

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

# 2SC5064

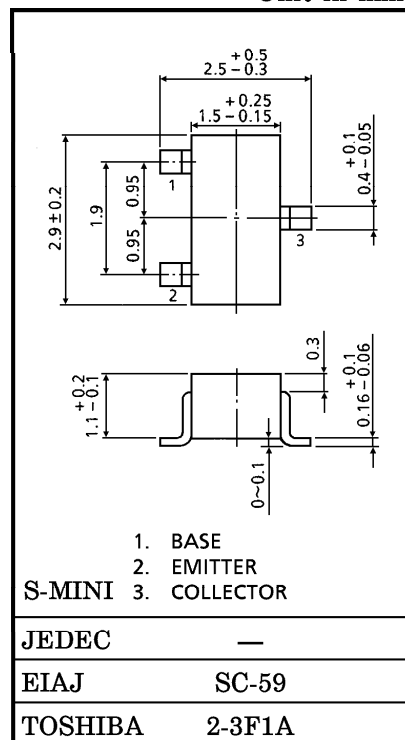
VHF~UHF BAND LOW NOISE AMPLIFIER APPLICATIONS

Unit in mm

- Low Noise Figure, High Gain.
- $NF=1.1dB, |S_{21e}|^2=12dB (f=1GHz)$

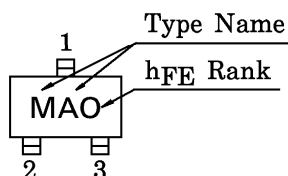
MAXIMUM RATINGS (Ta = 25°C)

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>	15	mA
Collector Current	I <sub>C</sub>	30	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> =5V, I <sub>C</sub> =10mA	5	7	—	GHz
Insertion Gain	S <sub>21e</sub>   <sup>2</sup> (1)	V <sub>CE</sub> =5V, I <sub>C</sub> =10mA, f=500MHz	—	17	—	dB
	S <sub>21e</sub>   <sup>2</sup> (2)	V <sub>CE</sub> =5V, I <sub>C</sub> =10mA, f=1GHz	8.5	12	—	
Noise Figure	NF (1)	V <sub>CE</sub> =5V, I <sub>C</sub> =3mA, f=500MHz	—	1	—	dB
	NF (2)	V <sub>CE</sub> =5V, I <sub>C</sub> =3mA, f=1GHz	—	1.1	2.0	

