

## 2SC4992

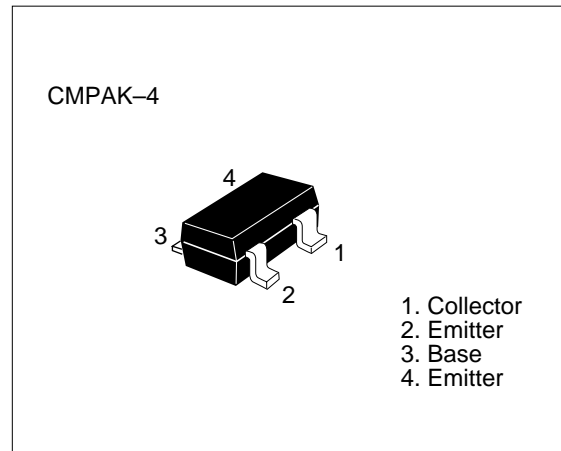
Silicon NPN Bipolar Transistor

### Application

VHF & UHF wide band amplifire

### Features

- High gain bandwidth product  
 $f_T = 9.5$  GHz typ
- High gain, low noise figure  
 PG = 15.0 dB typ,  
 NF = 1.2 dB typ at  $f = 900$  MHz



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

Item	Symbol	Ratings	Unit
Collector to base voltage	$V_{CBO}$	15	V
Collector to emitter voltage	$V_{CEO}$	9	V
Emitter to base voltage	$V_{EBO}$	1.5	V
Collector current	$I_C$	50	mA
Collector power dissipation	$P_C$	100	mW
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

## 2SC4992

**Table 2 Electrical Characteristics** (Ta = 25°C)

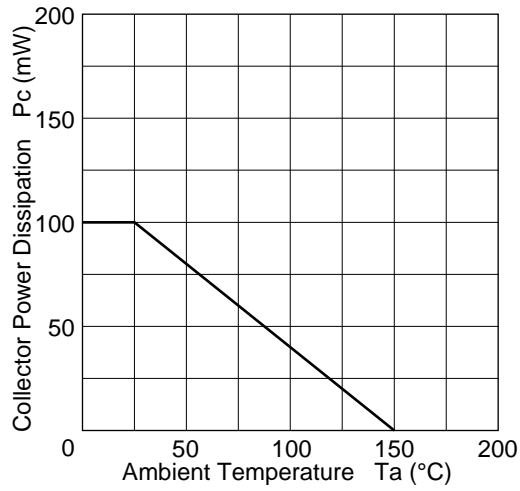
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	15	—	—	V	$I_C = 10 \mu A, I_E = 0$
Collector cutoff current	$I_{CBO}$	—	—	1	$\mu A$	$V_{CB} = 12 V, I_E = 0$
	$I_{CEO}$	—	—	1	mA	$V_{CE} = 9 V, R_{BE} = \infty$
Emitter cutoff current	$I_{EBO}$	—	—	10	$\mu A$	$V_{EB} = 1.5 V, I_C = 0$
DC current transfer ratio	$h_{FE}$	50	120	250		$V_{CE} = 5 V, I_C = 20 mA$
Output capacitance	$C_{ob}$	—	8.5	1.3	pF	$V_{CB} = 5 V, I_E = 0, f = 1 MHz$
Gain bandwidth product	$f_T$	6.5	9.5	—	GHz	$V_{CE} = 5 V, I_C = 20 mA$
Power gain	PG	12	15	—	dB	$V_{CE} = 5 V, I_C = 20 mA, f = 900 MHz$
Noise figure	NF	—	1.2	2.5	dB	$V_{CE} = 5 V, I_C = 5 mA, f = 900 MHz$

Note: Marking of 2SC4992 is "YR-".

