

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

# 2SC5084

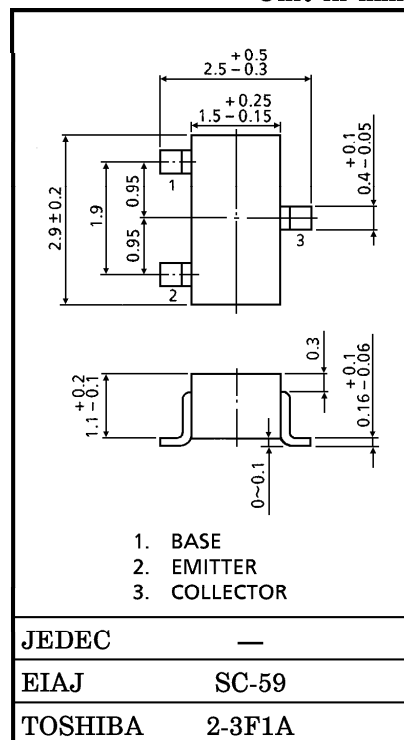
VHF~UHF BAND LOW NOISE AMPLIFIER APPLICATIONS

Unit in mm

- Low Noise Figure, High Gain.
- $NF=1.1dB, |S_{21e}|^2=11dB (f=1GHz)$

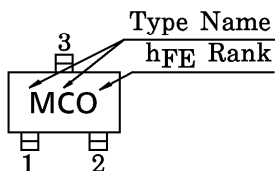
MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	V <sub>CBO</sub>	20	V
Collector-Emitter Voltage	V <sub>CEO</sub>	12	V
Emitter-Base Voltage	V <sub>EBO</sub>	3	V
Base Current	I <sub>B</sub>	40	mA
Collector Current	I <sub>C</sub>	80	mA
Collector Power Dissipation	P <sub>C</sub>	150	mW
Junction Temperature	T <sub>j</sub>	125	°C
Storage Temperature Range	T <sub>stg</sub>	-55~125	°C



Weight : 0.012g

MARKING



MICROWAVE CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Transition Frequency	f <sub>T</sub>	V <sub>CE</sub> =10V, I <sub>C</sub> =20mA	5	7	—	GHz
Insertion Gain	S <sub>21e</sub>   <sup>2</sup> (1)	V <sub>CE</sub> =10V, I <sub>C</sub> =20mA, f=500MHz	—	16.5	—	dB
	S <sub>21e</sub>   <sup>2</sup> (2)	V <sub>CE</sub> =10V, I <sub>C</sub> =20mA, f=1GHz	7.5	11	—	
Noise Figure	NF (1)	V <sub>CE</sub> =10V, I <sub>C</sub> =5mA, f=500MHz	—	1	—	dB
	NF (2)	V <sub>CE</sub> =10V, I <sub>C</sub> =5mA, f=1GHz	—	1.1	2	

