

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

# 2SC4844

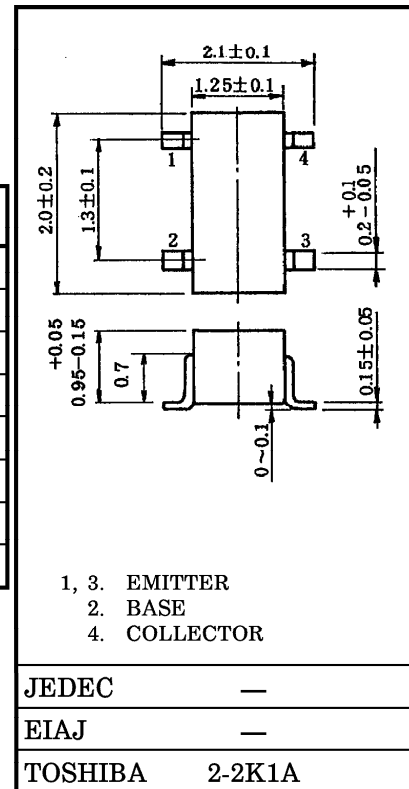
VHF~UHF BAND LOW NOISE AMPLIFIER APPLICATIONS.

Unit in mm

- Low Noise Figure, High Gain.
- $NF = 1.8\text{dB}$ ,  $|S_{21e}|^2 = 9.5\text{dB}$  ( $f = 2\text{GHz}$ )

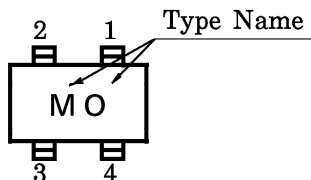
MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	$V_{CB0}$	20	V
Collector-Emitter Voltage	$V_{CEO}$	10	V
Emitter-Base Voltage	$V_{EB0}$	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	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-55~125	$^\circ\text{C}$



Weight : 0.006g

Marking



MICROWAVE CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Transition Frequency	$f_T$	$V_{CE} = 6\text{V}$ , $I_C = 7\text{mA}$	7	10	—	GHz
Insertion Gain	$ S_{21e} ^2$ (1)	$V_{CE} = 6\text{V}$ , $I_C = 7\text{mA}$ , $f = 1\text{GHz}$	—	15	—	dB
	$ S_{21e} ^2$ (2)	$V_{CE} = 6\text{V}$ , $I_C = 7\text{mA}$ , $f = 2\text{GHz}$	6.5	9.5	—	
Noise Figure	NF (1)	$V_{CE} = 6\text{V}$ , $I_C = 3\text{mA}$ , $f = 1\text{GHz}$	—	1.4	—	dB
	NF (2)	$V_{CE} = 6\text{V}$ , $I_C = 3\text{mA}$ , $f = 2\text{GHz}$	—	1.8	3.0	