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

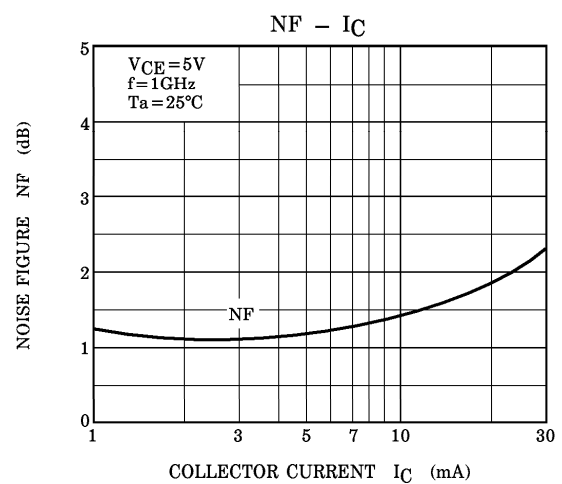
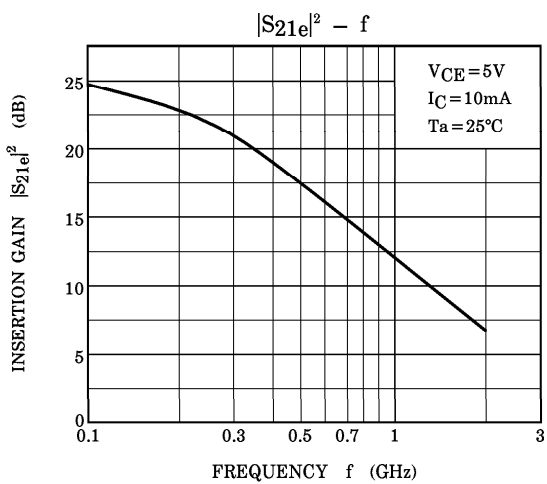
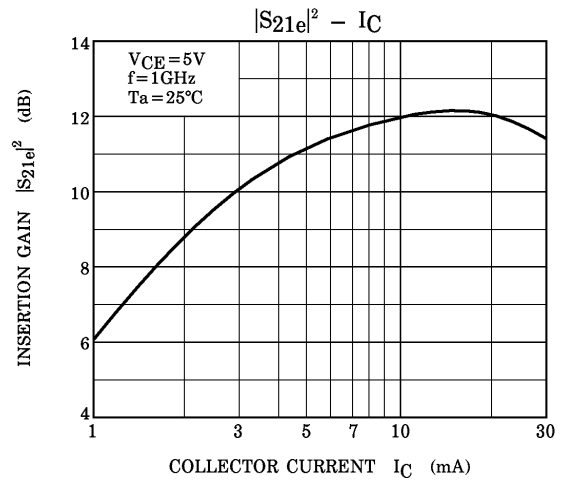
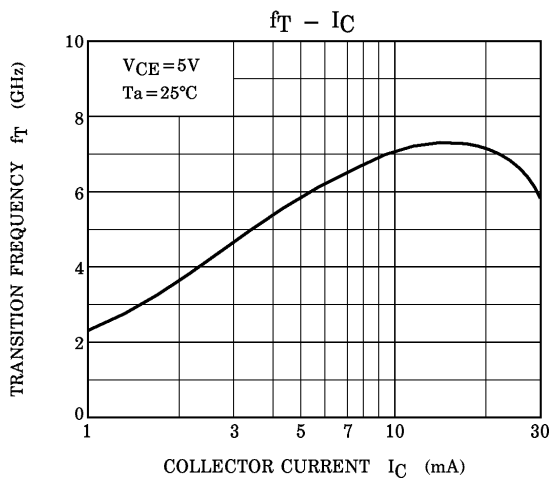
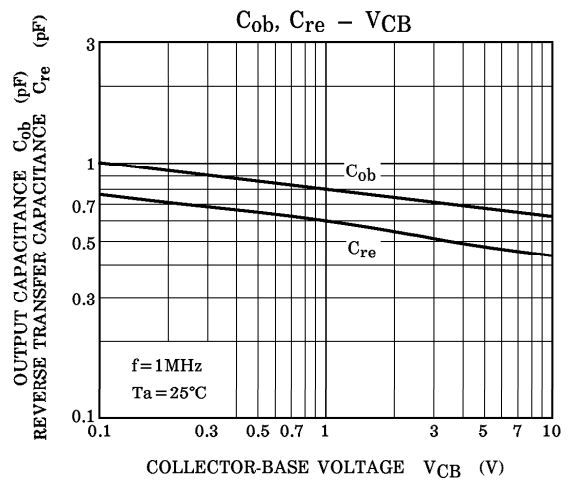
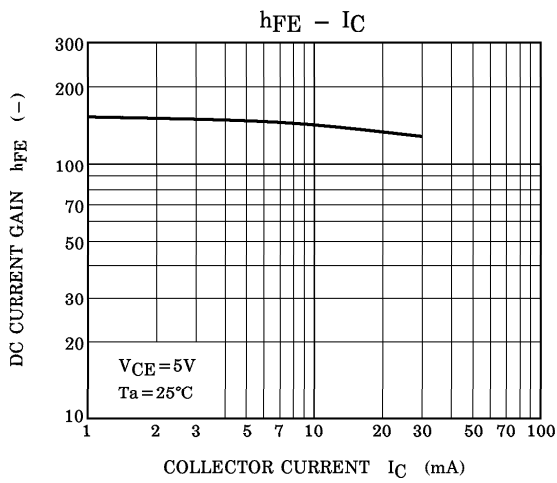
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I <sub>CBO</sub>	V <sub>CB</sub> =10V, I <sub>E</sub> =0	—	—	1	μA
Emitter Cut-off Current	I <sub>EBO</sub>	V <sub>EB</sub> =1V, I <sub>C</sub> =0	—	—	1	μA
DC Current Gain	h <sub>FE</sub> (Note 1)	V <sub>CE</sub> =5V, I <sub>C</sub> =10mA	80	—	240	—
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> =5V, I <sub>E</sub> =0, f=1MHz	—	0.7	—	pF
Reverse Transfer Capacitance	C <sub>re</sub>	(Note 2)	—	0.45	0.9	pF

