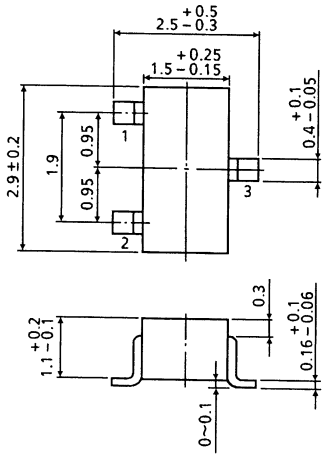
TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

2SC5084

VHF~UHF Band Low Noise Amplifier Applications

- Low noise figure, high gain.
- NF = 1.1dB, $|S_{21e}|^2$ = 11dB (f = 1 GHz)

Unit: mm



1. BASE
2. EMITTER
3. COLLECTOR

JEDEC	—
JEITA	SC-59
TOSHIBA	2-3F1A

Weight: 0.012 g (typ.)

Maximum Ratings (Ta = 25°C)

Characteristics	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	150	mW
Junction temperature	T_j	125	°C
Storage temperature range	T_{stg}	−55~125	°C

Microwave Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition frequency	f_T	V_{CE} = 10 V, I_C = 20 mA	5	7	—	GHz
Insertion gain	$\|S_{21e}\|^2$ (1)	V_{CE} = 10 V, I_C = 20 mA, f = 500 MHz	—	16.5	—	dB
	$\|S_{21e}\|^2$ (2)	V_{CE} = 10 V, I_C = 20 mA, f = 1 GHz	7.5	11	—	
Noise figure	NF (1)	V_{CE} = 10 V, I_C = 5 mA, f = 500 MHz	—	1	—	dB
	NF (2)	V_{CE} = 10 V, I_C = 5 mA, f = 1 GHz	—	1.1	2	

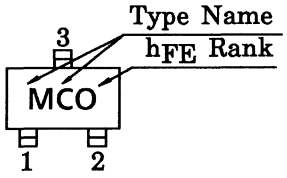
Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB} = 10 V, I_E = 0	—	—	1	μA
Emitter cut-off current	I_{EBO}	V_{EB} = 1 V, I_C = 0	—	—	1	μA
DC current gain	h_{FE} (Note 1)	V_{CE} = 10 V, I_C = 20 mA	80	—	240	
Output capacitance	C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz (Note 2)	—	1.0	—	pF
Reverse transfer capacitance	C_{re}		—	0.65	1.15	pF

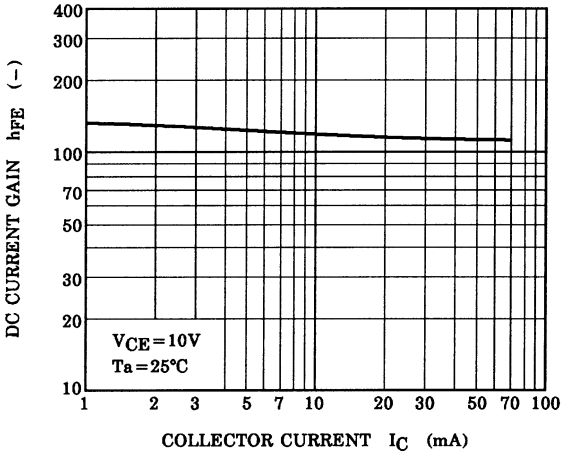
Note 1: h_{FE} classification O: 80~160, Y: 120~240

