To all our customers

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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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2SC5246

Silicon NPN Epitaxial

RENESAS

ADE-208-264
1st. Edition

Application

VHF / UHF wide band amplifier

Features

- High gain bandwidth product
  f_T = 12 GHz typ
- High gain, low noise figure
  PG = 16.5 dB typ, NF = 1.6 dB typ at f = 900 MHz

Outline

SMPAK

1. Emitter
2. Base
3. Collector

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	20	mA
Collector power dissipation	P_C	80	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C

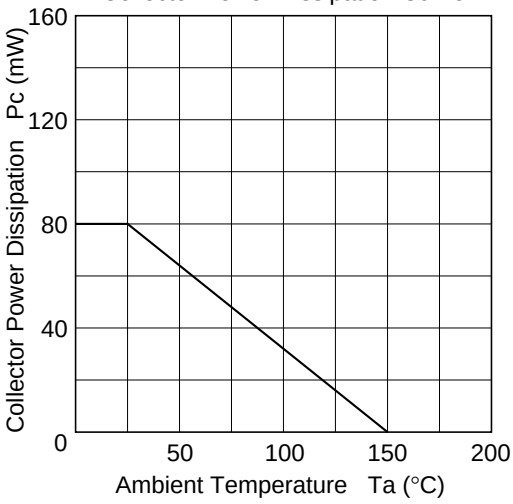
Note: Marking is “ZC–”.

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

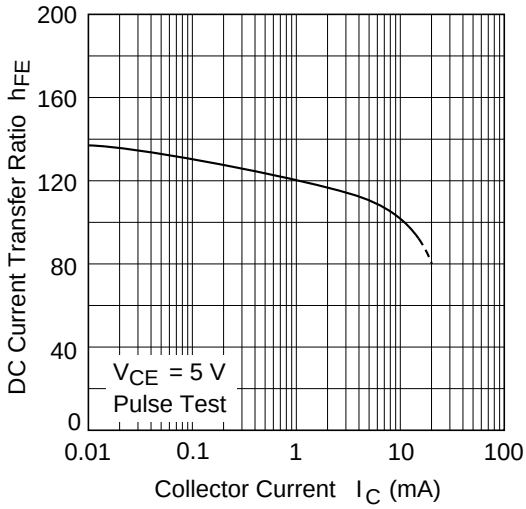
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector cutoff current	I_{CBO}	—	—	10	µA	V_{CB} = 15 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	100	160		V_{CE} = 5 V, I_C = 10 mA
Collector output capacitance	Cob	—	0.3	0.8	pF	V_{CB} = 5 V, I_E = 0, f = 1 MHz
Gain bandwidth product	f_T	9	12	—	GHz	V_{CE} = 5 V, I_C = 5 mA
Power gain	PG	14	16.5	—	dB	V_{CE} = 5 V, I_C = 10 mA, f = 900 MHz
Noise figure	NF	—	1.6	2.5	dB	V_{CE} = 5 V, I_C = 5 mA, f = 900 MHz

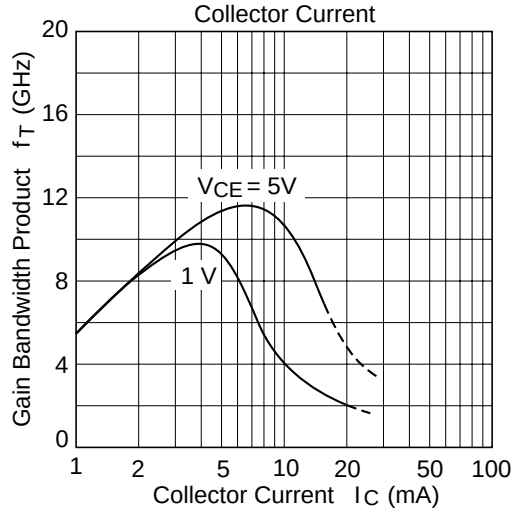
Collector Power Dissipation Curve



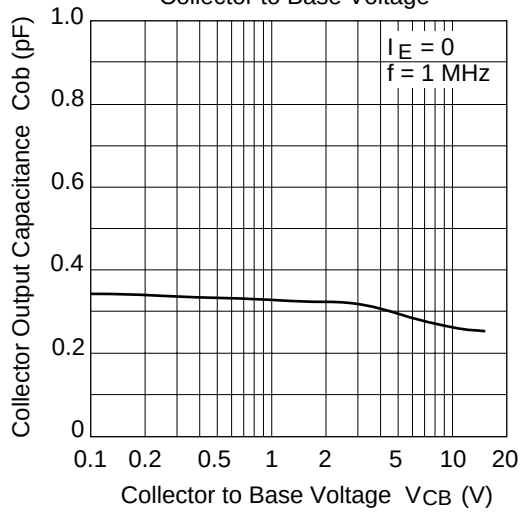
DC Current Transfer Ratio vs. Collector Current



