2SC4995

Silicon NPN Epitaxial

HITACHI

ADE-208-013
1st. Edition

Application

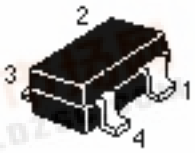
VHF / UHF wide band amplifier

Features

- High gain bandwidth product
  f_T = 11 GHz Typ
- High gain, low noise figure
  PG = 16.5 dB Typ, NF = 1.1 dB Typ at f = 900 MHz

Outline

CMPAK-4



1. Collector
2. Emitter
3. Base
4. Emitter

2SC4995

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	15	V
Collector to emitter voltage	V_{CEO}	8	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	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C

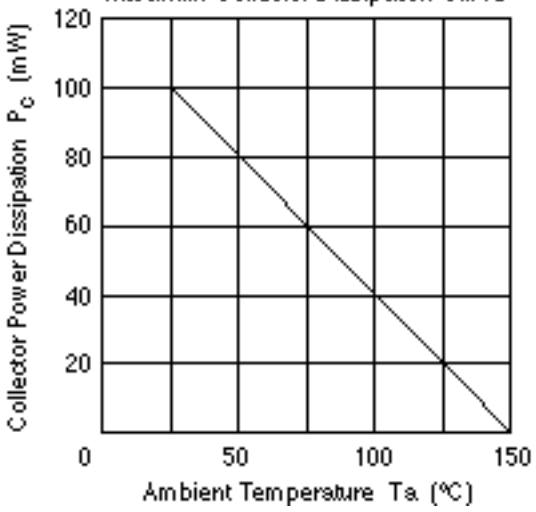
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltge	$V_{(BR)CBO}$	15	—	—	V	I_C = 10 µA, I_E = 0
Collector cutoff current	I_{CBO}	—	—	10	µA	V_{CB} = 12 V, I_E = 0
	I_{CEO}	—	—	1	mA	V_{CE} = 8 V, R_{BE} = ∞
Emitter cutoff current	I_{EBO}	—	—	10	µA	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
Collector output capacitance	Cob	—	0.55	1.05	pF	V_{CB} = 5 V, I_E = 0, f = 1 MHz
Gain bandwidth product	f_T	8.0	11.0	—	GHz	V_{CE} = 5 V, I_C = 20 mA
S21 Parameter	|S21|	—	16	—	dB	V_{CE} = 5 V, I_C = 20 mA, f = 1000 MHz
Power gain	PG	13.5	16.5	—	dB	V_{CE} = 5 V, I_C = 20 mA, f = 900 MHz
Noise figure	NF	—	1.1	2.0	dB	V_{CE} = 5 V, I_C = 5 mA, f = 900 MHz

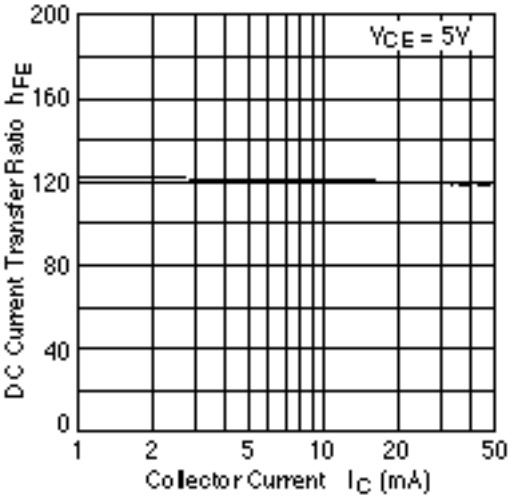
Note: Marking is “YD–”.

Attention: This device is very sensitive to electro static discharge.
It is recommended to adopt appropriate cautions when handling this transistor.