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

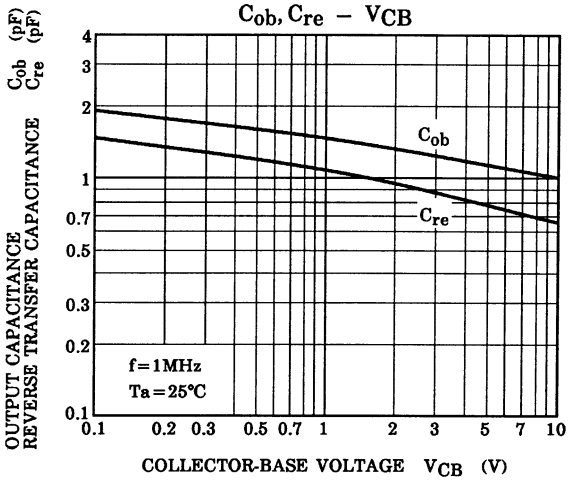
Marking



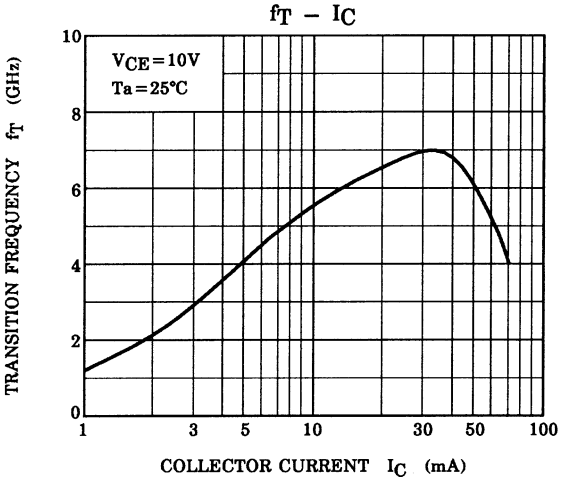
h_{FE} – I_C



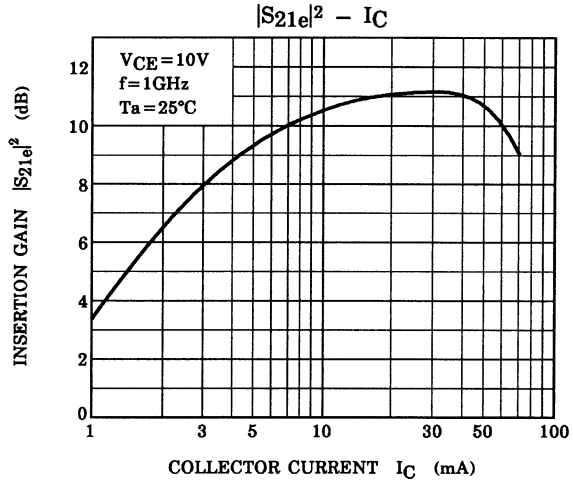
C_{ob}, C_{re} – V_{CB}



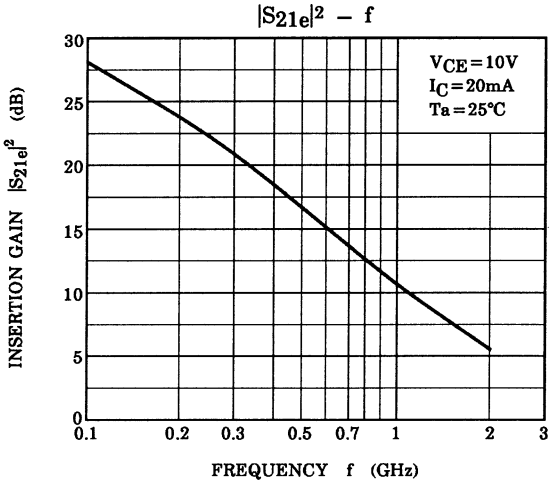
f_T – I_C



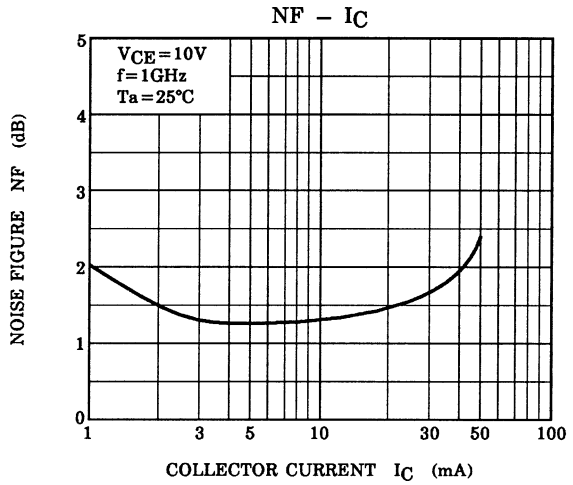
$|S_{21e}|^2$ – I_C

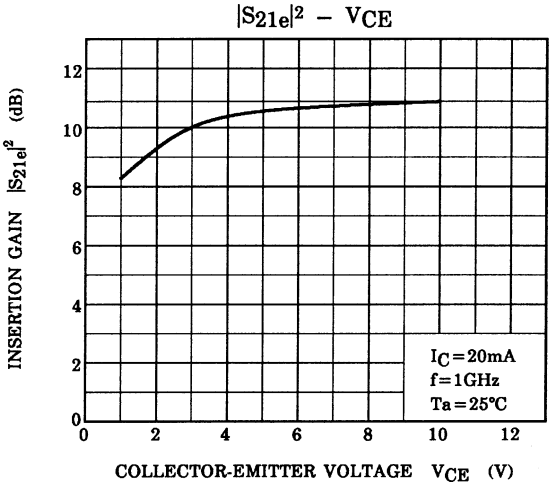


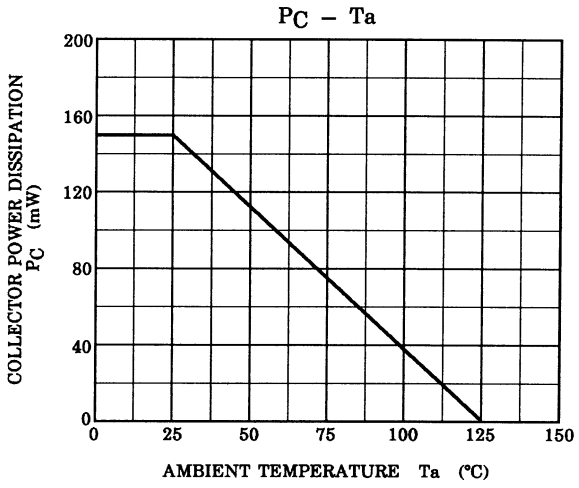
$|S_{21e}|^2$ – f



NF – I_C







S-Parameter Z_O = 50 Ω, Ta = 25°C

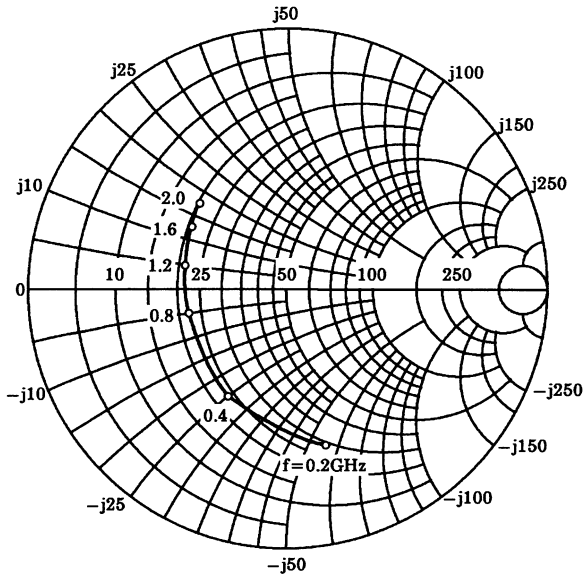
V_{CE} = 10 V, I_C = 5 mA

Frequency	S11		S21		S12		S22	
(MHz)	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.628	–77.1	9.254	126.5	0.051	53.3	0.695	–31.0
400	0.471	–122.1	6.027	103.3	0.067	48.4	0.509	–34.9
600	0.417	–149.1	4.341	90.3	0.077	51.9	0.441	–35.2
800	0.404	–167.3	3.381	81.2	0.090	56.9	0.412	–36.0
1000	0.402	178.1	2.798	73.3	0.104	62.0	0.398	–37.7
