

TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

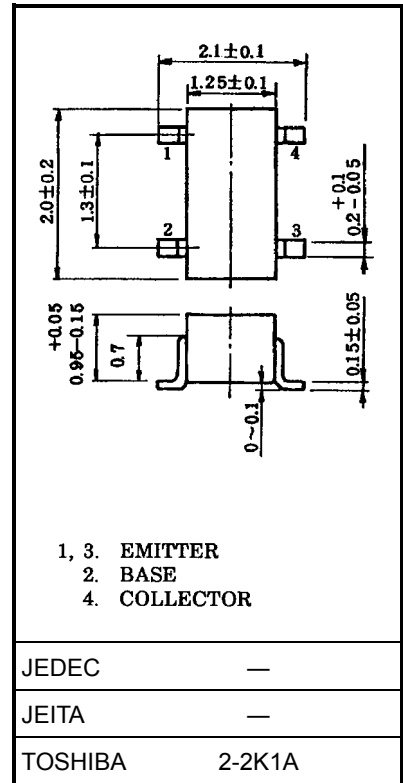
2SC4843

VHF~UHF Band Low Noise Amplifier Applications

- Low noise figure, high gain.
- $NF = 1.1\text{dB}$, $|S_{21e}|^2 = 15.5\text{dB}$ ($f = 1\text{GHz}$)

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

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



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

Weight: 0.006 g (typ.)

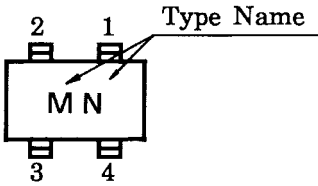
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition frequency	f_T	$V_{CE} = 8\text{V}$, $I_C = 20\text{mA}$	7	10	—	GHz
Insertion gain	$ S_{21e} ^2 (1)$	$V_{CE} = 8\text{V}$, $I_C = 20\text{mA}$, $f = 1\text{GHz}$	12	15.5	—	dB
	$ S_{21e} ^2 (2)$	$V_{CE} = 8\text{V}$, $I_C = 20\text{mA}$, $f = 2\text{GHz}$	—	9	—	
Noise figure	NF (1)	$V_{CE} = 8\text{V}$, $I_C = 5\text{mA}$, $f = 1\text{GHz}$	—	1.1	2.5	dB
	NF (2)	$V_{CE} = 8\text{V}$, $I_C = 5\text{mA}$, $f = 2\text{GHz}$	—	1.7	—	

