

TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

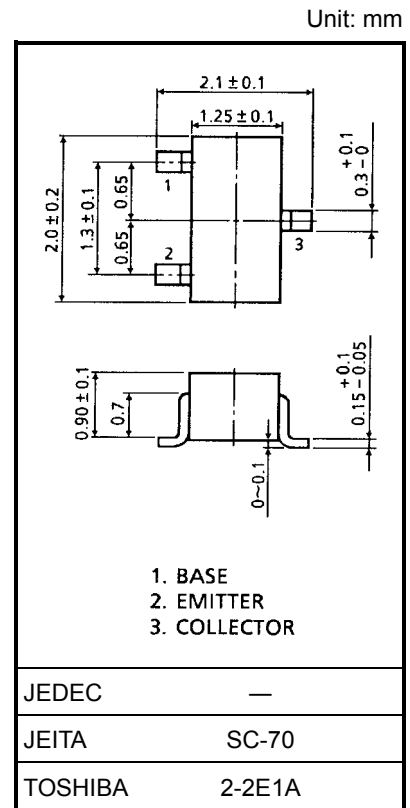
2SC4325

VHF~UHF Band Low Noise Amplifier Applications

- Low noise figure, high gain.
- $NF = 1.8\text{dB}$, $|S_{21e}|^2 = 7.5\text{dB}$ ($f = 2\text{GHz}$)

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.)

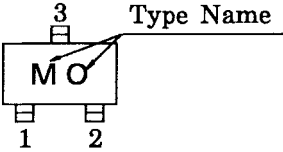
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition frequency	f_T	$V_{CE} = 6\text{V}$, $I_C = 7\text{mA}$	7	10	—	GHz
Insertion gain	$ S_{21e} ^2 (1)$	$V_{CE} = 6\text{V}$, $I_C = 7\text{mA}$, $f = 1\text{GHz}$	—	13	—	dB
	$ S_{21e} ^2 (2)$	$V_{CE} = 6\text{V}$, $I_C = 7\text{mA}$, $f = 2\text{GHz}$	4.5	7.5	—	
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	

