

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

2SC4324

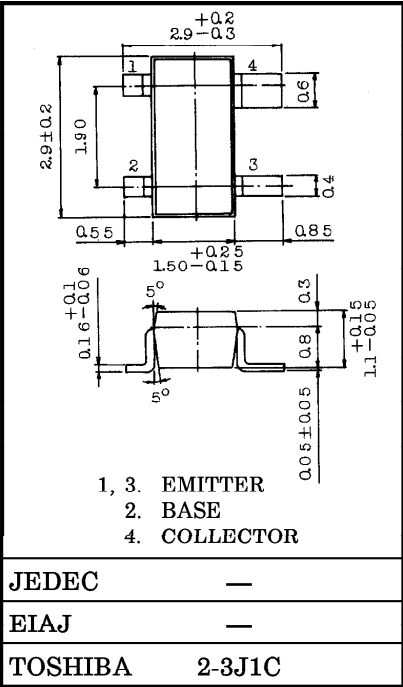
VHF~UHF BAND LOW NOISE AMPLIFIER APPLICATIONS.

Unit in mm

- Low Noise Figure, High Gain.
- $NF = 1.8dB$, $|S_{21e}|^2 = 9.5dB$ ($f = 2GHz$)

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

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	150	mW
Junction Temperature	T_j	125	$^{\circ}C$
Storage Temperature Range	T_{stg}	$-55 \sim 125$	$^{\circ}C$



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

Weight : 0.012g

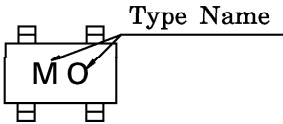
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Transition Frequency	f_T	$V_{CE} = 6V$, $I_C = 7mA$	7	10	—	GHz
Insertion Gain	$ S_{21e} ^2 (1)$	$V_{CE} = 6V$, $I_C = 7mA$, $f = 1GHz$	—	15	—	dB
	$ S_{21e} ^2 (2)$	$V_{CE} = 6V$, $I_C = 7mA$, $f = 2GHz$	6.5	9.5	—	
Noise Figure	NF (1)	$V_{CE} = 6V$, $I_C = 3mA$, $f = 1GHz$	—	1.4	—	dB
	NF (2)	$V_{CE} = 6V$, $I_C = 3mA$, $f = 2GHz$	—	1.8	3.0	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I_{CBO}	$V_{CB} = 10V$, $I_E = 0$	—	—	1	μA
Emitter Cut-off Current	I_{EBO}	$V_{EB} = 1V$, $I_C = 0$	—	—	1	μA
DC Current Gain	h_{FE}	$V_{CE} = 6V$, $I_C = 7mA$	50	—	250	—
Output Capacitance	C_{ob}	$V_{CB} = 10V$, $I_E = 0$, $f = 1MHz$ (Note)	—	0.55	—	pF
Reverse Transfer Capacitance	C_{re}		—	0.35	0.8	pF

