

2SC5700

Silicon NPN Epitaxial
VHF/UHF wide band amplifier

HITACHI

ADE-208-1435 (Z)

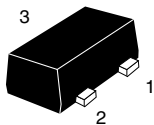
Rev.0
Jul. 2001

Features

- High power gain low noise figure at low power operation:
 $|S_{21}|^2 = 16$ dB typ, NF = 1.0 dB typ ($V_{CE} = 1$ V, $I_C = 5$ mA, $f = 900$ MHz)

Outline

MFPAK



1. Emitter
2. Base
3. Collector

Note: Marking is "WB-".

Absolute Maximum Ratings

(Ta = 25 °C)

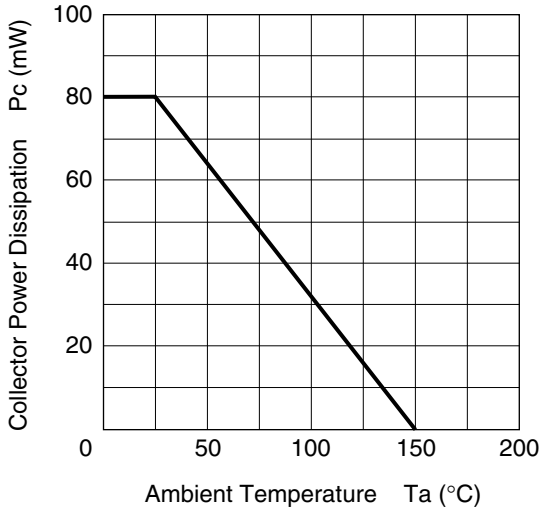
Parameter	Symbol	Value	Unit
Collector to base voltage	V_{CBO}	15	V
Collector to emitter voltage	V_{CEO}	4	V
Emitter to base voltage	V_{EBO}	1.5	V
Collector current	I_C	50	mA
Collector power dissipation	P_C	80	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

Electrical Characteristics

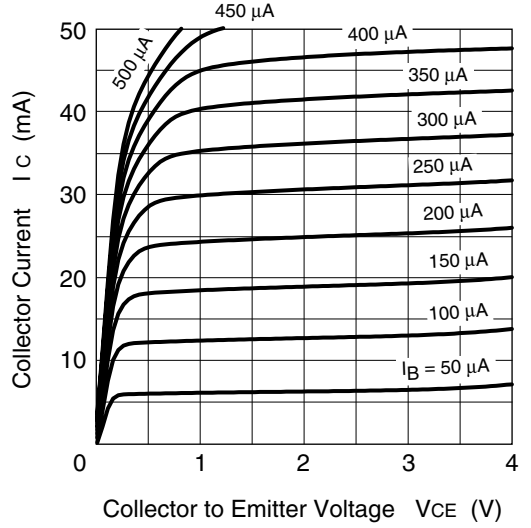
(Ta = 25°C)

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}	—	—	0.1	μA	$V_{CB} = 15 V, I_E = 0$
Collector cutoff current	I_{CEO}	—	—	1	μA	$V_{CE} = 4 V, R_{BE} = \text{Infinite}$
Emitter cutoff current	I_{EBO}	—	—	200	nA	$V_{EB} = 0.8 V, I_C = 0$
DC current transfer ratio	h_{FE}	100	130	170	—	$V_{CE} = 1 V, I_C = 5 mA$
Collector output capacitance	C_{ob}	—	0.4	0.7	pF	$V_{CB} = 1 V, I_E = 0,$ $f = 1 MHz$
Gain bandwidth product	f_T	10	12	—	GHz	$V_{CE} = 1 V, I_C = 5 mA$
Forward transmission coefficient	$ S_{21} ^2$	13	16	—	dB	$V_{CE} = 1 V, I_C = 5 mA,$ $f = 900 MHz$
Noise figure	NF	—	1.0	1.7	dB	$V_{CE} = 1 V, I_C = 5 mA,$ $f = 900 MHz,$ $\Gamma_S = \Gamma_L = 50 \text{ ohm}$

