CA3083

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

Features:

- *High I_C: 100 mA max.*
- *Low V_{CEsat} (at 50 mA): 0.7V max.*
- *Matched pair (Q1 and Q2) -*
  V_{IO} (V_{BE} matched): ± 5 mV max.
  I_{IO} (at 1 mA): 2.5 μA max.
- *5 independent transistors plus separate substrate connection*

RCA-CA3083 is a versatile array of five high-current (to 100mA) n-p-n transistors on a common monolithic substrate. In addition, two of these transistors (Q1 and Q2) are matched at low currents (i.e. 1 mA) for applications in which offset parameters are of special importance.

Independent connections for each transistor plus a separate terminal for the substrate permit maximum flexibility in circuit design. The CA3083 is supplied in a 16-lead dual-in-line frit-seal ceramic package. The CA3083 is also available in chip form.

Applications:

- *Signal processing and switching systems operating from DC to VHF*
- *Lamp and relay driver*
- *Differential amplifier*
- *Temperature-compensated amplifier*
- *Thyristor firing*
- *See RCA Application Note, ICAN-5296 "Application of the RCA-CA3018 Circuit Transistor Array" for suggested applications*

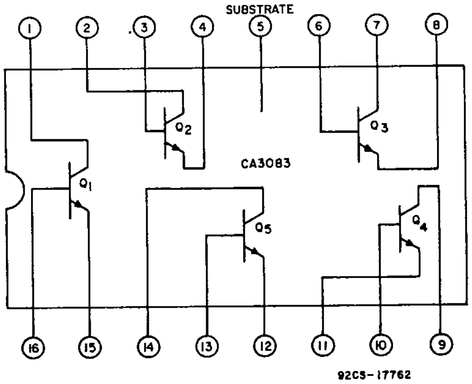

Fig. 1 — Functional diagram of the CA3083.

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

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 following ratings apply for each transistor in the device:		
Collector-to-Emitter Voltage (V_{CEO})	15	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

■ The collector of each transistor of the CA3083 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 (5) should be maintained at either DC or signal (AC) ground. A suitable bypass capacitor can be used to establish a signal ground.

ELECTRICAL CHARACTERISTICS at T_A = 25°C
For Equipment Design

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	Typ. Char. Curve Fig. No.	LIMITS Min.	Typ.	Max.	UNITS
For Each Transistor:							
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = 100μA, I_E = 0	–	20	60	–	V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = 1mA, I_B = 0	–	15	24	–	V
Collector-to-Substrate Breakdown Voltage	$V_{(BR)CIO}$	I_{CI} = 100μA, I_B = 0, I_E = 0	–	20	60	–	V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E = 500μA, I_C = 0	–	5	6.9	–	V
Collector-Cutoff-Current	I_{CEO}	V_{CE} = 10V, I_B = 0	–	–	–	10	μA
Collector-Cutoff-Current	I_{CBO}	V_{CB} = 10V, I_E = 0	–	–	–	1	μA
DC Forward-Current Transfer Ratio	h_{FE}	V_{CE} = 3V, I_C = 10mA	2	40	76	–	
		V_{CE} = 3V, I_C = 50mA		40	75	–	
Base-to-Emitter Voltage	V_{BE}	V_{CE} = 3V, I_C = 10mA	3	0.65	0.74	0.85	V
Collector-to-Emitter Saturation Voltage	V_{CEsat}	I_C = 50mA, I_B = 5mA	4	–	0.40	0.70	V
Gain-Bandwidth Product	f_T	V_{CE} = 3 V I_C = 10 mA		–	450	–	MHz
For Transistors Q1 and Q2 (As a Differential Amplifier):							
Absolute Input Offset Voltage	$\lvert V_{IO} \rvert$	V_{CE} = 3V, I_C = 1mA	7	–	1.2	5	mV
Absolute Input Offset Current	$\lvert I_{IO} \rvert$		8	–	0.7	2.5	μA

