

SANYO

No.2972

2SA1669

PNP Epitaxial Planar Silicon Transistor

High-Frequency Amp Applications

Features

- High cutoff frequency : $f_T = 3.0\text{GHz}$ typ
- High power gain : $\text{MAG} = 11\text{dB}$ typ ($f = 0.9\text{GHz}$)
- Small noise figure : $\text{NF} = 2.0\text{dB}$ typ ($f = 0.9\text{GHz}$)

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

			unit
Collector to Base Voltage	V_{CBO}	-20	V
Collector to Emitter Voltage	V_{CEO}	-15	V
Emitter to Base Voltage	V_{EBO}	-3	V
Collector Current	I_{C}	-50	mA
Collector Dissipation	P_{C}	250	mW
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

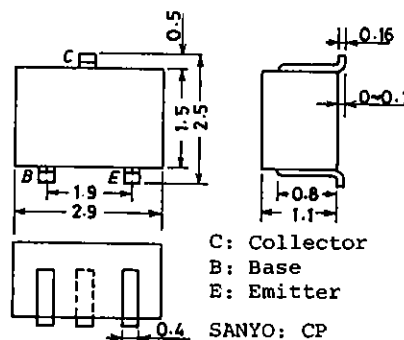
Electrical Characteristics at $T_a = 25^\circ\text{C}$

			min	typ	max	unit
Collector Cutoff Current	I_{CBO}	$V_{\text{CB}} = -15\text{V}, I_{\text{E}} = 0$			-0.1	μA
Emitter Cutoff Current	I_{EBO}	$V_{\text{EB}} = -2\text{V}, I_{\text{C}} = 0$			-0.1	μA
DC Current Gain	h_{FE}	$V_{\text{CE}} = -10\text{V}, I_{\text{C}} = -5\text{mA}$	15			
Gain-Bandwidth Product	f_{T}	$V_{\text{CE}} = -10\text{V}, I_{\text{C}} = -5\text{mA}$	1.5	3.0		GHz
Output Capacitance	c_{ob}	$V_{\text{CB}} = -10\text{V}, f = 1\text{MHz}$		1.0	1.5	pF
Reverse Transfer Capacitance	c_{re}	$V_{\text{CB}} = -10\text{V}, f = 1\text{MHz}$		0.7		pF
Forward Transfer Gain	$ S_{21e} ^2$	$V_{\text{CE}} = -10\text{V}, I_{\text{C}} = -5\text{mA}, f = 0.9\text{GHz}$	5.0			dB
Maximum Available Power Gain	MAG	$V_{\text{CE}} = -10\text{V}, I_{\text{C}} = -5\text{mA}, f = 0.9\text{GHz}$		11		dB
Noise Figure	NF	$V_{\text{CE}} = -10\text{V}, I_{\text{C}} = -3\text{mA}, f = 0.9\text{GHz}$		2.0		dB

(Note) Marking: BS

Package Dimensions 2018A

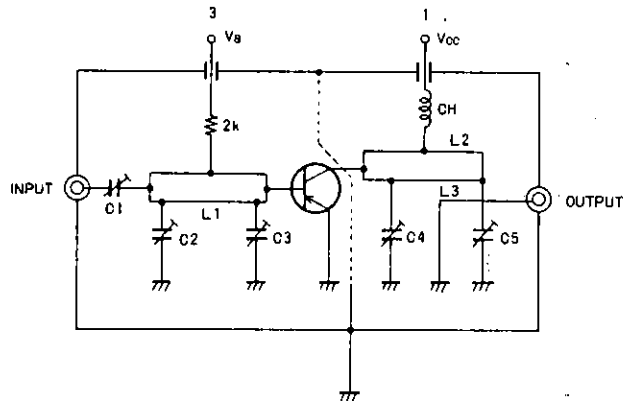
(unit: mm)

