Ordering number:EN2971

NPN Epitaxial Planar Silicon Transistor

2SC4270

UHF Converter, Local Oscillator Applications

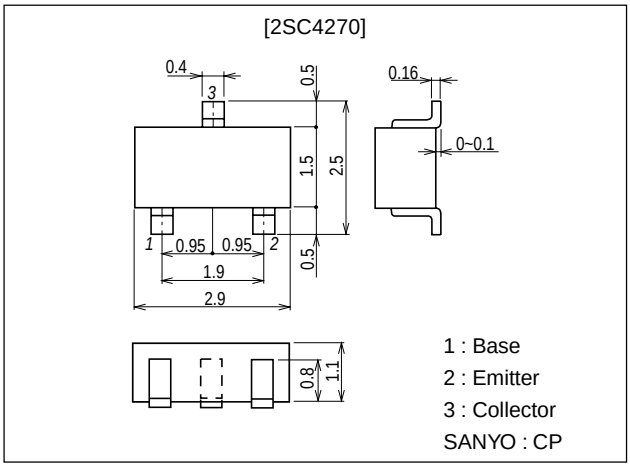
Features

- Small noise figure : NF=3.0dB typ (f=0.9GHz)
- High power gain : PG=12dB typ (f=0.9GHz)
- High cutoff frequency : f_T=3.0GHz typ

Package Dimensions

unit:mm

2018B



Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		25	V
Collector-to-Emitter Voltage	V_{CEO}		15	V
Emitter-to-Base Voltage	V_{EBO}		3	V
Collector Current	I_C		50	mA
Base Current	I_B		20	mA
Collector Dissipation	P_C		250	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}=20V, I_E=0			0.1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=2V, I_C=0			10	μA
DC Current Gain	h_{FE}	V_{CE}=10V, I_C=5mA	40*		200*	
Gain-Bandwidth Product	f_T	V_{CE}=10V, I_C=10mA	1.5	3.0		GHz
Output Capacitance	C_{ob}	V_{CB}=10V, f=1MHz		0.7	1.0	pF
Reverse Transfer Capacitance	C_{re}	V_{CB}=10V, f=1MHz		0.45		pF
Power Gain	PG	V_{CE}=10V, I_C=10mA, f=0.9GHz		12		dB
Noise Figure	NF	V_{CE}=10V, I_C=3mA, f=0.9GHz		3.0		dB

* : The 2SC4270 is classified by 5mA h_{FE} as follows :

