

**BD166**

**1.5 AMPERE  
POWER TRANSISTOR  
PNP SILICON  
45 VOLTS  
20 WATTS**

**Plastic Medium Power Silicon  
PNP Transistor**

... designed for use as audio amplifiers and drivers utilizing complementary or quasi complementary circuits.

- DC Current Gain —  $h_{FE} = 40$  (Min) @  $I_C = 0.15$  Adc
- BD166 is complementary with BD165

**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO}$	45	Vdc
Collector–Base Voltage	$V_{CBO}$	45	Vdc
Emitter–Base Voltage	$V_{EBO}$	5.0	Vdc
Collector Current	$I_C$	1.5	Adc
Base Current	$I_B$	0.5	Adc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.25 10	Watts mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	20 160	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +150	$^\circ\text{C}$

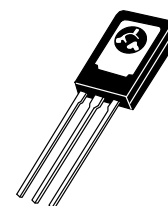
**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$\theta_{JC}$	6.25	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	$\theta_{JA}$	100	$^\circ\text{C/W}$

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

Characteristic	Symbol	Min	Max	Unit
Collector–Emitter Sustaining Voltage* ( $I_C = 0.1$ Adc, $I_B = 0$ )	$V_{(BR)CEO}$	45	—	Vdc
Collector Cutoff Current ( $V_{CB} = 45$ Vdc, $I_E = 0$ )	$I_{CBO}$	—	0.1	mAdc
Emitter Cutoff Current ( $V_{BE} = 5.0$ Vdc, $I_C = 0$ )	$I_{EBO}$	—	1.0	mAdc
DC Current Gain ( $I_C = 0.15$ A, $V_{CE} = 2.0$ V) ( $I_C = 0.5$ A, $V_{CE} = 2.0$ V)	$h_{FE}$	40 15	— —	
Collector–Emitter Saturation Voltage* ( $I_C = 0.5$ Adc, $I_B = 0.05$ Adc)	$V_{CE(sat)}$	—	0.5	Vdc
Base–Emitter On Voltage* ( $I_C = 0.5$ Adc, $V_{CE} = 2.0$ Vdc)	$V_{BE(on)}$	—	0.95	Vdc
Current–Gain — Bandwidth Product ( $I_C = 500$ mAdc, $V_{CE} = 2.0$ Vdc, $f = 1.0$ MHz)	$f_T$	6.0	—	MHz

\* Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .



**CASE 77-08  
TO-225AA TYPE**

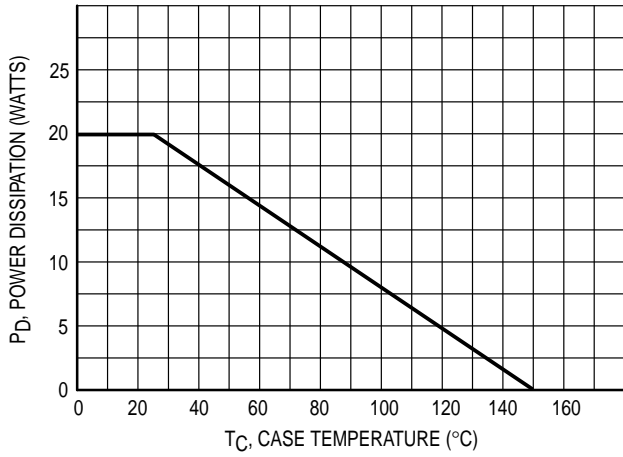


Figure 1.  $P_D - T_C$  Derating Curve

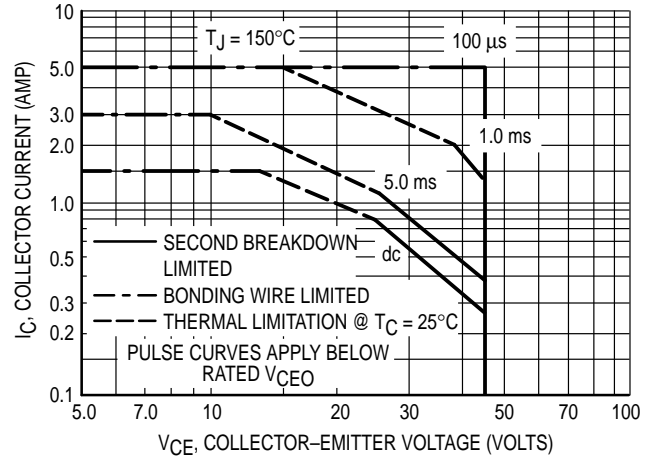


Figure 2. Safe Operating Area (see Note 1)