1200	0.412	166.6	2.393	66.7	0.122	66.4	0.390	–40.3
1400	0.427	156.6	2.108	60.4	0.145	69.1	0.385	–44.3
1600	0.440	147.3	1.881	54.8	0.170	69.8	0.376	–48.8
1800	0.455	140.0	1.713	49.4	0.194	70.2	0.373	–54.3
2000	0.482	132.6	1.586	44.6	0.223	71.3	0.367	–60.0

V_{CE} = 10 V, I_C = 20 mA

Frequency	S11		S21		S12		S22	
(MHz)	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.340	–122.7	15.443	107.4	0.034	62.7	0.415	–40.5
400	0.299	–158.7	8.266	92.4	0.056	69.3	0.293	–34.2
600	0.293	–178.0	5.664	84.0	0.080	71.7	0.265	–30.4
800	0.294	169.0	4.334	77.3	0.104	72.1	0.255	–29.9
1000	0.299	157.9	3.528	71.2	0.129	72.0	0.252	–30.6
1200	0.310	149.5	3.002	66.0	0.155	71.4	0.254	–32.5
1400	0.321	142.0	2.629	61.0	0.183	69.7	0.255	–36.1
1600	0.332	134.9	2.336	56.3	0.209	67.6	0.248	–40.6
1800	0.341	129.5	2.121	51.7	0.234	65.6	0.242	–45.9
2000	0.366	124.3	1.958	47.3	0.260	64.6	0.236	–51.7