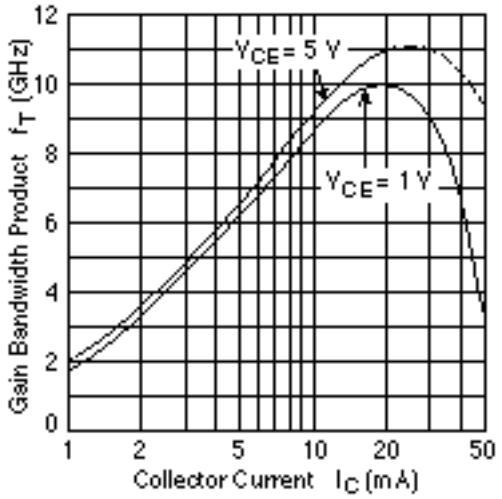
Maximum Collector Dissipation Curve



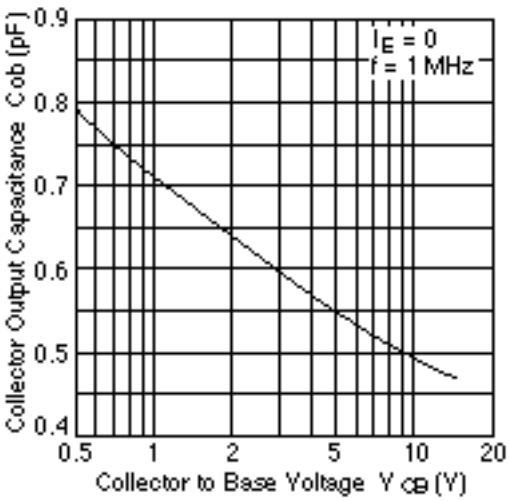
DC Current Transfer Ratio
vs. Collector Current



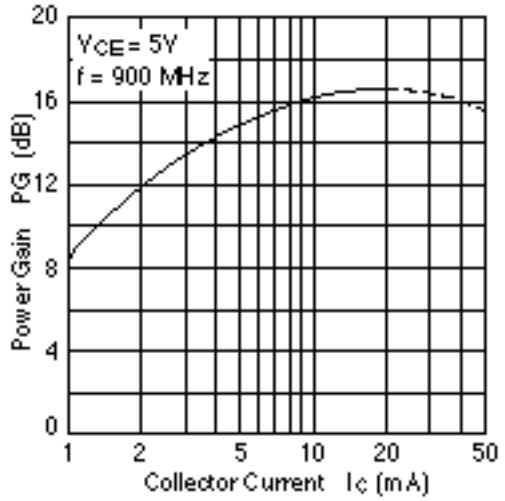
Gain Bandwidth Product vs. Collector Current



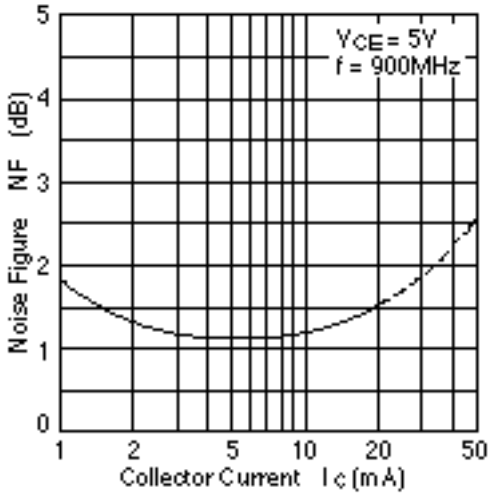
Collector Output Capacitance vs. Collector to Base Voltage