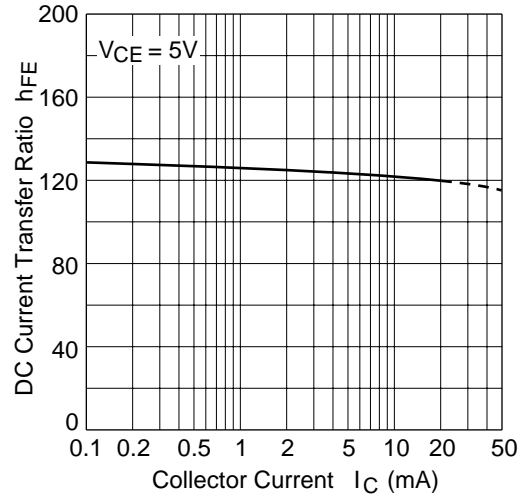
Attention: This device is very sensitive to electro static discharge.

It is recommended to adopt appropriate cautions when handling this transistor.

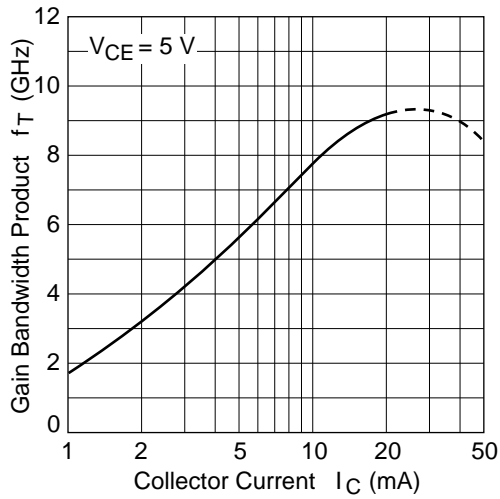
Collector power dissipation curve



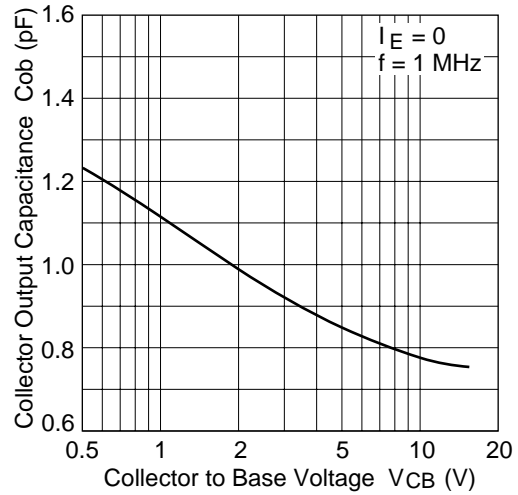
DC current transfer ratio vs. collector current



