

TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

2SC4844

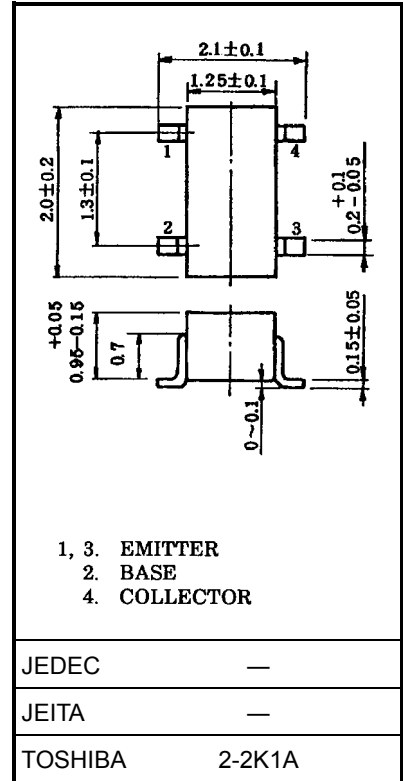
VHF~UHF Band Low Noise Amplifier Applications

Unit: mm

- Low noise figure, high gain.
- $NF = 1.8\text{dB}$, $|S_{21e}|^2 = 9.5\text{dB}$ ($f = 2\text{GHz}$)

Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics	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	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55~125	$^\circ\text{C}$



Microwave Characteristics ($T_a = 25^\circ\text{C}$)

Weight: 0.006 g (typ.)

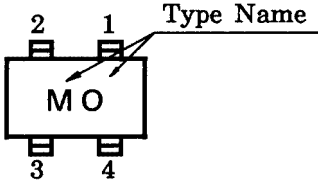
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition frequency	f_T	$V_{CE} = 6\text{V}$, $I_C = 7\text{mA}$	7	10	—	GHz
Insertion gain	$ S_{21e} ^2 (1)$	$V_{CE} = 6\text{V}$, $I_C = 7\text{mA}$, $f = 1\text{GHz}$	—	15	—	dB
	$ S_{21e} ^2 (2)$	$V_{CE} = 6\text{V}$, $I_C = 7\text{mA}$, $f = 2\text{GHz}$	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	

