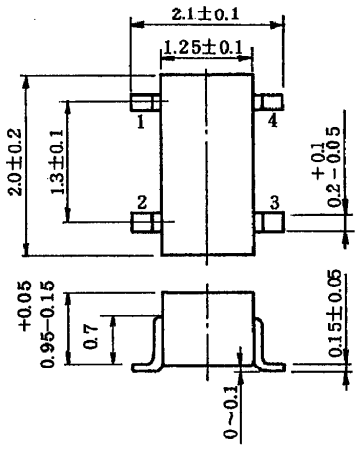
TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

2SC4842

VHF~UHF BAND LOW NOISE AMPLIFIER APPLICATIONS.

Unit in mm

- Low Noise Figure, High Gain.
- NF = 1.1dB, $|S_{21e}|^2$ = 14dB (f = 1GHz)



1, 3. EMITTER
2. BASE
4. COLLECTOR

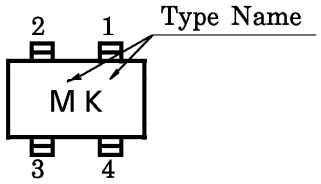
JEDEC	—
EIAJ	—
TOSHIBA	2-2K1A

Weight : 0.006g

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
Collector Current	I_C	80	mA
Base Current	I_B	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} = 10V, I_C = 20mA	5	7	—	GHz
Insertion Gain	$\|S_{21e}\|^2$ (1)	V_{CE} = 10V, I_C = 20mA, f = 500MHz	—	19.5	—	dB
	$\|S_{21e}\|^2$ (2)	V_{CE} = 10V, I_C = 20mA, f = 1GHz	10.5	14	—	
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}	V_{CE} = 10V, I_C = 20mA	30	—	250	—
Output Capacitance	C_{ob}	V_{CB} = 10V, I_E = 0, f = 1MHz (Note)	—	0.8	—	pF
Reverse Transfer Capacitance	C_{re}		—	0.55	1	pF

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

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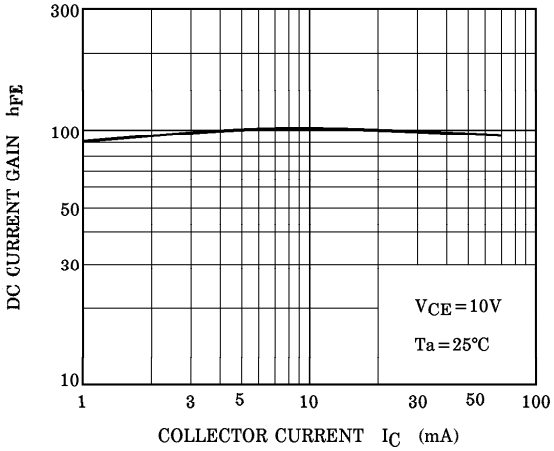
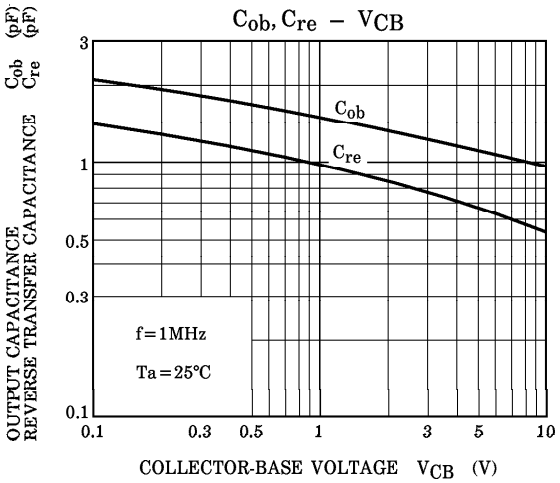
● TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

