

NPN Epitaxial Planar Silicon Transistor

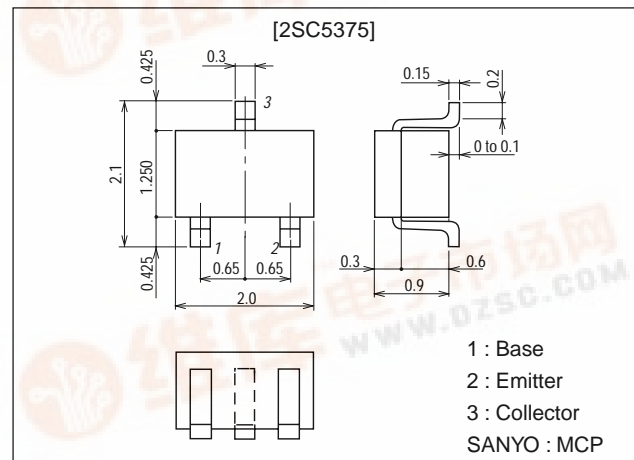
SANYO**2SC5375****VHF to UHF Band OSC,
High-Frequency Amplifiers Applications****Features**

- High gain : $|S_{21e}|^2 = 10\text{dB}$ typ ($f=1\text{GHz}$).
- High cutoff frequency : $f_T = 5.2\text{GHz}$ typ.

Package Dimensions

unit:mm

2059B

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		20	V
Collector-to-Emitter Voltage	V_{CEO}		10	V
Emitter-to-Base Voltage	V_{EBO}		2	V
Collector Current	I_C		100	mA
Collector Dissipation	P_C		150	mW
Junction Temperature	T_J		150	$^\circ\text{C}$
Storage Temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

