



SANYO Semiconductors

# DATA SHEET

An ON Semiconductor Company

## 2SC5227A — NPN Epitaxial Planar Silicon Transistor

### VHF to UHF Wide-Band Low-Noise Amplifier Applications

#### Features

- Low-noise : NF=1.0dB typ (f=1GHz).
- High gain :  $|S_{21e}|^2=12\text{dB}$  typ (f=1GHz).
- High cut-off frequency :  $f_T=7\text{GHz}$  typ.

#### Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CB0}$		20	V
Collector-to-Emitter Voltage	$V_{CEO}$		10	V
Emitter-to-Base Voltage	$V_{EB0}$		2	V
Collector Current	$I_C$		70	mA
Collector Dissipation	$P_C$		200	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	$I_{CBO}$	$V_{CB}=10\text{V}, I_E=0\text{A}$			1.0	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=1\text{V}, I_C=0\text{A}$			10	$\mu\text{A}$
DC Current Gain	$h_{FE}$	$V_{CE}=5\text{V}, I_C=20\text{mA}$	60*		270*	

Continued on next page.

\* : The 2SC5227A is classified by 20mA  $h_{FE}$  as follows :

Marking	LN3	LN4	LN5
Rank	3	4	5
$h_{FE}$	60 to 120	90 to 180	135 to 270

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**SANYO Semiconductor Co., Ltd.**

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# 2SC5227A

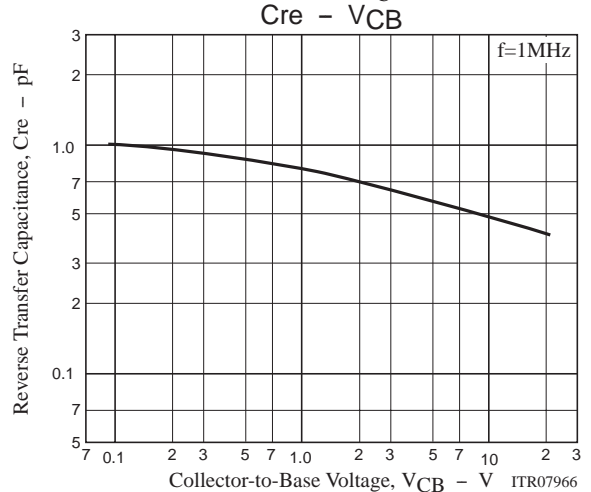
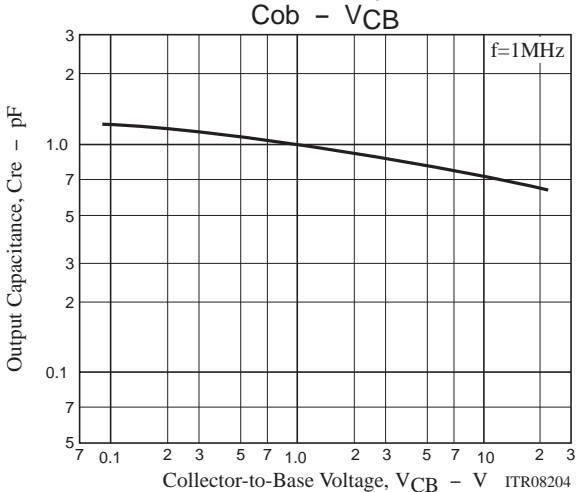
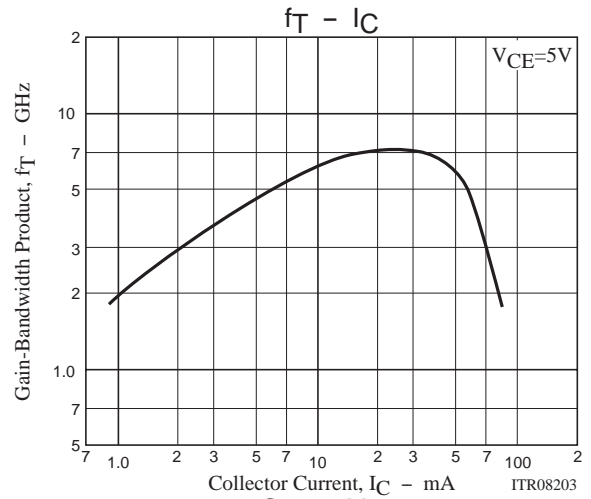
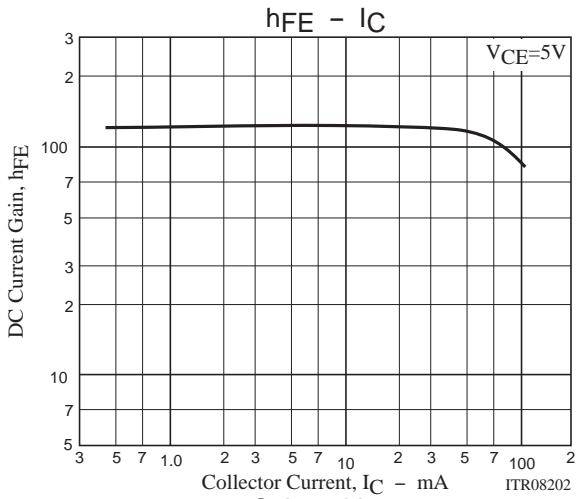
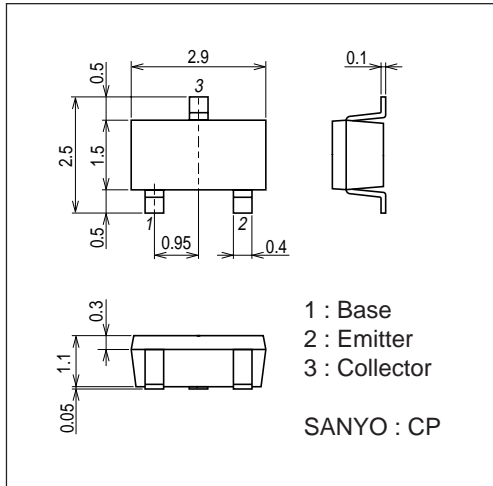
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Gain-Bandwidth Product	$f_T$	$V_{CE}=5V, I_C=20mA$	5	7		GHz
Output Capacitance	$C_{ob}$	$V_{CB}=10V, f=1MHz$		0.75	1.2	pF
Reverse Transfer Capacitance	$C_{re}$	$V_{CB}=10V, f=1MHz$		0.5		pF
Forward Transfer Gain	$ S_{21e} ^{21}$	$V_{CE}=5V, I_C=20mA, f=1GHz$	9	12		dB
	$ S_{21e} ^{22}$	$V_{CE}=2V, I_C=3mA, f=1GHz$		8		dB
Noise Figure	NF	$V_{CE}=5V, I_C=7mA, f=1GHz$		1.0	1.8	dB

