

SANYO	No.5230	2SA1963
		PNP Epitaxial Planar Silicon Transistor High-Frequency Low-Noise Amp, Ultrahigh-Speed Switching Applications

Features

- Low noise : NF=1.5dB typ (f=1GHz).
- High gain : | S21e |²=9dB typ (f=1GHz).
- High cutoff frequency : f_T=5GHz typ.

Absolute Maximum Ratings at Ta = 25°C

			unit
Collector-to-Base Voltage	V _{CB0}	-12	V
Collector-to-Emitter Voltage	V _{CEO}	-8	V
Emitter-to-Base Voltage	V _{EBO}	-2	V
Collector Current	I _C	-50	mA
Collector Dissipation	P _C	200	mW
Junction Temperature	T _J	150	°C
Storage Temperature	T _{stg}	-55 to +150	°C

Electrical Characteristics at Ta = 25°C

			min	typ	max	unit
Collector Cutoff Current	I _{CB0}	V _{CB} = -10V, I _E = 0			-1.0	μA
Emitter Cutoff Current	I _{EBO}	V _{EB} = -1V, I _C = 0			-1.0	μA
DC Current Gain	h _{FE}	V _{CE} = -5V, I _C = -10mA	20*		120*	
Gain-Bandwidth Product	f _T	V _{CE} = -5V, I _C = -10mA	3	5		GHz
Output Capacitance	C _{ob}	V _{CB} = -10V, f = 1MHz		0.8	1.3	pF
Reverse Transfer Capacitance	C _{re}	V _{CB} = -10V, f = 1MHz		0.55		pF
Forward Transfer Gain	S21e ² (1)	V _{CE} = -5V, I _C = -10mA, f = 1GHz	7	9		dB
	S21e ² (2)	V _{CE} = -2V, I _C = -3mA, f = 1GHz		6.5		dB
Noise Figure	NF	V _{CE} = -5V, I _C = -5mA, f = 1GHz		1.5	3.0	dB

* : The 2SA1963 is classified by 10mA h_{FE} as follows :

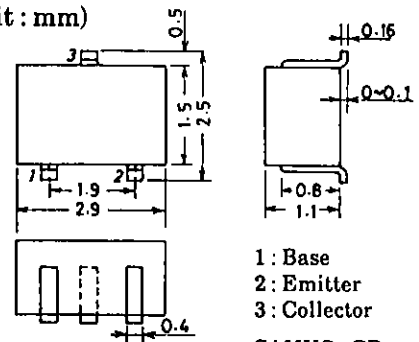
20	1	50	40	2	80	60	3	120
----	---	----	----	---	----	----	---	-----

