

TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

2SC4842

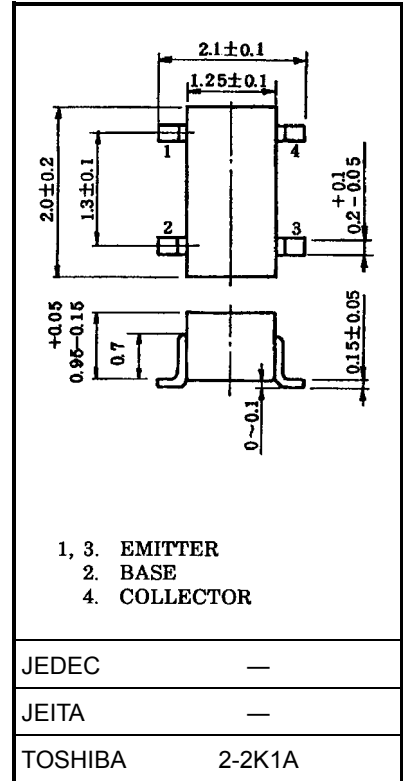
VHF~UHF Band Low Noise Amplifier Applications

Unit: mm

- Low noise figure, high gain.
- $NF = 1.1\text{dB}$, $|S_{21e}|^2 = 14\text{dB}$ ($f = 1\text{GHz}$)

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

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	20	V
Collector-emitter voltage	V_{CEO}	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	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55~125	$^\circ\text{C}$



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

Weight: 0.006 g (typ.)

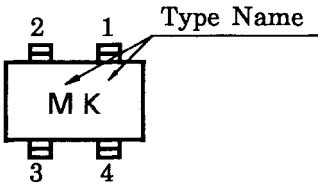
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition frequency	f_T	$V_{CE} = 10\text{V}$, $I_C = 20\text{mA}$	5	7	—	GHz
Insertion gain	$ S_{21e} ^2 (1)$	$V_{CE} = 10\text{V}$, $I_C = 20\text{mA}$, $f = 500\text{MHz}$	—	19.5	—	dB
	$ S_{21e} ^2 (2)$	$V_{CE} = 10\text{V}$, $I_C = 20\text{mA}$, $f = 1\text{GHz}$	10.5	14	—	
Noise figure	NF (1)	$V_{CE} = 10\text{V}$, $I_C = 5\text{mA}$, $f = 500\text{MHz}$	—	1	—	dB
	NF (2)	$V_{CE} = 10\text{V}$, $I_C = 5\text{mA}$, $f = 1\text{GHz}$	—	1.1	2	

