

2SC4903

Silicon NPN Bipolar Transistor

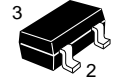
Application

VHF & UHF wide band amplifire

Features

- High gain bandwidth product
 $f_T = 6 \text{ GHz typ}$
- High gain, low noise figure
 $PG = 12.0 \text{ dB typ,}$
 $NF = 1.6 \text{ dB typ at } f = 900 \text{ MHz}$

CMPAK



1. Emitter
 2. Base
 3. Collector

Table 1 Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	20	V
Collector to emitter voltage	V_{CEO}	12	V
Emitter to base voltage	V_{EBO}	2	V
Collector current	I_C	30	mA
Collector power dissipation	P_C	100	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

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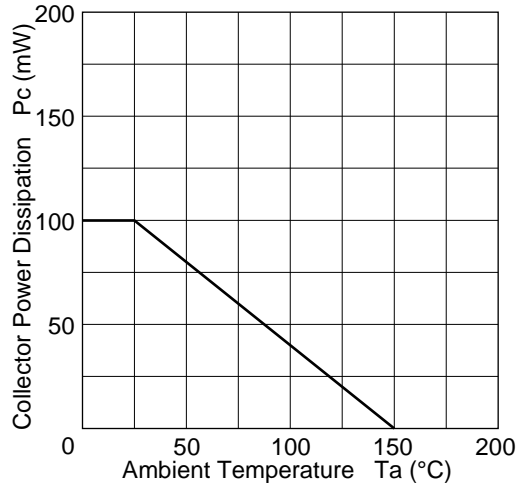
Table 2 Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector cutoff current	I_{CBO}	—	—	10	μA	$V_{CB} = 20\text{ V}$, $I_E = 0$
	I_{CEO}	—	—	1	mA	$V_{CE} = 12\text{ V}$, $R_{BE} = \infty$
Emitter cutoff current	I_{EBO}	—	—	10	μA	$V_{EB} = 2\text{ V}$, $I_C = 0$
DC current transfer ratio	h_{FE}	50	120	250		$V_{CE} = 5\text{ V}$, $I_C = 10\text{ mA}$
Output capacitance	Cob	—	0.6	1.0	pF	$V_{CB} = 5\text{ V}$, $I_E = 0$, $f = 1\text{ MHz}$
Gain bandwidth product	f_T	4.0	6.0	—	GHz	$V_{CE} = 5\text{ V}$, $I_C = 10\text{ mA}$
Power gain	PG	9.5	12.0	—	dB	$V_{CE} = 5\text{ V}$, $I_C = 10\text{ mA}$, $f = 900\text{ MHz}$
Noise figure	NF	—	1.6	3.0	dB	$V_{CE} = 5\text{ V}$, $I_C = 5\text{ mA}$, $f = 900\text{ MHz}$

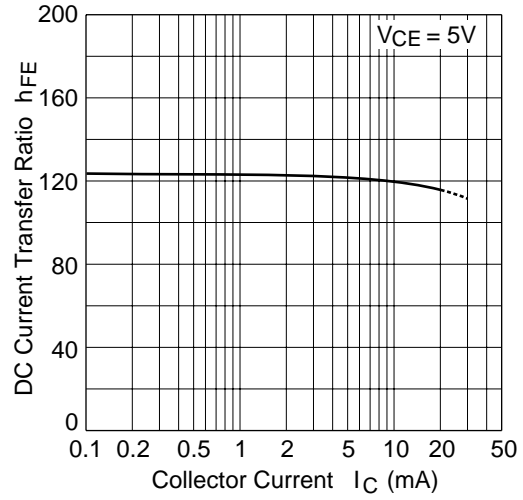
Marking for 2SC4903 is "YL-".

Attention: This is electrostatic sensitive device.

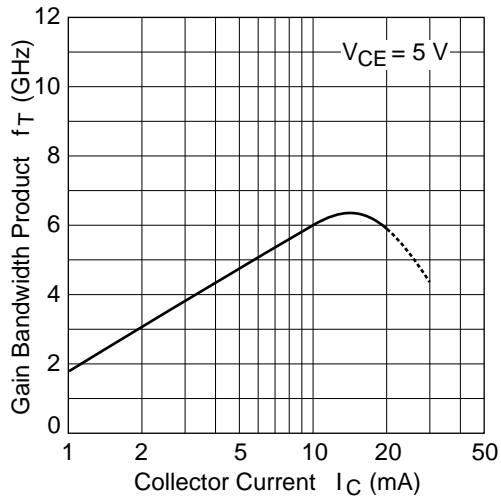
Maximum collector power dissipation curve



