

SANYO	No.5046	2SC5230
		NPN Epitaxial Planar Silicon Transistor VHF to UHF Wide-Band Low-Noise Amp Applications

Features

- Low noise : $NF = 1.0\text{dB typ (}f = 1\text{GHz)}.$
- High gain : $|S_{21e}|^2 = 10.5\text{dB typ (}f = 1\text{GHz)}.$
- High cutoff frequency : $f_T = 6.5\text{GHz typ.}$

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

			unit
Collector-to-Base Voltage	V_{CB0}	20	V
Collector-to-Emitter Voltage	V_{CEO}	10	V
Emitter-to-Base Voltage	V_{EBO}	2	V
Collector Current	I_C	70	mA
Collector Dissipation	P_C	400	mW
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics at $T_a = 25^\circ\text{C}$

			min	typ	max	unit
Collector Cutoff Current	I_{CBO}	$V_{CB} = 10\text{V}, I_E = 0$			1.0	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 1\text{V}, I_C = 0$			10	μA
DC Current Gain	h_{FE}	$V_{CE} = 5\text{V}, I_C = 20\text{mA}$	60※		270※	
Gain-Bandwidth Product	f_T	$V_{CE} = 5\text{V}, I_C = 20\text{mA}$	4.5	6.5		GHz
Output Capacitance	C_{ob}	$V_{CB} = 10\text{V}, f = 1\text{MHz}$		0.85	1.3	pF
Reverse Transfer Capacitance	C_{re}	$V_{CB} = 10\text{V}, f = 1\text{MHz}$		0.55		pF
Forward Transfer Gain	$ S_{21e} ^2$	$V_{CE} = 5\text{V}, I_C = 20\text{mA}, f = 1\text{GHz}$	8	10.5		dB
Noise Figure	NF	$V_{CE} = 5\text{V}, I_C = 7\text{mA}, f = 1\text{GHz}$		1.0	1.8	dB

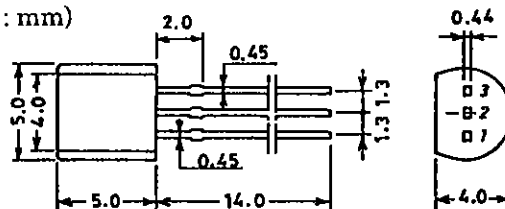
※ : The 2SC5230 is classified by 20mA h_{FE} as follows :

60	D	120	90	E	180	135	F	270
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h_{FE} rank : D, E, F

Package Dimensions 2004B

(unit : mm)