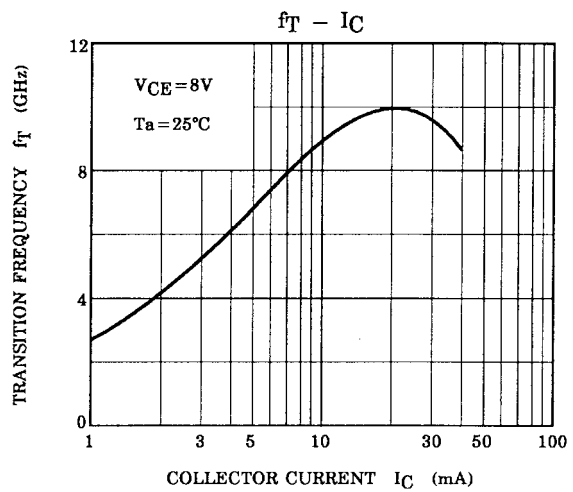
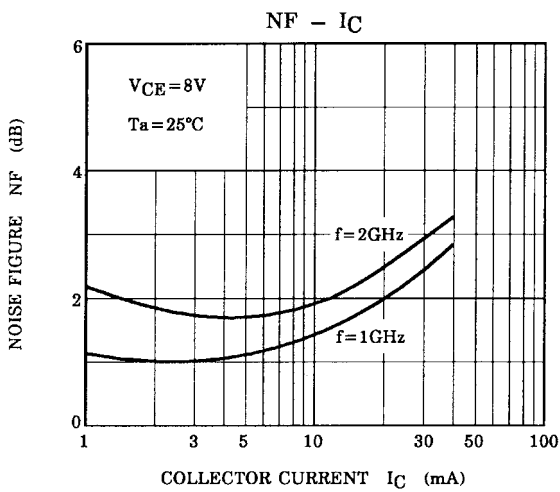
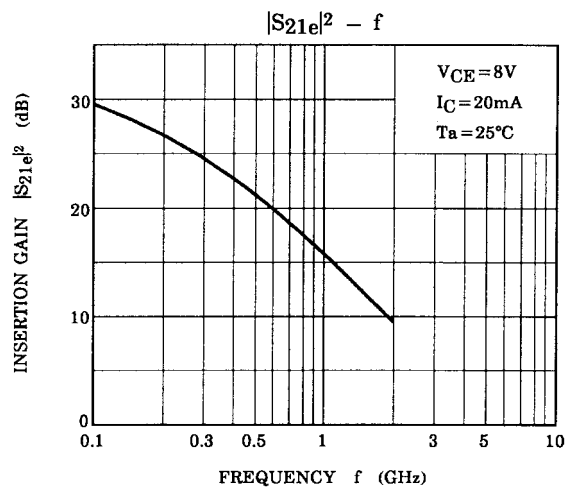
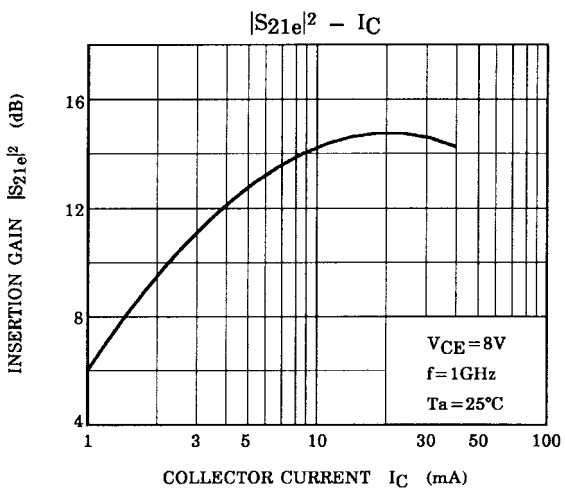
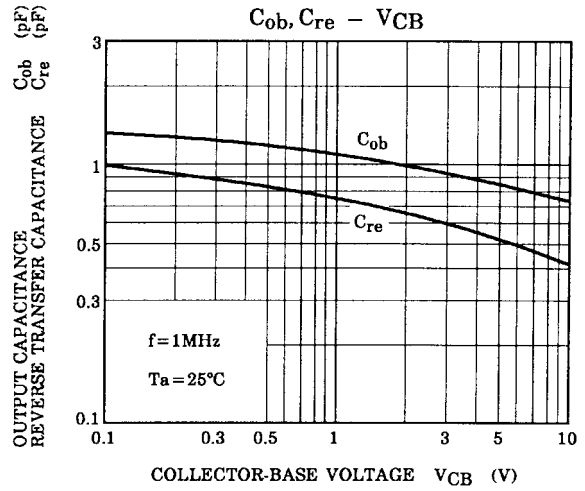
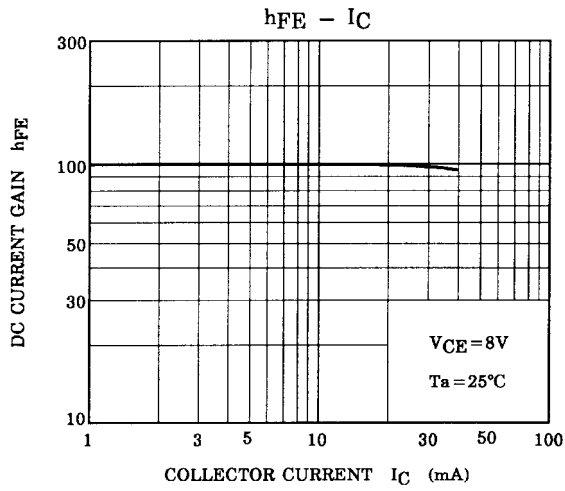
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

