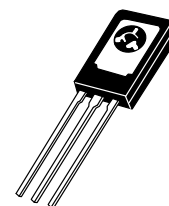


Plastic Medium Power Silicon PNP Transistor

... for amplifier and switching applications. Complementary types are BD437 and BD441.

BD438
BD440
BD442

4.0 AMPERES
POWER TRANSISTORS
PNP SILICON



CASE 77-08
TO-225AA TYPE

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|--|----------------|----------------|------------------------------|
| Collector-Emitter Voltage BD438 BD440 BD442 | V_{CEO} | 45 60 80 | Vdc |
| Collector-Base Voltage BD438 BD440 BD442 | V_{CBO} | 45 60 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 @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 36 288 | Watts W/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

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

BD438 BD440 BD442
ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | | Symbol | Min | Typ | Max | Unit |
|--|-------------------------|---------------|----------------|-------------|-------------------|------|
| Collector–Emitter Breakdown Voltage ($I_C = 100\text{ mA}$, $I_B = 0$) | BD438 BD440 BD442 | $V_{(BR)CEO}$ | 45 60 80 | — — — | — — — | Vdc |
| Collector–Base Breakdown Voltage ($I_C = 100\ \mu\text{A}$, $I_B = 0$) | BD438 BD440 BD442 | $V_{(BR)CBO}$ | 45 60 80 | — — — | — — — | Vdc |
| Emitter–Base Breakdown Voltage ($I_E = 100\ \mu\text{A}$, $I_C = 0$) | | $V_{(BR)EBO}$ | 5.0 | — | — | Vdc |
| Collector Cutoff Current ($V_{CB} = 45\text{ V}$, $I_E = 0$) ($V_{CB} = 60\text{ V}$, $I_E = 0$) ($V_{CB} = 80\text{ V}$, $I_E = 0$) | BD438 BD440 BD442 | I_{CBO} | — — — | — — — | 0.1 0.1 0.1 | mAdc |
| Emitter Cutoff Current ($V_{EB} = 5.0\text{ V}$) | | I_{EBO} | — | — | 1.0 | mAdc |
| DC Current Gain ($I_C = 10\text{ mA}$, $V_{CE} = 5.0\text{ V}$) | BD438 BD440 BD442 | h_{FE} | 30 20 15 | — — — | — — — | |
| DC Current Gain ($I_C = 500\text{ mA}$, $V_{CE} = 1.0\text{ V}$) | BD438 BD440 BD442 | h_{FE} | 85 40 40 | — — — | 375 475 475 | |
| DC Current Gain ($I_C = 2.0\text{ A}$, $V_{CE} = 1.0\text{ V}$) | BD438 BD440 BD442 | h_{FE} | 40 25 15 | — — — | — — — | |
| Collector Saturation Voltage ($I_C = 3.0\text{ A}$, $I_B = 0.3\text{ A}$) | BD438 BD440 BD442 | $V_{CE(sat)}$ | — — — | — — — | 0.7 0.8 0.8 | Vdc |
| Base–Emitter On Voltage ($I_C = 2.0\text{ A}$, $V_{CE} = 1.0\text{ V}$) | BD438 BD440/442 | $V_{BE(ON)}$ | — — | — — | 1.1 1.5 | Vdc |
| Current–Gain — Bandwidth Product ($V_{CE} = 1.0\text{ V}$, $I_C = 250\text{ mA}$, $f = 1.0\text{ MHz}$) | | f_T | 3.0 | — | — | MHz |

