

BFT19, BFT19A, BFT19B

File Number **683**

HARRIS SEMICOND SECTOR

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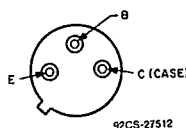
**Silicon P-N-P
High-Voltage Planar Transistors**

For High-Speed Switching and Linear-Amplifier
Applications in Military, Industrial and Commercial Equipment

Features:

- Maximum safe-area-of-operation curves
- High voltage ratings:
 - V_{CBO} = -400 V max. (BFT19B); -300 V max. (BFT19A);
-200 V max. (BFT19)
 - $V_{CEO(sus)}$ = -350 V max. (BFT19B); -250 V max. (BFT19A);
-150 V max. (BFT19)

TERMINAL DESIGNATIONS



JEDEC TO-205AD

RCA-BFT19, BFT19A, and BFT19B are silicon p-n-p transistors with high breakdown voltages, high frequency response, and fast switching speeds. These transistors differ in their voltage ratings.

Typical applications include high-voltage differential and operational amplifiers; high-voltage inverters, and high-voltage, low-current switching and series regulators.

MAXIMUM RATINGS, Absolute-Maximum Values:

	BFT19	BFT19A	BFT19B	
COLLECTOR-TO-BASE VOLTAGE	-200	-300	-400	V
COLLECTOR-TO-EMITTER SUSTAINING VOLTAGE:				
With base open	$V_{CEO(sus)}$ -150	-250	-350	V
With external base-to-emitter resistance (R_{BE}) = 100 Ω	$V_{CER(sus)}$ -200	-300	-400	V
EMITTER-TO-BASE VOLTAGE	-5	-5	-5	V
COLLECTOR CURRENT (Continuous)	I_C -1	-1	-1	A
BASE CURRENT (Continuous)	I_B -0.5	-0.5	-0.5	A
TRANSISTOR DISSIPATION:	P_T			
At case temperatures up to 25°C	5	5	5	W
At case temperatures above 25°C	See Figs. 1 & 4.			
At ambient temperatures up to 25°C	1	1	1	W
At ambient temperatures above 25°C	Derate linearly at 5.7 mW/°C			
TEMPERATURE RANGE:				
Storage and Operating (Junction)	← -65 to 200 →			°C
PIN TEMPERATURE (During Soldering):				
At distance \geq 1/32 in. (0.8 mm) from case for 10 s max.	← 255 →			°C

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ELECTRICAL CHARACTERISTICS, At Case Temperature (T_C) = 25°C

CHARACTERISTIC	SYMBOL	TEST CONDITIONS						LIMITS						UNITS	
		VOLTAGE V dc			CURRENT mA			BFT19		BFT19A		BFT19B			
		V _{CB}	V _{CE}	V _{EB}	I _C	I _E	I _B	Min.	Max.	Min.	Max.	Min.	Max.		
Collector Cutoff Current With emitter open	I _{CBO}	-100 -200 -300					0 0 0	-	-100	-	-	-	-	-	μA
Emitter Cutoff Current	I _{EBO}			-5	0			-	-100	-	-100	-	-100	-	μA
DC Forward-Current Transfer Ratio	h _{FE}		-10 -10 -10		-10 -30 -50			20 25 20	-	20 25 20	-	20 25 20	-	-	
Collector-to-Emitter Sustaining Voltage (See Figs. 2 and 3) With base open	V _{CEO(sus)}				-10		0	-150 ^a	-	-250 ^a	-	-350 ^a	-	-	V
With external base-to-emitter resistance (R _{BE}) = 100 Ω	V _{CER(sus)}				-10			-200 ^a	-	-300 ^a	-	-400 ^a	-	-	V
Base to-Emitter Saturation Voltage	V _{BE(sat)}				-30		-3	-	-1.8	-	-1.8	-	-1.8	V	
Collector-to-Emitter Saturation Voltage	V _{CE(sat)}				-10 -30		-1 -3	-	-1 -2.5	-	-1 -2.5	-	-1 -2.5	V	
Common-Emitter, Small-Signal, Short Circuit, Forward-Current Transfer Ratio (at 1 kHz)	h _{fe}		-10		-5			25	-	25	-	25	-		
Magnitude of Common-Emitter, Small- Signal, Short Circuit Forward- Current Transfer Ratio (at 5 MHz)	h _{fe}		-10		-30			5	-	5	-	5	-		
Common-Base, Short Circuit, Input Capacitance (at 1 MHz)	C _{ib}			-5	0			-	75	-	75	-	75	pF	
Output Capacitance (at 1 MHz)	C _{ob}	-10					0	-	15	-	15	-	15	pF	
Second-Breakdown ^b Collector Current With base forward biased ^c	I _{S/b} ^d	-100						-50	-	-50	-	-50	-	mA	
Thermal Resistance (Junction-to Case)	R _{θJC}							-	35	-	35	-	35	°C/W	

^a CAUTION The sustaining voltages V_{CEO(sus)} and V_{CER(sus)} MUST NOT be measured on a curve tracer. The sustaining voltage should be measured by means of the test circuit shown in Fig. 2.

