

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

2SC5086

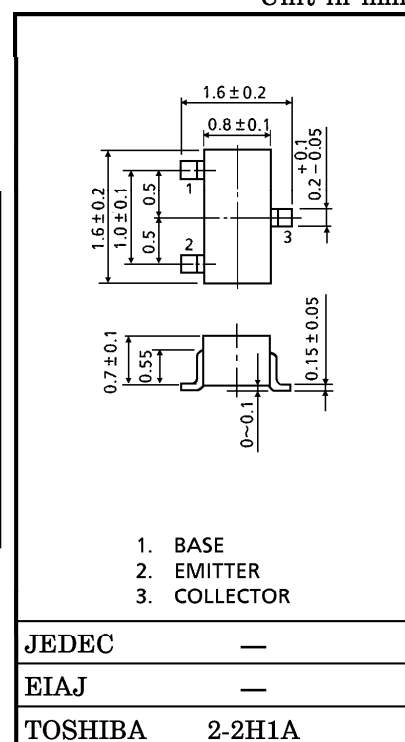
VHF~UHF BAND LOW NOISE AMPLIFIER APPLICATIONS

Unit in mm

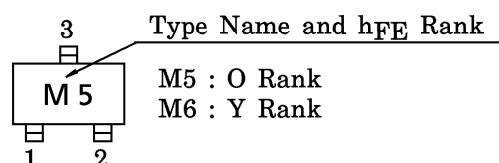
- Low Noise Figure, High Gain.
- $NF=1.1dB$, $|S_{21e}|^2=11dB$ ($f=1GHz$)

MAXIMUM RATINGS ($T_a = 25^\circ C$)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	V_{CBO}	20	V
Collector-Emitter Voltage	V_{CEO}	12	V
Emitter-Base Voltage	V_{EBO}	3	V
Base Current	I_B	40	mA
Collector Current	I_C	80	mA
Collector Power Dissipation	P_C	100	mW
Junction Temperature	T_j	125	$^\circ C$
Storage Temperature Range	T_{stg}	$-55 \sim 125$	$^\circ C$



MARKING

MICROWAVE CHARACTERISTICS ($T_a = 25^\circ C$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Transition Frequency	f_T	$V_{CE}=10V$, $I_C=20mA$	5	7	—	GHz
Insertion Gain	$ S_{21e} ^2 (1)$	$V_{CE}=10V$, $I_C=20mA$, $f=500MHz$	—	16.5	—	dB
	$ S_{21e} ^2 (2)$	$V_{CE}=10V$, $I_C=20mA$, $f=1GHz$	7.5	11	—	
Noise Figure	NF (1)	$V_{CE}=10V$, $I_C=5mA$, $f=500MHz$	—	1	—	dB
	NF (2)	$V_{CE}=10V$, $I_C=5mA$, $f=1GHz$	—	1.1	2	