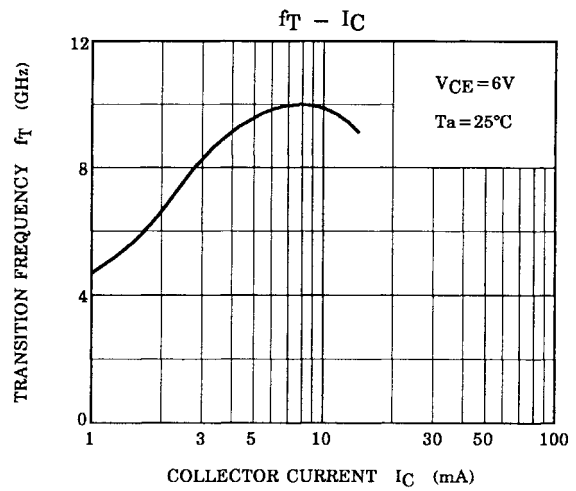
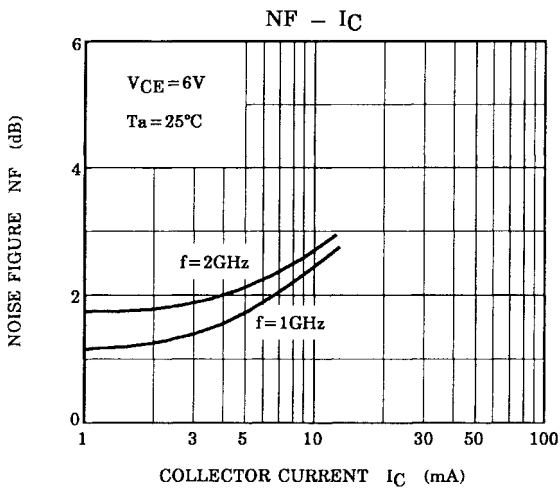
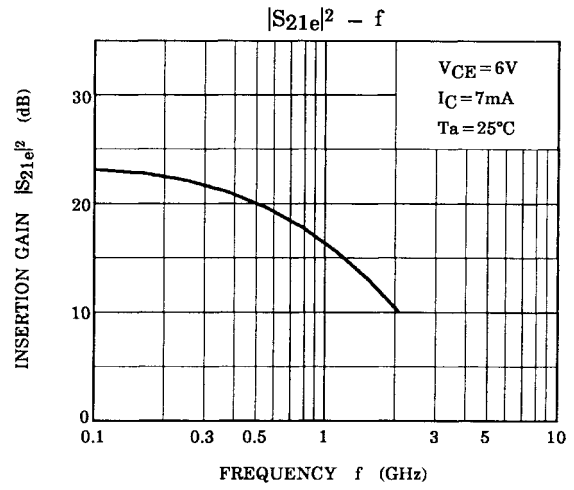
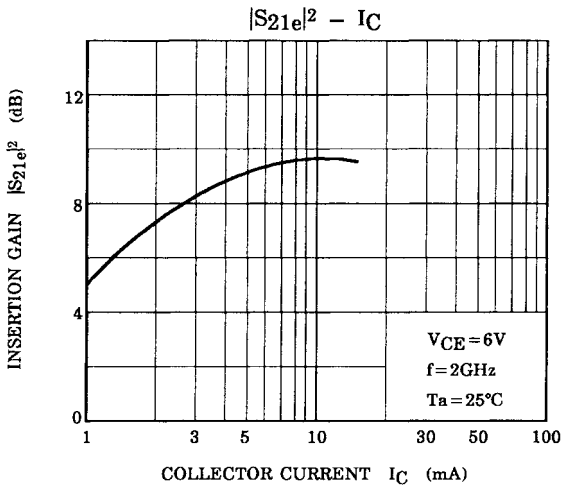
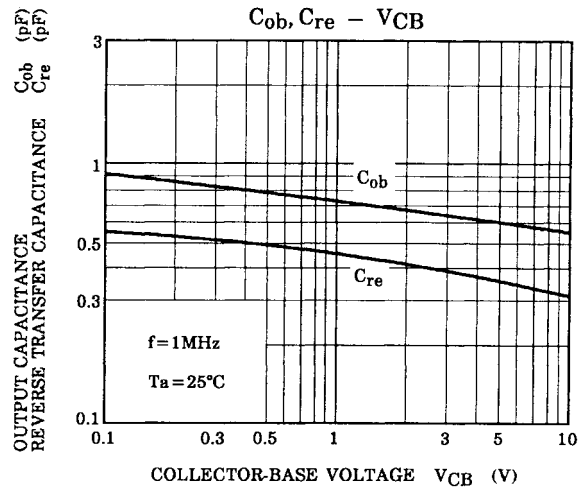
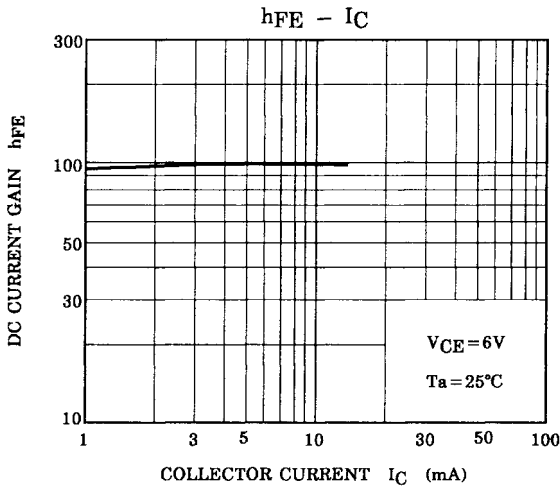
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

