

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

File Number 1448

T-33-01

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

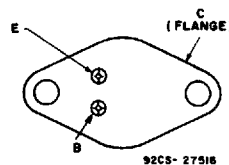
**Features:**

- 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 RCA9228A, RCA9228B, RCA9228C, RCA9228D and the RCA9229A\*, RCA9229B\*, RCA9229C\*, RCA9229D\* are complementary n-p-n and p-n-p silicon Darlington transistors 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 RCA9228A, RCA9228B, RCA9228C, RCA9228D and RCA9229A, RCA9229B, RCA9229C, RCA9229D were formerly RCA developmental nos. 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>EB0</sub> .....	5				V
I <sub>C</sub> .....	50				A
I <sub>B</sub> .....	1				A
P <sub>T</sub>					
T <sub>C</sub> ≤ 25°C .....	300				W
T <sub>C</sub> > 25°C .....	Derate linearly				W/°C
T <sub>sto</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.

POWER TRANSISTORS

**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
$V_{CEO}(SUS)$	a		0.1 <sup>b</sup>		60	—	80	—	100	—	120	—	V
$h_{FE}$	3 5		25 50		2000 400	—	2000 400	—	2000 400	—	2000 400	—	
$V_{BE}(sat)$			25 50	0.2 0.3	—	3 4.5	—	3 4.5	—	3 4.5	—	3 4.5	V
$V_{CE}(sat)$			25 50	0.25 0.5	—	2.5 3.5	—	2.5 3.5	—	2.5 3.5	—	2.5 3.5	V
$I_{s,b}$ $t = 0.5$ sec.	30				10	—	10	—	10	—	10	—	A
$C_{obo}$ $V_{CB} = 10$ V RCA9228A, B, C, D RCA9229A, B, C, D					Typ. 300 Typ. 600	—	Typ. 300 Typ. 600	—	Typ. 300 Typ. 600	—	Typ. 300 Typ. 600	—	pF
$h_{fe}$ at $f = 1$ MHz					Typ. 5	—	Typ. 5	—	Typ. 5	—	Typ. 5	—	
$R\theta_{JC}$					—	0.416	—	0.416	—	0.416	—	0.416	°C/W

- For p-n-p devices, voltage and current values are negative.
- CAUTION: Sustaining voltage  $V_{CEO}(SUS)$  MUST NOT be measured on a curve tracer.
- Pulsed: Pulse duration = 300  $\mu s$ , duty factor < 2%.

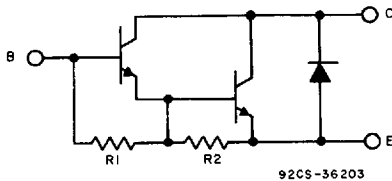


Fig. 1 - Schematic diagram for RCA9228A, RCA9228B, RCA9228C, RCA9228D.

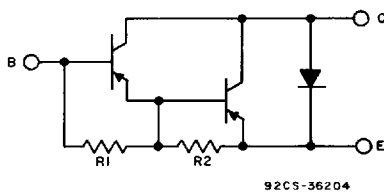
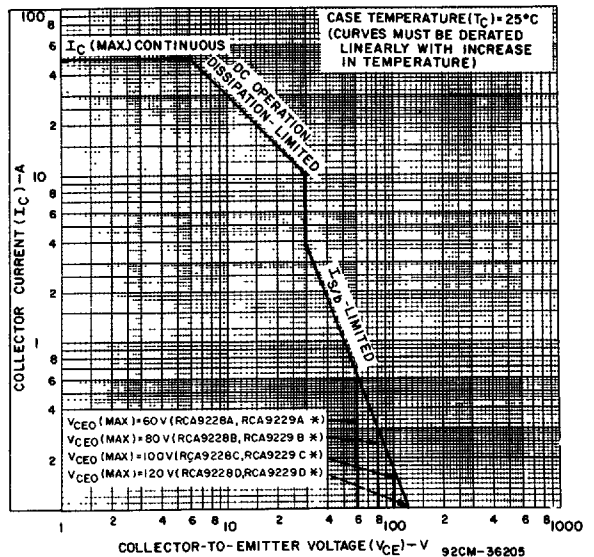


Fig. 2 - Schematic diagram for RCA9229A, RCA9229B, RCA9229C, RCA9229D.



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

Fig. 3 - Maximum operating areas for all types.

