

# BD436G, BD438G, BD440G, BD442G

## Plastic Medium Power Silicon PNP Transistor

This series of plastic, medium-power silicon PNP transistors can be used for amplifier and switching applications. Complementary types are BD437 and BD441.

### Features

- These Devices are Pb-Free and are RoHS Compliant\*

### MAXIMUM RATINGS

| Rating                                                                                    | Symbol         | Value                | Unit                     |
|-------------------------------------------------------------------------------------------|----------------|----------------------|--------------------------|
| Collector-Emitter Voltage<br>BD436G<br>BD438G<br>BD440G<br>BD442G                         | $V_{CEO}$      | 32<br>45<br>60<br>80 | Vdc                      |
| Collector-Base Voltage<br>BD436G<br>BD438G<br>BD440G<br>BD442G                            | $V_{CBO}$      | 32<br>45<br>60<br>80 | Vdc                      |
| Emitter-Base Voltage                                                                      | $V_{EBO}$      | 5.0                  | Vdc                      |
| Collector Current                                                                         | $I_C$          | 4.0                  | Adc                      |
| Base Current                                                                              | $I_B$          | 1.0                  | Adc                      |
| Total Device Dissipation<br>@ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 36<br>288            | W<br>W/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range                                          | $T_J, T_{stg}$ | -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.

### THERMAL CHARACTERISTICS

| Characteristic                       | Symbol          | Max | Unit               |
|--------------------------------------|-----------------|-----|--------------------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 3.5 | $^\circ\text{C/W}$ |

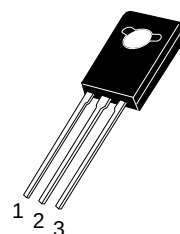
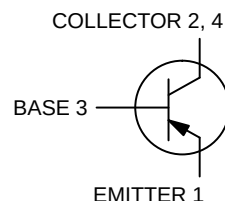
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



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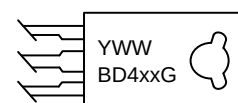
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## 4.0 AMP POWER TRANSISTORS PNP SILICON



TO-225  
CASE 77-09  
STYLE 1

### MARKING DIAGRAM



Y = Year  
WW = Work Week  
BD4xx = Device Code  
xx = 36, 36T, 38, 38T, 40, 42  
G = Pb-Free Package

### ORDERING INFORMATION

| Device  | Package          | Shipping      |
|---------|------------------|---------------|
| BD436G  | TO-225 (Pb-Free) | 500 Units/Box |
| BD436TG | TO-225 (Pb-Free) | 50 Units/Rail |
| BD438G  | TO-225 (Pb-Free) | 500 Units/Box |
| BD438TG | TO-225 (Pb-Free) | 50 Units/Rail |
| BD440G  | TO-225 (Pb-Free) | 500 Units/Box |
| BD442G  | TO-225 (Pb-Free) | 500 Units/Box |

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## ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted)