40	2	80	60	3	120	100	4	200

(Note) Marking : KT
h_{FE} rank : 2, 3, 4

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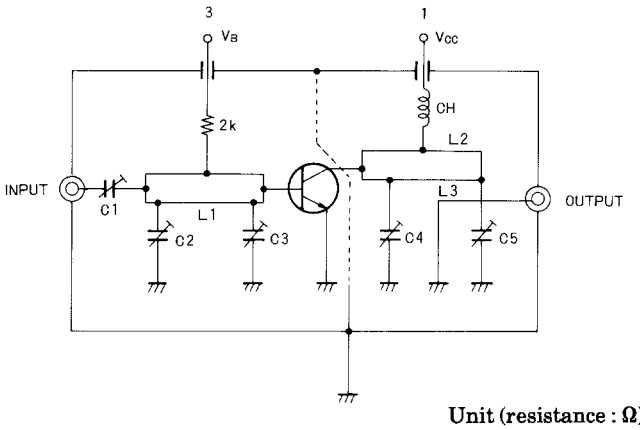
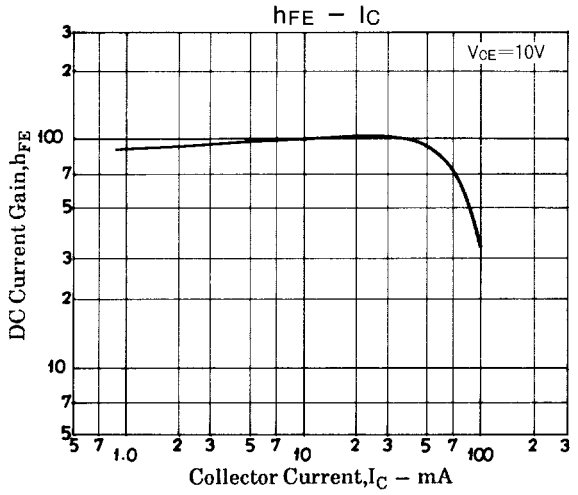
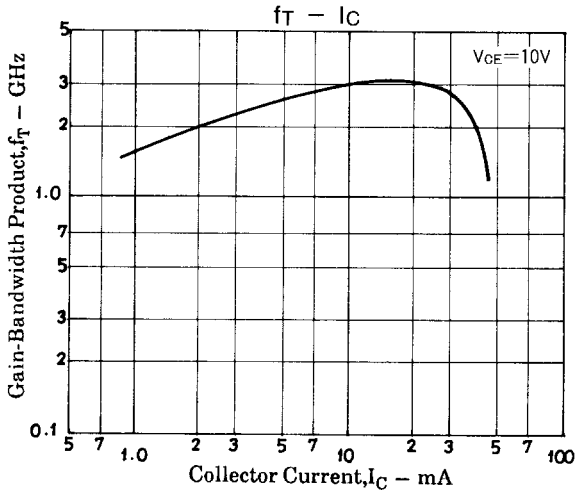
PG, NF Test Circuit

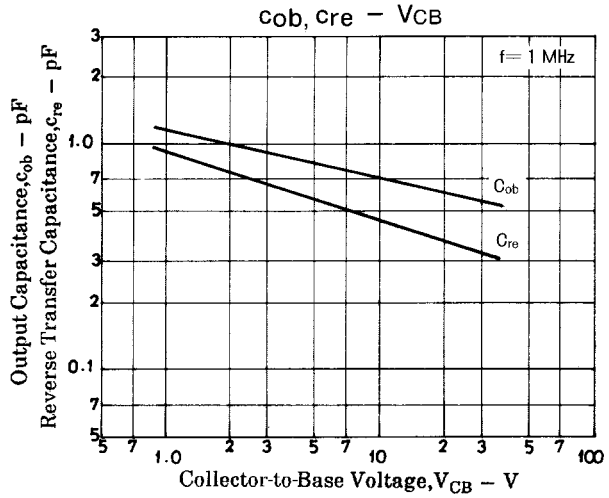


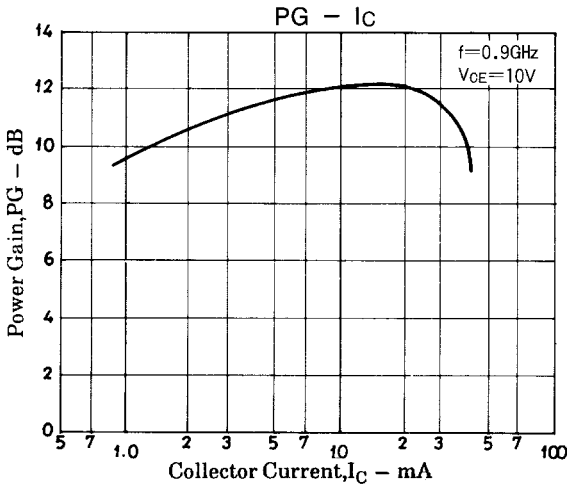
	900MHz
C1	~5pF
C2	~10pF
C3	~10pF
C4	~10pF
C5	~10pF
L1	W ≈ 1.5mm, l ≈ 25mm Strip line
L2	W ≈ 4mm, l ≈ 25mm Strip line
L3	0.5ϕ, l ≈ 40mm
CH	2t+bead core