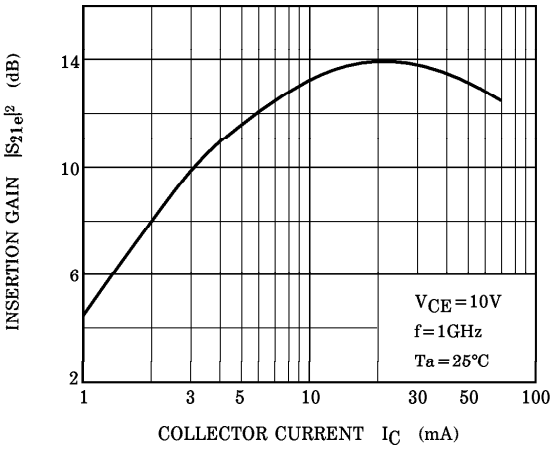
h_{FE} – I_C



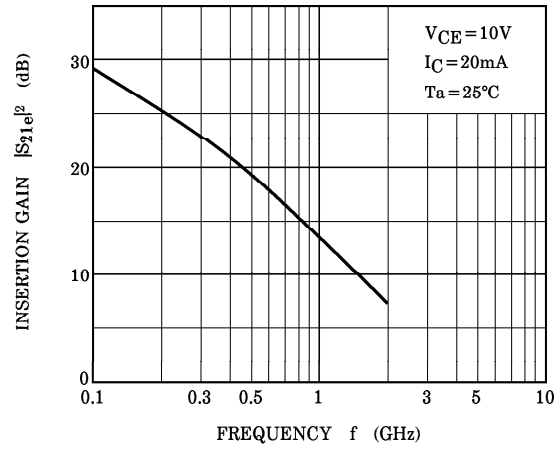
C_{ob}, C_{re} – V_{CB}



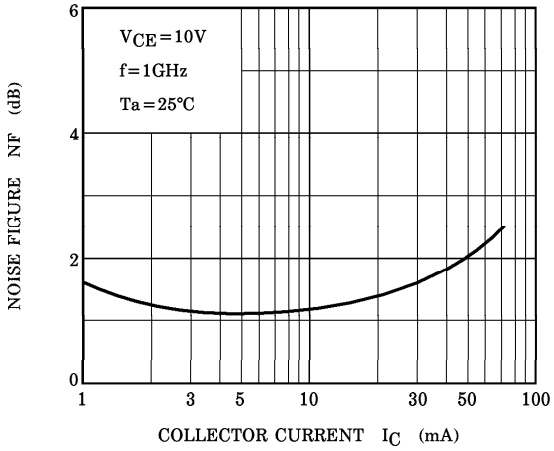
$|S_{21e}|^2$ – I_C



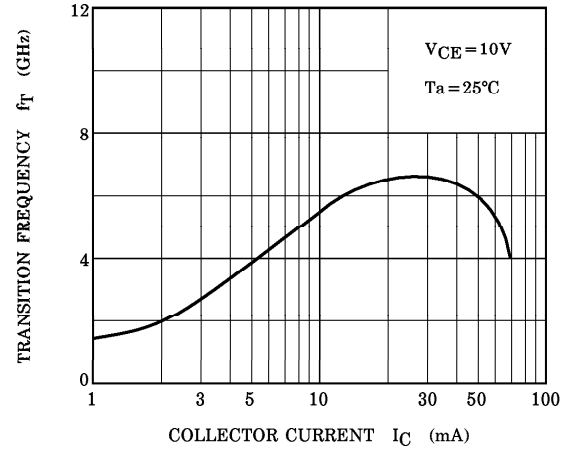
$|S_{21e}|^2$ – f



NF – I_C



f_T – I_C



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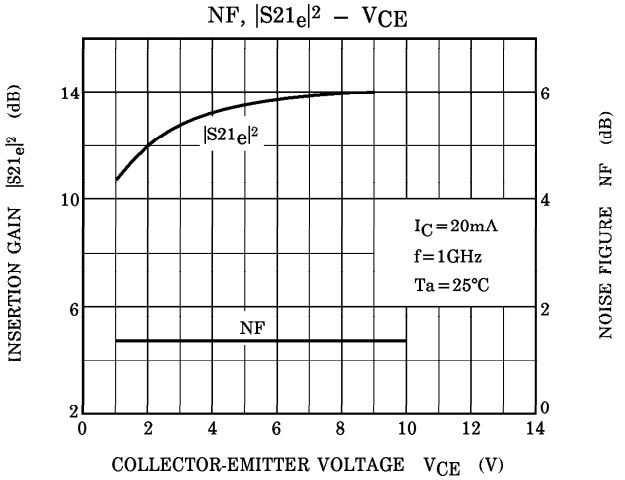
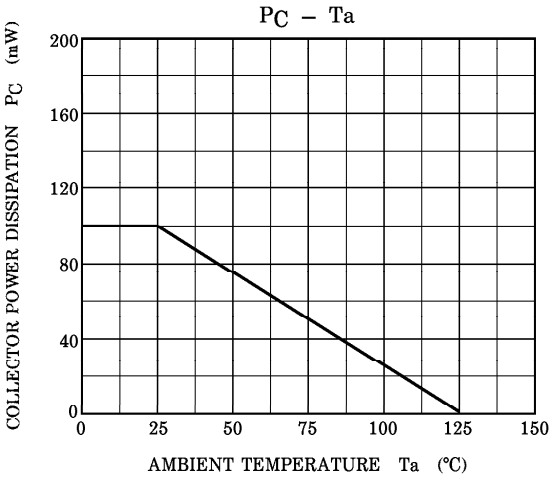
- The information contained herein is subject to change without notice.





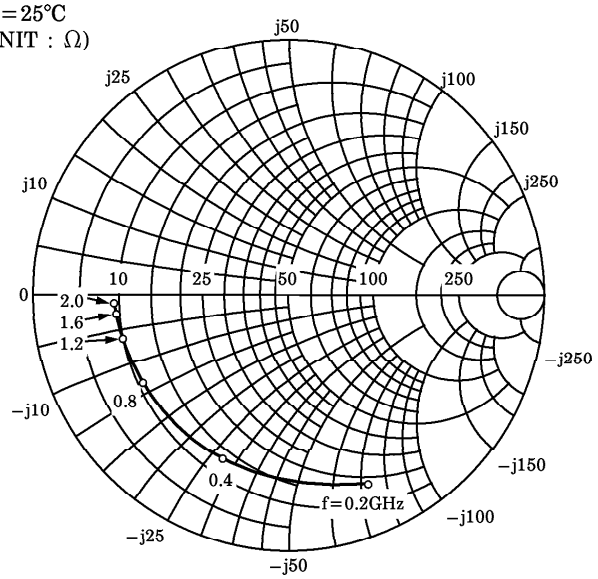
S-PARAMETER $Z_O = 50\Omega$, Ta = 25°C
V_{CE} = 10V, I_C = 5mA

FREQUENCY	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.794	−68.9	10.322	137.8	0.048	54.1	0.798	−29.8
400	0.722	−112.7	7.453	114.8	0.065	38.7	0.599	−41.1
600	0.699	−136.4	5.534	101.5	0.070	33.4	0.500	−45.9
800	0.683	−150.6	4.321	92.9	0.072	32.5	0.450	−49.3
1000	0.678	−160.9	3.499	86.1	0.073	33.7	0.425	−53.1