Gain bandwidth product vs. collector current

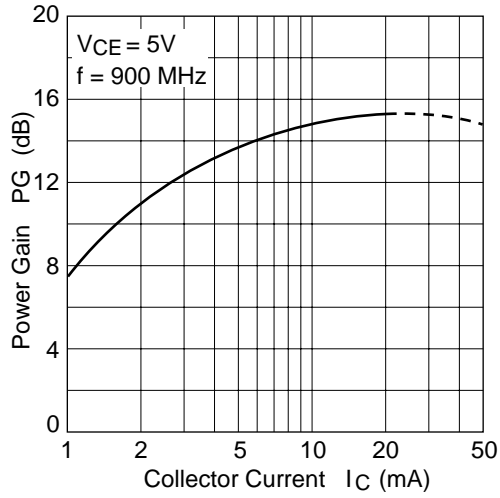


Collector output capacitance vs. collector to base voltage

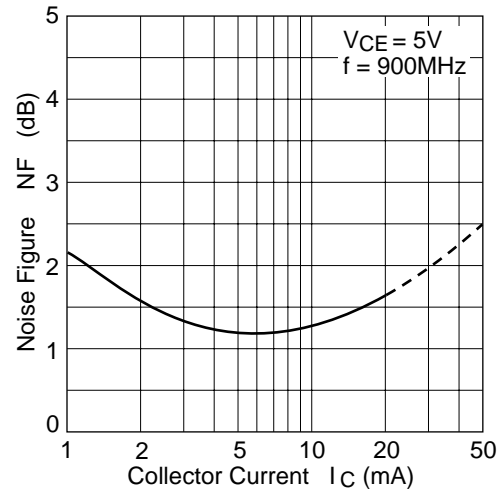


## 2SC4992

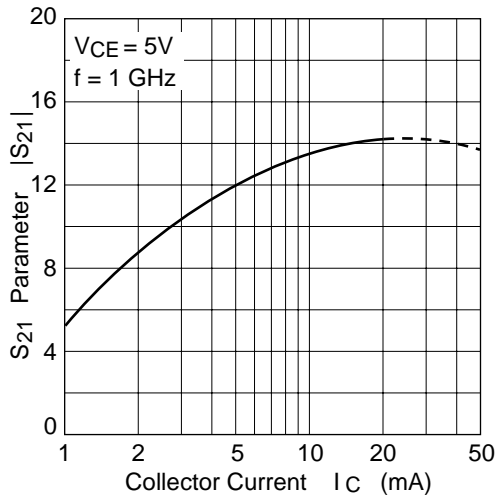
Power gain vs. collector current



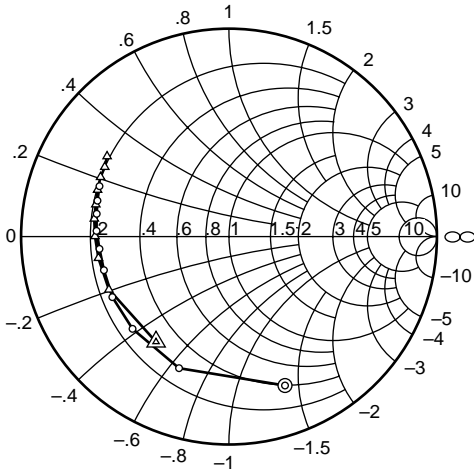
Noise figure vs. collector current



S21 parameter vs. collector current

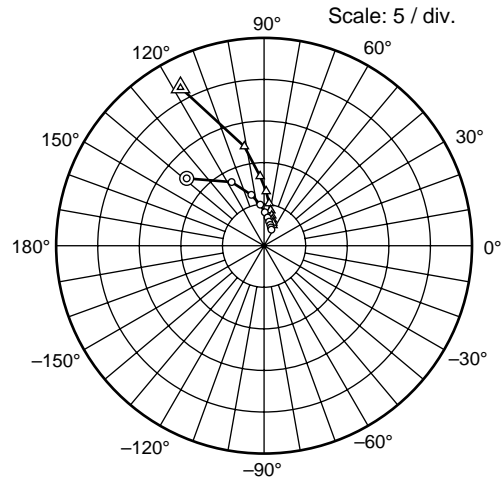


S11 parameter vs. frequency



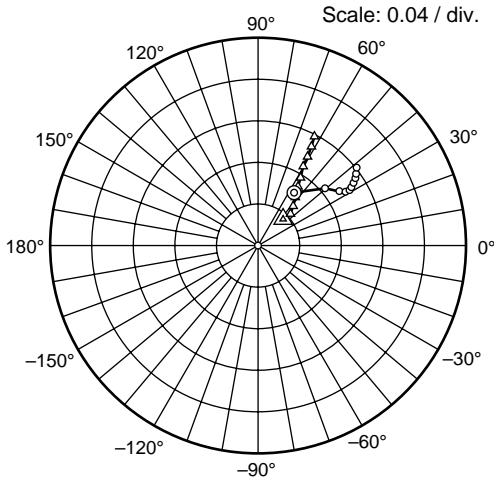
Condition:  $V_{CE} = 5\text{ V}$ ,  $Z_o = 50\ \Omega$   
 200 to 2000 MHz (200 MHz step)  
 ○ — ○ (Ic = 5 mA)  
 △ — △ (Ic = 20 mA)