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

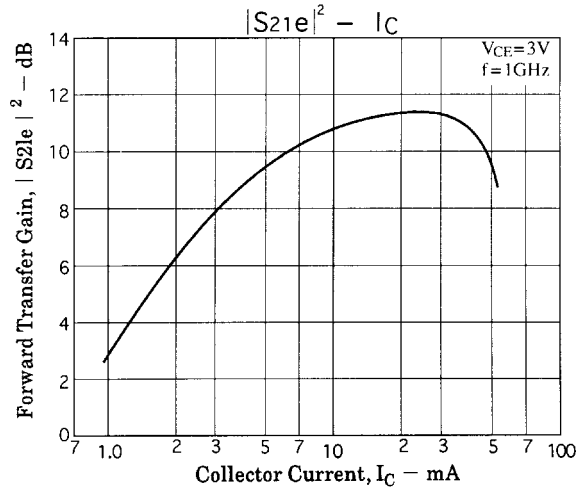
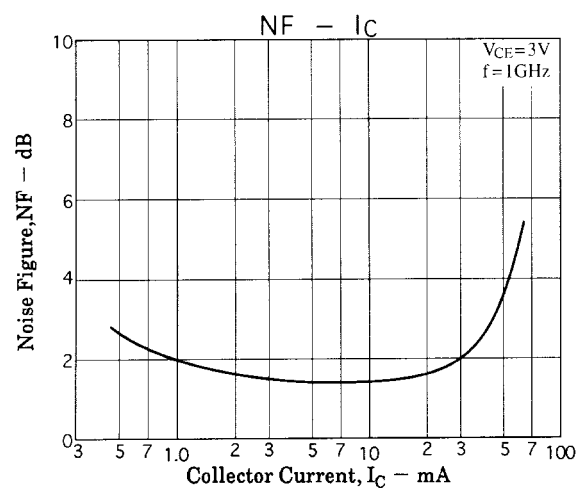
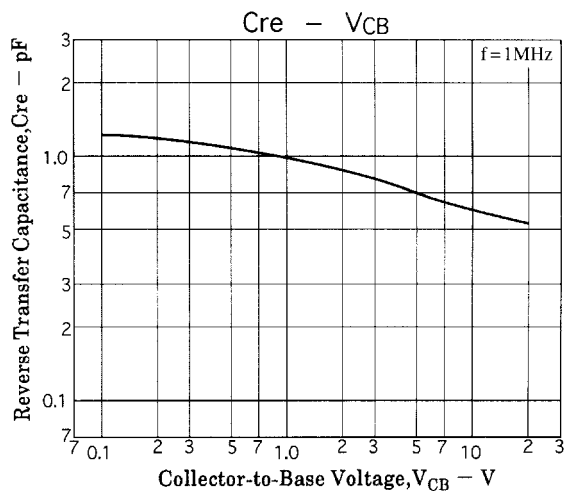
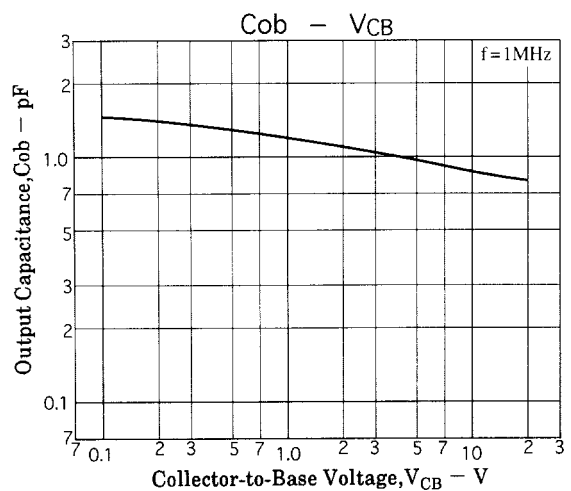
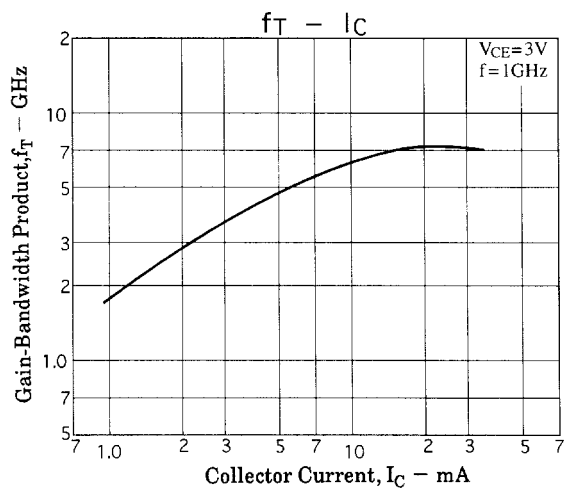
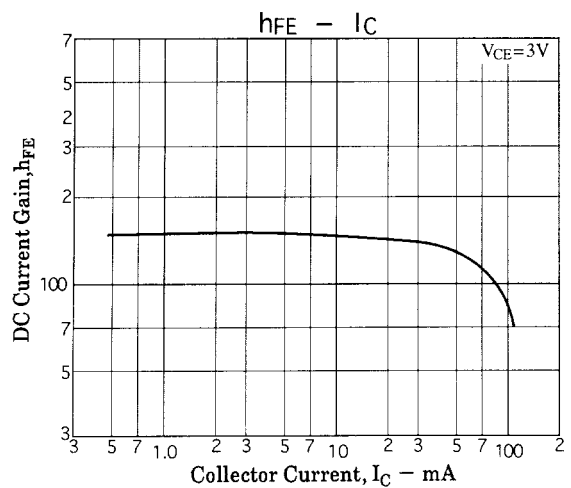
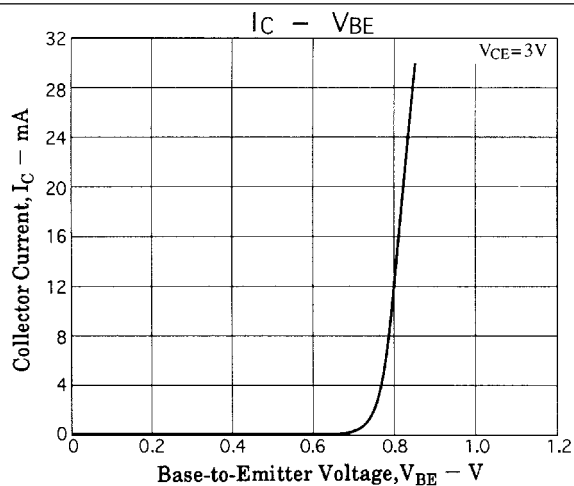
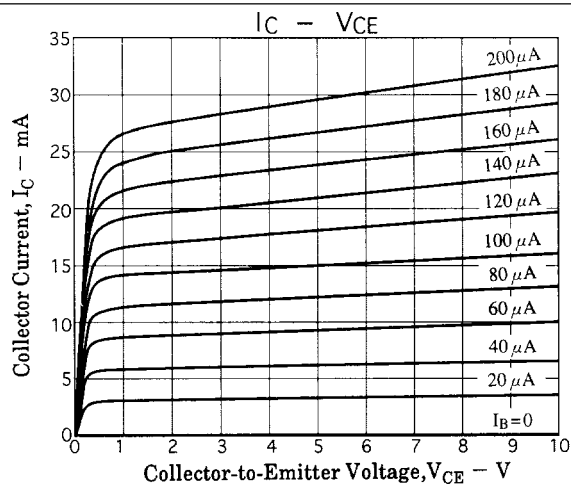
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	$V_{CB}=10\text{V}, I_E=0$			1.0	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=1\text{V}, I_C=0$			10	μA
DC Current Gain	h_{FE1}	$V_{CE}=3\text{V}, I_C=7\text{mA}$	110		180	
	h_{FE2}	$V_{CE}=3\text{V}, I_C=30\text{mA}$	100			
Gain-Bandwidth Product	f_T	$V_{CE}=3\text{V}, I_C=7\text{mA}$	3	5.2		GHz
Output Capacitance	C_{ob}	$V_{CB}=3\text{V}, f=1\text{MHz}$		1.0	1.5	pF
Reverse Transfer Capacitance	C_{re}	$V_{CB}=3\text{V}, f=1\text{MHz}$		0.7		pF
Forward Transfer Gain	$ S_{21e} ^2$	$V_{CE}=3\text{V}, I_C=7\text{mA}, f=1\text{GHz}$	8	10		dB
Noise Figure	NF	$V_{CE}=3\text{V}, I_C=7\text{mA}, f=1\text{GHz}$		1.4	2.5	dB

