I_B = 0$ )   | $BV_{CEO}$      | BD 136<br>BD 138<br>BD 140 | 45<br>60<br>80       | —<br>—<br>—          | Vdc              |
| Collector Cutoff Current<br>( $V_{CB} = 30 \text{ Vdc}$ , $I_E = 0$ )<br>( $V_{CB} = 30 \text{ Vdc}$ , $I_E = 0$ , $T_C = 125^{\circ}\text{C}$ )   | $I_{CBO}$       |                            | —<br>—               | 0.1<br>10            | $\mu\text{A dc}$ |
| Emitter Cutoff Current<br>( $V_{BE} = 5.0 \text{ Vdc}$ , $I_C = 0$ )   | $I_{EBO}$       |                            | —                    | 10                   | $\mu\text{A dc}$ |
| DC Current Gain<br>( $I_C = 0.005 \text{ A}$ , $V_{CE} = 2 \text{ V}$ )<br><br>( $I_C = 0.15 \text{ A}$ , $V_{CE} = 2 \text{ V}$ )<br><br>( $I_C = 0.5 \text{ A}$ , $V_{CE} = 2 \text{ V}$ ) | $h_{FE}^*$      | ALL<br><br>BD140-10        | 25<br>40<br>63<br>25 | —<br>250<br>160<br>— | —                |
| Collector–Emitter Saturation Voltage*<br>( $I_C = 0.5 \text{ A dc}$ , $I_B = 0.05 \text{ A dc}$ )  | $V_{CE(sat)}^*$ |                            | —                    | 0.5                  | Vdc              |
| Base–Emitter On Voltage*<br>( $I_C = 0.5 \text{ A dc}$ , $V_{CE} = 2.0 \text{ Vdc}$ )  | $V_{BE(on)}^*$  |                            | —                    | 1                    | Vdc              |

\*Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

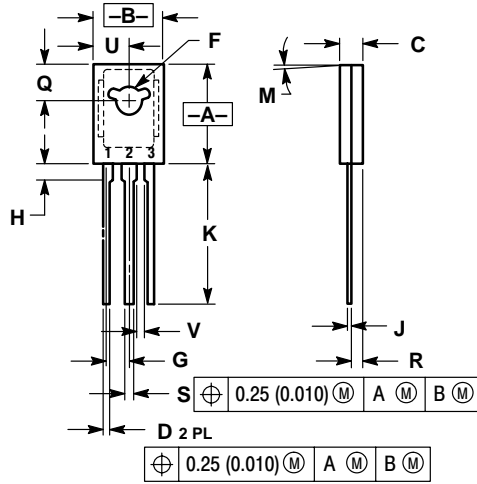


**Figure 1. Active-Region Safe Operating Area**

# BD136 BD138 BD140 BD140-10

## PACKAGE DIMENSIONS


TO-225AA  
CASE 77-09  
ISSUE W



- NOTES:  
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
2. CONTROLLING DIMENSION: INCH.

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 0.425     | 0.435 | 10.80       | 11.04 |
| B   | 0.295     | 0.305 | 7.50        | 7.74  |
| C   | 0.095     | 0.105 | 2.42        | 2.66  |
| D   | 0.020     | 0.026 | 0.51        | 0.66  |
| F   | 0.115     | 0.130 | 2.93        | 3.30  |
| G   | 0.094 BSC |       | 2.39 BSC    |       |
| H   | 0.050     | 0.095 | 1.27        | 2.41  |
| J   | 0.015     | 0.025 | 0.39        | 0.63  |
| K   | 0.575     | 0.655 | 14.61       | 16.63 |
| M   | 5° TYP    |       | 5° TYP      |       |
| Q   | 0.148     | 0.158 | 3.76        | 4.01  |
| R   | 0.045     | 0.065 | 1.15        | 1.65  |
| S   | 0.025     | 0.035 | 0.64        | 0.88  |
| U   | 0.145     | 0.155 | 3.69        | 3.93  |
| V   | 0.040     | ----  | 1.02        | ----  |

STYLE 1:  
PIN 1. EMITTER  
2. COLLECTOR  
3. BASE

**ON Semiconductor** and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer.

## PUBLICATION ORDERING INFORMATION

### Literature Fulfillment:

Literature Distribution Center for ON Semiconductor  
P.O. Box 5163, Denver, Colorado 80217 USA  
**Phone:** 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
**Fax:** 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
**Email:** ONlit@hibbertco.com

**N. American Technical Support:** 800-282-9855 Toll Free USA/Canada

**JAPAN:** ON Semiconductor, Japan Customer Focus Center  
4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan 141-0031  
**Phone:** 81-3-5740-2700  
**Email:** r14525@onsemi.com

**ON Semiconductor Website:** <http://onsemi.com>

For additional information, please contact your local Sales Representative.