

3875081 G E SOLID STATE  
Darlington Power Transistors

01E 17308

D T-33-29

RCA1000, RCA1001

File Number 594

## 8-Ampere Silicon N-P-N Darlington Power Transistors

For Use as Output Devices in General-Purpose  
Switching and Amplifier Applications

### Features:

- High dc current gain:  
 $h_{FE} = 1000$  min. at  $I_C = 3$  A
- Monolithic construction

RCA1000 and 1001 are monolithic silicon n-p-n Darlington transistors intended for medium-power applications as output devices. The construction of these units provides good forward-bias second-breakdown capability. Their high gain makes it possible for them to be driven directly from integrated circuits.

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

### TERMINAL DESIGNATIONS

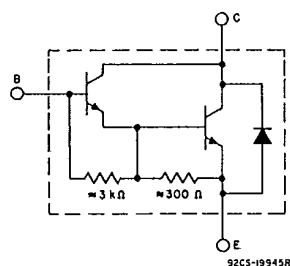
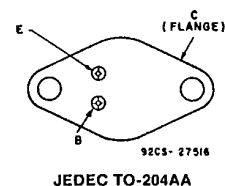


Fig. 1 — Schematic diagram for all types.

### MAXIMUM RATINGS, Absolute-Maximum Values:

|   |           | RCA-1000    | RCA-1001 |      |
|---|-----------|-------------|----------|------|
| COLLECTOR-TO-BASE VOLTAGE:                                  |           |             |          |      |
| With emitter open   | $V_{CBO}$ | 60          | 80       | V    |
| COLLECTOR-TO-EMITTER VOLTAGE:                               |           |             |          |      |
| With base open  | $V_{CEO}$ | 60          | 80       | V    |
| EMITTER-TO-BASE VOLTAGE:                                    |           |             |          |      |
| With collector open   | $V_{EBO}$ | 5           | 5        | V    |
| COLLECTOR CURRENT:  |           |             |          |      |
| Continuous  | $I_C$     | 8           | 8        | A    |
| Pulsed  |           | 15          | 15       | A    |
| BASE CURRENT (Continuous)                                   | $I_B$     | 0.1         | 0.1      | A    |
| TRANSISTOR DISSIPATION:                                     |           |             |          |      |
| At case temperatures up to 25°C                             | $P_T$     | 90          | 90       | W    |
| At case temperatures above 25°C, derate linearly at         |           |             | 0.515    | W/°C |
| TEMPERATURE RANGE:  |           |             |          |      |
| Storage & Operating (Junction)                              |           | -55 to +200 |          | °C   |
| LEAD TEMPERATURE (During Soldering):                        |           |             |          |      |
| At distance $\geq 1/8$ in. (3.17 mm) from case to 10 s max. |           | 235         |          | °C   |

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ELECTRICAL CHARACTERISTICS, At Case Temperature ( $T_C$ ) = 25°C unless otherwise specified

