

File Number 677

2N6246, 2N6247, 2N6248, 2N6469

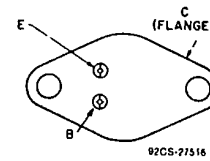
## Silicon P-N-P Epitaxial-Base, High-Power Transistors

General-Purpose Types of Switching and Linear-Amplifier Applications

**Features:**

- High dissipation capability: 125 W at 25°C
- Low saturation voltages
- Maximum safe-area-of-operation curves
- High gain at high current

**TERMINAL DESIGNATIONS**



JEDEC TO-204AA

RCA-2N6246, 2N6247, 2N6248, and 2N6469 are epitaxial-base silicon p-n-p transistors featuring high gain at high current. All of these devices have a dissipation capability of 125 watts at case temperatures up to 25°C. They differ in voltage ratings and in the currents at which the parameters are controlled. All are supplied in the JEDEC TO-204AA package.

▲ Formerly RCA Dev. Nos. TA7281, TA7280, TA7279, and TA8724, respectively.

**Maximum Ratings, Absolute-Maximum Values:**

	2N6469	2N6246	2N6247	2N6248	
*COLLECTOR-TO-BASE VOLTAGE . . . . .	-50	-70	-90	-110	V
COLLECTOR-TO-EMITTER VOLTAGE:					
* With external base-to-emitter resistance (R <sub>BE</sub> ) = 100 Ω . . . . .	-50	-70	-90	-110	V
With base open . . . . .	-40	-60	-80	-100	V
*EMITTER-TO-BASE VOLTAGE . . . . .	-5	-5	-5	-5	V
*CONTINUOUS COLLECTOR CURRENT . . . . .	-15	-15	-15	-10	A
*CONTINUOUS BASE CURRENT . . . . .	-5	-5	-5	-5	A
*TRANSISTOR DISSIPATION: P <sub>T</sub>					
At case temperatures up to 25°C . . . . .	125	125	125	125	W
At case temperatures above 25°C . . . . .	← See Fig. 2 →				
*TEMPERATURE RANGE:					
Storage & Operating (Junction) . . . . .	← -65 to +200 →				°C
*PIN TEMPERATURE (During Soldering):					
At distances ≥ 1/32" (0.8 mm) from seating plane for 10 s max. . . . .	← +235 →				°C

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

3875081 G E SOLID STATE

01E 17428

D F-33-23

General-Purpose Power Transistors

2N6246, 2N6247, 2N6248, 2N6469

ELECTRICAL CHARACTERISTICS FOR P-N-P TYPES, At case temperature ( $T_C$ ) = 25°C unless otherwise specified

CHARACTERISTIC	SYMBOL	TEST CONDITIONS				LIMITS				UNITS
		VOLTAGE V dc		CURRENT A dc		2N6469		2N6246		
		V <sub>CE</sub>	V <sub>BE</sub>	I <sub>C</sub>	I <sub>B</sub>	Min.	Max.	Min.	Max.	
Collector-Cutoff Current: With external base-emitter resistance ( $R_{BE}$ ) = 100 Ω	I <sub>CER</sub>	-35 -55				- -	-200 -	- -	- -200	μA
With base-emitter junction reverse-biased	I <sub>CEX</sub>	-45 -65	1.5 1.5			- -	-200 -	- -	- -200	μA
With reverse bias and $T_C$ = 150°C		-45 -55	1.5 1.5			- -	-5 -	- -	- -5	mA
With base open	I <sub>CEO</sub>	-20 -30		0 0	0	- -	-1 -	- -	- -1	mA
Emitter-Cutoff Current	I <sub>EBO</sub>		5		0	-	-5	-	-5	mA
DC Forward-Current Transfer Ratio	h <sub>FE</sub>	-4 -4 -4		-5 <sup>a</sup> -7 <sup>a</sup> -15 <sup>a</sup>		20 - 5	150 - -	- 20 5	- 100 -	
Collector-to-Emitter Sustaining Voltage: With base open	V <sub>CEO(sus)</sub>			-0.2	0	-40 <sup>b</sup>	-	-60 <sup>b</sup>	-	V
With external base-emitter resistance ( $R_{BE}$ ) = 100 Ω	V <sub>CER(sus)</sub>			-0.2		-45 <sup>b</sup>	-	-65 <sup>b</sup>	-	V
Base-to-Emitter Voltage	V <sub>BE</sub>	-4 -4		-15 <sup>a</sup> -7 <sup>a</sup>		- -	-3.5 -	- -	- -2	V
Collector-to-Emitter Saturation Voltage	V <sub>CE(sat)</sub>			-5 <sup>a</sup> -7 <sup>a</sup> -15 <sup>a</sup> -15 <sup>a</sup>	-0.5 -0.7 -5 -3	- - - -	-1.3 - -3.5 -	- - - -	- -1.3 - -2.5	V
Magnitude of Common-Emitter Small-Signal Short-Circuit Forward-Current Transfer Ratio: f = 2 MHz	h <sub>fe</sub>	-4		-1		5	-	5	-	
Common-Emitter, Small-Signal Short-Circuit, Forward-Current Transfer Ratio: f = 1 kHz	h <sub>fe</sub>	-4		-1		25	-	25	-	
Thermal Resistance: Junction-to-case	R <sub>θJC</sub>					-	1.4	-	1.4	°C/W

