Ordering number:EN5034

NPN Epitaxial Planar Silicon Transistor

2SC5227

VHF to UHF Wide-Band Low-Noise Amplifier Applications

Features

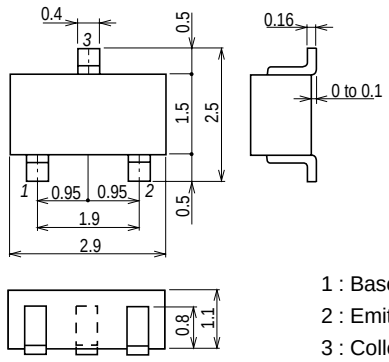
- Low noise : NF=1.0dB typ (f=1GHz).
- High gain : $|S21e|^2$=12dB typ (f=1GHz).
- High cutoff frequency : f_T=7GHz typ.

Package Dimensions

unit:mm

2018B

[2SC5227]



1 : Base
2 : Emitter
3 : Collector
SANYO : CP

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		200	mW
Junction Temperature	Tj		150	˚C
Storage Temperature	Tstg		–55 to +150	˚C

Electrical Characteristics at Ta = 25˚C

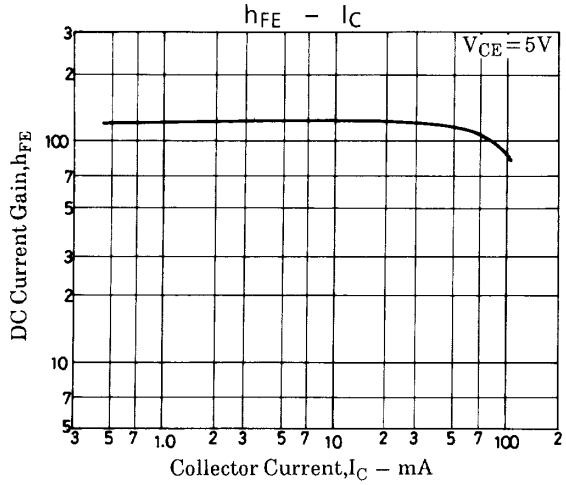
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=10V, I_E=0			1.0	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=1V, I_C=0			10	μA
DC Current Gain	h_{FE}	V_{CE}=5V, I_C=20mA	60*		270*	
Gain-Bandwidth Product	f_T	V_{CE}=5V, I_C=20mA	5	7		GHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		0.75	1.2	pF
Reverse Transfer Capacitance	Cre	V_{CB}=10V, f=1MHz		0.5		pF
Forward Transfer Gain	$\|S21e\|^2$ 1	V_{CE}=5V, I_C=20mA, f=1GHz	9	12		dB
	$\|S21e\|^2$ 2	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

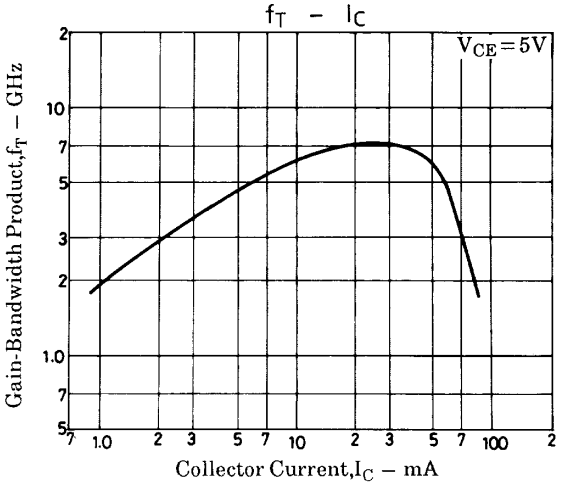
* : The 2SC5227 is classified by 20mA h_{FE} as follows :