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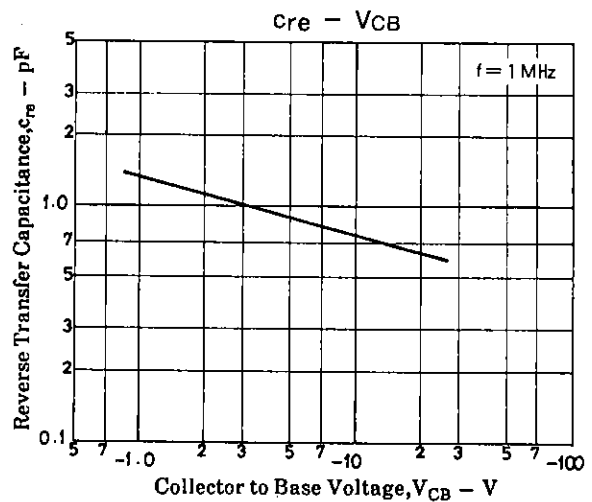
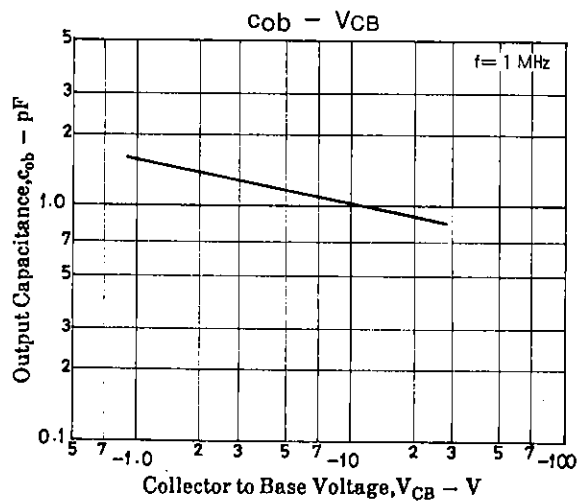
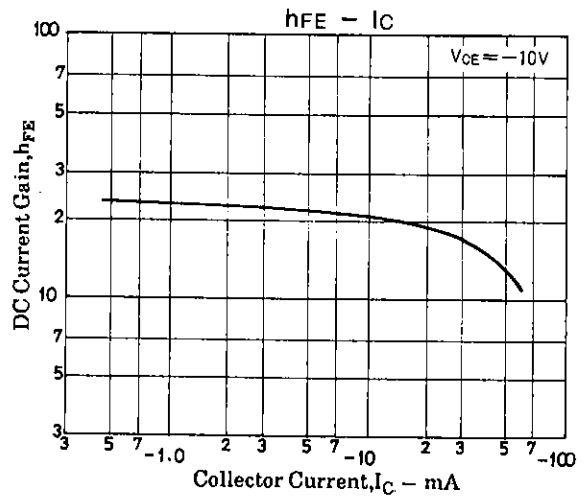
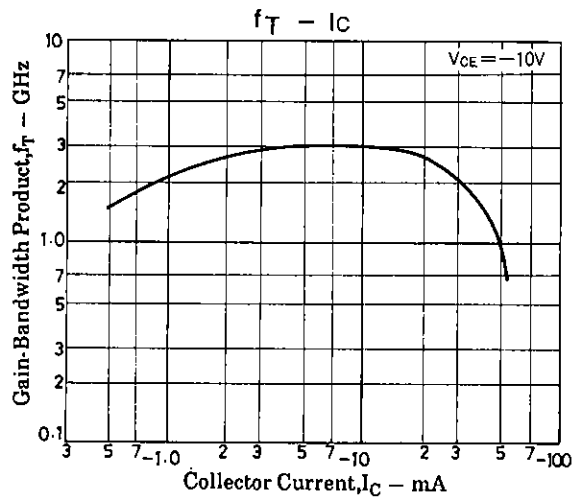
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110 JAPAN

