

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

# 2SC4325

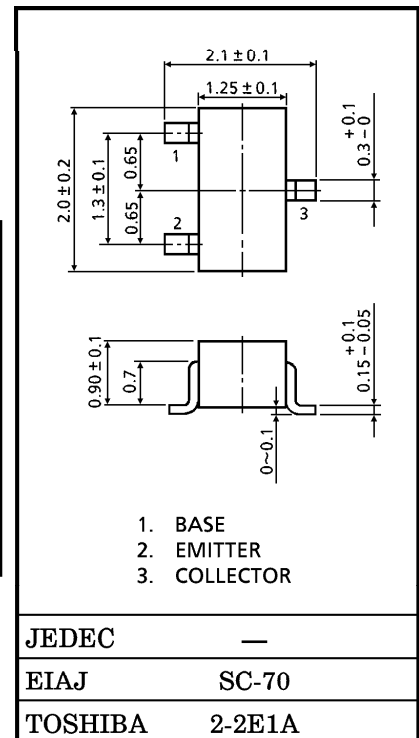
VHF~UHF BAND LOW NOISE AMPLIFIER APPLICATIONS

Unit in mm

- Low Noise Figure, High Gain.
- $NF = 1.8\text{dB}$ ,  $|S_{21e}|^2 = 7.5\text{dB}$  ( $f = 2\text{GHz}$ )

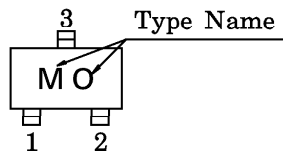
MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC	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	$^\circ\text{C}$



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)$	$V_{CE} = 6\text{V}$ , $I_C = 7\text{mA}$ , $f = 1\text{GHz}$	—	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	

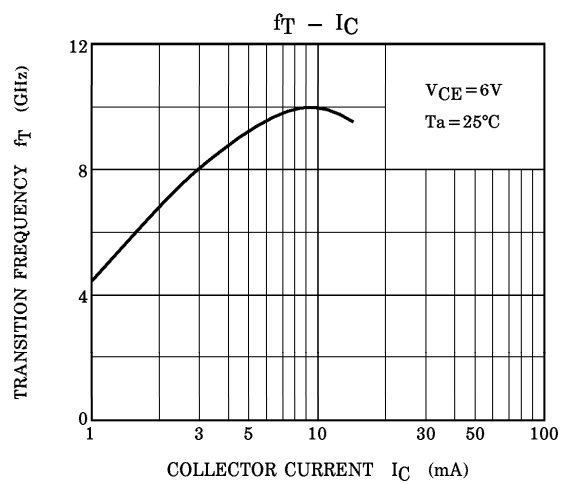
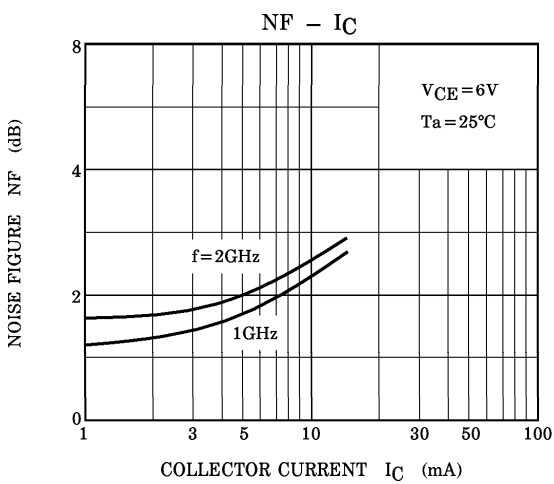
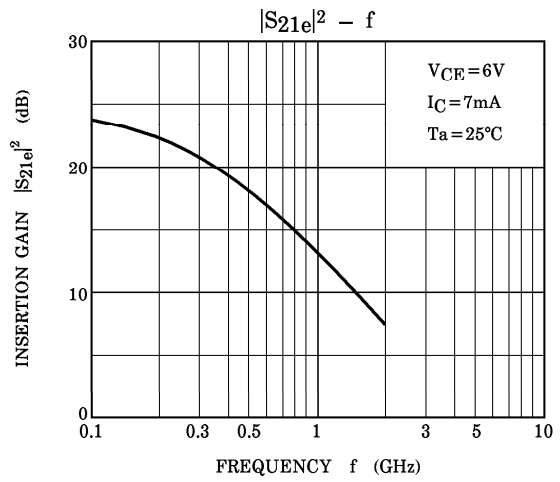
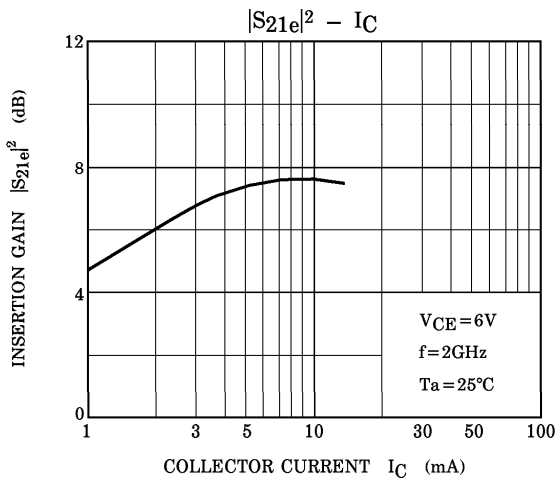
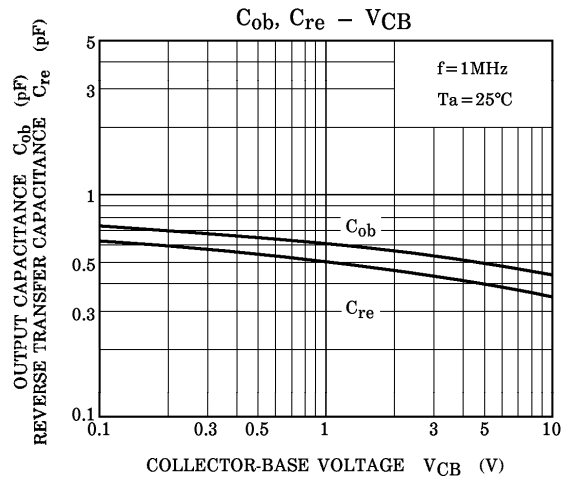
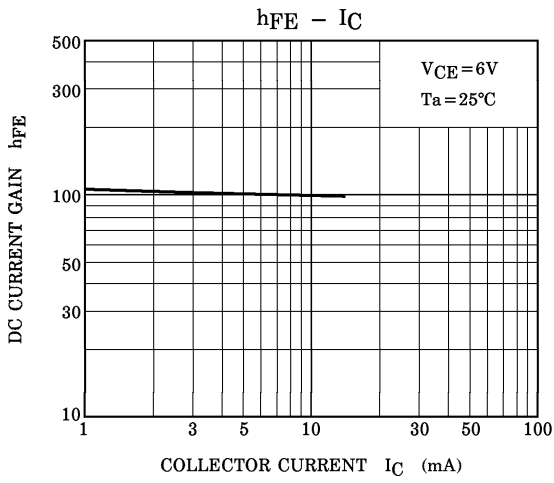
ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

