



SANYO Semiconductors

## DATA SHEET

# 55GN01SA — NPN Epitaxial Planar Silicon Transistor

## UHF Wide-band Low-noise Amplifier Applications

### Features

- High cutoff frequency :  $f_T = 5.5\text{GHz}$  typ.
- High gain :  $|S_{21e}|^2 = 10\text{dB}$  typ ( $f = 1\text{GHz}$ ).
- Ultrasmall package permitting applied sets to be small and slim.

### 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	$V_{EBO}$		3	V
Collector Current	$I_C$		70	mA
Collector Dissipation	$P_C$		100	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	$I_{CBO}$	$V_{CB} = 10\text{V}, I_E = 0\text{A}$			0.1	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = 2\text{V}, I_C = 0\text{A}$			1	$\mu\text{A}$
DC Current Gain	$h_{FE}$	$V_{CE} = 5\text{V}, I_C = 10\text{mA}$	100		180	
Gain-Bandwidth Product	$f_T1$	$V_{CE} = 3\text{V}, I_C = 5\text{mA}$	3.0	4.5		GHz
	$f_T2$	$V_{CE} = 5\text{V}, I_C = 20\text{mA}$		5.5		GHz
Output Capacitance	$C_{ob}$	$V_{CB} = 10\text{V}, f = 1\text{MHz}$		1.0	1.2	pF
Reverse Transfer Capacitance	$C_{re}$	$V_{CB} = 10\text{V}, f = 1\text{MHz}$		0.6		pF
Forward Transfer Gain	$ S_{21e} ^2$	$V_{CE} = 5\text{V}, I_C = 20\text{mA}, f = 1\text{GHz}$	7	10		dB
Noise Figure	NF	$V_{CE} = 3\text{V}, I_C = 5\text{mA}, f = 1\text{GHz}, Z_S = Z_L = 50\Omega$		1.9		dB