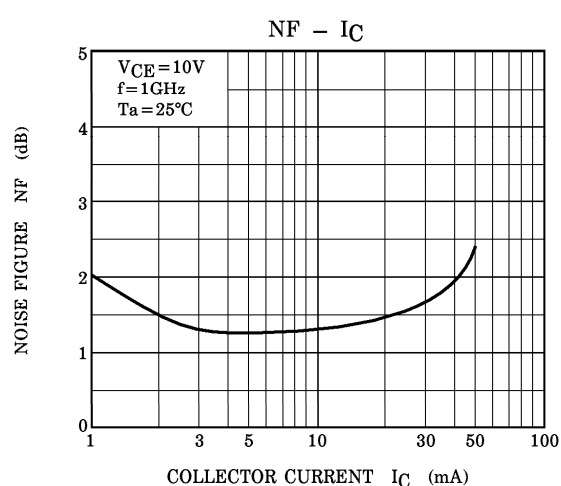
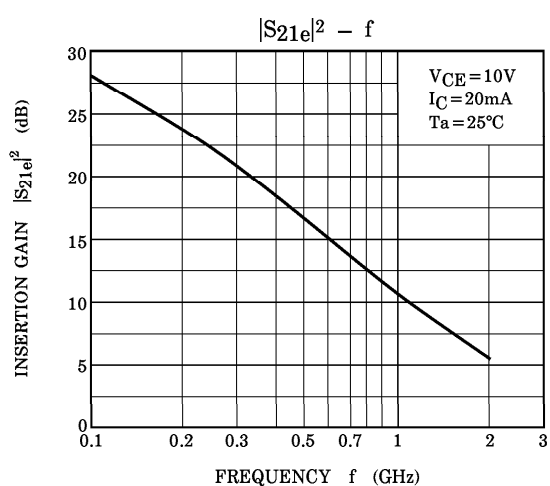
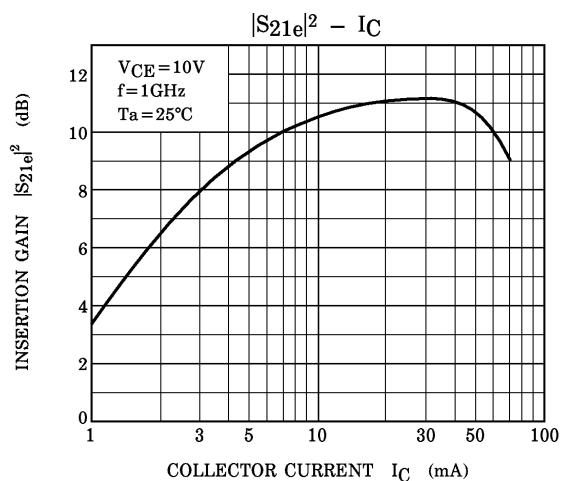
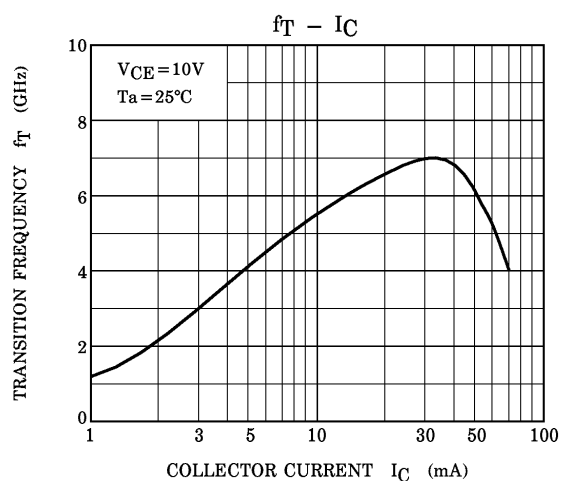
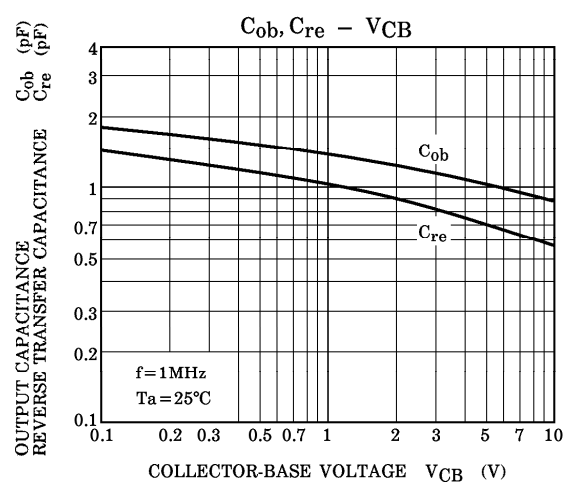
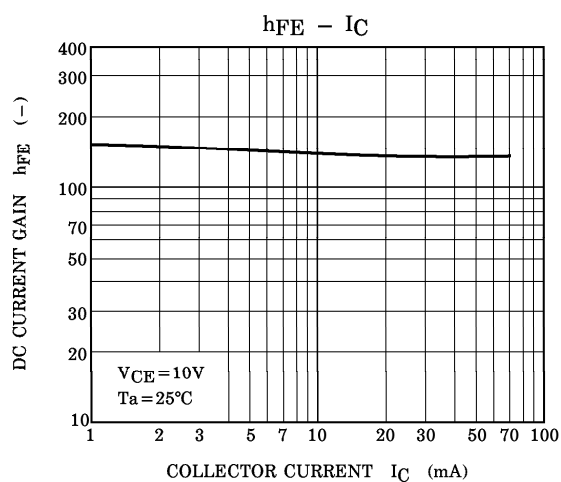
ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ C$)

