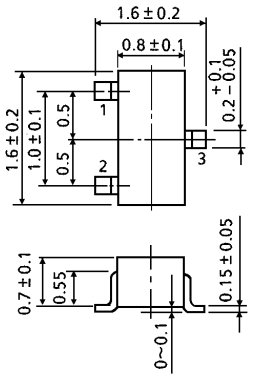
TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

2SC4841

VHF~UHF BAND LOW NOISE AMPLIFIER APPLICATIONS

Unit in mm

- Low Noise Figure, High Gain.
- NF = 1.8dB, $|S_{21e}|^2$ = 8.5dB (f = 2GHz)



1. BASE
2. EMITTER
3. COLLECTOR

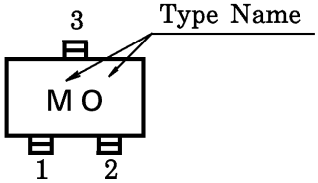
JEDEC	—
EIAJ	—
TOSHIBA	2-2H1A

Weight : 2.4mg

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	V_{CBO}	20	V
Collector-Emitter Voltage	V_{CEO}	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	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} = 6V, I_C = 7mA	7	10	—	GHz
Insertion Gain	$\|S_{21e}\|^2$ (1)	V_{CE} = 6V, I_C = 7mA, f = 1GHz	—	13.5	—	dB
	$\|S_{21e}\|^2$ (2)	V_{CE} = 6V, I_C = 7mA, f = 2GHz	4.5	8.5	—	
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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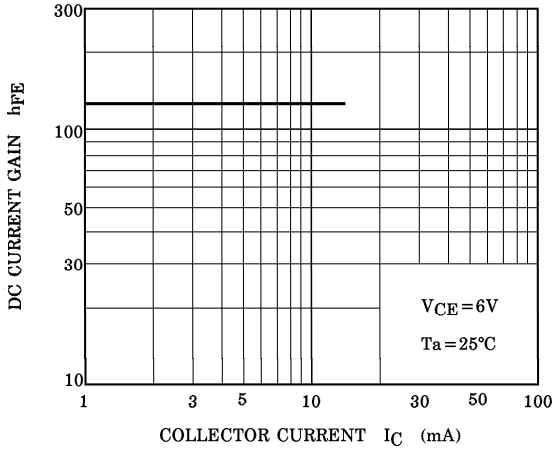
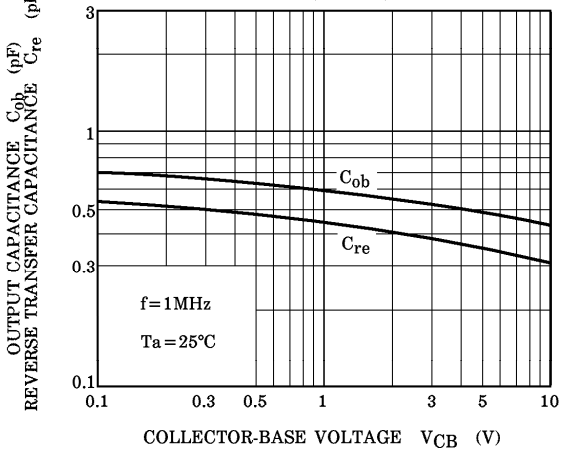
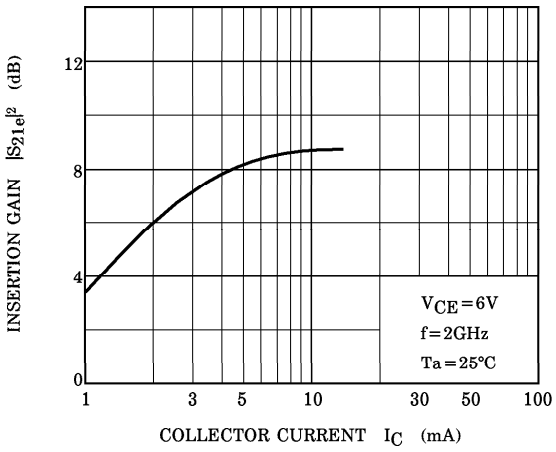
h_{FE} – I_C



