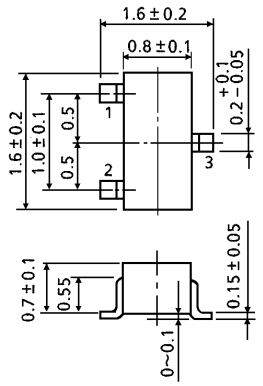
TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

2SC4840

VHF~UHF BAND LOW NOISE AMPLIFIER APPLICATIONS

Unit in mm

- Low Noise Figure, High Gain.
- NF = 1.1dB, $|S_{21e}|^2$ = 13dB (f = 1GHz)



1. BASE
2. EMITTER
3. COLLECTOR

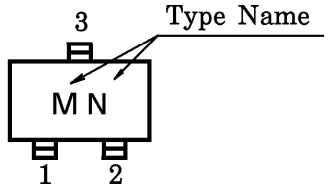
JEDEC	—
EIAJ	—
TOSHIBA	2-2H1A

Weight : 2.4mg

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	V_{CBO}	20	V
Collector-Emitter Voltage	V_{CEO}	10	V
Emitter-Base Voltage	V_{EBO}	1.5	V
Base Current	I_B	20	mA
Collector Current	I_C	40	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)

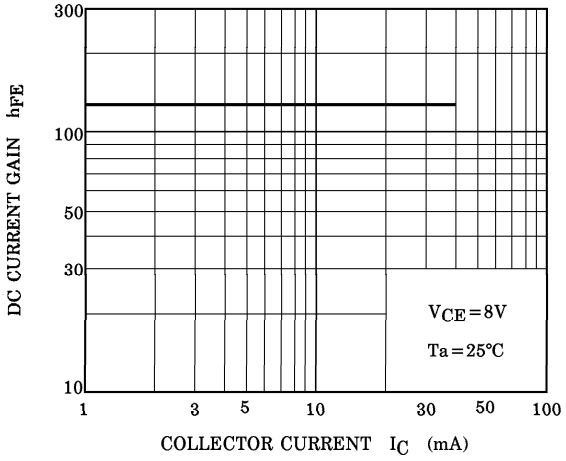
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Transition Frequency	f_T	V_{CE} = 8V, I_C = 20mA	7	10	—	GHz
Insertion Gain	$\|S_{21e}\|^2$ (1)	V_{CE} = 8V, I_C = 20mA, f = 1GHz	10	13	—	dB
	$\|S_{21e}\|^2$ (2)	V_{CE} = 8V, I_C = 20mA, f = 2GHz	—	7	—	
Noise Figure	NF (1)	V_{CE} = 8V, I_C = 5mA, f = 1GHz	—	1.1	2.5	dB
	NF (2)	V_{CE} = 8V, I_C = 5mA, f = 2GHz	—	1.7	—	

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

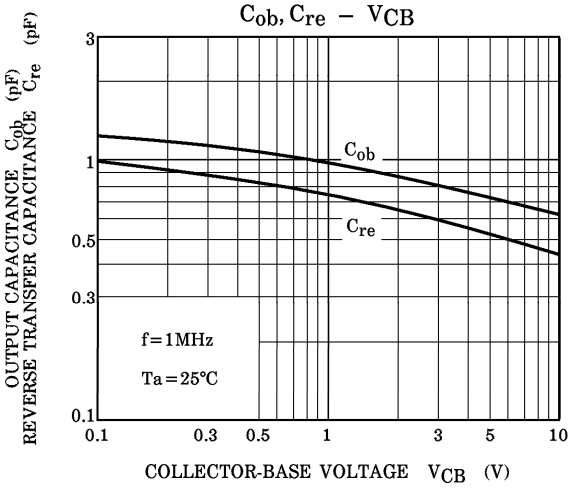
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I_{CBO}	V_{CB} = 10V, I_E = 0	—	—	1	μA
Emitter Cut-off Current	I_{EBO}	V_{EB} = 1V, I_C = 0	—	—	1	μA
DC Current Gain	h_{FE}	V_{CE} = 8V, I_C = 20mA	50	—	250	—
Output Capacitance	C_{ob}	V_{CB} = 10V, I_E = 0, f = 1MHz	—	0.6	—	pF
Reverse Transfer Capacitance	C_{re}	(Note)	—	0.45	0.9	pF