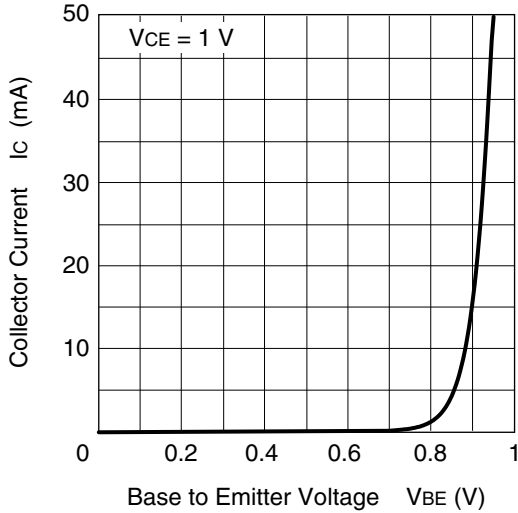
Collector Power Dissipation Curve



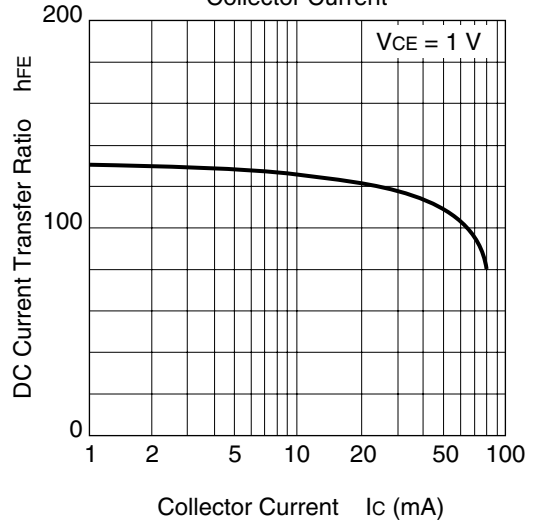
Typical Output Characteristics

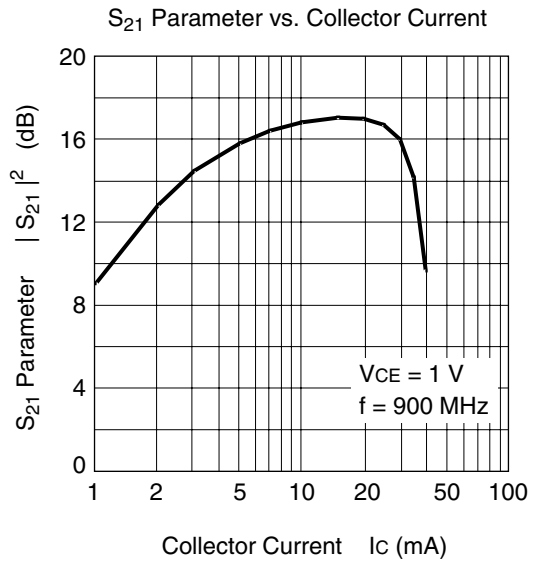
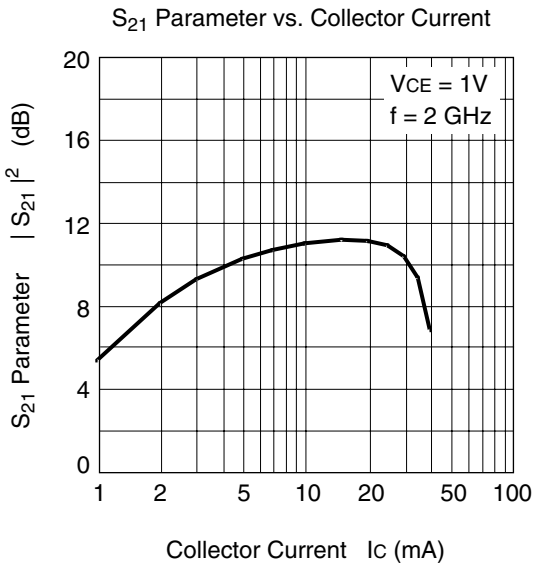
