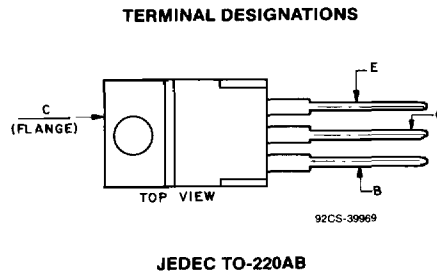


Epitaxial-Base, Silicon N-P-N and P-N-P VERSAWATT Transistors

General-Purpose Medium-Power Types for
Switching and Amplifier Applications

Features:

- Low saturation voltages
- Complementary n-p-n and p-n-p types
- Maximum safe-area-of-operation curves



2
POWER
TRANSISTORS

The RCA-BD533-BD538 are epitaxial-base silicon transistors intended for a wide variety of medium-power switching and amplifier applications, such as series and shunt regulators and driver and output stages of high-fidelity amplifiers.

The BD533, BD535, and BD537 are n-p-n complements of p-n-p types BD534, BD536, and BD538, respectively. All types are supplied in the JEDEC TO-220AB (VERSAWATT)

MAXIMUM RATINGS, Absolute-Maximum Values:

	N-P-N BD533 BD534■	BD535 BD536■	BD537 BD538■	
V_{CBO}	45	60	80	V
$V_{CES}(SUS)$	45	60	80	V
$V_{CEO}(SUS)$	45	60	80	V
V_{EBO}		5		V
I_C		8		A
I_B		1		A
P_T		50		W
$T_C \leq 25^\circ C$		0.4		W/ $^\circ C$
$T_C > 25^\circ C$ derate linearly		-65 to 150		$^\circ C$
T_{stg} , T_J				
T_L At distances $\geq 1/8$ in. (3.17 mm) from case for 10 s max.		235		$^\circ C$

■For p-n-p devices, voltage and current values are negative.

BD533, BD534, BD535, BD536, BD537, BD538

ELECTRICAL CHARACTERISTICS at Case Temperature (T_C) = 25°C
Unless Otherwise Specified

CHARACTERISTIC	TEST CONDITIONS [▲]				LIMITS						UNITS
	VOLTAGE V dc		CURRENT A dc		BD533 BD534 [▲]		BD535 BD536 [▲]		BD537 BD538 [▲]		
	V _{CE}	V _{BE}	I _C	I _B	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
I _{CBO}	45 [Ⓢ]				—	100	—	—	—	—	μA
	60 [Ⓢ]				—	—	—	100	—	—	
	80 [Ⓢ]				—	—	—	—	—	100	
I _{CES}	45				—	100	—	—	—	—	μA
	60				—	—	—	100	—	—	
	80				—	—	—	—	—	100	
I _{EBO}		5			—	1	—	1	—	1	mA
V _{CEO(sus)} [■]			0.1 [*]	0	45	—	60	—	80	—	V
h _{FE}	5		0.01 [*]		20	—	20	—	15	—	V
	2		0.5 [*]		40	—	40	—	40	—	
	2		2 [*]		25	—	25	—	15	—	
h _{FE} Groups	J		2 [*]		30	75	30	75	30	75	V
		2	3 [*]		15	—	15	—	15	—	
K		2 [*]		40	100	40	100	40	100	V	
	2	3 [*]		20	—	20	—	20	—		
L (For BD533, BD534 only)		2 [*]		60	150	—	—	—	—	V	
	2	3 [*]		30	—	—	—	—	—		
V _{BE}	2		2 [*]		—	1.5	—	1.5	—	1.5	V
V _{CE(sat)}			2 [*]	0.2	—	0.8	—	0.8	—	0.8	V
			6 [*]	0.6	0.8 [●]	—	0.8 [●]	—	0.8 [●]	—	
f _T	1		0.5		3	12 [●]	3	12 [●]	3	12 [●]	MHz
R _{θJC}					—	2.5	—	2.5	—	2.5	°C/W

- ▲ For p-n-p devices, voltage and current values are negative.
- Ⓢ V_{CB} value
- CAUTION: The sustaining voltage V_{CEO(sus)} MUST NOT be measured on a curve tracer.
- * Pulsed: Pulse duration = 300 μs, duty factor = 1.5%.
- Typical values.