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

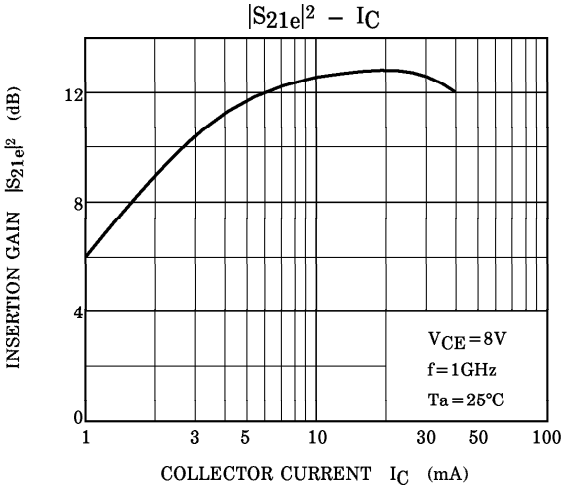
h_{FE} – I_C



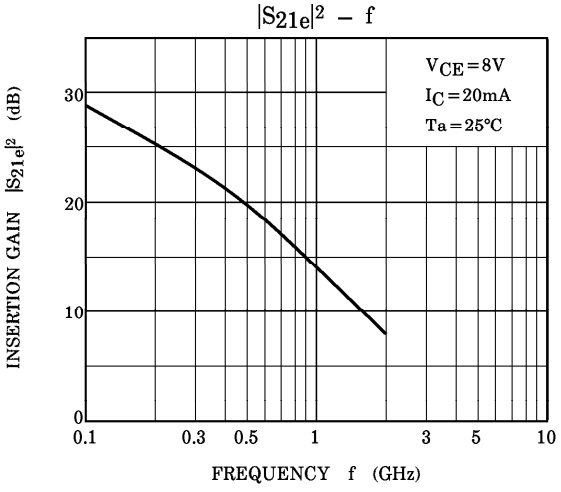
C_{ob}, C_{re} – V_{CB}



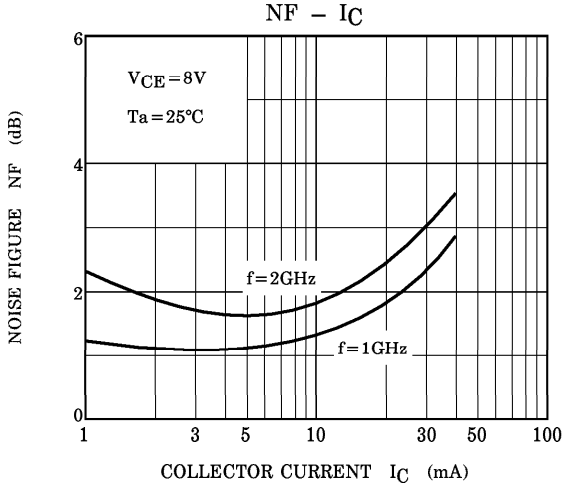
$|S_{21e}|^2$ – I_C



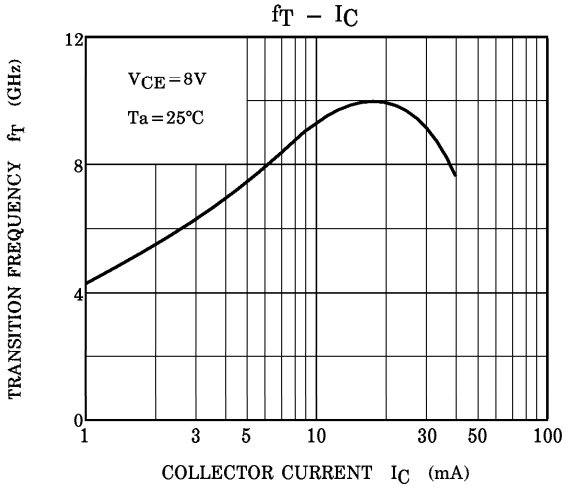
$|S_{21e}|^2$ – f

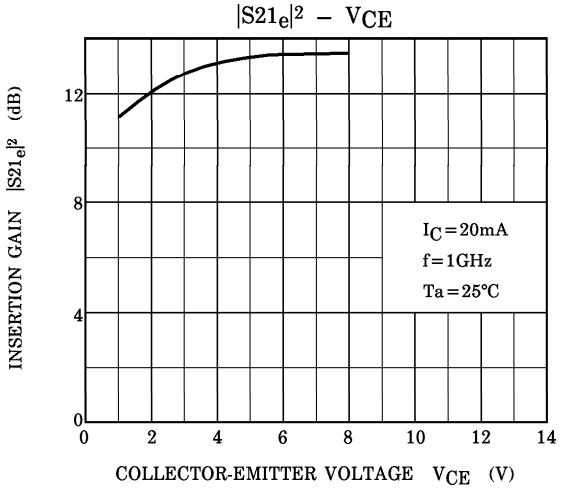


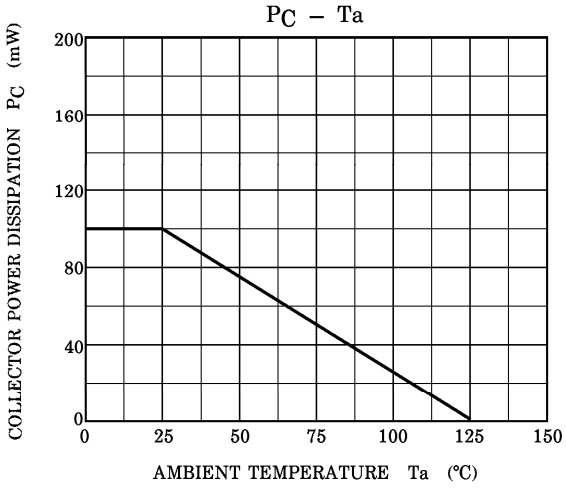
NF – I_C



f_T – I_C







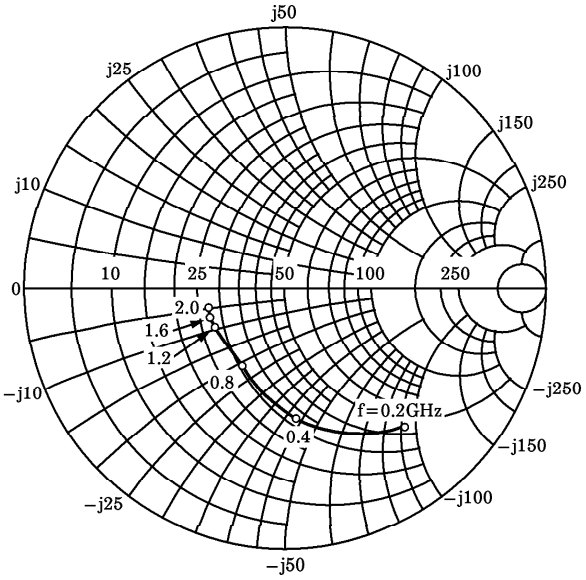
S-PARAMETER Z_O = 50Ω, Ta = 25°C
V_{CE} = 8V, I_C = 5mA

FREQUENCY	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.710	−49.8	10.366	140.1	0.043	63.4	0.805	−24.9
400	0.513	−85.6	7.744	118.2	0.063	55.6	0.609	−32.5
600	0.400	−109.8	5.844	105.6	0.076	55.0	0.507	−33.3
800	0.347	−126.2	4.634	97.8	0.087	57.4	0.456	−32.4
1000	0.319	−138.6	3.851	91.9	0.099	60.2	0.427	−31.8
1200	0.303	−148.0	3.310	87.4	0.112	62.9	0.411	−31.5
1400	0.299	−155.5	2.914	83.3	0.126	64.4	0.401	−32.6
1600	0.294	−160.5	2.610	80.0	0.139	65.9	0.389	−33.8
1800	0.296	−160.3	2.367	77.4	0.153	68.7	0.380	−34.8
2000	0.300	−163.9	2.184	75.0	0.171	69.3	0.376	−36.4