S_{11e}
V_{CE} = 10V
I_C = 5mA
Ta = 25°C
(UNIT : Ω)



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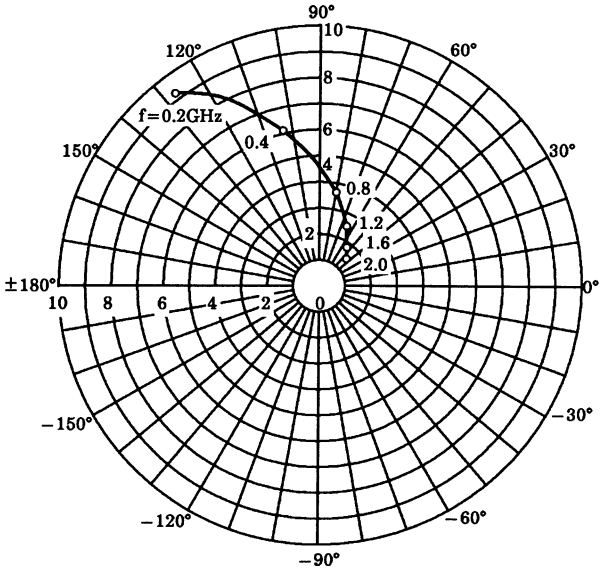

S_{12e}
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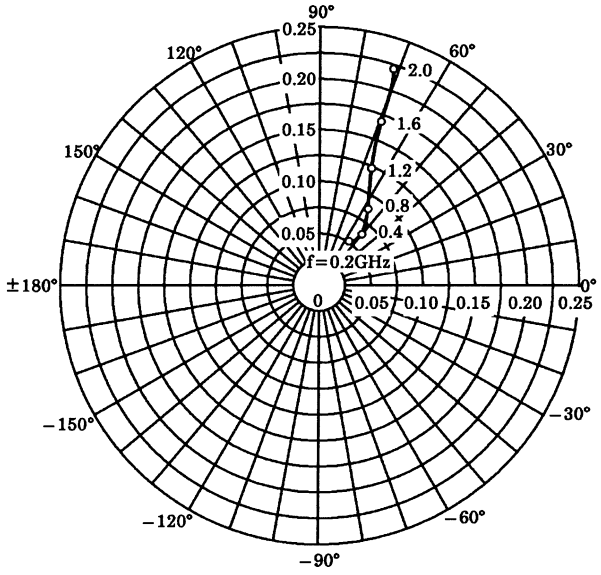

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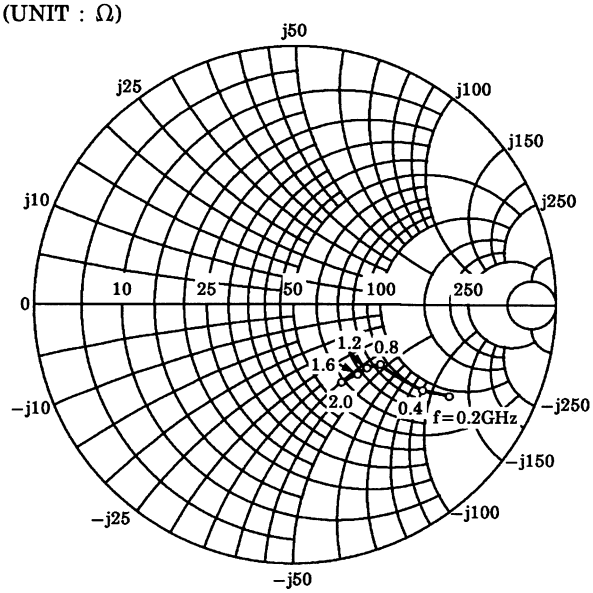