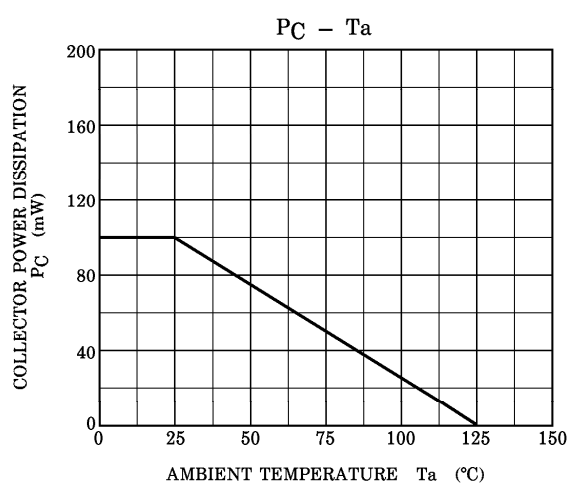
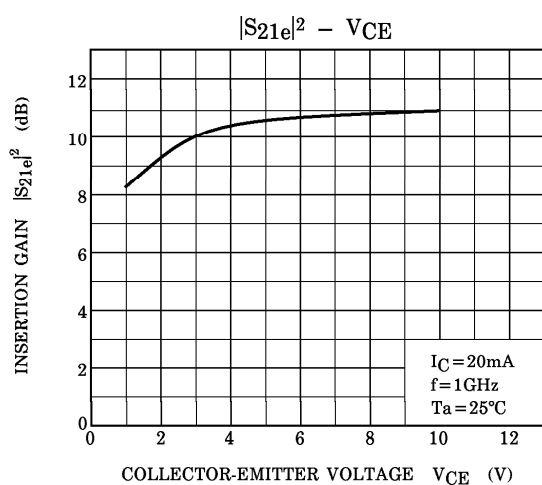
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I_{CBO}	$V_{CB}=10V$, $I_E=0$	—	—	1	μA
Emitter Cut-off Current	I_{EBO}	$V_{EB}=1V$, $I_C=0$	—	—	1	μA
DC Current Gain	h_{FE} (Note 1)	$V_{CE}=10V$, $I_C=20mA$	80	—	240	—
Output Capacitance	C_{ob}	$V_{CB}=10V$, $I_E=0$, $f=1MHz$	—	1.0	—	pF
Reverse Transfer Capacitance	C_{re}		—	0.65	1.15	pF

(Note 1) h_{FE} Classification O : 80~160, Y : 120~240(Note 2) C_{re} is measured by 3 terminal method with capacitance bridge.

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S-Parameter $Z_0 = 50\Omega$, $T_a = 25^\circ\text{C}$

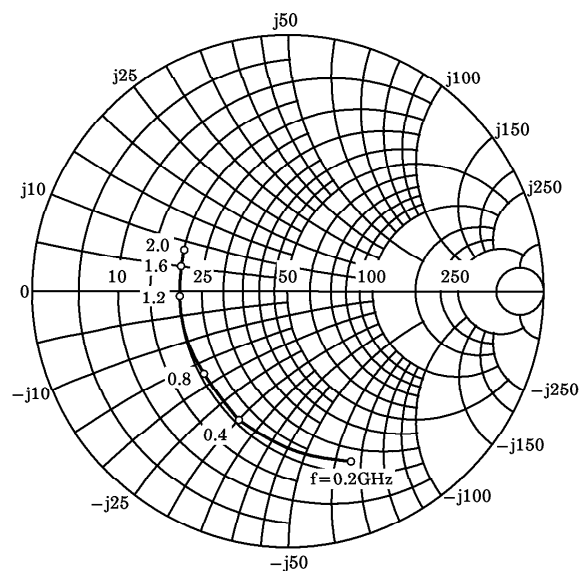
$V_{CE} = 10\text{V}$, $I_C = 5\text{mA}$

frequency (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.715	-69.3	9.495	132.1	0.051	55.2	0.747	-29.0
400	0.542	-112.4	6.482	108.5	0.068	46.8	0.555	-35.1
600	0.476	-137.7	4.717	95.8	0.077	47.9	0.478	-36.2
800	0.447	-154.4	3.691	87.1	0.086	51.6	0.442	-37.1
1000	0.435	-166.8	3.049	79.9	0.096	55.9	0.424	-38.9
1200	0.433	-176.6	2.611	73.9	0.108	60.4	0.418	-41.8
1400	0.435	174.8	2.294	68.3	0.123	64.2	0.411	-45.0
1600	0.439	167.3	2.050	63.2	0.140	66.9	0.407	-49.0
1800	0.444	160.6	1.860	58.7	0.159	68.7	0.406	-53.6
2000	0.454	154.2	1.713	53.9	0.180	70.5	0.404	-57.8

