

2N6702, 2N6703, 2N6704

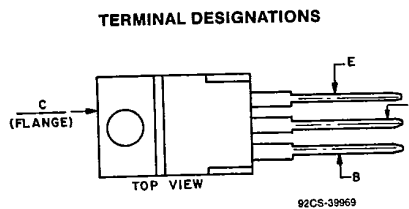
File Number 1187

High-Current, Silicon N-P-N VERSAWATT Transistors

Switching Applications

Features:

- Fast switching speed at temperatures up to 125°C
- Low $V_{CE(sat)}$
- VERSAWATT plastic package



JEDEC TO-220AB

RCA-2N6702, 2N6703, and 2N6704* epitaxial-base silicon n-p-n power transistors which feature fast switching speeds, low saturation voltages, and high safe-operating-area (SOA) ratings. They are specially designed for converters, inverters, pulse-width-modulated regulators and a variety of power switching circuits.

The 2N6702, 2N6703, and 2N6704 transistors are supplied in the JEDEC TO-220AB (RCA VERSAWATT) plastic packages.

*Formerly RCA Dev. Type Nos. TA9164A, TA9164B, TA9164C, respectively.

MAXIMUM RATINGS, Absolute-Maximum Values:

	2N6702	2N6703	2N6704	
* V_{CEV}	140	160	180	V
$V_{BE} = -1.5$ V	90	110	130	V
* V_{CEO}		7		V
* V_{EBO}	5	5	4	A
$I_C(sat)$		7		A
* I_C		10		A
I_{CM}		5		A
* I_B				
* P_T		50		W
T_C up to 25°C		0.4		W/°C
T_C above 25°C		-65 to 150		°C
* T_{stg}, T_J				
* T_L		235		°C
At distance $\geq 1/8$ in. (3.16 mm) from seating plane for 10 s max. ...				

*In accordance with JEDEC registration data.

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ELECTRICAL CHARACTERISTICS, at Case Temperature $T_C = 25^\circ\text{C}$ Unless Otherwise Specified

CHARAC- TERISTIC		TEST CONDITIONS				LIMITS						UNITS
		VOLTAGE V dc		CURRENT A dc		2N6702		2N6703		2N6704		
		V _{CE}	V _{BE}	I _C	I _B	Min.	Max.	Min.	Max.	Min.	Max.	
*	I _{CEV}	140 160 180	-1.5 -1.5 -1.5			-	100	-	-	-	-	μA
	T _C = 125°C	140 160 180	-1.5 -1.5 -1.5			-	1	-	-	-	-	mA
*	I _{EBO}		-7	0		-	100	-	100	-	100	μA
*	V _{CEO(sus)b}			0.01a	0	90	-	110	-	130	-	V
*	h _{FE}	2		0.2a		30	-	30	-	30	-	
		2		4a		-	-	-	-	20	-	
		2		5a		20	-	20	-	-	-	
*	V _{BE(sat)}			4a 5a	0.4 0.5	- - 1.5	- - 1.5	- - 1.5	- -	- -	1.4 -	V
*	V _{CE(sat)}			4a 5a 7a	0.4 0.5 0.7	- - -	- 0.8 1.5	- 0.8 1.5	- - -	- - 1.5	0.7 - 1.5	
	I _{S/b}	20		2.5		1	-	1	-	1	-	s
*	h _{fe} f = 5 MHz	10		0.5		10	40	10	40	10	40	
	f _T	10		0.5		50	200	50	200	50	200	MHz
*	C _{obo} f = 0.1 MHz	10c				50	150	50	150	50	150	pF
*	t _d ^d		-4	4 5	0.4 0.5	- -	- 0.1	- -	- 0.1	- -	0.1 -	μs
				4 5	0.4 0.5	- -	- 0.25	- -	- 0.25	- -	0.25 -	
*	t _r ^d		-4	4 5	0.4e 0.5e	- -	- 1	- -	- 1	- -	1	
*	t _s ^d		-4	4 5	0.4e 0.5e	- -	- -	- -	- -	- -	0.5 -	
*	t _f ^d		-4	4 5	0.4e 0.5e	- -	- 0.5	- -	- 0.5	- -	-	
*	R _{θJC}	4		5		-	2.5	-	2.5	-	2.5	°C/W

* In accordance with JEDEC registration data.

^a Pulsed: pulse duration = 300 μs , duty factor $\leq 2\%$.^b CAUTION: The sustaining voltage $V_{CEO(sus)}$ MUST NOT be measured on a curve tracer.^c V_{CB} value.^d $V_{CC} = 70\text{ V}$, $t_p = 20\text{ } \mu\text{s}$ ^e $I_{B1} = -I_{B2}$.

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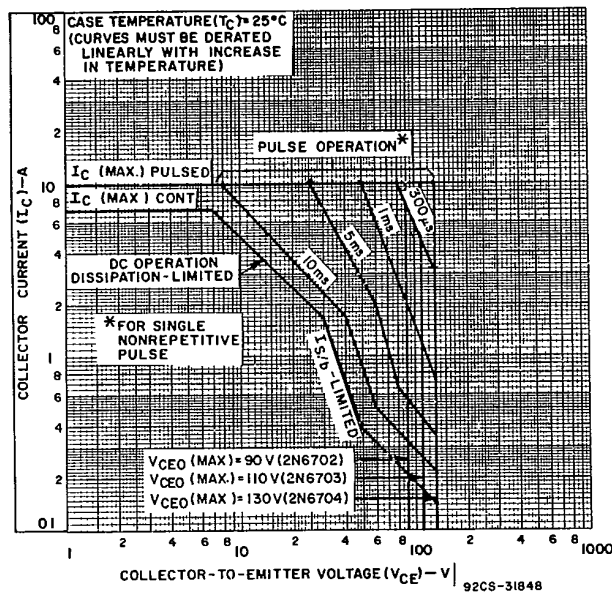


Fig. 1 - Maximum operating areas for all types
($T_C = 25^\circ\text{C}$).