JEDEC : TO-92

EIAJ : SC-43

SANYO : NP

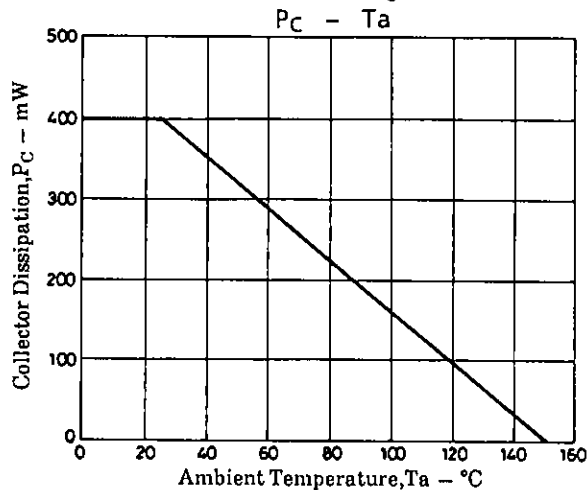
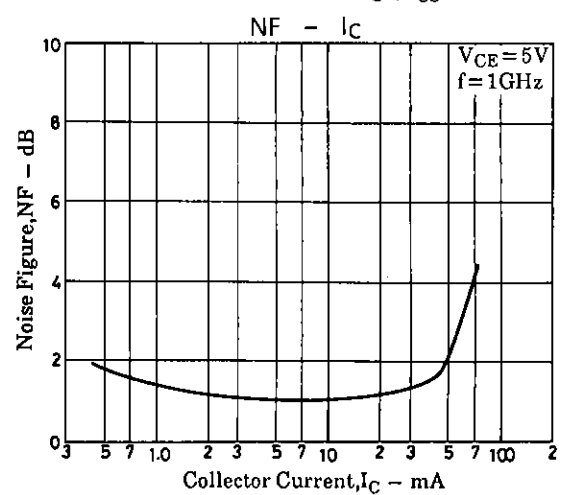
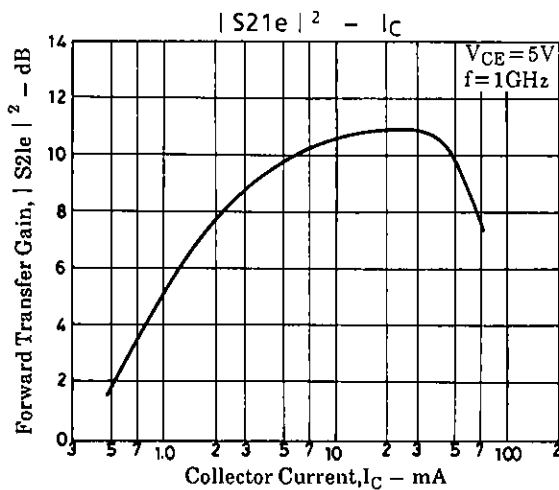
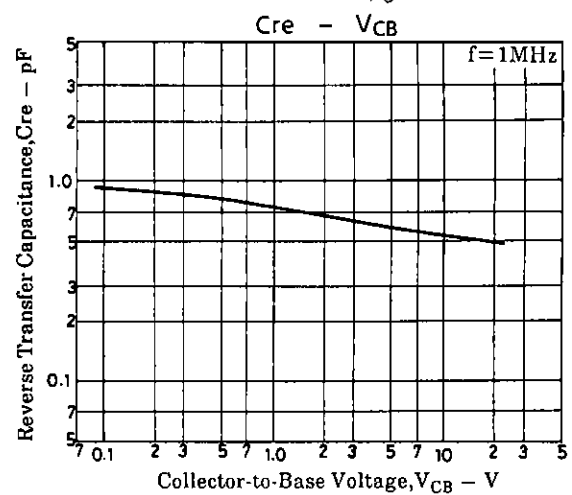
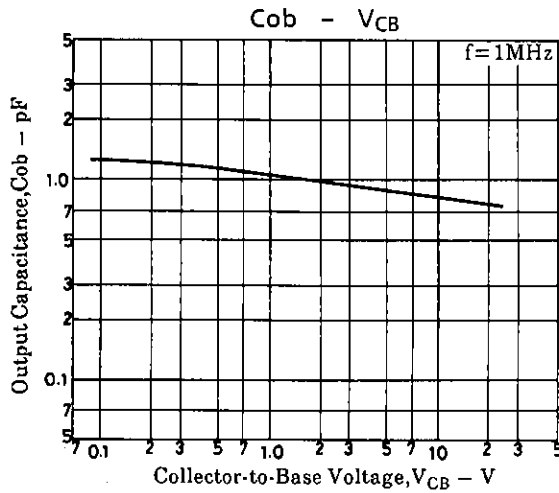
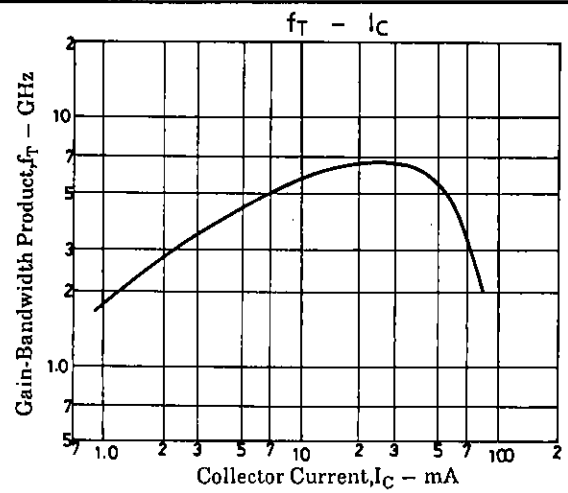
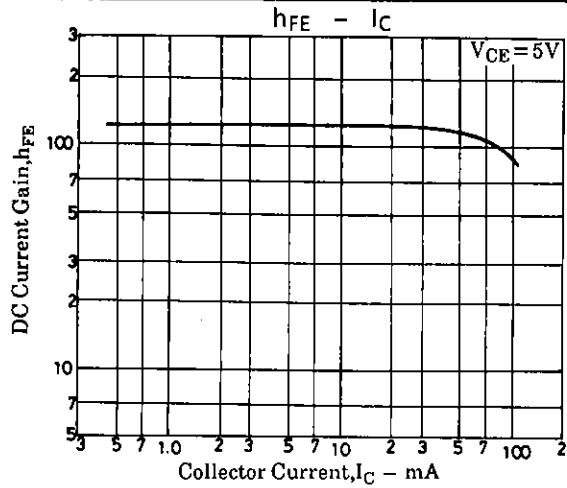
1 : Base

