MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

NPN
BD315, BD316
PNP
BD317, BD318

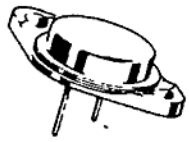
COMPLEMENTARY SILICON HIGH-POWER TRANSISTORS

... 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 MHz @ I_C = 1.0 A

16 AMPERE
COMPLEMENTARY SILICON
POWER TRANSISTORS

80-100 VOLTS
200 WATTS

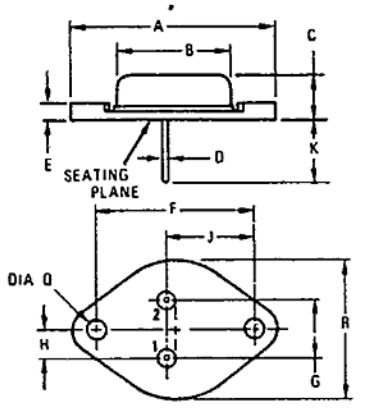


MAXIMUM RATINGS

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°C Derate above 25°C	P_D	200 1.14		Watts W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	θ_{JC}	0.875	°C/W



STYLE 1
PIN 1 BASE
2 EMITTER
CASE COLLECTOR

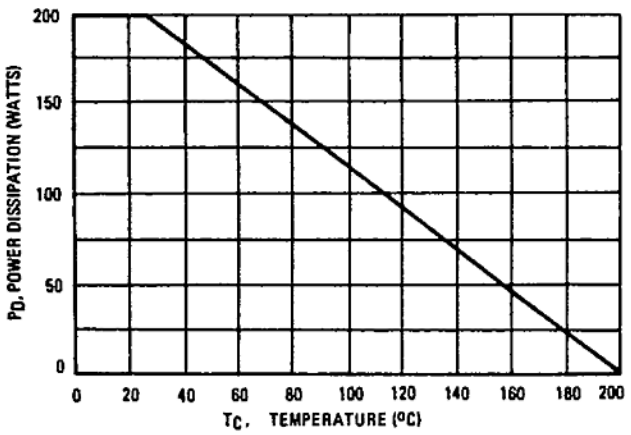
NOTE
1 DIM "Q" IS DIA

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A		39 37	–	1 550
B		21 08		0 830
C	6 35	7 62	0 250	0 300
D	0 99	1 09	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
Q	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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*** ELECTRICAL CHARACTERISTICS** (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Sustaining Voltage (1) (I_C = 200 mAdc, I_B = 0)	BD315, BD316 BD317, BD318	$V_{CEO(sus)}$	60 100	— —	Vdc
Collector-Base Cutoff Current (V_{CB} = Rated V_{CB}, I_E = 0)		I_{CBO}	—	1.0	mAdc
Emitter-Base Cutoff Current (V_{BE} = 7.0 Vdc, I_C = 0)		I_{EBO}	—	1.0	mAdc
ON CHARACTERISTICS (1)					
DC Current Gain I_C = 5.0 Adc, V_{CE} = 4.0 Vdc I_C = 8.0 Adc, V_{CE} = 4.0 Vdc I_C = 10 Adc, V_{CE} = 4.0 Vdc	 BD317, BD318 BD315, BD316 All Types	h_{FE}	 25 25 15		—
Collector-Emitter Saturation Voltage (I_C = 8.0 Adc, I_B = 0.8 Adc)		$V_{CE(sat)}$	—	1.0	Vdc
Base-Emitter Saturation Voltage (I_C = 8.0 Adc, I_B = 0.8 Adc)		$V_{BE(sat)}$	—	1.8	Vdc
Base-Emitter On Voltage (I_C = 8.0 Adc, V_{CE} = 2.0 Vdc)		$V_{BE(on)}$	—	1.5	Vdc
DYNAMIC CHARACTERISTICS					
Current-Gain—Bandwidth Product (2) (I_C = 1.0 Adc, V_{CE} = 20 Vdc, f_{test} = 0.5 MHz)		f_T	1.0	—	MHz

(1) Pulse Test: Pulse Width $\leq$ 300 μs, Duty Cycle $\geq$ 2.0%.
(2) $f_T = |h_{fe}| \bullet f_{test}$.