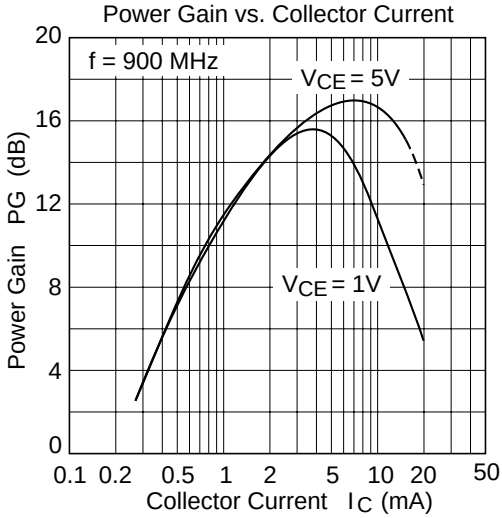
Gain Bandwidth Product vs. Collector Current



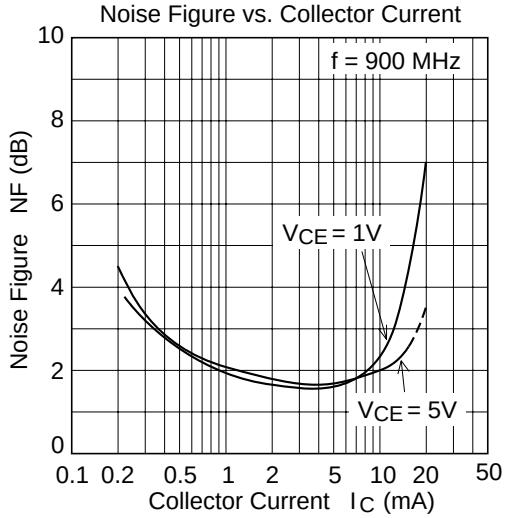
Collector Output Capacitance vs. Collector to Base Voltage



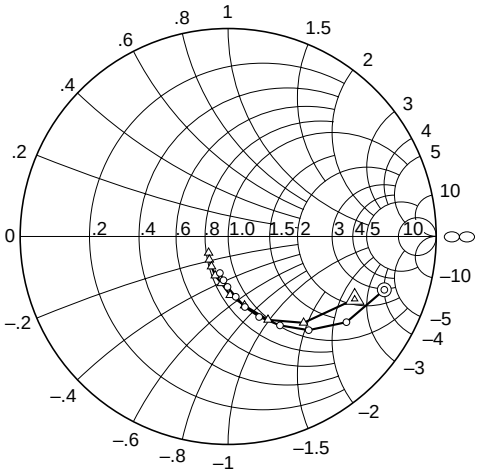
Power Gain vs. Collector Current



Noise Figure vs. Collector Current

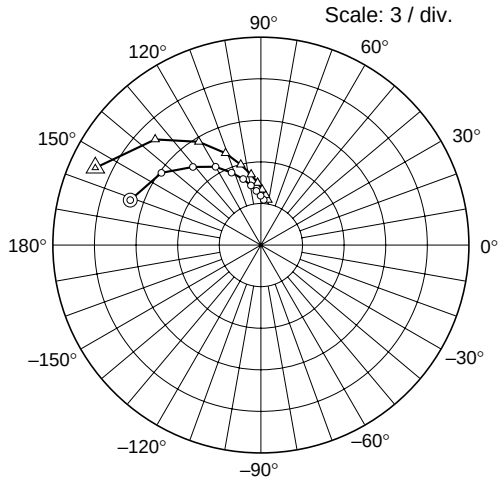


S11 Parameter vs. Frequency



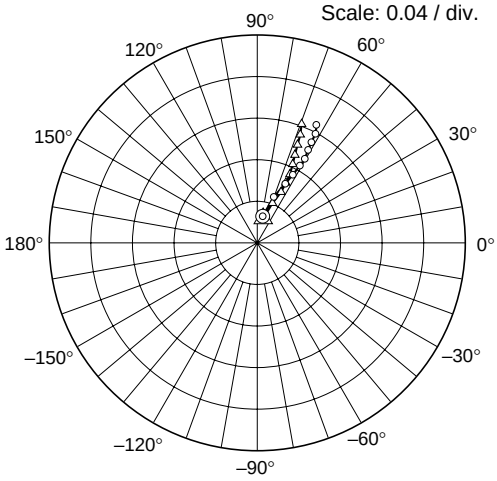
Condition: V_{CE} = 5 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(I_C = 5 mA)
(I_C = 10 mA)