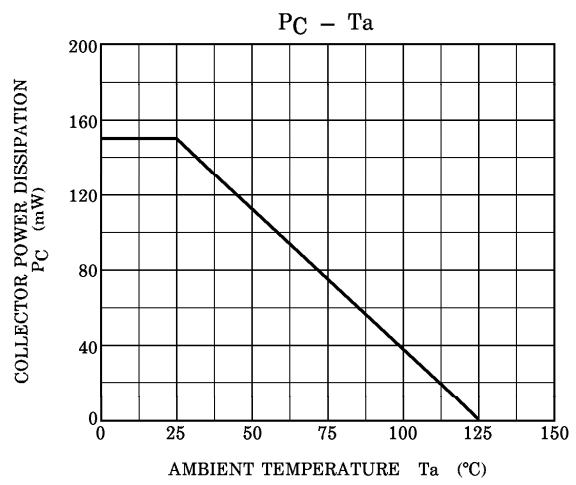
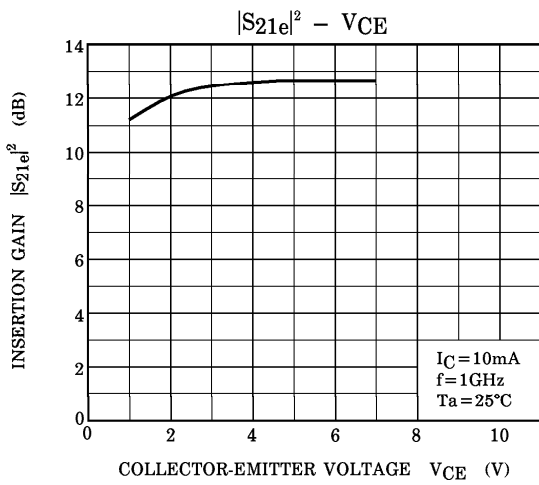
(Note 1) h<sub>FE</sub> Classification O : 80~160, Y : 120~240

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

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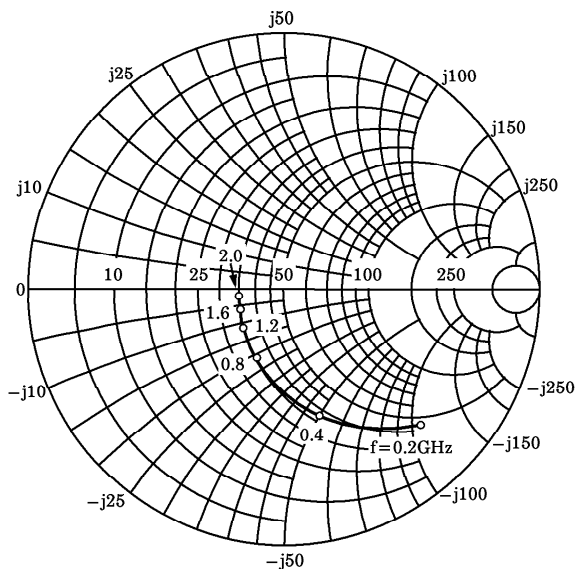
S-Parameter Z<sub>O</sub> = 50Ω, T<sub>a</sub> = 25°C  
V<sub>CE</sub> = 5V, I<sub>C</sub> = 5mA

frequency (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.753	-43.7	10.247	140.6	0.040	65.6	0.827	-22.6
400	0.531	-75.1	7.684	117.1	0.060	57.1	0.648	-30.3
600	0.384	-96.4	5.815	103.0	0.074	56.1	0.551	-32.0
800	0.305	-112.6	4.523	93.6	0.086	57.0	0.500	-32.3
1000	0.255	-126.5	3.788	86.3	0.099	58.9	0.472	-32.4
1200	0.224	-138.4	3.244	80.7	0.112	60.2	0.455	-32.2
1400	0.203	-150.1	2.833	75.4	0.127	60.3	0.442	-32.6
1600	0.187	-159.4	2.529	70.6	0.139	60.0	0.434	-33.0
1800	0.174	-166.5	2.283	66.7	0.150	60.3	0.429	-32.6
2000	0.176	-171.2	2.107	63.0	0.164	59.2	0.428	-32.2

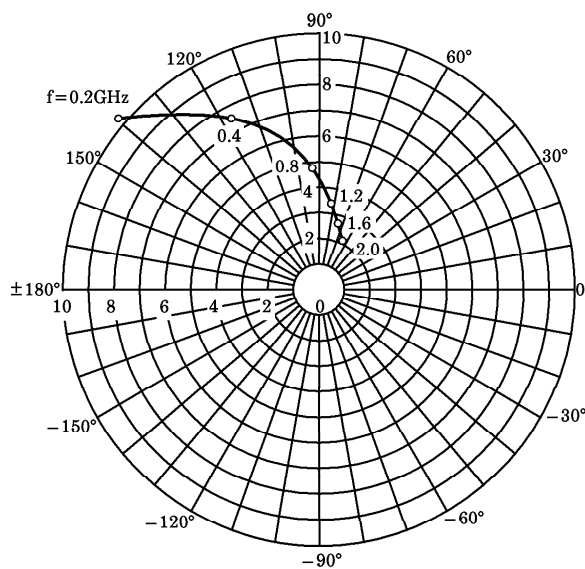
V<sub>CE</sub> = 5V, I<sub>C</sub> = 10mA