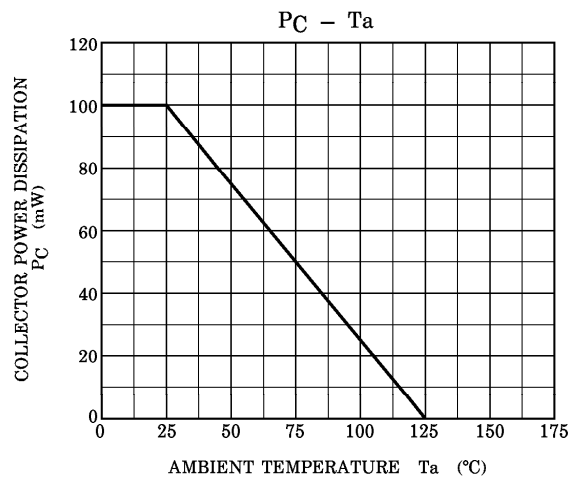
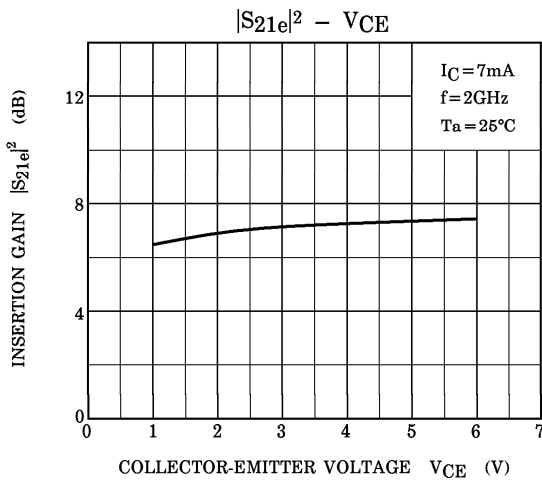
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	$I_{CBO}$	$V_{CB} = 10\text{V}$ , $I_E = 0$	—	—	1	$\mu\text{A}$
Emitter Cut-off Current	$I_{EBO}$	$V_{EB} = 1\text{V}$ , $I_C = 0$	—	—	1	$\mu\text{A}$
DC Current Gain	$h_{FE}$	$V_{CE} = 6\text{V}$ , $I_C = 7\text{mA}$	50	—	250	—
Output Capacitance	$C_{ob}$	$V_{CB} = 10\text{V}$ , $I_E = 0$ , $f = 1\text{MHz}$	—	0.45	—	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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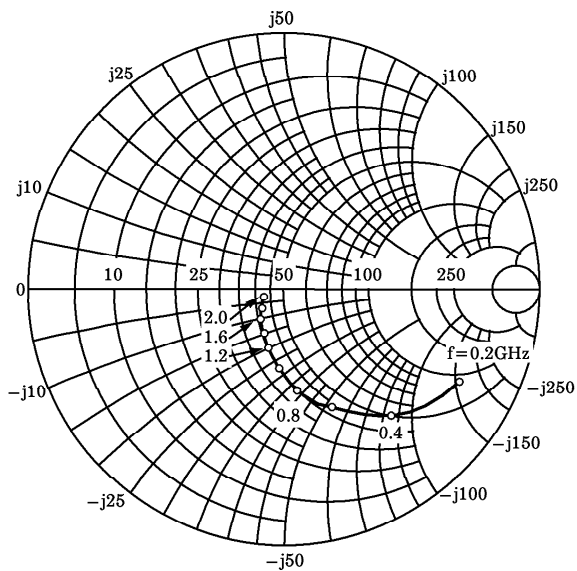
S-PARAMETER  $Z_0 = 50\Omega$ ,  $T_a = 25^\circ\text{C}$   
 $V_{CE} = 6\text{V}$ ,  $I_C = 3\text{mA}$

