

6367254 MOTOROLA SC (XSTRS/R F)

96D 80557 DT-33-19

**MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA**

**BD166
BD168
BD170**

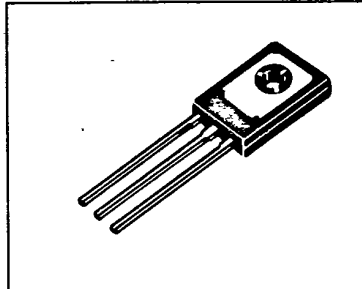
**PLASTIC MEDIUM POWER
SILICON PNP TRANSISTOR**
... designed for use as audio amplifiers and drivers utilizing complementary or quasi complementary circuits.

- DC Current Gain— $h_{FE} = 40$ (Min) @ $I_C = 0.15$ Adc
- BD 166, 168, 170 are complementary with BD 165, 167, 169

**1.5 AMPERE
POWER TRANSISTOR**
PNP SILICON
**45, 60, 80 VOLTS
20 WATTS**

MAXIMUM RATINGS

Rating	Symbol	Type	Value	Unit
Collector-Emitter Voltage	V_{CEO}	BD 166 BD 168 BD 170	45 60 80	Vdc
Collector-Base Voltage	V_{CBO}	BD 166 BD 168 BD 170	45 60 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 @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D		1.25 10	Watts mW/°C
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ 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

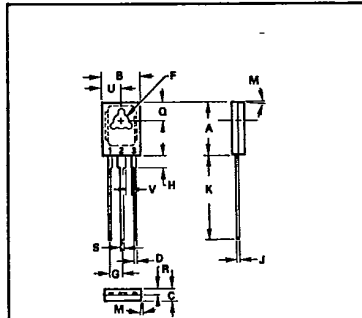


THERMAL CHARACTERISTICS

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

Characteristic	Symbol	Type	Min	Max	Unit
Collector-Emitter Sustaining Voltage* ($I_C = 0.1$ Adc, $I_B = 0$)	BV_{CEO}	BD 166 BD 168 BD 170	45 60 80	—	Vdc
Collector Cutoff Current ($V_{CB} = 45$ Vdc, $I_E = 0$) ($V_{CB} = 60$ Vdc, $I_E = 0$) ($V_{CB} = 80$ Vdc, $I_E = 0$)	I_{CBO}	BD 166 BD 168 BD 170	—	0.1 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



	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	0.20	1.054	0.008	0.041
B	1.75	2.74	0.069	0.108
C	2.40	2.86	0.094	0.113
D	0.15	0.40	0.006	0.016
E	2.50	3.17	0.118	0.125
F	0.20	0.40	0.008	0.016
G	1.27	2.71	0.050	0.107
H	0.20	0.40	0.008	0.016
I	1.41	1.63	0.055	0.064
J	0.20	0.40	0.008	0.016
K	0.20	0.40	0.008	0.016
L	0.20	0.40	0.008	0.016
M	0.20	0.40	0.008	0.016
N	0.20	0.40	0.008	0.016
O	0.20	0.40	0.008	0.016
P	0.20	0.40	0.008	0.016
Q	0.20	0.40	0.008	0.016
R	0.20	0.40	0.008	0.016
S	0.20	0.40	0.008	0.016
T	0.20	0.40	0.008	0.016
U	0.20	0.40	0.008	0.016
V	0.20	0.40	0.008	0.016

STYLE 1
PIN 1. EMITTER
2. COLLECTOR
3. BASE

NOTES
1. MET = METAL TERMINAL
2. LEADS: TIME POSTHOLE WITHIN 0.25mm REF CD
DIA TO DIM A & B AT MAXIMUM MATERIAL
CONDITION

CASE 77-05
TO-126

* Pulse Test: Pulse Width ≤ 300 μ s, Duty Cycle $\leq 2.0\%$.

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96D 80558 D

BD166, BD168, BD170

T-33-19

FIGURE 1 - P_c - T_c DERATING CURVE

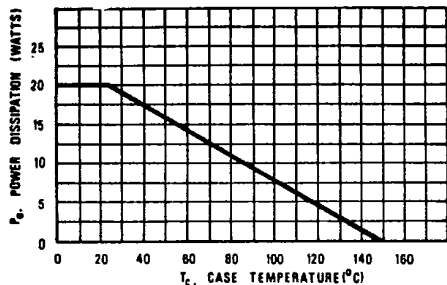


FIGURE 2 - SAFE OPERATING AREA

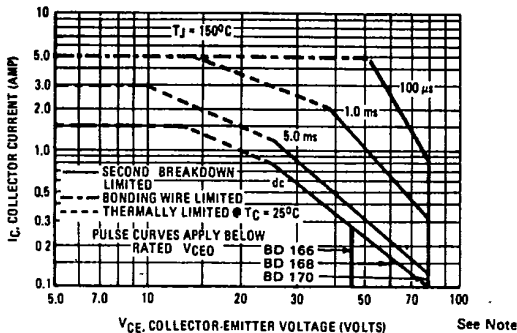


FIGURE 3 - COLLECTOR SATURATION REGION

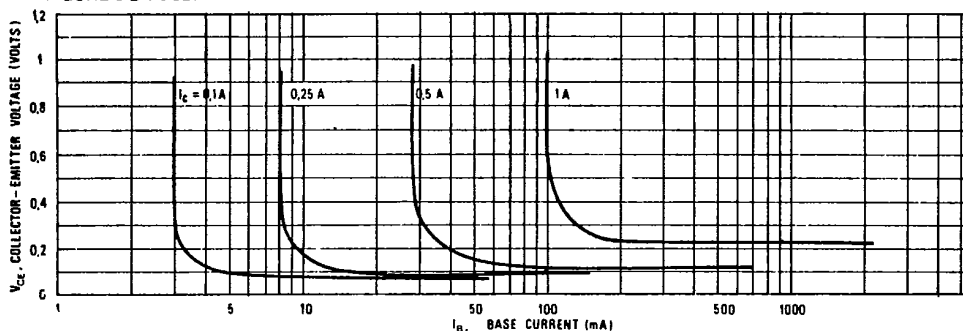


FIGURE 4 - CURRENT GAIN

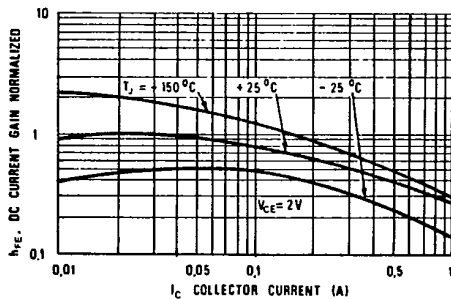
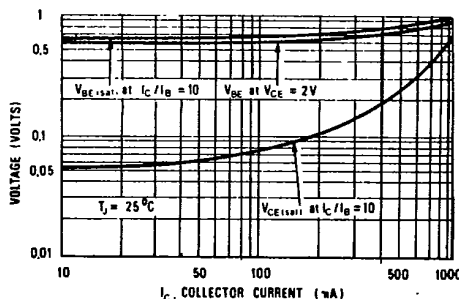


FIGURE 5 - "ON" VOLTAGE



Note 1:

There are two limitations on the power handling ability of a transistor; average junction temperature and second breakdown. Safe operating area 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. (See AN-415)