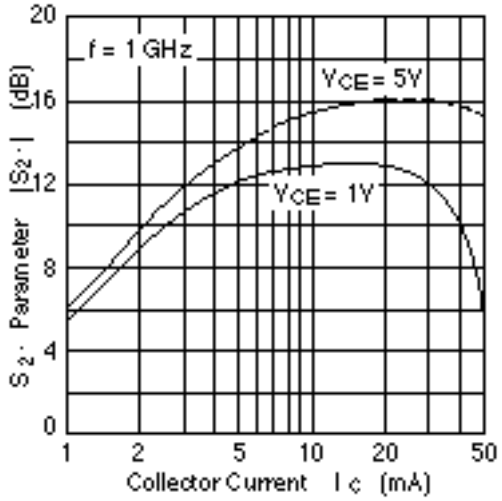
Power Gain vs. Collector Current



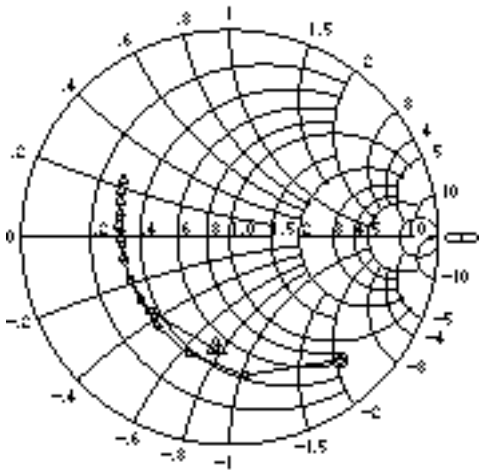
Noise Figure vs. Collector Current



S21 Parameter vs. Collector Current

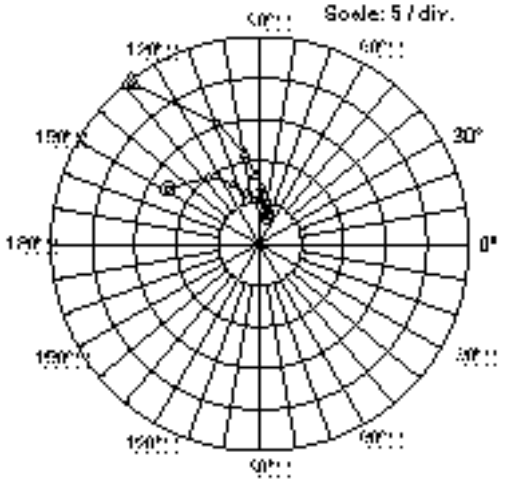


S11 Parameter vs. Frequency



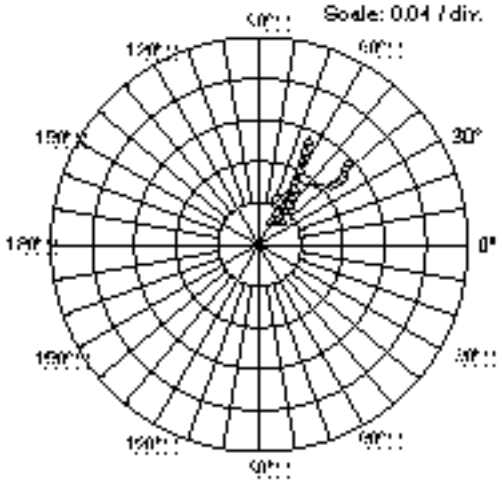
Condition: V_{CE}= 5 V, Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(Ic = 5 mA)
(Ic = 20 mA)

S21 Parameter vs. Frequency



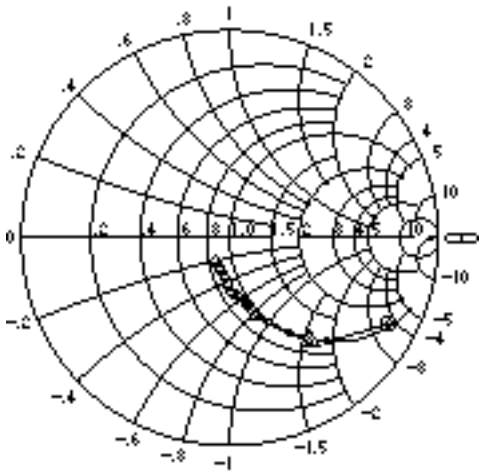
Condition: V_{CE}= 5 V, Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(IC = 5 mA)
(IC = 20 mA)