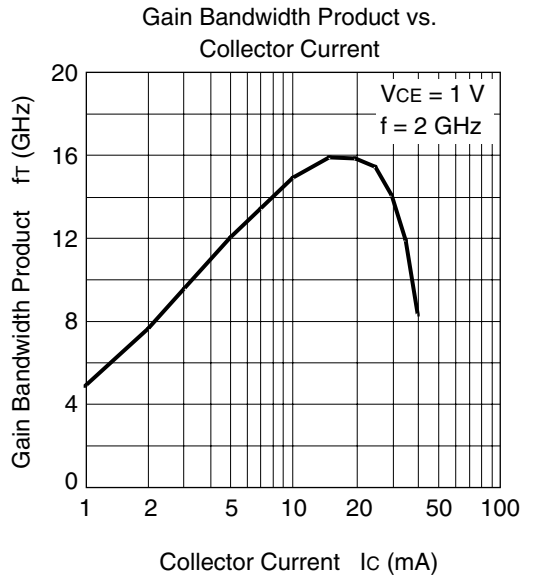
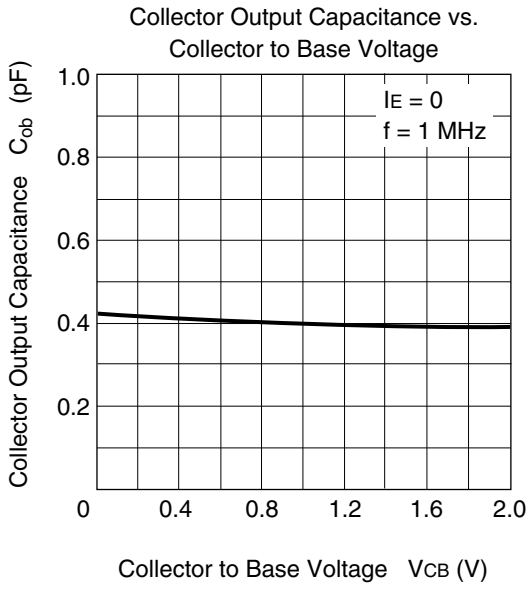


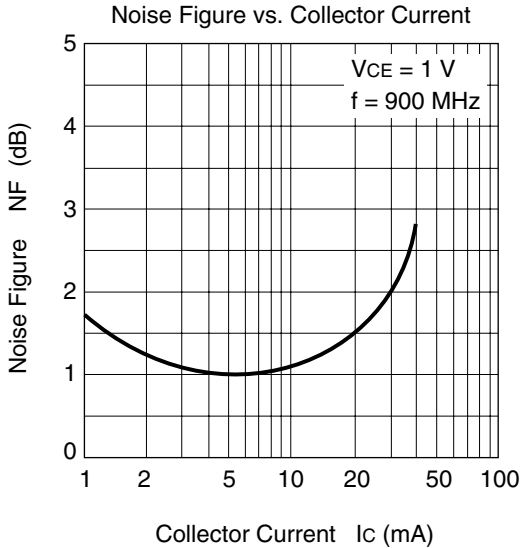
Typical Transfer Characteristics



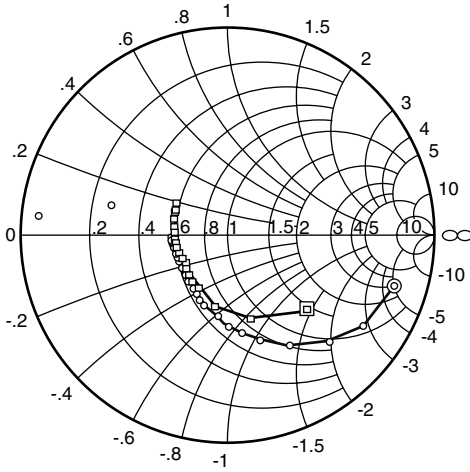
DC Current Transfer Ratio vs. Collector Current