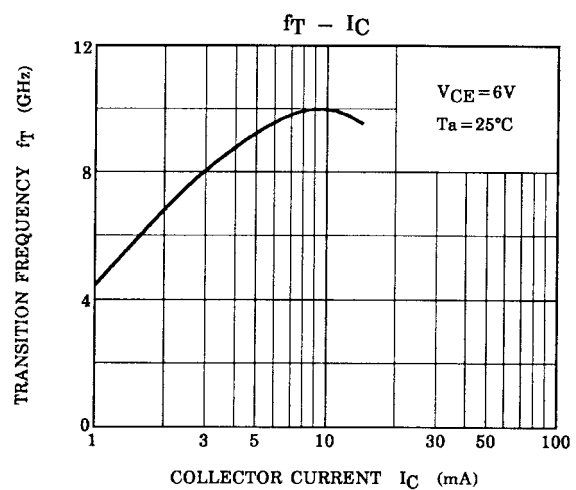
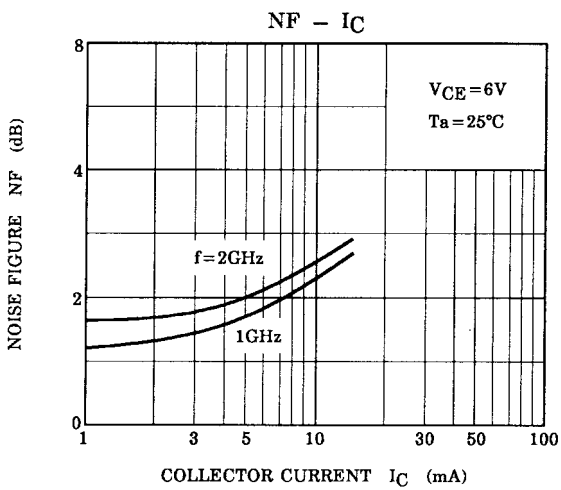
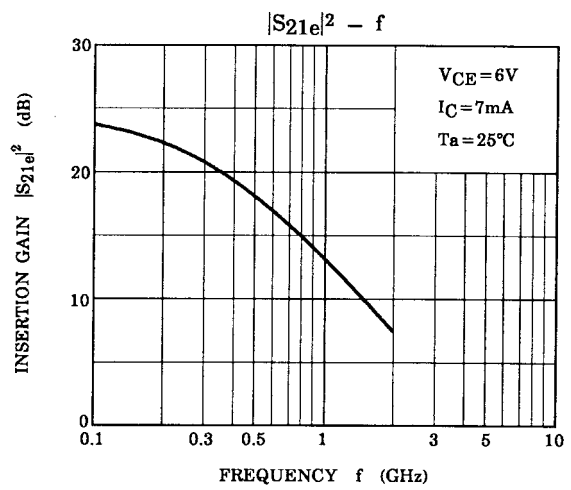
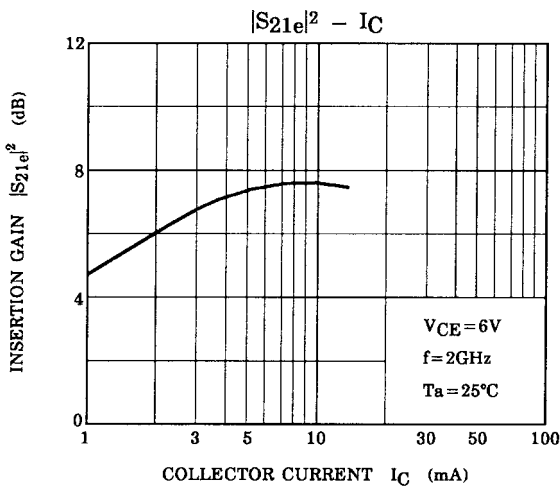
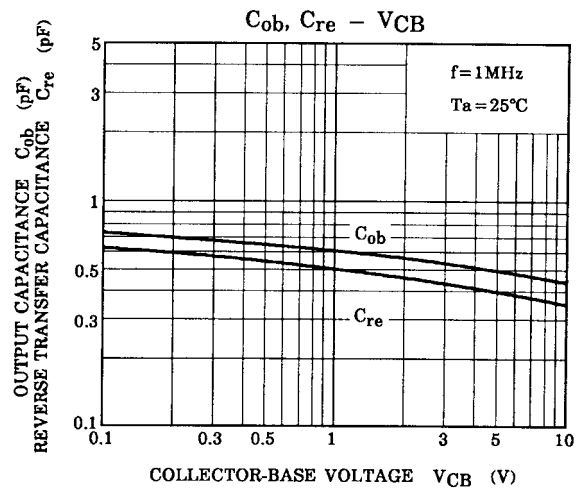
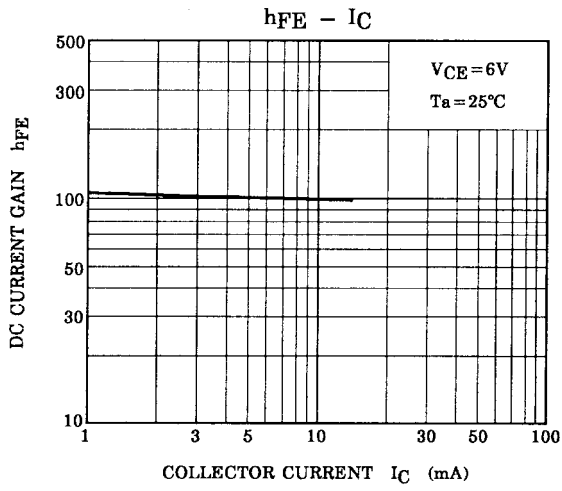
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