<sup>a</sup> In accordance with JEDEC registration data format (JS-6 RDF-2).

<sup>b</sup> Pulsed: pulse duration = 300 μs, duty factor = 1.8%.

<sup>c</sup> CAUTION: CAUTION: Sustaining voltages V<sub>CEO(sus)</sub> and V<sub>CER(sus)</sub> MUST NOT be measured on a curve tracer.

3875081 G E SOLID STATE

01E 17429 DT-33-23  
General-Purpose Power Transistors

2N6246, 2N6247, 2N6248, 2N6469

ELECTRICAL CHARACTERISTICS FOR P-N-P TYPES, At case temperature ( $T_C$ ) = 25°C unless otherwise specified

CHARACTERISTIC	SYMBOL	TEST CONDITIONS				LIMITS				UNITS
		VOLTAGE V dc		CURRENT A dc		2N6247		2N6248		
		V <sub>CE</sub>	V <sub>BE</sub>	I <sub>C</sub>	I <sub>B</sub>	Min.	Max.	Min.	Max.	
Collector-Cutoff Current: With external base-emitter resistance (R <sub>BE</sub> ) = 100 Ω	I <sub>CER</sub>	-75 -95				- -	-200 -	- -	- -200	μA
With base-emitter junction reverse-biased	I <sub>CEX</sub>	-85 -100	1.5 1.5			- -	-200 -	- -	- -200	μA
With reverse bias, at T <sub>C</sub> = 150°C		-70 -90	1.5 1.5			- -	-5 -	- -	- -5	mA
With base open	I <sub>CEO</sub>	-40 -50			0 0	- -	-1 -	- -	- -1	mA
Emitter-Cutoff Current	I <sub>EBO</sub>		5		0	- -	-1 -	- -	- -1	mA
DC Forward-Current Transfer Ratio	h <sub>FE</sub>	-4 -4 -4 -4		-5 <sup>a</sup> -6 <sup>a</sup> -10 <sup>a</sup> -15 <sup>a</sup>		- 20 - 5	- 100 - -	20 - 5 -	100 - - -	
Collector-to-Emitter Sustaining Voltage: With base open	V <sub>CEO(sus)</sub>			-0.2	0	-80 <sup>b</sup>	-	-100 <sup>b</sup>	-	V
With external base-emitter resistance (R <sub>BE</sub> ) = 100 Ω	V <sub>CER(sus)</sub>			-0.2		-85 <sup>b</sup>	-	-105 <sup>b</sup>	-	V
Base-to-Emitter Voltage	V <sub>BE</sub>	-4 -4		-6 <sup>a</sup> -5 <sup>a</sup>		- -	-1.8 -	- -	- -1.8	V
Collector-to-Emitter Saturation Voltage	V <sub>CE(sat)</sub>			-5 <sup>a</sup> -6 <sup>a</sup> -15 <sup>a</sup> -10 <sup>a</sup>	-0.5 -0.6 -4 -2	- - - -	- -1.3 -3.5 -	- - - -	-1.3 - -3.5 -	V
Magnitude of Common-Emitter Small-Signal Short-Circuit Forward-Current Transfer Ratio: f = 2 MHz	h <sub>fe</sub>	-4		-1		5	-	5	-	
Common-Emitter, Small-Signal, Short-Circuit, Forward-Current Transfer Ratio: f = 1 kHz	h <sub>fe</sub>	-4		-1		25	-	25	-	
Thermal Resistance: Junction-to-case	R <sub>θJC</sub>					-	1.4	-	1.4	°C/W

<sup>a</sup> In accordance with JEDEC registration data format (JS-6 RDF-2).

