

2N5490-2N5497

File Number 353

**Silicon N-P-N
VERSAWATT Transistors**

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

Features:

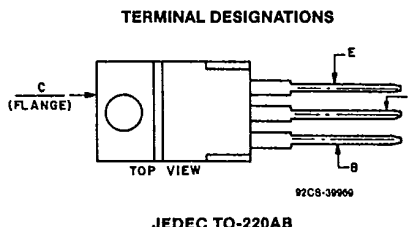
- Low saturation voltage —
 - $V_{CE(sat)} = 1\text{ V max. at } I_C = 2\text{ A (2N5490, 2N5491)}$
 - $1\text{ V max. at } I_C = 2.5\text{ A (2N5492, 2N5493)}$
 - $1\text{ V max. at } I_C = 3\text{ A (2N5494, 2N5495)}$
 - $1\text{ V max. at } I_C = 3.5\text{ A (2N5496, 2N5497)}$

RCA-2N5490, 2N5491, 2N5492, 2N5493, 2N5494, 2N5495, 2N5496 and 2N5497* are 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 driver and output stages of high-fidelity amplifiers.

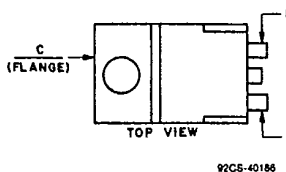
Types 2N5491, 2N5493, 2N5494, and 2N5497 have formed emitter and base leads for insertion into TO-213AA sockets. Types 2N5490, 2N5492, 2N5494, and 2N5496 are electrically identical to the 2N5491, 2N5493, 2N5495, and 2N5497 but have straight leads.

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

*Formerly RCA Dev. Nos. TA7317, TA7318, TA7315, TA7316, TA7313, TA7314, TA7311, TA7312, respectively.



JEDEC TO-220AB



JEDEC TO-220AA

Maximum Ratings, Absolute-Maximum Values:

	2N5490 2N5491 2N5494 2N5495	2N5492 2N5493	2N5496 2N5497	
COLLECTOR-TO-BASE VOLTAGE	V_{CBO}	60	75	90 V
COLLECTOR-TO-EMITTER SUSTAINING VOLTAGE:				
With -1.5 volts (V_{BE}) of reverse bias	$V_{CEV(sus)}$	60	75	90 V
With external base-to-emitter resistance (R_{BE}) = 100Ω	$V_{CEB(sus)}$	50	65	80 V
With base open	$V_{CEO(sus)}$	40	55	70 V
EMITTER-TO-BASE VOLTAGE	V_{EBO}	5	5	5 V
COLLECTOR CURRENT	I_C	7	7	7 A
BASE CURRENT	I_B	3	3	3 A
TRANSISTOR DISSIPATION:	P_T			
At case temperatures up to 25°C		50	50	50 W
At ambient temperatures up to 25°C		1.8	1.8	1.8 W
At case temperatures above 25°C		Derate linearly at 0.4 W/°C or see Figs. 2 & 3.		
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 ≥ 1/8 in. (3.17 mm) from case for 10 s max		← 235 → °C		