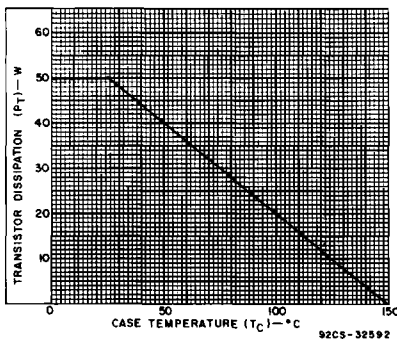


Fig. 1—Derating curve for all types.

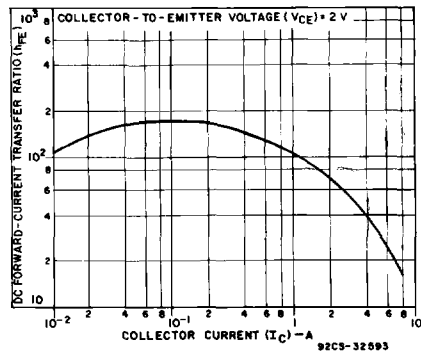


Fig. 2—Typical dc beta characteristic for BD533, BD535, and BD537 types.

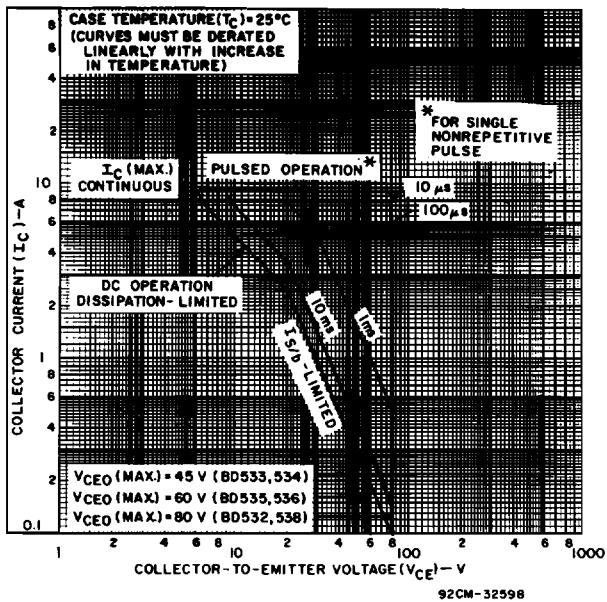


Fig. 3—Maximum safe-operating areas for all types.

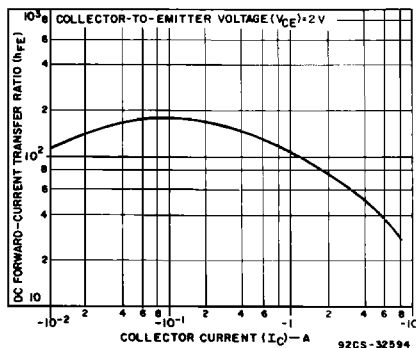


Fig. 4—Typical dc beta characteristic for BD534, BD536, and BD538 types.

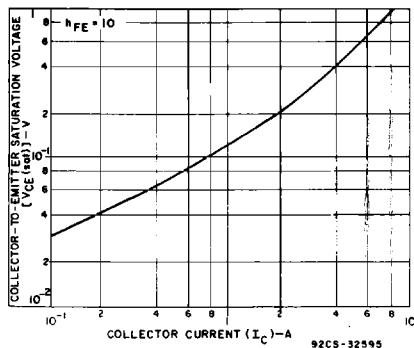


Fig. 5—Typical collector to-emitter saturation voltage characteristic for BD533, BD535, and BD537 types.

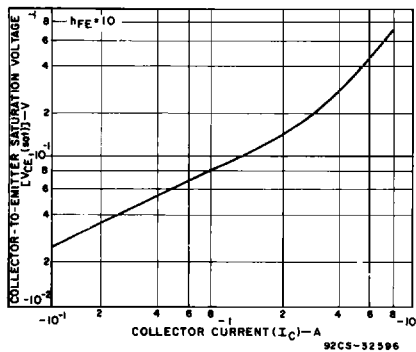


Fig. 6—Typical collector-to-emitter saturation voltage characteristic for BD534, BD536, and BD538 types.

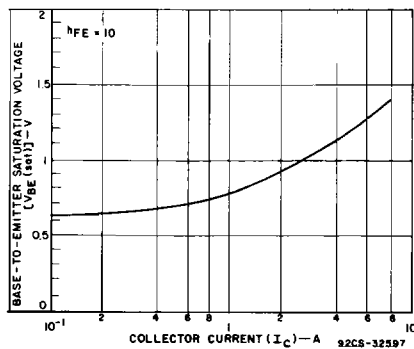


Fig. 7—Typical base-to-emitter saturation voltage characteristic for BD533, BD535, and BD537 types.

