Ordering number:EN3927

NPN Epitaxial Planar Silicon Transistor

2SC4673

UHF Low-Noise Amplifier, Wide-Band Amplifier Applications

Features

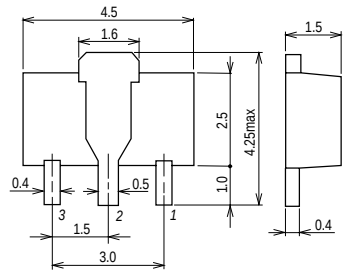
· Low noise figure : NF=1.5dB typ (f=0.9GHz).
· High power gain : $|S21e|^2$=8.0dB typ (f=0.9GHz).
· High cutoff frequency : f_T=4.5GHz typ.

Package Dimensions

unit:mm

2038A

[2SC4673]



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

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}		12	V
Emitter-to-Base Voltage	V_{EBO}		3	V
Collector Current	I_C		100	mA
Base Current	I_B		30	mA
Collector Dissipation	P_C		400	mW
		Mounted on ceramic board (250mm^2×0.8mm)	800	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}=12V, I_E=0			1.0	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=2V, I_C=0			10	μA
DC Current Gain	h_{FE}	V_{CE}=10V, I_C=20mA	40*		200*	
Gain-Bandwidth Product	f_T	V_{CE}=10V, I_C=20mA		4.5		GHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		1.1		pF
Reverse Transfer Capacitance	Cre	V_{CB}=10V, f=1MHz		0.75		pF

* : The 2SC3778 is classified by 20mA h_{FE} as follows :

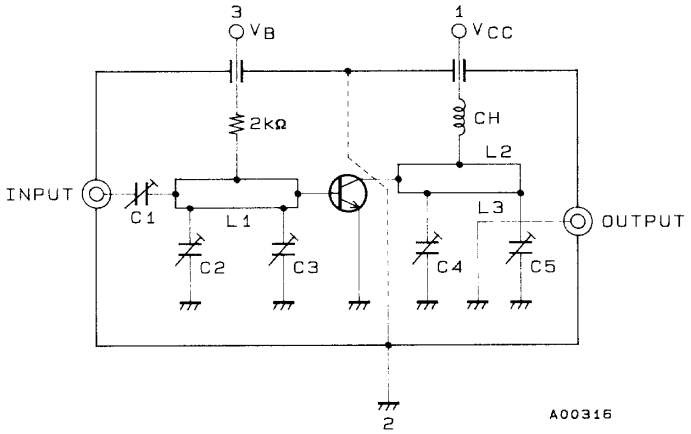
40	C	80	60	D	120	100	E	200

Marking : CD
h_{FE} rank : C, D, E

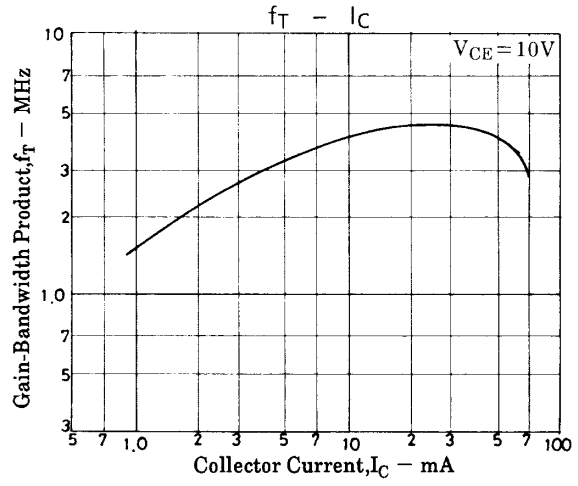
SANYO Electric Co.,Ltd. Semiconductor Bussiness Headquaters
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

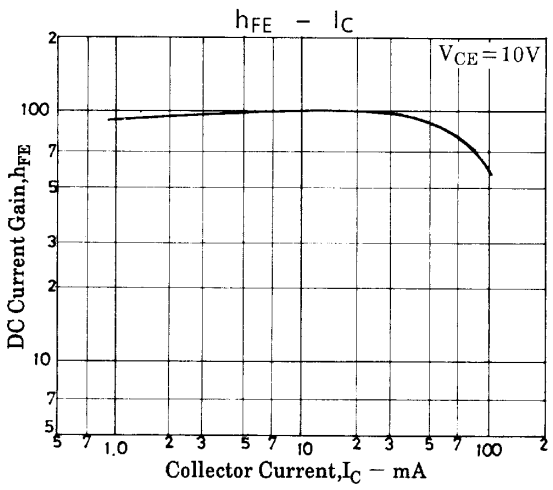
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Forward Transfer Gain	| S21e |²	V_{CE}=10V, I_C=20mA, f=0.9GHz		8.0		dB
Noise Figure	NF	V_{CE}=10V, I_C=5mA, f=0.9GHz		1.5	3.0	dB