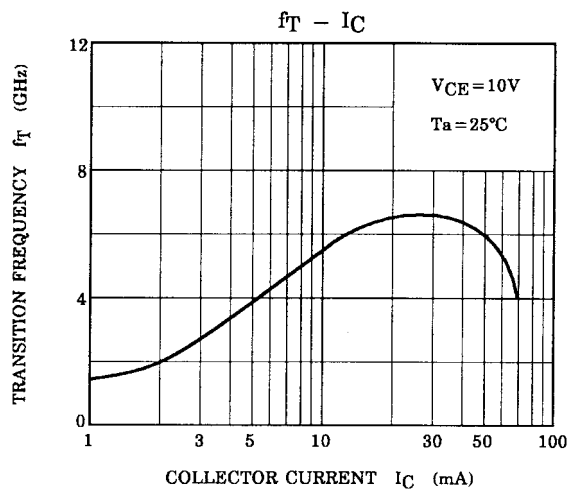
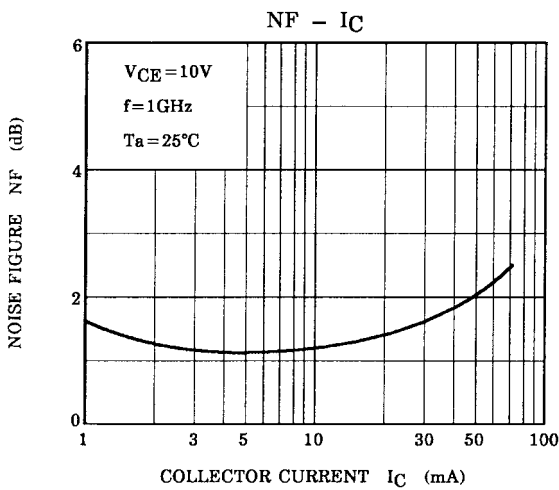
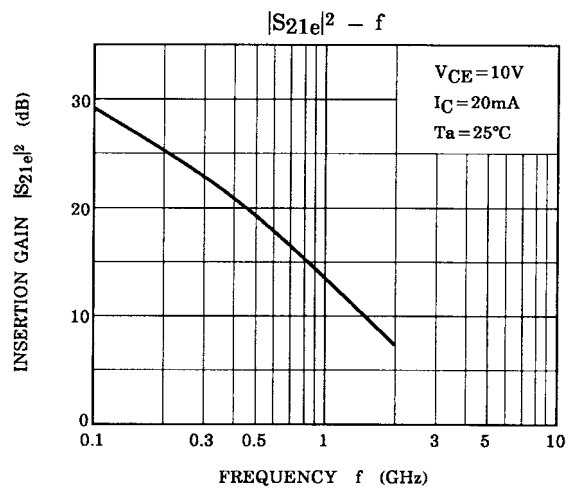
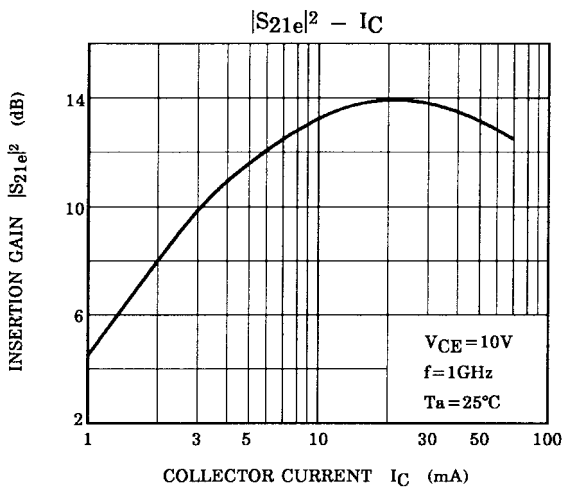
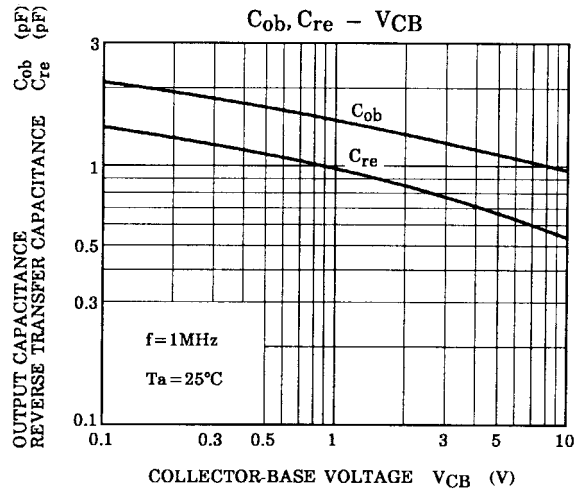
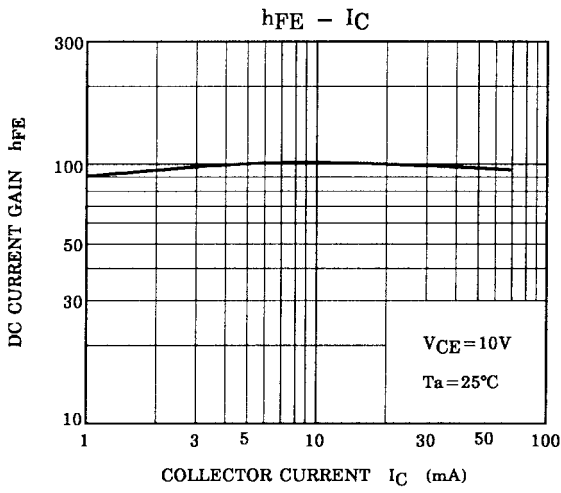
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

