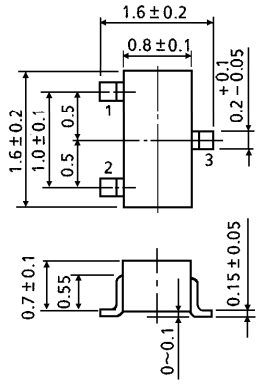
TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

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)



1. BASE
2. EMITTER
3. COLLECTOR

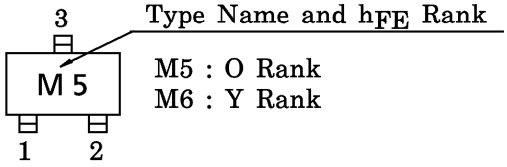
JEDEC	—
EIAJ	—
TOSHIBA	2-2H1A

Weight : 2.4mg

MAXIMUM RATINGS (Ta = 25°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	°C
Storage Temperature Range	T_{stg}	−55~125	°C

MARKING



MICROWAVE CHARACTERISTICS (Ta = 25°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	

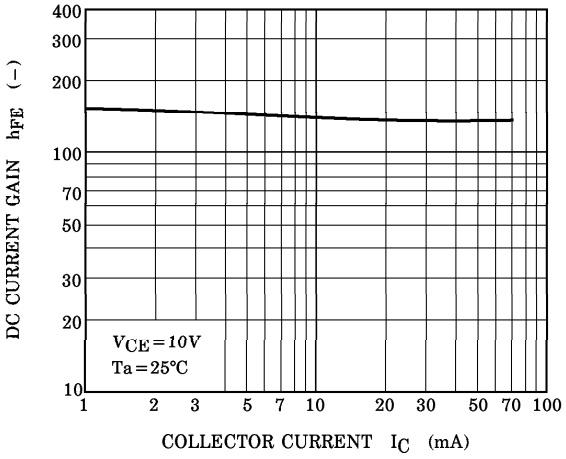
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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}	(Note 2)	—	0.65	1.15	pF

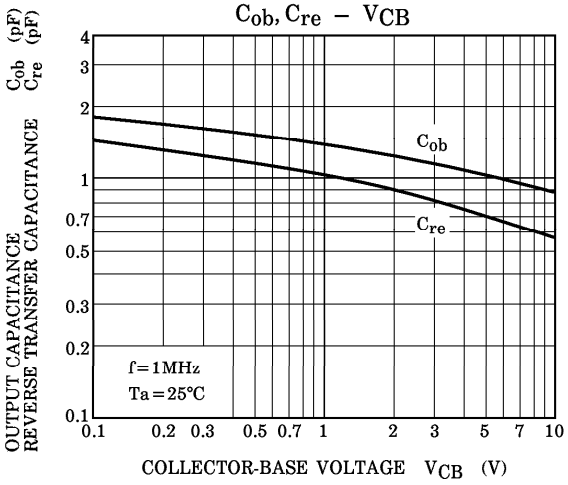
(Note 1) h_{FE} Classification O : 80~160, Y : 120~240

(Note 2) C_{re} is measured by 3 terminal method with capacitance bridge.

