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Darlington Power Transistors

File Number 1448

RCA9228A, RCA9228B, RCA9228C, RCA9228D  
RCA9229A, RCA9229B, RCA9229C, RCA9229D

## 50-A Complementary High Current, Medium Voltage N-P-N and P-N-P Silicon Darlington Power Transistors

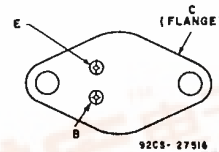
**Features:**

- 300 W at 25° C case temperature
- 50-A rated collector current
- Hard glass passivation
- Wire-bonded construction

**Applications:**

- General purpose
- Low-speed switching
- DC motor control

**TERMINAL DESIGNATIONS**



JEDEC TO-204AE

(141 mil diameter pin isolation)

The RCA-9228 Series and the RCA-9229 Series\* complementary n-p-n and p-n-p silicon Darlington transistors are designed for general-purpose amplifier and low-speed switching applications. The high gain of these devices makes it possible for them to be driven directly from integrated circuits.

These devices are supplied in the JEDEC TO-204AE hermetic steel package.

\*The RCA9228 and RCA9229 Series were formerly RCA developmental numbers TA9228 and TA9229, respectively.

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

	RCA9228A RCA9229A*	RCA9228B RCA9229B*	RCA9228C RCA9229C*	RCA9228D RCA9229D*	
V <sub>CEO</sub> .....	60	80	100	120	V
V <sub>CEO(SUS)</sub> .....	60	80	100	120	V
V <sub>ES0</sub> .....	5				V
I <sub>C</sub> .....	50				A
I <sub>A</sub> .....	1				A
P <sub>T</sub>					
T <sub>C</sub> ≤ 25° C .....	300				W
T <sub>C</sub> > 25° C .....	2.4				W/°C
T <sub>stg</sub> , T <sub>J</sub> .....	-65 to +150				°C
T <sub>L</sub>					
At distances > 1/8 in. (3.17 mm) from case for 10 s max. ....	235				°C

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



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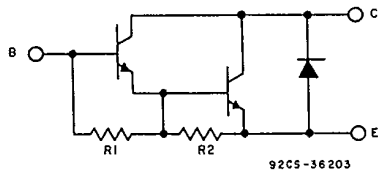


Fig. 1 - Schematic diagram for RCA9228 Series.

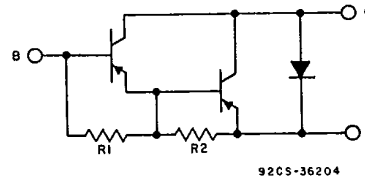


Fig. 2 - Schematic diagram for RCA9229 Series.

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

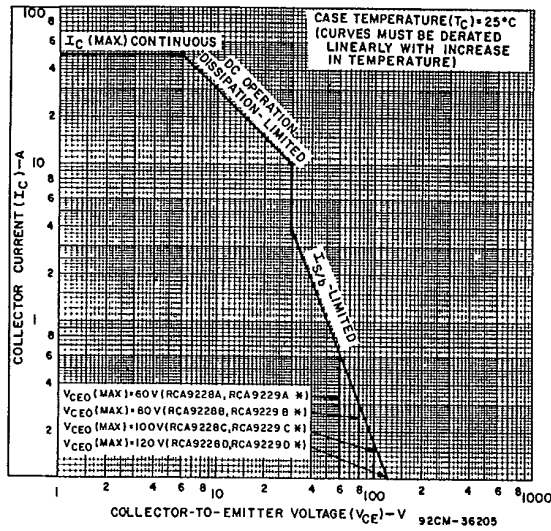
CHARACTERISTIC	TEST CONDITIONS				LIMITS								UNITS
	VOLTAGE V dc		CURRENT A dc		RCA9228A RCA9229A*		RCA9228B RCA9229B*		RCA9228C RCA9229C*		RCA9228D RCA9229D*		
	$V_{CE}$	$V_{BE}$	$I_C$	$I_B$	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
$I_{CEO}$	50 70 90 110				—	0.5	—	—	—	—	—	—	mA
$I_{EBO}$		-5			—	5	—	5	—	5	—	5	mA
$V_{CEO}$	(a)		0.1 <sup>(b)</sup>		60	—	80	—	100	—	120	—	V
$h_{FE}$	3 3		25 50		2000 400	—	2000 400	—	2000 400	—	2000 400	—	
$V_{BE(sat)}$			25 50	0.1 0.2	— —	2.5 3.5	— —	2.5 3.5	— —	2.5 3.5	— —	2.5 3.5	V
$V_{CE(sat)}$			25 50	0.1 0.2	— —	2 3	— —	2 3	— —	2 3	— —	2 3	V
$I_{S/B}$ $t = 0.5 \text{ sec.}$	30				10	—	10	—	10	—	10	—	A
$R_{\theta JC}$					—	0.416	—	0.416	—	0.416	—	0.416	°C/W
Typical Values $C_{ob}$ $V_{CB} = 10 \text{ V}$ RCA9228 Series RCA9229 Series $h_{ie} 1 \text{ MHz}$					Typ. Typ. Typ.	300 600 5	Typ. Typ. Typ.	300 600 5	Typ. Typ. Typ.	300 600 5	Typ. Typ. Typ.	300 600 5	pF

(a) CAUTION: Sustaining voltage  $V_{CEO(sus)}$  MUST NOT be measured on a curve tracer.