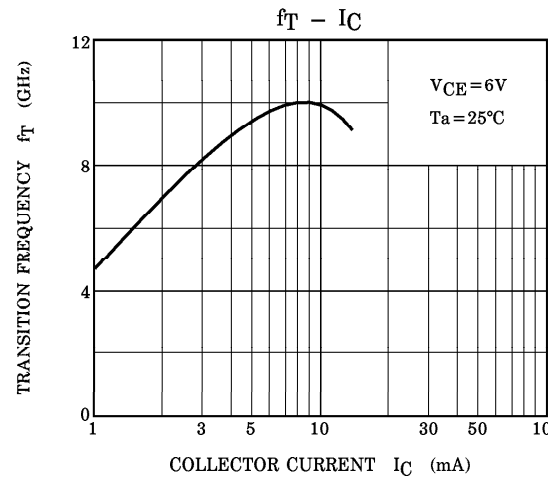
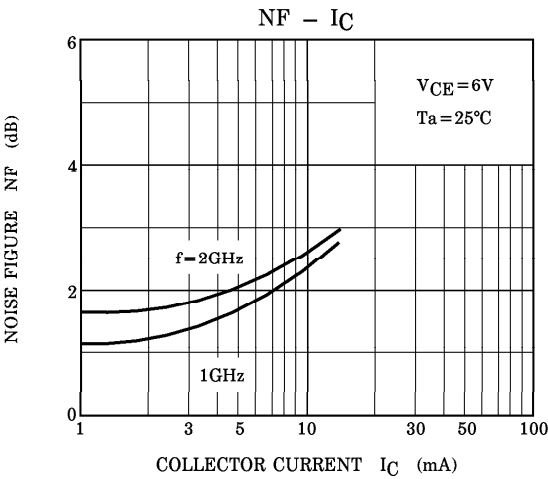
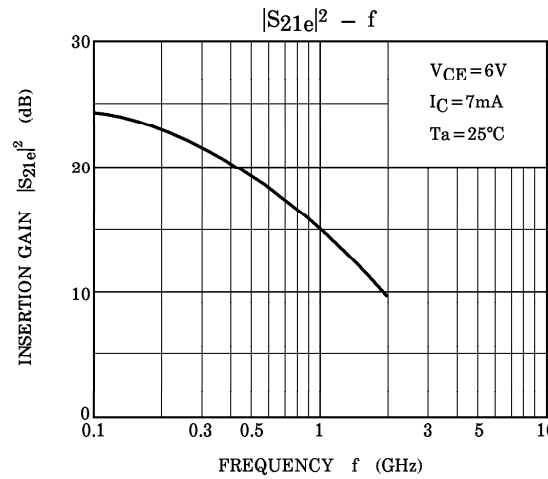
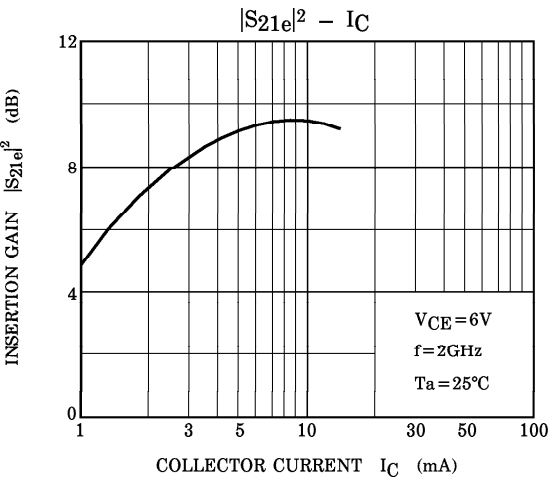
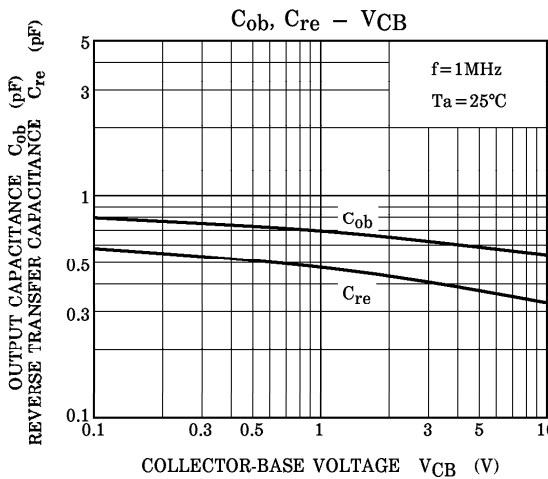
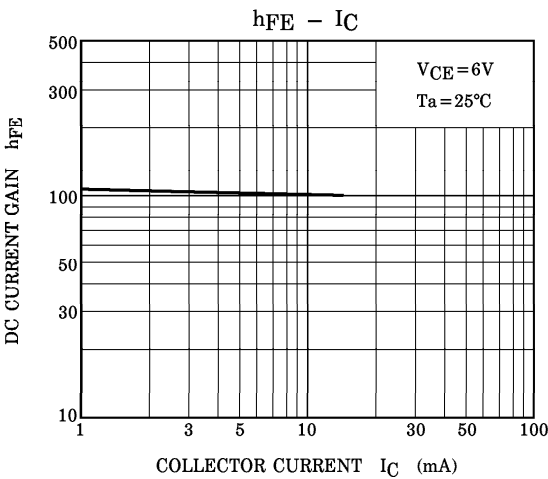
Note : C_{re} is measured by 3 terminal method with Capacitance Bridge.