TYPICAL STATIC CHARACTERISTICS FOR EACH TRANSISTOR

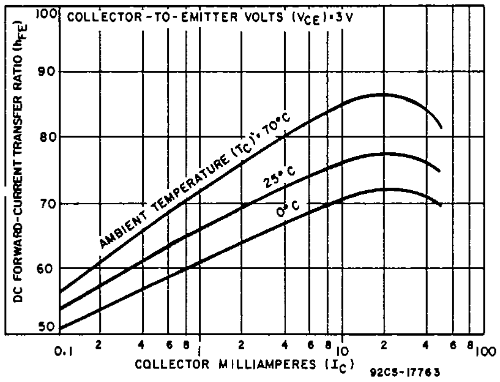

Fig.2 – h_{FE} vs I_C

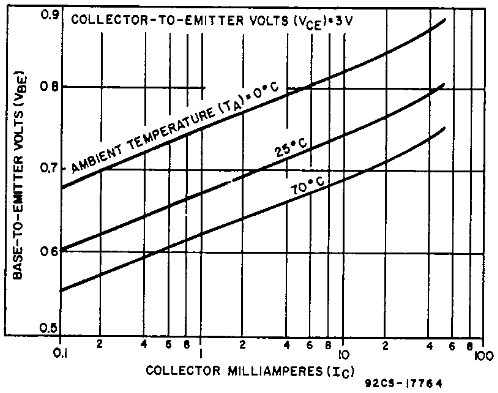

Fig.3 – V_{BE} vs I_C

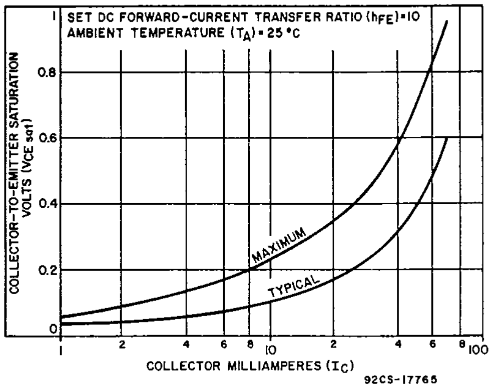

Fig.4 – V_{CEsat} vs I_C at 25°C

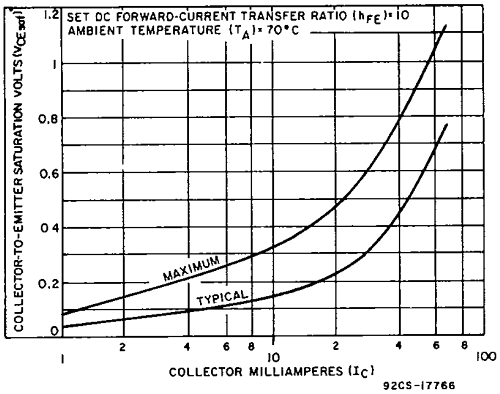

Fig.5 – V_{CEsat} vs I_C at 70°C

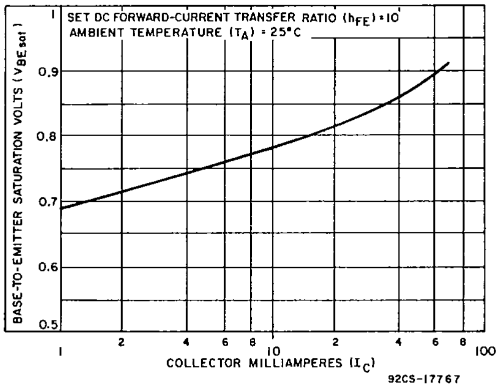

Fig.6 – V_{BEsat} vs I_C

TYPICAL STATIC CHARACTERISTICS FOR DIFFERENTIAL AMPLIFIER

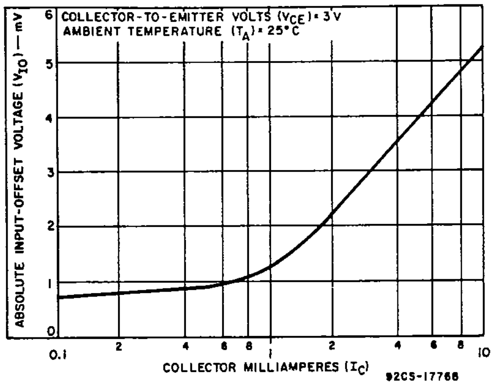

Fig.7 – V_{IO} vs I_C (transistors Q1 and Q2 as a differential amplifier).

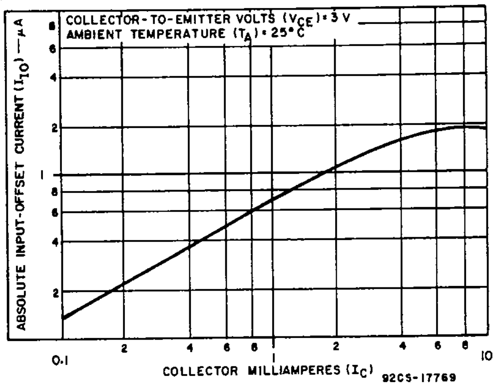

Fig.8 – I_{IO} vs I_C (transistors Q1 and Q2 as a differential amplifier).