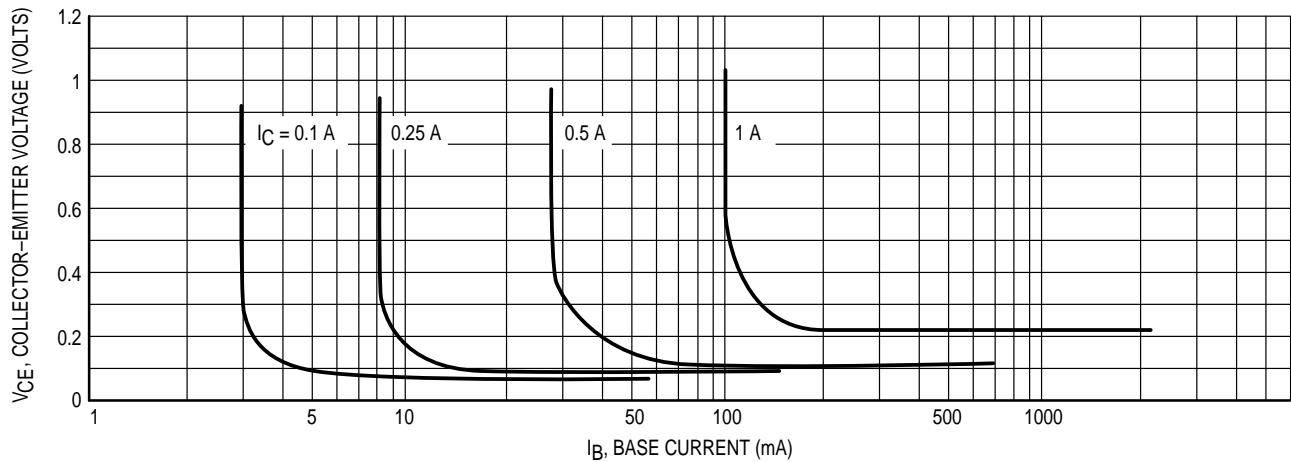


Figure 3. Collector Saturation Region

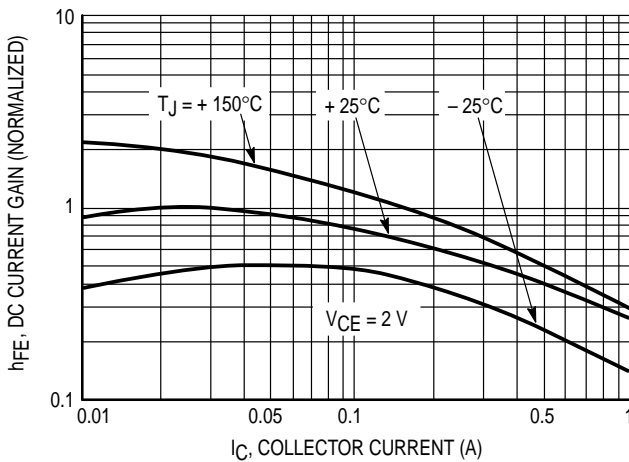


Figure 4. Current Gain

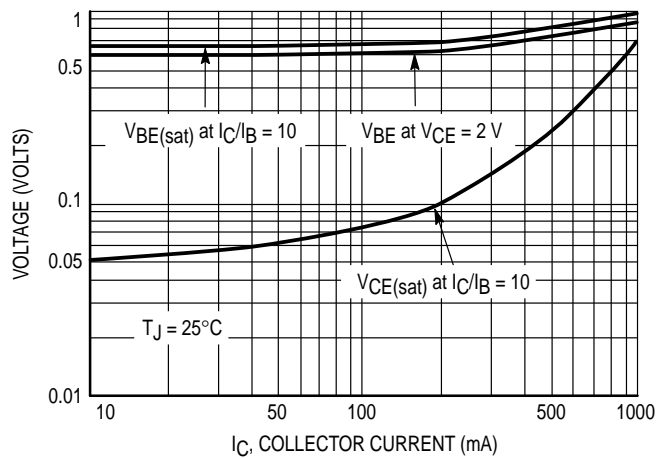


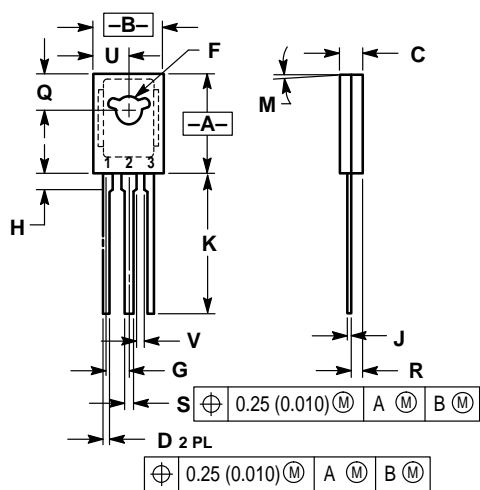
Figure 5. "On" Voltage

**Note 1:**

There are two limitations on the power handling ability of a transistor; average junction temperature and second breakdown. Safe operating area curves indicate  $I_C - V_{CE}$  limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 2 is based on  $T_{J(pk)} = 150^\circ\text{C}$ ;  $T_C$  is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(pk)} \leq 150^\circ\text{C}$ . At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

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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