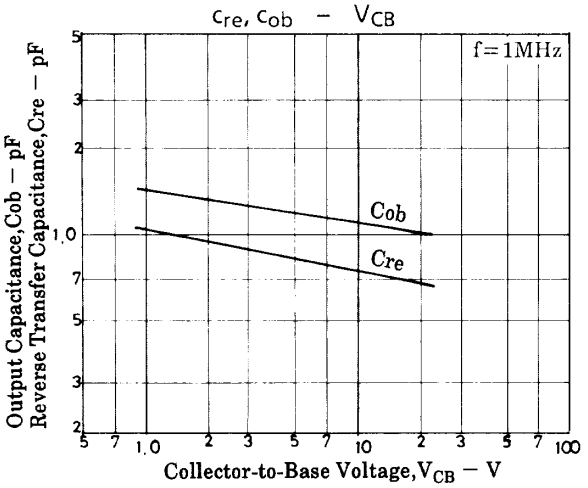
NF Test Circuit

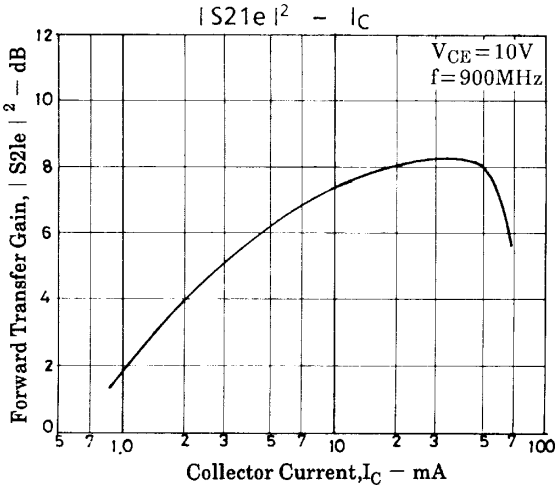


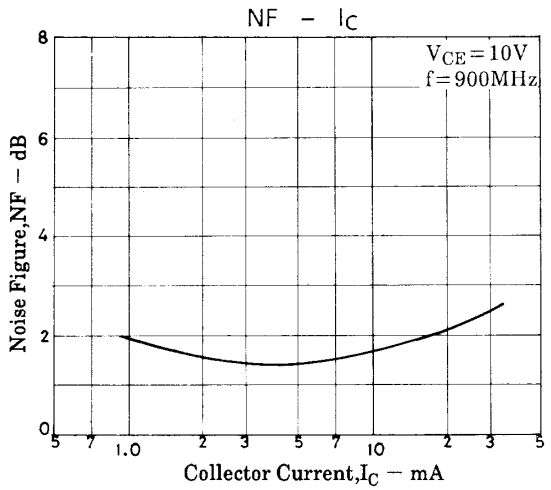
	900MHz
C1	up to 5pF
C2	up to 10pF
C3	up to 10pF
C4	up to 10pF
C5	up to 10pF
L1	W ≈ 1.5mm, l ≈ 25mm Strip line
L2	W ≈ 4mm, l ≈ 25mm Strip line
L3	0.5ϕ, l ≈ 4mm
CH	2t+bead core

