

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

# 2SC5095

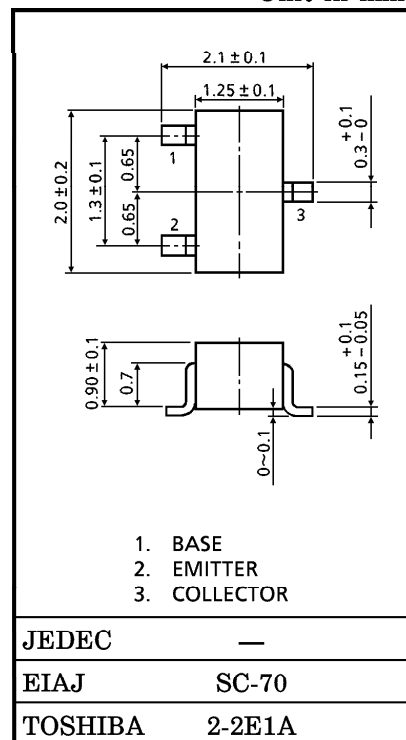
VHF~UHF BAND LOW NOISE AMPLIFIER APPLICATIONS

Unit in mm

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

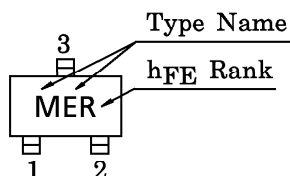
MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	V <sub>CB0</sub>	20	V
Collector-Emitter Voltage	V <sub>CEO</sub>	10	V
Emitter-Base Voltage	V <sub>EBO</sub>	1.5	V
Base Current	I <sub>B</sub>	7	mA
Collector Current	I <sub>C</sub>	15	mA
Collector Power Dissipation	P <sub>C</sub>	100	mW
Junction Temperature	T <sub>j</sub>	125	°C
Storage Temperature Range	T <sub>stg</sub>	-55~125	°C



Weight : 0.006g

MARKING



MICROWAVE CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Transition Frequency	f <sub>T</sub>	V <sub>CE</sub> =6V, I <sub>C</sub> =7mA	7	10	—	GHz
Insertion Gain	S <sub>21e</sub>   <sup>2</sup> (1)	V <sub>CE</sub> =6V, I <sub>C</sub> =7mA, f=1GHz	—	13	—	dB
	S <sub>21e</sub>   <sup>2</sup> (2)	V <sub>CE</sub> =6V, I <sub>C</sub> =7mA, f=2GHz	4.5	7.5	—	
Noise Figure	NF (1)	V <sub>CE</sub> =6V, I <sub>C</sub> =3mA, f=1GHz	—	1.4	—	dB
	NF (2)	V <sub>CE</sub> =6V, I <sub>C</sub> =3mA, f=2GHz	—	1.8	3.0	

