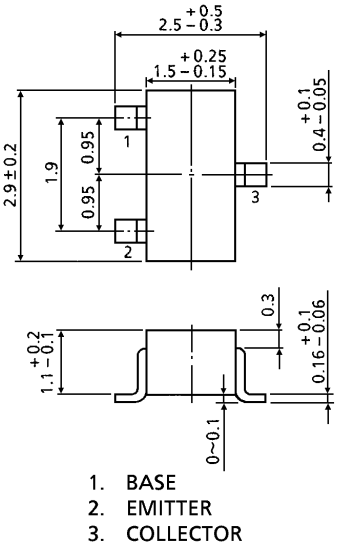
TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

2SC4322

VHF~UHF BAND LOW NOISE AMPLIFIER APPLICATIONS

Unit in mm



JEDEC	—
EIAJ	SC-59
TOSHIBA	2-3F1A

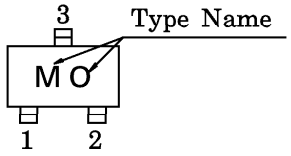
Weight : 0.012g

- Low Noise Figure, High Gain.
- NF = 1.8dB, $|S_{21e}|^2$ = 7.5dB (f = 2GHz)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	V_{CBO}	20	V
Collector-Emitter Voltage	V_{CEO}	10	V
Emitter-Base Voltage	V_{EBO}	1.5	V
Base Current	I_B	7	mA
Collector Current	I_C	15	mA
Collector Power Dissipation	P_C	150	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} = 6V, I_C = 7mA	7	10	—	GHz
Insertion Gain	$\|S_{21e}\|^2$ (1)	V_{CE} = 6V, I_C = 7mA, f = 1GHz	—	13	—	dB
	$\|S_{21e}\|^2$ (2)	V_{CE} = 6V, I_C = 7mA, f = 2GHz	4.5	7.5	—	
Noise Figure	NF (1)	V_{CE} = 6V, I_C = 3mA, f = 1GHz	—	1.4	—	dB
	NF (2)	V_{CE} = 6V, I_C = 3mA, f = 2GHz	—	1.8	3.0	

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}	V_{CE} = 6V, I_C = 7mA	50	—	250	—
Output Capacitance	C_{ob}	V_{CB} = 10V, I_E = 0, f = 1MHz	—	0.45	—	pF
Reverse Transfer Capacitance	C_{re}	(Note)	—	0.35	0.8	pF

(Note) C_{re} is measured by 3 terminal method with Capacitance Bridge.

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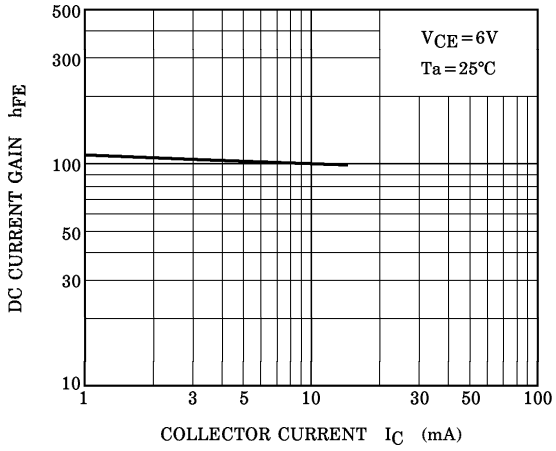
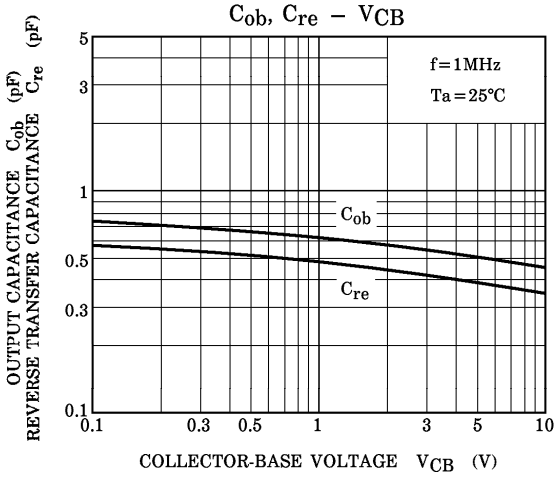
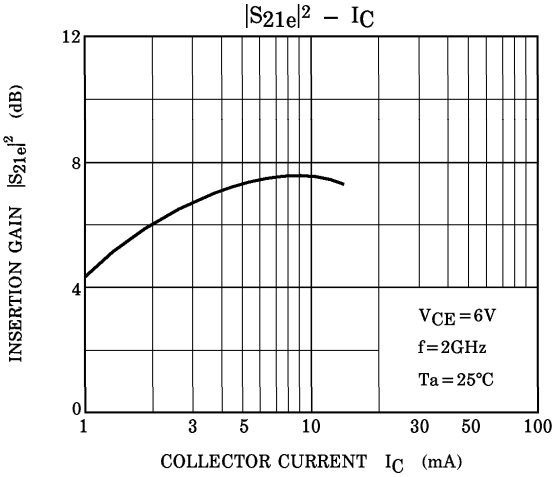
h_{FE} – I_C