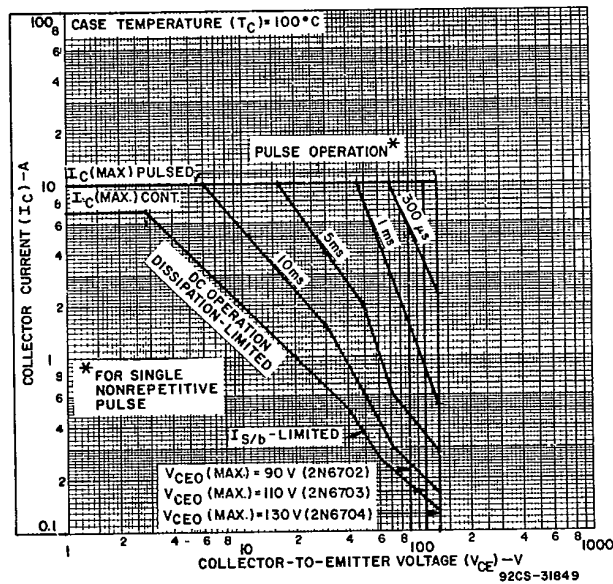


Fig. 2 - Maximum operating areas for all types
($T_C = 100^\circ\text{C}$).

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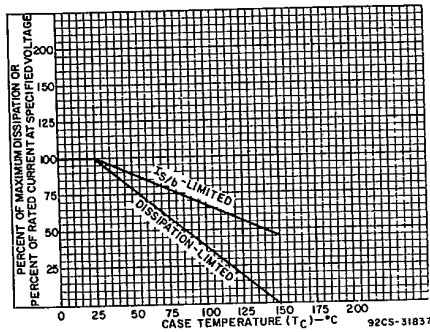


Fig. 3 - Dissipation and I_{S/I_B} derating curves for all types.

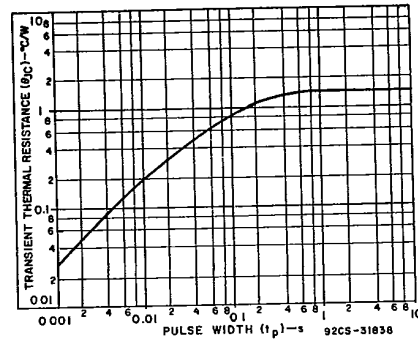


Fig. 4 - Typical thermal-response characteristic for all types.

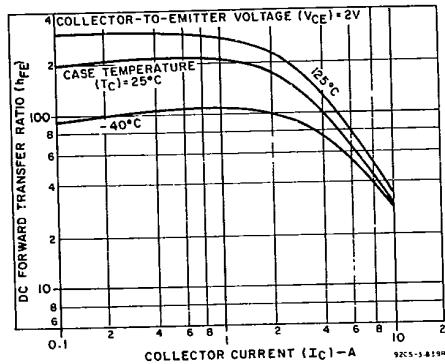


Fig. 5 - Typical dc beta characteristics for all types.

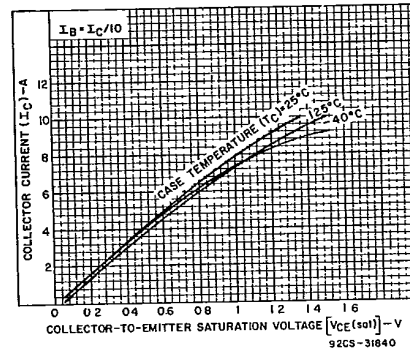


Fig. 6 - Typical collector-to-emitter saturation voltage characteristics for all types.

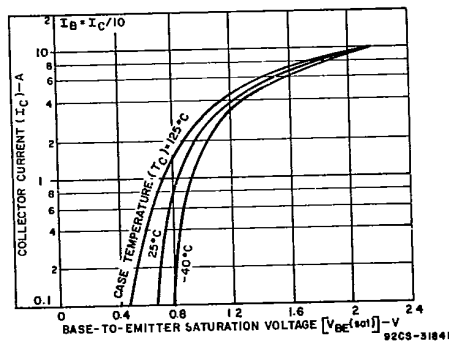


Fig. 7 - Typical base-to-emitter saturation voltage characteristic for all types.

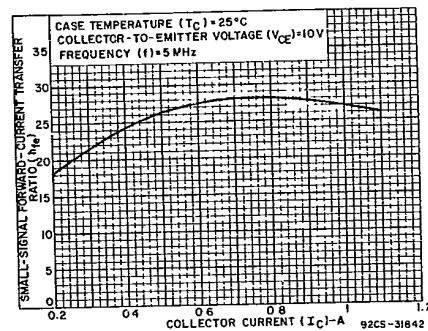
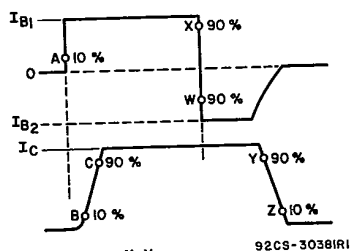


Fig. 8 - Typical small-signal forward-current transfer ratio characteristic for all types ($f = 5 \text{ MHz}$).

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 $t_d = A-B$ $t_f = X-Y$ $t_r = B-C$ $t_f = Y-Z$ $t_{\text{transition}} = X-W$

NOTE: TRANSITION TIME
FROM 90% I_{B1} TO 90% I_{B2} MUST
BE LESS THAN 0.5 μs .

Fig. 14 - Phase relationship between input and output currents showing reference points for specification of switching times.