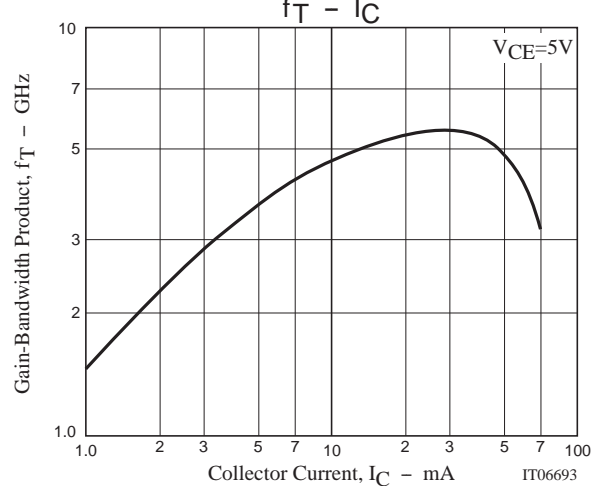
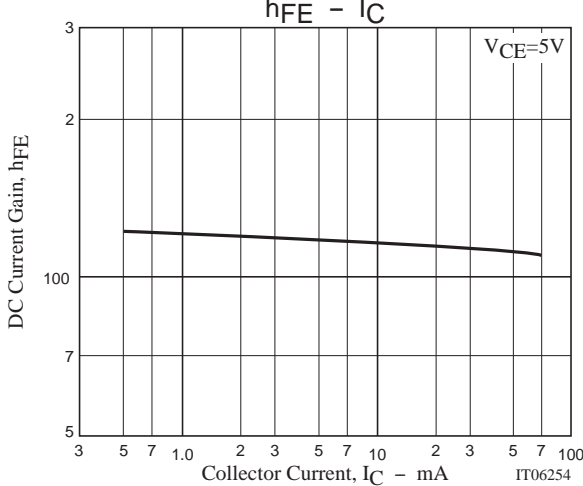
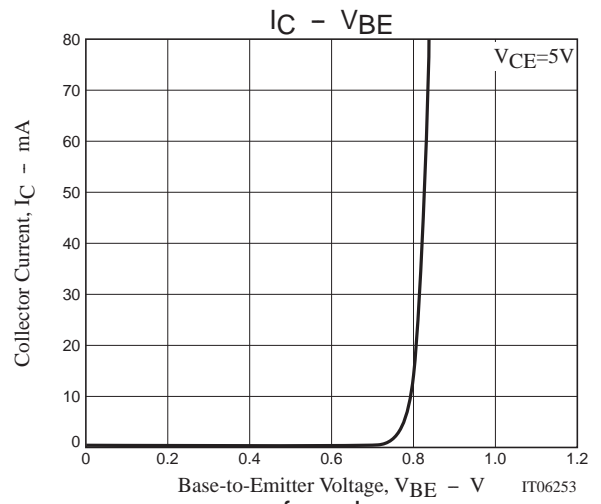
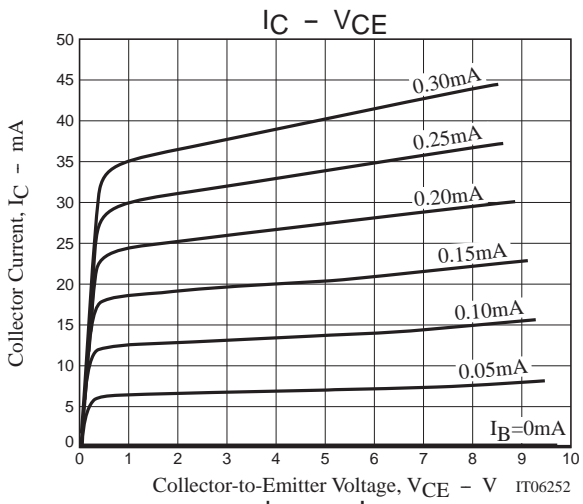
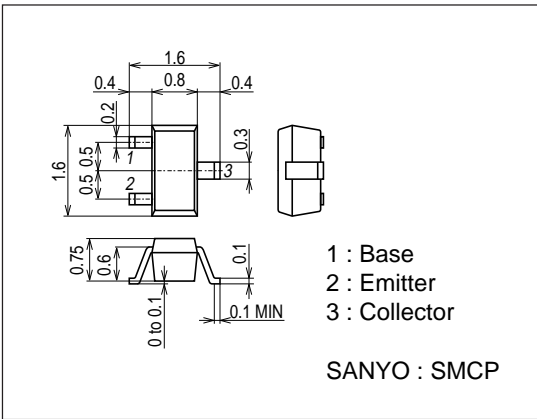
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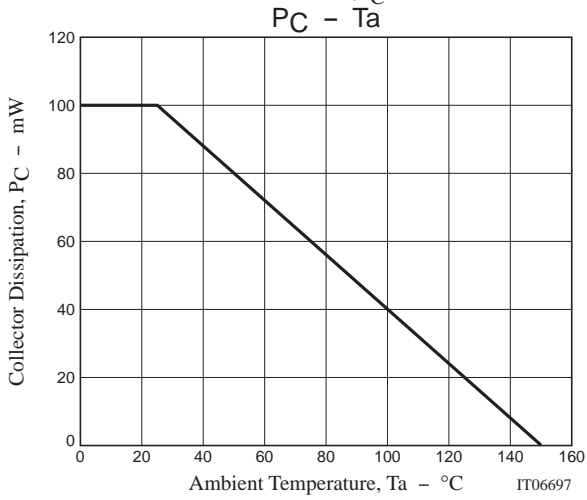
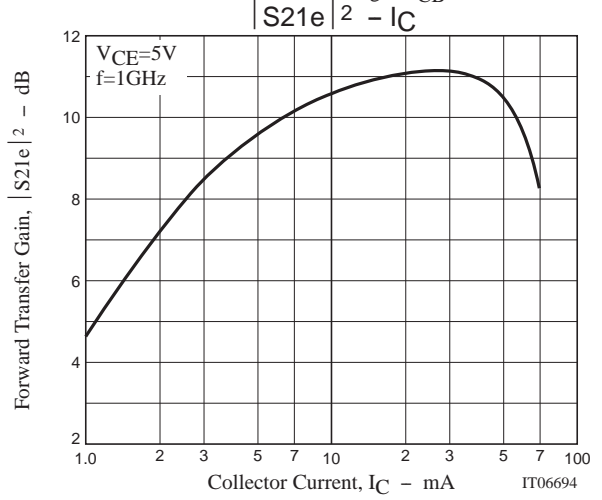
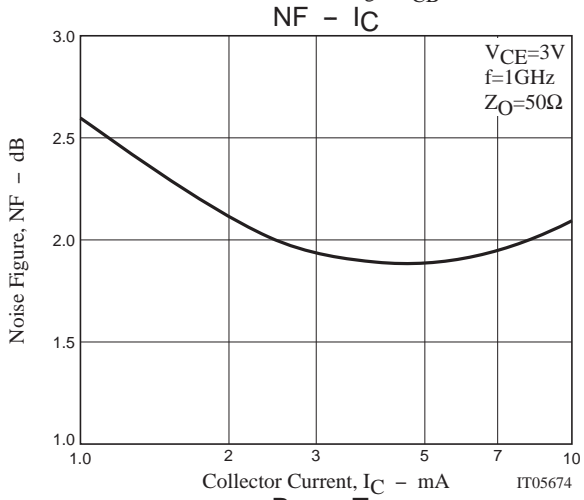
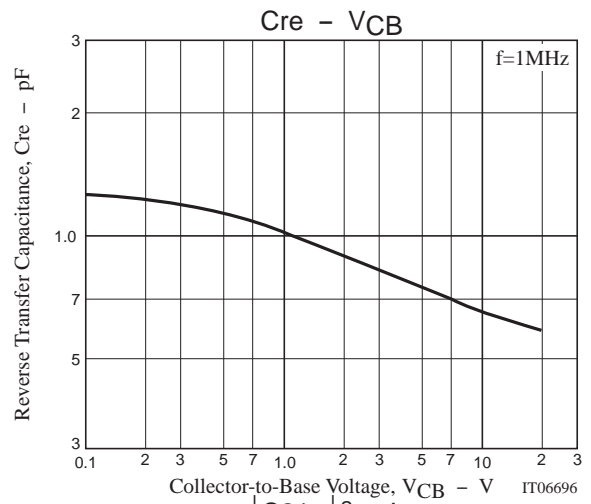
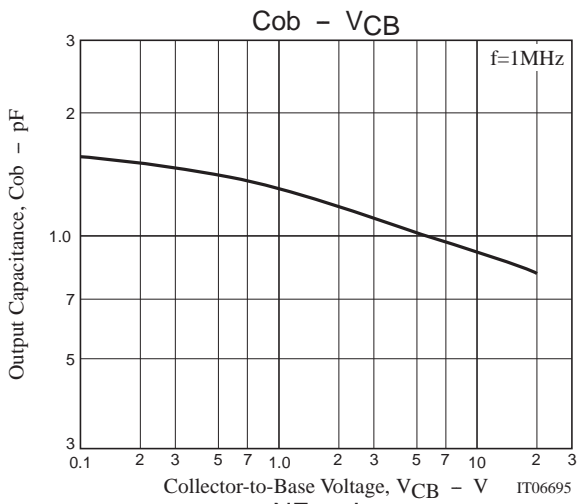
Package Dimensions