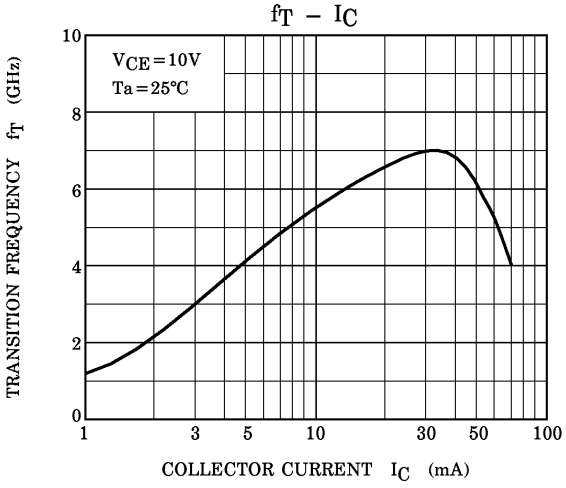
h_{FE} – I_C



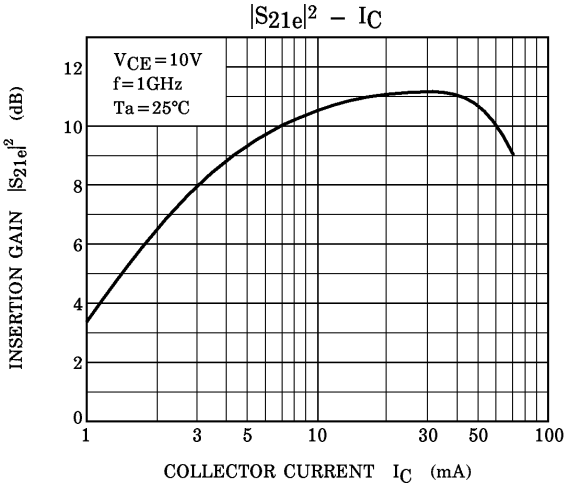
C_{ob}, C_{re} – V_{CB}



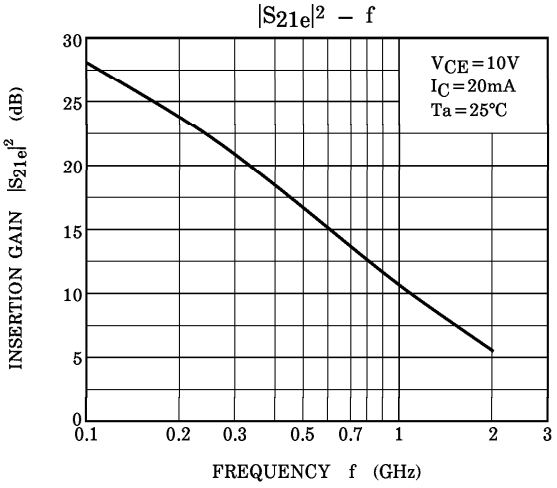
f_T – I_C



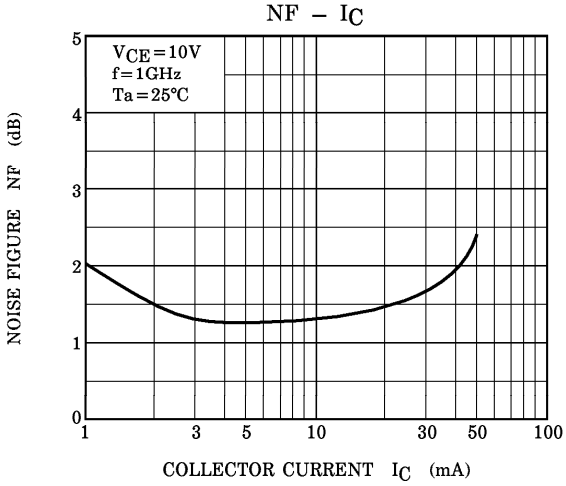
$|S_{21e}|^2$ – I_C

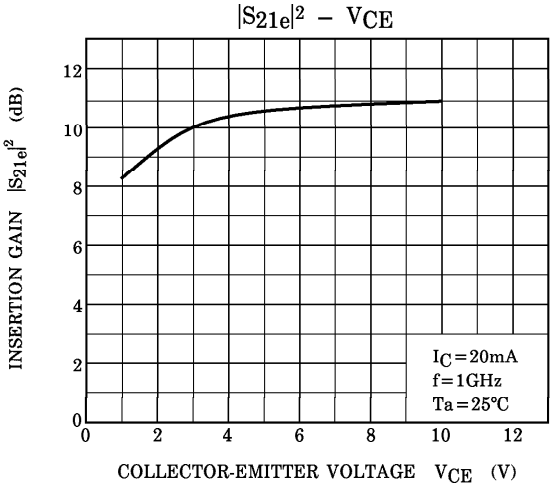


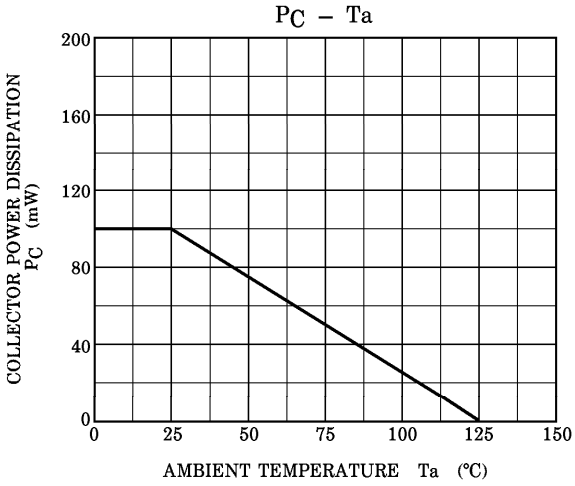
$|S_{21e}|^2$ – f



NF – I_C







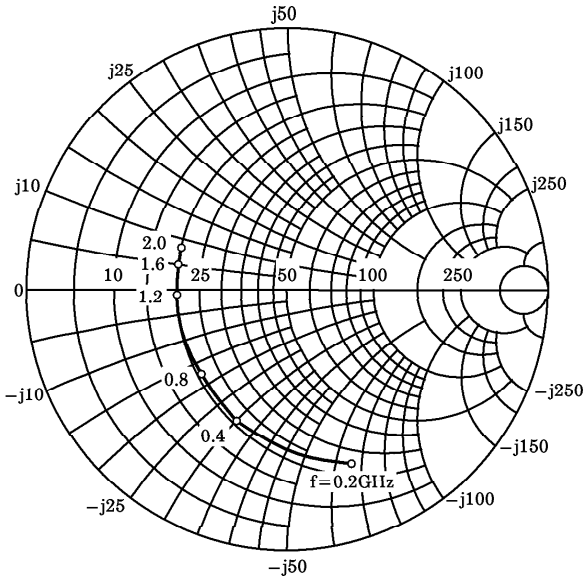
S-Parameter $Z_O = 50\Omega$, Ta = 25°C
V_{CE} = 10V, I_C = 5mA

frequency	S11		S21		S12		S22	
