Ordering number:EN5045

NPN Epitaxial Planar Silicon Transistor

2SC5229

VHF to UHF Wide-Band Low-Noise Amplifier Applications

Features

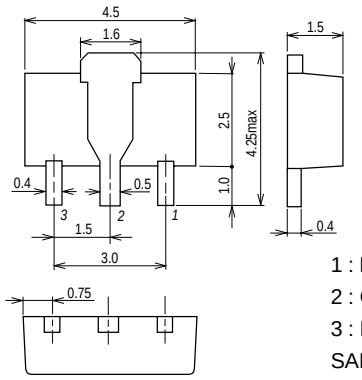
- Low noise : NF=1.0dB typ (f=1GHz).
- High gain : $|S21e|^2$=10.5dB typ (f=1GHz).
- High cutoff frequency : f_T=6.5GHz typ.
- Medium power operation : NF=1.7dB typ (f=1GHz). (V_{CE}=8V, I_C=40mA) : $|S21e|^2$=11dB typ (f=1GHz).

Package Dimensions

unit:mm

2038A

[2SC5229]



1 : Base
2 : Collector
3 : Emitter
SANYO : PCP
(Bottom view)

Specifications

Absolute Maximum Ratings at Ta = 25˚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		70	mA
Collector Dissipation	P_C	Mounted on ceramic board (250mm²×0.8mm)	700	mW
Junction Temperature	Tj		150	˚C
Storage Temperature	Tstg		–55 to +150	˚C

Electrical Characteristics at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=10V, I_E=0			1.0	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=1V, I_C=0			10	μA
DC Current Gain	h_{FE}	V_{CE}=5V, I_C=20mA	60*		270*	
Gain-Bandwidth Product	f_T	V_{CE}=5V, I_C=20mA	4.5	6.5		GHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		0.85	1.3	pF
Reverse Transfer Capacitance	Cre	V_{CB}=10V, f=1MHz		0.55		pF

* : The 2SC5229 is classified by 20mA h_{FE} as follows :

60	D	120	90	E	180	135	F	270

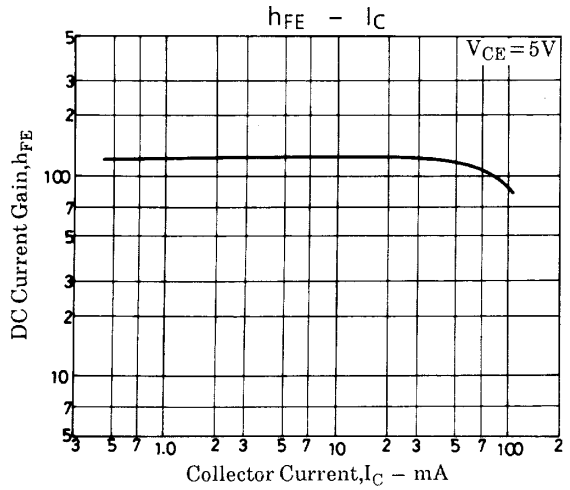
Marking : CY
h_{FE} rank : D, E, F

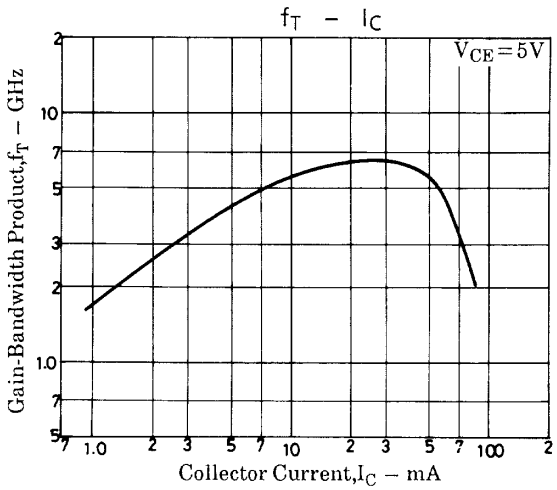
Continued on next page.

