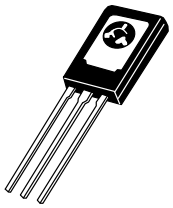
BD165
BD169

Plastic Medium Power Silicon NPN 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
- BD 165, 169 are complementary with BD 166, 168, 170

1.5 AMPERE POWER TRANSISTORS NPN SILICON 45, 60, 80 VOLTS 20 WATTS



CASE 77–08 TO–225AA TYPE

MAXIMUM RATINGS

Rating	Symbol	Type	Value	Unit
Collector–Emitter Voltage	V_{CEO}	BD 165 BD 169	45 80	
Collector–Base Voltage	V_{CBO}	BD 165 BD 169	45 80	Vdc
Emitter–Base Voltage	V_{EBO}		5	Vdc
Collector Current	I_C		1.5	Adc
Base Current	I_B		0.5	Adc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D		1.25 8	Watts mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D		20 160	Watt mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}		–65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	θ_{JC}	6.25	°C/W
Thermal Resistance, Junction to Ambient	θ_{JA}	100	°C/W

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Type	Min	Max	Unit
Collector–Emitter Sustaining Voltage* (I_C = 0.1 Adc, I_B = 0)	BV_{CEO}	BD 165 BD 169	45 80	— —	Vdc
Collector Cutoff Current (V_{CB} = 45 Vdc, I_E = 0) (V_{CB} = 80 Vdc, I_E = 0)	I_{CBO}	 BD 165 BD 169	 — —	 0.1 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 V) (I_C = 0.5 A, V_{CE} = 2 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 Vdc, f = 1.0 MHz)	f_T		6.0	—	MHz

* Pulse Test: Pulse Width ≦ 300 μs, Duty Cycle ≦ 2.0%.

REV 7

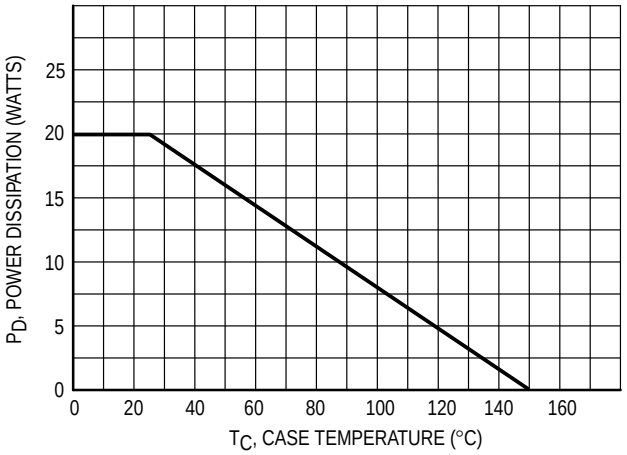


Figure 1. P_D – T_C Derating Curve

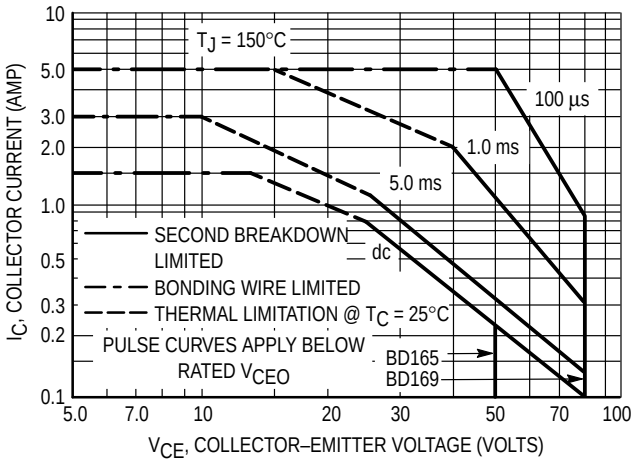


Figure 2. Safe Operating Area (see Note 1)

