

6367254 MOTOROLA SC (XSTRS/R F)

96D 80590

DT-33-15

T-33-23

MOTOROLA SEMICONDUCTOR TECHNICAL DATA

**NPN
BD315, BD316
PNP
BD317, BD318**

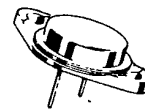
COMPLEMENTARY SILICON HIGH-POWER TRANSISTORS

... designed for high quality amplifiers operating up to 100 Watts into 4 ohm load with BD315, BD316 and into 8 ohm load with BD317, BD318.

- High DC Current Gain
- Excellent Safe Operating Area
- High Current Gain — Bandwidth Product — Typical
 $f_T = 2.0 \text{ MHz} @ I_C = 1.0 \text{ A}$

**16 AMPERE
COMPLEMENTARY SILICON
POWER TRANSISTORS**

**80-100 VOLTS
200 WATTS**



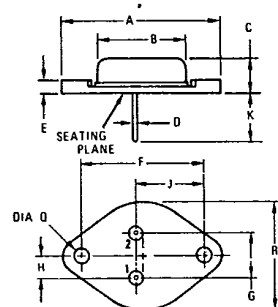
MAXIMUM RATINGS

Rating	Symbol	BD315 BD316	BD317 BD318	Unit
Collector-Emitter Voltage	V_{CEO}	80	100	Vdc
Collector-Base Voltage	V_{CB}	80	100	Vdc
Emitter-Base Voltage	V_{EB}	7.0		Vdc
Collector Current — Continuous Peak	I_C	16 20		Adc
Base Current — Continuous	I_B	5.0		Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	200 1.14		Watts W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	θ_{JC}	0.875	$^\circ\text{C/W}$

3



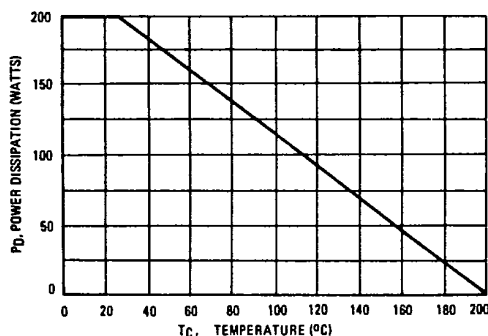
STYLE 1
PIN 1 BASE
2 EMITTER
CASE COLLECTOR
NOTE
1 DIM "O" IS DIA

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A		39.37		1.560
B		21.08		0.830
C	5.35	7.62	0.250	0.300
D	0.99	1.05	0.039	0.043
E		3.43		0.135
F	29.90	30.40	1.177	1.197
G	10.67	11.18	0.420	0.440
H	5.33	5.59	0.210	0.220
J	16.64	17.15	0.655	0.675
K	11.18	12.19	0.440	0.480
L	3.84	4.09	0.151	0.161
R		26.67		1.050

Collector connected to case

CASE 11 (TO-3)

FIGURE 1 — POWER DERATING



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 BD315, BD316, BD317, BD318

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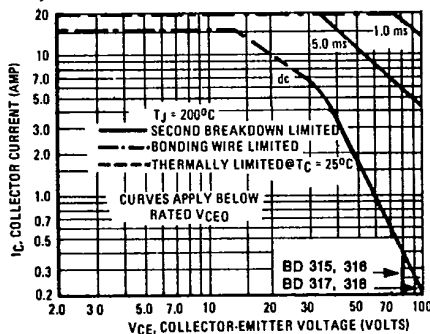
* ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Sustaining Voltage (1) ($I_C = 200 \text{ mAdc}$, $I_B = 0$)	BD315, BD316 BD317, BD318 $V_{CE(sus)}$	80 100	— —	Vdc
Collector-Base Cutoff Current ($V_{CB} = \text{Rated } V_{CB}$, $I_E = 0$)	I_{CBO}	—	1.0	mAdc
Emitter-Base Cutoff Current ($V_{EB} = 7.0 \text{ Vdc}$, $I_C = 0$)	I_{EBO}	—	1.0	mAdc
ON CHARACTERISTICS (1)				
DC Current Gain $I_C = 5.0 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$ $I_C = 8.0 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$ $I_C = 10 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$	BD317, BD318 BD315, BD316 All Types h_{FE}	25 25 15	—	—
Collector-Emitter Saturation Voltage $I_C = 8.0 \text{ Adc}$, $I_B = 0.8 \text{ Adc}$	$V_{CE(sat)}$	—	1.0	Vdc
Base-Emitter Saturation Voltage $I_C = 8.0 \text{ Adc}$, $I_B = 0.8 \text{ Adc}$	$V_{BE(sat)}$	—	1.8	Vdc
Base-Emitter On Voltage ($I_C = 8.0 \text{ Adc}$, $V_{CE} = 2.0 \text{ Vdc}$)	$V_{BE(on)}$	—	1.5	Vdc
DYNAMIC CHARACTERISTICS				
Current-Gain—Bandwidth Product (2) ($I_C = 1.0 \text{ Adc}$, $V_{CE} = 20 \text{ Vdc}$, $f_{test} = 0.5 \text{ MHz}$)	f_T	1.0	—	MHz

(1) Pulse Test: Pulse Width $< 300 \mu\text{s}$, Duty Cycle $> 2.0\%$.
 (2) $f_T = |h_{FE}| \cdot f_{test}$.



FIGURE 2 — ACTIVE REGION SAFE OPERATING AREA



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 $T_{J(pk)} = 200^\circ\text{C}$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} < 200^\circ\text{C}$. 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).

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BD315, BD316, BD317, BD318

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PNP DEVICES
BD316 and BD318

NPN DEVICES
BD315 and BD317

FIGURE 3 — DC CURRENT GAIN

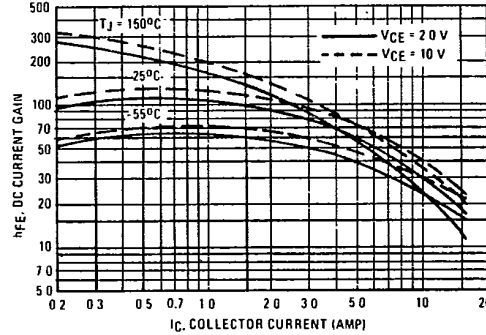
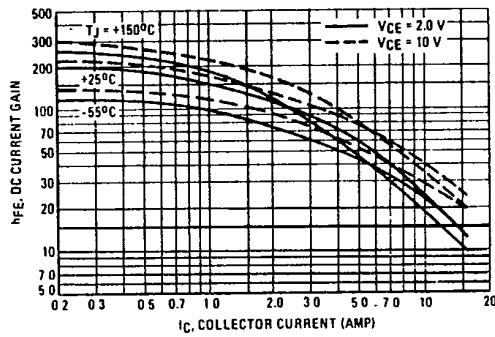


FIGURE 4 — "ON" VOLTAGES