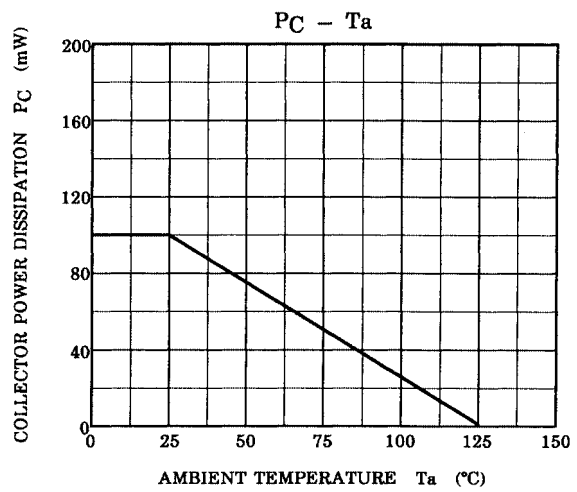
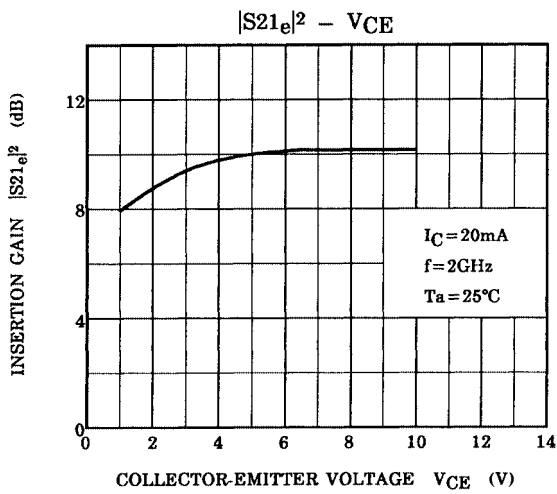
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	$V_{CB} = 10\text{V}$, $I_E = 0$	—	—	1	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = 1\text{V}$, $I_C = 0$	—	—	1	μA
DC current gain	h_{FE}	$V_{CE} = 6\text{V}$, $I_C = 7\text{mA}$	50	—	250	
Output capacitance	C_{ob}	$V_{CB} = 10\text{V}$, $I_E = 0$, $f = 1\text{MHz}$ (Note)	—	0.55	—	pF
Reverse transfer capacitance	C_{re}		—	0.35	0.8	pF

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

Marking







S-Parameter $Z_O = 50 \Omega, T_a = 25^\circ\text{C}$

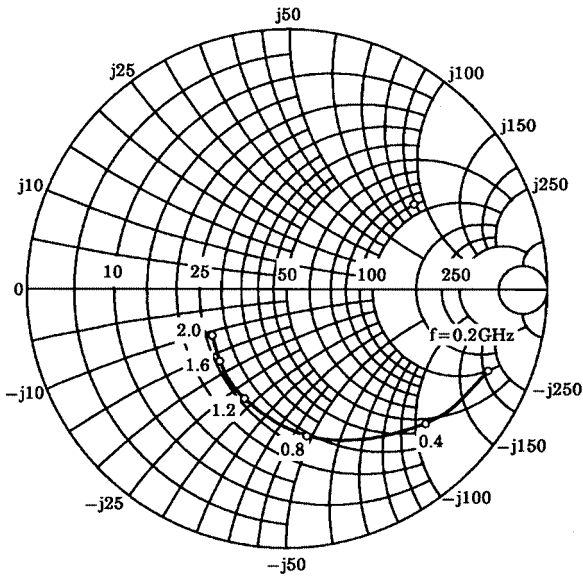
$V_{CE} = 6 \text{ V}, I_C = 3 \text{ mA}$

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

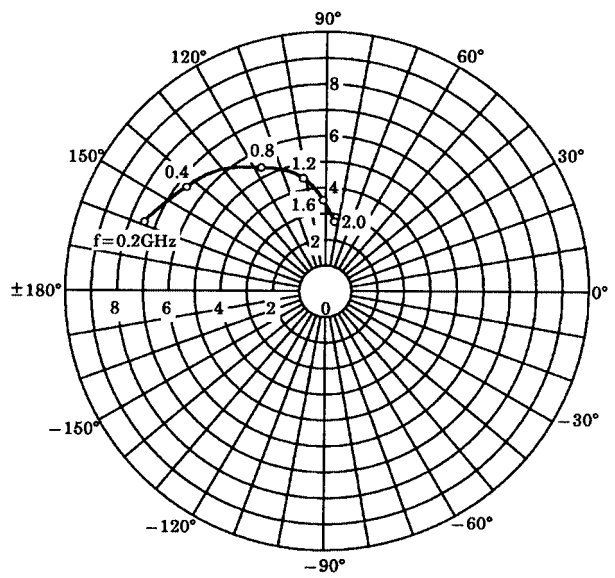
$V_{CE} = 6 \text{ V}, I_C = 7 \text{ mA}$