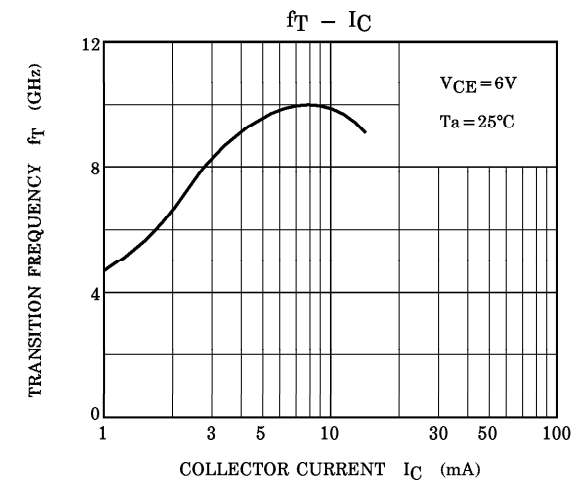
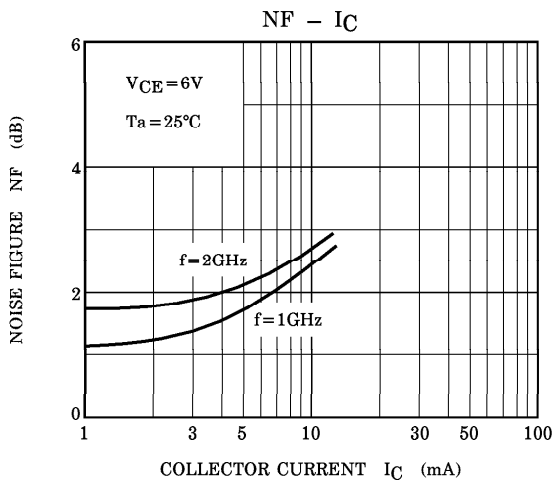
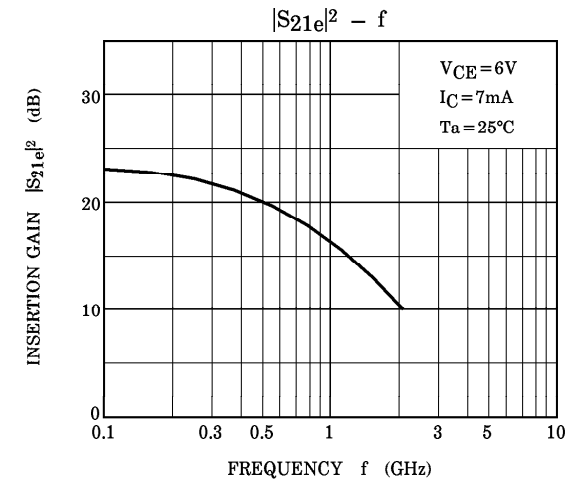
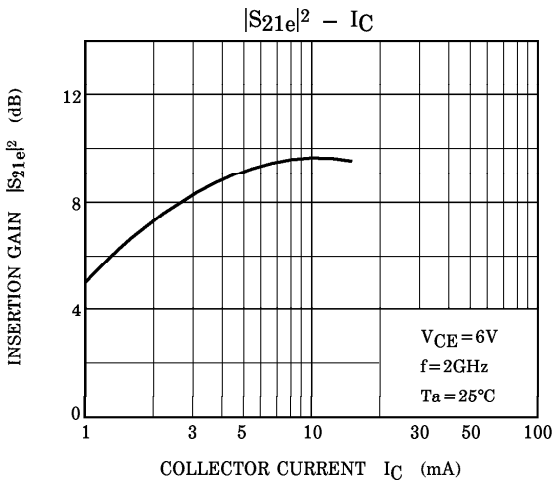
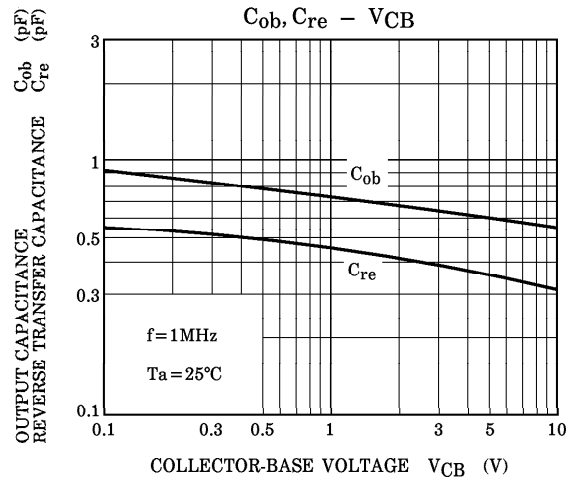
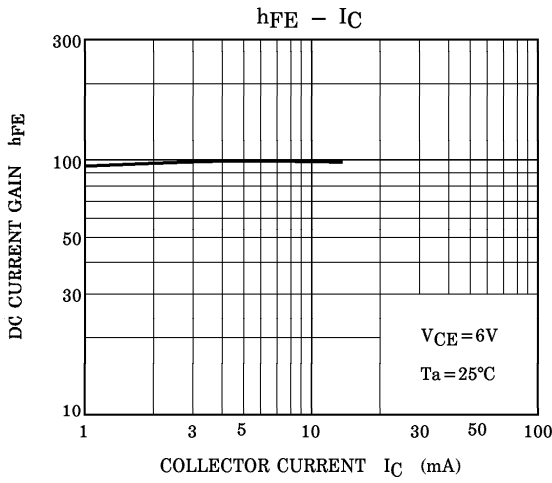
ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	$I_{CBO}$	$V_{CB} = 10\text{V}$ , $I_E = 0$	—	—	1	$\mu\text{A}$
Emitter Cut-off Current	$I_{EBO}$	$V_{EB} = 1\text{V}$ , $I_C = 0$	—	—	1	$\mu\text{A}$
DC Current Gain	$h_{FE}$	$V_{CE} = 6\text{V}$ , $I_C = 7\text{mA}$	50	—	250	—
Output Capacitance	$C_{ob}$	$V_{CB} = 10\text{V}$ , $I_E = 0$ , $f = 1\text{MHz}$	—	0.55	—	pF
Reverse Transfer Capacitance	$C_{re}$	(Note)	—	0.35	0.8	pF