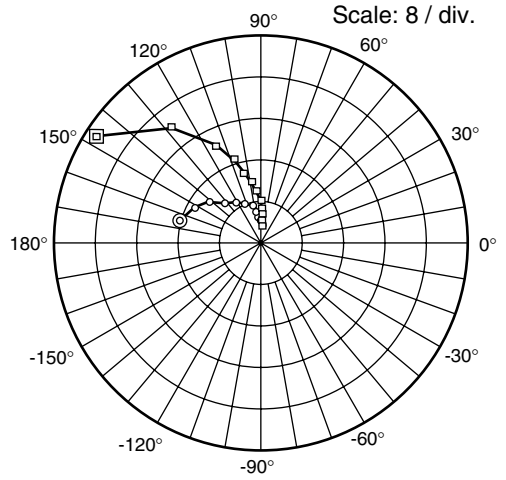


S_{11} Parameter vs. Frequency



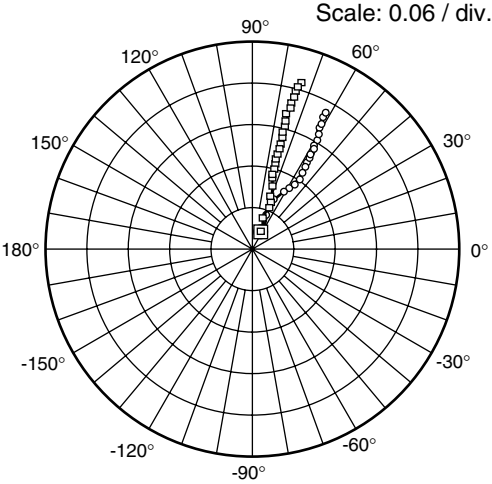
Condition: $V_{CE} = 1\text{ V}$, $Z_O = 50\ \Omega$
 100 to 2000 MHz (100 MHz Step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 □ — □ ($I_C = 20\text{ mA}$)

S_{21} Parameter vs. Frequency



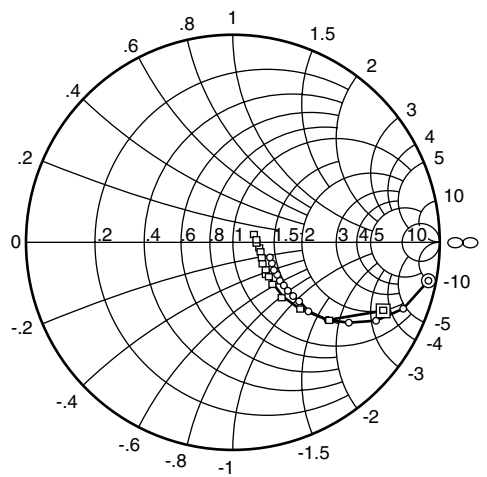
Condition: $V_{CE} = 1\text{ V}$, $Z_O = 50\ \Omega$
 100 to 2000 MHz (100 MHz Step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 □ — □ ($I_C = 20\text{ mA}$)

S_{12} Parameter vs. Frequency



Condition: $V_{CE} = 1\text{ V}$, $Z_O = 50\ \Omega$
 100 to 2000 MHz (100 MHz Step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 □ — □ ($I_C = 20\text{ mA}$)

S_{22} Parameter vs. Frequency



Condition: $V_{CE} = 1\text{ V}$, $Z_O = 50\ \Omega$
 100 to 2000 MHz (100 MHz Step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 □ — □ ($I_C = 20\text{ mA}$)