S21 Parameter vs. Frequency



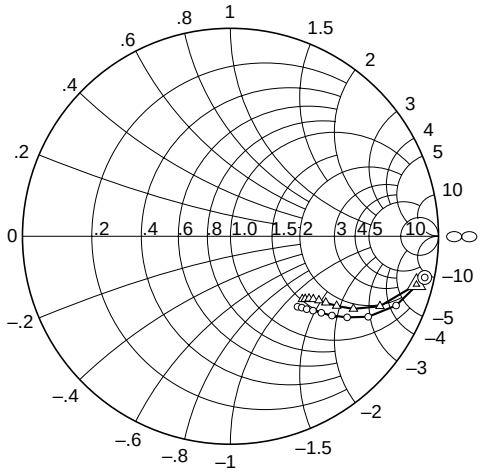
Condition: V_{CE} = 5 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(I_C = 5 mA)
(I_C = 10 mA)

S12 Parameter vs. Frequency



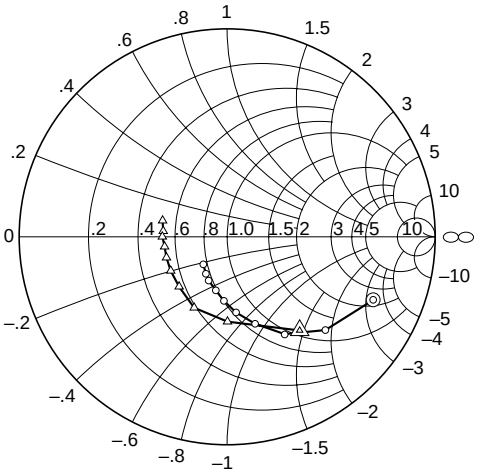
Condition: V_{CE} = 5 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(I_C = 5 mA)
(I_C = 10 mA)

S22 Parameter vs. Frequency



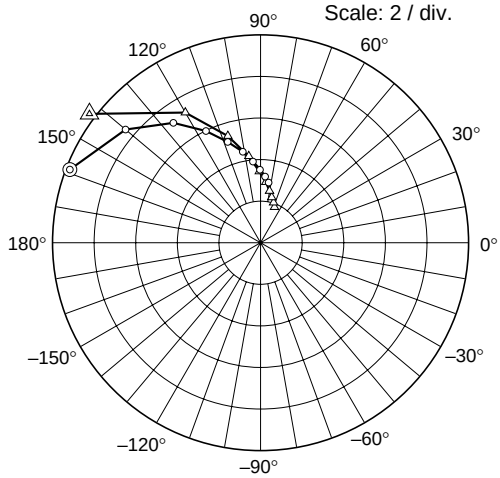
Condition: V_{CE} = 5 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(I_C = 5 mA)
(I_C = 10 mA)

S11 Parameter vs. Frequency



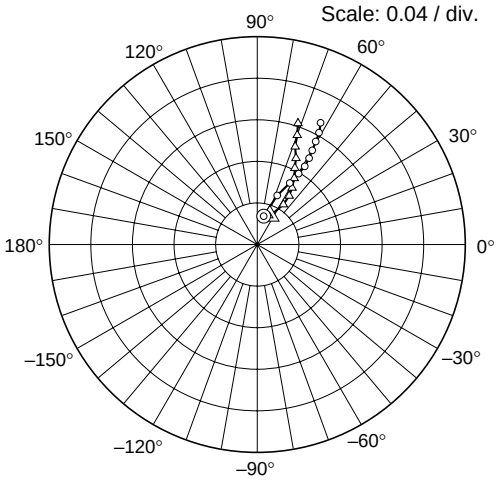
Condition: V_{CE} = 1 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(I_C = 5 mA)
(I_C = 10 mA)

S21 Parameter vs. Frequency



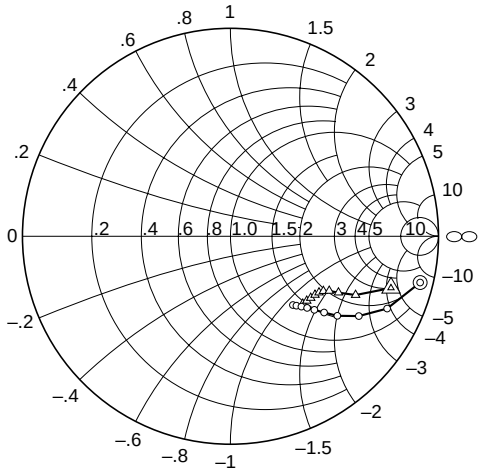
Condition: V_{CE} = 1 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(I_C = 5 mA)
(I_C = 10 mA)