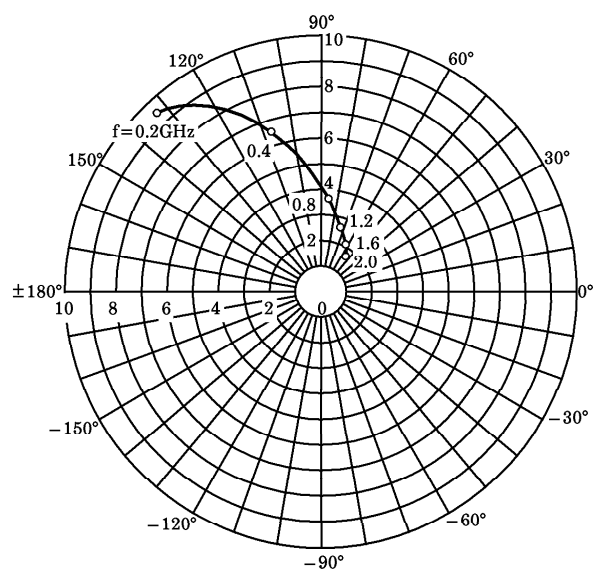
$V_{CE} = 10\text{V}$, $I_C = 20\text{mA}$

frequency (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.465	-107.8	16.512	113.2	0.035	56.7	0.484	-40.9
400	0.375	-145.6	9.090	96.5	0.052	62.2	0.331	-37.8
600	0.351	-164.4	6.252	88.1	0.070	66.5	0.291	-34.1
800	0.343	-176.7	4.762	81.9	0.089	68.9	0.277	-33.3
1000	0.338	174.8	3.875	76.6	0.109	70.2	0.273	-34.0
1200	0.337	167.9	3.285	71.8	0.130	70.8	0.274	-36.2
1400	0.343	161.6	2.874	67.2	0.152	70.6	0.274	-39.3
1600	0.343	156.2	2.553	62.9	0.173	69.8	0.274	-43.4
1800	0.348	151.2	2.317	58.8	0.195	68.9	0.273	-47.8
2000	0.354	146.2	2.113	55.0	0.218	68.2	0.272	-52.1

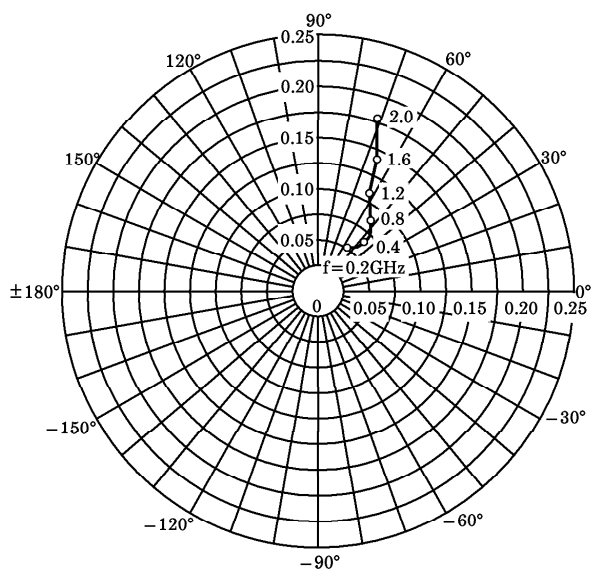
S_{11e}
 $V_{CE}=10V$
 $I_C=5mA$
 $T_a=25^\circ C$
 (UNIT : Ω)



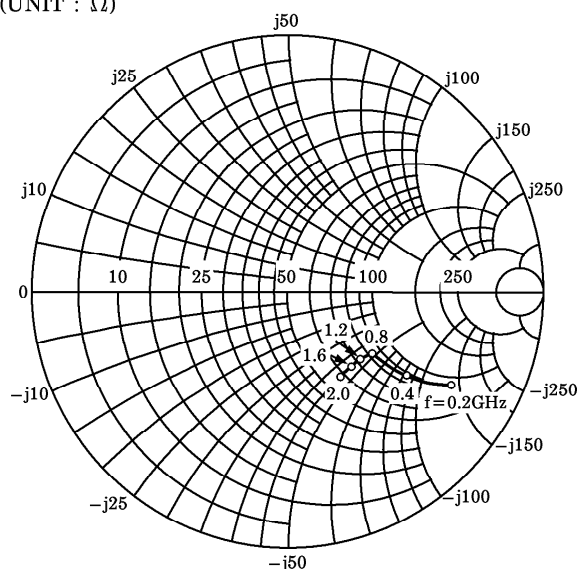
S_{21e}
 $V_{CE}=10V$
 $I_C=5mA$
 $T_a=25^\circ C$