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

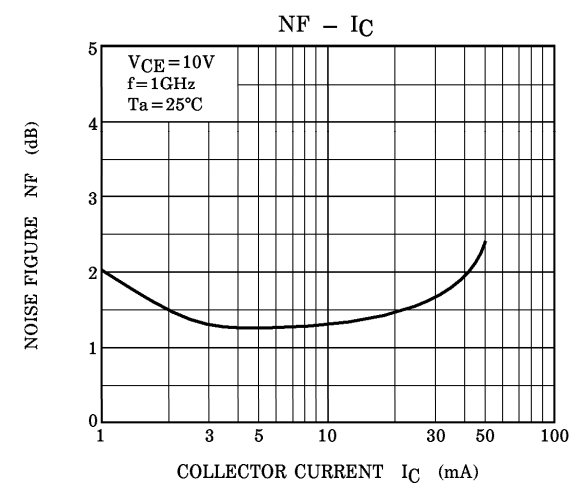
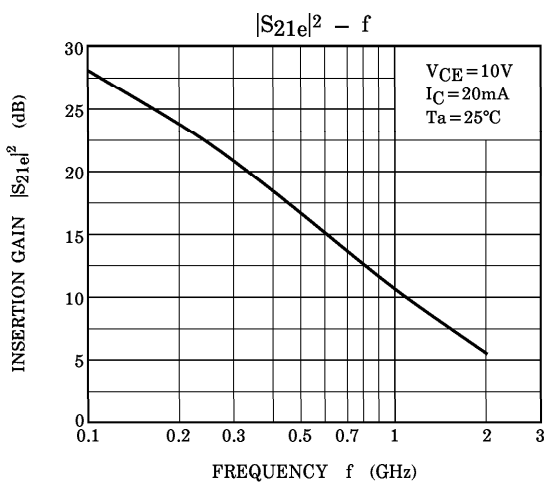
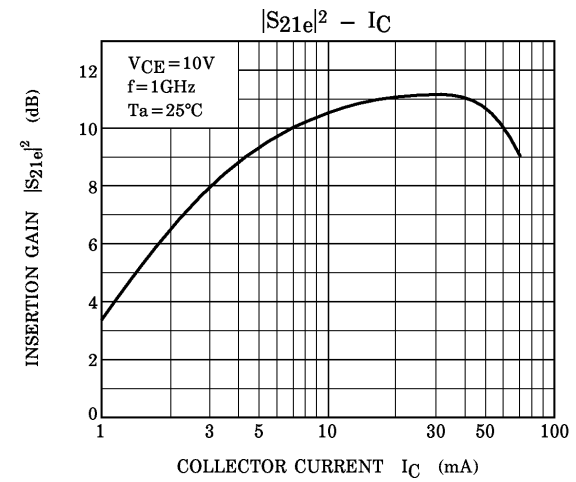
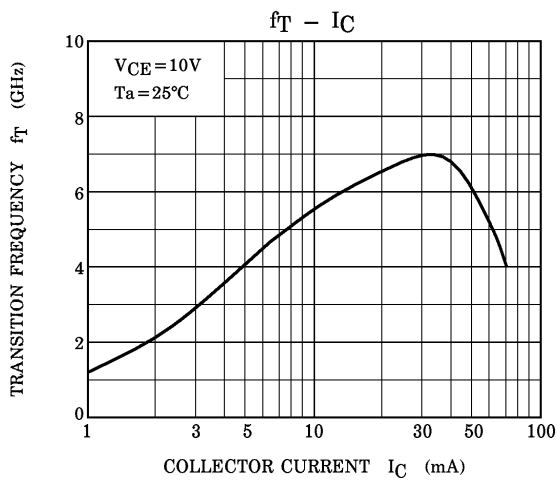
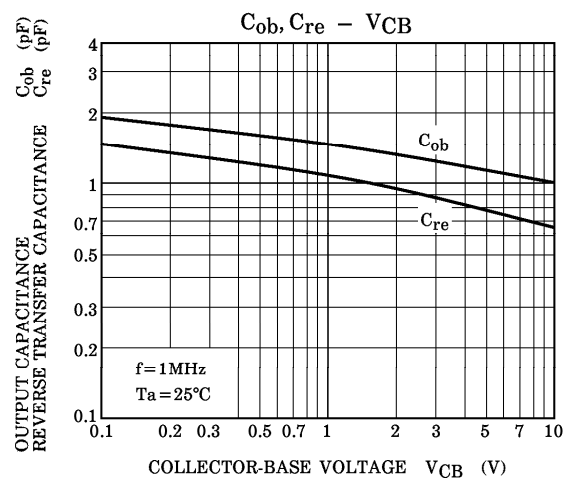
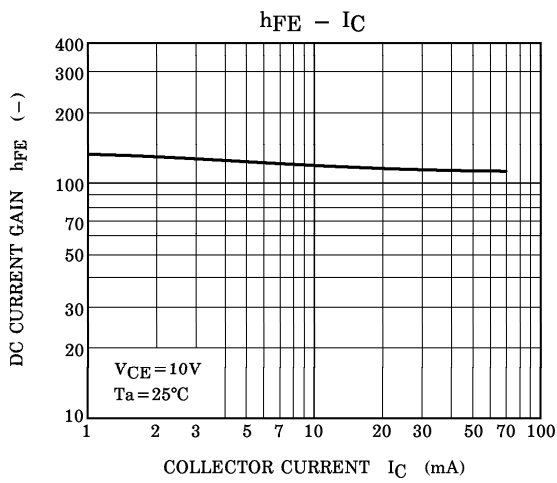
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I <sub>CBO</sub>	V <sub>CB</sub> =10V, I <sub>E</sub> =0	—	—	1	μA
Emitter Cut-off Current	I <sub>EBO</sub>	V <sub>EB</sub> =1V, I <sub>C</sub> =0	—	—	1	μA
DC Current Gain	h <sub>FE</sub> (Note 1)	V <sub>CE</sub> =10V, I <sub>C</sub> =20mA	80	—	240	—
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> =10V, I <sub>E</sub> =0, f=1MHz	—	1.0	—	pF
Reverse Transfer Capacitance	C <sub>re</sub>		(Note 2)	—	0.65	1.15