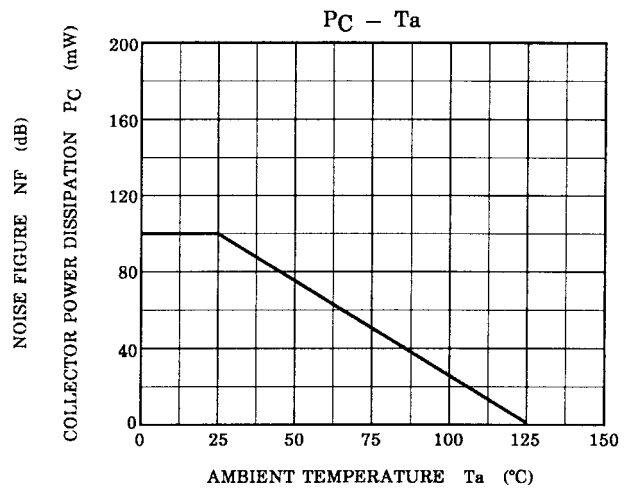
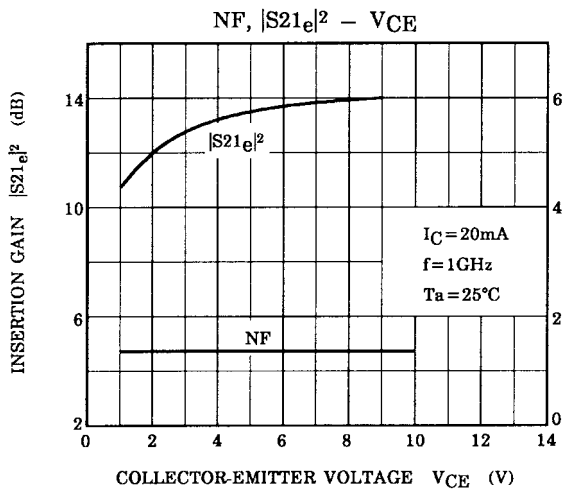
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	$V_{CB} = 10\text{V}$, $I_E = 0$	—	—	1	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = 1\text{V}$, $I_C = 0$	—	—	1	μA
DC current gain	h_{FE}	$V_{CE} = 10\text{V}$, $I_C = 20\text{mA}$	30	—	250	
Output capacitance	C_{ob}	$V_{CB} = 10\text{V}$, $I_E = 0$, $f = 1\text{MHz}$ (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.

Marking







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

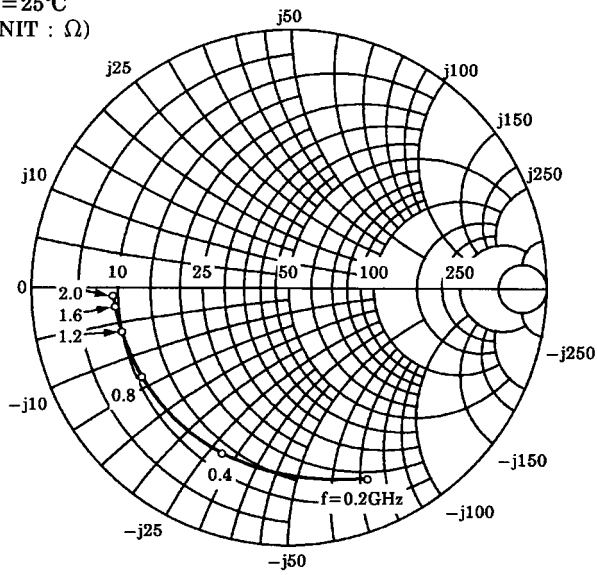
$V_{CE} = 10 \text{ V}, I_C = 5 \text{ mA}$

Frequency MHz	S11		S21		S12		S22	
	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

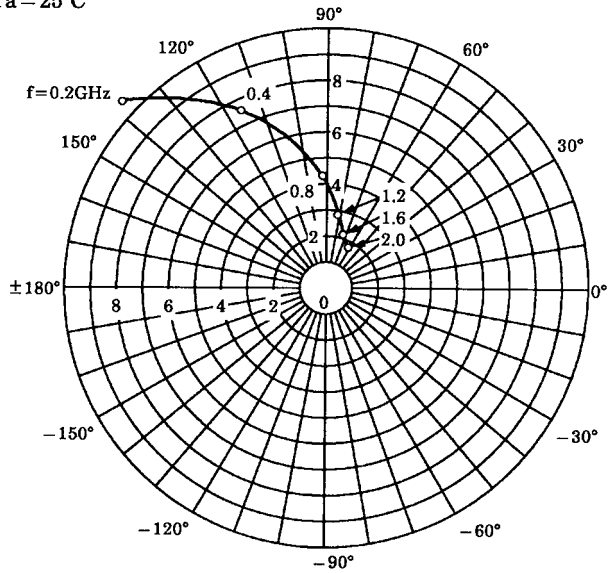
$V_{CE} = 10 \text{ V}, I_C = 20 \text{ mA}$