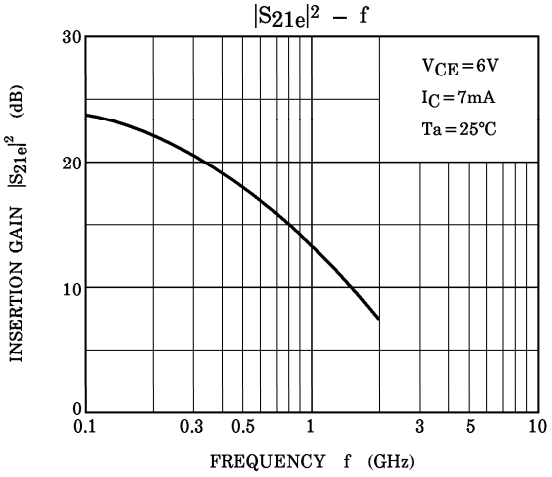
C_{ob}, C_{re} – V_{CB}



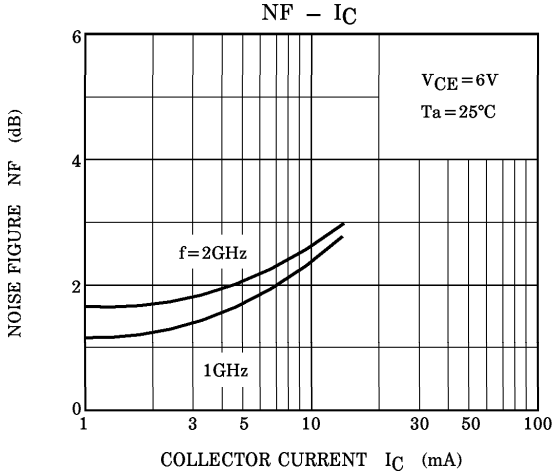
$|S_{21e}|^2$ – I_C



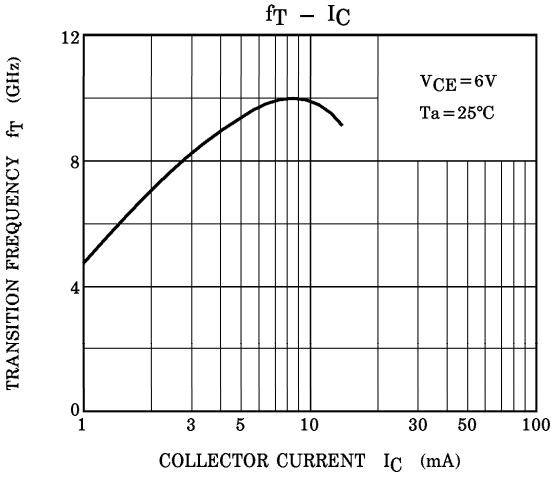
$|S_{21e}|^2$ – f

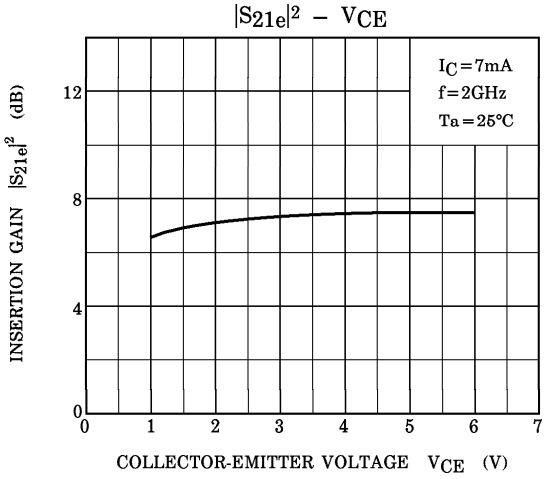


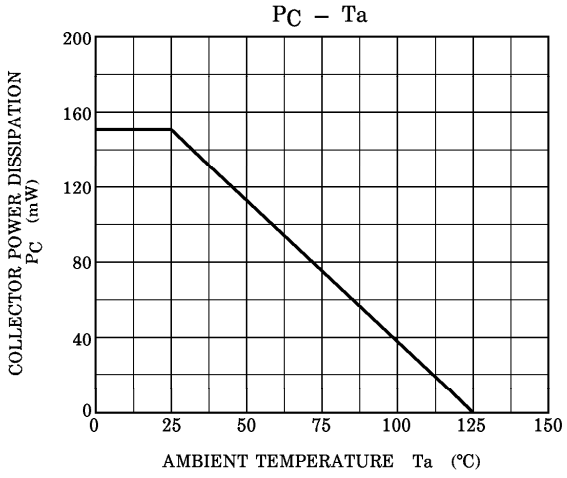
NF – I_C



f_T – I_C







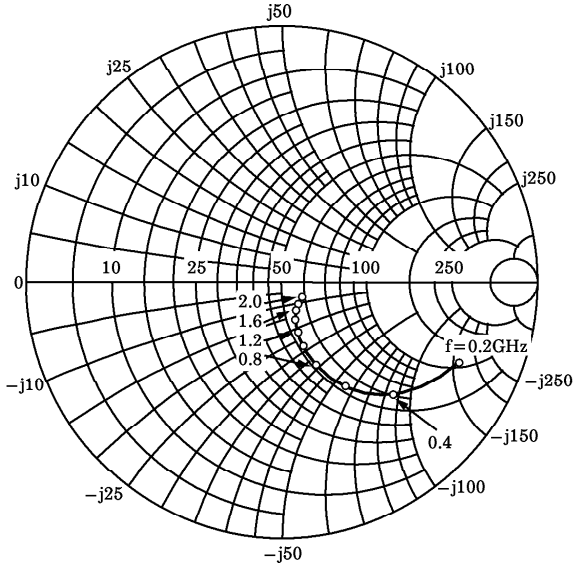
S-PARAMETER $Z_O = 50\Omega$, Ta = 25°C
V_{CE} = 6V, I_C = 3mA

FREQUENCY	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.764	−25.0	7.758	153.8	0.037	76.2	0.934	−16.4
400	0.613	−44.9	6.493	132.9	0.065	67.0	0.808	−27.7
600	0.473	−57.9	5.331	117.9	0.085	62.8	0.702	−34.3
800	0.356	−66.9	4.433	106.2	0.102	61.2	0.623	−38.0
1000	0.261	−70.4	3.738	97.7	0.117	60.4	0.575	−40.6
1200	0.198	−71.7	3.266	90.1	0.132	60.2	0.544	−42.4
1400	0.147	−66.3	2.853	83.0	0.147	60.1	0.529	−44.1
1600	0.129	−54.9	2.555	78.2	0.163	60.3	0.519	−46.4
1800	0.114	−41.8	2.348	72.8	0.179	60.0	0.514	−49.0
2000	0.124	−34.5	2.108	69.2	0.192	60.1	0.513	−52.4