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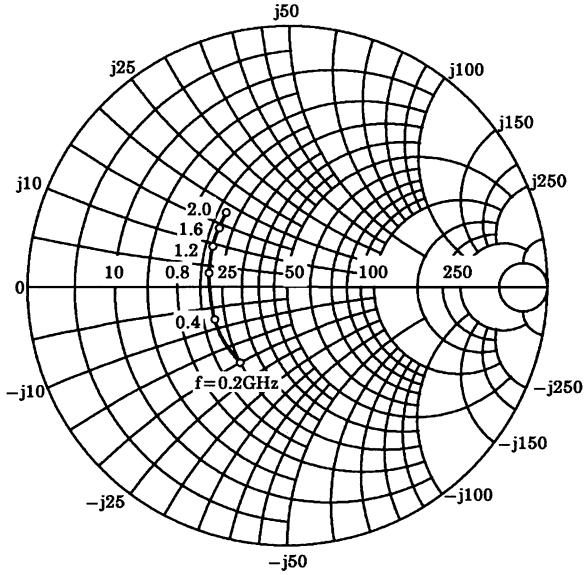

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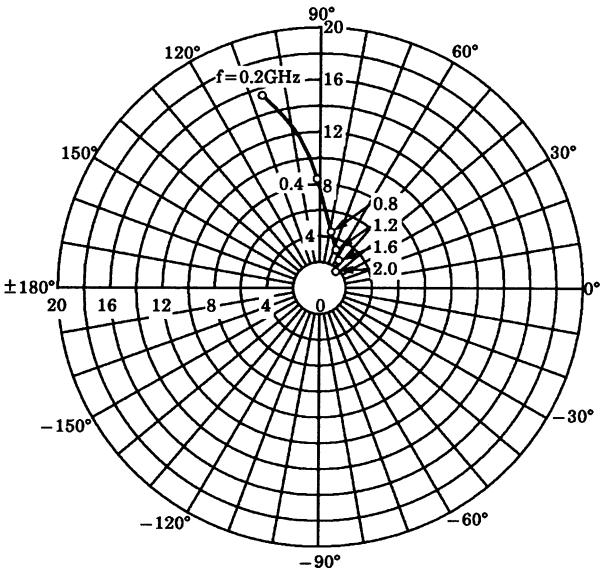

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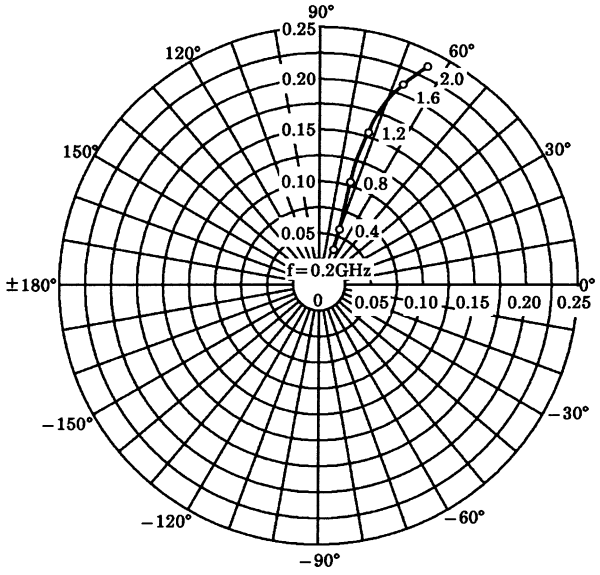

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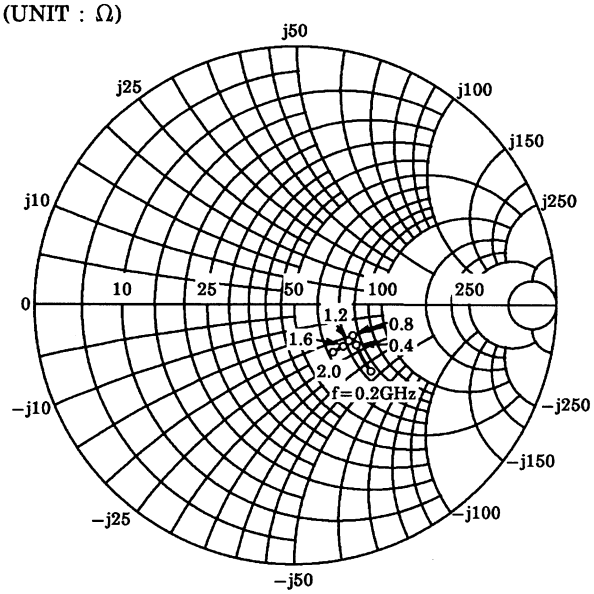

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