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15-A, 75-W, Silicon N-P-N and P-N-P Epitaxial-Base VERSAWATT Transistors

2N6486-2N6491

Complementary Pairs for General-Purpose Switching and Amplifier Applications

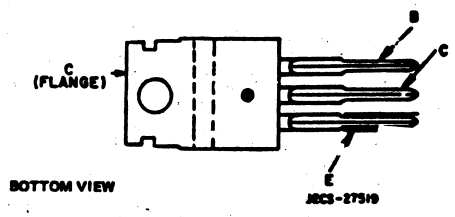
Features:
- Thermal-cycling ratings
- Maximum safe-area-of-operation curves.
- Color-coded packages of molded-silicone plastic:
  Green – p-n-p (2N6489, 2N6490, 2N6491)
  Gray – n-p-n (2N6486, 2N6487, 2N6488)

RCA-2N6486–2N6491*, inclusive, are epitaxial-base silicon transistors. The 2N6486, 2N6487, and 2N6488 are n-p-n complements of p-n-p types 2N6489, 2N6490, and 2N6491, respectively. All these devices are intended for a wide variety of medium-power switching and amplifier applications, and are particularly useful in high-fidelity amplifiers utilizing complementary-symmetry circuits.

These devices are supplied in the VERSAWATT package in color-coded molded-silicone plastic; the 2N6489–2N6491 (p-n-p) devices are green, and the 2N6486–2N6488 (n-p-n) devices are gray. All are regularly supplied in the JEDEC TO-220AB straight-lead version of the package. They are also available on special order in a variety of lead-form configurations.

* Formerly RCA Dev. Nos. TA8325, TA8324, TA8323, TA8328, TA8327, and TA8326, respectively.

TERMINAL DESIGNATIONS



JEDEC TO-220AB

MAXIMUM RATINGS, *Absolute-Maximum Values:*

		N-P-N P-N-P	2N6486 . 2N6489♦	2N6487 2N6490♦	2N6488 2N6491♦	
COLLECTOR-TO-BASE VOLTAGE	V_{CBO}		50	70	90	V
COLLECTOR-TO-EMITTER VOLTAGE:						
With 1.5 volts (V_{BE}) of reverse bias, and external base-to-emitter resistance (R_{BE}) = 100 Ω	V_{CEX}		50	70	90	V
With external base-to-emitter resistance (R_{BE}) = 100 Ω	V_{CER}		45	65	85	V
With base open	V_{CEO}		40	60	80	V
*EMITTER-TO-BASE VOLTAGE	V_{EBO}		5	5	5	V
*CONTINUOUS COLLECTOR CURRENT	I_C		15	15	15	A
*CONTINUOUS BASE CURRENT	I_B		5	5	5	A
*TRANSISTOR DISSIPATION:	P_T					
At case temperatures up to 25°C			75	75	75	W
At ambient temperatures up to 25°C			1.8	1.8	1.8	W
At case temperatures above 25°C			Derate linearly 0.6			W/°C
At ambient temperatures above 25°C			Derate linearly 0.0144			W/°C
*TEMPERATURE RANGE:						
Storage and operating (Junction)			−65 to +150			°C
*LEAD TEMPERATURE (During soldering):						
At distance ≥ 1/8 in. (3.17 mm) from seating plane for 10 s max.			235			°C

* In accordance with JEDEC registration data format JS-6 RDF-2.

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

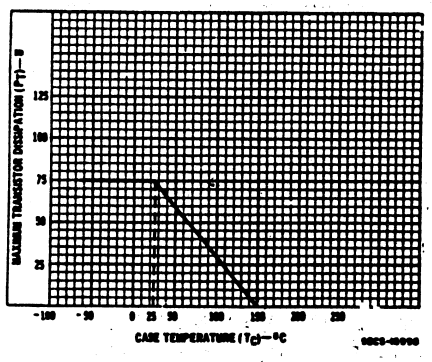


Fig. 1 - Derating chart for all types.