V_{CE} = 6V, I_C = 7mA

FREQUENCY	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.560	−35.3	12.525	142.0	0.032	74.2	0.853	−21.5
400	0.367	−54.1	8.958	118.8	0.055	69.5	0.678	−30.1
600	0.248	−63.4	6.693	105.3	0.073	68.4	0.581	−32.7
800	0.158	−62.4	5.270	95.5	0.091	68.6	0.530	−33.6
1000	0.101	−47.8	4.319	88.5	0.110	68.4	0.506	−34.7
1200	0.088	−27.3	3.687	82.1	0.128	67.9	0.493	−36.0
1400	0.099	−4.3	3.188	76.2	0.146	67.0	0.491	−37.8
1600	0.131	−0.7	2.813	71.9	0.165	66.2	0.492	−40.5
1800	0.152	0.4	2.563	67.4	0.183	65.2	0.498	−43.7
2000	0.167	−1.7	2.276	64.5	0.198	64.5	0.500	−47.5

S_{11e}
V_{CE} = 6V
I_C = 3mA
Ta = 25°C
(UNIT : Ω)



S_{21e}
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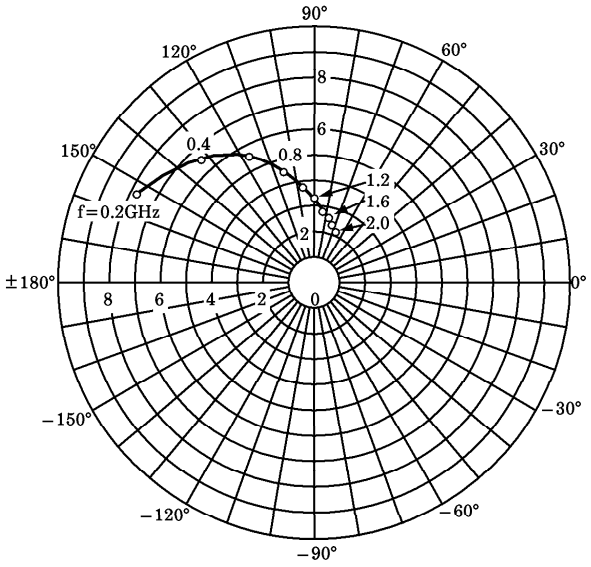
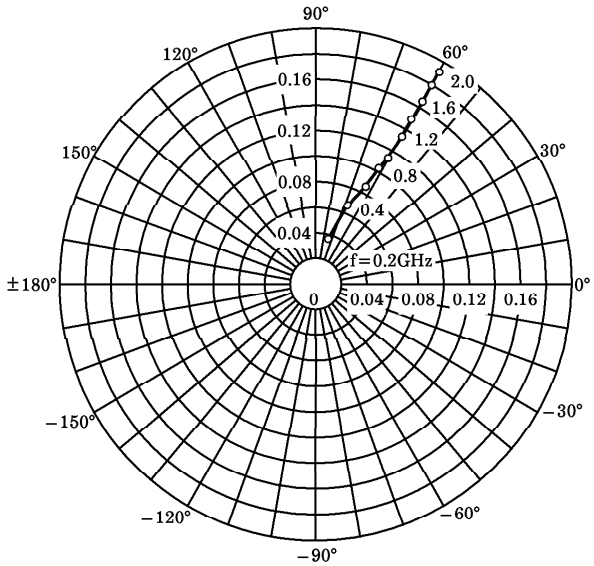


S_{12e}
V_{CE} = 6V
I_C = 3mA
Ta = 25°C



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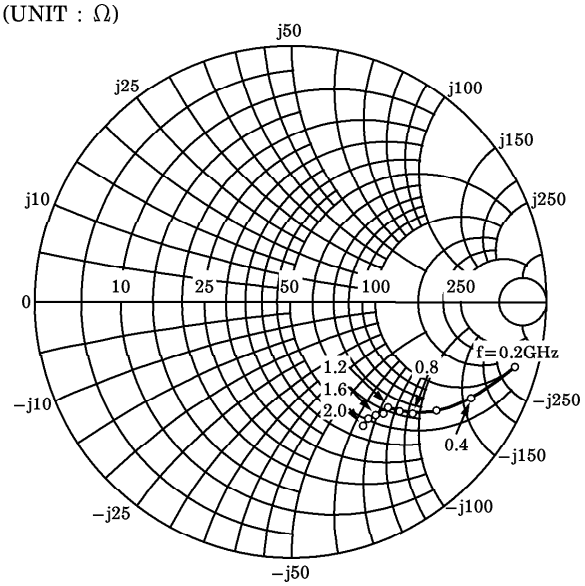

