Advance Information/
Preliminary Data

CA3250, CA3251

T-43-25

General-Purpose High-Current N-P-N Transistor Arrays

CA3251 - Common-Emitter Array
CA3250 - Common-Collector Array

Features:

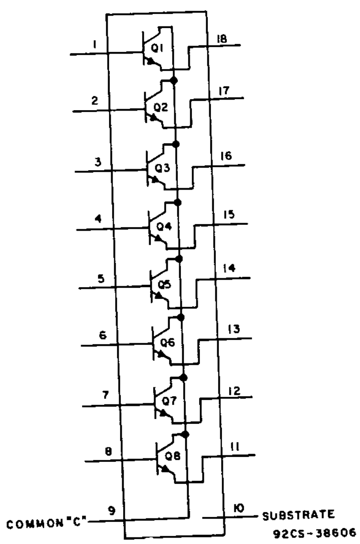
- *8 transistors permit a wide range of applications in either a common-emitter (CA3251) or common-collector (CA3250) configuration*
- *High I_C: 100 mA max.*
- *Low V_{CEsat} (at 50 mA): 0.4 V typ.*

RCA-CA3250• and CA3251• consist of eight high-current (to 100 mA) silicon n-p-n transistors on a common monolithic substrate. The CA3251 is connected in a common-emitter configuration and the CA3250 is connected in a common-collector configuration.

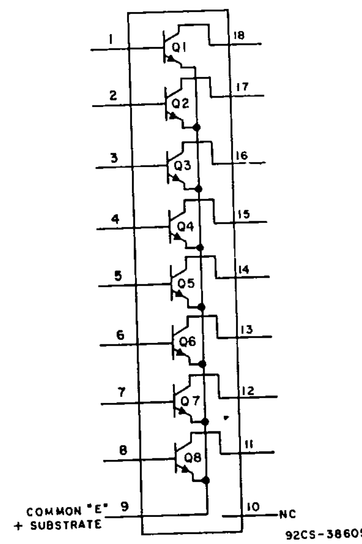
•Formerly RCA Development Type Nos. TA11550 and TA11551.

Applications:

- *Drivers for:*
  - *Incandescent display devices*
  - *LED (e.g. RCA-40736R GaAs High-Efficiency Emitting Diode)*
  - *Relay control*
  - *Thyristor firing*



(a)
COMMON-COLLECTOR CONFIGURATION



(b)
COMMON-EMITTER CONFIGURATION

Fig. 1 - Functional diagrams of types CA3250 and CA3251.

File Number **1684**

CA3250, CA3251

The CA3250 and CA3251 are capable of directly driving seven-segment and decimal point displays such as incandescent and light-emitting diode (LED). These types are also well-suited for a variety of other drive applications, including relay control and thyristor firing.

In some applications, the CA3250 is functionally compatible with the higher power UDN2580A. The CA3251 is functionally compatible with the ULN2800A series and the TD62081AP series. It may be necessary, however, to insert in each base a series resistance to limit the I_B to 20 mA.

The CA3250 and CA3251 are supplied in an 18-lead dual-in-line plastic package (E suffix), and in an 18-lead dual-in-line frit seal ceramic package (F suffix), which includes a separate substrate connection (CA3250 only) for maximum flexibility in circuit design. Both types are also available in chip form (H suffix).

MAXIMUM RATINGS, *Absolute-Maximum Values at T_A = 25° C*

The following ratings apply for each transistor in the device:

COLLECTOR-TO-EMITTER VOLTAGE (V_{CEO}) .... 16 V
COLLECTOR-TO-BASE VOLTAGE (V_{CBO}) .... 20 V
COLLECTOR-TO-SUBSTRATE VOLTAGE (V_{CIO})* .... 20 V
EMITTER-TO-BASE VOLTAGE (V_{EBO}) .... 5 V
COLLECTOR CURRENT (I_C) .... 100 mA
BASE CURRENT (I_B) .... 20 mA
POWER DISSIPATION:
Any one transistor .... 500 mW
Total Package .... 750 mW
Above 55° C .... Derate Linearly 6.67 mW/° C
AMBIENT TEMPERATURE RANGE:
Operating .... -55 to +125° C
Storage .... -65 to +150° C
LEAD TEMPERATURE (DURING SOLDERING):
At distance 1/16" ± 1/32" (1.59 mm ± 0.79 mm) from case for 10 seconds max. .... 265° C

* The collector of each transistor of the CA3250 and CA3251 is isolated from the substrate by an integral diode. The substrate must be connected to a voltage which is more negative than any collector voltage in order to maintain isolation between transistors and provide normal transistor action. To avoid undesired coupling between transistors, the substrate terminal (10) of the CA3250 should be maintained at either DC or signal (AC) ground. A suitable bypass capacitor can be used to establish a signal ground.

The substrate of the CA3251 is internally connected to the common-emitter terminal No. 9 to make it more compatible with existing industry types.