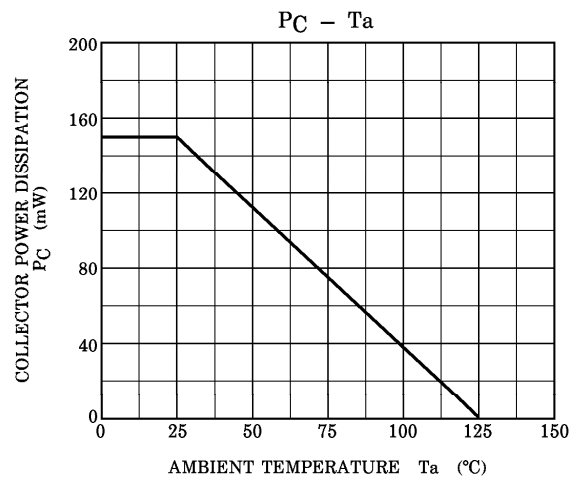
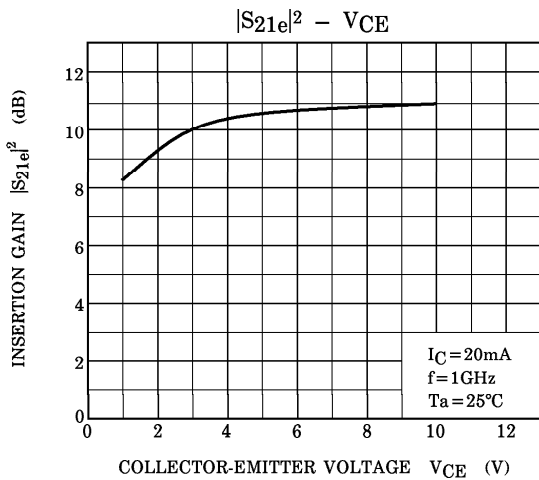
(Note 1) h<sub>FE</sub> Classification O : 80~160, Y : 120~240

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

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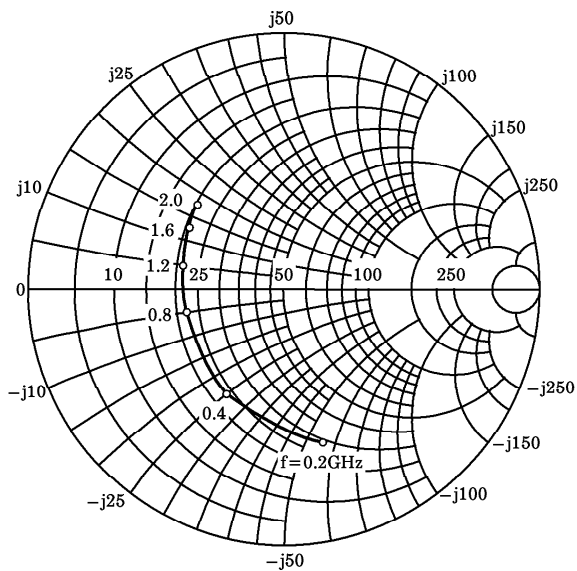
S-Parameter  $Z_0 = 50\Omega$ ,  $T_a = 25^\circ\text{C}$   
 $V_{CE} = 10\text{V}$ ,  $I_C = 5\text{mA}$

frequency (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.628	-77.1	9.254	126.5	0.051	53.3	0.695	-31.0
400	0.471	-122.1	6.027	103.3	0.067	48.4	0.509	-34.9
600	0.417	-149.1	4.341	90.3	0.077	51.9	0.441	-35.2
800	0.404	-167.3	3.381	81.2	0.090	56.9	0.412	-36.0
1000	0.402	178.1	2.798	73.3	0.104	62.0	0.398	-37.7
1200	0.412	166.6	2.393	66.7	0.122	66.4	0.390	-40.3
1400	0.427	156.6	2.108	60.4	0.145	69.1	0.385	-44.3
1600	0.440	147.3	1.881	54.8	0.170	69.8	0.376	-48.8
1800	0.455	140.0	1.713	49.4	0.194	70.2	0.373	-54.3
2000	0.482	132.6	1.586	44.6	0.223	71.3	0.367	-60.0