ELECTRICAL CHARACTERISTICS, *At case temperature (T_C) = 25°C unless otherwise specified*

CHARACTERISTIC	SYMBOL	TEST CONDITIONS: VOLTAGE V dc V_{CE}	TEST CONDITIONS: VOLTAGE V dc V_{BE}	TEST CONDITIONS: CURR. A dc I_C	LIMITS: 2N6486 2N6489♦ Min.	2N6486 2N6489♦ Max.	2N6487 2N6490♦ Min.	2N6487 2N6490♦ Max.	2N6488 2N6491♦ Min.	2N6488 2N6491♦ Max.	UNITS
Collector-Cutoff Current: With external base-emitter resistance (R_{BE}) = 100Ω	I_{CER}	35			–	500	–	–	–	–	
		55			–	–	–	500	–	–	
		75			–	–	–	–	–	500	μA
* With base-emitter junction reverse biased and external base-to-emitter resistance (R_{BE}) = 100Ω	I_{CEX}	45	−1.5		–	500	–	–	–	–	
		65	−1.5		–	–	–	500	–	–	
		85	−1.5		–	–	–	–	–	500	μA
* At T_C = 150°C	I_{CEX}	40	−1.5		–	5	–	–	–	–	
		60	−1.5		–	–	–	5	–	–	
		80	−1.5		–	–	–	–	–	5	mA
* With base open	I_{CEO}	20			–	1	–	–	–	–	
		30			–	–	–	1	–	–	
		40			–	–	–	–	–	1	mA
* Emitter-Cutoff Current	I_{EBO}		−5	0	–	1	–	1	–	1	mA
* DC Forward-Current Transfer Ratio	h_{FE}	4		5[a]	20	150	20	150	20	150	
		4		15[a]	5	–	5	–	5	–	
* Collector-to-Emitter Sustaining Voltage With base open	$V_{CEO(sus)}$			0.2	40[b]	-	60[b]	-	80[b]	-	
With external base-emitter resistance (R_{BE}) = 100Ω	$V_{CER(sus)}$			0.2	45[b]	-	65[b]		85[b]	-	V
With base-emitter junction reverse-biased and external base-to-emitter resistance (R_{BE}) = 100Ω	$V_{CEX(sus)}$		1.5	0.2	50[b]		70[b]		90[b]		
* Base-to-Emitter Voltage	V_{BE}	4		5[a]	-	1.3	-	1.3	-	1.3	
		4		15[a]	-	3.5	-	3.5	-	3.5	V
* Collector-to-Emitter Saturation Voltage (I_B = 0.5 A, I_B = 5 A)	$V_{CE(sat)}$			5[a]	-	1.3	-	1.3	-	1.3	
				15[a]	-	3.5	-	3.5	-	3.5	V
* Magnitude of Common-Emitter Small-Signal Short-Circuit Forward-Current Transfer Ratio: f = 1 MHz	$\lvert h_{fe} \rvert$	4		1	5	-	5	-	5	-	
* Common-Emitter, Small-Signal, Short-Circuit, Forward-Current Transfer Ratio (f = 1 kHz)	h_{fe}	4		1	25	-	25	-	25	-	
Thermal Resistance: Junction-to-case	$R_{\theta JC}$				-	1.67	-	1.67	-	1.67	°C/W
Junction-to-ambient	$R_{\theta JA}$				-		-	70	-	70	

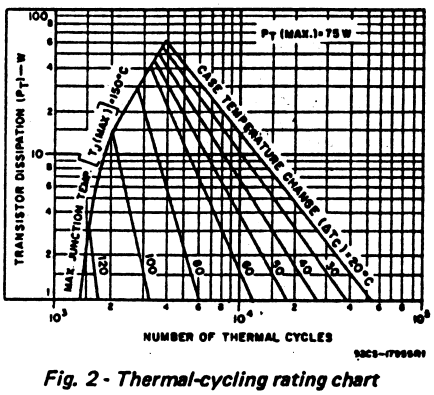


Fig. 2 - Thermal-cycling rating chart for all types.

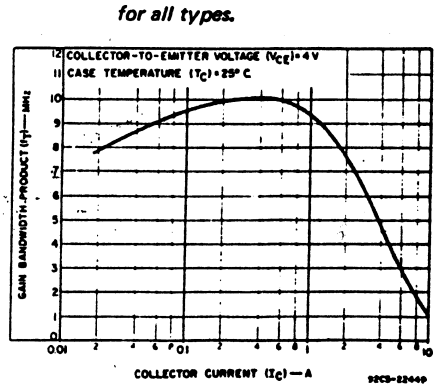


Fig. 3 - Typical gain-bandwidth product as a function of collector current for all types.♦

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