unit : mm (typ)

7027-002



# 55GN01SA



## 55GN01SA

### S Parameters (Common emitter)

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

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.818	-45.11	12.945	149.89	0.040	68.19	0.882	-23.66
200	0.723	-79.29	10.378	128.84	0.063	53.36	0.708	-38.25
400	0.619	-119.57	6.589	105.34	0.082	43.85	0.504	-50.00
600	0.590	-140.45	4.732	92.21	0.094	44.40	0.422	-54.83
800	0.566	-153.95	3.677	82.43	0.106	46.39	0.387	-58.60
1000	0.553	-163.02	3.000	74.67	0.118	48.68	0.369	-62.43
1200	0.546	-170.25	2.547	67.70	0.132	51.04	0.368	-65.91
1400	0.536	-176.36	2.214	61.57	0.145	53.10	0.374	-70.19
1600	0.529	178.47	1.979	55.95	0.162	54.51	0.376	-73.95
1800	0.518	173.34	1.790	50.69	0.178	55.69	0.387	-77.80
2000	0.515	168.18	1.642	45.28	0.197	56.79	0.393	-81.33
2200	0.506	163.01	1.499	40.79	0.216	56.84	0.403	-85.56
2400	0.502	158.27	1.394	36.26	0.236	56.80	0.415	-89.57
2600	0.496	153.59	1.299	32.33	0.257	56.63	0.423	-93.86
2800	0.495	148.84	1.220	28.79	0.281	56.40	0.431	-98.20
3000	0.488	144.62	1.152	25.31	0.307	55.34	0.440	-101.75