Marking : NA

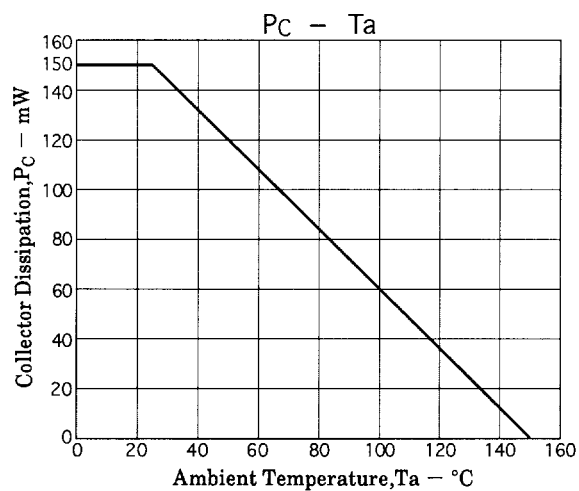
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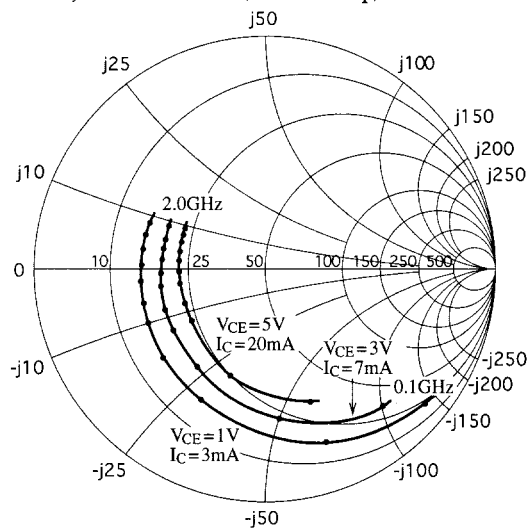
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S Parameters

