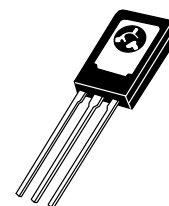


# Plastic Medium Power Silicon PNP Transistor

... 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 $25^\circ\text{C}$	$P_D$	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	$\theta_{JC}$	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

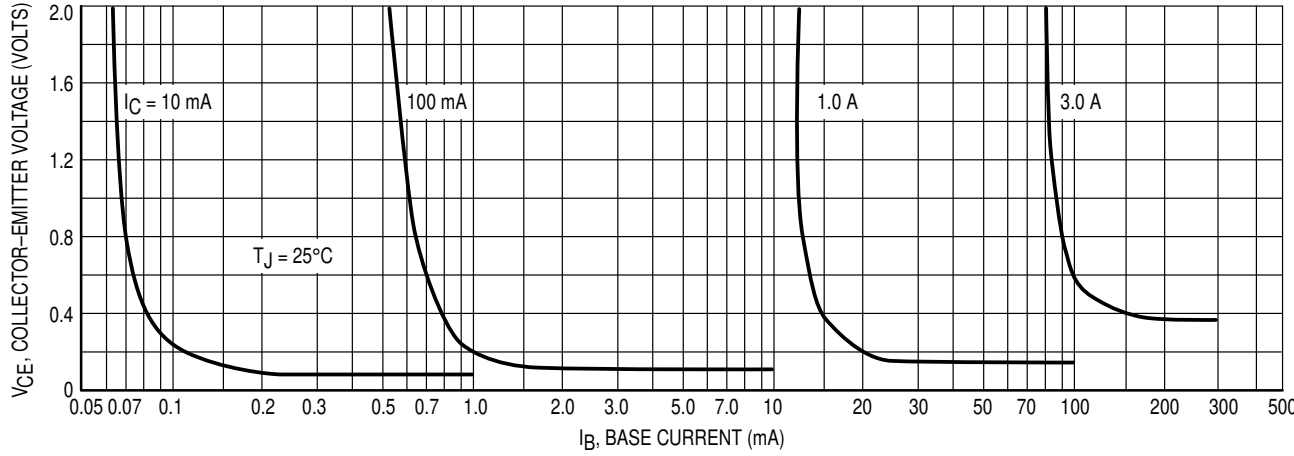


Figure 1. Collector Saturation Region

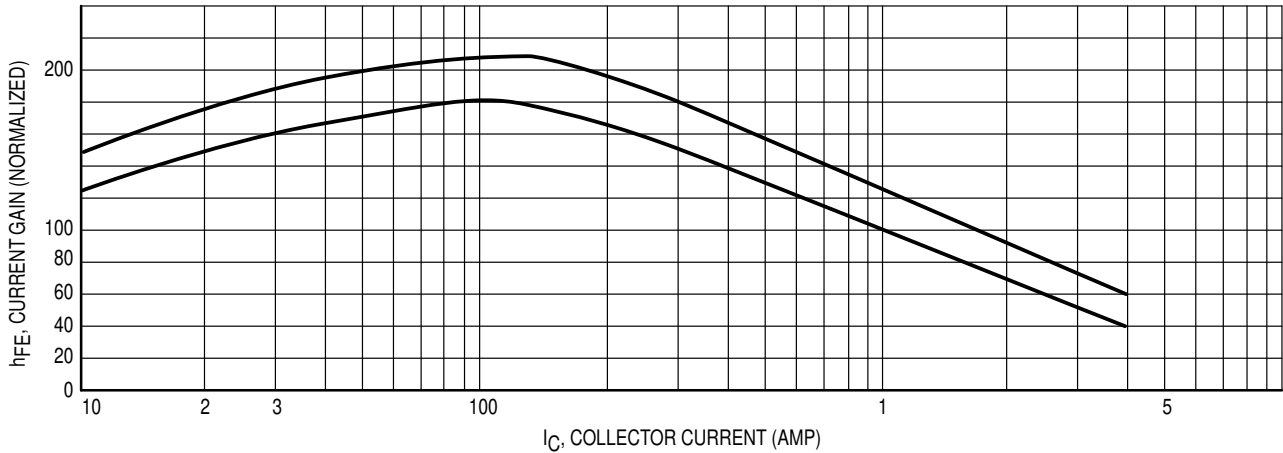


Figure 2. Current Gain

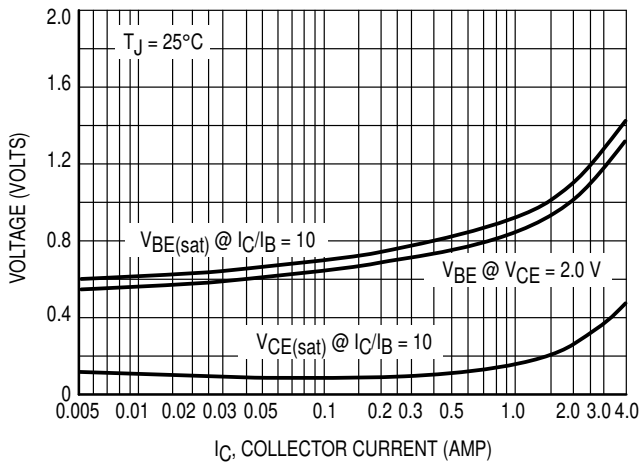


Figure 3. "On" Voltage

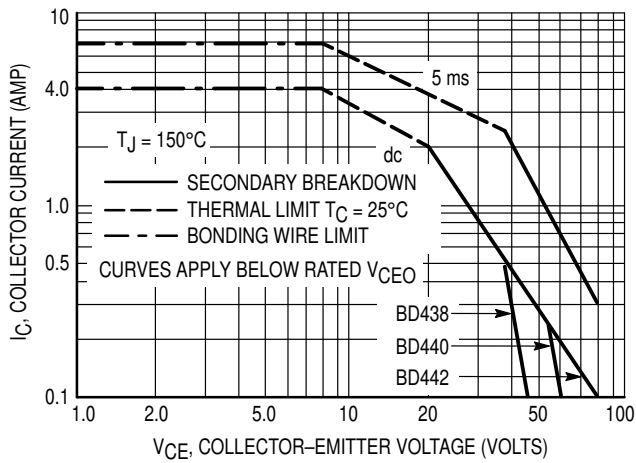
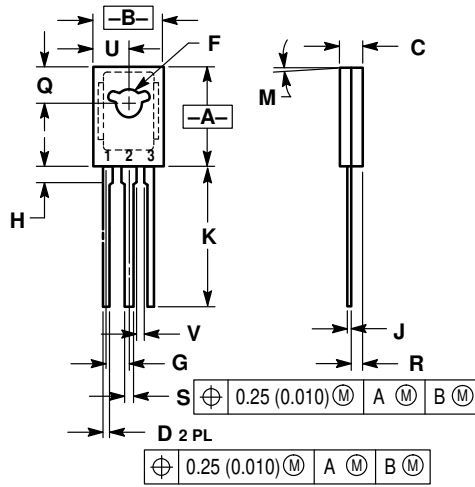


Figure 4. Active Region Safe Operating Area

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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