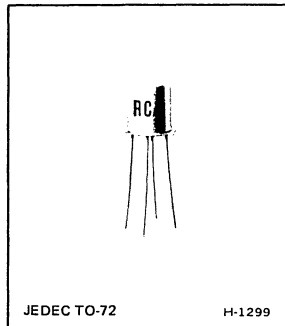




RF Power Transistors

40894 40896
40895 40897



High - Frequency Silicon N-P-N Transistors

For TV-Tuner, FM and AM/FM "Front-End", and IF Amplifier, Oscillator, and Converter Service

Features:

- High gain-bandwidth products:
 $f_T = 1200 \text{ MHz typ. for tuner types}$
 $= 800 \text{ MHz typ. for if-amplifier types}$
- Very low collector-to-base feedback capacitance:
 $C_{cb} = 0.7 \text{ pF typ. for 40894, 40895}$
- Low noise figure:
 $3 \text{ dB typ. at } 200 \text{ MHz for rf amplifier type}$

RCA-40894, 40895, 40896, and 40897 are high-frequency n-p-n silicon devices characterized especially for rf, mixer, oscillator, and if stages of vhf, SSB, and FM receivers.

These devices utilize a hermetically sealed four-lead JEDEC TO-72 package. All active elements of the transistor are insulated from the case, which may be grounded by means of the fourth lead in applications requiring minimum feedback capacitance, shielding of the device, or both.

- High power gain as neutralized amplifier:
 $G_{PE} = 15 \text{ dB min. at } 200 \text{ MHz (40894)}$
- High power output as uhf oscillator:
 $P_{OE} = 20 \text{ mW typ. at } 500 \text{ MHz (40896)}$
- Low noise figure:
 $NF = 4.5 \text{ dB max. at } 200 \text{ MHz (40894)}$
- Low collector-to-base time constant:
 $t_b C_c = 14 \text{ ps max.}$

MAXIMUM RATINGS, *Absolute-Maximum Values*:

COLLECTOR-TO-EMITTER VOLTAGE	V_{CEO}	12	V
COLLECTOR-TO-BASE VOLTAGE	V_{CBO}	20	V
EMITTER-TO-BASE VOLTAGE	V_{EBO}	2.5	V
CONTINUOUS COLLECTOR CURRENT	I_C	50	mA
TRANSISTOR DISSIPATION	P_T		
With heat sink, at case temperatures up to 25°C		300	mW
With heat sink, at case temperatures above 25°C		Derate linearly 1.71	mW/ $^\circ\text{C}$
At ambient temperatures up to 25°C		200	mW
At ambient temperatures above 25°C		Derate linearly 1.14	mW/ $^\circ\text{C}$
TEMPERATURE RANGE:			
Storage & Operating (Junction)		-65 to +200	$^\circ\text{C}$
CASE TEMPERATURE (During soldering):			
At distances $\geq 1/32 \text{ in. (0.8 mm)}$ from seating surface for 10 seconds max.		265	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS at Ambient Temperature (T_A) = 25°C unless otherwise specified