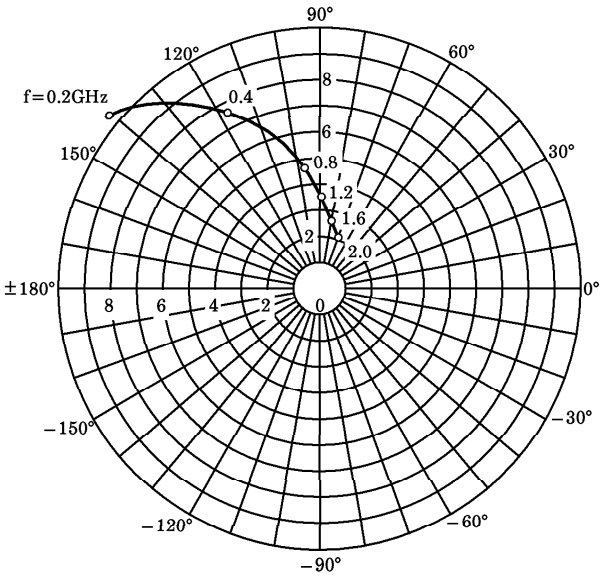
V_{CE} = 8V, I_C = 20mA

FREQUENCY	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.383	−98.8	19.474	117.1	0.043	63.5	0.538	−34.2
400	0.292	−134.7	10.899	100.9	0.063	55.5	0.384	−30.2
600	0.270	−154.3	7.496	93.5	0.076	55.0	0.341	−25.5
800	0.262	−165.3	5.727	88.7	0.087	57.3	0.327	−22.9
1000	0.256	−173.1	4.663	84.6	0.099	60.1	0.321	−21.8
1200	0.254	−178.3	3.972	81.4	0.112	62.7	0.322	−22.3
1400	0.257	178.1	3.462	78.3	0.126	64.4	0.320	−23.7
1600	0.258	176.3	3.088	75.7	0.138	66.0	0.315	−25.3
1800	0.258	176.5	2.786	73.7	0.153	68.5	0.314	−26.2
2000	0.265	177.7	2.569	71.6	0.171	69.4	0.308	−28.3

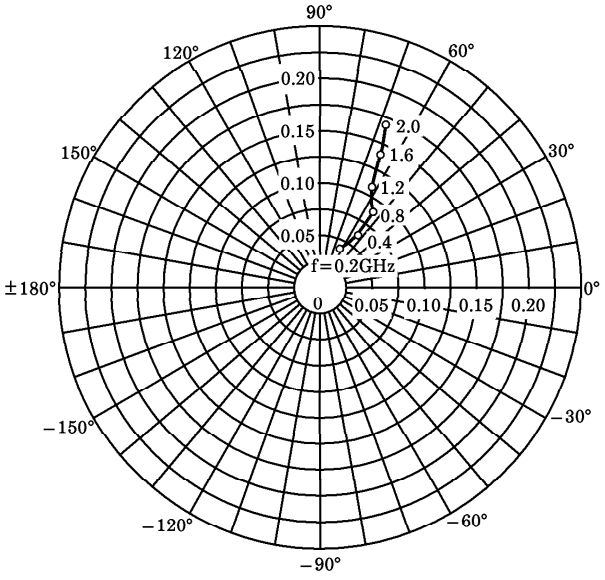
S_{11e}
V_{CE} = 8V
I_C = 5mA
Ta = 25°C
(UNIT : Ω)



S_{21e}
V_{CE} = 8V
I_C = 5mA
Ta = 25°C



S_{12e}
V_{CE} = 8V
I_C = 5mA
Ta = 25°C



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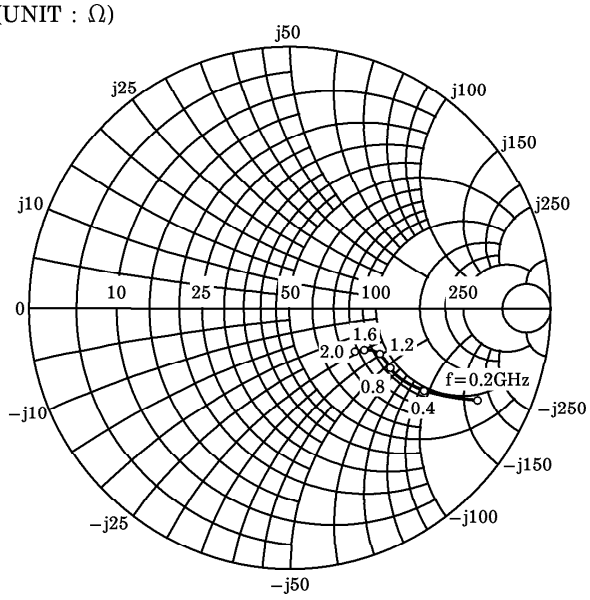