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

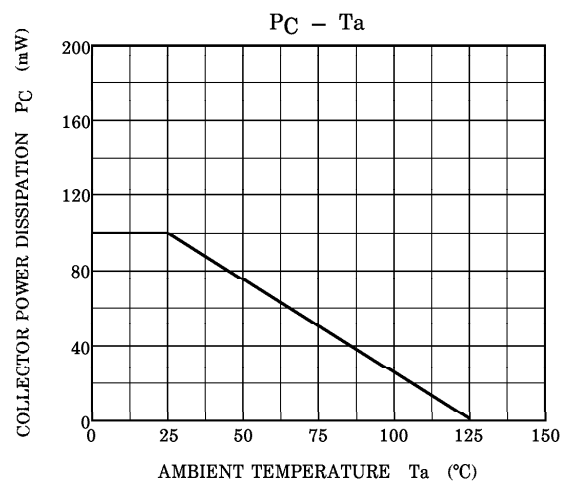
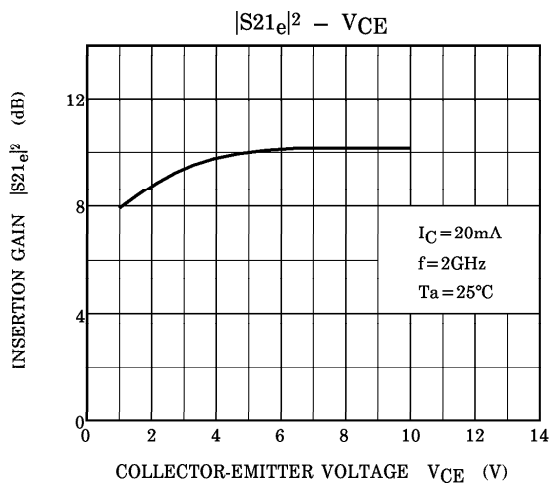
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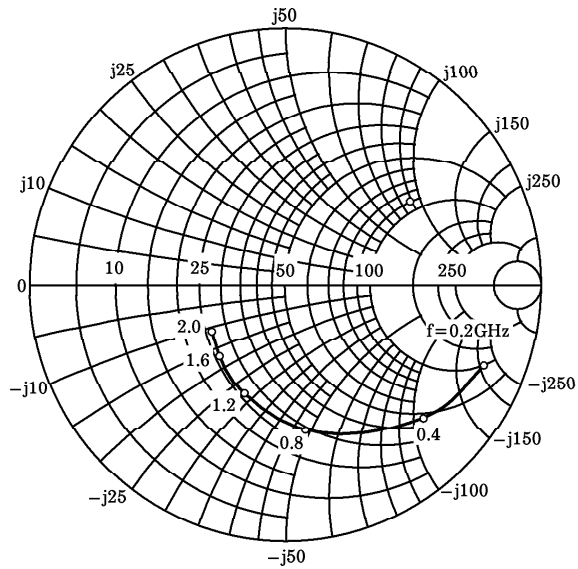
S-PARAMETER  $Z_O = 50\Omega$ ,  $T_a = 25^\circ\text{C}$   
 $V_{CE} = 6\text{V}$ ,  $I_C = 3\text{mA}$

FREQUENCY MHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.847	-22.2	7.290	159.9	0.037	75.5	0.954	-16.2
400	0.767	-43.8	6.718	143.8	0.066	64.5	0.857	-29.3
600	0.666	-63.7	6.064	129.8	0.087	56.5	0.765	-39.3
800	0.573	-80.8	5.332	119.0	0.102	51.3	0.680	-47.0
1000	0.492	-96.6	4.642	109.6	0.113	47.5	0.612	-53.3
1200	0.435	-111.0	4.133	102.7	0.121	45.1	0.560	-58.2
1400	0.393	-122.1	3.671	96.6	0.126	44.0	0.518	-62.6
1600	0.366	-132.7	3.314	92.1	0.131	43.5	0.486	-66.5
1800	0.351	-141.5	3.051	88.0	0.136	43.4	0.466	-70.2
2000	0.340	-149.6	2.820	83.7	0.141	43.8	0.450	-73.2