<sup>a</sup> Pulsed; pulse duration = 300 μs, duty factor = 1.8%.

<sup>b</sup> CAUTION: Sustaining voltages V<sub>CEO(sus)</sub> and V<sub>CER(sus)</sub> MUST NOT be measured on a curve tracer.

3875081 G E SOLID STATE  
General-Purpose Power Transistors

01E 17430 D T-33-23

2N6246, 2N6247, 2N6248, 2N6469

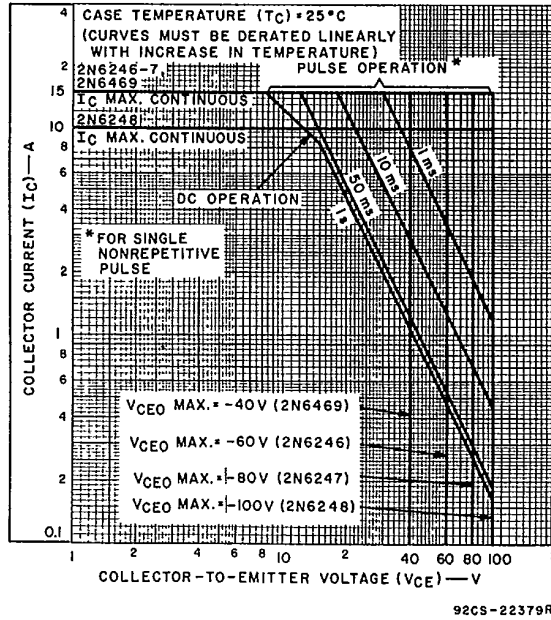


Fig. 1 — Maximum operating areas for all types.

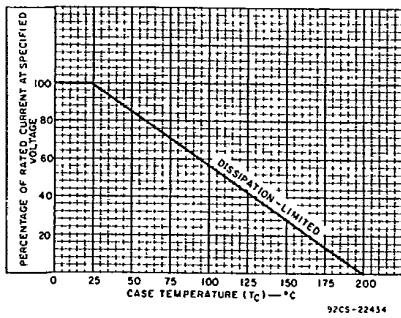


Fig. 2 — Current derating for all types.

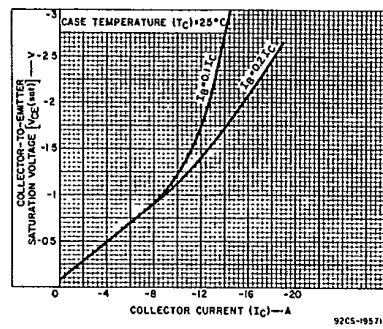
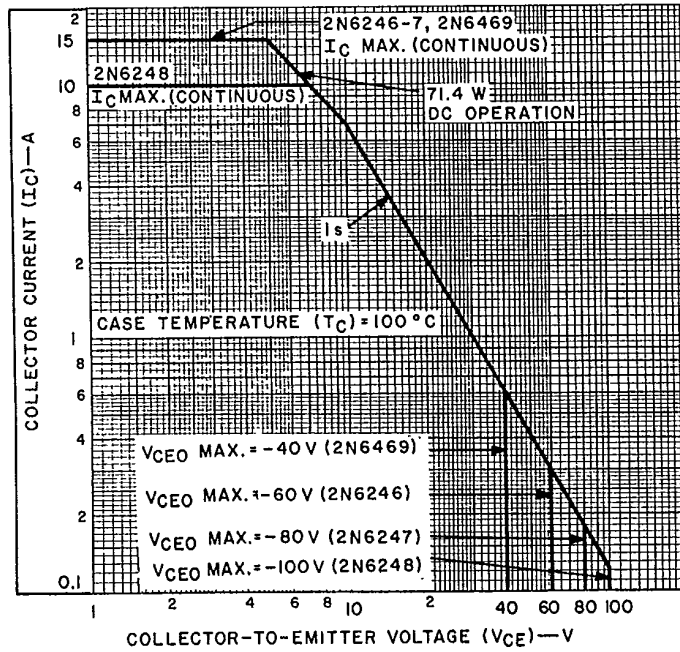