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

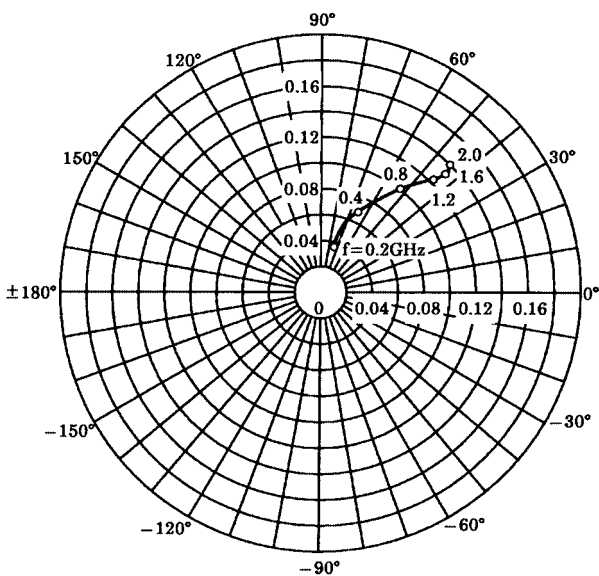
S11e
 VCE=6V
 IC=3mA
 Ta=25°C
 (UNIT : Ω)



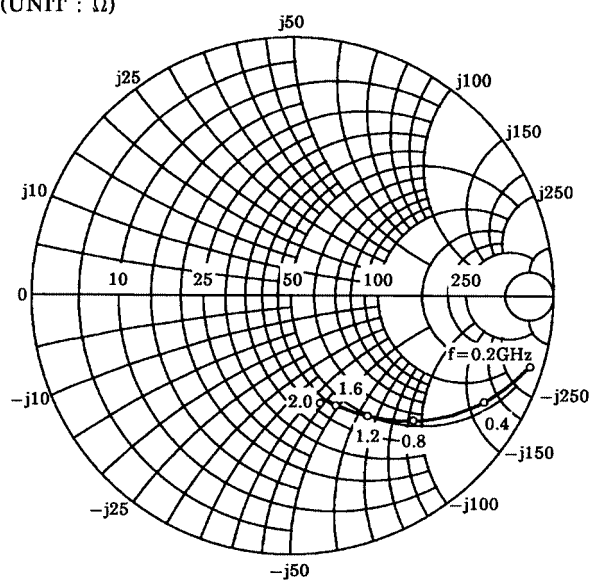
S21e
 VCE=6V
 IC=3mA
 Ta=25°C



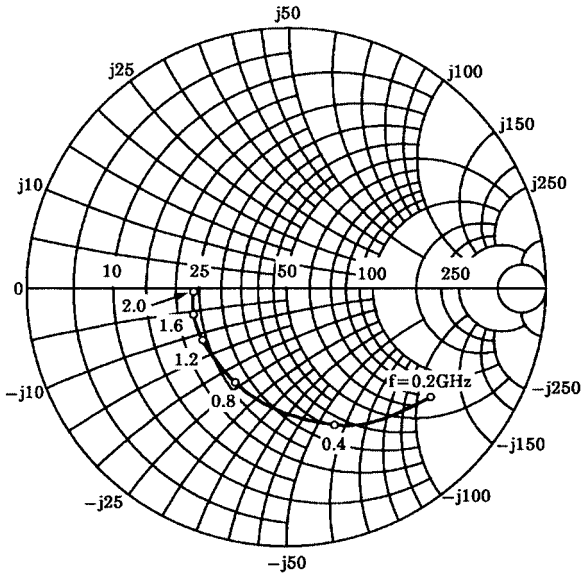
S12e
 VCE=6V
 IC=3mA
 Ta=25°C



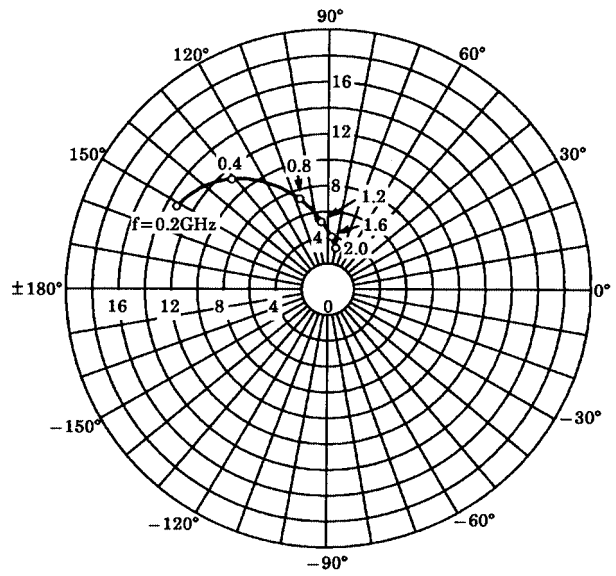
S22e
 VCE=6V