S Parameter

 $(V_{CE} = 1 \text{ V}, I_C = 5 \text{ mA}, Z_0 = 50 \Omega)$

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.855	-16.3	15.67	165.4	0.018	81.2	0.962	-10.7
200	0.784	-32.7	14.42	152.1	0.035	72.2	0.889	-20.9
300	0.703	-48.4	12.92	140.6	0.048	65.3	0.791	-28.9
400	0.616	-60.4	11.41	131.2	0.059	61.2	0.698	-34.6
500	0.540	-72.1	10.09	123.5	0.067	58.6	0.618	-38.2
600	0.475	-81.4	8.94	117.2	0.074	57.3	0.549	-40.7
700	0.428	-90.3	8.00	112.3	0.080	56.6	0.492	-42.1
800	0.385	-99.1	7.23	108.2	0.085	56.1	0.445	-42.5
900	0.348	-106.5	6.54	104.2	0.091	56.3	0.404	-42.7
1000	0.320	-113.6	6.00	100.9	0.096	57.3	0.373	-42.0
1100	0.297	-121.6	5.51	98.2	0.101	57.4	0.344	-41.6
1200	0.283	-128.8	5.14	95.4	0.106	57.8	0.321	-40.7
1300	0.271	-134.6	4.80	93.1	0.111	58.7	0.298	-39.1
1400	0.262	-142.4	4.47	90.8	0.117	59.2	0.283	-37.5
1500	0.254	-149.0	4.23	89.0	0.122	60.0	0.263	-36.3
1600	0.246	-155.3	3.99	87.0	0.128	60.5	0.252	-34.6
1700	0.248	-160.8	3.79	85.3	0.134	61.1	0.238	-33.0
1800	0.249	-167.3	3.59	83.7	0.140	61.5	0.226	-31.3
1900	0.253	-172.0	3.44	81.9	0.145	62.1	0.215	-29.6
2000	0.253	-177.5	3.29	80.5	0.151	62.7	0.204	-27.2

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($V_{CE} = 1\text{ V}$, $I_C = 20\text{ mA}$, $Z_o = 50\ \Omega$)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.526	-43.0	37.91	148.3	0.015	75.0	0.817	-25.2
200	0.406	-76.6	27.98	127.5	0.025	67.3	0.605	-40.0
300	0.334	-100.0	20.76	115.3	0.033	66.9	0.453	-45.9
400	0.284	-116.6	16.30	108.1	0.040	68.0	0.360	-47.1
500	0.263	-131.4	13.33	103.0	0.047	69.8	0.300	-46.2
600	0.243	-143.4	11.24	99.2	0.055	71.1	0.257	-44.4
700	0.242	-152.6	9.74	96.3	0.063	72.0	0.226	-41.4
800	0.236	-159.6	8.57	93.6	0.071	72.7	0.203	-38.2
900	0.230	-167.8	7.62	91.4	0.078	73.5	0.184	-34.3
1000	0.239	-173.4	6.91	89.4	0.086	74.1	0.170	-30.5
1100	0.240	-179.4	6.31	87.7	0.094	73.9	0.160	-26.8
1200	0.247	175.6	5.82	85.9	0.102	74.1	0.150	-22.6
1300	0.246	172.4	5.38	84.4	0.110	74.4	0.143	-18.1
1400	0.255	167.4	5.02	82.9	0.117	74.3	0.138	-14.0
1500	0.257	163.8	4.71	81.3	0.126	74.2	0.133	-9.6
1600	0.265	160.2	4.45	80.1	0.134	74.4	0.130	-5.3
1700	0.268	158.7	4.19	78.9	0.142	74.2	0.128	-1.2
1800	0.282	154.1	3.97	77.6	0.149	73.9	0.125	2.5
1900	0.283	152.7	3.80	76.4	0.157	74.1	0.123	7.1
2000	0.300	150.3	3.63	75.4	0.165	73.7	0.123	11.8

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