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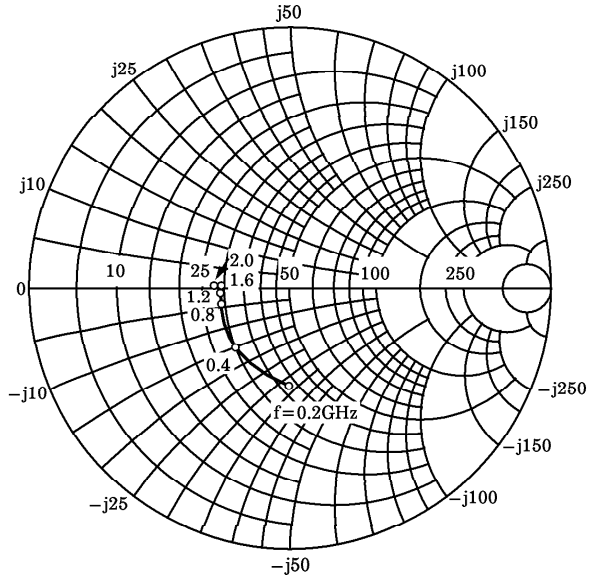

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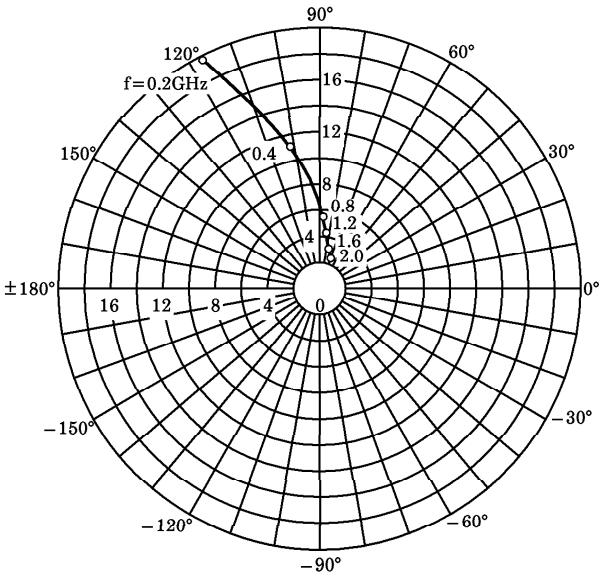

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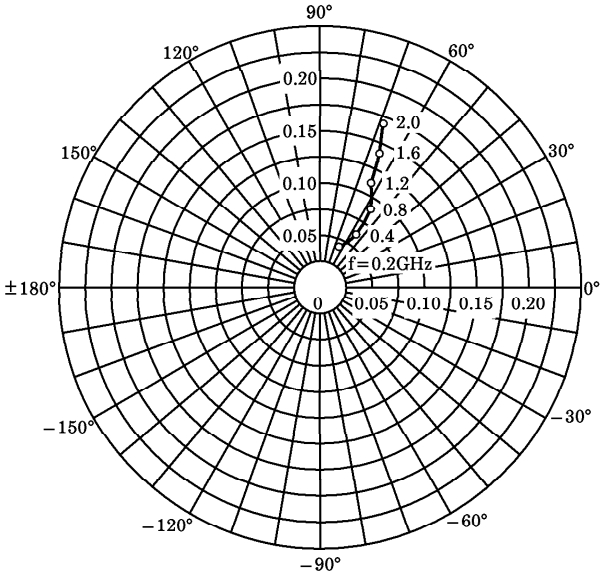

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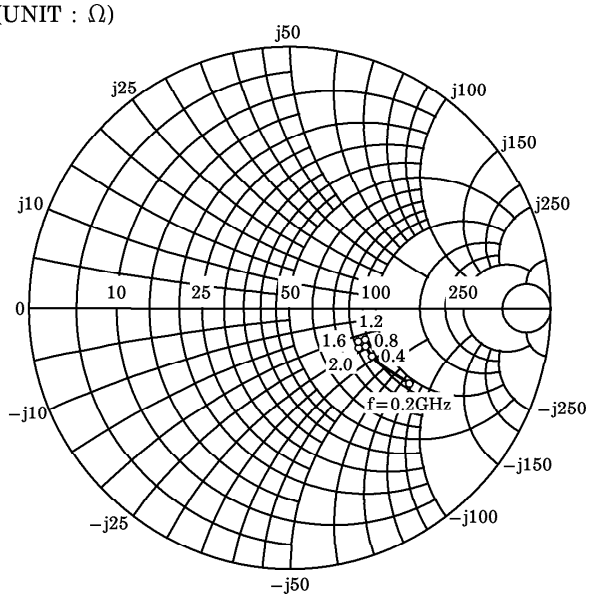

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