Marking



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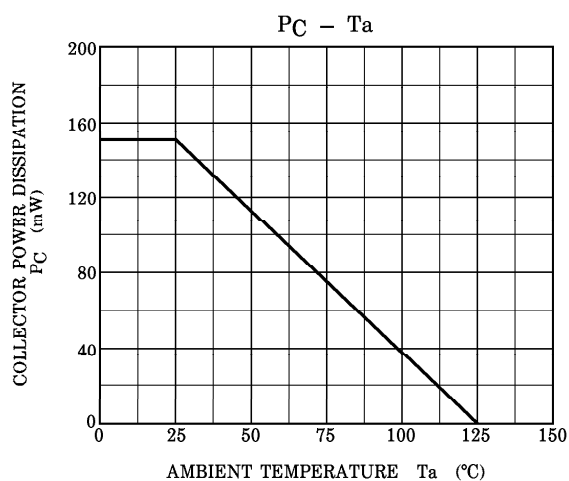
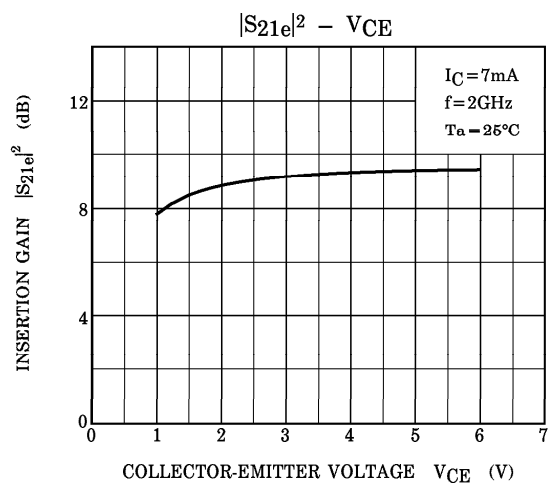
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S-PARAMETER $Z_0 = 50\Omega$, $T_a = 25^\circ\text{C}$

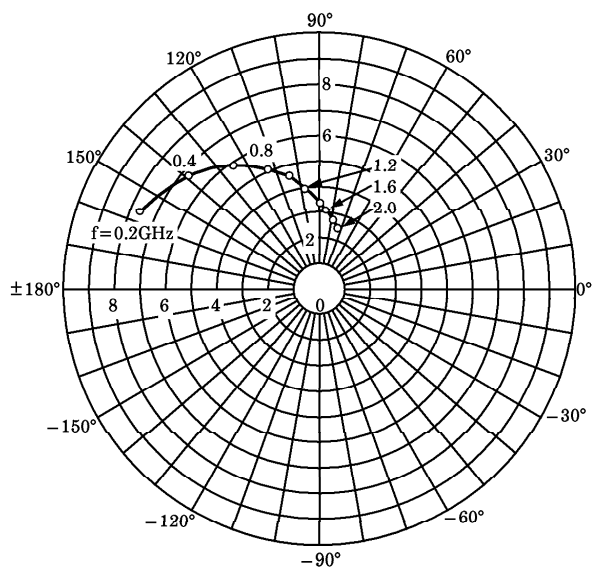
$V_{CE} = 6\text{V}$, $I_C = 3\text{mA}$

FREQUENCY		S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	
200	0.831	−26.6	7.776	156.8	0.042	74.0	0.939	−19.5	
400	0.719	−50.1	6.775	139.2	0.074	61.6	0.833	−35.5	
600	0.618	−70.8	5.857	125.4	0.097	52.5	0.724	−48.1	
800	0.515	−88.5	5.063	113.9	0.111	46.5	0.627	−58.0	
1000	0.434	−104.0	4.381	105.3	0.122	42.3	0.553	−65.6	
1200	0.374	−119.2	3.886	97.2	0.130	39.6	0.495	−71.6	
1400	0.332	−134.7	3.425	89.8	0.137	37.8	0.453	−76.1	
1600	0.293	−147.5	3.135	84.4	0.145	36.5	0.423	−81.0	
1800	0.267	−163.2	2.926	78.2	0.150	35.8	0.397	−85.1	
2000	0.248	−175.3	2.709	73.7	0.157	35.7	0.382	−89.4	

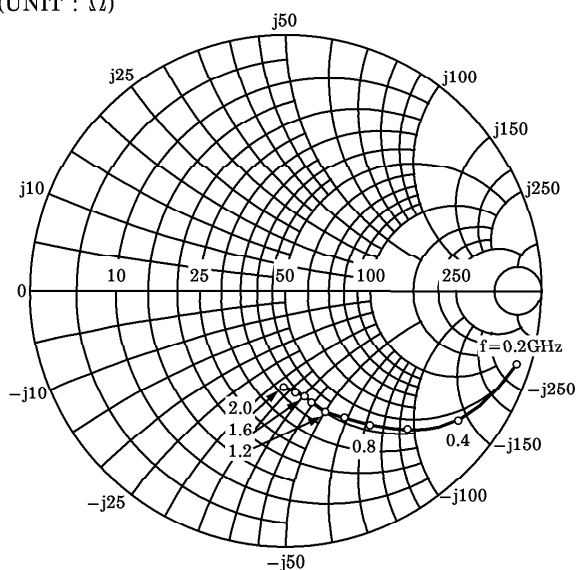
$V_{CE} = 6\text{V}$, $I_C = 7\text{mA}$