1200	0.680	−168.2	2.967	81.2	0.073	36.5	0.412	−57.1
1400	0.688	−173.8	2.584	76.5	0.074	40.7	0.408	−61.5
1600	0.692	−178.4	2.291	72.6	0.075	45.7	0.406	−66.2
1800	0.702	−177.5	2.071	68.8	0.078	50.8	0.409	−70.6
2000	0.709	−173.7	1.902	64.9	0.082	56.0	0.416	−75.4

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

FREQUENCY	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.645	−117.4	19.826	117.5	0.029	45.7	0.517	−47.9
400	0.637	−150.2	11.127	100.3	0.037	46.1	0.334	−53.2
600	0.643	−163.3	7.616	91.9	0.043	51.2	0.273	−54.3
800	0.646	−171.5	5.780	86.7	0.050	56.4	0.247	−56.6
1000	0.653	−177.7	4.629	82.0	0.057	60.7	0.237	−60.2
1200	0.662	178.1	3.903	78.7	0.065	64.0	0.235	−64.2
1400	0.668	174.2	3.399	75.0	0.073	66.8	0.237	−69.2
1600	0.678	170.7	3.006	71.7	0.082	69.1	0.241	−74.1
1800	0.679	167.5	2.711	68.7	0.091	71.1	0.248	−78.5
2000	0.631	164.6	2.475	65.2	0.100	72.7	0.259	−83.1