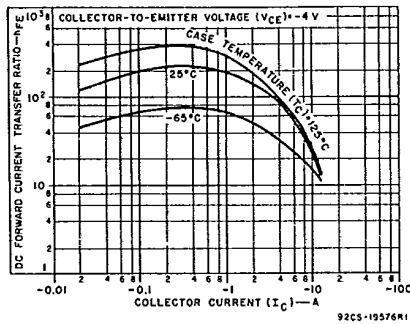
Fig. 3 — Typical collector-to-emitter saturation-voltage characteristics for 2N6246, 2N6247, 2N6248, and 2N6469.

2N6246, 2N6247, 2N6248, 2N6469



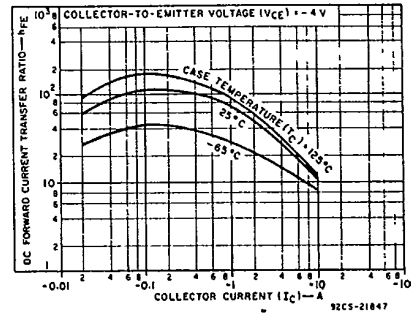
92CS-22380RI

Fig. 4 — Maximum operating areas for all types.



92CS-19576RI

Fig. 5 — Typical dc beta characteristics for 2N6246, 2N6247, and 2N6469.



92CS-21847

Fig. 6 — Typical dc beta characteristics for 2N6248.

3875081 G E SOLID STATE  
General-Purpose Power Transistors

01E 17432 D T-33-23

2N6246, 2N6247, 2N6248, 2N6469

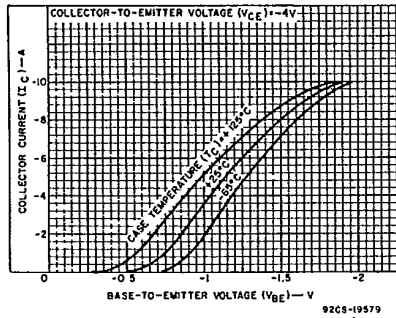


Fig. 7 — Typical transfer characteristics for 2N6246, 2N6247, 2N6248, and 2N6469.

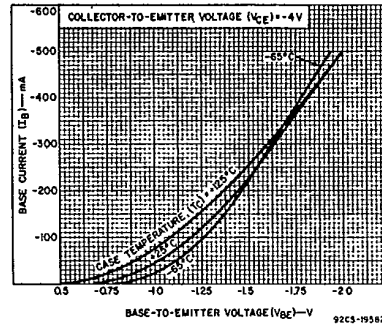


Fig. 8 — Typical input characteristics for 2N6246, 2N6247, and 2N6469.

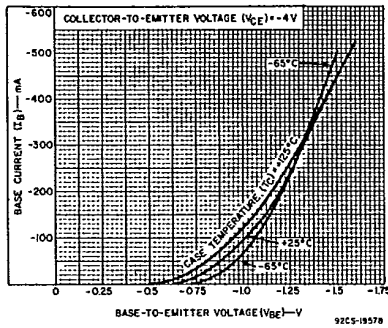


Fig. 9 — Typical input characteristics for 2N6248.

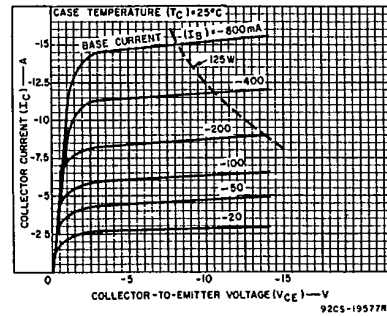


Fig. 10 — Typical output characteristics for 2N6246, 2N6247, and 2N6469.

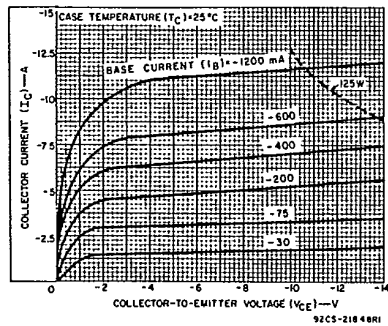


Fig. 11 — Typical output characteristics for 2N6248.