| Characteristic                                                                                                                                                                                                                                                   | Symbol               | Min                  | Typ              | Max                      | Unit |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|------------------|--------------------------|------|
| Collector–Emitter Breakdown Voltage<br>(I <sub>C</sub> = 100 mA, I <sub>B</sub> = 0)<br>BD436G<br>BD438G<br>BD440G<br>BD442G                                                                                                                                     | V <sub>(BR)CEO</sub> | 32<br>45<br>60<br>80 | –<br>–<br>–<br>– | –<br>–<br>–<br>–         | Vdc  |
| Collector–Base Breakdown Voltage<br>(I <sub>C</sub> = 100 μA, I <sub>B</sub> = 0)<br>BD436G<br>BD438G<br>BD440G<br>BD442G                                                                                                                                        | V <sub>(BR)CBO</sub> | 32<br>45<br>60<br>80 | –<br>–<br>–<br>– | –<br>–<br>–<br>–         | Vdc  |
| Emitter–Base Breakdown Voltage<br>(I <sub>E</sub> = 100 μA, I <sub>C</sub> = 0)                                                                                                                                                                                  | V <sub>(BR)EBO</sub> | 5.0                  | –                | –                        | Vdc  |
| Collector Cutoff Current<br>(V <sub>CB</sub> = 32 V, I <sub>E</sub> = 0)<br>BD436G<br>(V <sub>CB</sub> = 45 V, I <sub>E</sub> = 0)<br>BD438G<br>(V <sub>CB</sub> = 60 V, I <sub>E</sub> = 0)<br>BD440G<br>(V <sub>CB</sub> = 80 V, I <sub>E</sub> = 0)<br>BD442G | I <sub>CBO</sub>     | –<br>–<br>–<br>–     | –<br>–<br>–<br>– | 0.1<br>0.1<br>0.1<br>0.1 | mAdc |
| Emitter Cutoff Current<br>(V <sub>EB</sub> = 5.0 V)                                                                                                                                                                                                              | I <sub>EBO</sub>     | –                    | –                | 1.0                      | mAdc |
| DC Current Gain<br>(I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 5.0 V)<br>BD436G<br>BD438G<br>BD440G<br>BD442G                                                                                                                                                     | h <sub>FE</sub>      | 40<br>30<br>20<br>15 | –<br>–<br>–<br>– | –<br>–<br>–<br>–         | –    |
| DC Current Gain<br>(I <sub>C</sub> = 500 mA, V <sub>CE</sub> = 1.0 V)<br>BD436G<br>BD438G<br>BD440G<br>BD442G                                                                                                                                                    | h <sub>FE</sub>      | 85<br>85<br>40<br>40 | –<br>–<br>–<br>– | 475<br>475<br>475<br>475 | –    |
| DC Current Gain<br>(I <sub>C</sub> = 2.0 A, V <sub>CE</sub> = 1.0 V)<br>BD436G<br>BD438G<br>BD440G<br>BD442G                                                                                                                                                     | h <sub>FE</sub>      | 50<br>40<br>25<br>15 | –<br>–<br>–<br>– | –<br>–<br>–<br>–         | –    |
| Collector Saturation Voltage<br>(I <sub>C</sub> = 2.0 A, I <sub>B</sub> = 0.2 A)<br>BD436G<br>(I <sub>C</sub> = 3.0 A, I <sub>B</sub> = 0.3 A)<br>BD438G<br>BD440G<br>BD442G                                                                                     | V <sub>CE(sat)</sub> | –<br>–<br>–<br>–     | –<br>–<br>–<br>– | 0.5<br>0.7<br>0.8<br>0.8 | Vdc  |
| Base–Emitter On Voltage<br>(I <sub>C</sub> = 2.0 A, V <sub>CE</sub> = 1.0 V)<br>BD436G/BD438G<br>BD440G/BD442G                                                                                                                                                   | V <sub>BE(ON)</sub>  | –<br>–               | –<br>–           | 1.1<br>1.5               | Vdc  |
| Current–Gain – Bandwidth Product<br>(V <sub>CE</sub> = 1.0 V, I <sub>C</sub> = 250 mA, f = 1.0 MHz)                                                                                                                                                              | f <sub>T</sub>       | 3.0                  | –                | –                        | MHz  |

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.