Marking : MS

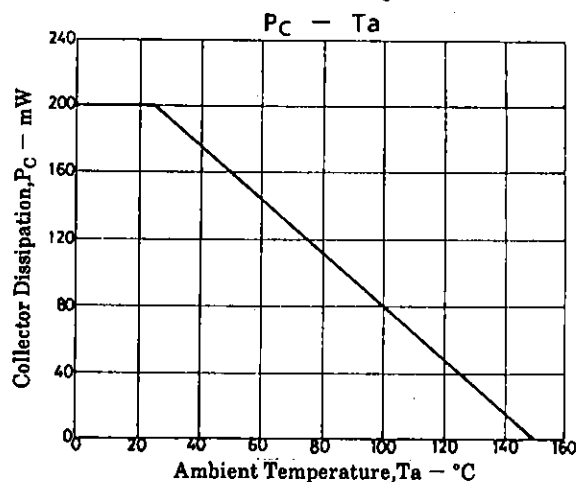
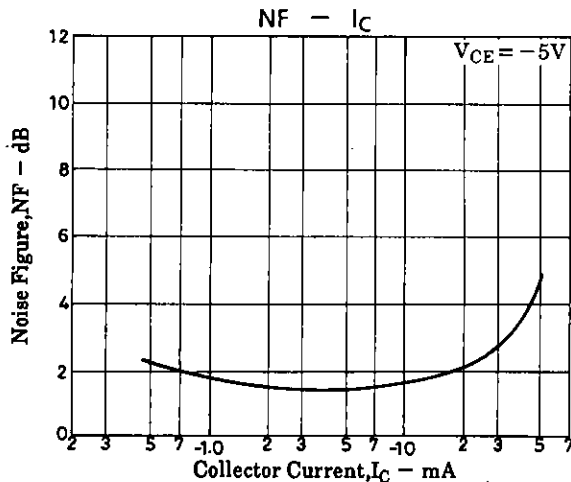
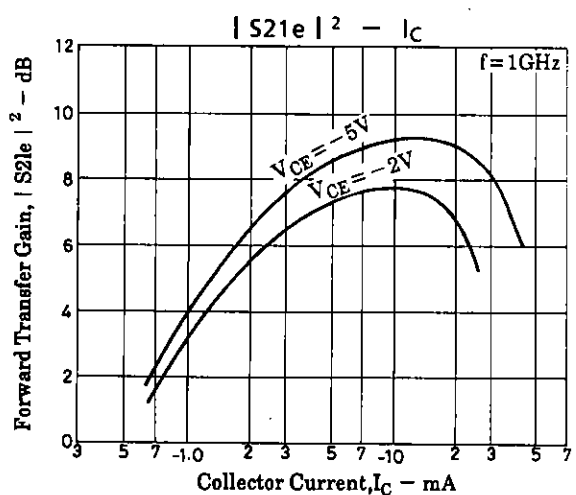
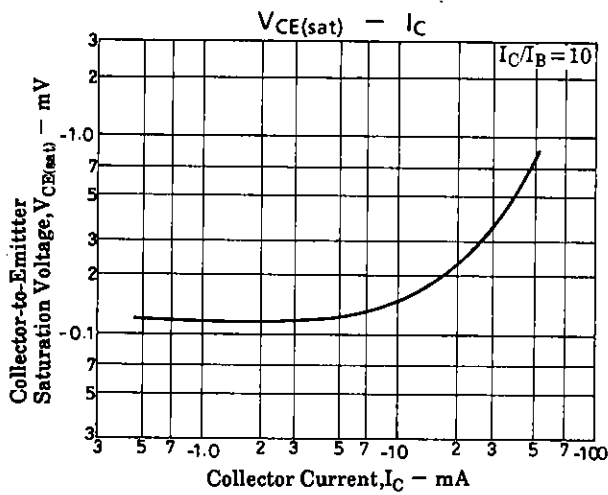
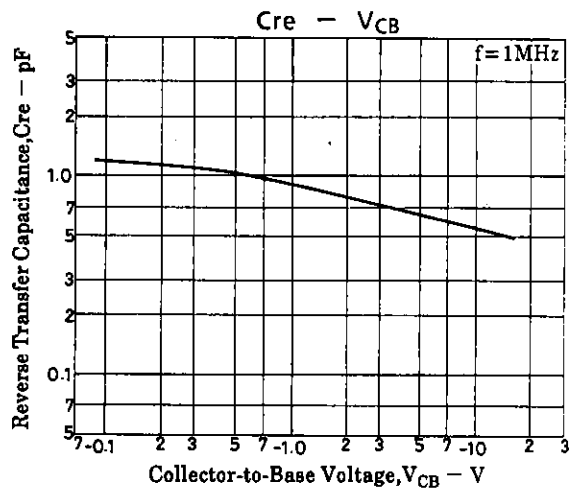
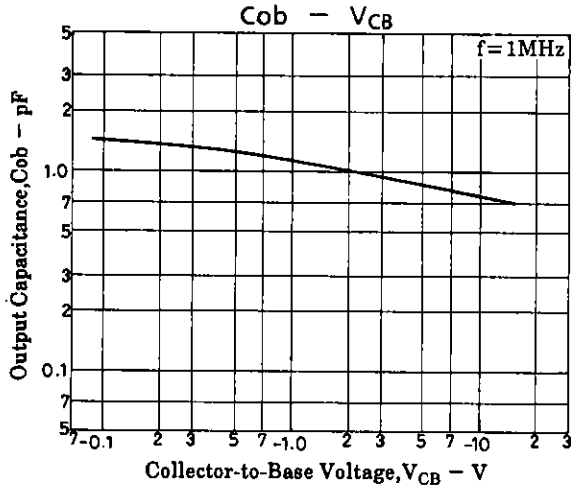
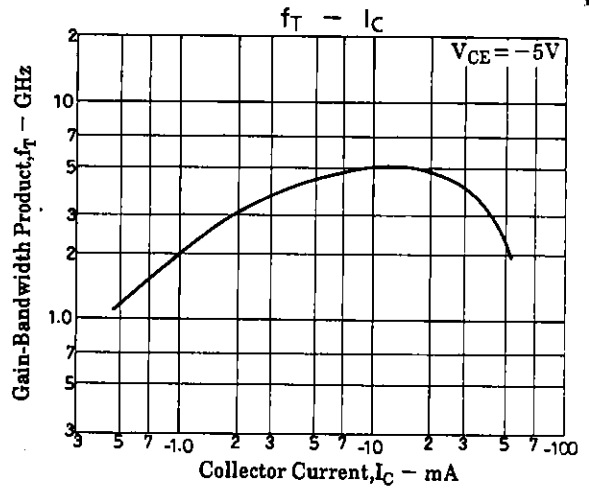
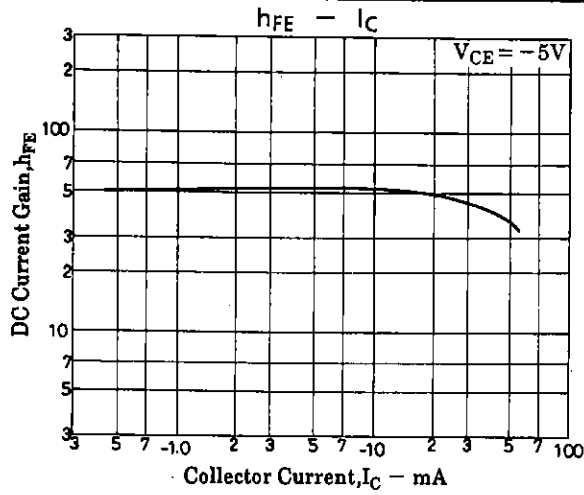
h_{FE} ranks : 1, 2, 3