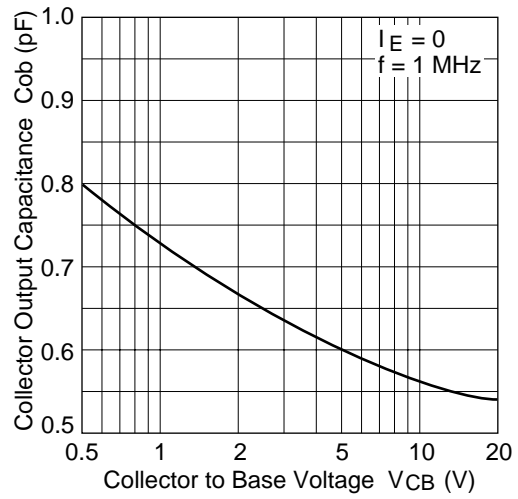
DC current transfer ratio vs. collector current



Gain bandwidth product vs. collector current

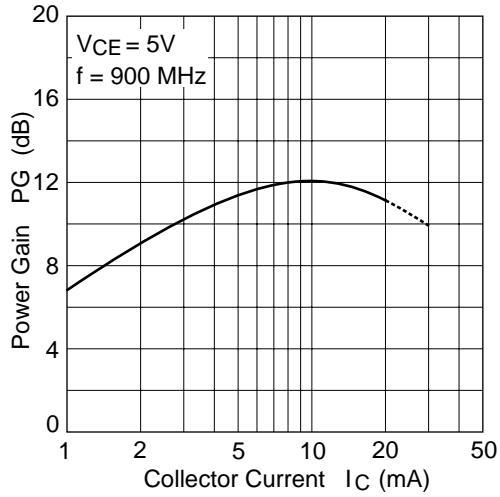


Collector output capacitance vs. collector to base voltage

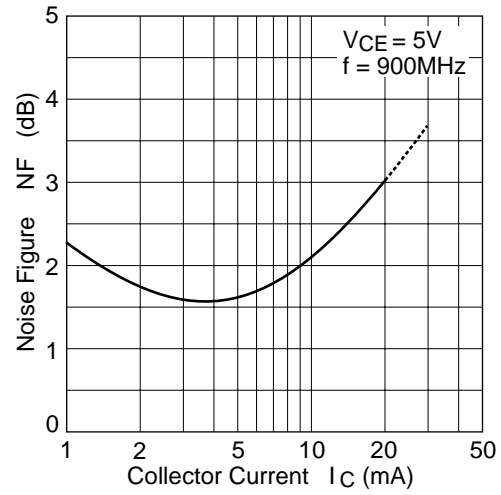


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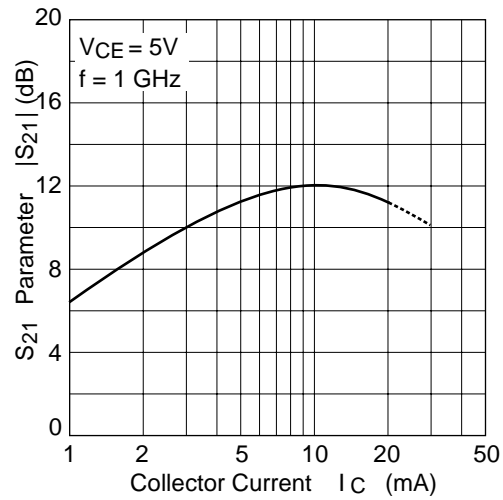
Power gain vs. collector current



