

# Plastic Medium Power Silicon PNP Transistor

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

**BD438  
BD440  
BD442**

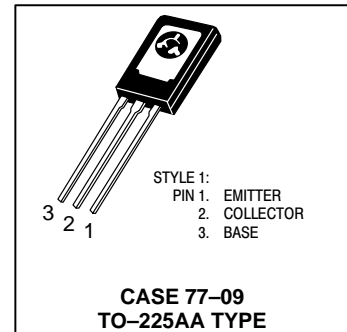
**4.0 AMPERES  
POWER TRANSISTORS  
PNP SILICON**

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	BD438 BD440 BD442	$V_{CE0}$ 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	$^\circ\text{C}/\text{W}$



## BD438 BD440 BD442

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

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

BD438 BD440 BD442

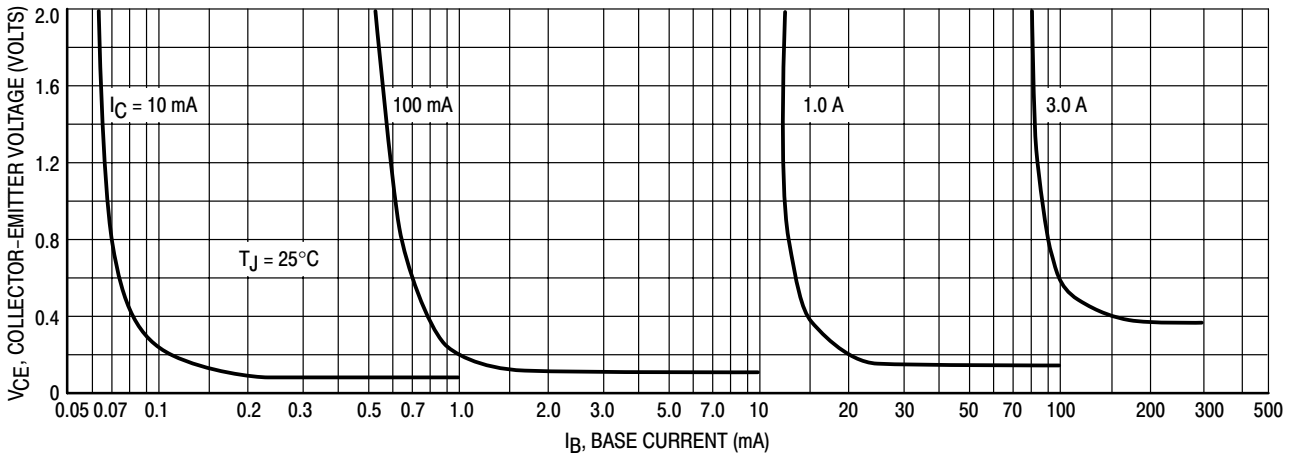


Figure 1. Collector Saturation Region

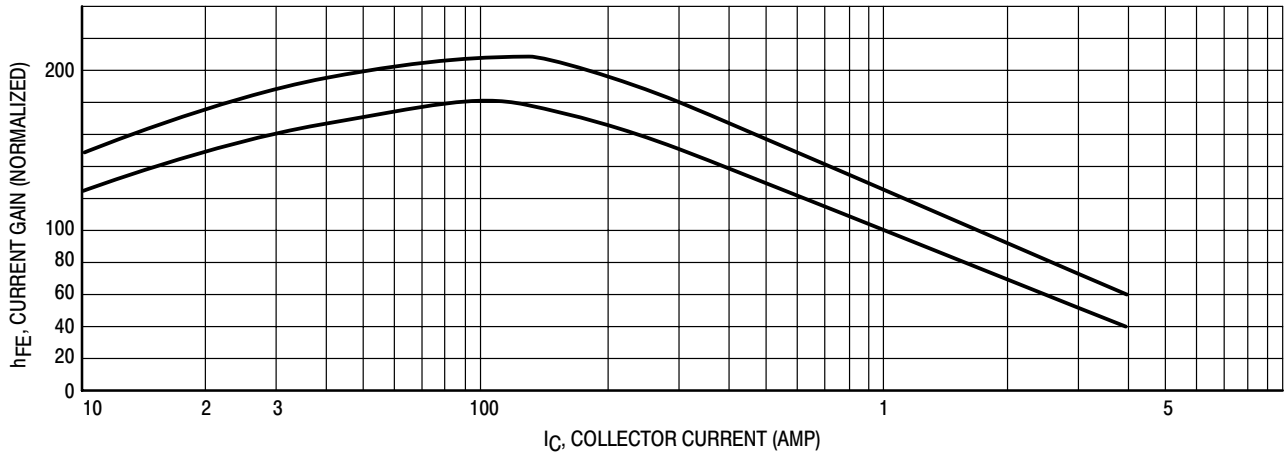


Figure 2. Current Gain

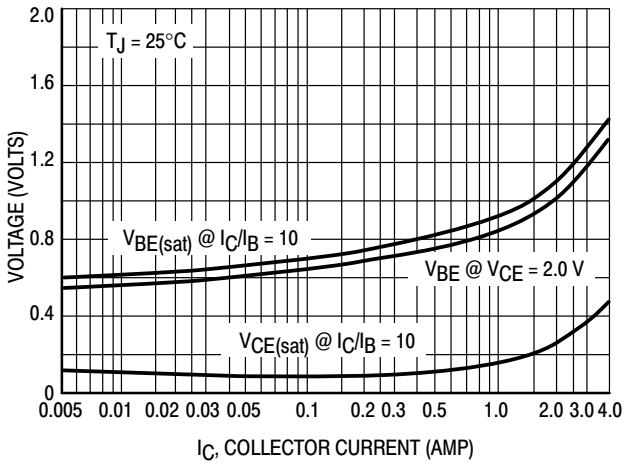


Figure 3. "On" Voltage

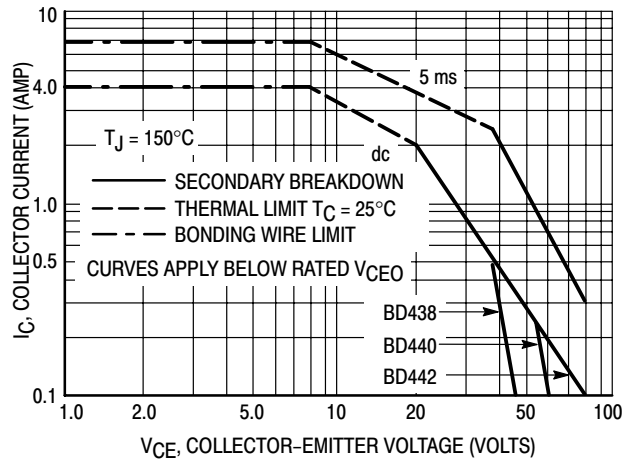
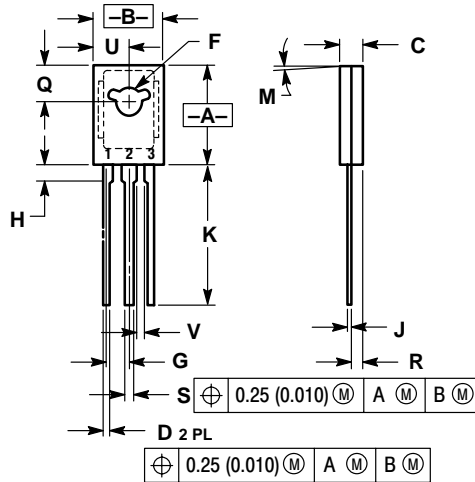


Figure 4. Active Region Safe Operating Area

# BD438 BD440 BD442

## 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

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