^b Regions for safe-operation with forward bias are shown in Fig. 1.

^c Specified value of I_{S/b} for given value of V_{CE} as base voltage is increased from zero in a positive direction.

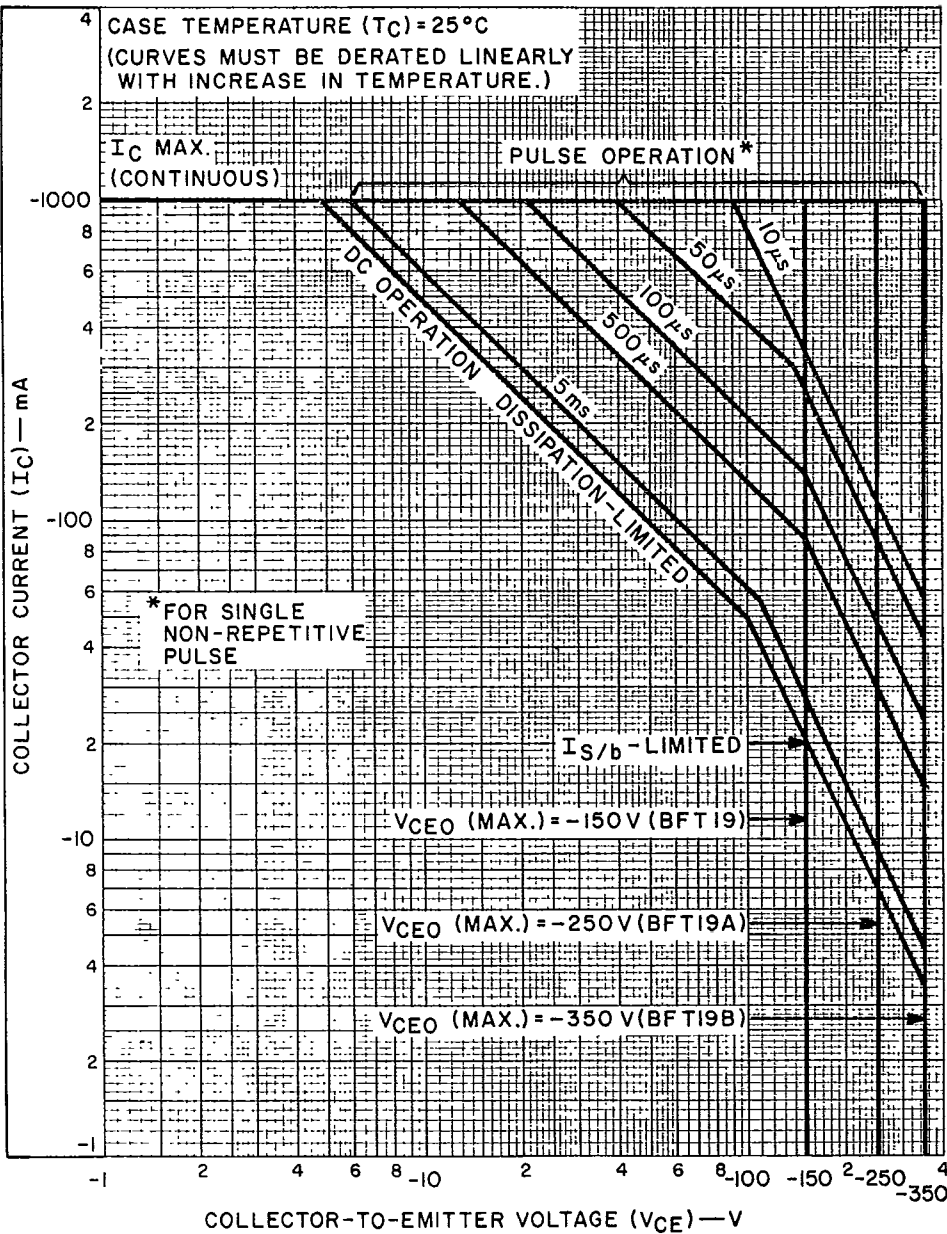
^d I_{S/b} is defined as the current at which second breakdown occurs at a specified collector voltage.



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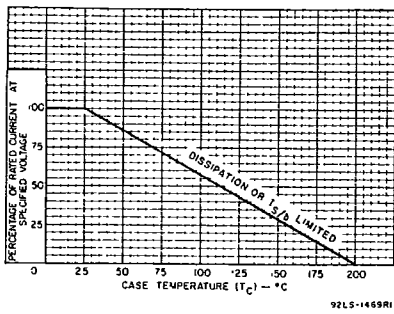


Fig. 2 — Dissipation derating curve.

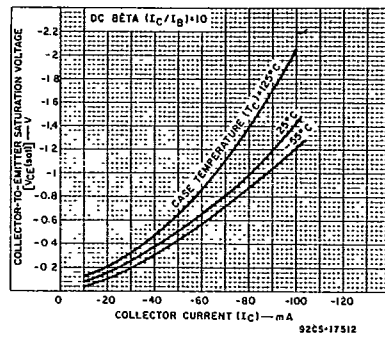


Fig. 3 — Typical collector-to-emitter saturation voltage.