$V_{CE}=5V, I_C=10mA, Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.695	-65.56	19.851	138.84	0.033	62.31	0.773	-33.54
200	0.600	-104.03	13.662	117.33	0.049	51.12	0.552	-48.13
400	0.540	-139.63	7.785	97.63	0.065	51.35	0.370	-56.25
600	0.532	-154.82	5.405	87.15	0.081	53.63	0.312	-60.19
800	0.522	-165.18	4.152	79.02	0.099	57.04	0.294	-64.03
1000	0.517	-171.99	3.356	72.24	0.115	59.04	0.283	-67.23
1200	0.511	-177.34	2.845	66.21	0.134	59.83	0.284	-70.66
1400	0.507	177.38	2.469	60.71	0.153	59.98	0.294	-74.85
1600	0.498	173.40	2.199	55.55	0.172	60.01	0.300	-78.33
1800	0.493	169.08	1.991	50.67	0.191	59.81	0.309	-82.14
2000	0.489	164.42	1.824	45.74	0.212	59.31	0.315	-85.02
2200	0.483	159.69	1.665	41.25	0.234	58.55	0.327	-88.98
2400	0.479	155.72	1.549	36.93	0.254	57.22	0.337	-92.57
2600	0.474	151.50	1.446	32.96	0.272	56.69	0.345	-96.49
2800	0.474	146.89	1.358	29.71	0.296	55.40	0.353	-100.19
3000	0.469	142.97	1.283	26.10	0.318	54.29	0.364	-103.38

# 55GN01SA

## S Parameters (Common emitter)

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

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.570	-89.86	25.811	127.74	0.027	57.86	0.639	-42.89
200	0.520	-126.23	15.701	108.51	0.038	55.16	0.416	-54.85
400	0.503	-153.83	8.426	92.69	0.057	59.71	0.276	-59.96
600	0.506	-164.64	5.772	83.96	0.077	63.42	0.242	-62.99
800	0.504	-172.52	4.408	76.83	0.098	64.34	0.234	-67.02
1000	0.498	-177.66	3.555	70.62	0.116	64.27	0.228	-70.93
1200	0.496	177.98	3.013	65.15	0.139	64.39	0.235	-74.09
1400	0.492	173.75	2.611	59.99	0.158	63.46	0.246	-78.62
1600	0.488	170.09	2.319	55.01	0.179	63.02	0.252	-81.39
1800	0.481	166.42	2.096	50.36	0.200	61.78	0.262	-85.56
2000	0.481	162.19	1.917	45.65	0.221	60.80	0.268	-87.90
2200	0.472	158.01	1.760	41.21	0.240	59.60	0.283	-91.47
2400	0.472	154.06	1.633	37.24	0.260	57.83	0.293	-94.81
2600	0.467	149.87	1.523	33.18	0.280	56.85	0.300	-98.53
2800	0.467	145.82	1.434	29.86	0.304	55.35	0.311	-102.06
3000	0.462	142.08	1.354	26.43	0.326	53.94	0.318	-104.23

$V_{CE}=5V, I_C=30mA, Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.523	-103.16	27.751	122.53	0.024	59.02	0.569	-46.47
200	0.498	-136.49	16.132	104.97	0.035	57.80	0.361	-56.04
400	0.498	-159.57	8.503	90.63	0.054	63.85	0.244	-59.31
600	0.503	-168.52	5.802	82.53	0.076	67.20	0.219	-62.34
800	0.500	-175.28	4.429	75.68	0.097	66.04	0.215	-66.55
1000	0.499	-179.85	3.582	69.78	0.118	66.40	0.215	-70.37
1200	0.498	176.25	3.013	64.35	0.138	66.22	0.222	-73.72
1400	0.494	172.08	2.615	59.21	0.161	65.47	0.233	-78.23
1600	0.489	169.05	2.324	54.35	0.180	64.05	0.241	-81.44
1800	0.484	165.09	2.102	49.78	0.200	62.79	0.250	-85.19
2000	0.483	161.02	1.925	45.03	0.222	61.56	0.258	-87.77
2200	0.476	157.15	1.762	40.66	0.243	60.04	0.273	-90.81
2400	0.476	153.18	1.634	36.62	0.263	58.71	0.286	-94.60
2600	0.471	149.16	1.524	32.74	0.283	57.48	0.294	-98.35
2800	0.471	145.15	1.436	29.38	0.307	55.99	0.302	-101.47
3000	0.467	141.40	1.355	25.99	0.329	54.46	0.312	-103.95

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