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

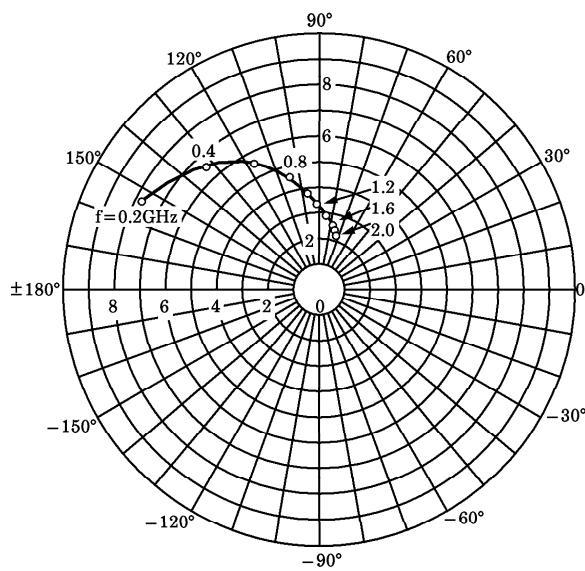
$V_{CE} = 6\text{V}$ ,  $I_C = 7\text{mA}$

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

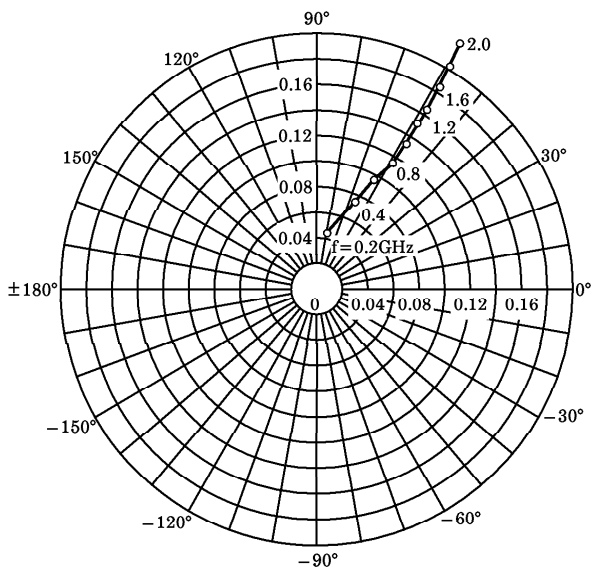
$S_{11e}$   
 $V_{CE} = 6V$   
 $I_C = 3mA$   
 $T_a = 25^\circ C$   
 (UNIT :  $\Omega$ )



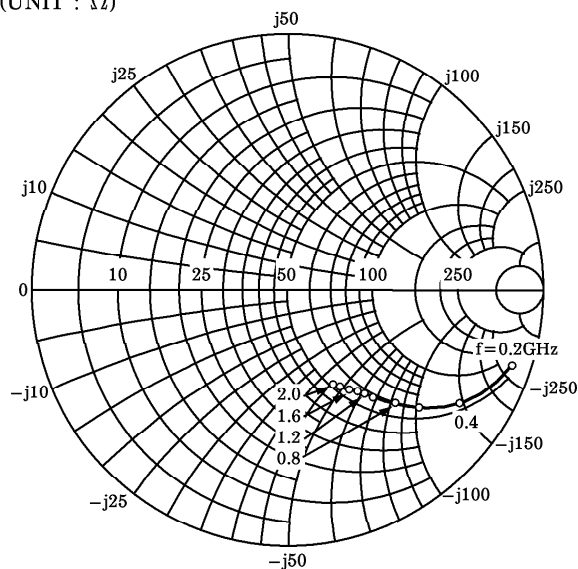
$S_{21e}$   
 $V_{CE} = 6V$   
 $I_C = 3mA$   
 $T_a = 25^\circ C$