 IC=3mA
 Ta=25°C
 (UNIT : Ω)



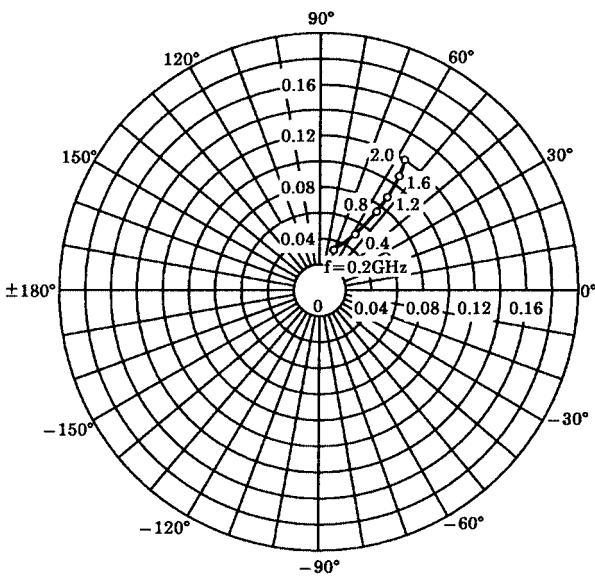
S_{11e}
 V_{CE}=6V
 I_C=7mA
 T_a=25°C
 (単位 : Ω)



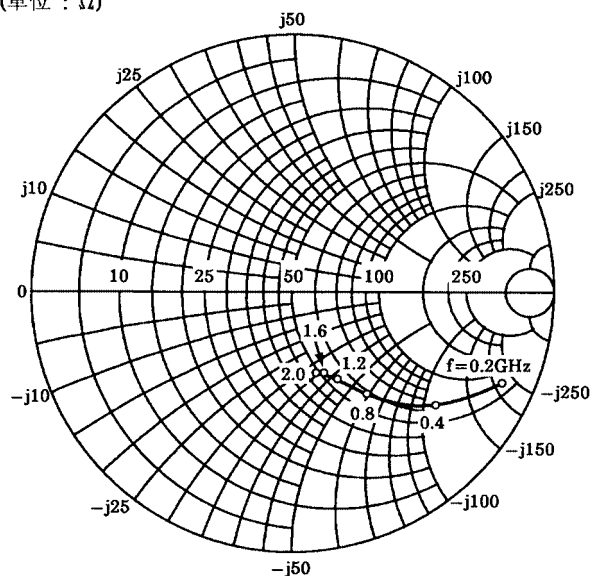
S_{21e}
 V_{CE}=6V
 I_C=7mA
 T_a=25°C



S_{12e}
 V_{CE}=6V
 I_C=7mA
 T_a=25°C



S_{22e}
 V_{CE}=6V
 I_C=7mA
 T_a=25°C
 (単位 : Ω)



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