S12 Parameter vs. Frequency



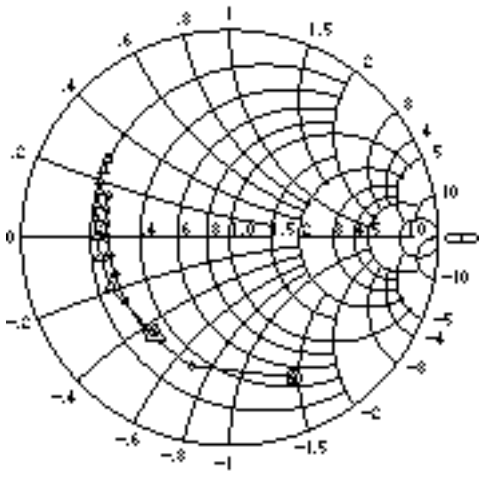
Condition: V_{CE}= 5 V, Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(IC = 5 mA)
(IC = 20 mA)

S22 Parameter vs. Frequency



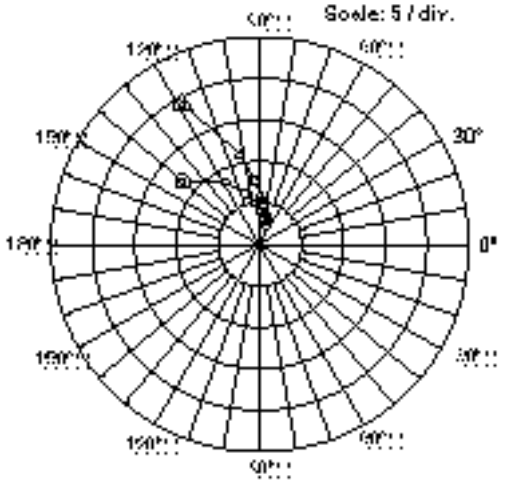
Condition: V_{CE}= 5 V, Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(Ic = 5 mA)
(Ic = 20 mA)

S11 Parameter vs. Frequency



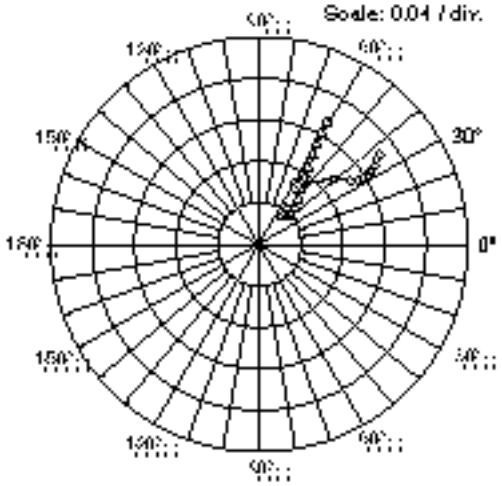
Condition: V_{CE}= 1 V, Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(Ic = 5 mA)
(Ic = 20 mA)

S21 Parameter vs. Frequency



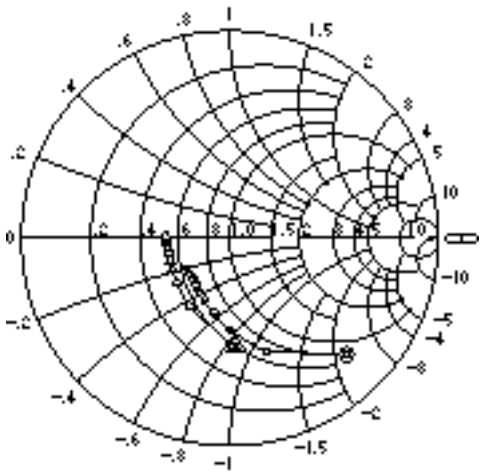
Condition: V_{CE}= 1 V, Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(IC = 5 mA)
(IC = 20 mA)

S12 Parameter vs. Frequency



Condition: V_{CE}= 1 V, Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(IC = 5 mA)
(IC = 20 mA)

S22 Parameter vs. Frequency



Condition: V_{CE}= 1 V, Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(Ic = 5 mA)
(Ic = 20 mA)

S Parameter (V_{CE} = 5 V, I_C = 5 mA, Z_O = 50 Ω)