Frequency MHz	S11		S21		S12		S22	
	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

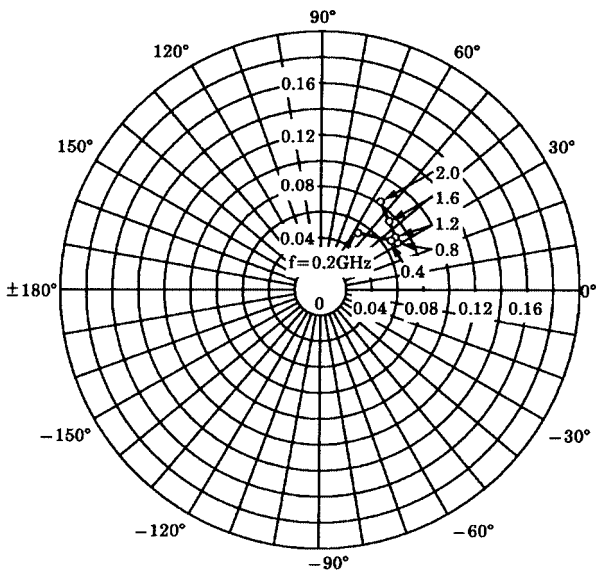
S11e
 $V_{CE} = 10V$
 $I_C = 5mA$
 $T_a = 25^\circ C$
 (UNIT : Ω)



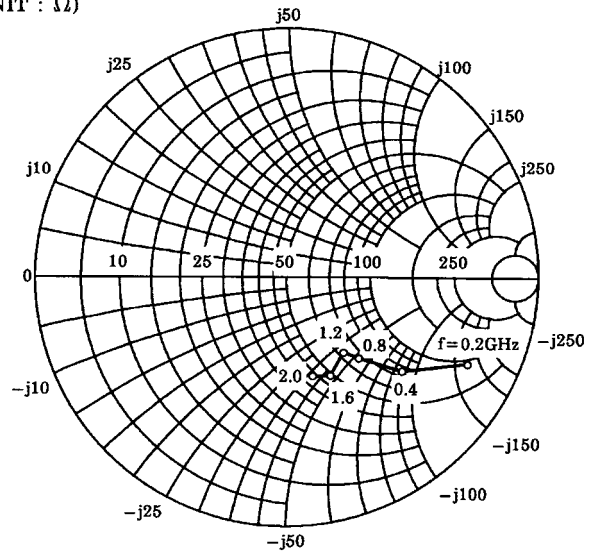
S21e
 $V_{CE} = 10V$
 $I_C = 5mA$
 $T_a = 25^\circ C$



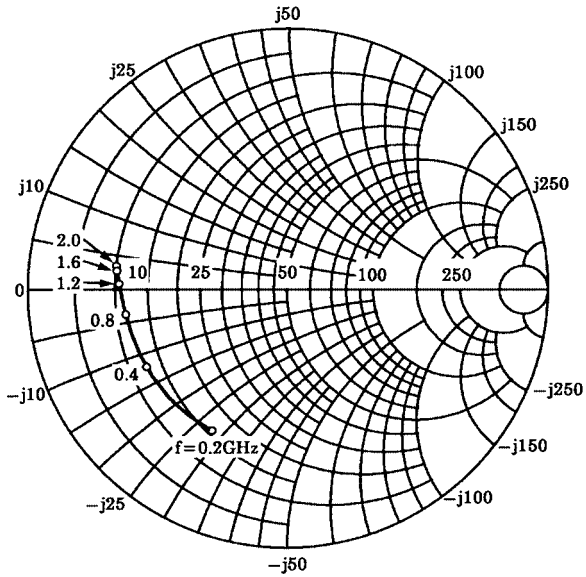
S12e
 $V_{CE} = 10V$
 $I_C = 5mA$
 $T_a = 25^\circ C$