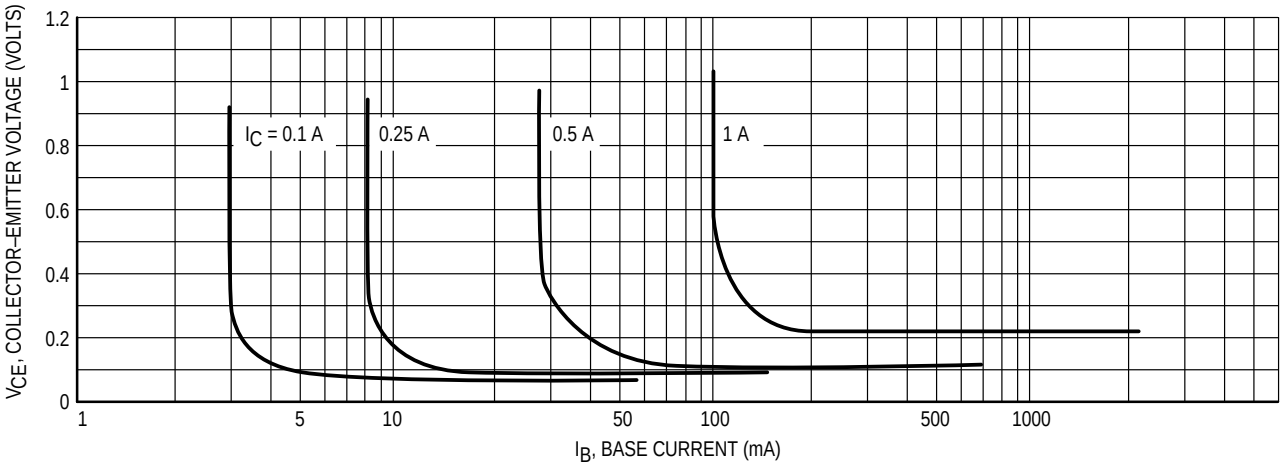


Figure 3. Collector Saturation Region

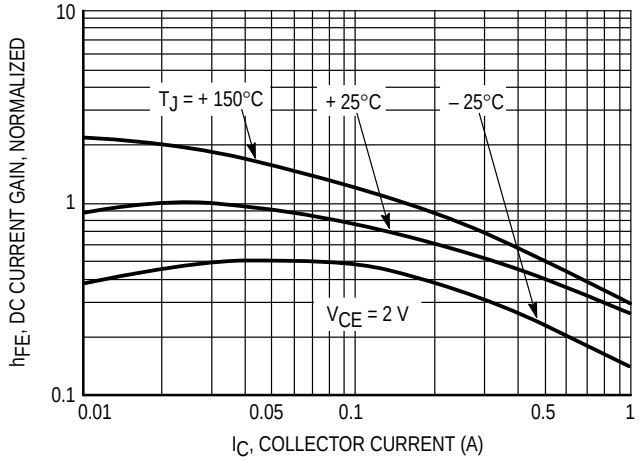


Figure 4. Current Gain

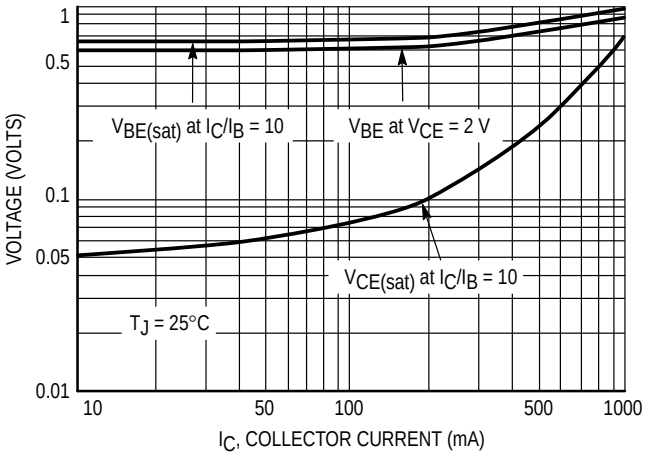


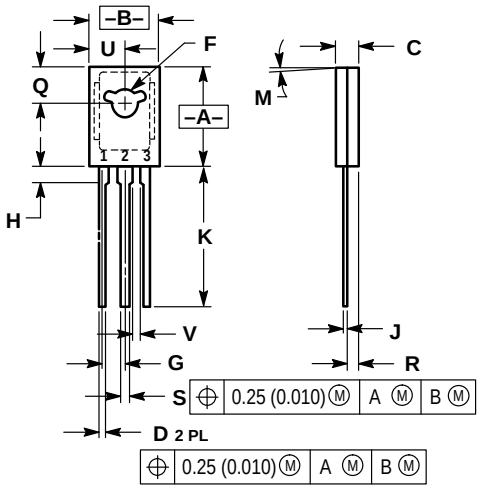
Figure 5. "On" Voltage

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°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°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.

	INCHES		MILLIMETERS	
DIM	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

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