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

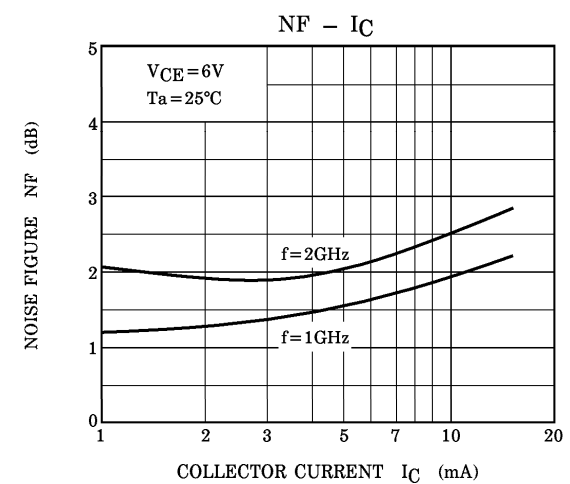
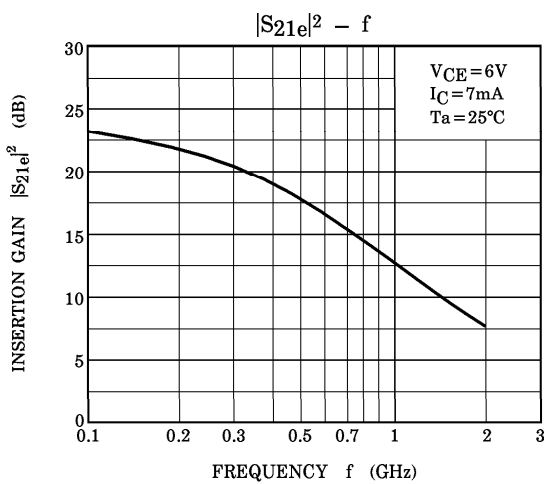
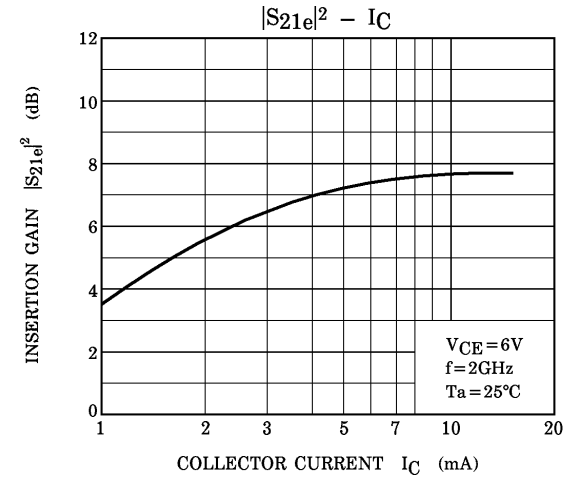
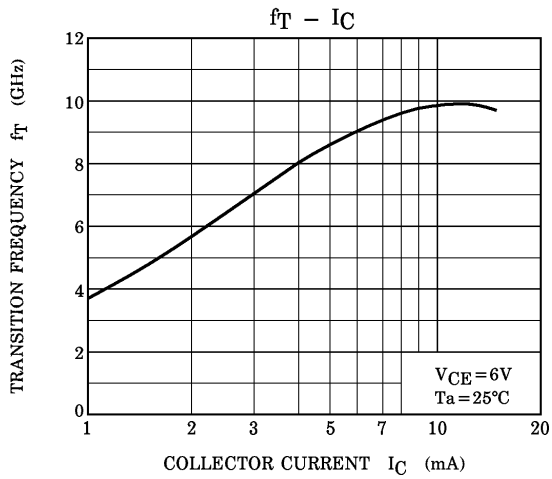
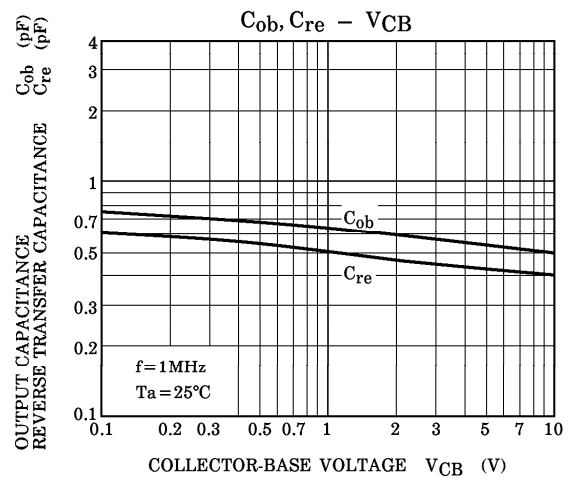
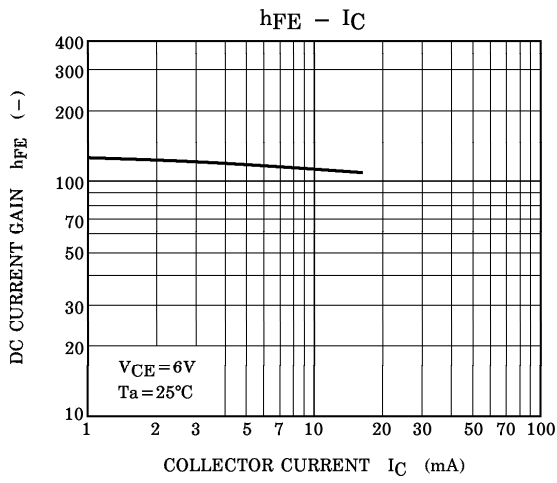
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I <sub>CB0</sub>	V <sub>CB</sub> =10V, I <sub>E</sub> =0	—	—	1	μA
Emitter Cut-off Current	I <sub>EBO</sub>	V <sub>EB</sub> =1V, I <sub>C</sub> =0	—	—	1	μA
DC Current Gain	h <sub>FE</sub> (Note 1)	V <sub>CE</sub> =6V, I <sub>C</sub> =7mA	50	—	160	—
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> =10V, I <sub>E</sub> =0, f=1MHz	—	0.5	—	pF
Reverse Transfer Capacitance	C <sub>re</sub>		(Note 2)	—	0.4	0.85