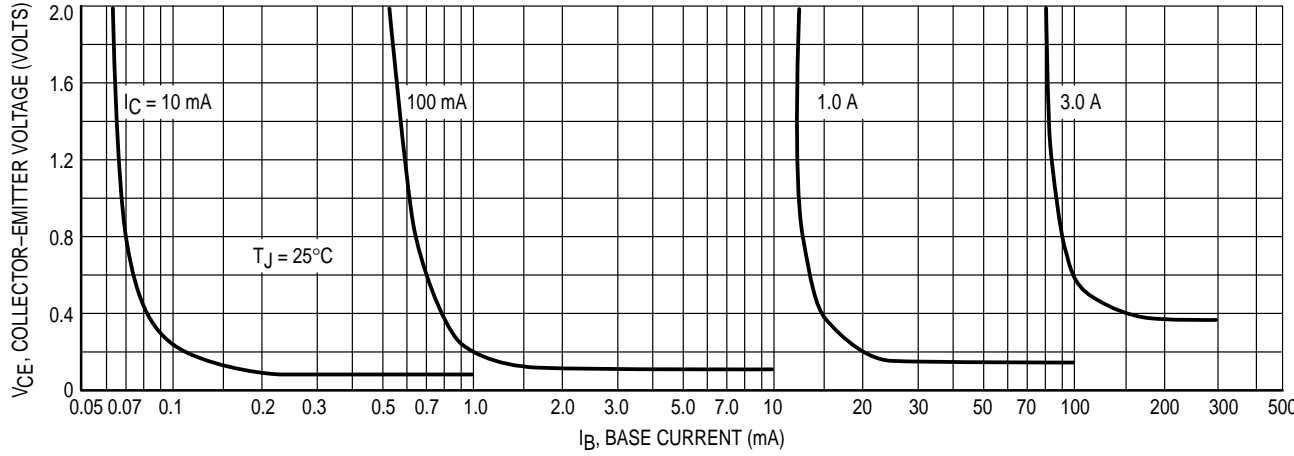


Figure 1. Collector Saturation Region

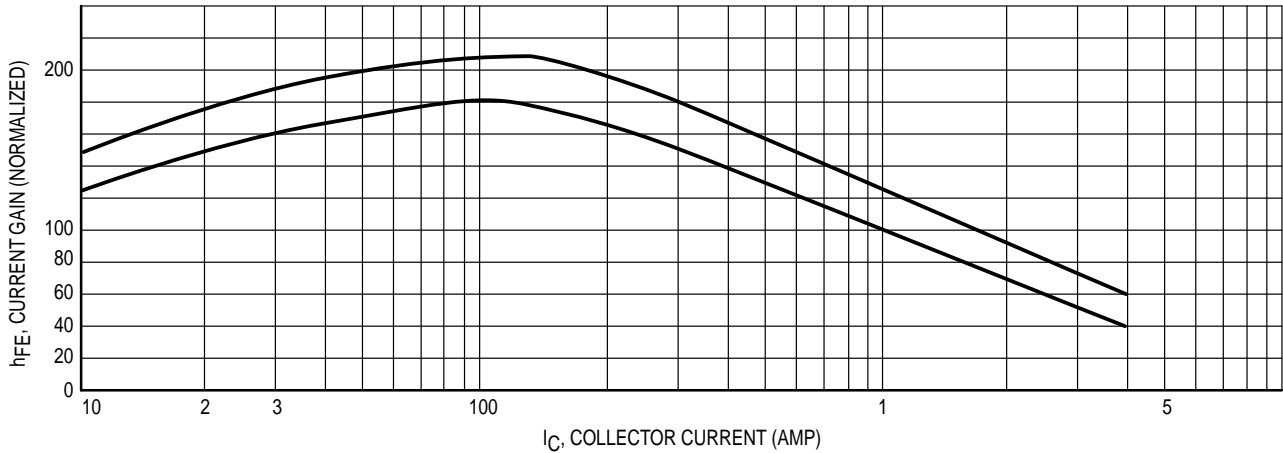


Figure 2. Current Gain

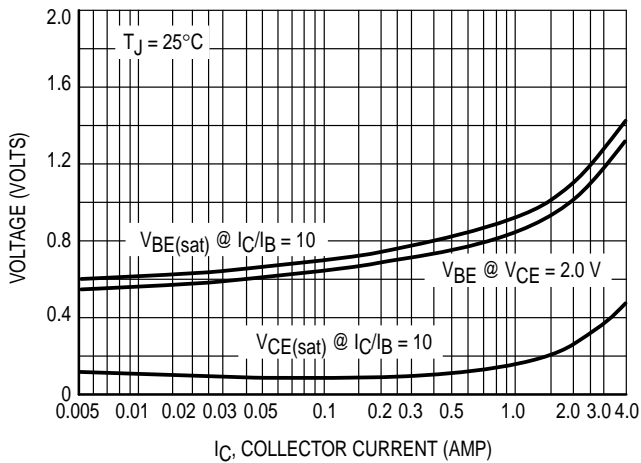


Figure 3. "On" Voltage

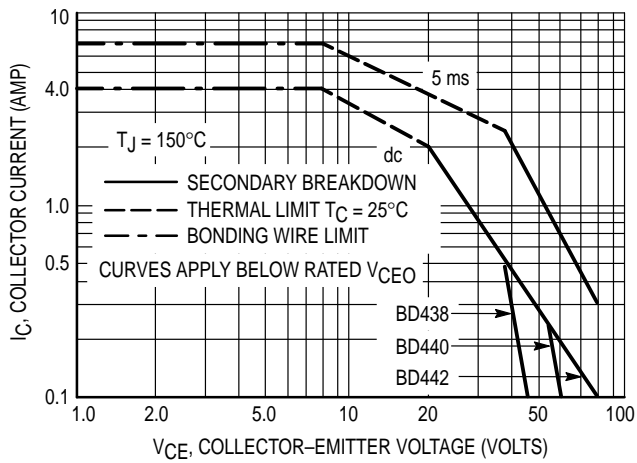
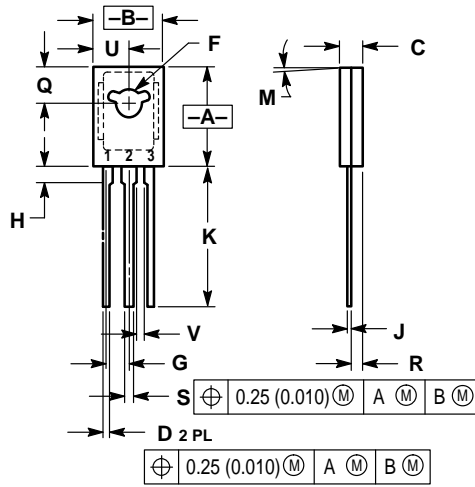


Figure 4. Active Region Safe Operating Area

PACKAGE DIMENSIONS



- 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 | 0.055 | 1.15 | 1.39 |
| 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

CASE 77-08
 TO-225AA TYPE
 ISSUE V

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