

2N5294, 2N5296, 2N5298

File Number 322

Silicon N-P-N Transistors

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

Features:

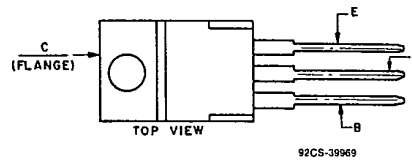
- Low saturation voltage -
 $V_{ce(sat)} = 1 \text{ V max. at } I_c = 0.5 \text{ A (2N5294)}$
 $= 1 \text{ V max. at } I_c = 1 \text{ A (2N5296)}$
 $= 1 \text{ V max. at } I_c = 1.5 \text{ A (2N5298)}$
- Maximum safe-area-of-operation curves specified for DC and pulse service

RCA-2N5294, 2N5296, and 2N5298 are triple-diffused silicon n-p-n transistors. They are intended for a wide variety of medium-power switching and amplifier applications such as series and shunt regulators, and in driver and output stages of high-fidelity amplifiers.

These plastic power transistors differ in voltage ratings and in the currents at which the parameters are controlled.

All types are supplied in the JEDEC TO-220AB (VERSAWATT) plastic package.

TERMINAL DESIGNATIONS



JEDEC TO-220AB

MAXIMUM RATINGS, Absolute-Maximum Values:

	2N5294	2N5296	2N5298	
*COLLECTOR-TO-BASE VOLTAGE..... V_{CBO}	80	60	80	V
COLLECTOR-TO-EMITTER SUSTAINING VOLTAGE:				
With -1.5 volts (V_{BE}) of reverse bias..... $V_{CEV(SUS)}$	80	60	80	V
With external base-to-emitter resistance (R_{BE}) = 100 Ω $V_{CER(SUS)}$	75	50	70	V
With base open..... * $V_{CEO(SUS)}$	70	40	60	V
*EMITTER-TO-BASE VOLTAGE..... V_{EBO}	7	5	5	V
*COLLECTOR CURRENT..... I_c	4	4	4	A
*BASE CURRENT..... I_B	2	2	2	A
*TRANSISTOR DISSIPATION, P_T				
At case temperatures up to 25°C.....	36	36	36	W
At case temperatures above 25°C.....	Derate linearly at 0.288 or see Figs. 1 & 2			W/°C
At ambient temperatures up to 25°C.....	1.8	1.8	1.8	W
At ambient temperatures above 25°C.....	Derate linearly at 0.0144			W/°C
*TEMPERATURE RANGE:				
Storage & Operating (Junction).....	-65 to +150			°C
LEAD TEMPERATURE (During Soldering):				
At distance \geq 1/8 in. (3.17 mm) from case for 10 s max.	235			°C

*In accordance with JEDEC registration data.

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ELECTRICAL CHARACTERISTICS, At Case Temperature (T_C) = 25°C, Unless Otherwise Specified.

Characteristic	Symbol	TEST CONDITIONS					LIMITS						Units	
		DC Collector Voltage (V)		DC Emitter or Base Voltage (V)		DC Current (A)		2N5294		2N5296		2N5298		
		V_{CE}	V_{EB}	V_{BE}	I_C	I_B	Min.	Max.	Min.	Max.	Min.	Max.		
Collector-Cutoff Current With base-emitter junction reverse biased	I_{CEV}	65 35		-1.5 -1.5			-	0.5	-	-	-	0.5	mA	
	I_{CEV} ($T_C = 150^\circ\text{C}$)	65 35		-1.5 -1.5			-	3	-	-	-	3	mA	
Collector-Cutoff Current With external base-to-emitter resistance (R_{BE}) = 100 Ω	I_{CER}	50					-	0.5	-	-	-	0.5	mA	
	I_{CER} ($T_C = 150^\circ\text{C}$)	50					-	2	-	-	-	2	mA	
Emitter-Cutoff Current	I_{EBO}		7 5				-	1	-	-	-	1	mA	
DC Forward Current Transfer Ratio	h_{FE}^c	4			0.5		30	120	-	-	-	-		
		4			1		-	-	30	120	-	-		
		4			1.5		-	-	-	-	20	80		
Collector-to-Emitter Sustaining Voltage With base open	$V_{CEO(sus)}^c$				0.1	0	70	-	-	-	-	-	V	
					0.1	0	-	-	40	-	-	-	-	
					0.1	0	-	-	-	-	60	-	-	
With external base-to-emitter resistance (R_{BE}) = 100 Ω	$V_{CER(sus)}^c$				0.1		75	-	-	-	-	-	V	
					0.1		-	-	50	-	-	-	-	
					0.1		-	-	-	-	70	-	-	
With base-emitter junction reverse biased	$V_{CEV(sus)}^c$			-1.5	0.1		80	-	-	-	-	-	V	
				-1.5	0.1		-	-	60	-	-	-	-	
				-1.5	0.1		-	-	-	-	80	-	-	
Base-to-Emitter Voltage	V_{BE}^c	4			0.5		-	1.1	-	-	-	-	V	
		4			1		-	-	-	1.3	-	-	-	
		4			1.5		-	-	-	-	-	1.5	-	
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}^c$				0.5	0.05	-	1	-	-	-	-	V	
					1	0.1	-	-	-	1	-	-	-	
					1.5	0.15	-	-	-	-	-	1	-	
Gain-Bandwidth Product	f_T	4			0.2		0.8	-	0.8	-	0.8	-	MHz	
Sat. Switching Time Turn-On (See Figs. 22 - 24)	t_{on}	$V_{CC} = 30$			0.5	0.05 ^a	-	5	-	-	-	-	μs	
					1	0.1 ^a	-	-	-	5	-	-	-	
					1.5	0.15 ^a	-	-	-	-	-	-	5	-
Turn-Off (See Figs. 22 - 24)	t_{off}	$V_{CC} = 30$			0.5	-0.05 ^a	-	15	-	-	-	-	μs	
					1	-0.1 ^b	-	-	-	15	-	-	-	
					1.5	-0.15 ^b	-	-	-	-	-	-	15	-
Thermal Resistance (Junction-to-Case)	θ_{J-C}						-	3.5	-	3.5	-	3.5	$^\circ\text{C/W}$	
							-	70	-	70	-	70	$^\circ\text{C/W}$	