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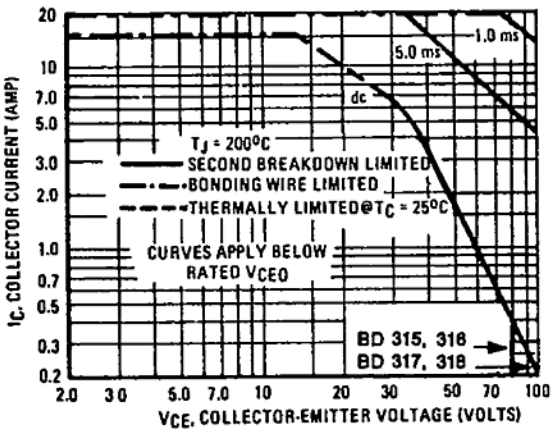
FIGURE 2 — ACTIVE REGION SAFE OPERATING AREA



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

PNP DEVICES
BD316 and BD318

NPN DEVICES
BD315 and BD317

FIGURE 3 — DC CURRENT GAIN

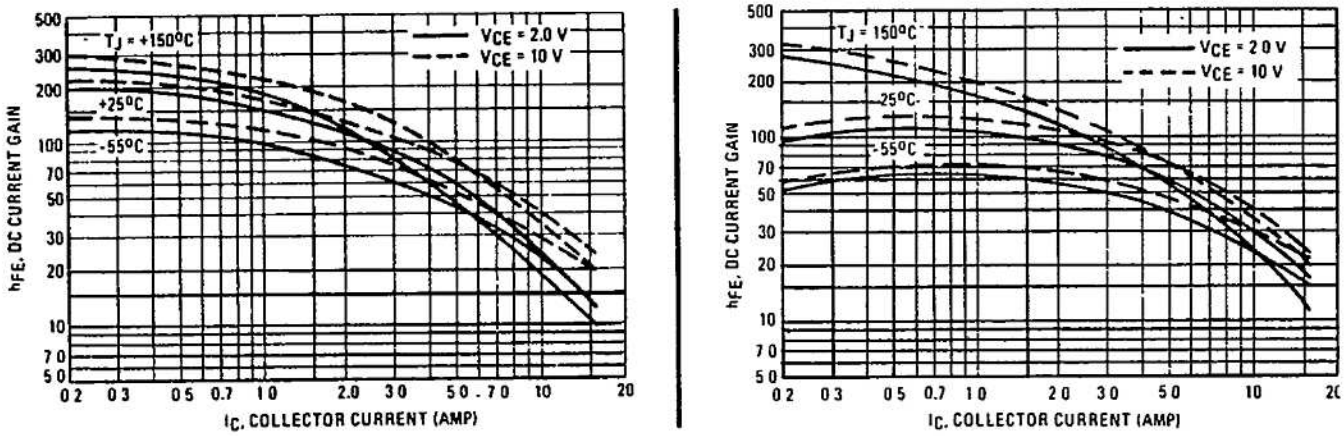
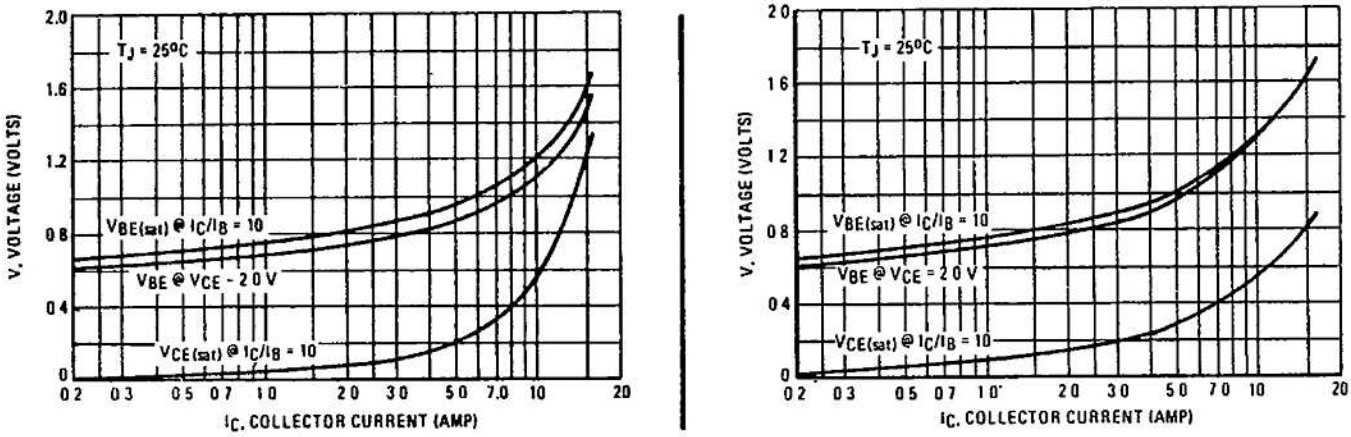


FIGURE 4 — "ON" VOLTAGES



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