Freq.	S11		S21		S12		S22	
(MHz)	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
200	0.781	–48.2	12.84	148.8	0.0449	64.6	0.866	–28.6
400	0.669	–83.6	10.04	127.3	0.0695	50.3	0.682	–46.9
600	0.591	–109.4	7.84	113.9	0.0815	42.6	0.541	–58.1
800	0.549	–129.1	6.30	104.4	0.0889	39.2	0.446	–65.2
1000	0.524	–145.0	5.23	96.7	0.0937	38.4	0.381	–70.4
1200	0.520	–156.8	4.45	90.7	0.0986	37.7	0.340	–74.6
1400	0.515	–166.9	3.86	86.0	0.103	38.7	0.309	–77.7
1600	0.518	–176.0	3.44	81.1	0.107	40.0	0.287	–81.2
1800	0.523	176.5	3.11	77.3	0.111	41.2	0.268	–85.1
2000	0.537	170.1	2.82	73.5	0.116	42.4	0.256	–89.0

S Parameter (V_{CE} = 5 V, I_C = 20 mA, Z_O = 50 Ω)

Freq.	S11		S21		S12		S22	
(MHz)	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
200	0.542	–69.9	24.74	128.7	0.0296	55.5	0.631	–52.5
400	0.520	–136.2	15.31	109.4	0.0398	50.2	0.395	–72.9
600	0.516	–156.3	10.81	99.5	0.0470	52.8	0.285	–83.6
800	0.519	–169.1	8.29	93.5	0.0547	55.1	0.225	–91.3
1000	0.525	–179.2	6.70	88.5	0.0624	57.9	0.189	–97.5
1200	0.538	173.6	5.63	84.1	0.0712	60.2	0.166	–102.8
1400	0.540	167.5	4.85	80.9	0.0805	61.5	0.151	–107.9
1600	0.554	161.6	4.29	77.5	0.0895	62.8	0.140	–112.6
1800	0.567	159.5	3.86	74.3	0.0991	63.8	0.134	–118.1
2000	0.580	151.7	3.48	71.6	0.109	64.3	0.129	–122.5

S Parameter (V_{CE} = 1 V, I_C = 5 mA, Z_O = 50 Ω)

Freq.	S11		S21		S12		S22	
(MHz)	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
200	0.739	–65.4	11.99	140.8	0.0681	56.9	0.793	–44.9
400	0.643	–106.5	8.54	118.9	0.0957	41.5	0.576	–72.1
600	0.603	–132.0	6.34	106.4	0.107	34.9	0.446	–89.4
800	0.586	–148.7	4.99	97.9	0.114	32.6	0.369	–101.9
1000	0.578	–162.1	4.08	90.9	0.118	32.6	0.323	–112.0
1200	0.580	–171.9	3.45	86.0	0.124	32.7	0.396	–120.1
1400	0.588	179.9	2.99	81.7	0.129	33.3	0.275	–127.0
1600	0.596	172.9	2.67	77.2	0.134	34.3	0.263	–133.0
1800	0.607	166.8	2.41	73.4	0.139	35.9	0.256	–139.5
2000	0.617	161.0	2.20	70.0	0.145	36.9	0.254	–144.7

S Parameter (V_{CE} = 1 V, I_C = 20 mA, Z_O = 50 Ω)

Freq.	S11		S21		S12		S22	
(MHz)	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
200	0.588	–127.7	19.25	119.0	0.0389	47.2	0.527	–86.7
400	0.618	–157.6	11.00	102.5	0.0483	45.3	0.380	–120.8
600	0.627	–171.4	7.62	94.6	0.0570	49.0	0.334	–139.3
800	0.639	179.6	5.80	89.2	0.0662	52.6	0.315	–150.9
1000	0.650	172.1	4.66	84.5	0.0768	55.9	0.306	–158.9
1200	0.656	–166.4	3.94	81.1	0.873	57.7	0.302	–165.4
1400	0.664	160.7	3.40	78.2	0.0996	59.2	0.301	–170.5
1600	0.677	156.5	3.03	75.2	0.110	60.2	0.301	–174.6
1800	0.689	151.6	2.71	71.9	0.122	61.1	0.304	–178.4
2000	0.696	147.5	2.47	69.2	0.134	61.2	0.306	178.2

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