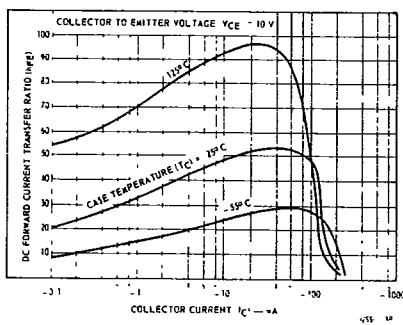


Fig. 4 — Typical dc-beta characteristics.

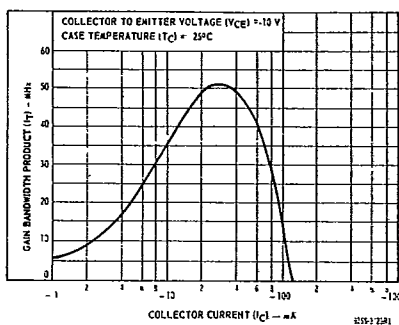


Fig. 5 — Typical gain-bandwidth product.

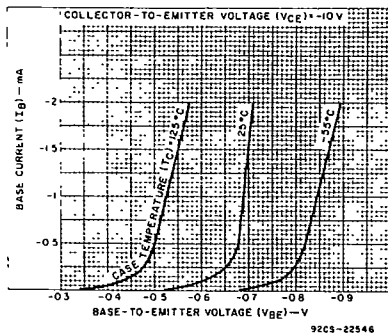


Fig. 6 — Typical input characteristics.

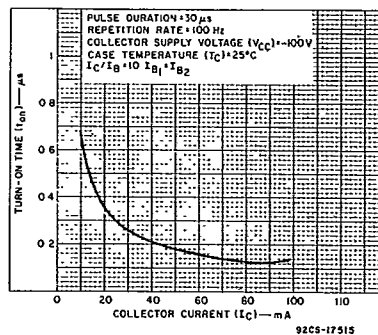


Fig. 7 — Typical turn-on time characteristic.

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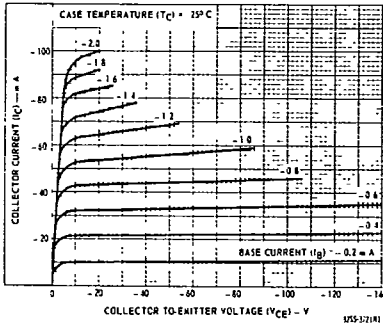


Fig. 8 — Typical output characteristics.

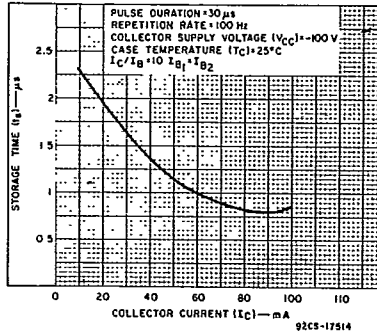


Fig. 9 — Typical storage-time characteristic.

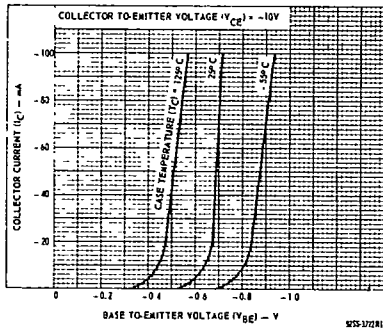


Fig. 10 — Typical transfer characteristics.

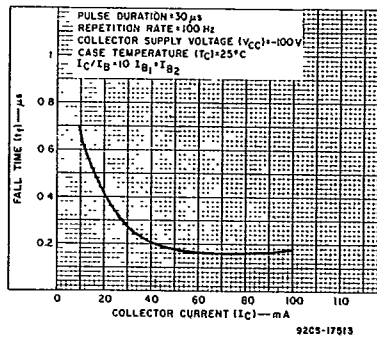


Fig. 11 — Typical fall-time characteristic.

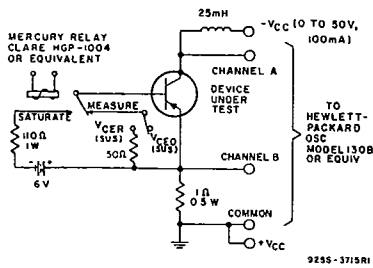
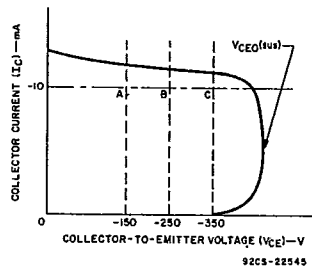


Fig. 12 — Circuit used to measure sustaining voltages, $V_{CE0}(sus)$ and $V_{CER}(sus)$.



The sustaining voltage $V_{CE0}(sus)$ is acceptable when the trace falls to the right and above point "A" for type BFT19. The trace must fall to the right and above point "B" for type BFT19A, and point "C" for BFT19B.

Fig. 13 — Oscilloscope display for measurement of sustaining voltages.

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