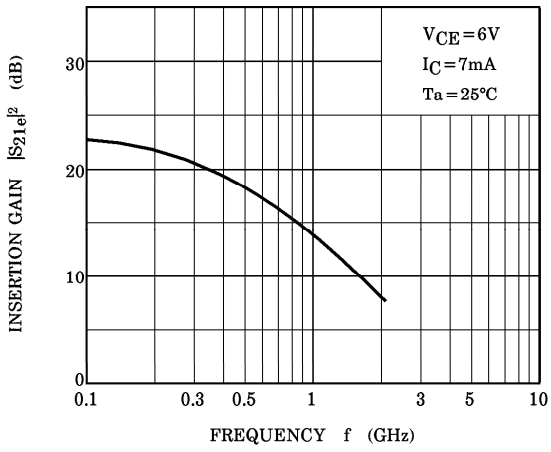
C_{ob}, C_{re} – V_{CB}



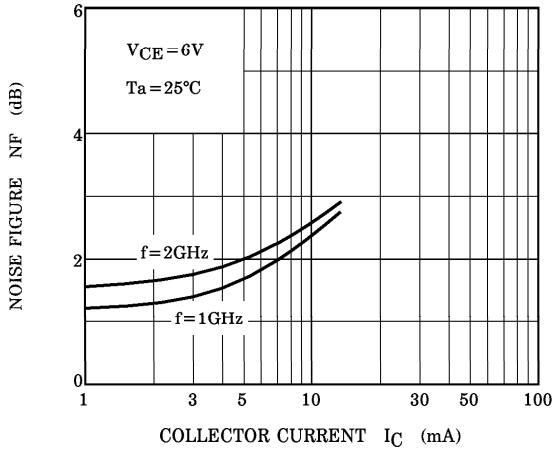
$|S_{21e}|^2$ – I_C



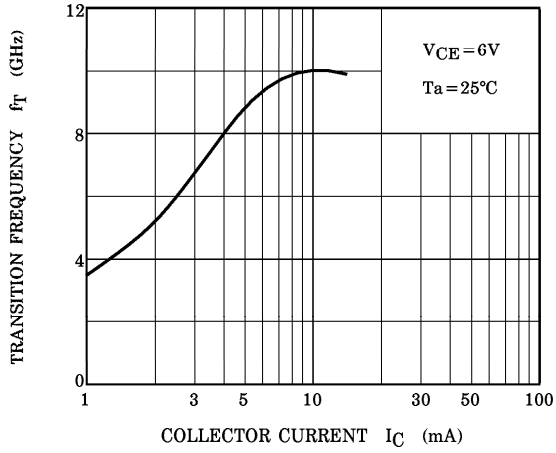
$|S_{21e}|^2$ – f

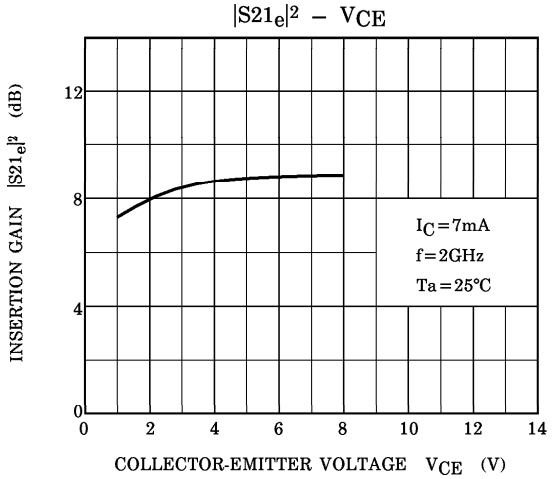


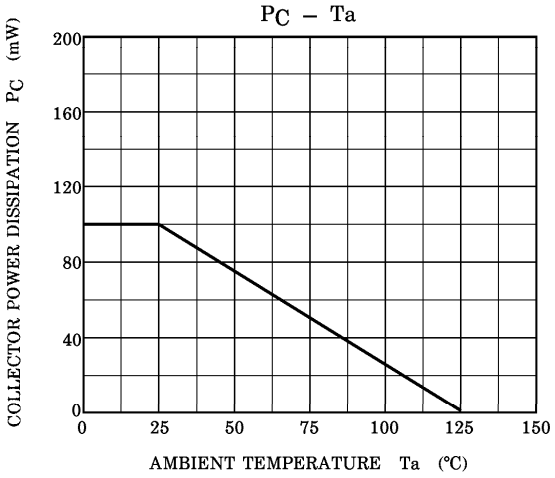
NF – I_C



f_T – I_C







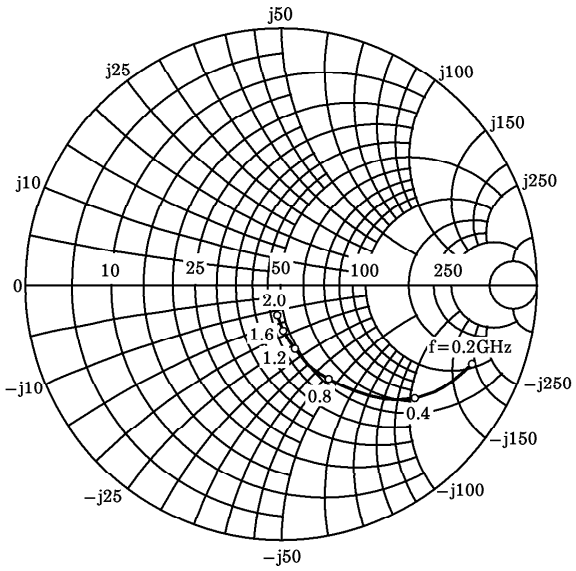
S-PARAMETER Z_O = 50Ω, Ta = 25°C
V_{CE} = 6V, I_C = 3mA