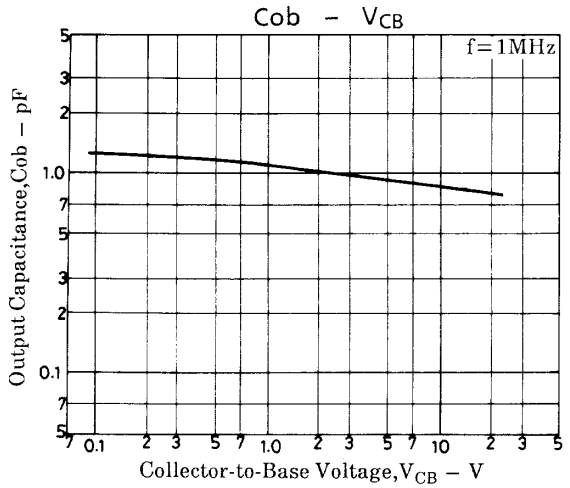
SANYO Electric Co.,Ltd. Semiconductor Bussiness Headquaters
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

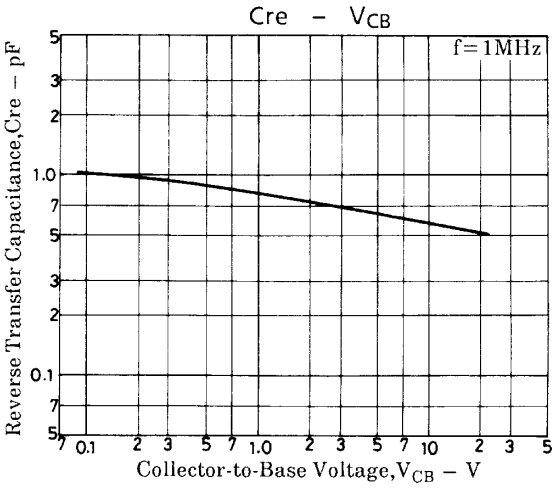
Continued from preceding page.

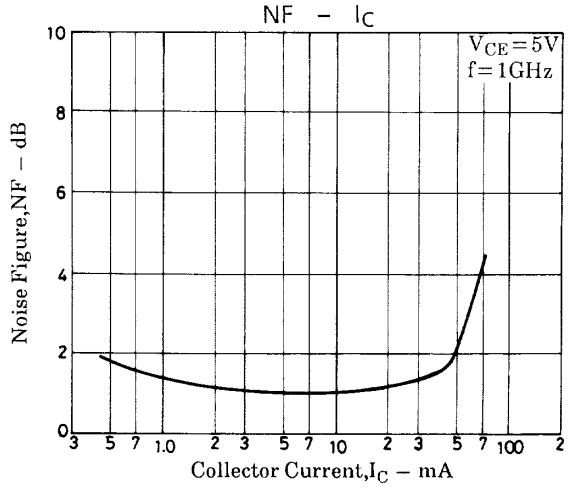
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Forward Transfer Gain	| S21e |^2 1	V_{CE}=5V, I_C=20mA, f=1GHz	8	10.5		dB
	| S21e |^2 2	V_{CE}=8V, I_C=40mA, f=1GHz		11		dB
Noise Figure	NF1	V_{CE}=5V, I_C=7mA, f=1GHz		1.0	1.8	dB
	NF2	V_{CE}=8V, I_C=40mA, f=1GHz		1.7		dB