(MHz)	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} = 10V, I_C = 20mA

frequency	S11		S21		S12		S22	
(MHz)	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
Ta = 25°C
(UNIT : Ω)



S_{21e}
V_{CE} = 10V
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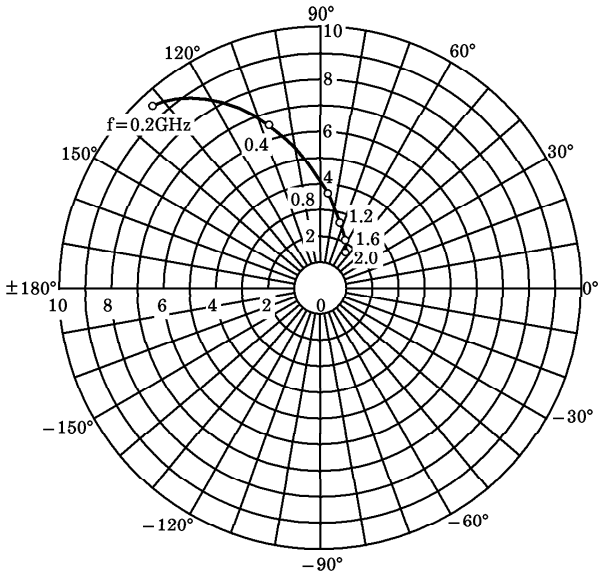
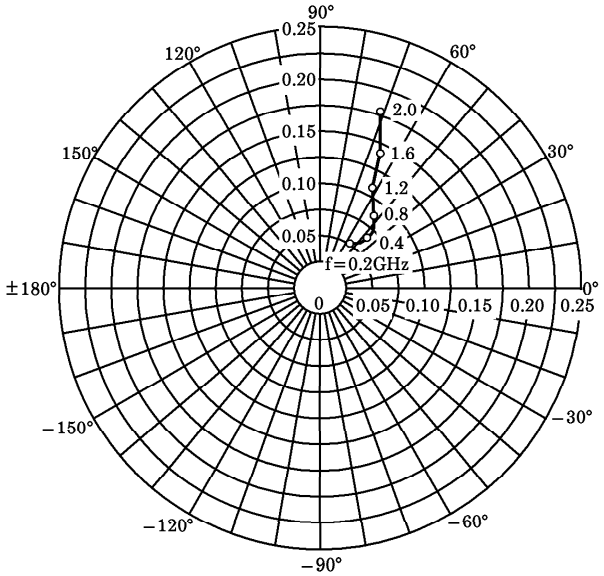
Ta = 25°C



S_{12e}
V_{CE} = 10V
I_C = 5mA
Ta = 25°C



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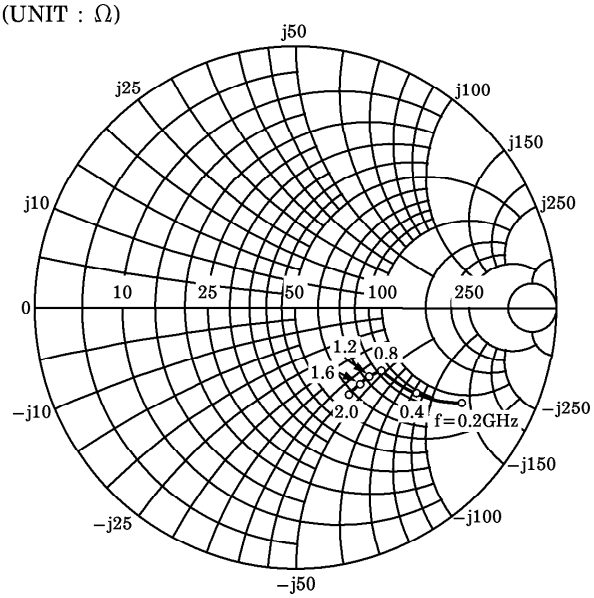