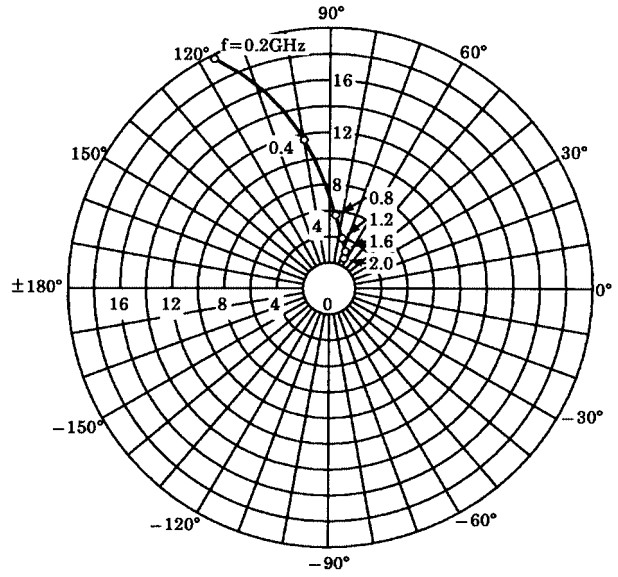
S22e
 $V_{CE} = 10V$
 $I_C = 5mA$
 $T_a = 25^\circ C$
 (UNIT : Ω)



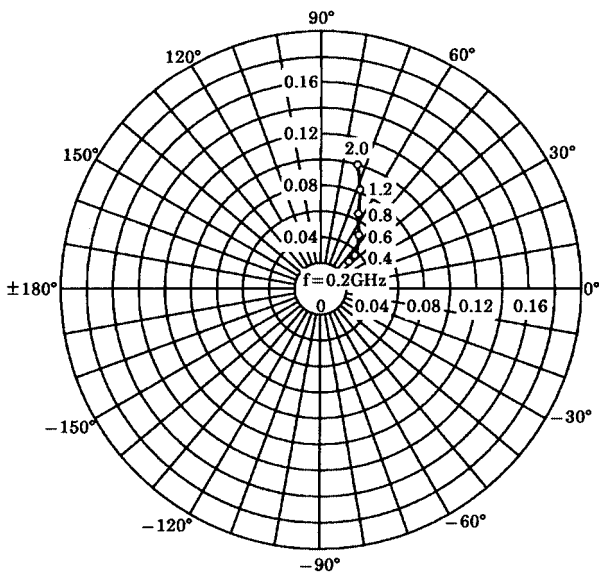
S11e
 $V_{CE} = 10V$
 $I_C = 20mA$
 $T_a = 25^\circ C$
 (UNIT : Ω)



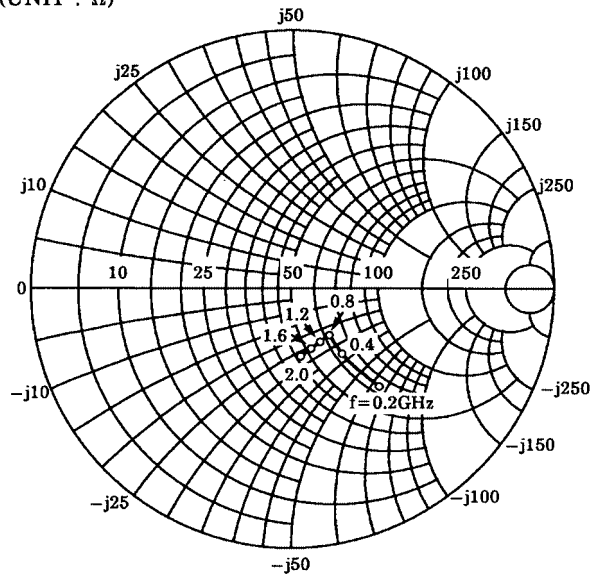
S21e
 $V_{CE} = 10V$
 $I_C = 20mA$
 $T_a = 25^\circ C$



S12e
 $V_{CE} = 10V$
 $I_C = 20mA$
 $T_a = 25^\circ C$



S22e
 $V_{CE} = 10V$
 $I_C = 20mA$
 $T_a = 25^\circ C$
 (UNIT : Ω)



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