(b) Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty factor < 2%.

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

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\*FOR p-n-p DEVICES, VOLTAGE AND CURRENT VALUES ARE NEGATIVE

Fig. 3 - Maximum operating areas for all types.

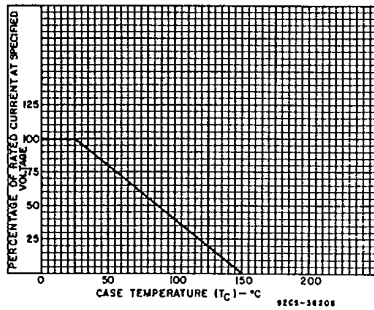


Fig. 4 - Current derating curve for all types.

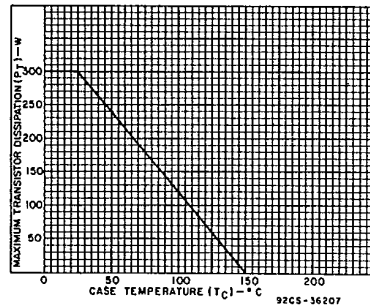


Fig. 5 - Power derating curve for all types.

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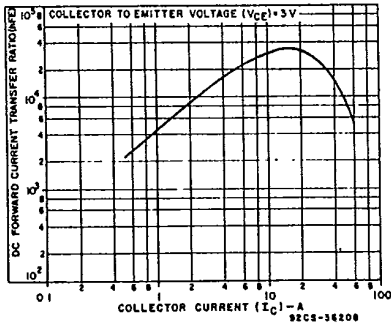


Fig. 6 - Typical dc beta characteristics for RCA9228 Series.

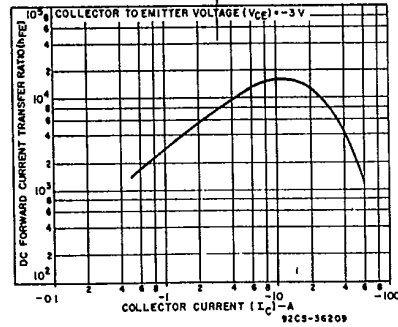


Fig. 7 - Typical dc beta characteristics for RCA9229 Series.

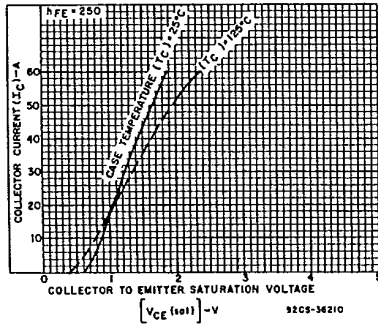


Fig. 8 - Typical saturation characteristics for RCA9228 Series.

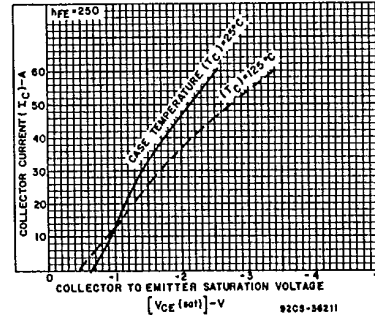


Fig. 9 - Typical saturation characteristics for RCA9229 Series.

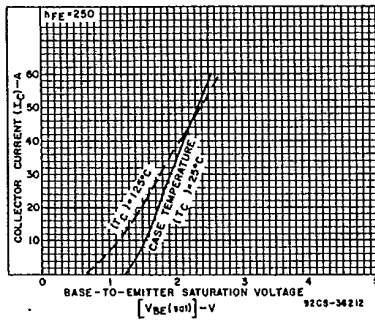


Fig. 10 - Typical saturation characteristics for RCA9228 Series.

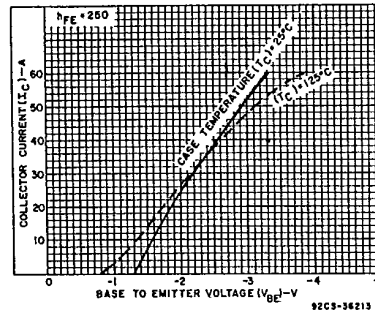


Fig. 11 - Typical saturation characteristics for RCA9229 Series.