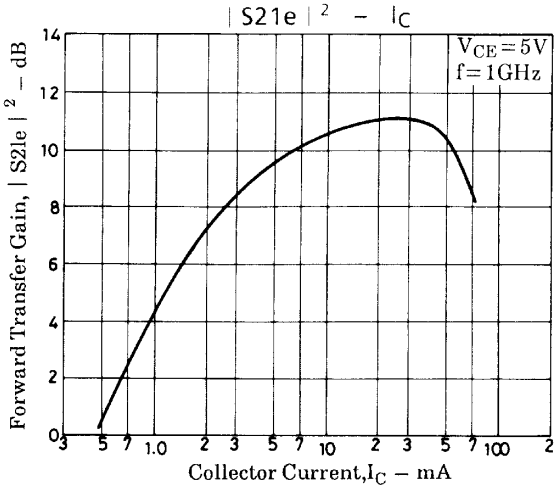


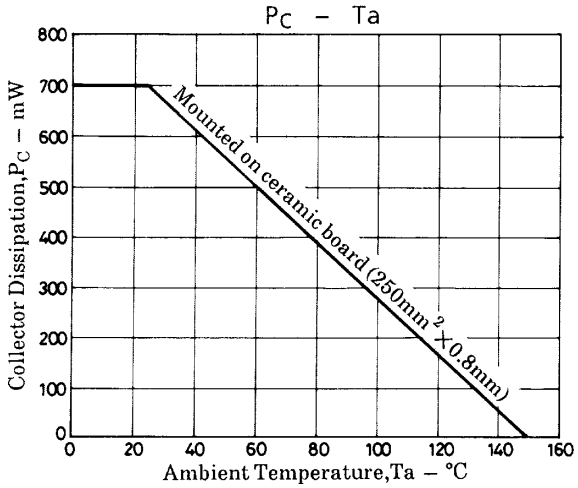






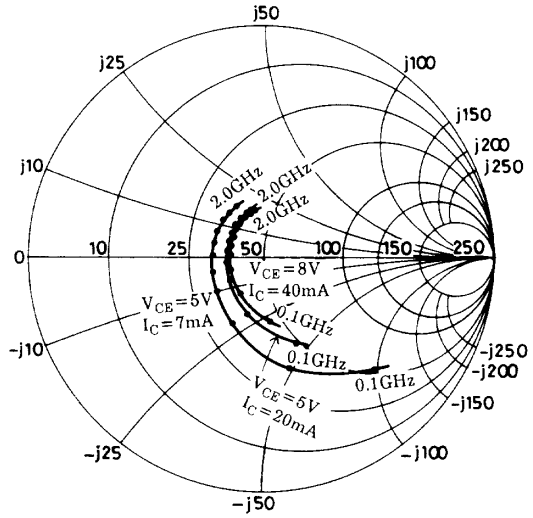




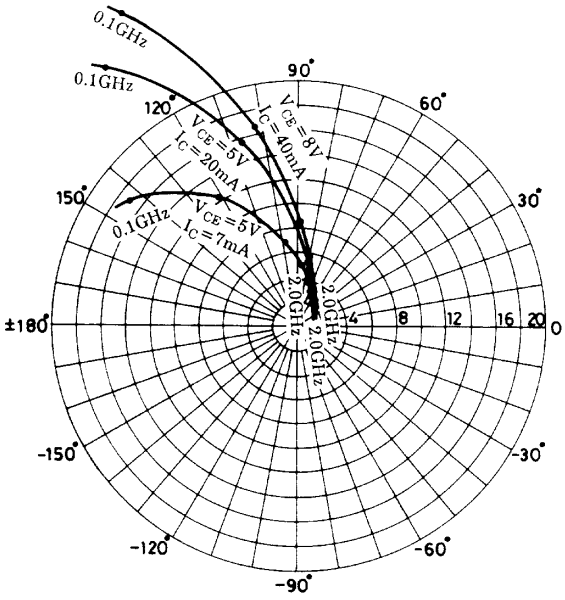


S Parameters

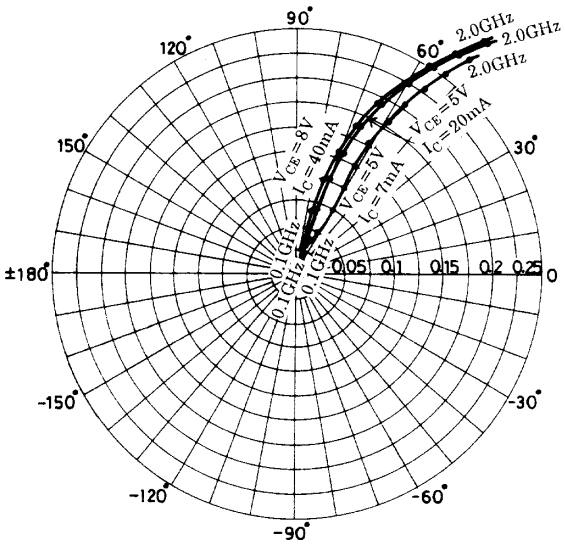
f=100MHz, 200 to 2000MHz (200MHz step)