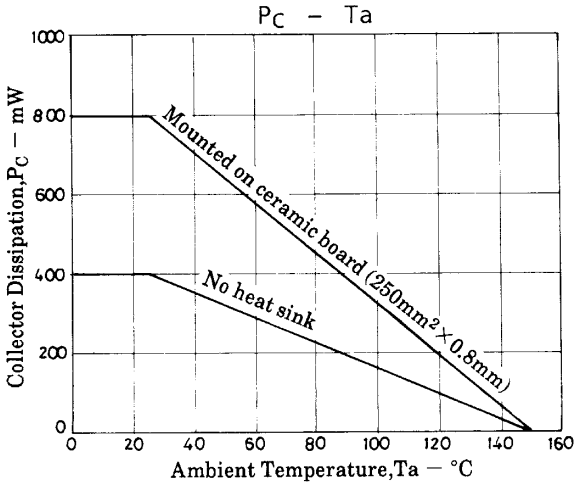






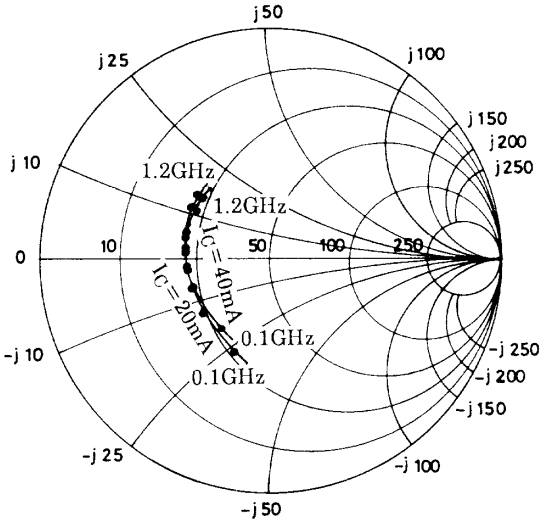




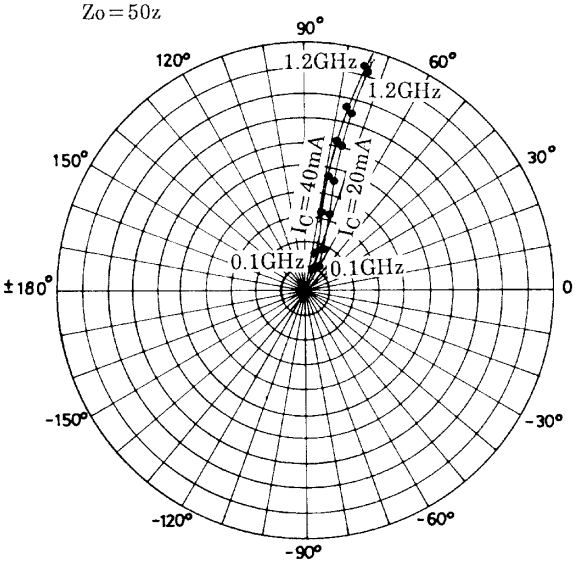


S parameter

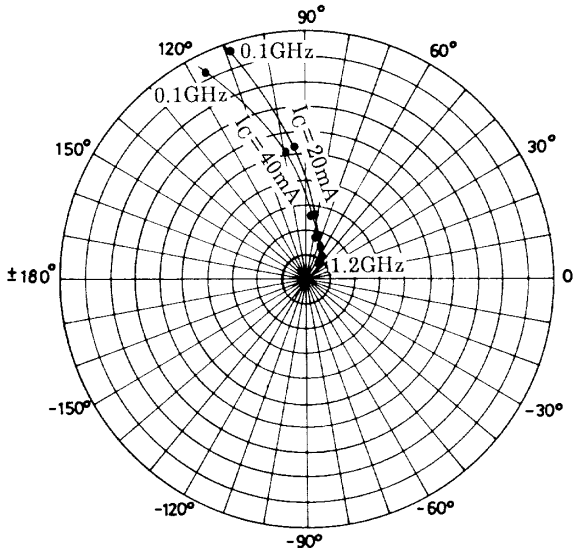
S11e : $V_{CE} = -10V$
f=100MHz, 200 to 1200MHz (200MHz step)



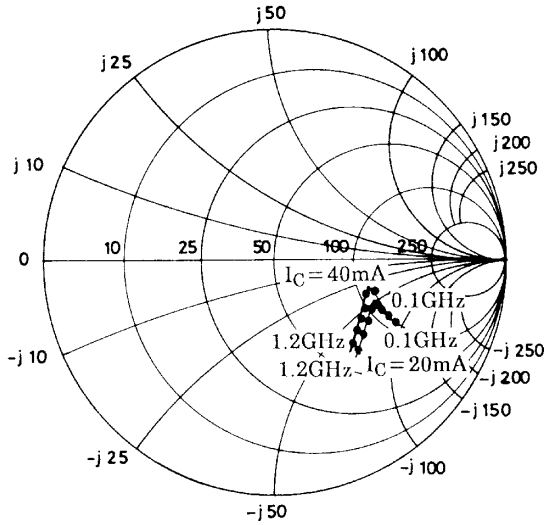
S12e : $V_{CE} = 10V$
f=100MHz, 200 to 1200MHz (200MHz step)
Zo=50z



S21e : $V_{CE} = 10V$
f=100MHz, 200 to 1200MHz (200MHz step)



S22e : $V_{CE} = 10V$
f=100MHz, 200 to 1200MHz (200MHz step)



S parameters (Common emitter)

V_{CE}=10V, I_C=20mA, Z_O=50Ω

Freq (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.414	–112.1	18.300	115.9	0.024	61.1	0.605	–26.4
200	0.372	–147.5	10.148	99.2	0.037	66.4	0.492	–23.5
400	0.364	–175.7	5.274	84.8	0.064	72.9	0.458	–23.0
600	0.369	170.1	3.619	75.6	0.093	75.3	0.460	–27.3
800	0.379	158.7	2.764	67.8	0.123	76.6	0.468	–32.6
900	0.366	153.6	2.504	66.4	0.139	75.4	0.475	–35.7
1000	0.388	148.5	2.279	60.8	0.152	75.1	0.478	–38.5
1200	0.399	140.5	1.914	54.2	0.184	74.0	0.487	–44.4

V_{CE}=10V, I_C=40mA, Z_O=50Ω

Freq (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.730	–133.7	19.714	109.3	0.021	66.4	0.535	–25.3
200	0.363	–161.5	10.534	95.3	0.035	72.5	0.452	–20.6
400	0.366	177.6	5.411	82.8	0.064	77.3	0.438	–21.1
600	0.371	166.7	3.690	74.3	0.094	77.9	0.444	–25.9
800	0.380	156.9	2.823	66.8	0.125	77.3	0.454	–31.7
900	0.389	153.1	2.562	63.5	0.142	76.8	0.462	–35.1
1000	0.391	148.3	2.329	59.9	0.155	76.1	0.465	–37.7
1200	0.404	141.3	1.982	53.6	0.186	74.7	0.474	–43.8