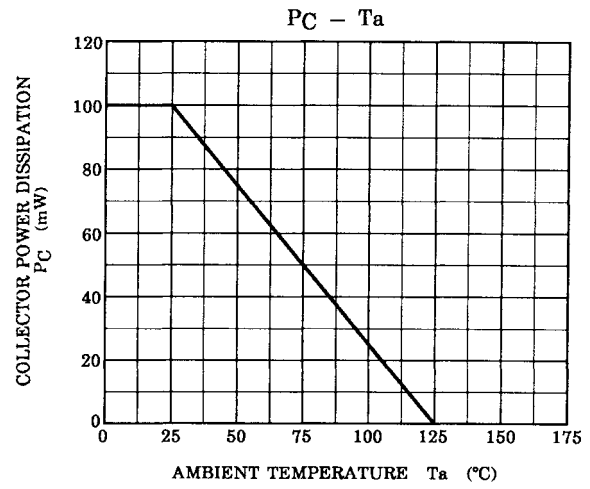
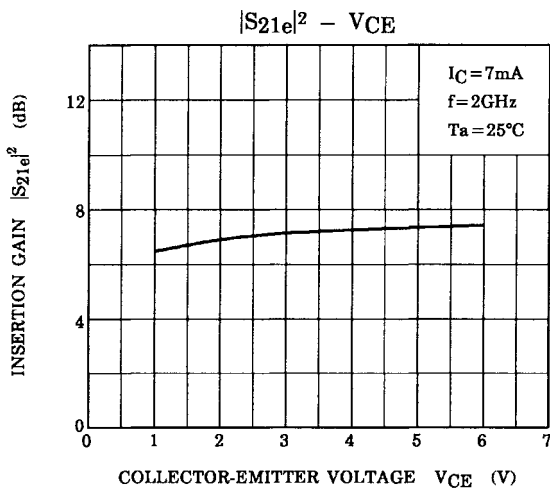
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	$V_{CB} = 10\text{V}$, $I_E = 0$	—	—	1	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = 1\text{V}$, $I_C = 0$	—	—	1	μA
DC current gain	h_{FE}	$V_{CE} = 6\text{V}$, $I_C = 7\text{mA}$	50	—	250	
Output capacitance	C_{ob}	$V_{CB} = 10\text{V}$, $I_E = 0$, $f = 1\text{MHz}$ (Note)	—	0.45	—	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 $Z_O = 50 \Omega, T_a = 25^\circ\text{C}$

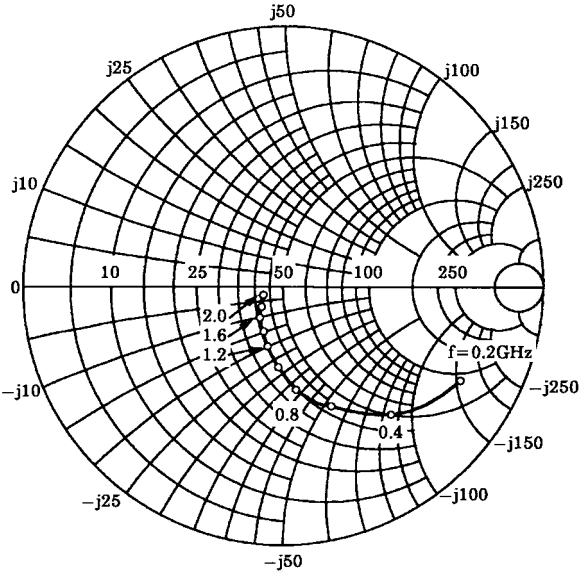
$V_{CE} = 6 \text{ V}, I_C = 3 \text{ mA}$

Frequency MHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.778	-27.1	7.781	154.1	0.043	75.7	0.932	-18.5
400	0.641	-49.4	6.538	133.4	0.075	66.5	0.800	-31.9
600	0.500	-67.1	5.409	118.1	0.097	61.9	0.683	-40.4
800	0.394	-80.5	4.508	106.6	0.115	59.9	0.595	-45.8
1000	0.311	-93.1	3.809	97.9	0.132	59.4	0.536	-49.6
1200	0.238	-103.0	3.314	90.6	0.149	59.3	0.492	-52.7
1400	0.194	-114.5	2.909	84.0	0.165	59.3	0.465	-55.3
1600	0.146	-122.2	2.619	78.7	0.183	59.4	0.444	-57.9
1800	0.102	-135.3	2.409	73.5	0.199	59.4	0.428	-60.8
2000	0.074	-150.4	2.188	70.0	0.216	59.6	0.415	-64.2

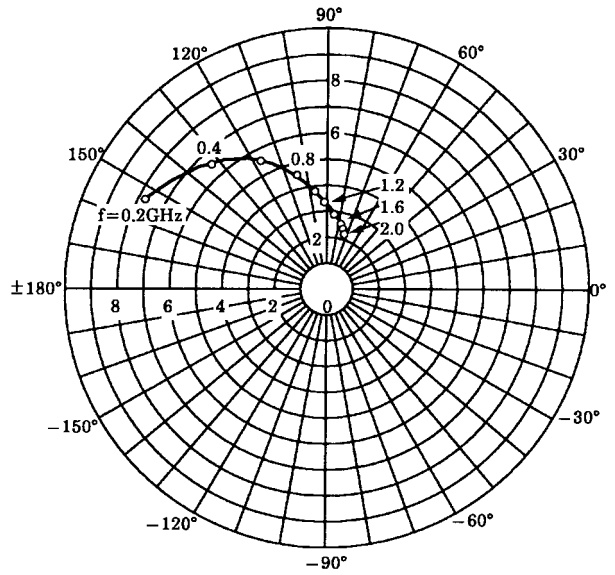
$V_{CE} = 6 \text{ V}, I_C = 7 \text{ mA}$