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

T-33-01

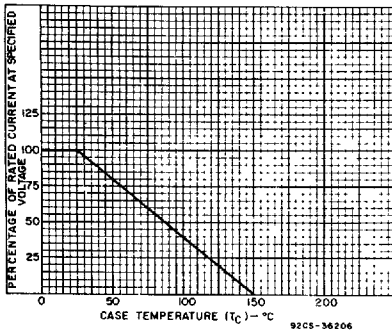


Fig. 4 - Current derating curve for all types.

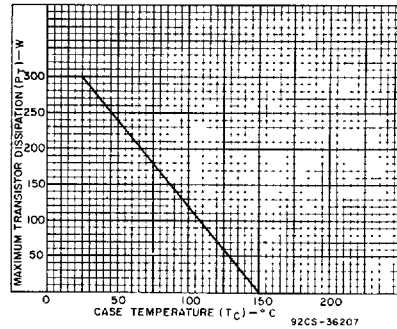


Fig. 5 - Power derating curve for all types.

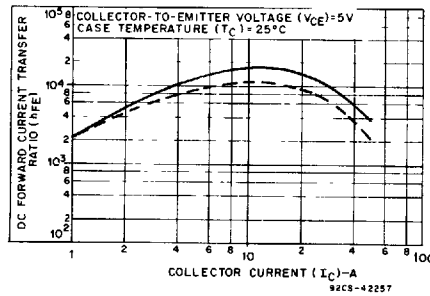


Fig. 6 - Typical dc beta characteristics for all types.

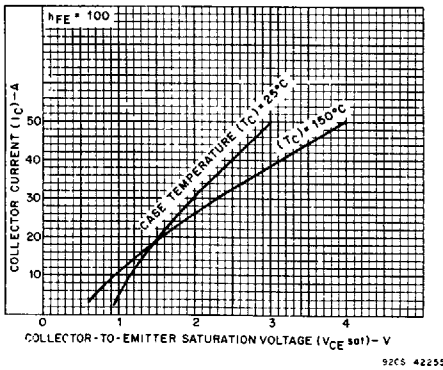


Fig. 7 - Typical collector-to-emitter saturation voltage characteristics for RCA9228A, RCA9228B, RCA9228C and RCA9228D.

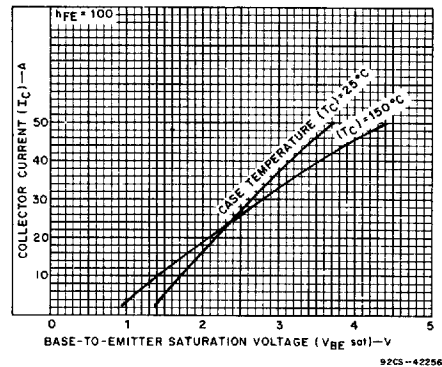


Fig. 8 - Typical base-to-emitter saturation voltage characteristics for RCA9228A, RCA9228B, RCA9228C and RCA9228D.

POWER TRANSISTORS

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

T-33-01

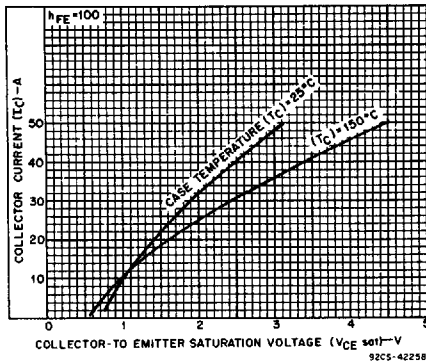


Fig. 9 - Typical collector-to-emitter saturation voltage characteristics for RCA9229A, RCA9229B, RCA9229C and RCA9229D.

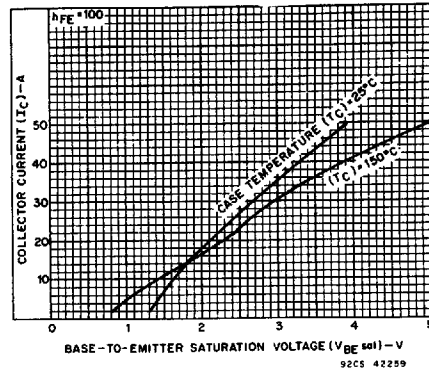


Fig. 10 - Typical base-to-emitter saturation voltage characteristics for RCA9229A, RCA9229B, RCA9229C and RCA9229D.