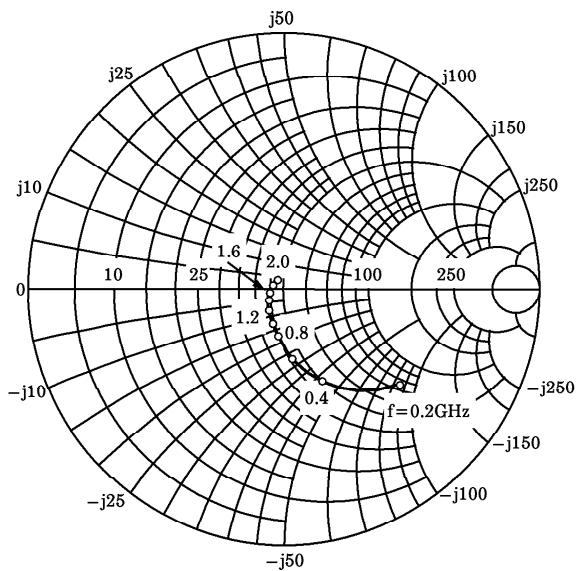
$S_{12e}$   
 $V_{CE} = 6V$   
 $I_C = 3mA$   
 $T_a = 25^\circ C$



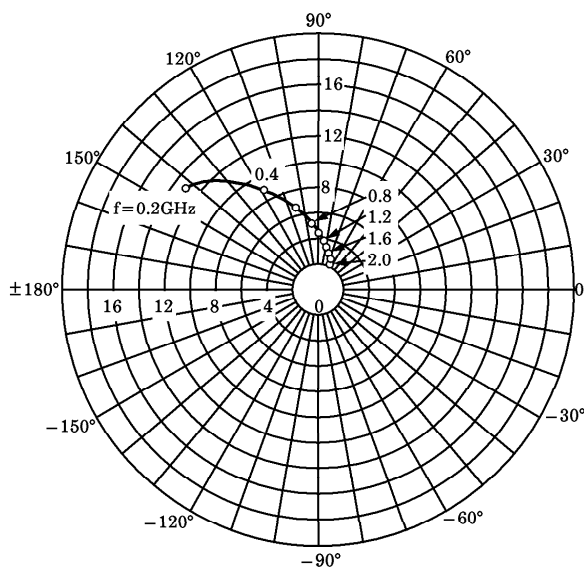
$S_{22e}$   
 $V_{CE} = 6V$   
 $I_C = 3mA$   
 $T_a = 25^\circ C$   
 (UNIT :  $\Omega$ )



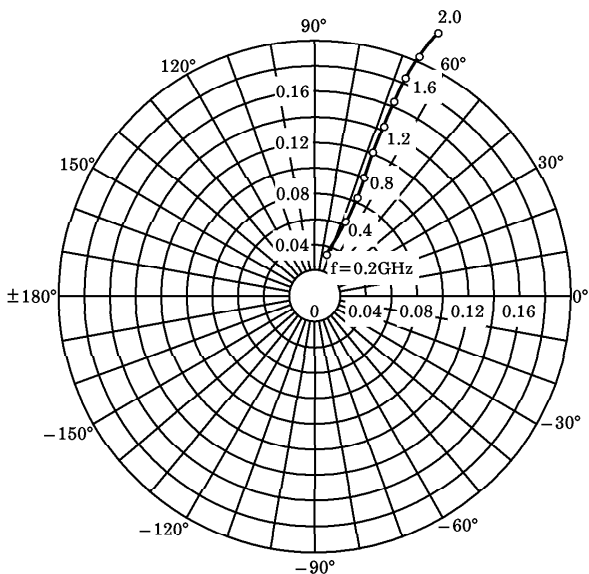
$S_{11e}$   
 $V_{CE} = 6V$   
 $I_C = 7mA$   
 $T_a = 25^\circ C$   
 (UNIT :  $\Omega$ )



$S_{21e}$   
 $V_{CE} = 6V$   
 $I_C = 7mA$   
 $T_a = 25^\circ C$



$S_{12e}$   
 $V_{CE} = 6V$   
 $I_C = 7mA$   
 $T_a = 25^\circ C$



$S_{22e}$   
 $V_{CE} = 6V$   
 $I_C = 7mA$   
 $T_a = 25^\circ C$   
 (UNIT :  $\Omega$ )