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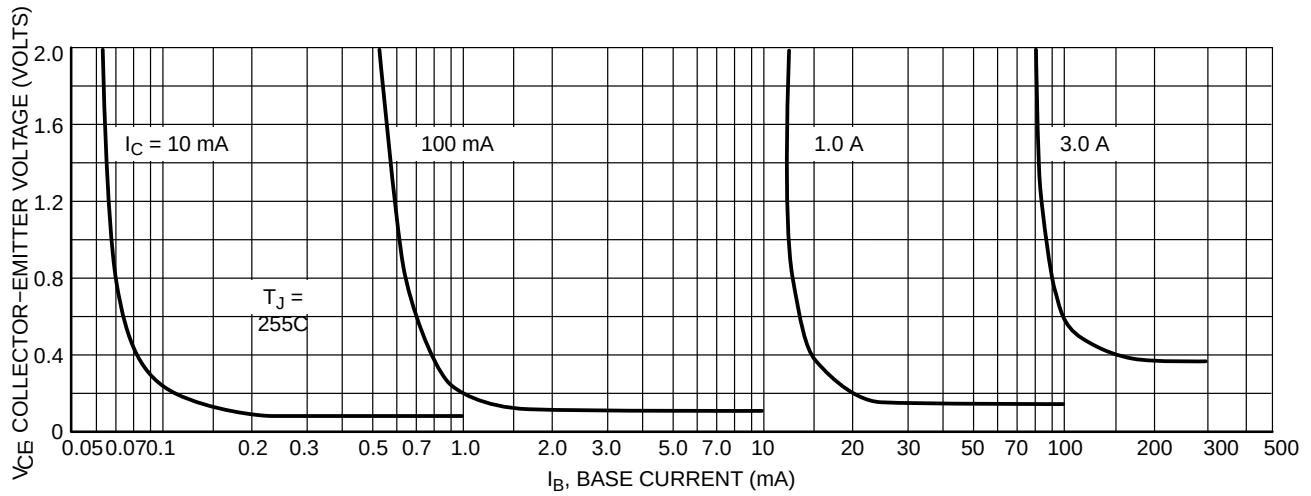