2N5490-2N5497

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

Characteristic	Symbol	TEST CONDITIONS				LIMITS								Units	
		DC Voltage (V)		DC Current (A)		Types 2N5496 2N5497		Types 2N5494 2N5495		Types 2N5492 2N5493		Types 2N5490 2N5491			
		V_{CE}	V_{BE}	I_C	I_B	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
Collector-Cutoff Current With base-emitter junction reverse biased	I_{CEV}	85 55 70	-1.5 -1.5 -1.5			-	1	-	-	-	-	-	-	mA	
	I_{CEV} ($T_C = 150^\circ C$)	85 55 70	-1.5 -1.5 -1.5			-	5	-	5	-	5	-	-	mA	
Collector-Cutoff Current With external base-to-emitter resistance (R_{BE}) = 100 Ω	I_{CER}	70 40 55				-	0.5	-	0.5	-	-	-	2	mA	
	I_{CER} ($T_C = 150^\circ C$)	70 40 55				-	3.5	-	3.5	-	3.5	-	5	mA	
Emitter-Cutoff Current	I_{EBO}		-5			-	1	-	1	-	1	-	1	mA	
DC Forward-Current Transfer Ratio	h_{FE}^c	4		3.5		20	100	-	-	-	-	-	-		
		4		3		-	-	20	100	-	-	-	-		
		4		2.5		-	-	-	-	20	100	-	-		
		4		2		-	-	-	-	-	-	20	100		
Collector-to-Emitter Sustaining Voltage: With base open	$V_{CE(sus)}^c$			0.1	0	70	-	40	-	55	-	40	-	V	
With external base-to-emitter resistance (R_{BE}) = 100 Ω	$V_{CER(sus)}^c$			0.1		80	-	50	-	65	-	50	-	V	
With base-emitter junction reverse biased	$V_{CEV(sus)}^c$		-1.5	0.1		90	-	60	-	75	-	60	-	V	
Base-to-Emitter Voltage	V_{BE}^c	4		3.5		-	1.7	-	-	-	-	-	-		
		4		3		-	-	1.5	-	-	-	-	-		
		4		2.5		-	-	-	-	1.3	-	-	-		
		4		2		-	-	-	-	-	-	-	1.1		
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}^c$			3.5	0.35	-	1	-	-	-	-	-	-		
				3	0.3	-	-	-	1	-	-	-	-		
				2.5	0.25	-	-	-	-	1	-	-	-		
				2	0.2	-	-	-	-	-	-	-	1		
Gain-Bandwidth Product	f_T	4		0.5		0.8	-	0.8	-	0.8	-	0.8	-	MHz	
Sat. Switching Time: Turn-On	t_{on}	$V_{CC} = 30$		3.5	0.35 ^a	-	5	-	-	-	-	-	-		
				3	0.3 ^a	-	-	-	5	-	-	-	-		
				2.5	0.25 ^a	-	-	-	-	-	5	-	-	-	
				2	0.2	-	-	-	-	-	-	-	-	5	μs
Turn-Off	t_{off}	$V_{CC} = 30$		3.5	0.35 ^b	-	15	-	-	-	-	-	-		
				3	0.3 ^b	-	-	-	15	-	-	-	-		
				2.5	0.25 ^b	-	-	-	-	-	15	-	-	-	
				2	0.2	-	-	-	-	-	-	-	-	15	μs

^a I_{B1} value (turn-on base current). ^b I_{B2} value (turn-off base current). ^c Pulsed, pulse duration = 300 μs

2N5490-2N5497

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

Characteristic	Symbol	TEST CONDITIONS				LIMITS								Units
		DC Voltage (V)		DC Current (A)		Types 2N5496, 2N5497		Types 2N5494, 2N5495		Types 2N5492, 2N5493		Types 2N5490, 2N5491		
		V_{CE}	V_{BE}	I_C	I_B	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Thermal Resistance: Junction-to-Case	θ_{J-C}					-	2.5	-	2.5	-	2.5	-	2.5	$^{\circ}C/W$
Junction-to-Ambient	θ_{J-A}					-	70	-	70	-	70	-	70	$^{\circ}C/W$

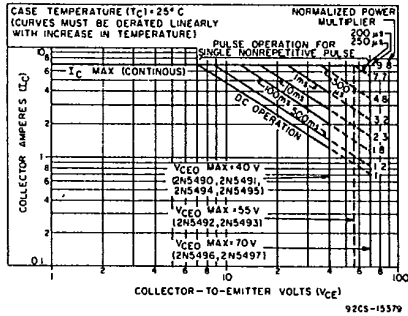


Fig. 1 — Maximum operating areas for types 2N5490 through 2N5497 inclusive.

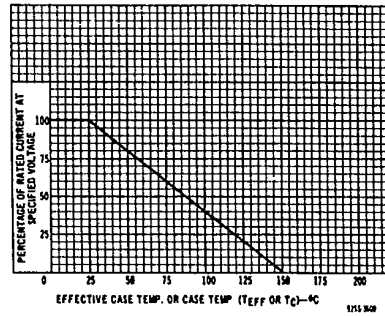


Fig. 2 — Derating curve for all types.

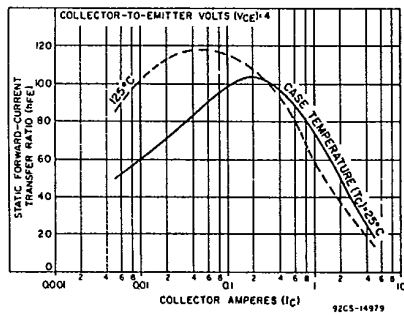


Fig. 3 — Typical static beta characteristics for types 2N5496 and 2N5497.

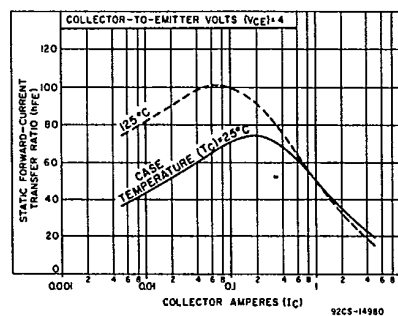


Fig. 4 — Typical static beta characteristics for types 2N5494 and 2N5495.