Package Dimensions 2018B

(unit : mm)

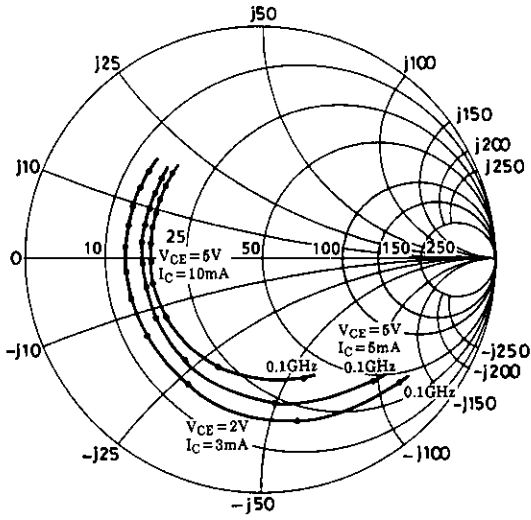


1 : Base
 2 : Emitter
 3 : Collector
 SANYO : CP

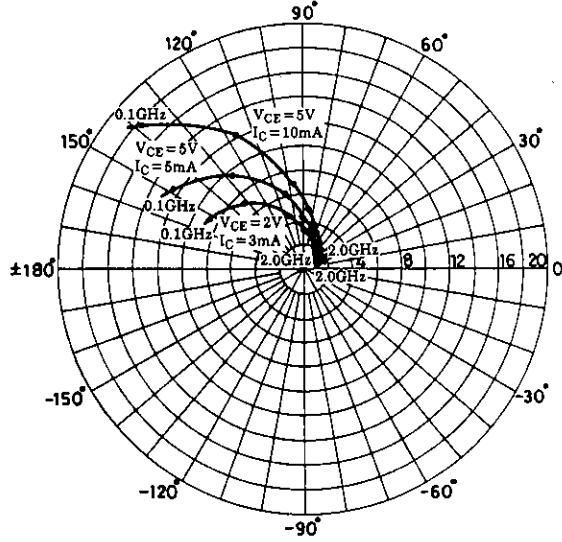


S Parameters

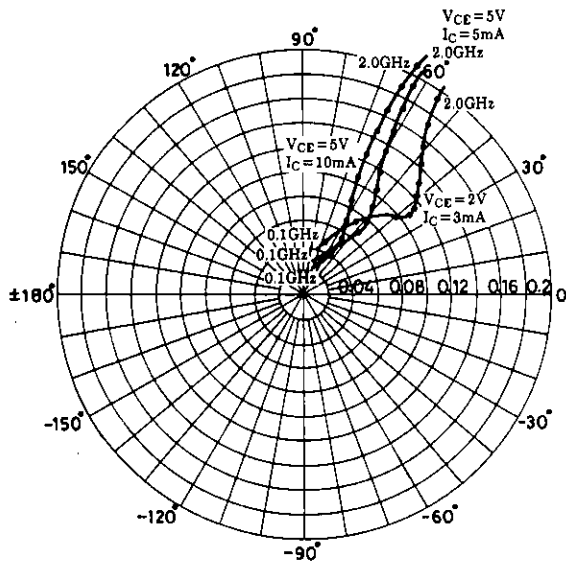
S11e : f= 100MHz, 200 to 2000MHz (200MHz step)