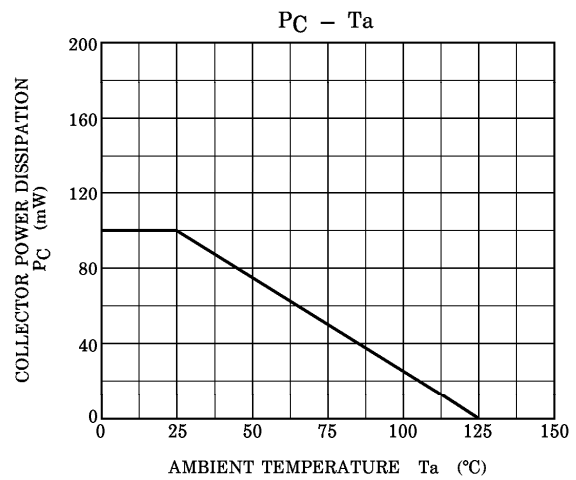
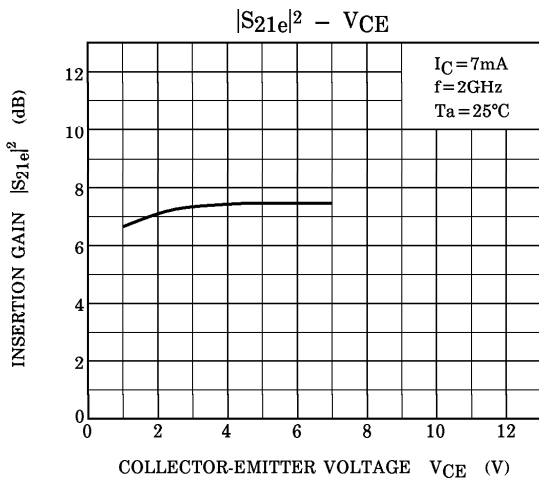
(Note 1) h<sub>FE</sub> Classification R : 50~100, O : 80~160

(Note 2) C<sub>re</sub> is measured by 3 terminal method with capacitance bridge.

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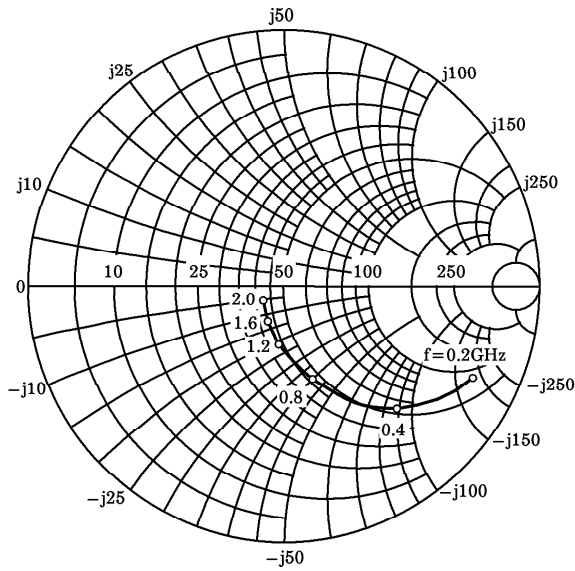
S-Parameter  $Z_0 = 50\Omega$ ,  $T_a = 25^\circ\text{C}$   
 $V_{CE} = 6\text{V}$ ,  $I_C = 3\text{mA}$

frequency (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.835	-26.1	7.069	150.4	0.046	71.0	0.899	-19.3
400	0.665	-46.5	5.948	130.4	0.076	60.5	0.745	-30.3
600	0.501	-62.7	5.021	115.2	0.095	55.7	0.630	-35.9
800	0.386	-74.3	4.173	104.3	0.111	53.7	0.552	-38.5
1000	0.297	-83.7	3.592	95.6	0.124	53.2	0.500	-39.9
1200	0.226	-92.7	3.140	88.5	0.137	53.6	0.465	-41.1
1400	0.175	-101.9	2.808	82.3	0.152	54.1	0.442	-42.2
1600	0.130	-113.4	2.514	76.6	0.165	54.2	0.421	-43.8
1800	0.103	-128.0	2.293	71.7	0.179	53.9	0.405	-45.7
2000	0.081	-147.4	2.114	67.3	0.193	54.8	0.388	-47.4