| CHARACTERISTIC  | SYMBOL               | TEST CONDITIONS |                 |                 |                                      |                | LIMITS      |        |             |        | UNIT |
|---|----------------------|-----------------|-----------------|-----------------|--------------------------------------|----------------|-------------|--------|-------------|--------|------|
|   |                      | DC VOLTAGE (V)  |                 |                 | DC CURRENT (A)                       |                | LIMITS      |        |             |        |      |
|   |                      |                 |                 |                 |                                      |                | RCA 1000    |        | RCA 1001    |        |      |
|   |                      | V <sub>CB</sub> | V <sub>CE</sub> | V <sub>BE</sub> | I <sub>C</sub>                       | I <sub>B</sub> | MIN.        | MAX.   | MIN.        | MAX.   |      |
| Collector Cutoff Current:<br>With base open                           | I <sub>CEO</sub>     |                 | 30<br>40        |                 | 0<br>0                               | —              | 500<br>—    | —      | —<br>500    | μA     |      |
| With external base-to-emitter<br>resistance (R <sub>BE</sub> ) = 1 kΩ | I <sub>CER</sub>     | 60<br>80        |                 |                 |                                      | —<br>—         | 1<br>—      | —<br>— | —<br>1      | mA     |      |
| At T <sub>C</sub> = 150°C   |                      | 60<br>80        |                 |                 |                                      | —<br>—         | 5<br>—      | —<br>— | —<br>5      |        |      |
| Emitter Cutoff Current  | I <sub>EBO</sub>     |                 |                 | 5               | 0                                    | —              | 2           | —      | 2           | mA     |      |
| Collector-to-Emitter<br>Breakdown Voltage                             | V <sub>(BR)CEO</sub> |                 |                 |                 | 0.1 <sup>a</sup><br>0.1 <sup>a</sup> | 0<br>0         | 60<br>—     | —<br>— | —<br>80     | V      |      |
| DC Forward Current<br>Transfer Ratio                                  | h <sub>FE</sub>      |                 | 3<br>3          |                 | 3<br>4                               |                | 1000<br>750 | —<br>— | 1000<br>750 |        |      |
| Base-to-Emitter Voltage   | V <sub>BE</sub>      |                 | 3               |                 | 3 <sup>a</sup>                       |                | —           | 2.5    | —           | 2.5    | V    |
| Collector-to-Emitter<br>Saturation Voltage                            | V <sub>CE(sat)</sub> |                 |                 |                 | 3 <sup>a</sup><br>8 <sup>a</sup>     | 0.012<br>0.04  | —<br>—      | 2<br>4 | —<br>—      | 2<br>4 | V    |
| Thermal Resistance<br>(Junction-to-Case)                              | R <sub>θJC</sub>     |                 |                 |                 |                                      |                | —           | 1.94   | —           | 1.94   | °C/W |

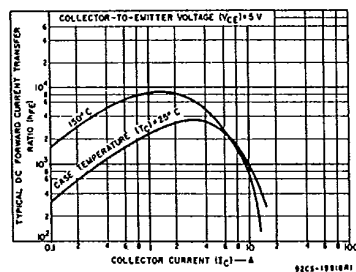
<sup>a</sup> Pulsed: Pulse duration  $\leq 300 \mu s$ , duty factor  $\leq 2\%$ .

Fig. 2 — Typical dc beta characteristics for both types.

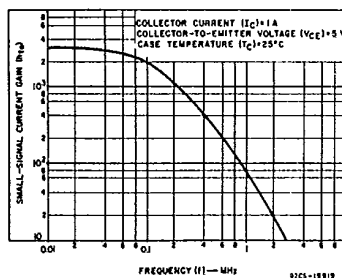


Fig. 3 — Typical small-signal gain for both types.

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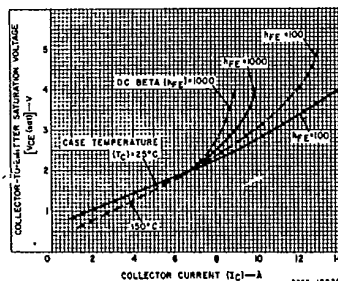


Fig. 4 — Typical saturation characteristics for both types.

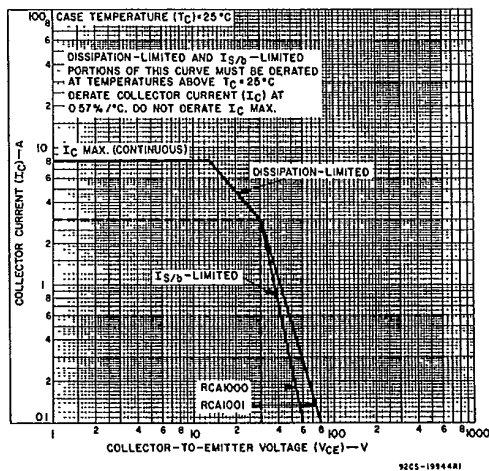


Fig. 5 — DC safe-area-of-operation for both types.