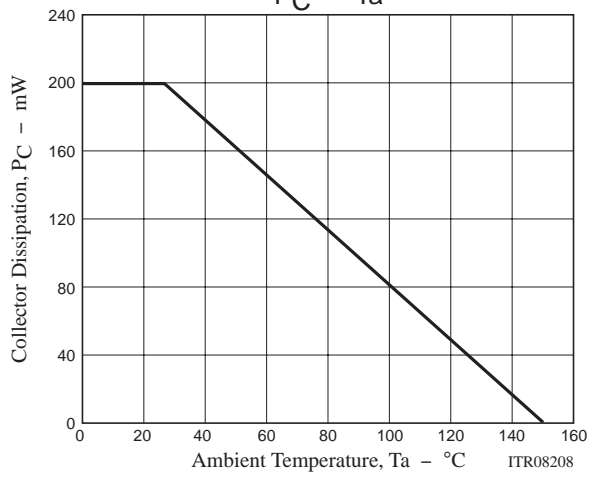
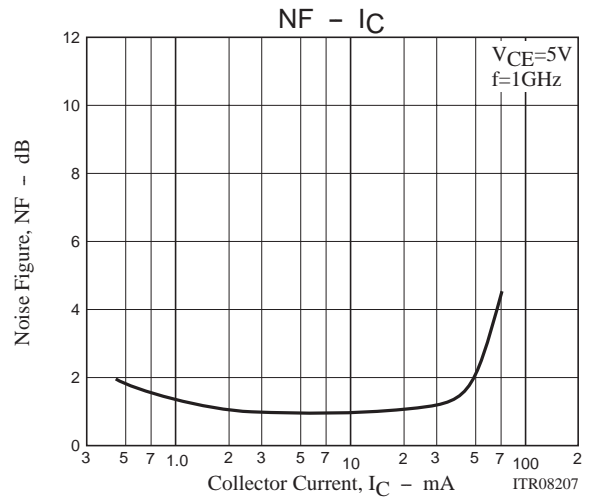
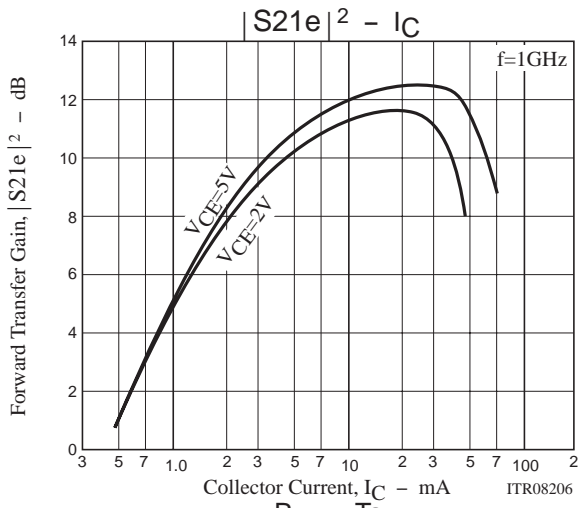
## Package Dimensions