2N5490-2N5497

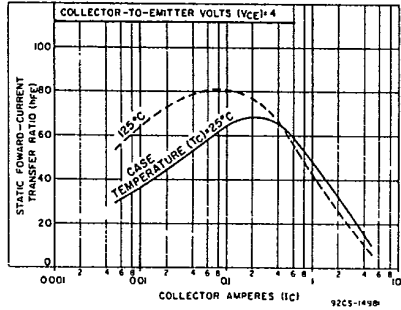


Fig. 5 — Typical static beta characteristics for types 2N5490 through 2N5493 inclusive.

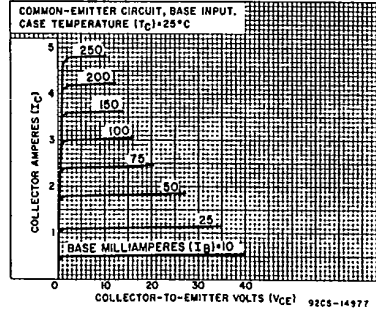


Fig. 6 — Typical output characteristics for types 2N5490 through 2N5497 inclusive.

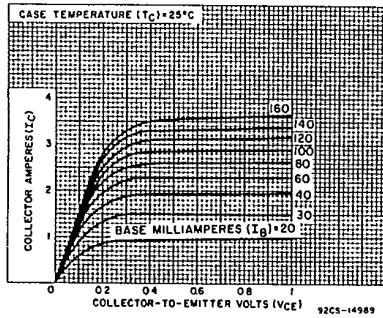


Fig. 7 — Typical output characteristics for types 2N5494 and 2N5495.

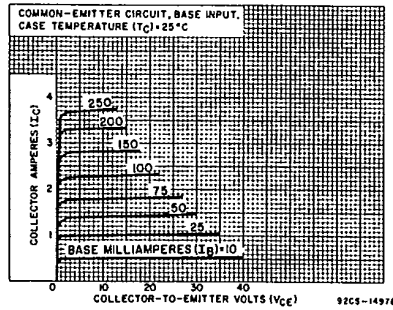


Fig. 8 — Typical output characteristics for types 2N5490 through 2N5493 inclusive.

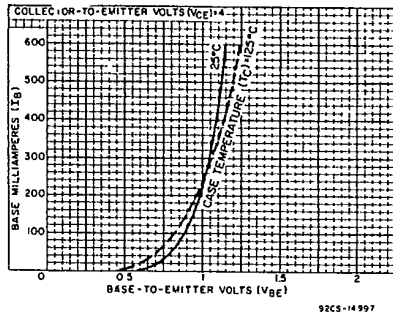


Fig. 9 — Typical input characteristics for types 2N5494 through 2N5497 inclusive.

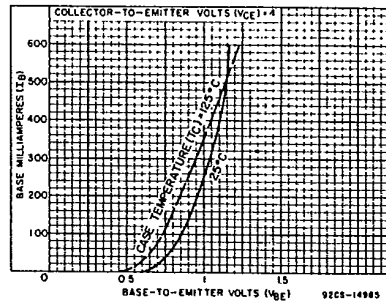


Fig. 10 — Typical input characteristics for types 2N5490 through 2N5493 inclusive.

2N5490-2N5497

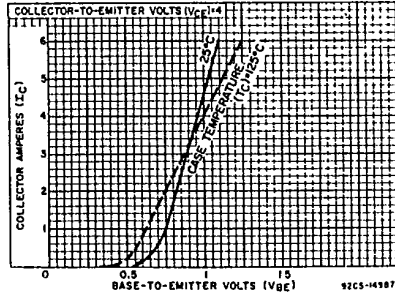


Fig. 11 — Typical transfer characteristics for types 2N5494 through 2N5497 inclusive.

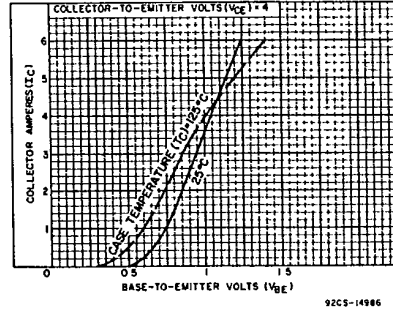


Fig. 12 — Typical transfer characteristics for types 2N5490 through 2N5493 inclusive.

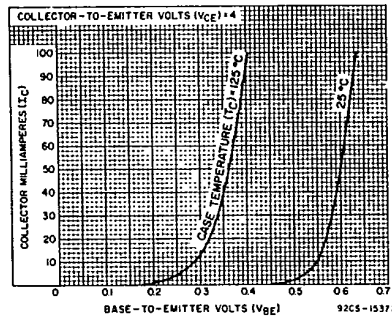


Fig. 13 — Typical transfer characteristics for types 2N5490 through 2N5497 inclusive.