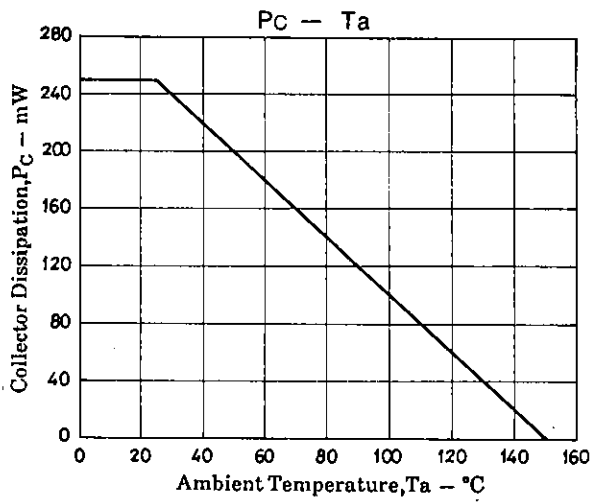
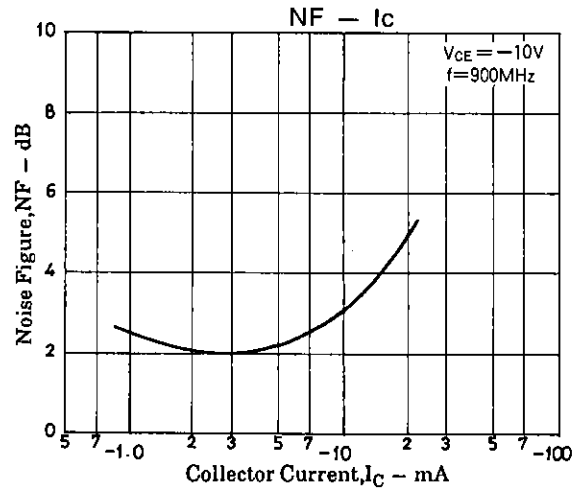
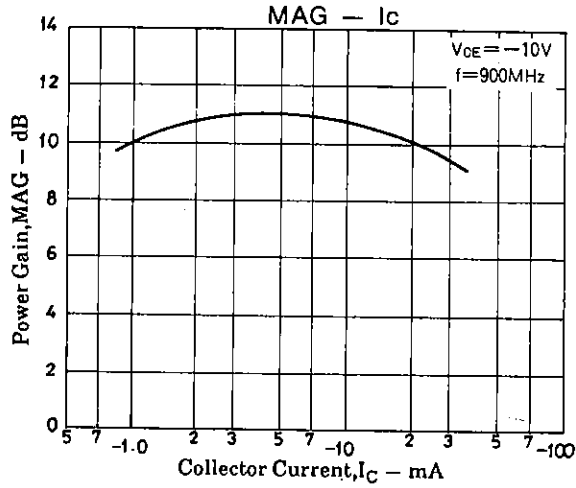
6069MO, TS No.2972-1/5

NF Test Circuit

Unit (Resistance : Ω)