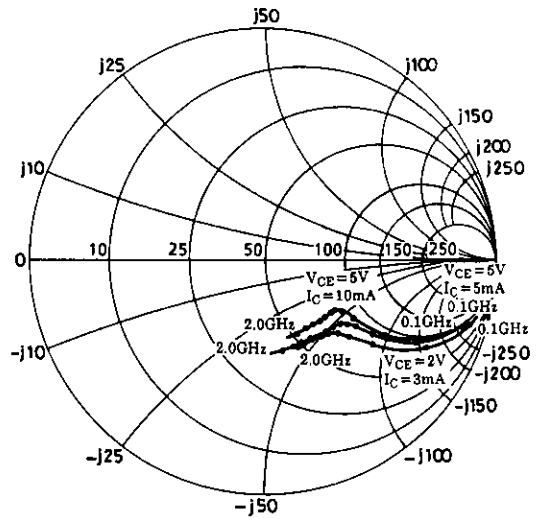
S21e : f= 100MHz, 200 to 2000MHz (200MHz step)



S12e : f= 100MHz, 200 to 2000MHz (200MHz step)



S22e : f= 100MHz, 200 to 2000MHz (200MHz step)



S Parameters (Common emitter) $V_{CE}=5V, I_C=5mA, Z_0=50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.711	-47.7	12.330	149.2	0.033	68.0	0.893	-18.2
200	0.628	-83.9	9.680	127.8	0.052	55.1	0.740	-28.5
400	0.542	-126.7	6.113	104.1	0.069	47.5	0.559	-34.7
600	0.513	-150.7	4.337	90.6	0.080	48.5	0.479	-36.5
800	0.502	-166.1	3.375	80.7	0.091	52.0	0.442	-38.4
1000	0.504	-177.9	2.772	72.7	0.104	55.0	0.424	-41.5
1200	0.506	172.3	2.378	65.5	0.119	57.6	0.416	-45.2
1400	0.509	163.8	2.069	58.5	0.136	59.6	0.409	-49.6
1600	0.516	155.3	1.825	52.1	0.153	61.1	0.403	-55.0
1800	0.527	147.7	1.645	46.4	0.173	61.9	0.403	-60.5
2000	0.541	140.6	1.515	41.3	0.193	62.2	0.406	-66.5

 $V_{CE}=5V, I_C=10mA, Z_0=50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.547	-70.6	17.652	139.1	0.027	64.1	0.801	-24.4
200	0.501	-112.1	12.156	117.0	0.040	55.5	0.610	-32.8
400	0.479	-148.5	6.937	97.2	0.056	55.7	0.457	-34.5
600	0.473	-166.7	4.783	85.8	0.071	60.0	0.398	-34.6
800	0.473	-178.8	3.677	77.6	0.088	63.2	0.374	-36.5
1000	0.478	172.1	3.005	70.5	0.107	65.0	0.366	-39.7
1200	0.486	163.7	2.570	63.7	0.126	65.6	0.358	-43.8
1400	0.492	156.4	2.228	57.3	0.147	65.8	0.353	-48.5
1600	0.502	149.2	1.967	51.4	0.166	65.5	0.349	-54.0
1800	0.514	142.4	1.765	45.9	0.188	64.6	0.348	-59.9
2000	0.526	135.6	1.626	42.1	0.209	63.6	0.351	-66.1

 $V_{CE}=2V, I_C=3mA, Z_0=50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.788	-42.7	8.469	152.2	0.045	68.4	0.913	-17.6
200	0.714	-77.5	6.984	131.1	0.074	53.9	0.780	-29.2
400	0.626	-120.3	4.613	106.0	0.099	40.2	0.586	-38.9
600	0.587	-145.9	3.338	90.6	0.108	36.9	0.491	-42.9
800	0.577	-162.3	2.612	79.5	0.114	38.0	0.443	-46.0
1000	0.574	-174.9	2.173	70.6	0.122	40.9	0.422	-50.2
1200	0.577	174.5	1.872	62.2	0.131	44.2	0.410	-54.7
1400	0.578	165.4	1.637	54.5	0.142	47.9	0.400	-59.8
1600	0.587	157.0	1.447	47.5	0.155	51.1	0.398	-65.9
1800	0.598	149.0	1.303	41.6	0.173	53.7	0.398	-72.0
2000	0.608	141.3	1.203	36.3	0.194	55.6	0.403	-78.8

■ No products described or contained herein are intended for use in surgical implants, life-support systems, aerospace equipment, nuclear power control systems, vehicles, disaster/crime-prevention equipment and the like, the failure of which may directly or indirectly cause injury, death or property loss.

■ Anyone purchasing any products described or contained herein for an above-mentioned use shall:

- ① Accept full responsibility and indemnify and defend SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors and all their officers and employees, jointly and severally, against any and all claims and litigation and all damages, cost and expenses associated with such use;
- ② Not impose any responsibility for any fault or negligence which may be cited in any such claim or litigation on SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors or any of their officers and employees jointly or severally.

■ Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

This catalog provides information as of August, 1995. Specifications and information herein are subject to change without notice.