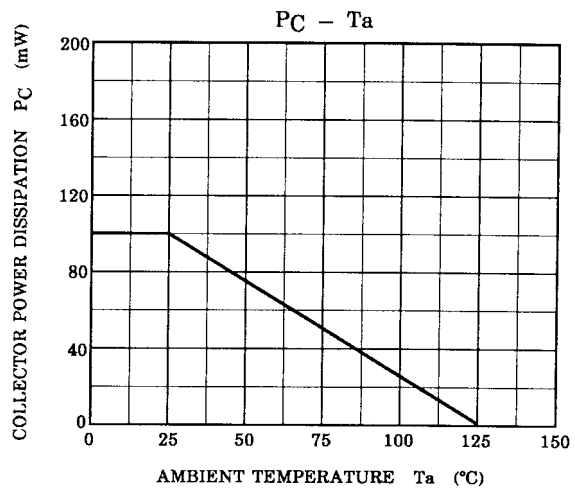
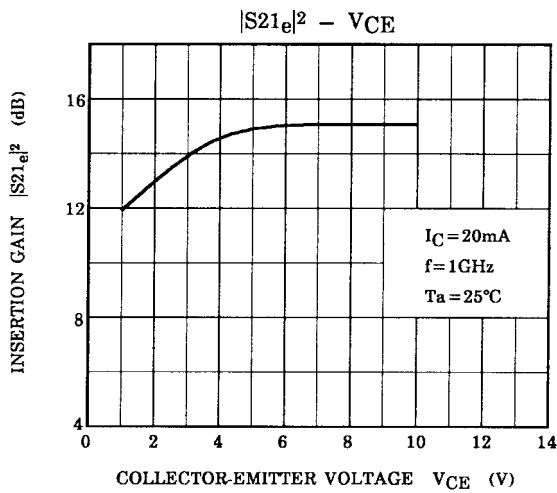
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	$V_{CB} = 10\text{V}$, $I_E = 0$	—	—	1	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = 1\text{V}$, $I_C = 0$	—	—	1	μA
DC current gain	h_{FE}	$V_{CE} = 8\text{V}$, $I_C = 20\text{mA}$	50	—	250	
Output capacitance	C_{ob}	$V_{CB} = 10\text{V}$, $I_E = 0$, $f = 1\text{MHz}$ (Note)	—	0.8	—	pF
Reverse transfer capacitance	C_{re}		—	0.45	0.9	pF

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

Marking







S-Parameter $Z_0 = 50 \Omega$, $T_a = 25^\circ\text{C}$

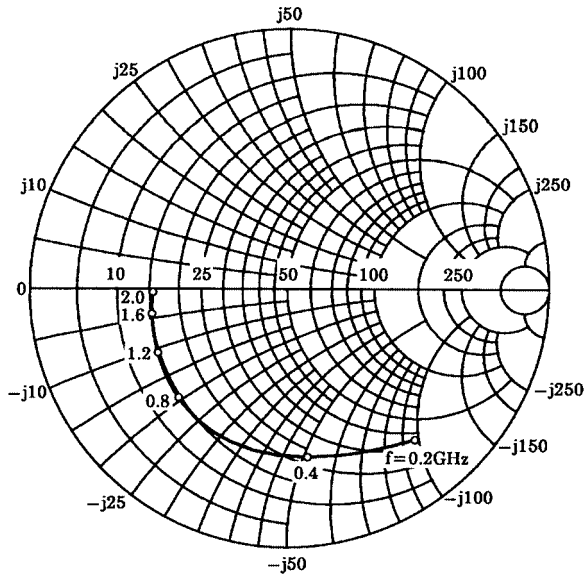
$V_{CE} = 8\text{ V}$, $I_C = 5\text{ mA}$

Frequency MHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.760	-47.2	10.933	146.8	0.043	63.8	0.859	-27.2
400	0.651	-83.8	8.697	125.2	0.068	50.1	0.671	-42.8
600	0.629	-112.6	6.938	111.4	0.079	43.6	0.545	-51.3
800	0.590	-132.4	5.621	102.2	0.085	41.6	0.463	-56.5
1000	0.579	-148.9	4.645	94.4	0.091	41.0	0.413	-60.8
1200	0.559	-157.4	3.953	89.1	0.095	41.7	0.382	-64.5
1400	0.547	-166.0	3.457	84.5	0.099	43.3	0.362	-68.1
1600	0.521	-170.2	3.052	80.5	0.103	45.3	0.350	-71.8
1800	0.512	-174.5	2.752	76.9	0.107	47.2	0.344	-75.2
2000	0.536	-177.5	2.534	73.6	0.113	49.3	0.341	-78.7

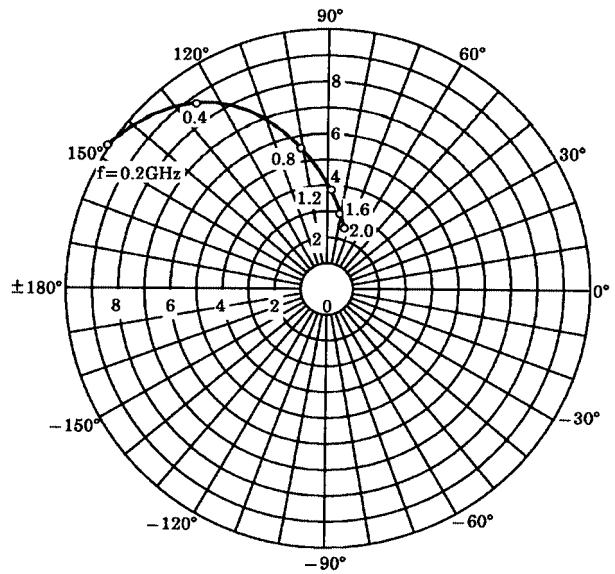
$V_{CE} = 8\text{ V}$, $I_C = 20\text{ mA}$