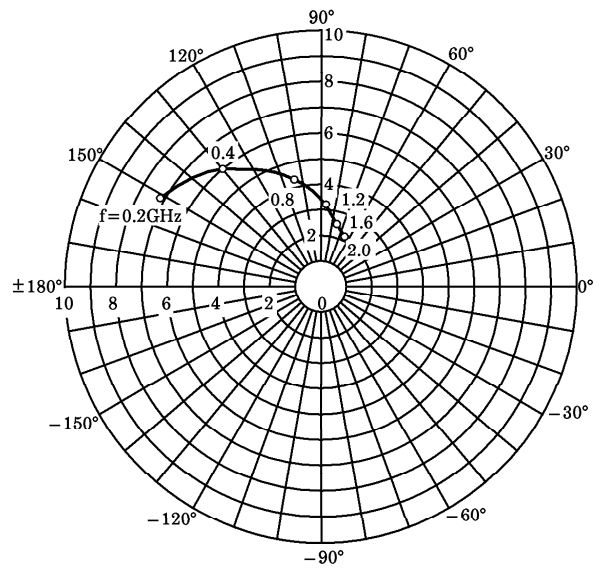
$V_{CE} = 6\text{V}$ ,  $I_C = 7\text{mA}$

frequency (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.668	-40.0	12.306	138.9	0.040	67.3	0.786	-27.0
400	0.427	-64.4	8.852	116.1	0.061	61.6	0.579	-35.0
600	0.280	-79.5	6.591	102.9	0.078	61.8	0.476	-35.9
800	0.193	-89.7	5.191	94.3	0.096	62.5	0.420	-35.0
1000	0.134	-99.3	4.288	87.8	0.112	63.2	0.390	-34.2
1200	0.088	-112.3	3.661	81.9	0.130	63.8	0.374	-34.0
1400	0.056	-129.8	3.232	76.9	0.150	63.4	0.366	-34.8
1600	0.035	-169.0	2.857	72.1	0.168	62.5	0.356	-36.6
1800	0.040	157.0	2.574	68.1	0.185	61.4	0.347	-39.0
2000	0.054	131.5	2.363	64.3	0.203	61.3	0.338	-40.2

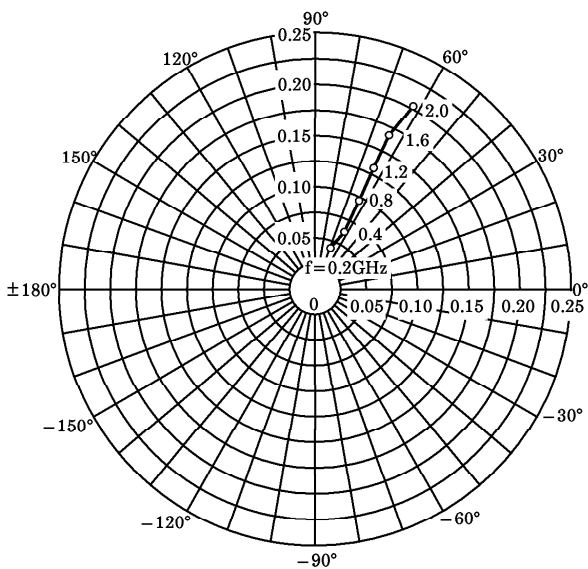
**S<sub>11e</sub>**  
 V<sub>CE</sub> = 6V  
 I<sub>C</sub> = 3mA  
 T<sub>a</sub> = 25°C  
 (UNIT : Ω)



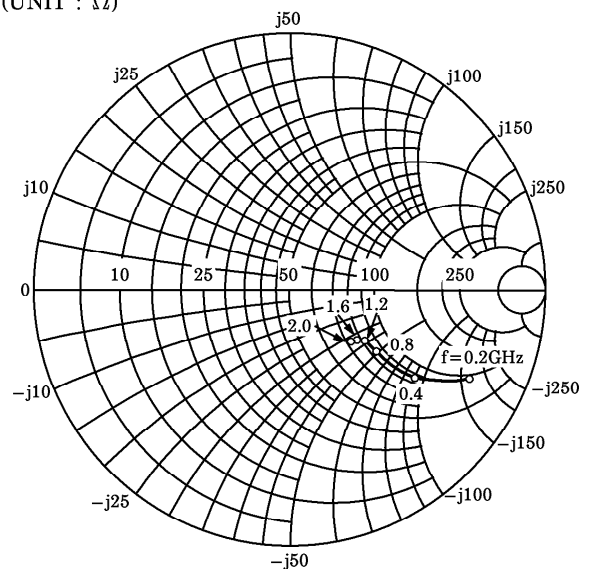
**S<sub>21e</sub>**  
 V<sub>CE</sub> = 6V  
 I<sub>C</sub> = 3mA  
 T<sub>a</sub> = 25°C