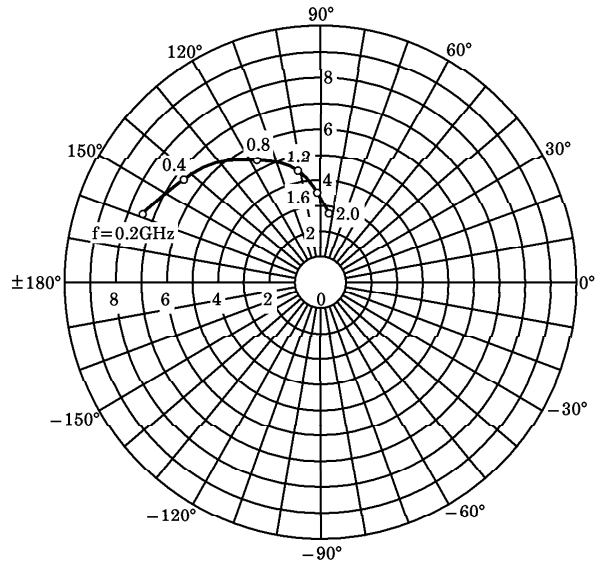
$V_{CE} = 6\text{V}$ ,  $I_C = 7\text{mA}$

FREQUENCY MHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.708	-36.8	13.239	151.4	0.032	70.2	0.890	-23.8
400	0.582	-69.7	11.041	131.1	0.053	59.2	0.718	-39.1
600	0.491	-96.0	8.920	116.6	0.066	54.3	0.589	-48.1
800	0.425	-116.4	7.290	107.1	0.074	52.7	0.502	-53.8
1000	0.386	-133.3	6.049	99.4	0.082	52.7	0.442	-58.0
1200	0.368	-147.0	5.176	94.3	0.090	53.5	0.405	-61.3
1400	0.353	-157.1	4.527	89.3	0.097	54.5	0.378	-64.7
1600	0.347	-166.1	4.007	85.7	0.105	55.7	0.359	-67.9
1800	0.345	-172.9	3.634	82.2	0.113	56.7	0.347	-70.7
2000	0.344	-179.0	3.333	78.8	0.120	57.9	0.340	-74.1

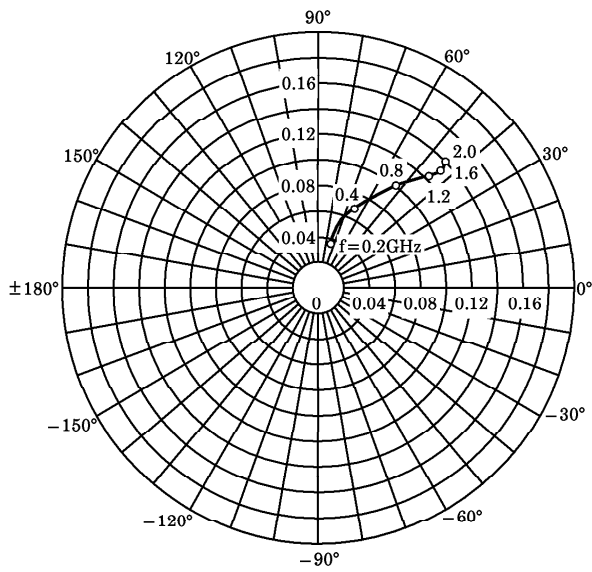
$S_{11e}$   
 $V_{CE}=6V$   
 $I_C=3mA$   
 $T_a=25^\circ C$   
 (UNIT :  $\Omega$ )



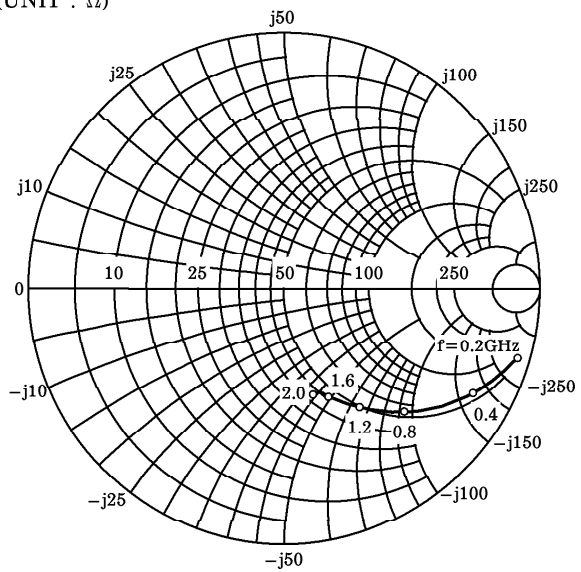
$S_{21e}$   
 $V_{CE}=6V$   
 $I_C=3mA$   
 $T_a=25^\circ C$