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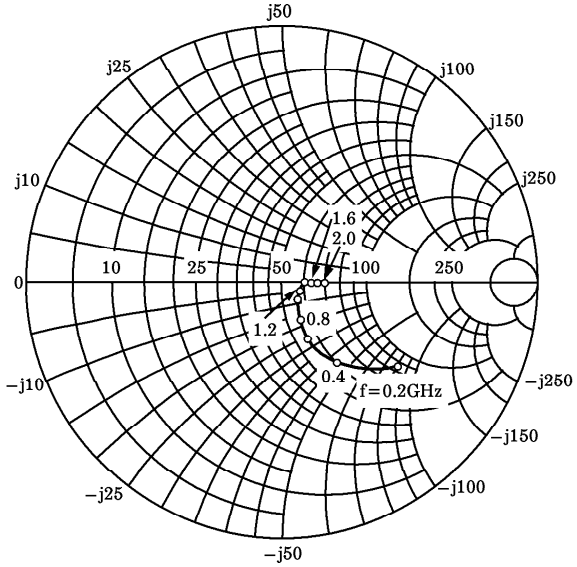

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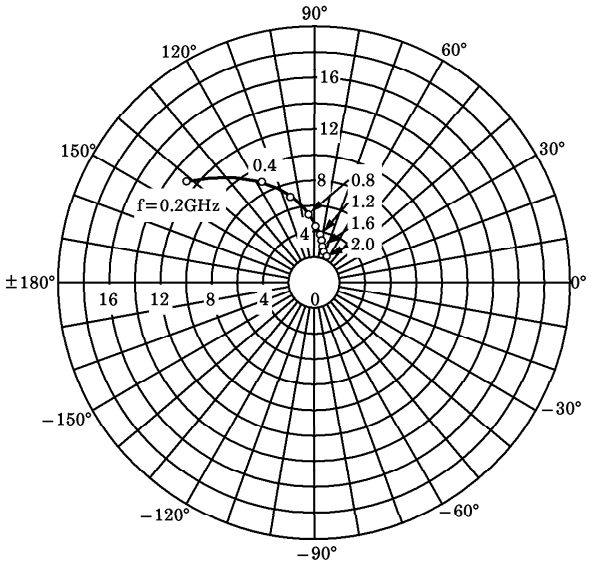

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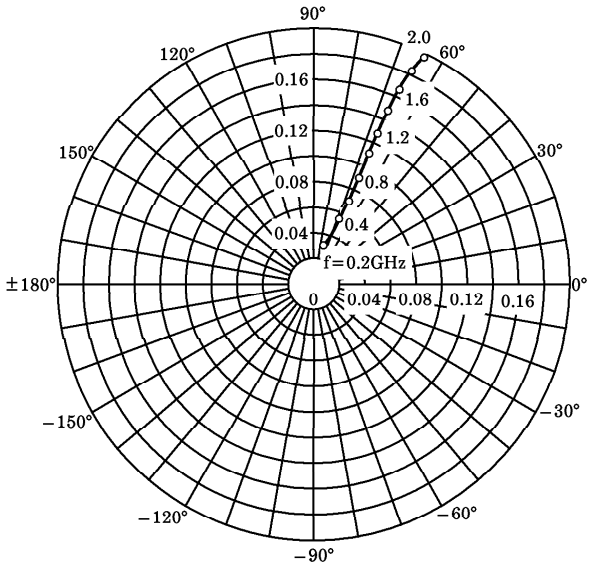

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