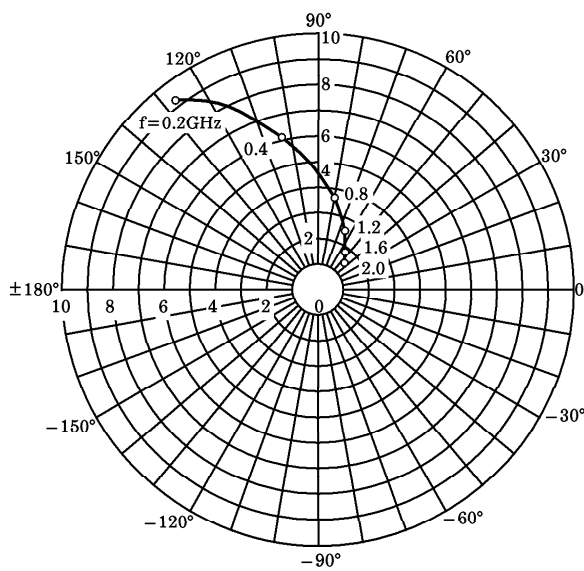
$V_{CE} = 10\text{V}$ ,  $I_C = 20\text{mA}$

frequency (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.340	-122.7	15.443	107.4	0.034	62.7	0.415	-40.5
400	0.299	-158.7	8.266	92.4	0.056	69.3	0.293	-34.2
600	0.293	-178.0	5.664	84.0	0.080	71.7	0.265	-30.4
800	0.294	169.0	4.334	77.3	0.104	72.1	0.255	-29.9
1000	0.299	157.9	3.528	71.2	0.129	72.0	0.252	-30.6
1200	0.310	149.5	3.002	66.0	0.155	71.4	0.254	-32.5
1400	0.321	142.0	2.629	61.0	0.183	69.7	0.255	-36.1
1600	0.332	134.9	2.336	56.3	0.209	67.6	0.248	-40.6
1800	0.341	129.5	2.121	51.7	0.234	65.6	0.242	-45.9
2000	0.366	124.3	1.958	47.3	0.260	64.6	0.236	-51.7

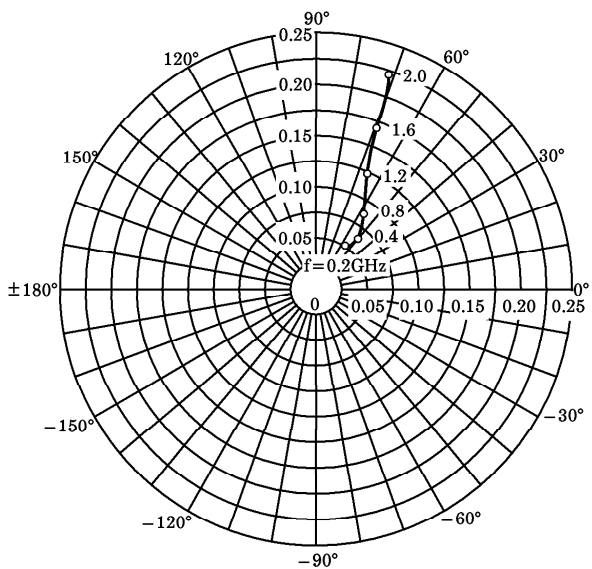
**S<sub>11e</sub>**  
 V<sub>CE</sub>=10V  
 I<sub>C</sub>=5mA  
 T<sub>a</sub>=25°C  
 (UNIT : Ω)



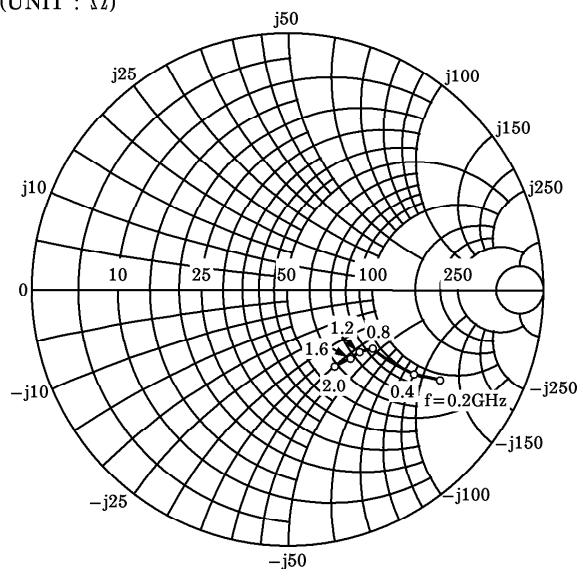
**S<sub>21e</sub>**  
 V<sub>CE</sub>=10V  
 I<sub>C</sub>=5mA  
 T<sub>a</sub>=25°C