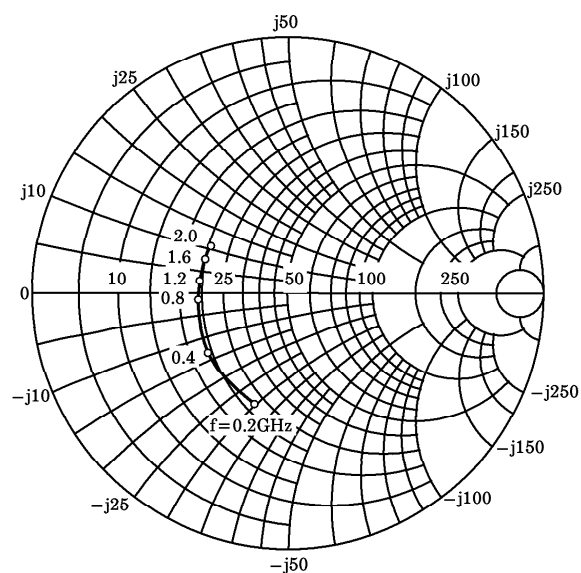
S_{12e}
 $V_{CE}=10V$
 $I_C=5mA$
 $T_a=25^\circ C$



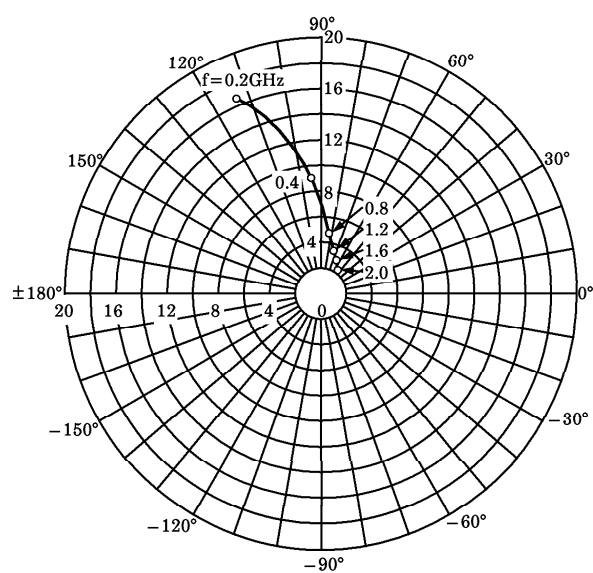
S_{22e}
 $V_{CE}=10V$
 $I_C=5mA$
 $T_a=25^\circ C$
 (UNIT : Ω)



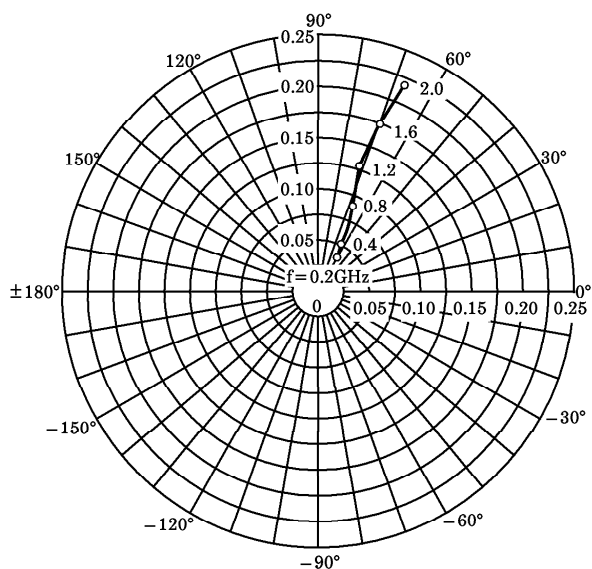
S_{11e}
 $V_{CE} = 10V$
 $I_C = 20mA$
 $T_a = 25^\circ C$
 (UNIT : Ω)



S_{21e}
 $V_{CE} = 10V$
 $I_C = 20mA$
 $T_a = 25^\circ C$



S_{12e}
 $V_{CE} = 10V$
 $I_C = 20mA$
 $T_a = 25^\circ C$



S_{22e}
 $V_{CE} = 10V$
 $I_C = 20mA$
 $T_a = 25^\circ C$
 (UNIT : Ω)