S12 Parameter vs. Frequency



Condition: V_{CE} = 1 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(I_C = 5 mA)
(I_C = 10 mA)

S22 Parameter vs. Frequency



Condition: V_{CE} = 1 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(I_C = 5 mA)
(I_C = 10 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	0.793	–18.9	9.98	161	0.026	78.6	0.955	–12.0
400	0.702	–36.0	8.88	144	0.047	70.2	0.864	–22.7
600	0.594	–49.4	7.63	131	0.063	64.6	0.768	–30.3
800	0.495	–59.9	6.54	120	0.074	62.4	0.684	–34.8
1000	0.415	–69.1	5.65	112	0.085	61.1	0.620	–38.0
1200	0.349	–76.8	4.94	105	0.093	60.5	0.572	–40.1
1400	0.293	–83.0	4.37	99.4	0.102	61.3	0.535	–42.0
1600	0.241	–90.2	3.93	94.7	0.110	61.7	0.508	–43.7
1800	0.214	–93.9	3.57	90.2	0.119	61.9	0.486	–45.0
2000	0.181	–103	3.28	89.3	0.127	63.4	0.469	–46.4

S Parameter (V_{CE} = 5 V, I_C = 10 mA, Z_O = 50 Ω)

Freq.	S11		S21		S12		S22	
(MHz)	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
200	0.679	–26.4	13.2	155	0.024	76.2	0.924	–14.6
400	0.552	–48.9	10.8	135	0.041	69.0	0.794	–25.1
600	0.445	–64.5	8.71	121	0.054	64.8	0.687	–30.6
800	0.342	–76.7	7.12	111	0.064	64.5	0.611	–33.3
1000	0.283	–88.1	5.99	104	0.073	64.5	0.559	–34.9
1200	0.228	–98.3	5.15	97.8	0.083	65.7	0.526	–36.0
1400	0.191	–105	4.50	93.0	0.092	66.8	0.501	–37.3
1600	0.166	–119	4.01	88.6	0.102	67.9	0.483	–38.5
1800	0.136	–124	3.62	84.6	0.112	68.3	0.470	–40.1
2000	0.123	–140	3.31	81.1	0.122	69.5	0.460	–41.3

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	0.764	–23.4	9.82	159	0.028	77.1	0.938	–13.7
400	0.651	–43.6	8.47	140	0.051	67.8	0.830	–24.8
600	0.545	–59.5	7.13	126	0.067	62.1	0.727	–31.9
800	0.439	–72.2	5.98	116	0.079	59.7	0.641	–36.7
1000	0.366	–83.3	5.10	108	0.088	58.7	0.581	–39.2
1200	0.308	–92.9	4.46	101	0.097	59.0	0.537	–41.3
1400	0.263	–102	3.92	95.3	0.105	59.7	0.505	–43.1
1600	0.228	–113	3.51	90.4	0.114	60.4	0.481	–44.8
1800	0.205	–120	3.19	86.0	0.123	61.1	0.461	–46.5
2000	0.175	–131	2.92	82.3	0.132	62.5	0.447	–47.8

S Parameter (V_{CE} = 1 V, I_C = 10 mA, Z_O = 50 Ω)

Freq.	S11		S21		S12		S22	
(MHz)	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
200	0.570	–52.3	10.3	143	0.030	66.1	0.811	–17.9
400	0.443	–89.8	7.23	120	0.046	56.8	0.665	–25.2
600	0.376	–115	5.37	107	0.056	56.7	0.586	–27.6
800	0.333	–134	4.20	97.7	0.064	58.4	0.534	–29.0
1000	0.317	–149	3.43	91.0	0.073	60.8	0.519	–30.6
1200	0.309	–161	2.93	85.0	0.082	63.8	0.505	–32.5
1400	0.305	–171	2.53	80.1	0.091	65.8	0.495	–34.8
1600	0.312	–180	2.25	76.1	0.101	68.1	0.487	–37.6
1800	0.309	175	2.03	72.0	0.112	69.9	0.481	–40.3
2000	0.320	166	1.84	68.6	0.123	71.4	0.476	–43.1

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