CA3227, CA3246

High-Frequency N-P-N Transistor Arrays

For Low-Power Applications at Frequencies up to 1.5 GHz

Features:

- *Gain-bandwidth product (f_T) > 3 GHz*
- *Five transistors on a common substrate*

The RCA-CA3227E and CA3246E* consist of five general-purpose silicon n-p-n transistors on a common monolithic substrate. Each of the transistors exhibits a value of f_T in excess of 3 GHz, making them useful from dc to 1.5 GHz. The monolithic construction of these devices provides close electrical and thermal matching of the five transistors.

The CA3227E is supplied in a 16-lead dual-in-line plastic package and the CA3246E is supplied in a 14-lead dual-in-line plastic package.

*Formerly RCA Developmental Nos. TA10854 and TA10855, respectively.

Applications:

- *VHF amplifiers*
- *VHF mixers*
- *Multifunction combinations - RF/mixer/oscillator*
- *IF converter*
- *IF amplifiers*
- *Sense amplifiers*
- *Synthesizers*
- *Synchronous detectors*
- *Cascade amplifiers*

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

POWER DISSIPATION, P_D:	
Any one transistor	85 mW
Total Package:	
For T_A up to 75°C	425 mW
For T_A > 75°C Derate Linearly at	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 in. (1.59 ± 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}	8 V
Collector-to-Base Voltage, V_{CBO}	12 V
Collector-to-Substrate Voltage, V_{CIO}§	20 V
Collector Current, I_C	20 mA

§The collector of each transistor of these devices is isolated from the substrate by an integral diode. The substrate (terminal 5/CA3227E and terminal 13/CA3246E) must be connected to the most negative point in the external circuit to maintain isolation between transistors and to provide for normal transistor action.

File Number **1345**

STATIC ELECTRICAL CHARACTERISTICS at T_A=25°C

CHARACTERISTIC	SYMBOL	TEST CONDITIONS		LIMITS Min.	Typ.	Max.	UNITS
For Each Transistor:							
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=10 μA, I_E=0		12	20	—	V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=1 mA, I_B=0		8	10	—	V
Collector-to-Substrate Breakdown Voltage	$V_{(BR)CIO}$	I_{C1}=10 μA, I_B=0, I_E=0		20	—	—	V
Emitter-Cutoff-Current*	I_{EBO}	V_{EB}=4.5 V, I_C=0		—	—	10	μA
Collector-Cutoff-Current	I_{CEO}	V_{CE}=5 V, I_B=0		—	—	1	μA
Collector-Cutoff-Current	I_{CBO}	V_{CB}=8 V, I_E=0		—	—	100	nA
DC Forward-Current Transfer Ratio	h_{FE}	V_{CE}=6 V	I_C=10 mA	—	110	—	
			I_C=1 mA	40	150	—	
			I_C=0.1 mA	—	150	—	
Base-to-Emitter Voltage	V_{BE}	V_{CE}=6 V	I_C=1 mA	0.62	0.71	0.82	V
Collector-to-Emitter Saturation Voltage	$V_{CE}(sat)$	I_C=10 mA, I_B=1 mA		—	0.13	0.50	V
Base-to-Emitter Saturation Voltage	$V_{BE}(sat)$	I_C=10 mA, I_B=1 mA		0.74	—	0.94	V

*On small-geometry, high-frequency transistors, it is very good practice never to take the Emitter Base Junction into reverse breakdown. To do so may permanently degrade the h_{FE}. Hence, the use of I_{EBO} rather than $V_{(BR)EBO}$. These devices are also susceptible to damage by electrostatic discharge and transients in the circuits in which they are used. Moreover, CMOS handling procedures should be employed.

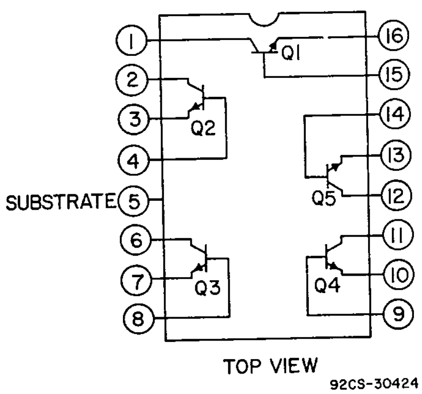

Fig. 1 - Schematic diagram of CA3227

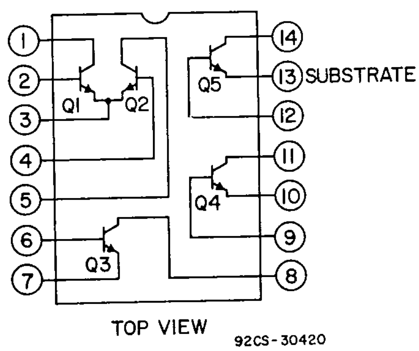

Fig. 2 - Schematic diagram of CA3246

CA3227, CA3246

DYNAMIC ELECTRICAL CHARACTERISTICS at T_A=25° C, 200 MHz, Common Emitter
Typical Values Intended Only for Design Guidance

CHARACTERISTIC			TEST CONDITIONS	TYPICAL VALUES	UNITS
For Each Transistor					
Input Admittance,	Y_{11}	b_{11}	I_C=1 mA, V_{CE}=5 V	4	mmho
		g_{11}		0.75	
Output Admittance,	Y_{22}	b_{22}		2.7	mmho
		g_{22}		0.13	
Forward Transfer Admittance,	Y_{21}	Y_{21}		29.3	mmho
		θ_{21}		−33	degrees
Reverse Transfer Admittance,	Y_{12}	Y_{12}		0.38	mmho
		θ_{12}		−97	degrees
Input Admittance,	Y_{11}	b_{11}	I_C=10 mA, V_{CE}=5 V	4.8	mmho
		g_{11}		2.85	
Output Admittance,	Y_{22}	b_{22}		2.75	
		g_{22}		0.9	
Forward Transfer Admittance,	Y_{21}	Y_{21}		95	mmho
		θ_{21}		−62	degrees
Reverse Transfer Admittance,	Y_{12}	Y_{12}		0.39	mmho
		θ_{12}		−97	degrees
Small-Signal Forward Current Transfer Ratio	h_{21}		I_C=1 mA, V_{CE}=5 V	7.1	
			I_C=10 mA, V_{CE}=5 V	17	
Typical Capacities @ 1 MHz, Three-Terminal Measurement					
Collector-to-Base Capacitance, C_{CB}			V_{CB}=6 V	0.3	pF
Collector-to-Substrate Capacitance, C_{CI}			V_{CI}=6 V	1.6	pF
Collector-to-Emitter Capacitance, C_{CE}			V_{CE}=6 V	0.4	pF
Emitter-to-Base Capacitance, C_{EB}			V_{EB}=3 V	0.75	pF