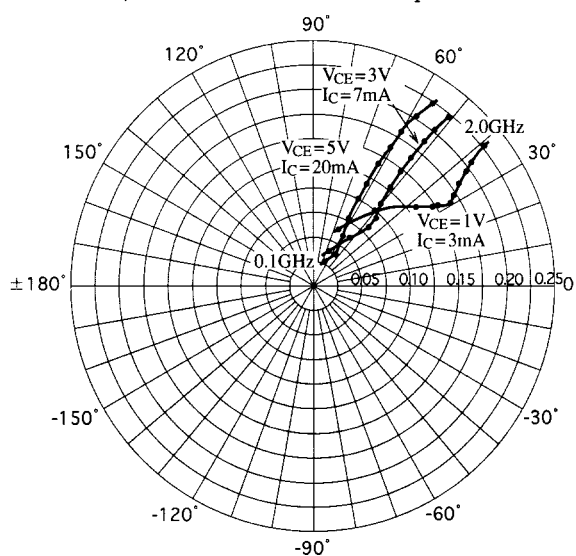
S_{11e}

$f = 100\text{MHz}, 200 \text{ to } 2000\text{MHz (200MHz step)}$



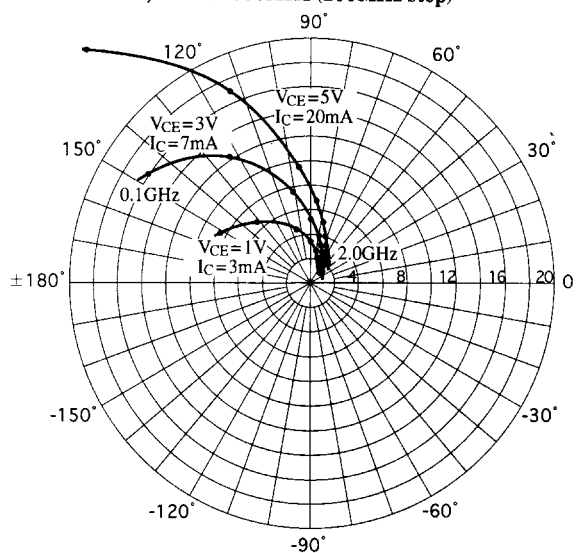
S_{12e}

$f = 100\text{MHz}, 200 \text{ to } 2000\text{MHz (200MHz step)}$



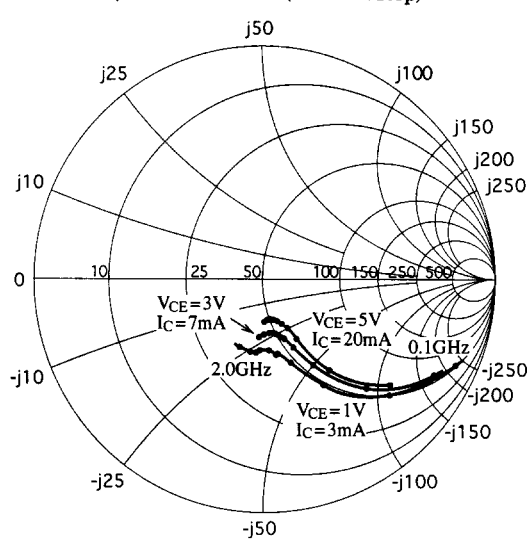
S_{21e}

$f = 100\text{MHz}, 200 \text{ to } 2000\text{MHz (200MHz step)}$



S_{22e}

$f = 100\text{MHz}, 200 \text{ to } 2000\text{MHz (200MHz step)}$



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S parameters (Common emitter)

$V_{CE}=1V$, $I_C=3mA$, $Z_O=50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.875	-40.1	8.529	152.1	0.062	67.4	0.905	-24.3
200	0.782	-70.7	6.673	131.8	0.101	51.6	0.745	-42.0
400	0.621	-115.9	4.733	104.7	0.135	37.2	0.524	-59.1
600	0.576	-138.2	3.353	90.2	0.143	33.3	0.387	-71.5
800	0.547	-155.7	2.686	79.1	0.151	33.0	0.329	-79.4
1000	0.542	-165.4	2.165	70.4	0.165	31.2	0.330	-80.5
1200	0.534	-174.7	1.873	62.4	0.173	33.0	0.310	-86.0
1400	0.529	178.3	1.638	55.7	0.184	35.1	0.295	-91.9
1600	0.529	170.8	1.480	49.7	0.194	35.6	0.308	-95.7
1800	0.533	165.4	1.321	43.4	0.208	36.8	0.312	-101.6
2000	0.532	159.3	1.215	38.3	0.227	38.6	0.304	-109.1

$V_{CE}=3V$, $I_C=7mA$, $Z_O=50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.777	-48.9	16.116	146.5	0.040	65.9	0.852	-29.0
200	0.643	-84.8	12.223	124.2	0.061	52.9	0.646	-46.3
400	0.505	-126.1	7.484	101.5	0.083	46.6	0.428	-58.8
600	0.473	-146.2	5.198	89.7	0.096	48.3	0.317	-65.6
800	0.454	-160.6	3.984	80.7	0.112	49.9	0.273	-70.2
1000	0.446	-170.4	3.275	73.6	0.129	51.4	0.248	-74.1
1200	0.449	-177.6	2.738	66.9	0.147	52.0	0.239	-76.3
1400	0.445	175.5	2.391	61.2	0.165	52.4	0.229	-79.6
1600	0.443	168.9	2.135	55.9	0.184	52.4	0.225	-84.6
1800	0.439	164.1	1.944	50.5	0.203	51.5	0.227	-90.0
2000	0.443	157.7	1.760	45.7	0.222	50.4	0.240	-93.0

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

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.595	-70.3	26.610	134.3	0.028	62.1	0.724	-39.3
200	0.480	-107.7	17.090	113.5	0.041	56.3	0.482	-54.3
400	0.406	-143.8	9.432	95.7	0.060	58.8	0.296	-61.9
600	0.393	-160.3	6.459	86.2	0.079	61.8	0.227	-64.4
800	0.388	-171.0	4.909	79.0	0.100	62.8	0.200	-67.5
1000	0.387	-178.6	3.989	73.3	0.121	62.8	0.188	-70.3
1200	0.390	175.1	3.356	67.3	0.142	62.0	0.182	-72.4
1400	0.385	169.8	2.918	62.1	0.163	61.0	0.176	-75.0
1600	0.386	163.9	2.588	57.7	0.184	59.9	0.173	-80.1
1800	0.388	159.8	2.322	52.8	0.205	57.9	0.177	-85.8
2000	0.394	154.7	2.117	48.5	0.226	56.0	0.185	-89.4

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