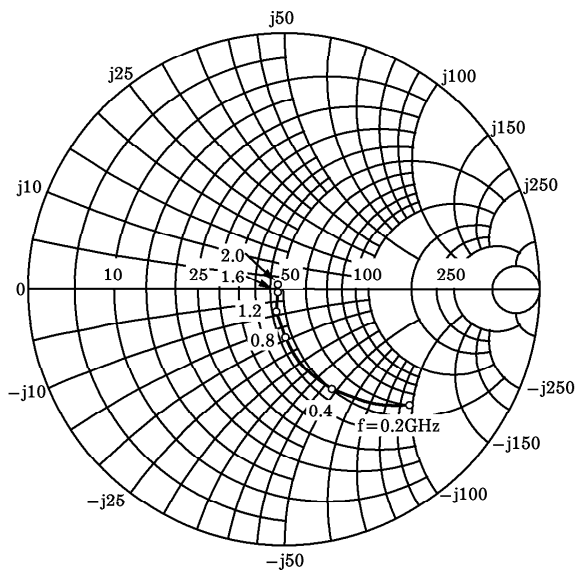
**S<sub>12e</sub>**  
 V<sub>CE</sub> = 6V  
 I<sub>C</sub> = 7mA  
 T<sub>a</sub> = 25°C



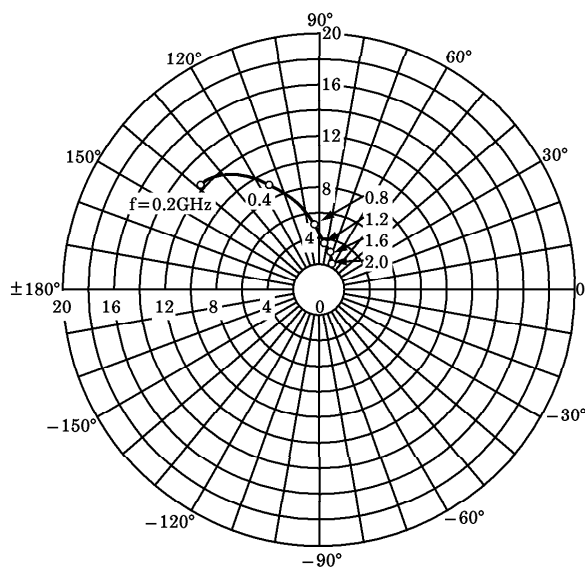
**S<sub>22e</sub>**  
 V<sub>CE</sub> = 6V  
 I<sub>C</sub> = 7mA  
 T<sub>a</sub> = 25°C  
 (UNIT : Ω)



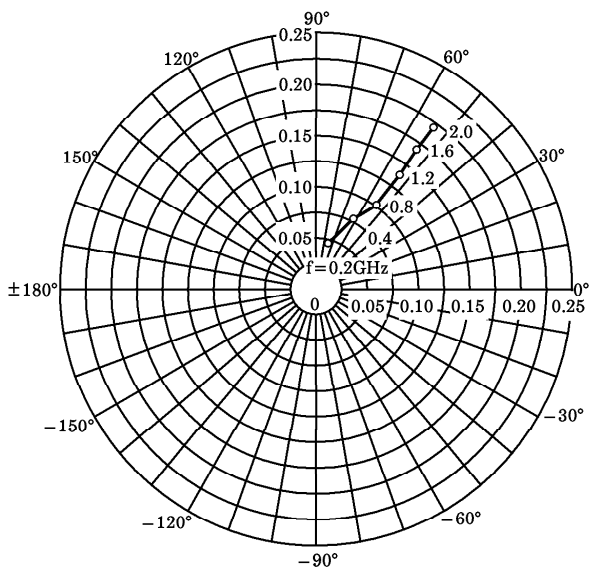
**S<sub>11e</sub>**  
 V<sub>CE</sub>=6V  
 I<sub>C</sub>=7mA  
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 (UNIT : Ω)



**S<sub>21e</sub>**  
 V<sub>CE</sub>=6V  
 I<sub>C</sub>=7mA  
 T<sub>a</sub>=25°C



**S<sub>12e</sub>**  
 V<sub>CE</sub>=6V  
 I<sub>C</sub>=3mA  
 T<sub>a</sub>=25°C



**S<sub>22e</sub>**  
 V<sub>CE</sub>=6V  
 I<sub>C</sub>=3mA  
 T<sub>a</sub>=25°C  
 (UNIT : Ω)