BD533, BD534, BD535, BD536, BD537, BD538

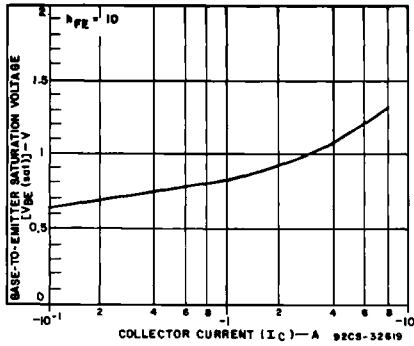


Fig. 8—Typical base-to-emitter saturation voltage characteristic for BD534, BD536, and BD538 types.

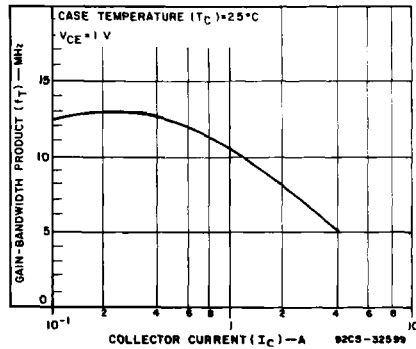


Fig. 9—Typical gain-bandwidth product characteristic for BD533, BD535, and BD537 types.

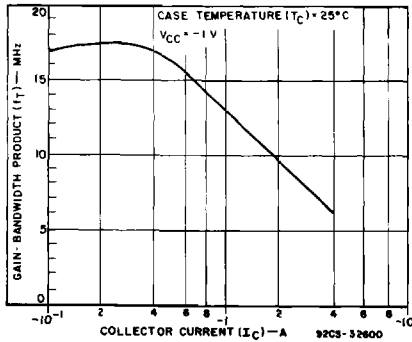


Fig. 10—Typical gain-bandwidth product characteristic for BD534, BD536, and BD538 types.

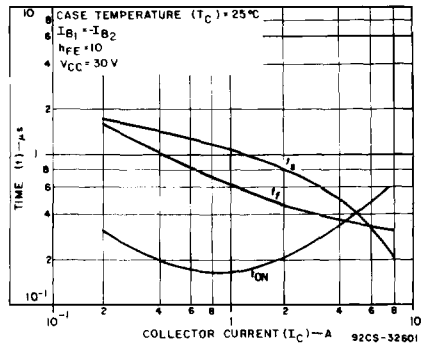


Fig. 11—Typical saturated-switching time characteristics for BD533, BD535, and BD537 types.

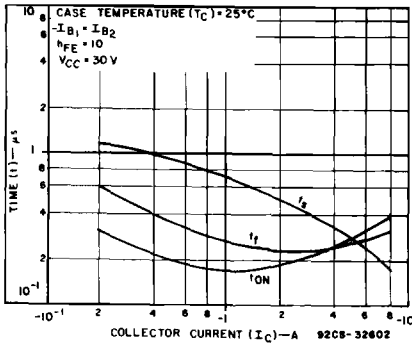


Fig. 12—Typical saturated switching time characteristics for BD534, BD536, and BD538 types.

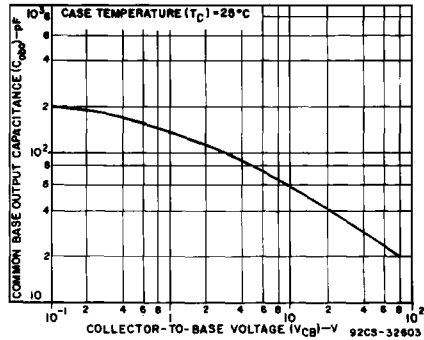


Fig. 13—Typical common-base output capacitance characteristic for BD533, BD535, and BD537 types.

BD533, BD534, BD535, BD536, BD537, BD538

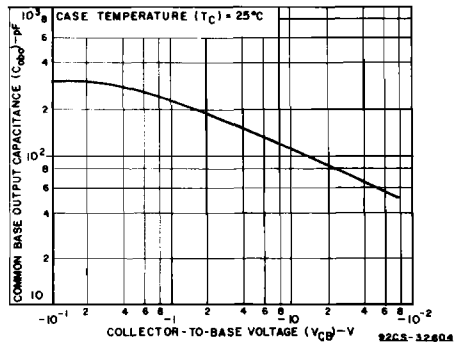


Fig. 14—Typical common-base output capacitance characteristic for BD534, BD536, and BD538 types.