MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

BD506
BD508
BD510

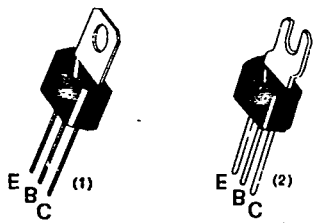
PNP SILICON ANNULAR♦ TRANSISTORS

. . . designed for complementary symmetry audio circuits

- Excellent Current Gain Linearity — 1.0 mAdc to 1.0 Adc
- Low Collector-Emitter Saturation Voltage —
  $V_{CE(sat)}$ = 0.7 Vdc (Max) @ I_C = 1.0 Adc
- Complements to NPN BD505, BD507, BD509
- Uniwatt▲ Package for Excellent Thermal Properties —
  1.0 Watt @ T_A = 25°C
  10.0 Watts @ T_C = 25°C

PNP SILICON AUDIO TRANSISTORS

20 - 30 - 40 VOLTS
10 WATTS



(1) **Standard package: BD506, 508, 510**
(2) Tab formed for flat mounting BD506-1, 508-1, 510-1

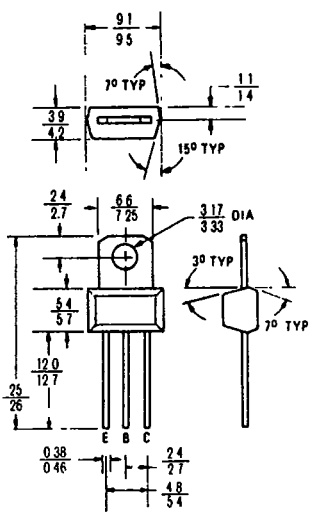
Also available with leads formed to TO-5 configuration: BD506-5, 508-5, 510-5

MAXIMUM RATINGS

Rating	Symbol	BD506	BD508	BD510	Unit
Collector-Emitter Voltage	V_{CEO}	20	30	40	Vdq
Collector-Base Voltage	V_{CB}	30	40	50	Vdc
Emitter-Base Voltage	V_{EB}	—	5.0	—	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

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)	BD506	BV_{CEO}	20	—	—	Vdc
	BD508		30	—	—	
	BD510		40	—	—	
Emitter-Base Breakdown Voltage (I_E = 100 μAdc, I_C = 0)		BV_{EBO}	5.0	—	—	Vdc
Collector Cutoff Current (V_{CB} = 20, 30, 40 Vdc, I_E = 0)	BD506	I_{CBO}	—	—	100	nAdc
	BD508		—	—	100	
	BD510		—	—	100	
ON CHARACTERISTICS						
DC Current Gain (1) (I_C = 250 mAdc, V_{CE} = 2.0 Vdc)		h_{FE}	60	135	—	—
(I_C = 1 0 Adc, V_{CE} = 2.0 Vdc)			40	90	—	
Collector-Emitter Saturation Voltage(1) (I_C = 1.0 Adc, I_B = 0.1 Adc)		$V_{CE(sat)}$	—	0.40	0.7	Vdc
Base-Emitter On Voltage (1) (I_C = 1.0 Adc, V_{CE} = 1.0 Vdc)		$V_{BE(on)}$	—	0 92	1.2	Vdc
SMALL-SIGNAL CHARACTERISTICS						
Current-Gain--Bandwidth Product (I_C = 50 mAdc, V_{CE} = 5.0 Vdc, f = 100 MHz)		f_T	50	180	—	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 100 kHz)		C_{ob}	—	—	30	pF

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

FIGURE 1 — DC CURRENT GAIN

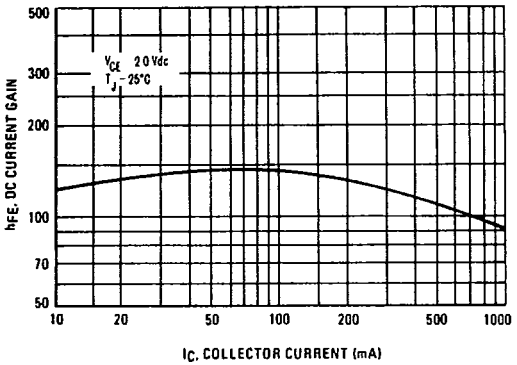


FIGURE 2 — "ON" VOLTAGES

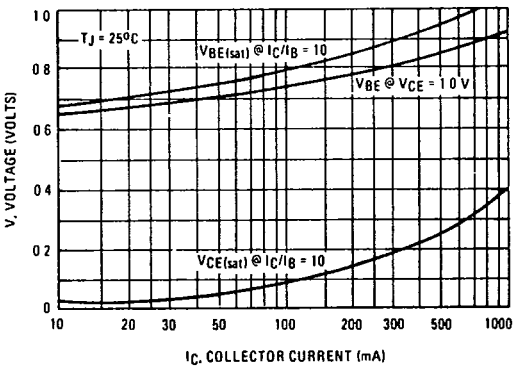
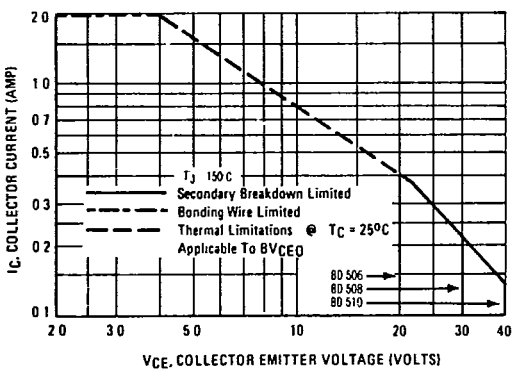


FIGURE 3 — DC SAFE OPERATING AREA



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