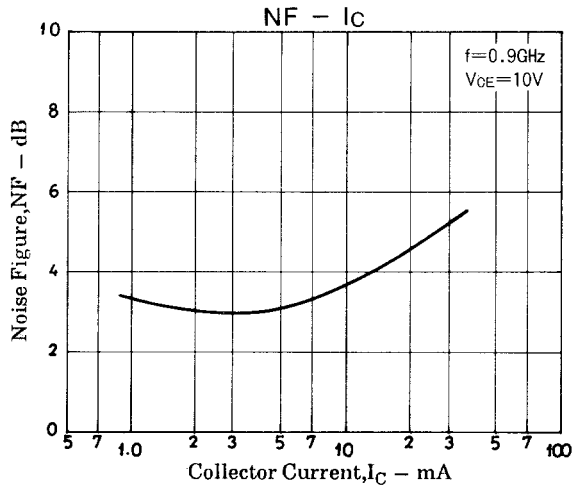
Unit (resistance : Ω)

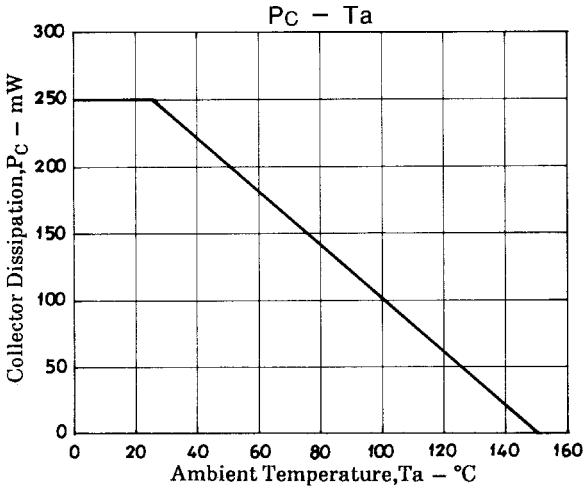






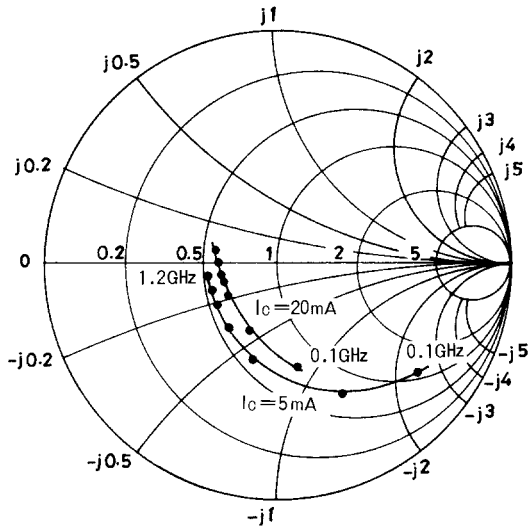




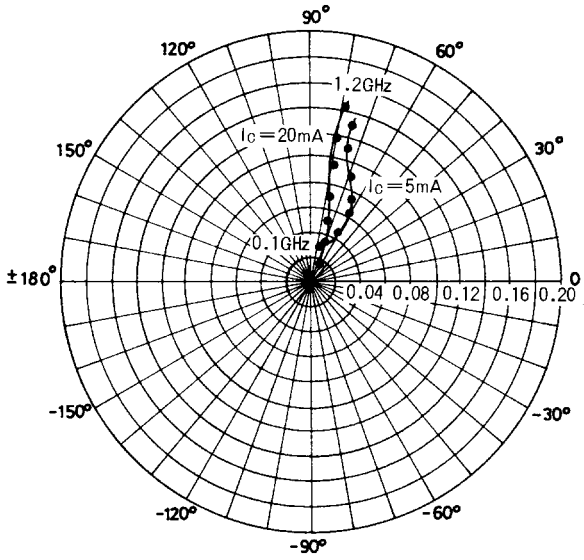


S parameter

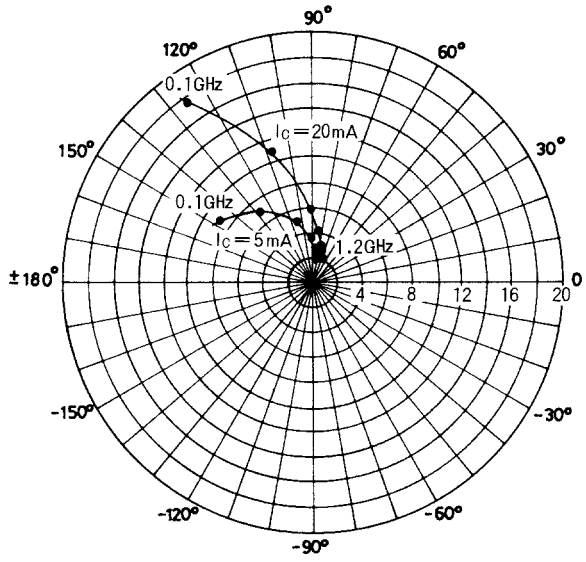
S11e : VCE=10V
f=100MHz, 200 to 1200MHz(200MHz step)



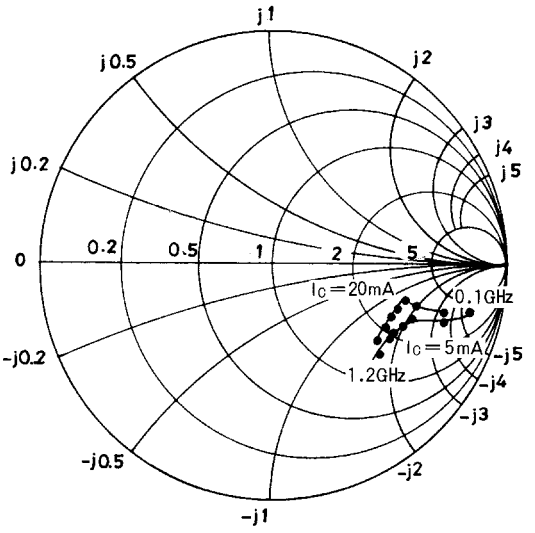
S12e : VCE=10V
f=100MHz, 200 to 1200MHz(200MHz step)



S21e : VCE=10V
f=100MHz, 200 to 1200MHz(200MHz step)



S22e : VCE=10V
f=100MHz, 200 to 1200MHz(200MHz step)



S parameter (Common emitter)

V_{CE}=10V, I_C=5mA, 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	0.771	–35.1	8.763	147.2	0.027	69.3	0.890	–14.2
200	0.613	–64.7	7.004	127.6	0.043	59.8	0.780	–19.7
400	0.429	–110.7	4.882	103.1	0.061	58.1	0.660	–22.8
600	0.361	–133.5	3.471	90.5	0.075	63.1	0.625	–25.1
800	0.355	–148.4	2.693	81.6	0.091	68.1	0.612	–28.6
900	0.331	–153.7	2.450	78.9	0.100	70.5	0.609	–29.9
1000	0.328	–158.9	2.236	75.5	0.110	72.5	0.607	–31.6
1200	0.326	–167.9	1.932	69.9	0.130	74.7	0.608	–35.7

V_{CE}=10V, 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	0.447	–78.1	17.728	125.0	0.020	66.0	0.752	–18.5
200	0.338	–113.2	10.936	107.5	0.031	66.5	0.639	–18.5
400	0.290	–146.6	5.773	91.4	0.052	72.1	0.580	–18.5
600	0.281	–159.3	3.956	83.0	0.074	75.7	0.571	–21.1
800	0.285	–168.8	2.982	76.2	0.095	77.6	0.566	–25.2
900	0.289	–171.3	2.703	74.0	0.106	78.6	0.563	–26.7
1000	0.291	–174.4	2.454	71.3	0.118	79.4	0.565	–28.6
1200	0.297	178.1	2.116	66.5	0.140	79.0	0.569	–33.1