MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

BD516
BD518
BD520

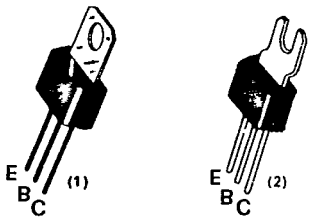
PNP SILICON ANNULAR
AMPLIFIER TRANSISTORS

. . . designed for general-purpose, high-voltage amplifier and driver applications.

- High Collector-Emitter Breakdown Voltage —
  BV_{CEO} = 45 Vdc (Min) @ I_C = 1 mAdc — BD516
  60 Vdc (Min) @ I_C = 1 mAdc — BD518
  80 Vdc (Min) @ I_C = 1 mAdc — BD520
- High Power Dissipation — P_D = 10 W @ T_C = 25°C
- Complements to BD515, BD517, BD519

PNP SILICON ANNULAR AMPLIFIER TRANSISTORS

45 - 60 - 80 VOLTS
10 WATTS



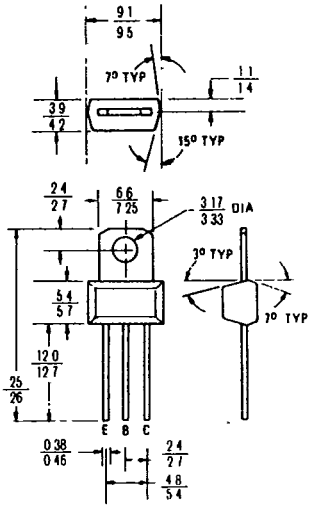
(1) **Standard package: BD516, 518, 520**
(2) Tab formed for flat mounting BD516-1, 518-1, 520-1
Also available with leads formed to TO-5 configuration BD516-5, 518-5, 520-5

MAXIMUM RATINGS

Rating	Symbol	BD516	BD518	BD520	Unit
Collector-Emitter Voltage	V_{CEO}	45	60	80	Vdc
Collector-Base Voltage	V_{CB}	45	60	80	Vdc
Emitter-Base Voltage	V_{EB}	—	4.0	—	Vdc
Collector Current – Continuous	I_C	—	2.0	—	Adc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D		1.0 8.0		Watt mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D		10 80		Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}		-55 to +150		°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	θ_{JC}	12.5	°C/W
Thermal Resistance, Junction to Ambient	θ_{JA}	125	°C/W



All dimensions in millimeters
Collector connected to tab

CASE 152

3

BD516, BD518, BD520

T-33-17

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

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage (I_C = 1.0 mAdc, I_B = 0)	BD516	BV_{CEO}	45	—	—	Vdc
	BD518		60	—	—	
	BD520		80	—	—	
Emitter-Base Breakdown Voltage (I_E = 100 μAdc, I_C = 0)		BV_{EBO}	4.0	—	—	Vdc
Collector Cutoff Current						nAdc
(V_{CB} = 30 Vdc, I_E = 0)	BD516	I_{CBO}	—	—	100	
(V_{CB} = 40 Vdc, I_E = 0)	BD518		—	—	100	
(V_{CB} = 60 Vdc, I_E = 0)	BD520		—	—	100	
ON CHARACTERISTICS						
DC Current Gain (1)		h_{FE}				—
(I_C = 10 mAdc, V_{CE} = 2.0 Vdc)			—	150	—	
(I_C = 150 mAdc, V_{CE} = 2.0 Vdc)			60	130	350	
(I_C = 500 mAdc, V_{CE} = 2.0 Vdc)			25	80	—	
Collector-Emitter Saturation Voltage (1)		$V_{CE(sat)}$				Vdc
(I_C = 500 mAdc, I_B = 50 mAdc)			—	0.24	0.5	
(I_C = 500 mAdc, I_B = 25 mAdc)			—	0.32	—	
Base-Emitter On Voltage (1) (I_C = 500 mAdc, V_{CE} = 2.0 Vdc)		$V_{BE(on)}$	—	0.78	1.0	Vdc
SMALL-SIGNAL CHARACTERISTICS						
Current-Gain--Bandwidth Product (I_C = 200 mAdc, V_{CE} = 5.0 Vdc, f = 100 MHz)		f_T	50	125	—	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 100 kHz)		C_{ob}	—	10	15	pF

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

FIGURE 1 — DC CURRENT GAIN

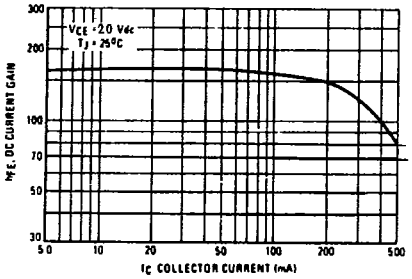


FIGURE 2 — "ON" VOLTAGES

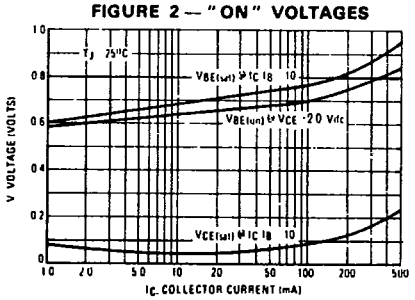


FIGURE 3 — DC SAFE OPERATING AREA

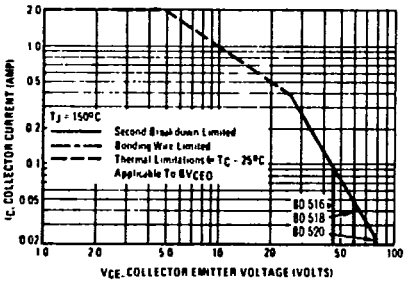
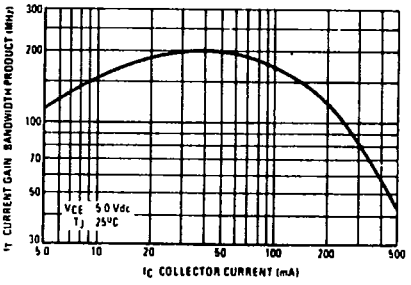


FIGURE 4 — CURRENT-GAIN–BANDWIDTH PRODUCT



There are two limitations on the power handling ability of a transistor: junction temperature and secondary 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 3 is based on $T_{J(pk)}$ = 150 °C, T_C is variable depending on conditions. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by secondary breakdown.