ELECTRICAL CHARACTERISTICS AT T_A = 25° C FOR EQUIPMENT DESIGN

CHARACTERISTIC		TEST CONDITIONS	LIMITS Min.	Typ.	Max.	UNITS
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CES}$	I_C = 500 μA	20	60	—	V
Collector-to-Substrate Breakdown Voltage	$V_{(BR)CIO}$	I_{CI} = 500 μA, I_E = 0, I_B = 0	20	60	—	V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = 1 mA, I_B = 0	16	24	—	V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E = 500 μA	5	6.9	—	V
DC Forward-Current Transfer Ratio	h_{FE}	V_{CE} = 0.5 V, I_C = 30 mA	30	68	—	—
		V_{CE} = 3 V, I_C = 50 mA	40	70	—	—
Base-to-Emitter Saturation Voltage	V_{BEsat}	I_C = 30 mA, I_B = 1 mA	—	0.87	1.0	V
Collector-to-Emitter Saturation Voltage	V_{CEsat}	I_C = 30 mA, I_B = 1 mA	—	0.27	0.5	V
		I_C = 50 mA, I_B = 5 mA	—	0.4	0.8	
Collector-Cutoff-Current	I_{CEO}	V_{CE} = 10 V, I_B = 0	—	—	10	μA
Collector-Cutoff-Current	I_{CBO}	V_{CB} = 10 V, I_E = 0	—	—	1	μA

CA3250, CA3251

TYPICAL STATIC CHARACTERISTICS FOR EACH TRANSISTOR OF TYPES CA3250 AND CA3251

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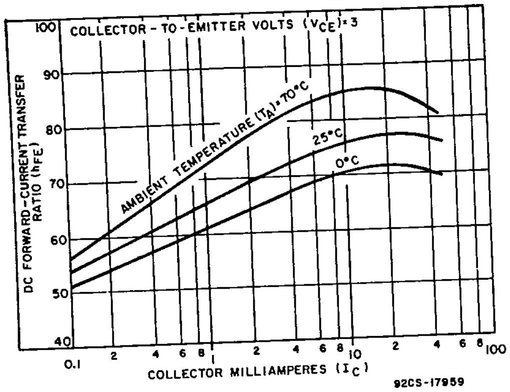

Fig. 2 - DC Forward-current transfer ratio as a function of collector current.

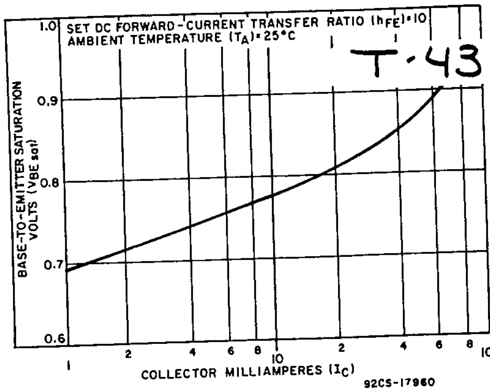

Fig. 3 - Base-to-emitter saturation voltage as a function of collector current.

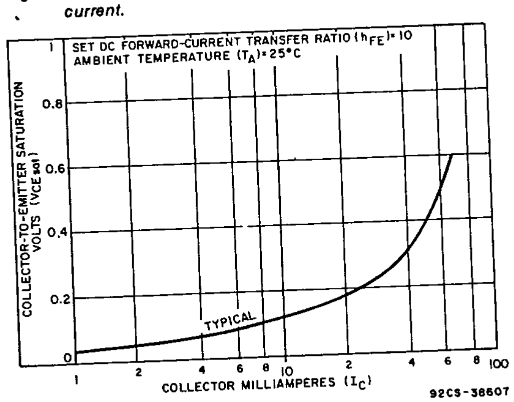

Fig. 4 - Collector-to-emitter saturation voltage as a function of collector current at T_A = 25° C.

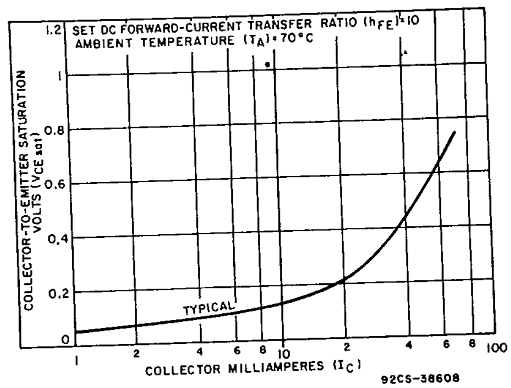

Fig. 5 - Collector-to-emitter saturation voltage as a function of collector current at T_A = 70° C.

TYPICAL READ-OUT DRIVER APPLICATIONS

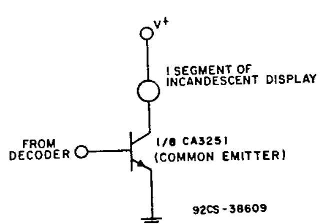

Fig. 6 - Schematic diagram showing one transistor of the CA3251 driving one segment of an incandescent display.

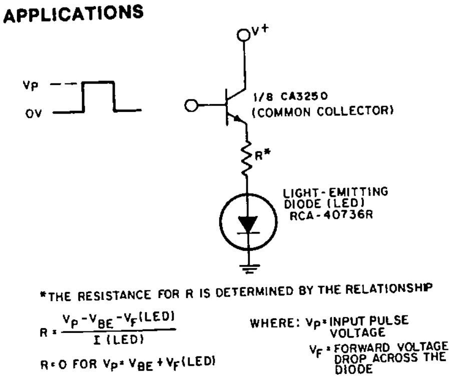

Fig. 7 - Schematic diagram showing one transistor of the CA3250 driving a light-emitting diode (LED).