2 : Emitter

3 : Collector

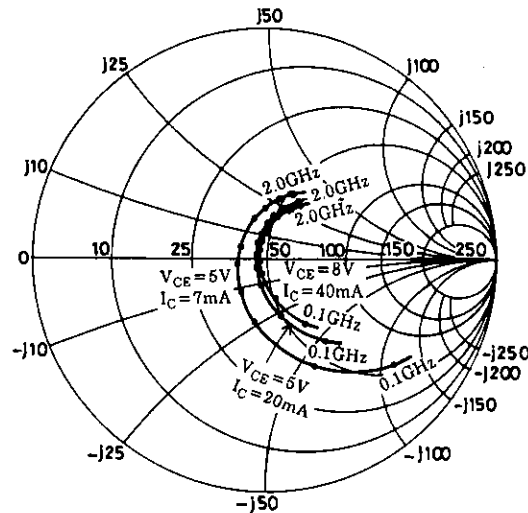
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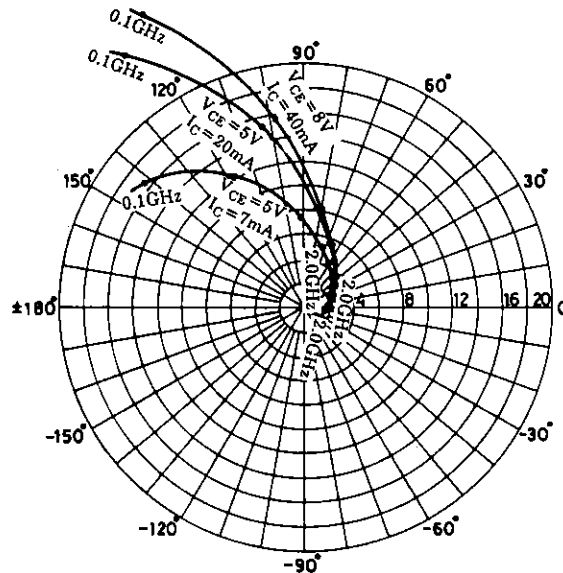


S Parameter

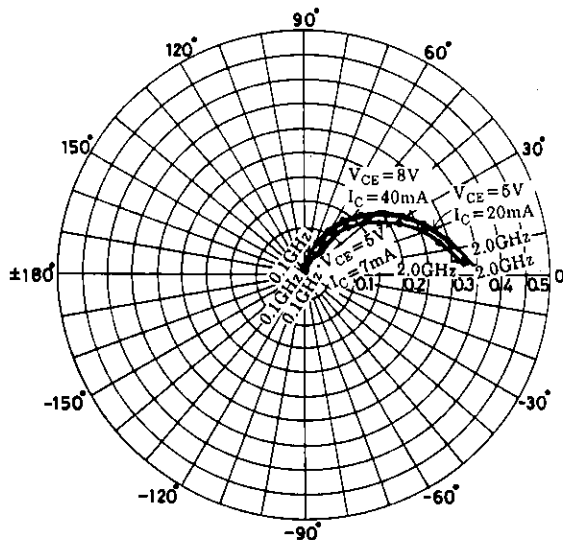
f = 100MHz, 200 to 2000MHz (200MHz step)