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

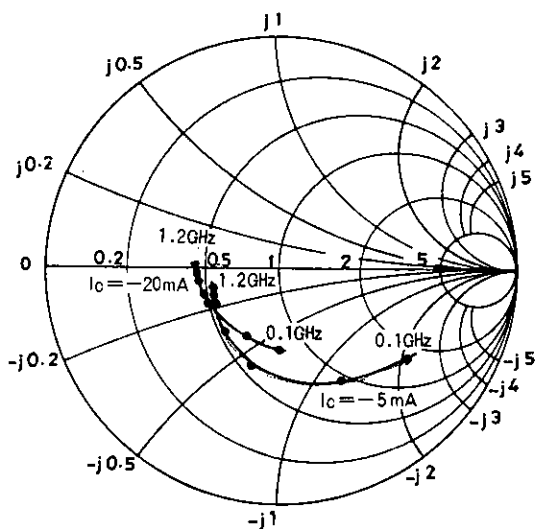




S parameter

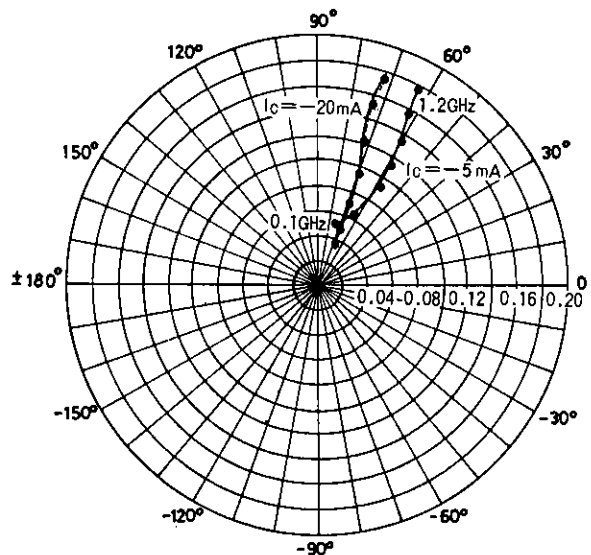
S11e : $V_{CE} = -10V$

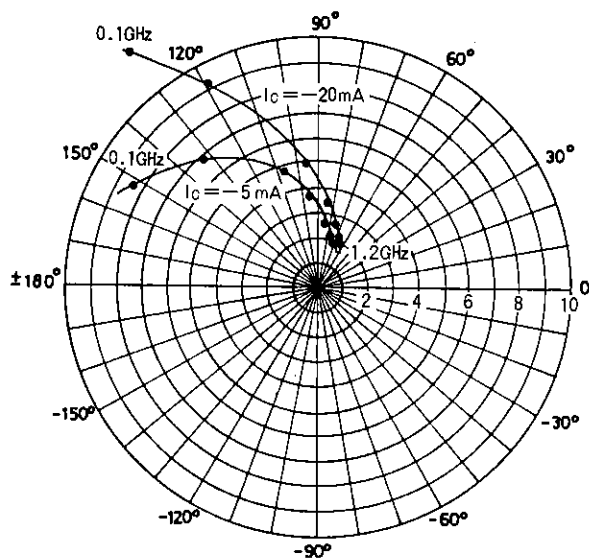
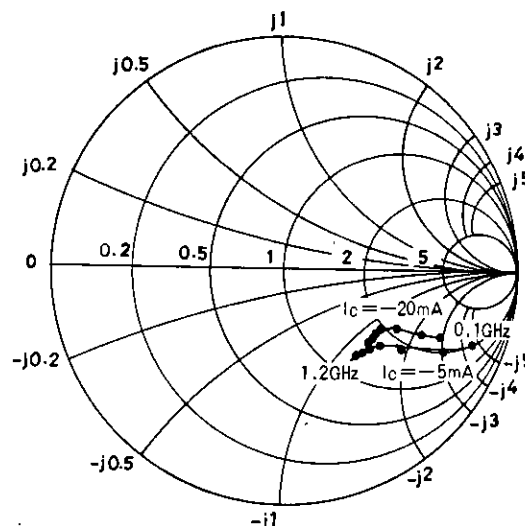
$f = 100MHz, 200 \sim 1200MHz (200MHz \text{ step})$



S12e : $V_{CE} = -10V$

$f = 100MHz, 200 \sim 1200MHz (200MHz \text{ step})$



S21e : $V_{CE} = -10V$ $f = 100\text{MHz}, 200 \sim 1200\text{MHz} (200\text{MHz step})$ S22e : $V_{CE} = -10V$ $f = 100\text{MHz}, 200 \sim 1200\text{MHz} (200\text{MHz step})$ **S parameter (Common emitter)** $V_{CE} = -10V, I_C = -5\text{mA}, Z_0 = 50\Omega$

Freq (MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.707	-33.1	8.215	151.1	0.043	68.6	0.856	-19.8
200	0.589	-60.3	6.763	132.2	0.059	62.0	0.761	-25.4
400	0.435	-104.7	4.810	106.5	0.089	56.4	0.584	-34.2
600	0.373	-128.1	3.503	93.2	0.110	57.3	0.508	-36.6
800	0.349	-144.4	2.728	83.4	0.130	59.5	0.474	-39.0
900	0.346	-150.1	2.492	80.0	0.142	60.9	0.464	-40.3
1000	0.344	-155.4	2.266	76.8	0.154	61.4	0.459	-41.7
1200	0.340	-163.6	1.971	70.6	0.176	62.1	0.452	-45.2

 $V_{CE} = -10V, I_C = -20\text{mA}, Z_0 = 50\Omega$

Freq (MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.348	-92.8	12.039	129.4	0.031	67.3	0.727	-22.9
200	0.330	-116.7	9.073	118.2	0.041	66.0	0.634	-24.8
400	0.350	-151.2	4.962	95.1	0.068	67.7	0.510	-26.5
600	0.353	-164.5	3.408	84.4	0.093	69.9	0.481	-28.1
800	0.360	-172.9	2.591	76.4	0.118	71.6	0.470	-31.1
900	0.366	-176.2	2.346	73.3	0.131	72.0	0.467	-32.9
1000	0.371	-178.4	2.142	70.8	0.146	71.8	0.467	-34.8
1200	0.379	-176.2	1.851	65.2	0.171	71.1	0.466	-39.1

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