unit : mm (typ)

7013A-009



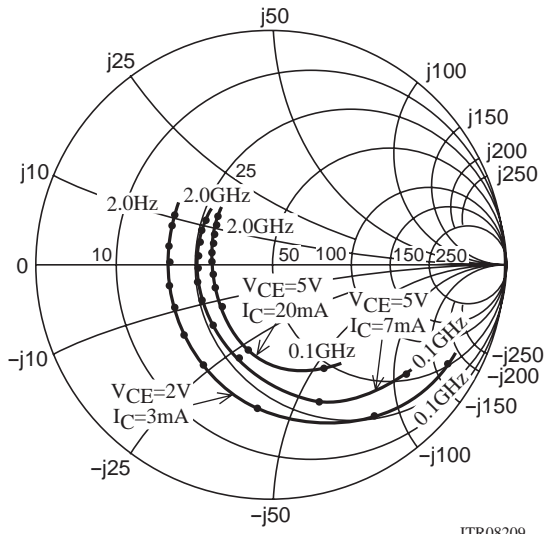
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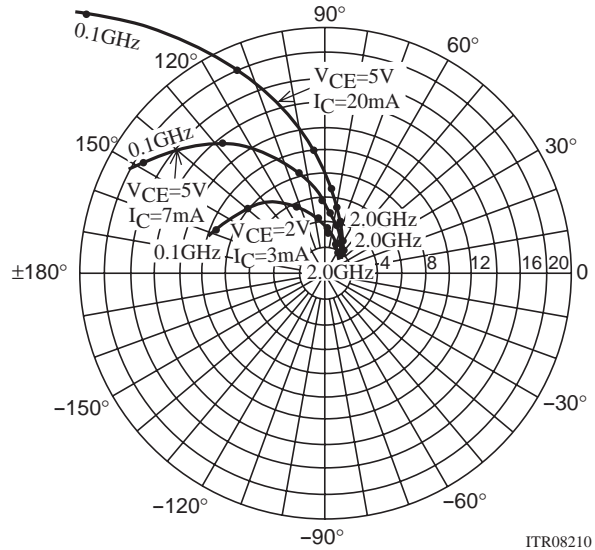
## S Parameters (Common emitter)