^a I_{B1} value (turn-on base current).

^b I_{B2} value (turn-off base current).

^c Pulsed, pulse duration = 300 μs , duty factor = .018.

*In accordance with JEDEC registration data.

3875081 G E SOLID STATE
General-Purpose Power Transistors

01E 17382 D T-33-11

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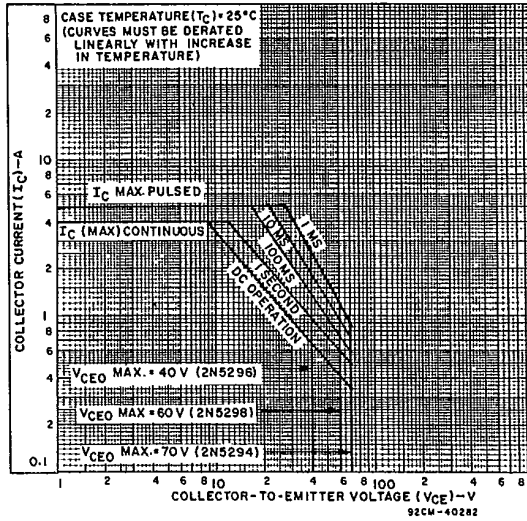


Fig. 1 - Maximum operating areas for all types.

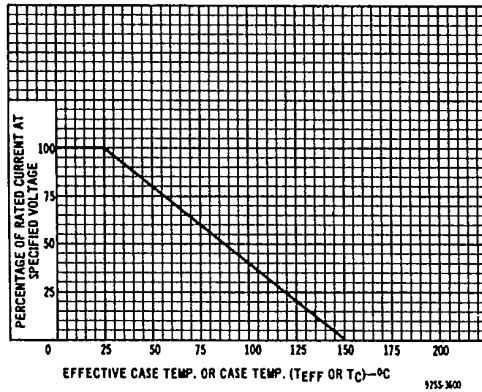


Fig. 2 - Derating curve for all types.

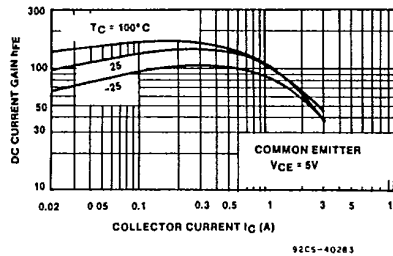


Fig. 3 - Typical DC beta characteristics for all types.

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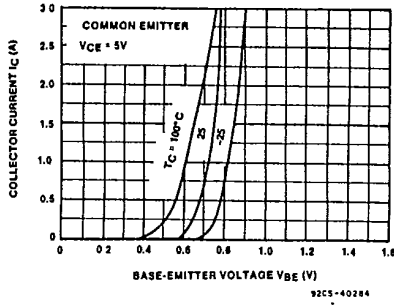


Fig. 4 - Typical input characteristics for all types.

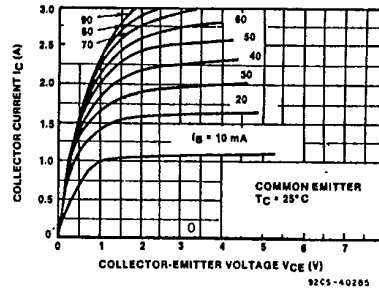


Fig. 5 - Typical output characteristics for all types.

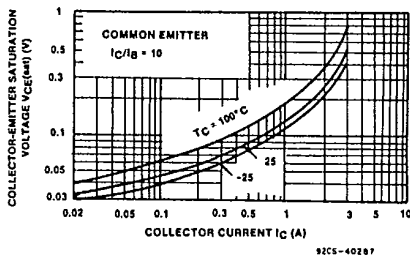


Fig. 6 - Typical collector-to-emitter saturation voltage as a function of collector current for all types.

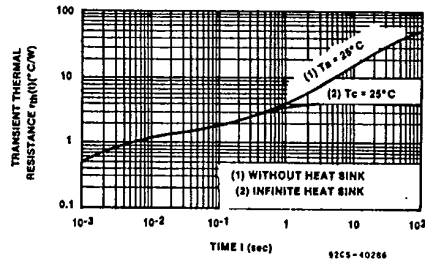


Fig. 7 - Transient thermal resistance characteristics for all types.

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