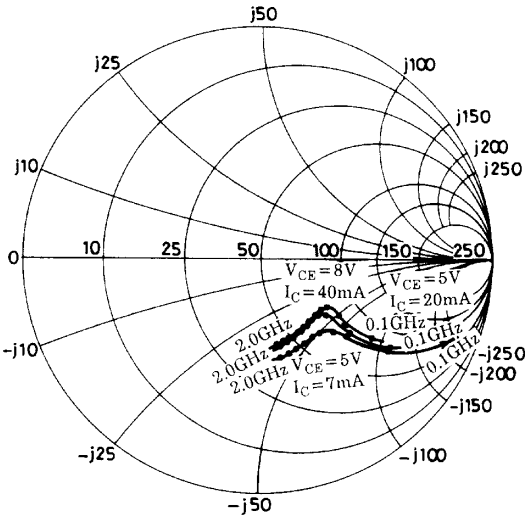
f=100MHz, 200 to 2000MHz (200MHz step)



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



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



S parameters (Common emitter)

V_{CE}=5V, I_C=7mA, Z_O=50Ω

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.682	–44.8	16.999	143.0	0.032	69.4	0.848	–24.7
200	0.496	–75.3	12.278	120.6	0.050	61.3	0.663	–36.3
400	0.311	–113.7	7.273	98.2	0.076	60.0	0.492	–43.2
600	0.234	–142.0	5.064	85.4	0.100	61.2	0.435	–46.6
800	0.210	–164.2	3.912	76.2	0.125	61.5	0.413	–50.2
1000	0.201	177.1	3.210	68.5	0.152	61.1	0.408	–54.1
1200	0.204	160.1	2.736	60.8	0.179	59.6	0.411	–58.6
1400	0.213	146.2	2.388	53.9	0.205	57.6	0.416	–63.6
1600	0.226	132.4	2.108	47.3	0.231	55.7	0.423	–68.8
1800	0.232	123.1	1.902	41.7	0.256	53.6	0.431	–73.3
2000	0.242	113.6	1.725	36.5	0.283	51.3	0.438	–77.3

V_{CE}=5V, I_C=20mA, Z_O=50Ω

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.399	–68.1	26.168	127.2	0.024	69.1	0.663	–35.1
200	0.249	–103.2	15.690	106.6	0.040	69.4	0.468	–41.0
400	0.163	–144.3	8.404	90.2	0.071	71.4	0.362	–42.1
600	0.143	–173.4	5.707	80.5	0.102	70.5	0.337	–45.2
800	0.144	166.1	4.343	73.5	0.133	68.5	0.330	–49.5
1000	0.150	151.3	3.559	66.8	0.165	66.1	0.337	–54.1
1200	0.162	137.3	3.028	60.2	0.195	63.0	0.343	–59.4
1400	0.177	126.4	2.633	53.7	0.225	59.7	0.353	–64.9
1600	0.191	115.0	2.326	48.0	0.252	56.6	0.360	–70.9
1800	0.200	106.9	2.100	42.9	0.279	53.5	0.369	–75.2
2000	0.204	99.8	1.915	37.9	0.307	50.6	0.376	–79.3

V_{CE}=8V, I_C=40mA, Z_O=50Ω

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.277	–83.1	29.257	119.1	0.021	72.6	0.576	–36.1
200	0.176	–119.8	16.497	101.9	0.037	74.5	0.414	–37.4
400	0.140	–160.6	8.638	87.9	0.069	74.9	0.343	–37.3
600	0.131	172.7	5.847	79.2	0.100	73.2	0.329	–41.1
800	0.136	155.2	4.445	72.3	0.132	70.7	0.328	–46.1
1000	0.144	140.8	3.627	66.0	0.164	67.7	0.335	–51.3
1200	0.159	130.3	3.089	59.7	0.194	64.3	0.344	–57.0
1400	0.173	120.1	2.686	53.5	0.224	50.9	0.354	–52.7
1600	0.188	110.0	2.365	48.0	0.251	57.7	0.362	–68.8
1800	0.188	101.8	2.134	42.7	0.278	54.5	0.372	–73.3
2000	0.206	95.8	1.937	38.1	0.305	51.3	0.380	–77.5