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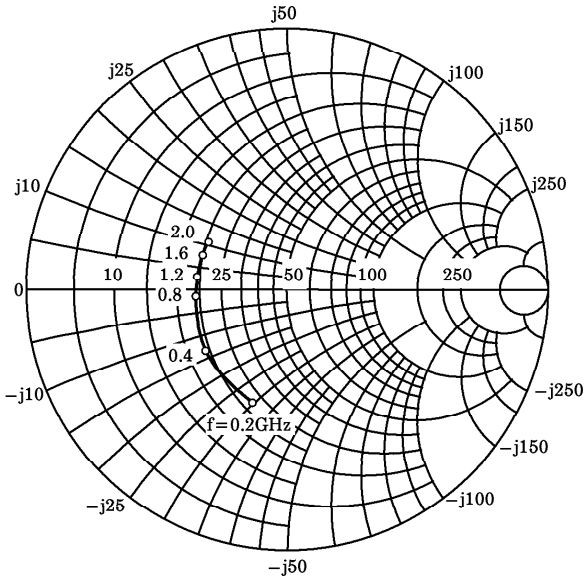

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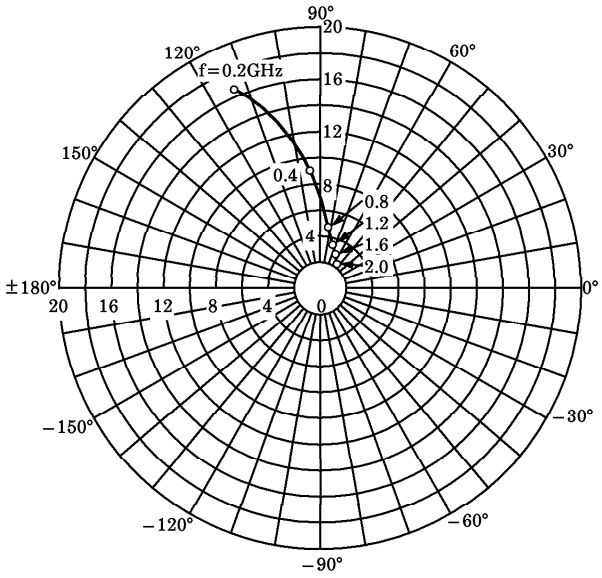

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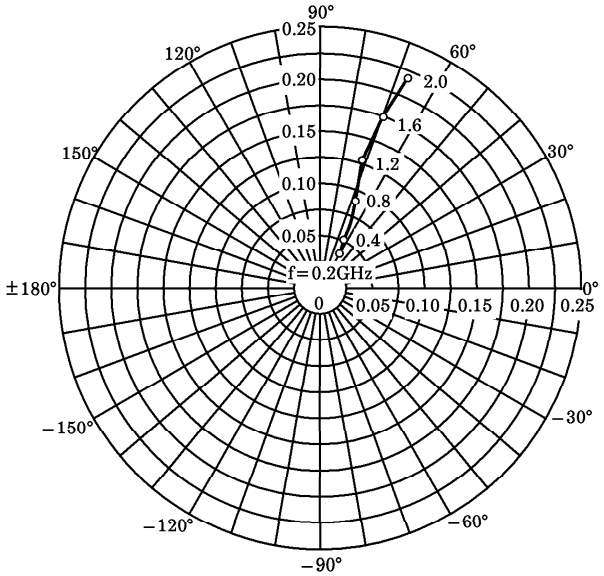

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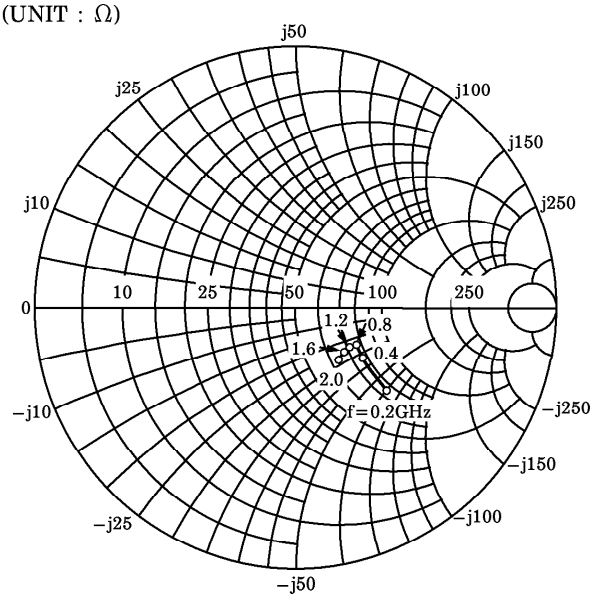

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