Frequency MHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.551	-93.3	22.441	127.0	0.030	55.6	0.622	-46.5
400	0.511	-132.8	13.552	107.5	0.040	52.6	0.393	-59.9
600	0.517	-151.6	9.551	98.0	0.049	55.2	0.299	-65.0
800	0.514	-163.6	7.326	92.1	0.057	58.7	0.250	-68.7
1000	0.520	-172.3	5.966	87.3	0.067	60.8	0.225	-72.2
1200	0.527	-178.0	4.961	84.0	0.077	62.7	0.211	-75.6
1400	0.526	-176.6	4.322	80.6	0.086	64.1	0.206	-80.0
1600	0.528	-172.9	3.820	77.5	0.096	65.4	0.203	-84.1
1800	0.534	-169.3	3.428	74.3	0.105	66.3	0.203	-87.4
2000	0.529	-166.7	3.132	71.6	0.115	67.0	0.209	-91.1

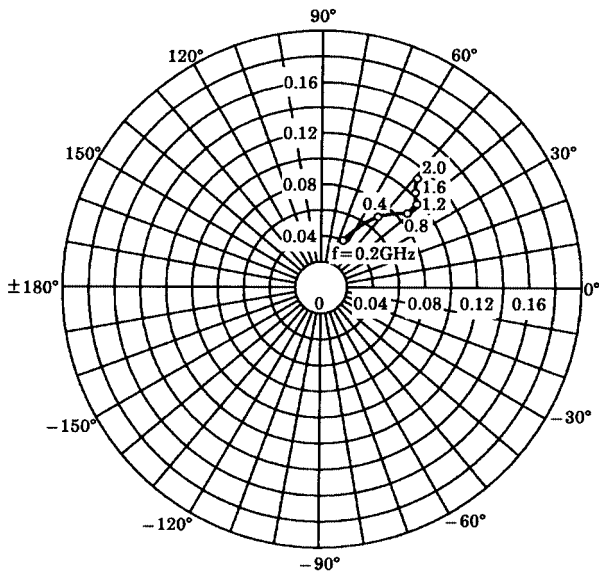
S_{11e}
 V_{CE} = 8V
 I_C = 5mA
 T_a = 25°C
 (UNIT : Ω)



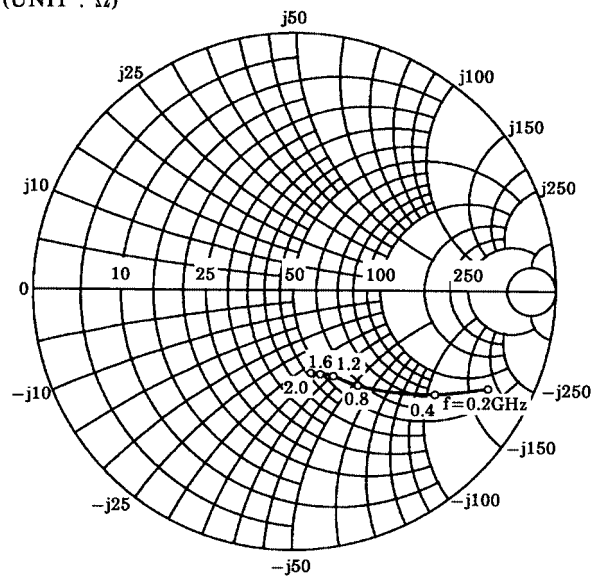
S_{21e}
 V_{CE} = 8V
 I_C = 5mA
 T_a = 25°C



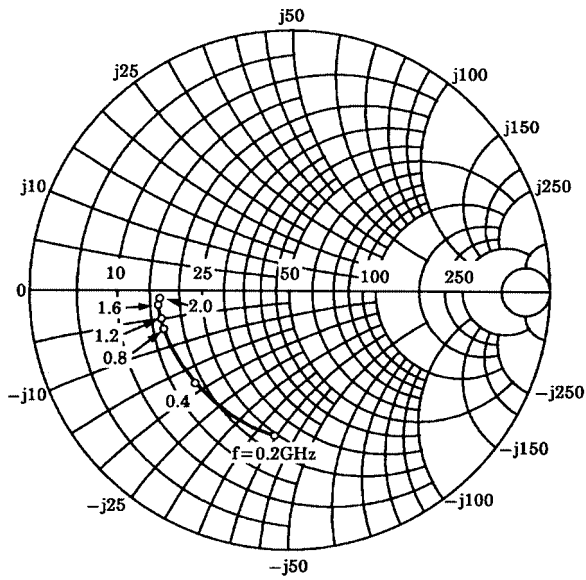
S_{12e}
 V_{CE} = 8V
 I_C = 5mA
 T_a = 25°C



