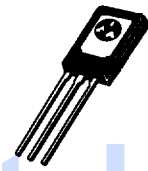


Plastic Medium Power Silicon PNP Transistor

... 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_{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	A dc
Base Current	I_B	1.0	A dc
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	$^\circ\text{C/W}$

REV 7

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

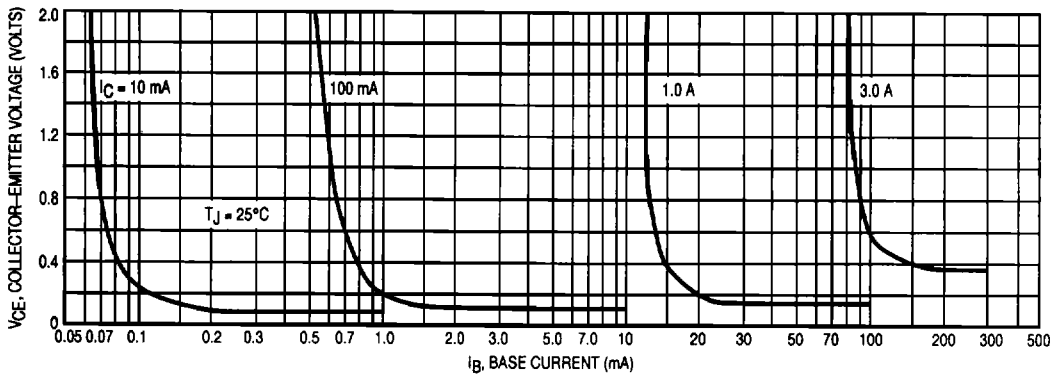


Figure 1. Collector Saturation Region

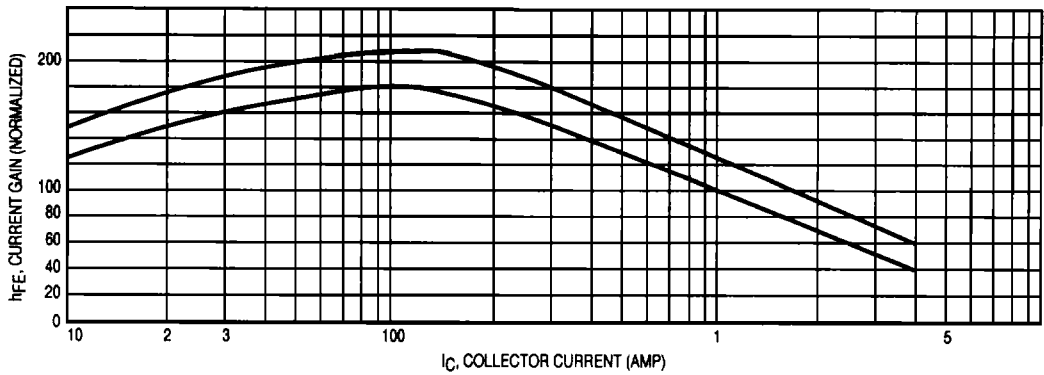


Figure 2. Current Gain

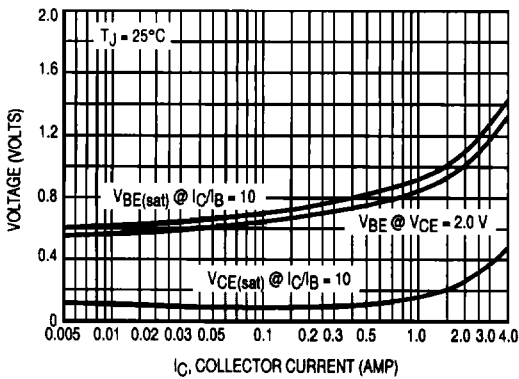


Figure 3. "On" Voltage

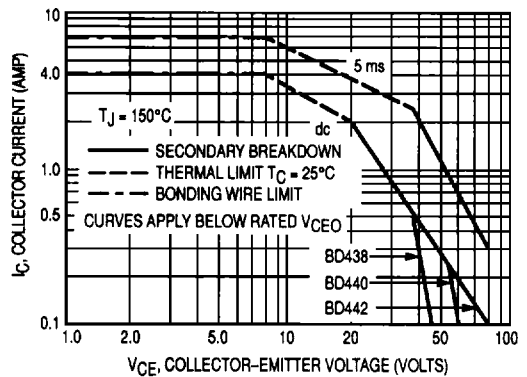


Figure 4. Active Region Safe Operating Area