CHARACTERISTICS	SYMBOLS	TEST CONDITIONS							LIMITS						UNITS
		FREQUENCY MHz	DC COLLECTOR OR EMITTER VOLTAGE V			DC CURRENT mA			TYPE 40894 RF AMPLIFIER			TYPE 40895 MIXER			
			V _{CB}	V _{CE}	V _{EB}	I _E	I _C	I _B	Min.	Typ.	Max.	Min.	Typ.	Max.	
Collector-Cutoff Current	I _{CBO}		15			0			-	-	0.02	-	-	0.02	μA
T _A = 150°C			15			0			-	-	1	-	-	1	
Collector-to-Base Breakdown Voltage ^a	V _{(BR)CBO}					0	0.001		20	-	-	20	-	-	V
Collector-to-Emitter Sustaining Voltage	V _{CEO(sus)}						3	0	15	-	-	15	-	-	V
Emitter-to-Base Breakdown Voltage	V _{(BR)EBO}					0.01	0		2.5	-	-	2.5	-	-	V
Collector-to-Emitter Saturation Voltage	V _{CE(sat)}						10	1	-	-	0.4	-	-	0.4	V
Base-to-Emitter Saturation Voltage	V _{BE(sat)}						10	1	-	-	1	-	-	1	V
Static Forward Current- Transfer Ratio	h _{FE}			6			1		50	80	250	40	70	250	
Magnitude of Common- Emitter, Small-Signal Short-Circuit, For- ward Current Transfer Ratio ^a	h _{fe}	100 1 kHz		6 6			5 2		9 25	14 90	20 300	9 25	14 90	20 300	
Collector-to-Base Feedback Capacitance ^b	C _{cb}	0.1 to 1	10			0			-	0.7	1	-	0.7	1	pF
Common-Base Input Capacitance ^c	C _{ib}	0.1 to 1			0.5		0		-	-	2	-	-	2	pF
Collector-to-Base Time Constant ^a	r _b 'C _c	31.9	6				2		3	7	14	3	7	14	ps
Small-Signal Power Gain in Neutralized Com- mon-Emitter Ampli- fier Circuit ^a (see Fig. 6)	G _{PE}	10.7 200		12 12			5 5		- 15	- 21	- -	- 15	- 21	- -	dB
Noise Figure ^a	NF	200		6			1.5		-	3	4.5	-	-	-	dB

^aLead No. 4 (case) grounded; $R_g = 125\Omega$ ^bThree-terminal measurement of the collector-to-base capacitance with the case and emitter leads connected to the guard terminal.^cLead No. 4 (case) floating.

ELECTRICAL CHARACTERISTICS at Ambient Temperature (T_A) = 25°C unless otherwise specified

CHARACTERISTICS	SYMBOLS	TEST CONDITIONS							LIMITS						UNITS
		FREQUENCY MHz	DC COLLECTOR OR EMITTER VOLTAGE V			DC CURRENT mA			TYPE 40896 OSCILLATOR			TYPE 40897 IF AMPLIFIER			
			V _{CB}	V _{CE}	V _{EB}	I _E	I _C	I _B	Min.	Typ.	Max.	Min.	Typ.	Max.	
Collector-Cutoff Current	I _{CBO}		15			0			-	-	0.02	-	-	0.02	μA
T _A = 150°C			15			0			-	-	1	-	-	1	
Collector-to-Base Breakdown Voltage ^a	V _{(BR)CBO}					0	0.001		20	-	-	20	-	-	V
Collector-to-Emitter Sustaining Voltage	V _{CEO(sus)}						3	0	15	-	-	15	-	-	V
Emitter-to-Base Breakdown Voltage	V _{(BR)EBO}					0.01	0		2.5	-	-	2.5	-	-	V
Collector-to-Emitter Saturation Voltage	V _{CE(sat)}						10	1	-	-	0.4	-	-	0.4	V
Base-to-Emitter Saturation Voltage	V _{BE(sat)}						10	1	-	-	1	-	-	1	V
Static Forward Current- Transfer Ratio	h _{FE}			6			1		27	50	250	70	120	250	
Magnitude of Common- Emitter, Small-Signal Short-Circuit, For- ward Current Transfer Ratio ^a	h _{fe}	100 1 kHz		6 6			5 2		9 25	14 90	20 300	9 25	14 90	20 300	
Collector-to-Base Feedback Capacitance ^b	C _{cb}	0.1 to 1	10			0			-	0.7	1	-	0.7	1	pF
Common-Base Input Capacitance ^c	C _{ib}	0.1 to 1			0.5	0			-	-	2	-	-	2	pF
Collector-to-Base Time Constant ^a	τ _b 'C _c	31.9	6				2		3	7	14	3	7	14	ps
Small-Signal Power Gain in Neutralized Com- mon-Emitter Ampli- fier Circuit ^a (see Fig. 6)	G _{PE}	10.7 200		12 12			5 5		- 15	- 21	- -	18 -	25 -	- -	dB
Noise Figure ^a	NF	200		6			1.5		-	-	-	-	-	-	dB

^aLead No. 4 (case) grounded; $R_g = 125\Omega$ ^bThree-terminal measurement of the collector-to-base capacitance with the case and emitter leads connected to the guard terminal.^cLead No. 4 (case) floating.