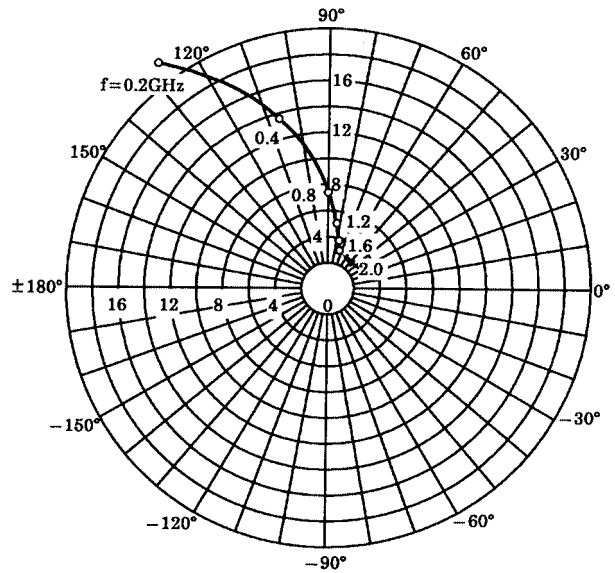
S_{22e}
 V_{CE} = 8V
 I_C = 5mA
 T_a = 25°C
 (UNIT : Ω)



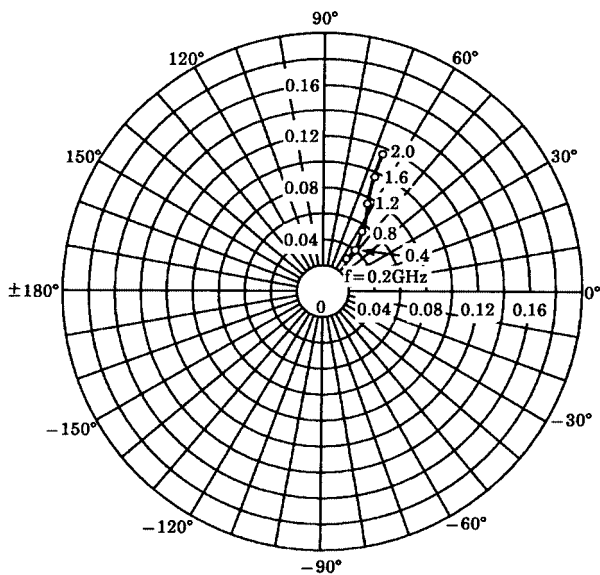
S11e
 $V_{CE} = 8V$
 $I_C = 20mA$
 $T_a = 25^\circ C$
 (UNIT : Ω)



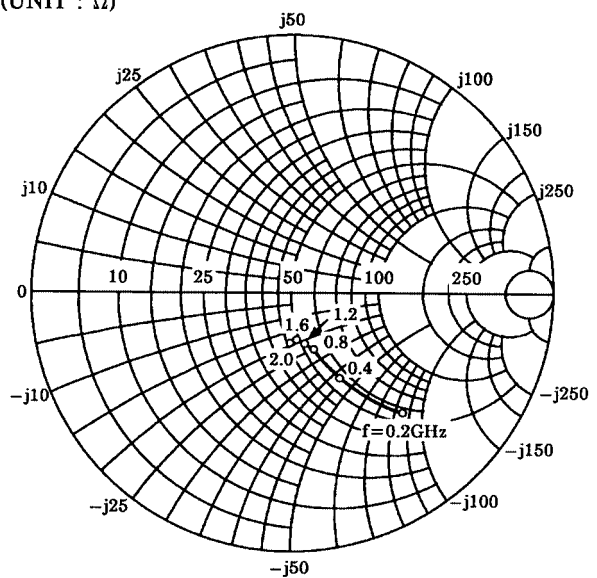
S21e
 $V_{CE} = 8V$
 $I_C = 20mA$
 $T_a = 25^\circ C$



S12e
 $V_{CE} = 8V$
 $I_C = 20mA$
 $T_a = 25^\circ C$



S22e
 $V_{CE} = 8V$
 $I_C = 20mA$
 $T_a = 25^\circ C$
 (UNIT : Ω)



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