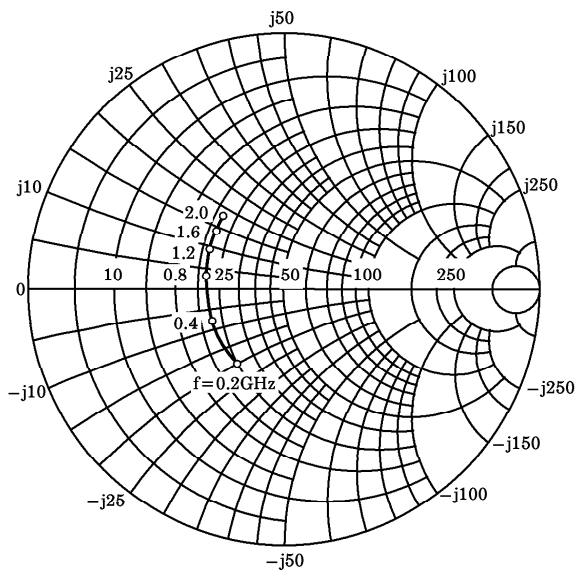
**S<sub>12e</sub>**  
 V<sub>CE</sub>=10V  
 I<sub>C</sub>=5mA  
 T<sub>a</sub>=25°C



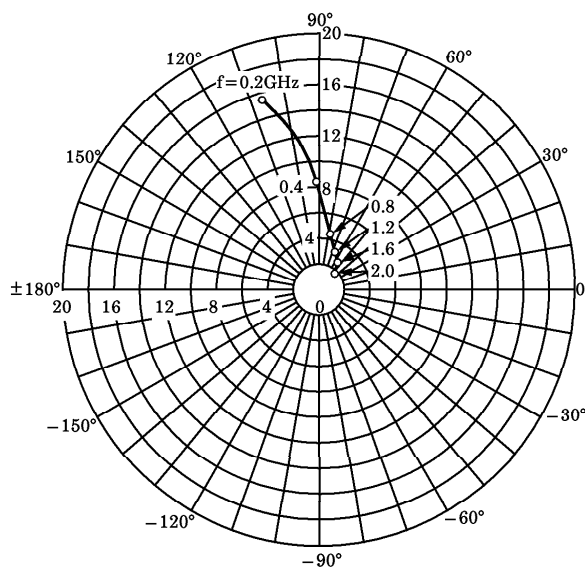
**S<sub>22e</sub>**  
 V<sub>CE</sub>=10V  
 I<sub>C</sub>=5mA  
 T<sub>a</sub>=25°C  
 (UNIT : Ω)



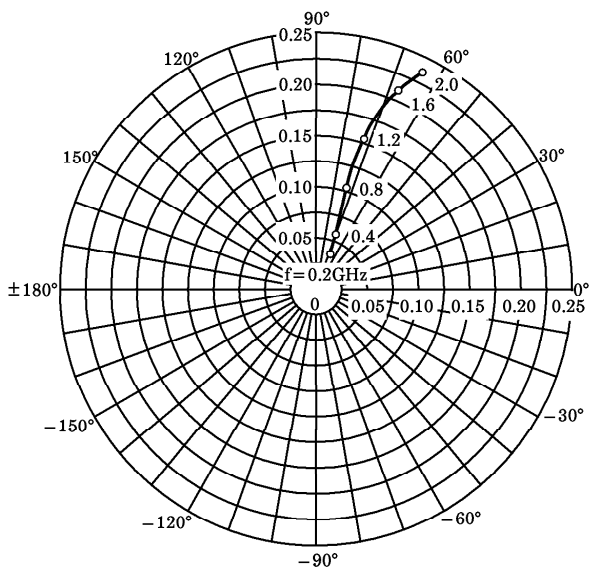
**S<sub>11e</sub>**  
 V<sub>CE</sub> = 10V  
 I<sub>C</sub> = 20mA  
 T<sub>a</sub> = 25°C  
 (UNIT : Ω)



**S<sub>21e</sub>**  
 V<sub>CE</sub> = 10V  
 I<sub>C</sub> = 20mA  
 T<sub>a</sub> = 25°C



**S<sub>12e</sub>**  
 V<sub>CE</sub> = 10V  
 I<sub>C</sub> = 20mA  
 T<sub>a</sub> = 25°C



**S<sub>22e</sub>**  
 V<sub>CE</sub> = 10V  
 I<sub>C</sub> = 20mA  
 T<sub>a</sub> = 25°C  
 (UNIT : Ω)