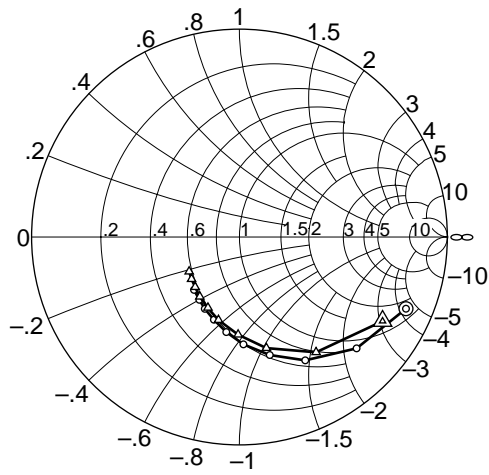
Noise figure vs. collector current



S21 parameter vs. collector current

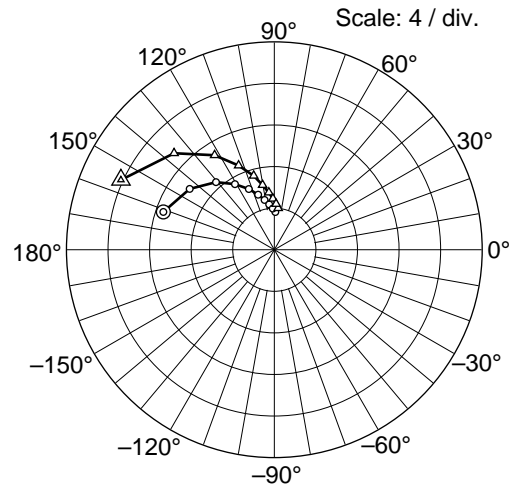


S11 parameter vs. frequency



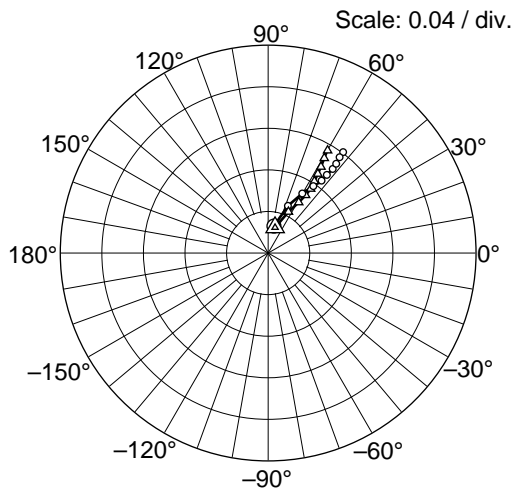
Condition: $V_{CE} = 5 \text{ V}$, $Z_o = 50 \Omega$
 100 MHz to 1000 MHz (100 MHz step)
 ○ — ○ ($I_C = 5 \text{ mA}$)
 △ — △ ($I_C = 10 \text{ mA}$)

S21 parameter vs. frequency



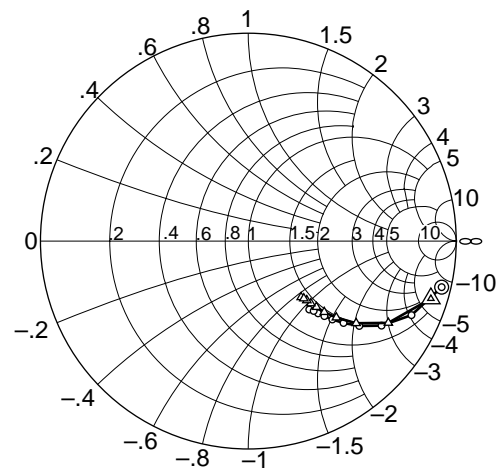
Condition: $V_{CE} = 5 \text{ V}$, $Z_o = 50 \Omega$
 100 MHz to 1000 MHz (100 MHz step)
 ○ — ○ ($I_C = 5 \text{ mA}$)
 △ — △ ($I_C = 10 \text{ mA}$)

S12 parameter vs. frequency



Condition: $V_{CE} = 5 \text{ V}$, $Z_o = 50 \Omega$
 100 MHz to 1000 MHz (100 MHz step)
 ○ — ○ ($I_C = 5 \text{ mA}$)
 △ — △ ($I_C = 10 \text{ mA}$)

S22 parameter vs. frequency



Condition: $V_{CE} = 5 \text{ V}$, $Z_o = 50 \Omega$
 100 MHz to 1000 MHz (100 MHz step)
 ○ — ○ ($I_C = 5 \text{ mA}$)
 △ — △ ($I_C = 10 \text{ mA}$)

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Table 3 S Parameter ($V_{CE} = 5\text{ V}$, $I_C = 5\text{ mA}$, $Z_O = 50\ \Omega$, Emitter common)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.872	-23.3	11.28	161.2	0.0266	77.9	0.956	-13.4
200	0.777	-43.6	10.03	144.3	0.0493	67.3	0.862	-24.4
300	0.672	-62.0	8.59	130.8	0.0661	60.2	0.759	-32.4
400	0.586	-75.7	7.36	121.0	0.0777	56.0	0.672	-37.4
500	0.517	-88.0	6.34	112.8	0.0866	53.6	0.604	-40.7
600	0.462	-98.0	5.52	106.4	0.0941	53.1	0.553	-43.0
700	0.417	-107.3	4.88	101.1	0.102	52.5	0.514	-44.6
800	0.384	-115.9	4.39	96.5	0.108	52.7	0.483	-46.0
900	0.359	-122.7	3.97	92.2	0.115	53.3	0.460	-46.9
1000	0.336	-130.8	3.63	88.5	0.121	53.4	0.441	-48.3

Table 4 S Parameter ($V_{CE} = 5\text{ V}$, $I_C = 10\text{ mA}$, $Z_O = 50\ \Omega$, Emitter common)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.798	-30.5	16.22	155.6	0.0254	74.9	0.921	-17.5
200	0.666	-56.4	13.39	136.1	0.0442	63.8	0.780	-30.3
300	0.550	-76.4	10.76	122.3	0.0569	58.9	0.652	-37.3
400	0.470	-90.8	8.80	113.0	0.0663	57.1	0.561	-41.0
500	0.412	-104.2	7.39	105.6	0.0741	56.5	0.500	-43.1
600	0.373	-114.0	6.33	100.3	0.0821	57.2	0.456	-44.1
700	0.345	-123.6	5.53	95.5	0.0899	57.9	0.425	-44.9
800	0.322	-131.5	4.91	91.6	0.0973	58.5	0.401	-45.4
900	0.307	-138.7	4.41	87.8	0.106	59.4	0.384	-46.0
1000	0.294	-145.5	4.02	84.8	0.114	59.9	0.371	-46.8