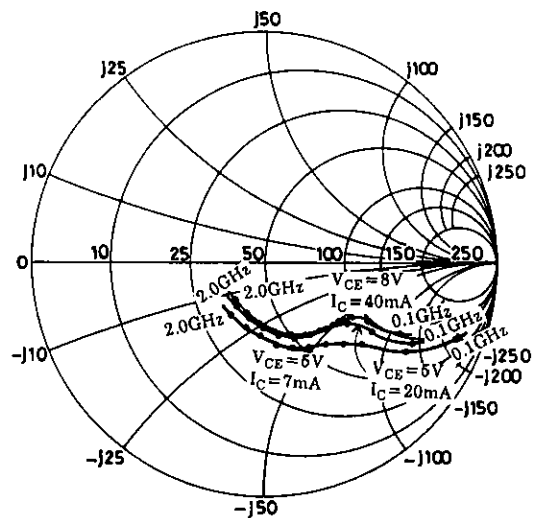
f = 100MHz, 200 to 2000MHz (200MHz step)



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f = 100MHz, 200 to 2000MHz (200MHz step)



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S Parameter (Common emitter)

 $V_{CE} = 5V, I_C = 7mA, Z_0 = 50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.706	-39.4	16.564	141.8	0.029	70.7	0.866	-22.2
200	0.504	-65.6	12.172	117.3	0.048	62.0	0.699	-32.9
400	0.272	-98.9	7.268	90.7	0.076	56.7	0.535	-40.9
600	0.167	-127.5	5.116	73.6	0.105	52.5	0.470	-46.9
800	0.116	-167.7	3.946	59.5	0.134	47.7	0.429	-54.5
1000	0.118	154.0	3.253	47.0	0.163	41.7	0.403	-63.3
1200	0.141	124.4	2.750	35.1	0.194	35.3	0.379	-72.7
1400	0.182	104.9	2.424	23.9	0.224	28.5	0.354	-83.0
1600	0.222	89.6	2.188	12.9	0.255	21.3	0.321	-94.3
1800	0.264	77.4	1.985	2.0	0.285	13.9	0.293	-107.3
2000	0.301	66.8	1.830	-8.6	0.315	6.2	0.267	-123.1

 $V_{CE} = 5V, I_C = 20mA, Z_0 = 50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.431	-53.7	25.126	125.0	0.024	71.2	0.704	-29.4
200	0.251	-75.2	15.206	103.1	0.040	68.6	0.533	-34.1
400	0.110	-100.5	8.172	82.6	0.073	65.2	0.433	-37.2
600	0.051	-137.1	5.608	68.5	0.107	59.3	0.395	-43.5
800	0.046	146.2	4.281	56.4	0.141	52.6	0.367	-52.2
1000	0.077	113.8	3.529	45.1	0.174	45.3	0.345	-62.1
1200	0.112	97.4	2.973	34.1	0.207	37.7	0.324	-72.4
1400	0.156	86.8	2.615	23.5	0.240	29.8	0.298	-83.8
1600	0.194	77.9	2.349	13.3	0.273	21.7	0.263	-96.2
1800	0.239	68.1	2.125	2.7	0.304	13.6	0.235	-110.7
2000	0.283	60.6	1.953	-7.5	0.334	5.1	0.209	-128.6

 $V_{CE} = 8V, I_C = 40mA, Z_0 = 50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.325	-59.7	27.400	118.6	0.021	72.3	0.638	-28.9
200	0.174	-77.9	15.667	98.7	0.037	71.6	0.498	-30.1
400	0.068	-103.4	8.249	80.2	0.071	67.7	0.430	-33.2
600	0.026	-160.0	5.633	67.1	0.104	61.4	0.401	-39.8
800	0.050	117.9	4.288	55.2	0.137	54.4	0.377	-49.0
1000	0.081	103.3	3.524	44.3	0.170	46.8	0.357	-59.1
1200	0.120	91.3	2.981	33.8	0.204	39.0	0.340	-69.6
1400	0.160	82.1	2.616	23.3	0.236	31.0	0.312	-80.9
1600	0.195	73.4	2.349	13.2	0.269	23.0	0.279	-93.1
1800	0.237	65.5	2.131	3.0	0.300	14.7	0.250	-107.3
2000	0.280	57.8	1.962	-7.3	0.331	6.3	0.223	-124.4