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



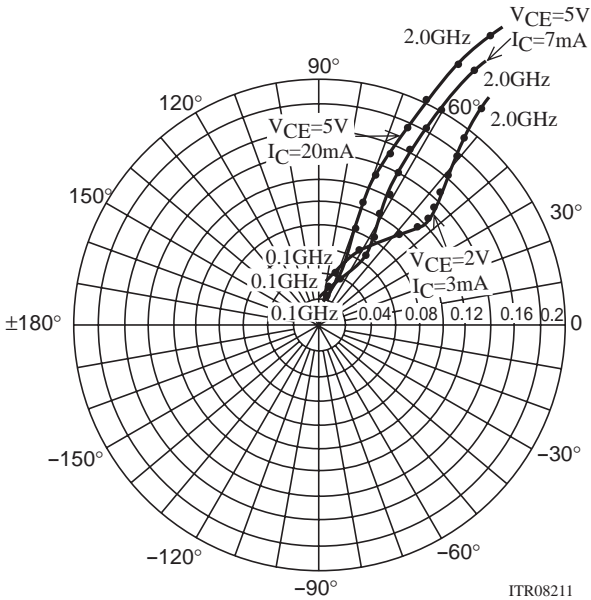
ITR08209

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



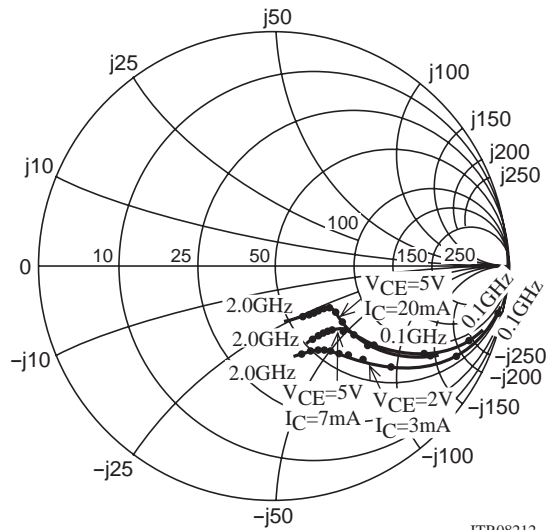
ITR08210

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



ITR08211

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



ITR08212

## 2SC5227A

### S Parameters (Common emitter)

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

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.722	-41.6	17.352	148.7	0.029	70.9	0.883	-21.3
200	0.587	-73.2	13.419	127.6	0.046	60.8	0.710	-33.1
400	0.426	-113.0	8.371	105.1	0.067	56.9	0.507	-40.7
600	0.369	-136.6	5.914	92.7	0.084	58.4	0.423	-42.5
800	0.344	-152.9	4.593	83.9	0.102	60.3	0.382	-43.9
1000	0.334	-165.7	3.750	76.7	0.121	61.5	0.360	-46.3
1200	0.326	-177.9	3.178	70.3	0.141	62.0	0.350	-49.1
1400	0.324	172.3	2.784	64.9	0.162	61.8	0.341	-52.2
1600	0.328	163.4	2.476	59.5	0.183	61.2	0.334	-56.4
1800	0.335	154.5	2.246	54.6	0.204	60.5	0.328	-60.8
2000	0.346	147.5	3.073	50.0	0.226	59.6	0.328	-65.4

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

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.477	-66.8	28.090	133.6	0.022	67.7	0.726	-32.7
200	0.358	-104.1	17.995	112.9	0.035	65.3	0.506	-41.6
400	0.288	-142.2	9.903	95.9	0.057	68.3	0.350	-42.4
600	0.273	-159.8	6.777	86.7	0.081	69.9	0.299	-41.8
800	0.270	-171.7	5.181	79.9	0.104	70.2	0.278	-43.2
1000	0.271	178.7	4.209	73.9	0.129	69.1	0.269	-45.9
1200	0.273	169.4	3.554	68.5	0.153	67.9	0.264	-49.6
1400	0.275	161.1	3.085	63.6	0.177	66.2	0.258	-53.3
1600	0.284	153.4	2.749	59.1	0.202	64.3	0.253	-58.3
1800	0.294	145.6	2.479	54.6	0.224	62.5	0.249	-63.4
2000	0.302	140.8	2.295	50.6	0.248	60.4	0.248	-68.7

$V_{CE}=2V, I_C=3mA, Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.858	-30.5	9.283	157.3	0.039	73.6	0.944	-15.6
200	0.769	-57.4	8.036	138.7	0.068	61.4	0.834	-27.5
400	0.607	-97.1	5.756	113.9	0.099	48.4	0.641	-40.5
600	0.528	-123.2	4.302	98.1	0.114	44.4	0.525	-46.5
800	0.486	-141.6	3.414	87.0	0.125	43.9	0.465	-50.2
1000	0.460	-156.4	2.834	78.0	0.137	45.4	0.429	-53.7
1200	0.453	-169.4	2.429	70.3	0.149	47.5	0.408	-57.3
1400	0.440	179.8	2.143	63.6	0.163	49.2	0.395	-60.9
1600	0.441	170.1	1.919	57.4	0.179	50.8	0.385	-65.4
1800	0.447	160.4	1.739	51.7	0.196	52.3	0.381	-70.1
2000	0.454	152.5	1.621	46.4	0.215	53.3	0.379	-75.2

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