Frequency MHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.581	-39.7	12.614	141.9	0.037	73.0	0.842	-24.8
400	0.397	-64.8	9.040	119.2	0.061	67.7	0.652	-36.1
600	0.278	-82.1	6.744	105.5	0.081	67.3	0.541	-40.4
800	0.194	-94.9	5.328	96.2	0.101	67.7	0.477	-42.6
1000	0.137	-109.4	4.364	89.2	0.121	67.8	0.440	-44.3
1200	0.096	-123.2	3.733	83.2	0.141	67.8	0.417	-46.4
1400	0.062	-140.8	3.254	77.9	0.162	67.1	0.403	-48.5
1600	0.041	-169.5	2.899	73.4	0.183	66.6	0.394	-50.9
1800	0.030	137.0	2.634	68.9	0.203	65.6	0.389	-54.0
2000	0.038	99.1	2.377	66.1	0.222	65.1	0.382	-57.6

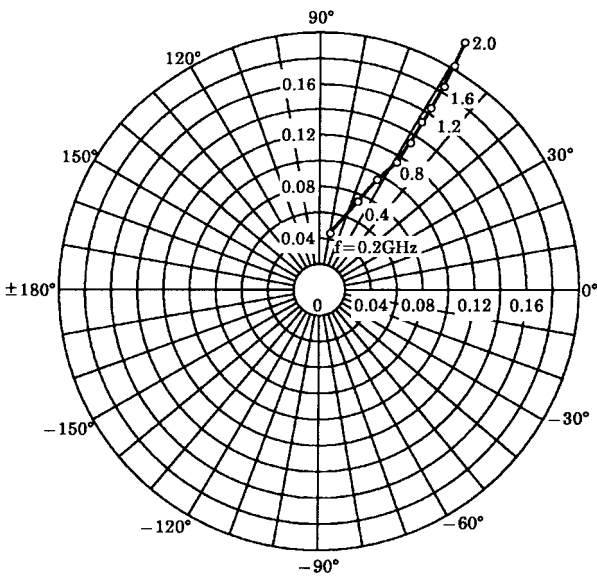
S11e
 $V_{CE} = 6V$
 $I_C = 3mA$
 $T_a = 25^\circ C$
 (UNIT : Ω)



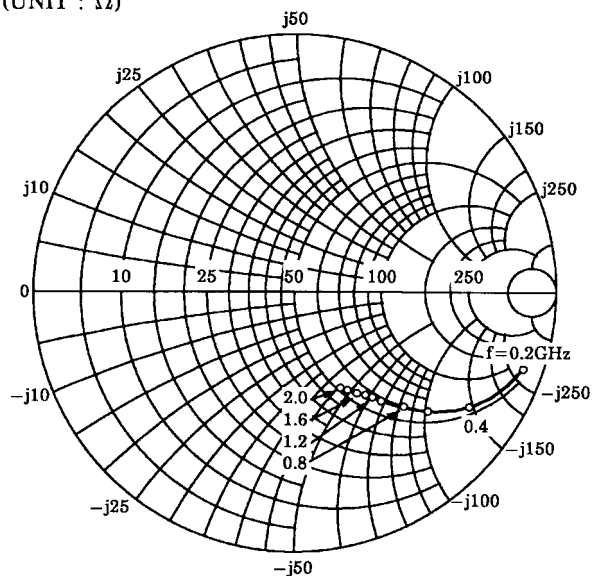
S21e
 $V_{CE} = 6V$
 $I_C = 3mA$
 $T_a = 25^\circ C$



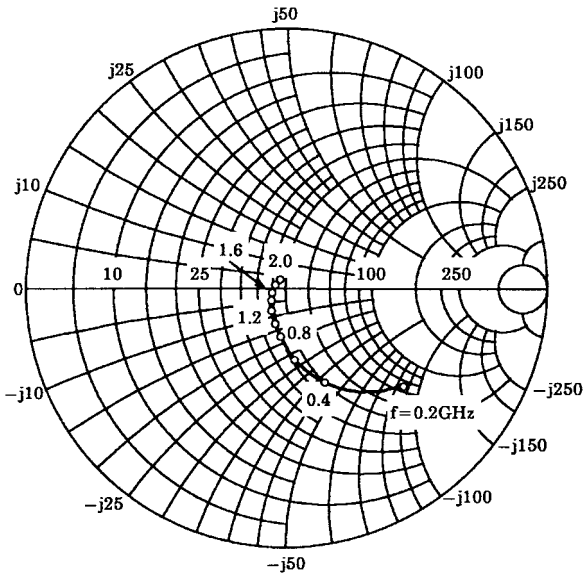
S12e
 $V_{CE} = 6V$
 $I_C = 3mA$
 $T_a = 25^\circ C$



