

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

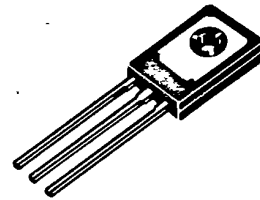
**1.5 AMPERE
POWER TRANSISTOR**

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/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D		20 160	Watt mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}		-65 to +150	$^\circ\text{C}$



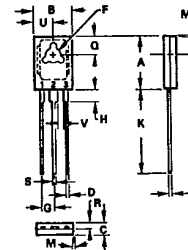
THERMAL CHARACTERISTICS

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

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

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



MILLIMETERS		INCHES	
MIN	MAX	MIN	MAX
1.00	1.05	0.039	0.041
0.75	0.77	0.029	0.030
2.40	2.86	0.094	0.113
0.15	0.40	0.006	0.016
0.25	0.37	0.010	0.015
0.30	0.40	0.012	0.016
0.17	0.21	0.007	0.008
0.20	0.25	0.008	0.010
0.44	0.53	0.017	0.021
0.10	0.13	0.004	0.005
0.15	0.20	0.006	0.008
0.15	0.20	0.006	0.008
0.15	0.20	0.006	0.008

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

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

**CASE 77-05
TO-126**



6367254 MOTOROLA SC (XSTRS/R F)

96D 80558 D

BD166, BD168, BD170

T-33-19

FIGURE 1 - P_c - T_c DERATING CURVE

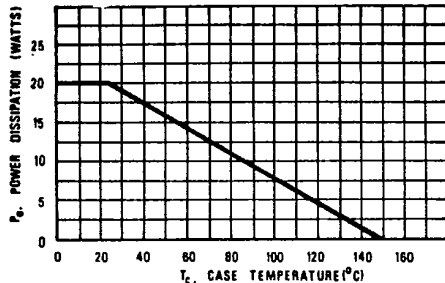


FIGURE 2 - SAFE OPERATING AREA

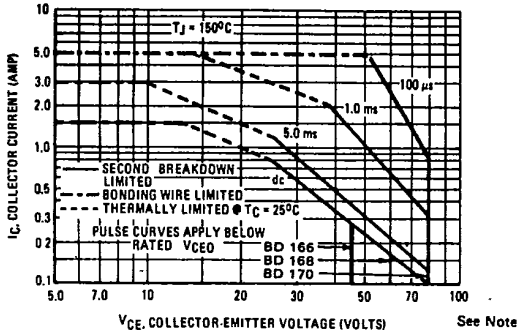


FIGURE 3 - COLLECTOR SATURATION REGION

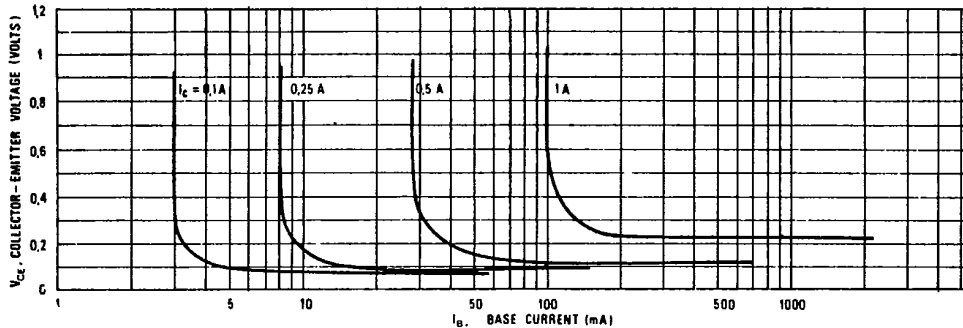


FIGURE 4 - CURRENT GAIN

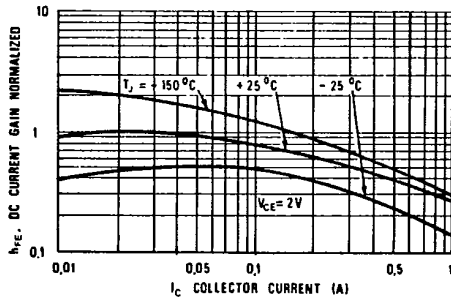
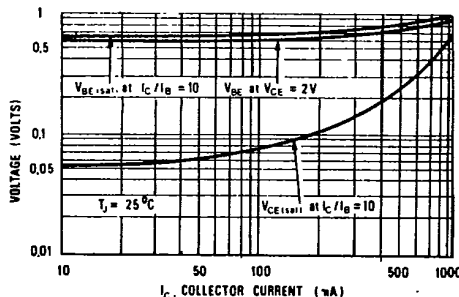


FIGURE 5 - "ON" VOLTAGE



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)