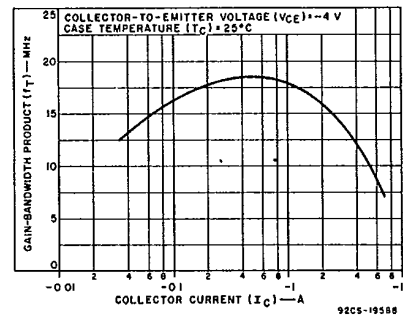


Fig. 12 — Typical gain-bandwidth product vs. collector current for 2N6246, 2N6247, 2N6248, and 2N6469.

3875081 G E SOLID STATE

01E 17433 D T-33-23  
General-Purpose Power Transistors

2N6246, 2N6247, 2N6248, 2N6469

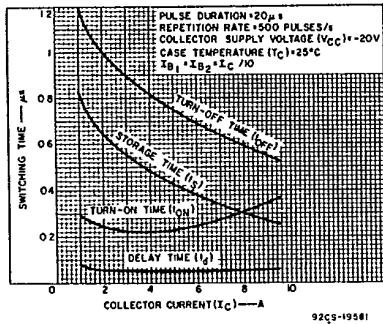


Fig. 13 — Typical saturated switching characteristics for 2N6246, 2N6247, 2N6248, and 2N6469.

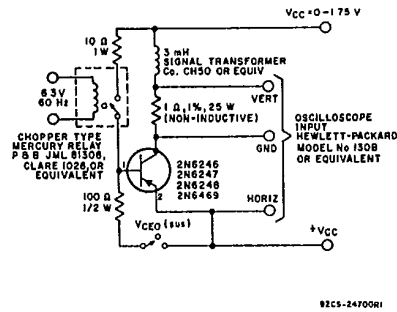
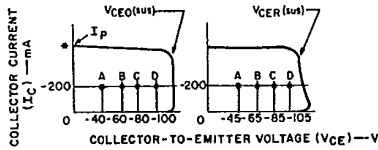


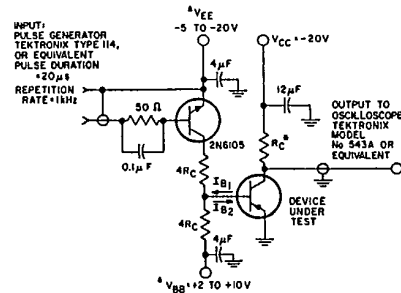
Fig. 14 — Circuit used to measure sustaining voltages  $V_{CE0}(sus)$  and  $V_{CER}(sus)$  for all types.



\* PULSE CURRENT ( $I_P$ ) RANGE = 0.6 - 0.8 A

THE SUSTAINING VOLTAGES  $V_{CE0}(sus)$  AND  $V_{CER}(sus)$  ARE ACCEPTABLE WHEN THE TRACES FALL TO THE RIGHT AND ABOVE POINT "A" FOR TYPE 2N6246; POINT "B" FOR 2N6246; POINT "C" FOR 2N6247; AND POINT "D" FOR 2N6248.

Fig. 15 — Oscilloscope display for measurement of sustaining voltages (test circuit shown in Fig. 14).



\*  $R_C$  IS CHOSEN FOR  $I_C$   
 \*  $V_{EE}$  AND  $V_{BB}$  ARE MEASURED FOR  $I_{B1}$  AND  $I_{B2}$   
 $I_{B1}$  AND  $I_{B2}$  ARE MEASURED WITH TETRIX CURRENT PROBE P-6019 AND TYPE 134 AMPLIFIER, OR EQUIVALENT

Fig. 16 — Circuit used to measure switching times for 2N6246, 2N6247, 2N6248, and 2N6469.

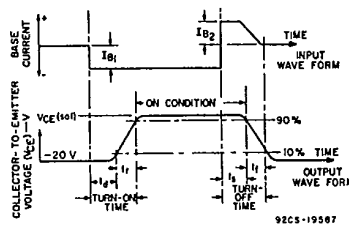


Fig. 17 — Oscilloscope display for measurement of switching times.