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



S_{21e}
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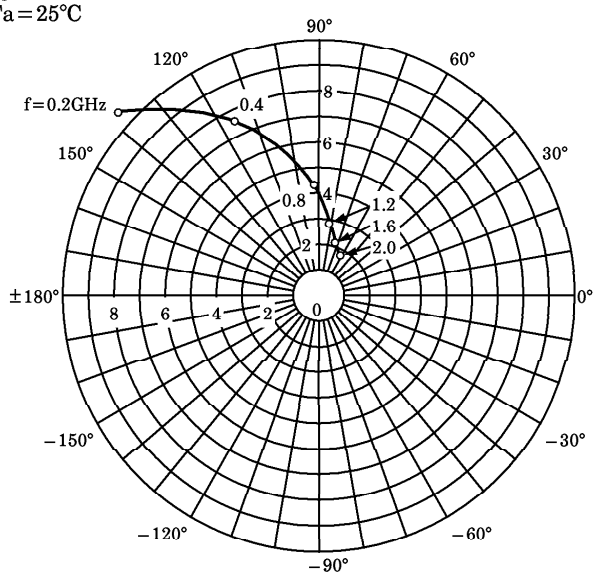

S_{12e}
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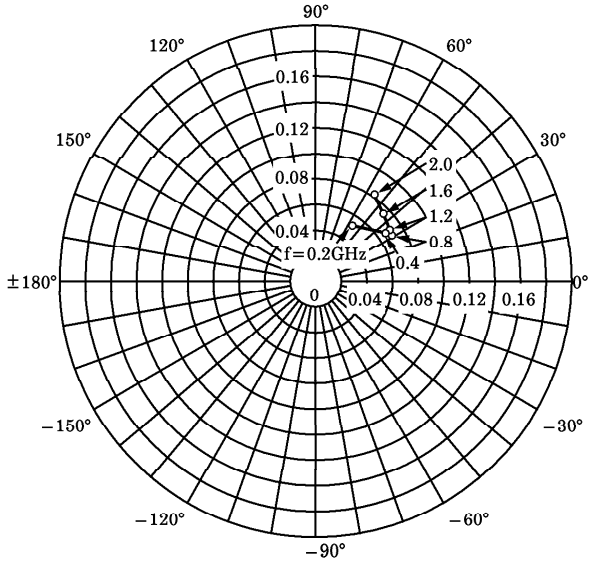

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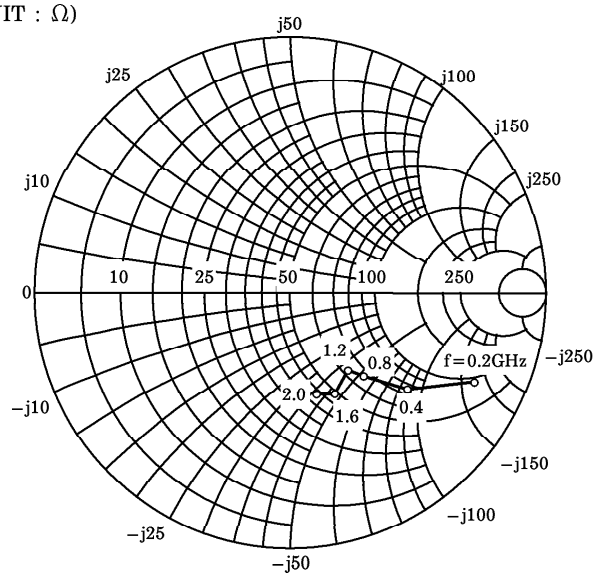