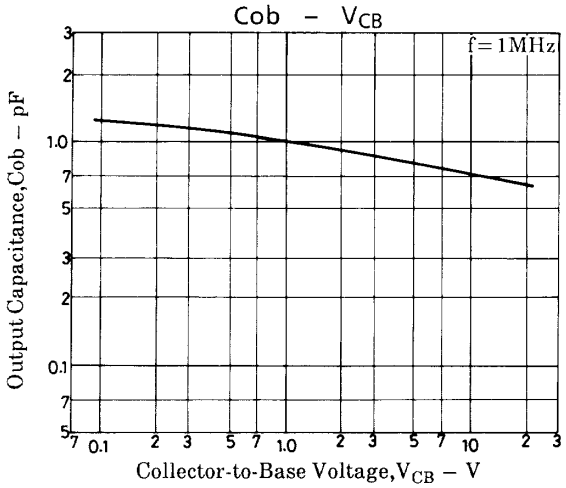
60	3	120
90	4	180
135	5	270

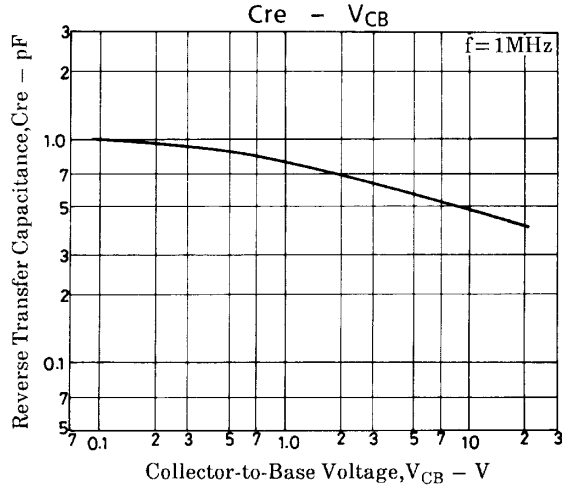
Marking : LN
h_{FE} rank : 3, 4, 5

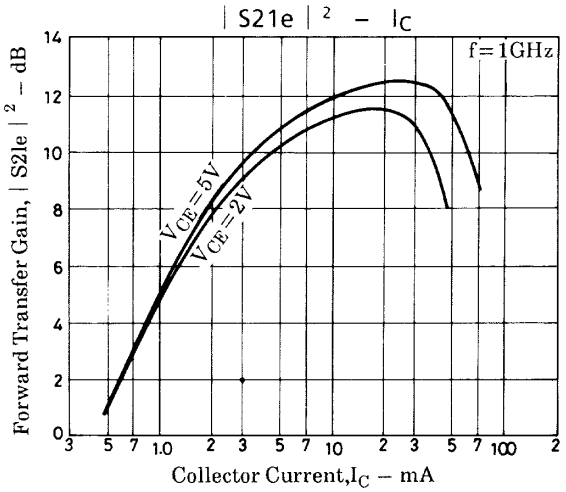
SANYO Electric Co.,Ltd. Semiconductor Bussiness Headquaters
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

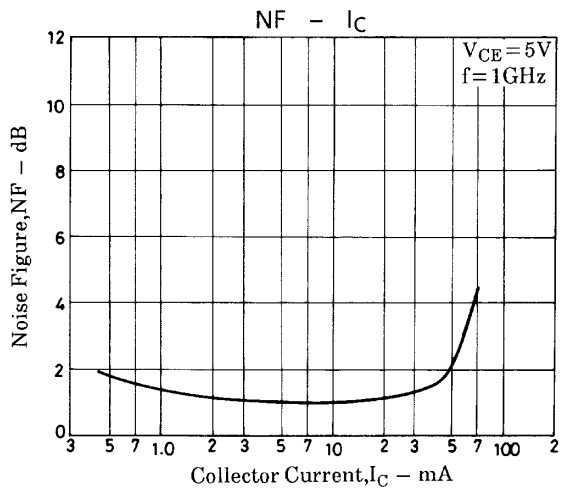

hFE – IC
VCE=5V
DC Current Gain,hFE
Collector Current,IC – mA

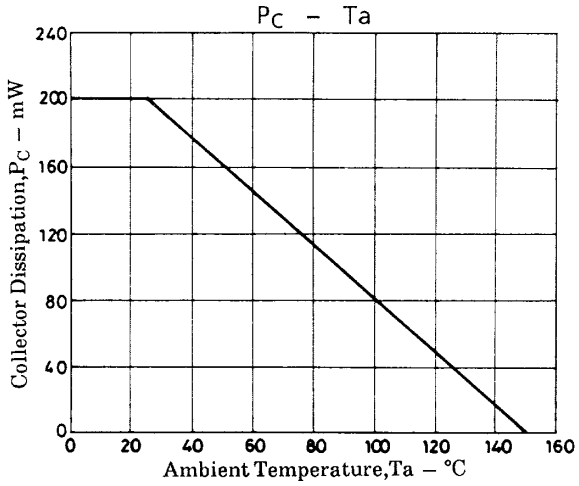

fT – IC
VCE=5V
Gain-Bandwidth Product,fT – GHz
Collector Current,IC – mA


Cob – VCB
f=1MHz
Output Capacitance,Cob – pF
Collector-to-Base Voltage,VCB – V


Cre – VCB
f=1MHz
Reverse Transfer Capacitance,Cre – pF
Collector-to-Base Voltage,VCB – V