Figure 1. Collector Saturation Region

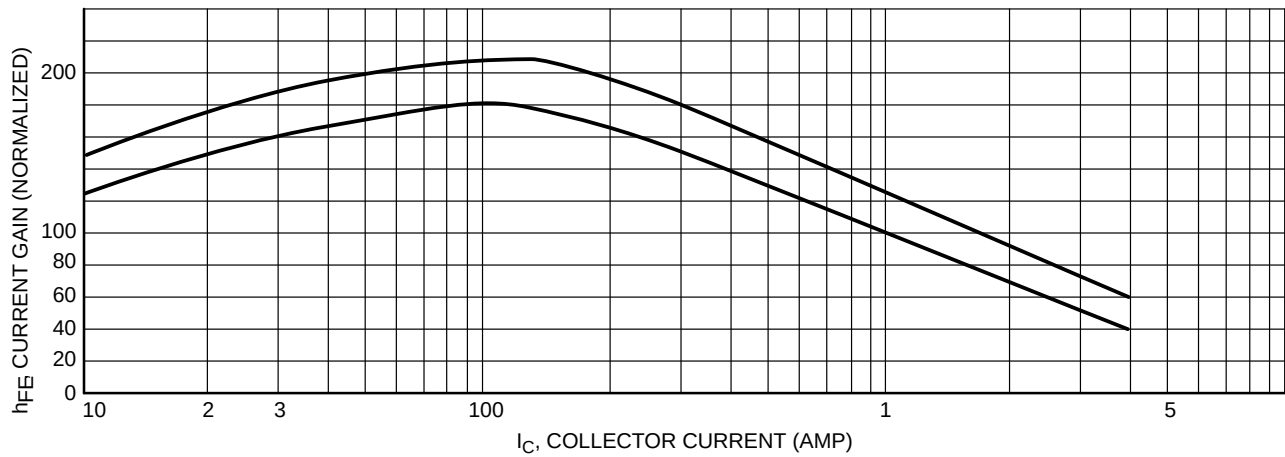


Figure 2. Current Gain

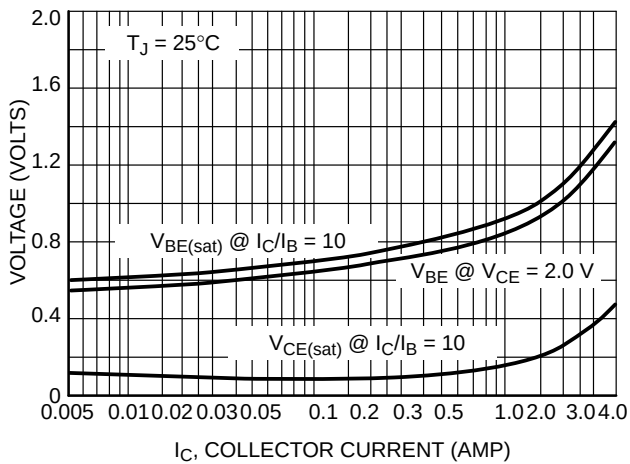


Figure 3. "On" Voltage

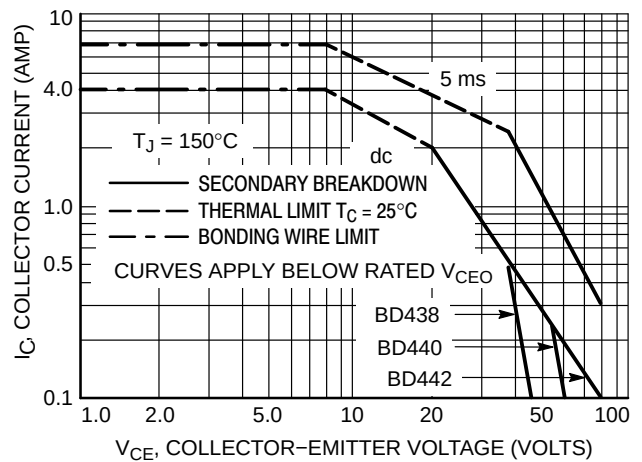
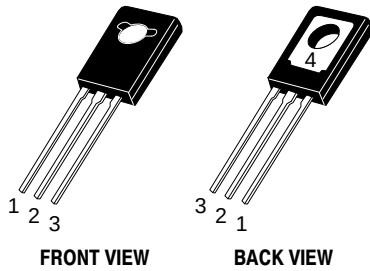


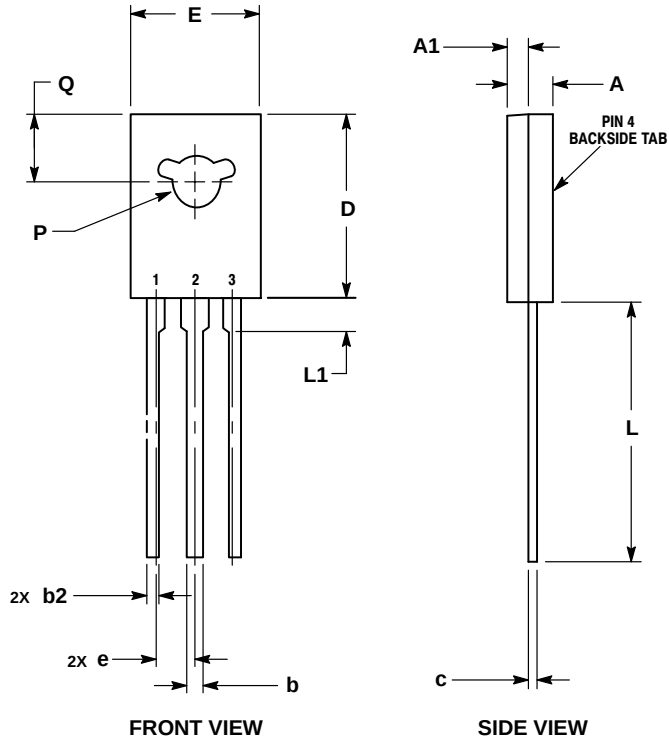
Figure 4. Active Region Safe Operating Area

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## PACKAGE DIMENSIONS



**TO-225**  
CASE 77-09  
ISSUE AC



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. NUMBER AND SHAPE OF LUGS OPTIONAL.

| DIM | MILLIMETERS |       |
|-----|-------------|-------|
|     | MIN         | MAX   |
| A   | 2.40        | 3.00  |
| A1  | 1.00        | 1.50  |
| b   | 0.60        | 0.90  |
| b2  | 0.51        | 0.88  |
| c   | 0.39        | 0.63  |
| D   | 10.60       | 11.10 |
| E   | 7.40        | 7.80  |
| e   | 2.04        | 2.54  |
| L   | 14.50       | 16.63 |
| L1  | 1.27        | 2.54  |
| P   | 2.90        | 3.30  |
| Q   | 3.80        | 4.20  |

### STYLE 1:

- PIN 1. EMITTER
- 2, 4. COLLECTOR
3. BASE

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