S21 parameter vs. frequency



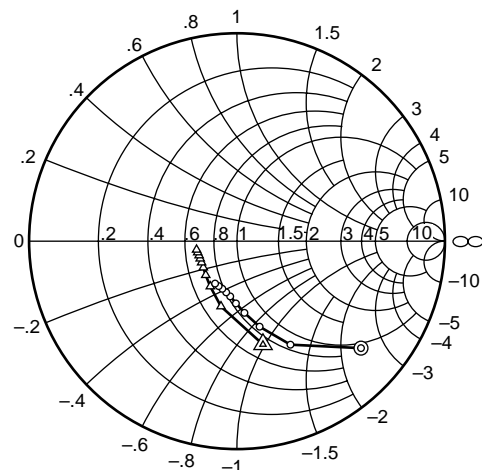
Condition:  $V_{CE} = 5\text{ V}$ ,  $Z_o = 50\ \Omega$   
 200 to 2000 MHz (200 MHz step)  
 ○ — ○ (Ic = 5 mA)  
 △ — △ (Ic = 20 mA)

S12 parameter vs. frequency



Condition:  $V_{CE} = 5\text{ V}$ ,  $Z_o = 50\ \Omega$   
 200 to 2000 MHz (200 MHz step)  
 ○ — ○ (Ic = 5 mA)  
 △ — △ (Ic = 20 mA)

S22 parameter vs. frequency



Condition:  $V_{CE} = 5\text{ V}$ ,  $Z_o = 50\ \Omega$   
 200 to 2000 MHz (200 MHz step)  
 ○ — ○ (Ic = 5 mA)  
 △ — △ (Ic = 20 mA)

## 2SC4992

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

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.766	-69.4	12.35	139.0	0.0615	55.6	0.788	-40.8
400	0.677	-110.8	8.61	116.9	0.0848	40.5	0.561	-62.7
600	0.642	-136.3	6.33	103.9	0.0942	33.8	0.426	-75.2
800	0.632	-152.6	4.99	95.2	0.0989	31.6	0.347	-84.1
1000	0.623	-165.0	4.05	88.6	0.103	31.2	0.300	-91.0
1200	0.626	-174.6	3.44	82.8	0.106	32.0	0.268	-97.0
1400	0.638	177.5	2.98	78.1	0.110	33.3	0.252	-101.9
1600	0.646	170.2	2.64	73.4	0.114	34.7	0.240	-107.1
1800	0.656	164.7	2.37	69.4	0.117	36.2	0.234	-112.2
2000	0.669	158.7	2.15	65.5	0.121	38.3	0.230	-117.3

**Table 4 S Parameter** ( $V_{CE} = 5 \text{ V}$ ,  $I_C = 20 \text{ mA}$ ,  $Z_O = 50 \Omega$ )

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.617	-124.7	21.51	117.9	0.0350	46.4	0.513	-75.9
400	0.632	-156.1	12.18	101.2	0.0435	44.4	0.323	-103.8
600	0.637	-170.6	8.37	93.2	0.0507	48.4	0.253	-120.6
800	0.645	179.9	6.39	87.7	0.0586	52.4	0.222	-132.7
1000	0.654	172.5	5.13	83.1	0.0684	55.9	0.206	-142.0
1200	0.659	166.5	4.33	79.5	0.0770	58.0	0.199	-149.0
1400	0.671	160.5	3.75	75.7	0.0875	60.2	0.196	-154.8
1600	0.681	155.2	3.30	72.3	0.0980	60.9	0.195	-159.5
1800	0.685	150.8	2.96	69.1	0.108	61.6	0.197	-164.1
2000	0.702	146.7	2.69	66.3	0.118	62.6	0.199	-168.1