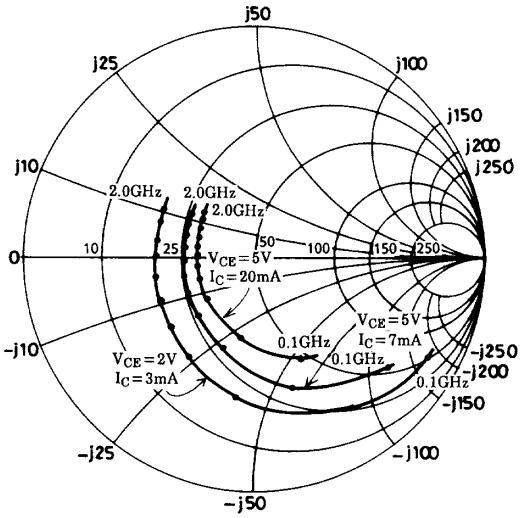

| S21e | 2 – IC
f=1GHz
VCE=5V
VCE=2V
Forward Transfer Gain, | S21e | 2 – dB
Collector Current,IC – mA


NF – IC
VCE=5V
f=1GHz
Noise Figure,NF – dB
Collector Current,IC – mA

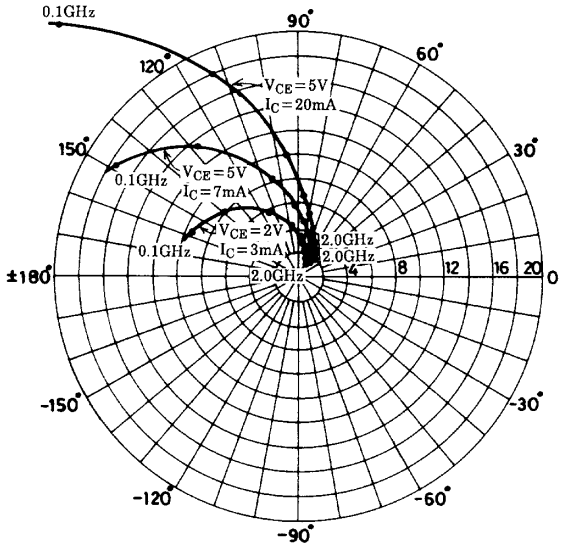

PC – Ta
Collector Dissipation,PC – mW
Ambient Temperature,Ta – °C

S Parameters

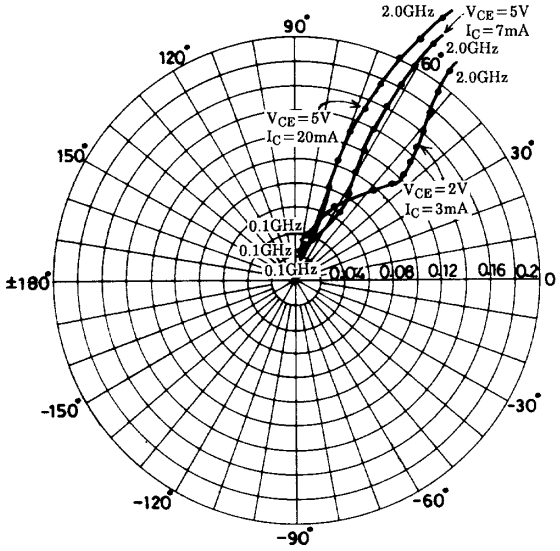
f=100MHz, 200 to 2000MHz (200MHz step)



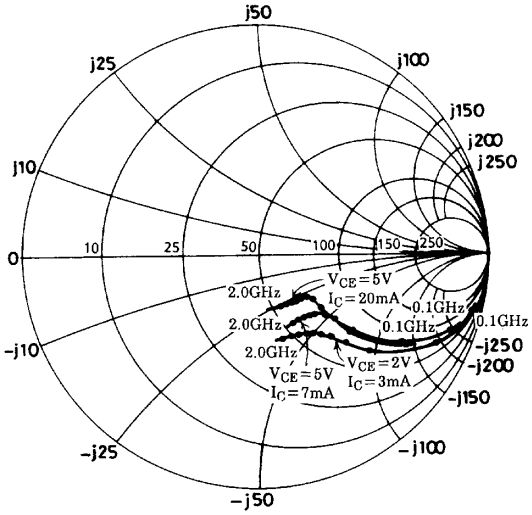
f=100MHz, 200 to 2000MHz (200MHz step)



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	0.722	–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=50Ω

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.477	–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=50Ω

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.858	–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