FREQUENCY	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.823	−22.5	7.186	154.4	0.036	74.8	0.928	−14.5
400	0.685	−40.5	6.252	136.4	0.063	65.5	0.805	−23.6
600	0.537	−54.5	5.378	122.5	0.080	60.8	0.700	−28.1
800	0.428	−64.4	4.567	112.6	0.094	59.3	0.627	−30.0
1000	0.343	−71.9	3.961	104.8	0.107	59.3	0.578	−30.7
1200	0.267	−77.4	3.486	98.6	0.119	59.7	0.544	−31.1
1400	0.227	−83.4	3.104	93.3	0.131	60.2	0.518	−31.8
1600	0.187	−86.9	2.793	88.9	0.141	60.6	0.497	−32.2
1800	0.157	−90.6	2.534	85.1	0.153	62.3	0.481	−32.7
2000	0.130	−94.1	2.336	81.2	0.167	62.7	0.466	−33.2

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

FREQUENCY	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.653	−34.3	12.924	144.3	0.032	71.8	0.840	−20.9
400	0.447	−57.1	9.858	122.7	0.051	66.3	0.657	−28.3
600	0.304	−70.0	7.513	109.8	0.066	66.0	0.552	−28.9
800	0.220	−77.9	5.971	101.8	0.081	67.2	0.500	−27.9
1000	0.164	−83.4	4.955	95.6	0.096	68.5	0.470	−26.9
1200	0.123	−87.1	4.225	91.0	0.112	69.1	0.454	−26.3
1400	0.094	−93.7	3.721	86.8	0.127	69.2	0.441	−26.4
1600	0.070	−97.1	3.302	83.3	0.142	69.1	0.430	−26.8
1800	0.054	−102.8	2.974	80.2	0.156	70.1	0.423	−27.0
2000	0.039	−115.8	2.732	76.9	0.174	69.5	0.414	−27.7

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



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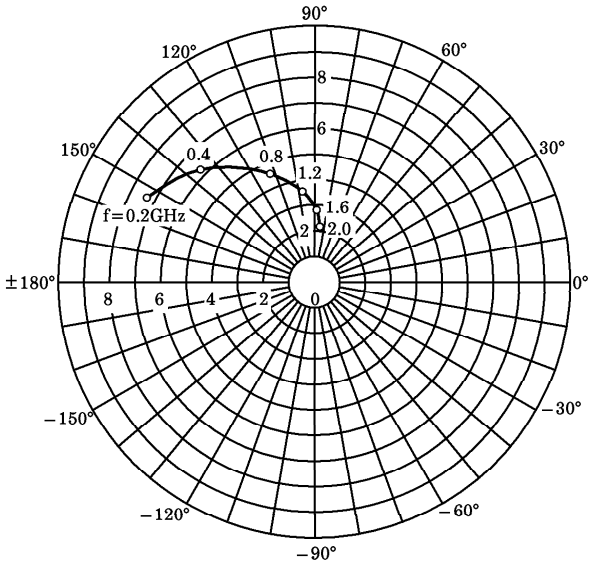

S_{12e}
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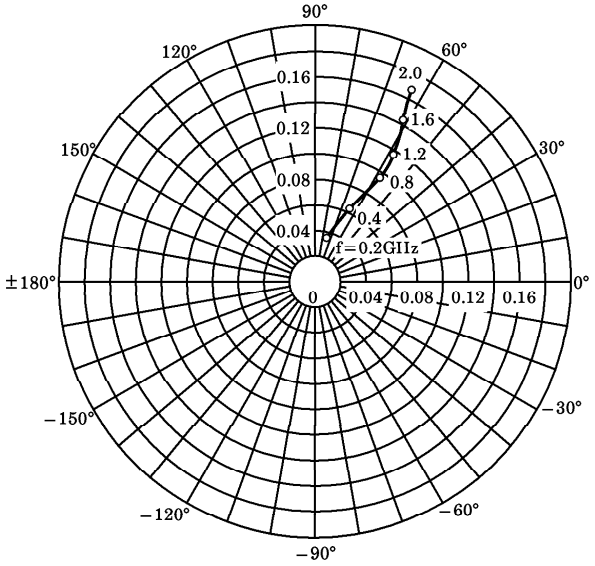