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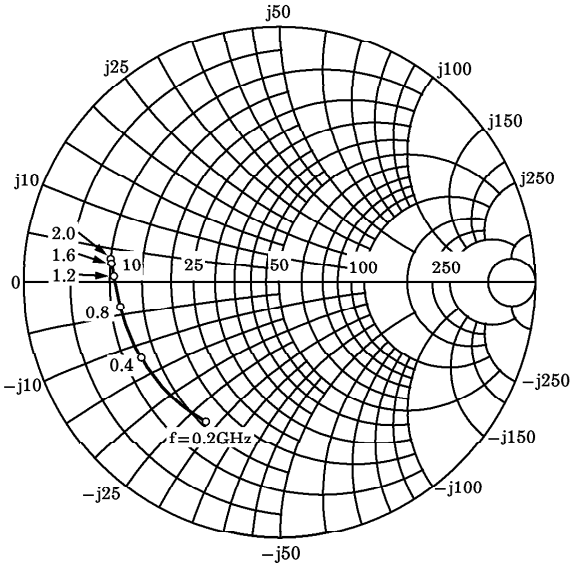

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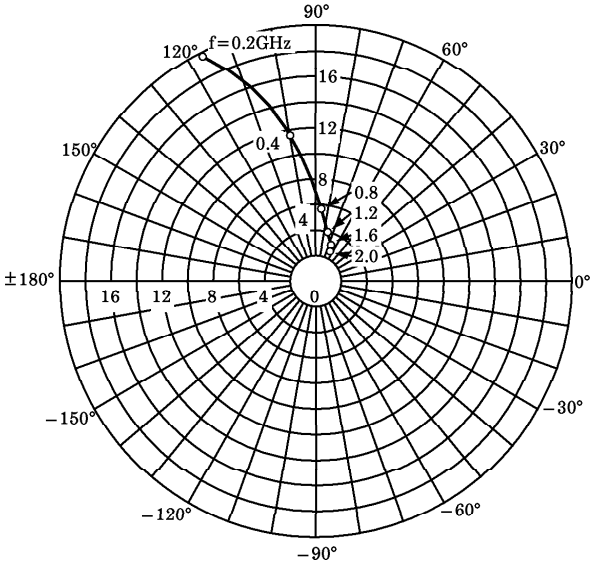

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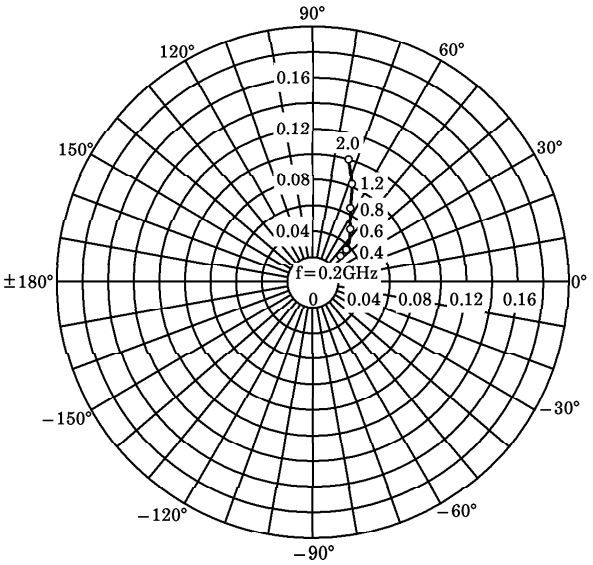
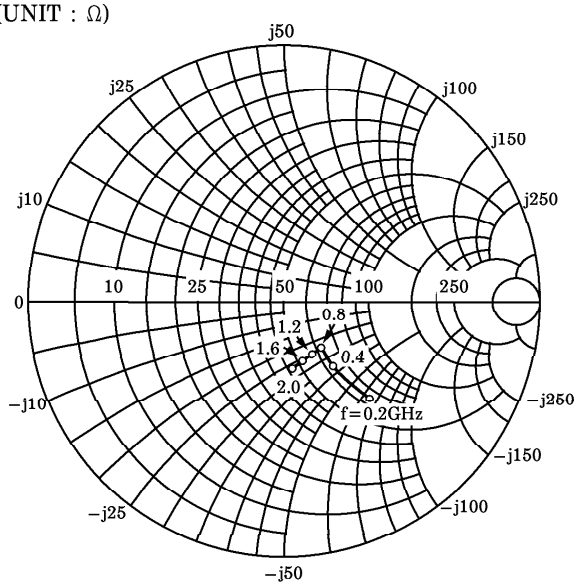
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