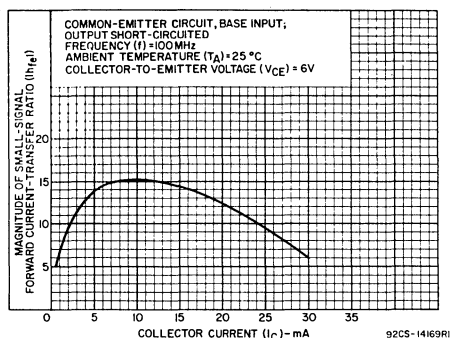
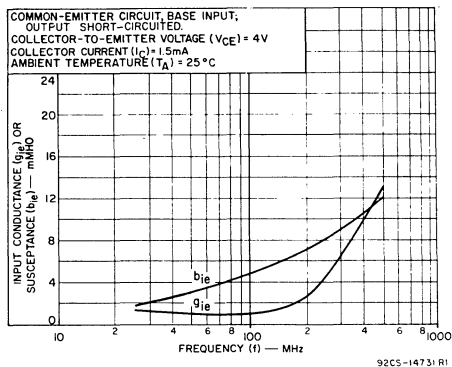
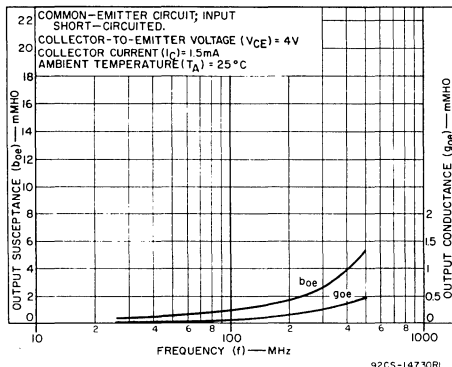
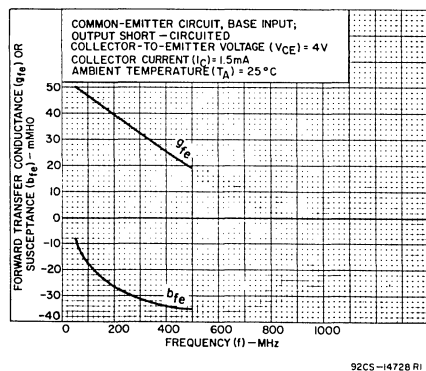
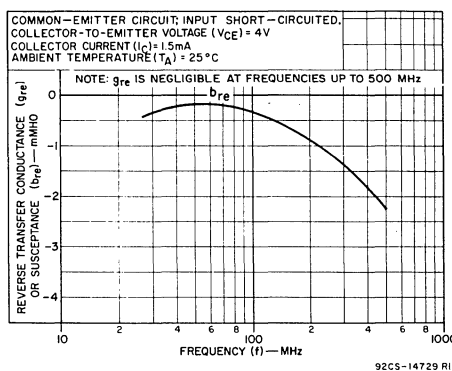


Fig. 1—Small-signal beta characteristic for all types

TWO-PORT ADMITTANCE (y) PARAMETERS AS FUNCTIONS OF FREQUENCY (f) FOR ALL TYPES

Fig. 2—Input admittance (y_{ie})Fig. 3—Output admittance (y_{oe})Fig. 4—Forward transadmittance (y_{fe})Fig. 5—Reverse transadmittance (y_{re})

