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

Complementary Pairs for General-Purpose Switching and Amplifier Applications

### 2N6486-2N6491

2N6486-2N6491<sup>®</sup>, 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.

<sup>®</sup> Formerly RCA Dev. Nos. TA8325, TA8324, TA8323, TA8328, TA8327, and TA8326, respectively.

**MAXIMUM RATINGS, Absolute-Maximum Values:**

PARAMETER	VCBO	VCEX	VCER	VCEO	VEBO	IC	IB	PT
COLLECTOR-TO-BASE VOLTAGE	50	70	90					
COLLECTOR-TO-EMITTER VOLTAGE: With 1.5 volts (V <sub>BE</sub> ) of reverse bias, and external base-to-emitter resistance (R <sub>BE</sub> ) = 100 Ω		50	70	90				
With external base-to-emitter resistance (R <sub>BE</sub> ) = 100 Ω		45	65	85				
With base open		40	60	80				
EMITTER-TO-BASE VOLTAGE					5			
CONTINUOUS COLLECTOR CURRENT						15		
CONTINUOUS BASE CURRENT							5	
TRANSISTOR DISSIPATION: At case temperatures up to 25°C								75 W
At ambient temperatures up to 25°C								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

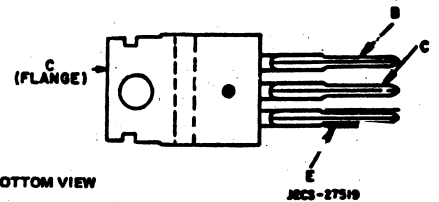
These devices are supplied in the VERSAWATT package in color-coded molded-silicone plastic; the 2N6489-2N6491 (p-n-p) devices are green, and the 2N6486-2N6488 (n-p-n) devices are gray. All are regularly supplied in the JEDEC TO-220AB straight-lead version of the package. They are also available on special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

N-P-N	2N6486	2N6487	2N6488
P-N-P	2N6489 <sup>®</sup>	2N6490 <sup>®</sup>	2N6491 <sup>®</sup>

**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)

**TERMINAL DESIGNATIONS**



BOTTOM VIEW

JEDEC TO-220AB

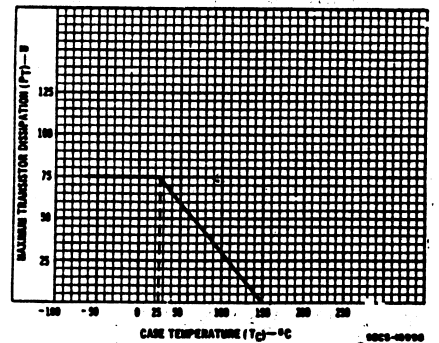


Fig. 1 - Derating chart for all types.

**ELECTRICAL CHARACTERISTICS, At case temperature (T<sub>C</sub>) = 25°C unless otherwise specified**

CHARACTERISTIC	SYMBOL	TEST CONDITIONS			LIMITS						UNITS	
		VOLTAGE V dc		CURR. A dc	2N6486 2N6489 <sup>®</sup>		2N6487 2N6490 <sup>®</sup>		2N6488 2N6491 <sup>®</sup>			
		V <sub>CE</sub>	V <sub>BE</sub>	I <sub>C</sub>	Min.	Max.	Min.	Max.	Min.	Max.		
Collector-Cutoff Current: With external base-emitter resistance (R <sub>BE</sub> ) = 100Ω	I <sub>CER</sub>	35 55 75			-	500	-	-	-	-	-	μA
With base-emitter junction reverse biased and external base-to-emitter resistance (R <sub>BE</sub> ) = 100Ω	I <sub>CEX</sub>	45 65 85	-1.5 -1.5 -1.5		-	500	-	-	-	-	500	μA
At T <sub>C</sub> = 150°C		40 60 80	-1.5 -1.5 -1.5		-	5	-	-	-	-	5	mA
With base open	I <sub>CEO</sub>	20 30 40			-	1	-	-	-	-	1	mA
Emitter-Cutoff Current	I <sub>EBO</sub>		-5	0	-	1	-	1	-	1	1	mA
DC Forward-Current Transfer Ratio	h <sub>FE</sub>	4		5 <sup>a</sup> 15 <sup>a</sup>	20 5	150 5	20 5	150 5	20 5	150 5	-	
Collector-to-Emitter Sustaining Voltage With base open	V <sub>CEO(sus)</sub>			0.2	40 <sup>b</sup>	-	60 <sup>b</sup>	-	80 <sup>b</sup>	-	-	V
With external base-emitter resistance (R <sub>BE</sub> ) = 100Ω	V <sub>CER(sus)</sub>			0.2	45 <sup>b</sup>	-	65 <sup>b</sup>	-	85 <sup>b</sup>	-	-	V
With base-emitter junction reverse-biased and external base-to-emitter resistance (R <sub>BE</sub> ) = 100Ω	V <sub>CEx(sus)</sub>		1.5	0.2	50 <sup>b</sup>	-	70 <sup>b</sup>	-	90 <sup>b</sup>	-	-	V
Base-to-Emitter Voltage	V <sub>BE</sub>	4 4		5 <sup>a</sup> 15 <sup>a</sup>	1.3 3.5	-	1.3 3.5	-	1.3 3.5	-	1.3 3.5	V
Collector-to-Emitter Saturation Voltage I <sub>B</sub> = 0.5 A I <sub>B</sub> = 5 A	V <sub>CE(sat)</sub>			5 <sup>a</sup> 15 <sup>a</sup>	1.3 3.5	-	1.3 3.5	-	1.3 3.5	-	1.3 3.5	V
Magnitude of Common-Emitter Small-Signal Short-Circuit Forward-Current Transfer Ratio: f = 1 MHz	h <sub>fe</sub>	4		1	5	-	5	-	5	-	-	
Common-Emitter, Small-Signal, Short-Circuit, Forward-Current Transfer Ratio (f = 1 kHz)	h <sub>fe</sub>	4		1	25	-	25	-	25	-	-	
Thermal Resistance: Junction-to-case	R <sub>θJC</sub>				-	1.67	-	1.67	-	1.67	-	°C/W
Junction-to-ambient	R <sub>θJA</sub>				-	-	-	70	-	70	-	°C/W

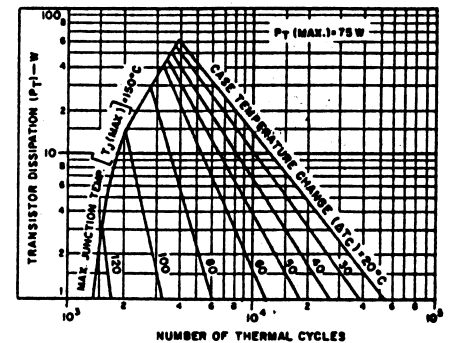


Fig. 2 - Thermal-cycling rating chart for all types.

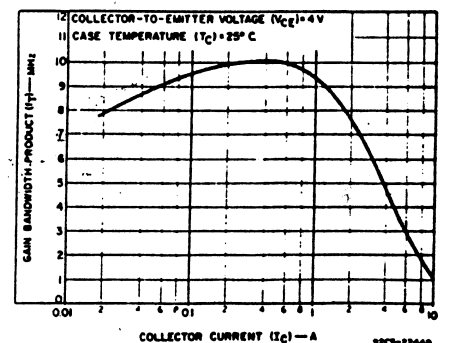


Fig. 3 - Typical gain-bandwidth product as a function of collector current for all types.

<sup>®</sup> For p-n-p devices, voltage and current values are negative.