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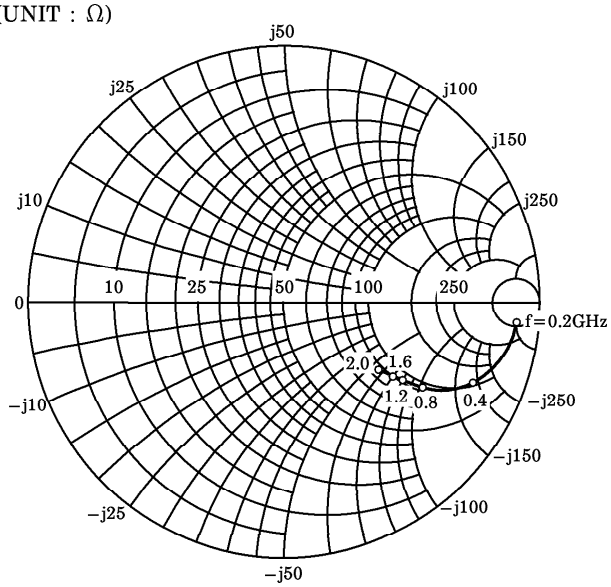

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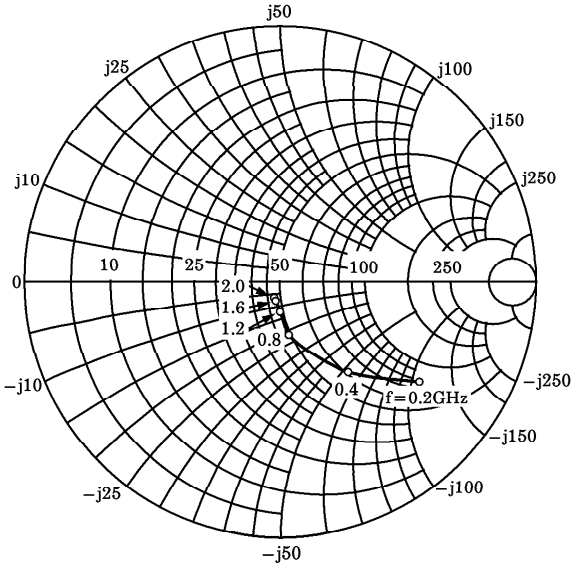

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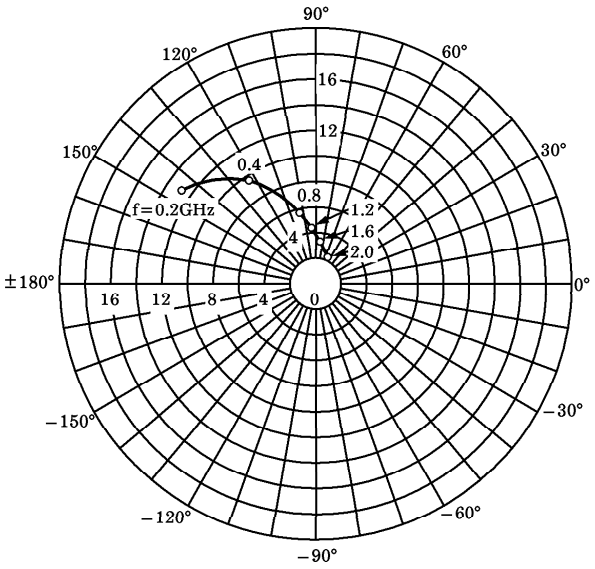

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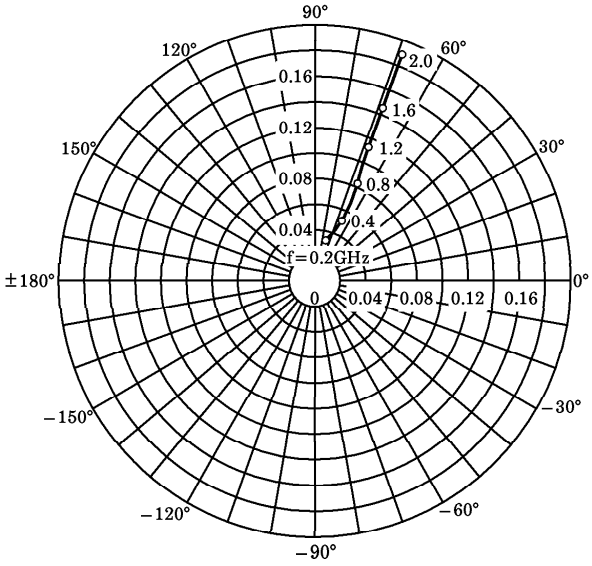

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