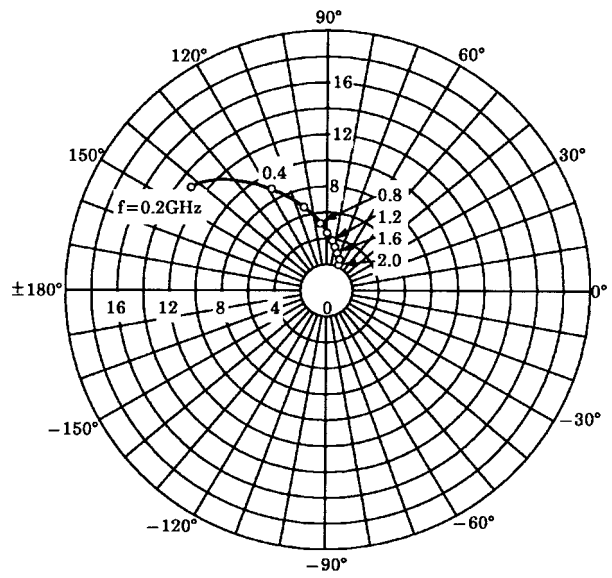
S22e
 $V_{CE} = 6V$
 $I_C = 3mA$
 $T_a = 25^\circ C$
 (UNIT : Ω)



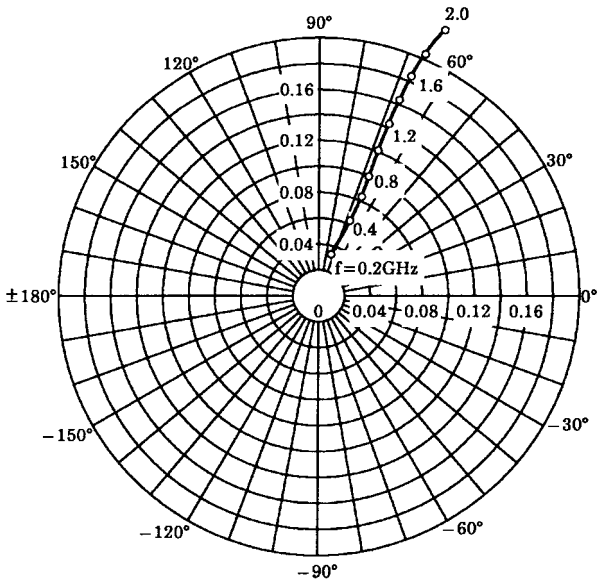
S_{11e}
 V_{CE}=6V
 I_C=7mA
 T_a=25°C
 (UNIT : Ω)



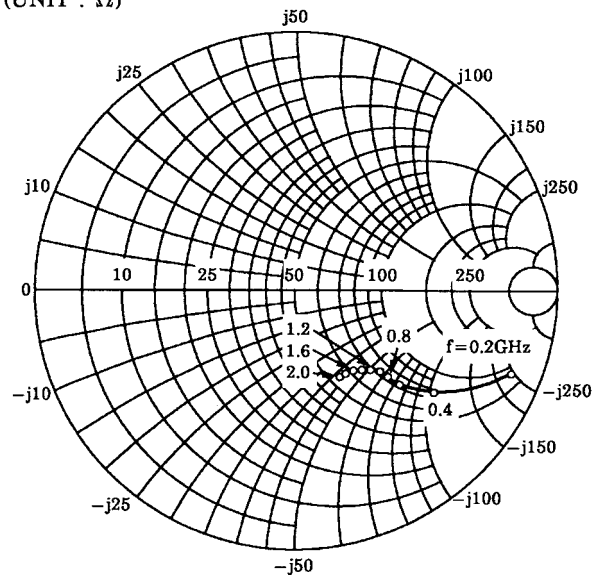
S_{21e}
 V_{CE}=6V
 I_C=7mA
 T_a=25°C



S_{12e}
 V_{CE}=6V
 I_C=7mA
 T_a=25°C



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



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