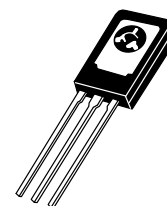


Plastic Medium Power Silicon PNP Transistor

... 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 ($I_C = 100\text{ }\mu\text{A}$, $I_B = 0$)	BD438 BD440 BD442	$V_{(BR)CBO}$	45 60 80	— — —	— — —	Vdc
Emitter–Base Breakdown Voltage ($I_E = 100\text{ }\mu\text{A}$, $I_C = 0$)		$V_{(BR)EBO}$	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

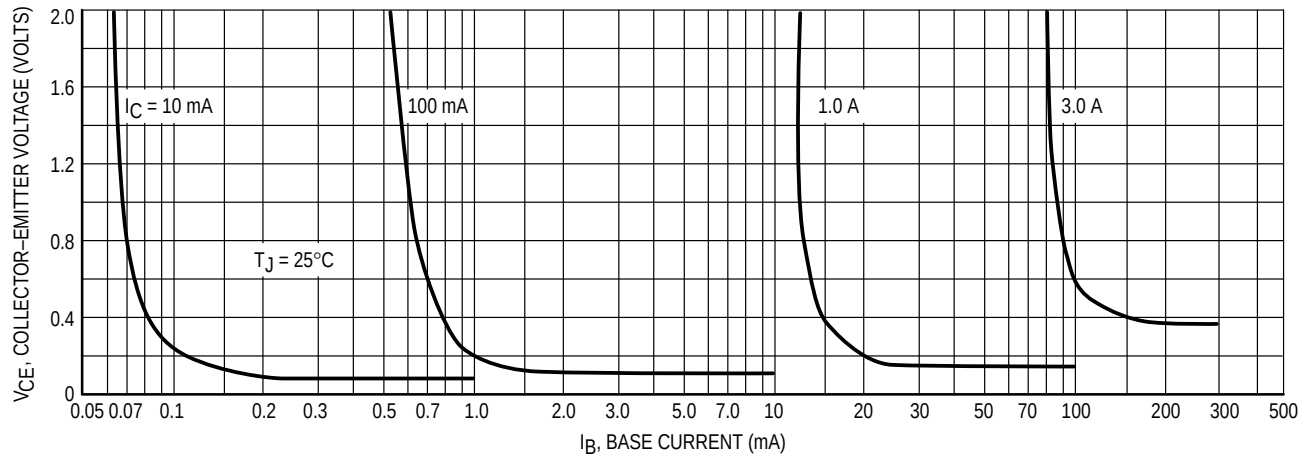


Figure 1. Collector Saturation Region

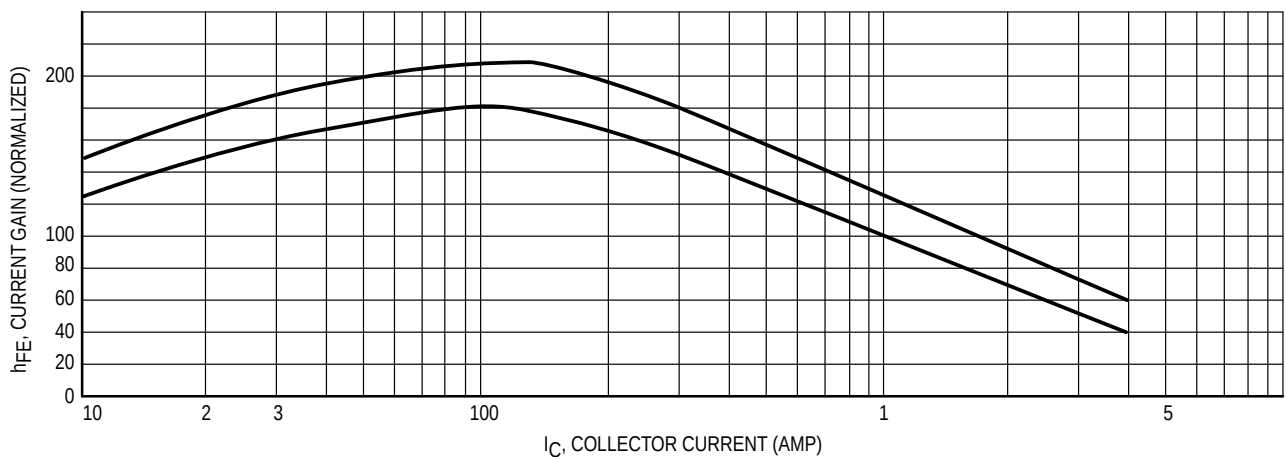


Figure 2. Current Gain

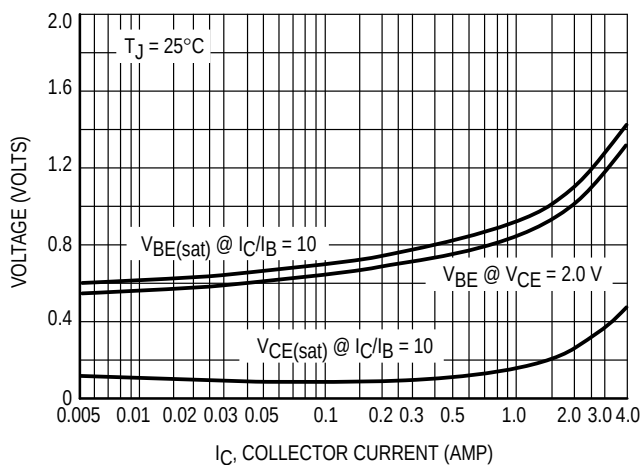


Figure 3. "On" Voltage

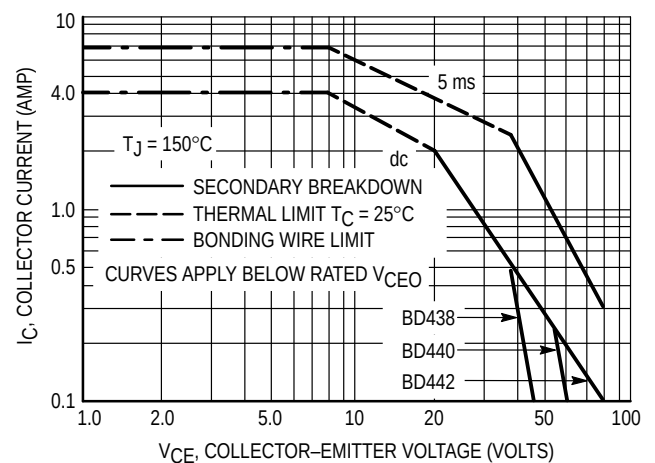
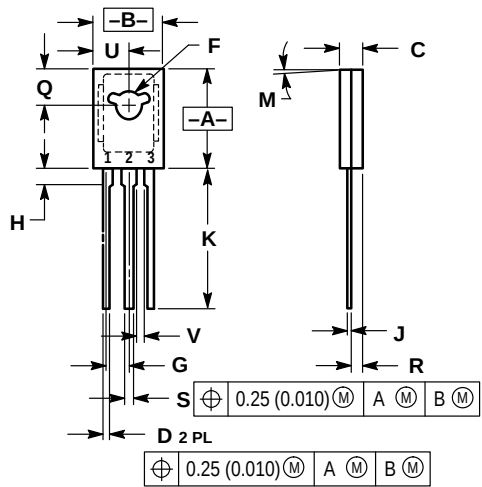


Figure 4. Active Region Safe Operating Area

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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How to reach us:
USA / EUROPE: Motorola Literature Distribution;
P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447

MFAX: RMFAX0@email.sps.mot.com - TOUCHTONE (602) 244-6609
INTERNET: <http://Design-NET.com>

JAPAN: Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, Toshikatsu Otsuki,
6F Seibu-Butsuryu-Center, 3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-3521-8315

HONG KONG: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298



MOTOROLA



BD438/D

