

6367254 MOTOROLA SC (XSTRS/R F)

96D 80603 D

T-33-07

MOTOROLA SEMICONDUCTOR TECHNICAL DATA

BD515
BD517
BD519

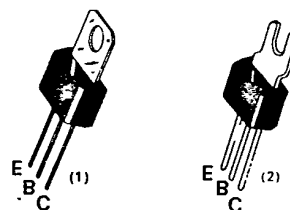
NPN SILICON ANNULAR AMPLIFIER TRANSISTORS

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

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

NPN SILICON AMPLIFIER TRANSISTORS

45 - 60 - 80 VOLTS
10 WATTS



- (1) Standard package BD515, 517, 519
 (2) Tab formed for flat mounting BD515-1, 517-1, 519-1

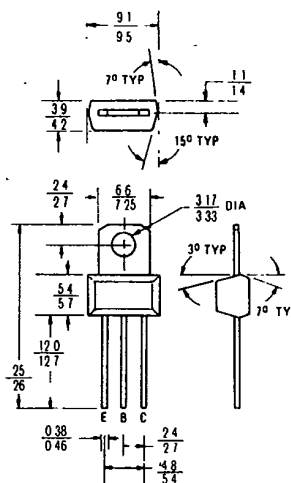
Also available with leads formed to TO-5 configuration BD515-5, 517-5, 519-5

MAXIMUM RATINGS

Rating	Symbol	BD515	BD517	BD519	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 @ $T_A = 25^\circ\text{C}$ — Derate above 25°C	P_D	—	1.0 8.0	—	Watt mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ — Derate above 25°C	P_D	—	10 80	—	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150			$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	θ_{JC}	12.5	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	θ_{JA}	125	$^\circ\text{C/W}$



All dimensions in millimeters
 Collector connected
 to tab

CASE 152

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BD515, BD517, BD519

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage ($I_C = 1.0 \text{ mAdc}$, $I_E = 0$)	BD515 BD517 BD519 BV_{CEO}	45 60 80	— — —	— — —	Vdc
Emitter-Base Breakdown Voltage ($I_E = 100 \mu\text{Adc}$, $I_C = 0$)	BV_{EBO}	4.0	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 30 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = 40 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = 60 \text{ Vdc}$, $I_E = 0$)	BD515 BD517 BD519 I_{CBO}	— — —	— — —	100 100 100	nAdc
ON CHARACTERISTICS					
DC Current Gain (1) ($I_C = 10 \text{ mAdc}$, $V_{CE} = 2.0 \text{ Vdc}$) ($I_C = 150 \text{ mAdc}$, $V_{CE} = 2.0 \text{ Vdc}$) ($I_C = 500 \text{ mAdc}$, $V_{CE} = 2.0 \text{ Vdc}$)	h_{FE}	— 60 25	115 125 55	— 350 —	—
Collector-Emitter Saturation Voltage (1) ($I_C = 500 \text{ mAdc}$, $I_B = 50 \text{ mAdc}$) ($I_C = 500 \text{ mAdc}$, $I_B = 25 \text{ mAdc}$)	$V_{CE(sat)}$	— —	0.18 0.24	0.5 —	Vdc
Base-Emitter On Voltage (1) ($I_C = 500 \text{ mAdc}$, $V_{CE} = 2.0 \text{ Vdc}$)	$V_{BE(on)}$	—	0.74	1.0	Vdc
SMALL-SIGNAL CHARACTERISTICS					
Current-Gain-Bandwidth Product ($I_C = 200 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$, $f = 100 \text{ MHz}$)	f_T	50	160	—	MHz
Output Capacitance ($V_{CB} = 10 \text{ Vdc}$, $I_E = 0$, $f = 100 \text{ kHz}$)	C_{ob}	—	6.0	12	pF

(1) Pulse Test. Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$

FIGURE 1 — TYPICAL DC CURRENT GAIN

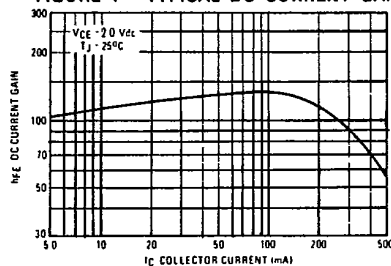


FIGURE 2 — "SATURATION" AND "ON" VOLTAGES

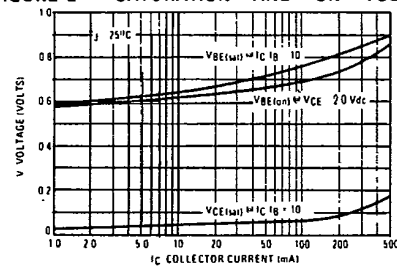


FIGURE 3 — DC SAFE OPERATING AREA

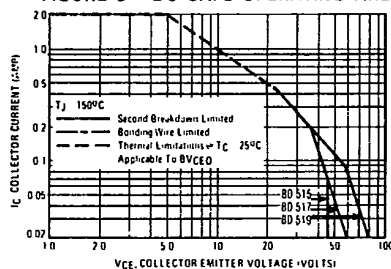
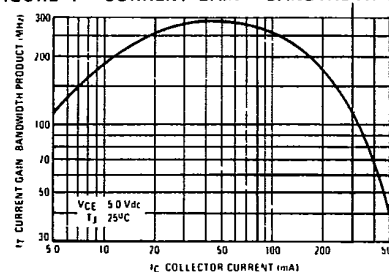


FIGURE 4 — CURRENT-GAIN — BANDWIDTH PRODUCT



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 $T_J(pk) = 150^\circ\text{C}$. 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.