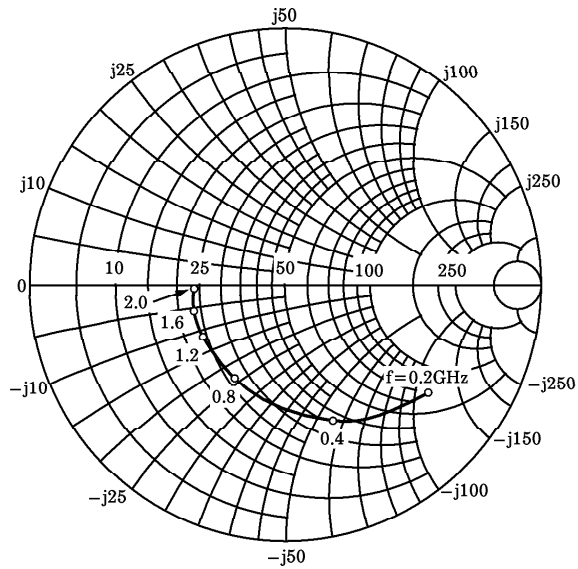
$S_{12e}$   
 $V_{CE}=6V$   
 $I_C=3mA$   
 $T_a=25^\circ C$



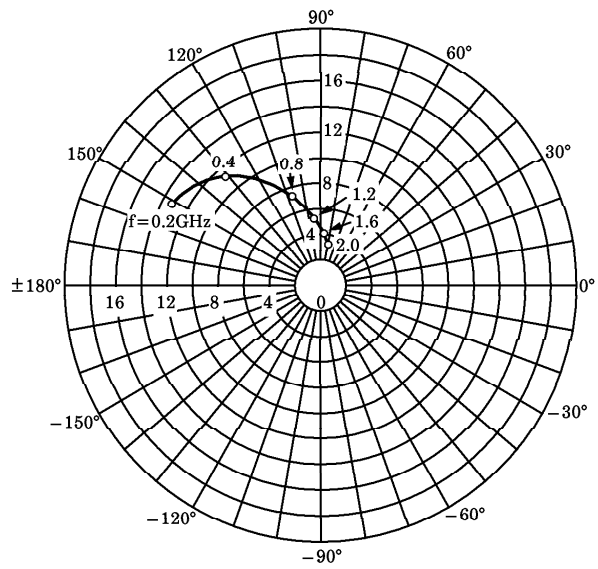
$S_{22e}$   
 $V_{CE}=6V$   
 $I_C=3mA$   
 $T_a=25^\circ C$   
 (UNIT :  $\Omega$ )



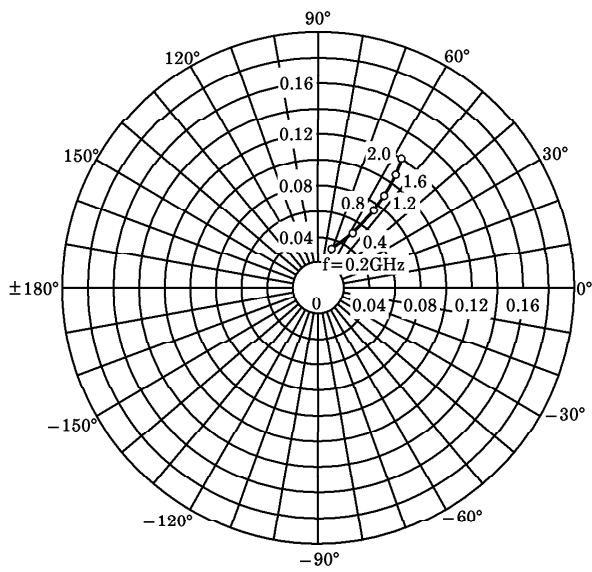
S<sub>11e</sub>  
 V<sub>CE</sub>=6V  
 I<sub>C</sub>=7mA  
 T<sub>a</sub>=25°C  
 (単位 : Ω)



S<sub>21e</sub>  
 V<sub>CE</sub>=6V  
 I<sub>C</sub>=7mA  
 T<sub>a</sub>=25°C



S<sub>12e</sub>  
 V<sub>CE</sub>=6V  
 I<sub>C</sub>=7mA  
 T<sub>a</sub>=25°C



S<sub>22e</sub>  
 V<sub>CE</sub>=6V  
 I<sub>C</sub>=7mA  
 T<sub>a</sub>=25°C  
 (単位 : Ω)