FREQUENCY		S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	
200	0.683	−43.5	13.639	148.7	0.037	68.4	0.876	−27.8	
400	0.541	−78.5	10.619	126.8	0.060	55.8	0.688	−46.4	
600	0.437	−105.5	8.350	112.6	0.072	49.8	0.547	−57.7	
800	0.365	−128.4	6.752	102.1	0.082	47.6	0.447	−65.1	
1000	0.319	−148.8	5.640	94.4	0.090	47.0	0.383	−70.0	
1200	0.293	−166.3	4.877	87.5	0.098	47.1	0.338	−73.3	
1400	0.280	174.4	4.248	81.3	0.107	46.9	0.308	−75.4	
1600	0.269	162.3	3.813	76.4	0.116	47.4	0.292	−78.0	
1800	0.272	148.6	3.489	70.8	0.124	47.5	0.283	−80.3	
2000	0.264	137.2	3.182	66.5	0.134	47.6	0.278	−83.7	

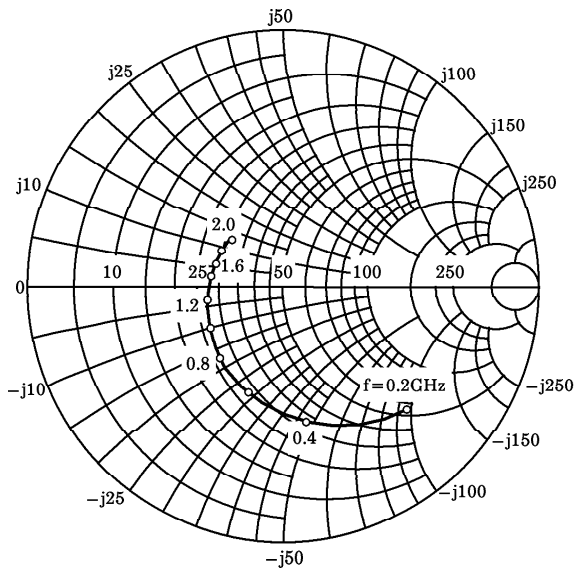
S21e
VCE=6V
IC=3mA
Ta=25°C



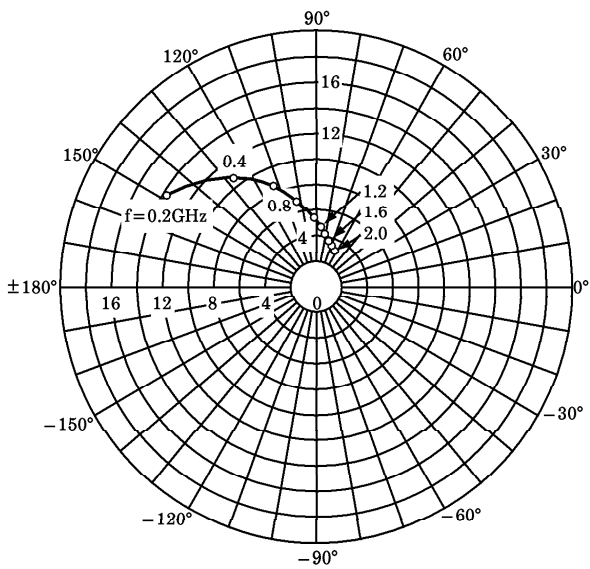
S22e
V_{CE} = 6V
I_C = 3mA
T_a = 25°C
(UNIT : Ω)



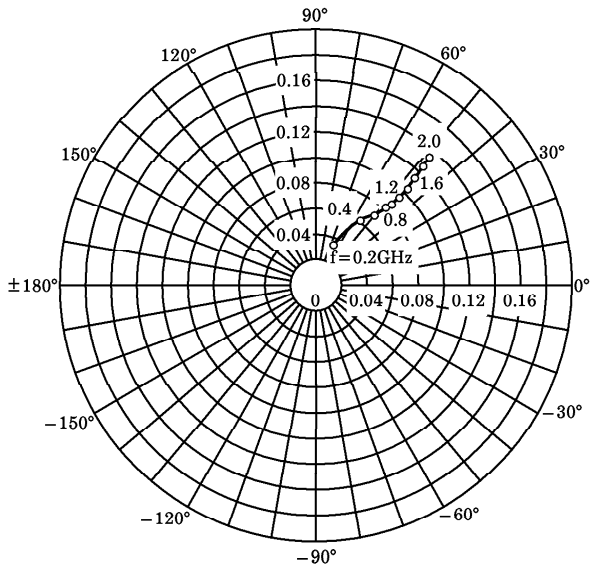
S_{11e}
 $V_{CE}=6V$
 $I_C=7mA$
 $T_a=25^{\circ}C$
(UNIT : Ω)



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 : Ω)