frequency (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.591	-58.0	14.955	129.6	0.034	64.3	0.714	-27.5
400	0.367	-90.3	9.581	107.5	0.052	61.9	0.534	-30.8
600	0.260	-110.7	6.781	96.1	0.067	63.9	0.462	-30.1
800	0.209	-126.9	5.207	88.6	0.083	65.2	0.428	-29.2
1000	0.178	-141.8	4.269	82.5	0.100	66.4	0.412	-28.6
1200	0.160	-153.7	3.618	77.7	0.117	66.7	0.403	-28.3
1400	0.150	-166.3	3.152	72.7	0.135	65.4	0.398	-28.8
1600	0.141	-175.2	2.801	68.7	0.149	64.0	0.393	-29.4
1800	0.130	178.2	2.521	65.0	0.163	63.4	0.392	-29.0
2000	0.133	174.0	2.314	61.7	0.179	61.3	0.395	-28.6

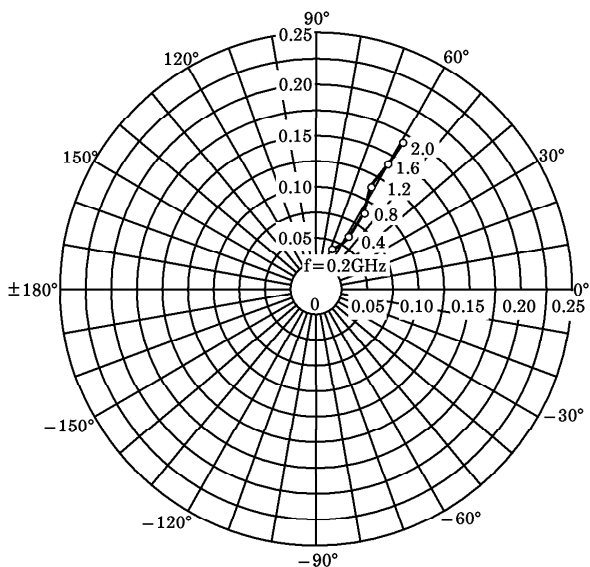
**S<sub>11e</sub>**  
 V<sub>CE</sub>=5V  
 I<sub>C</sub>=5mA  
 T<sub>a</sub>=25°C  
 (UNIT : Ω)



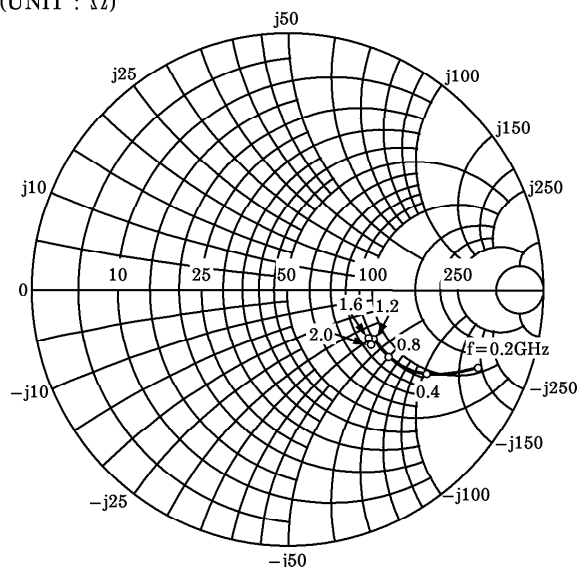
**S<sub>21e</sub>**  
 V<sub>CE</sub>=5V  
 I<sub>C</sub>=5mA  
 T<sub>a</sub>=25°C



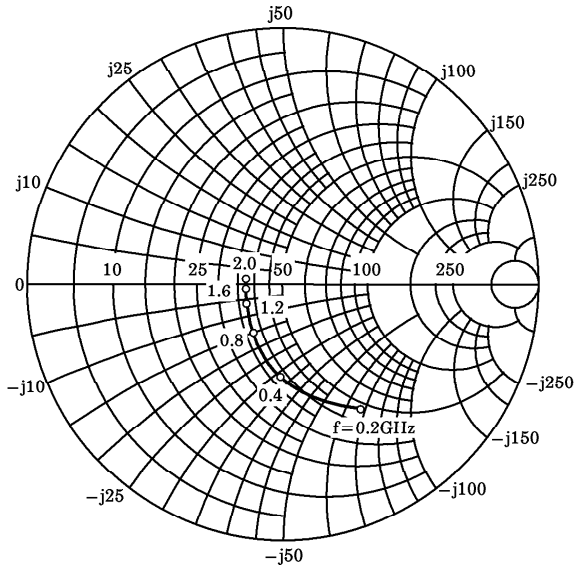
**S<sub>12e</sub>**  
 V<sub>CE</sub>=5V  
 I<sub>C</sub>=5mA  
 T<sub>a</sub>=25°C



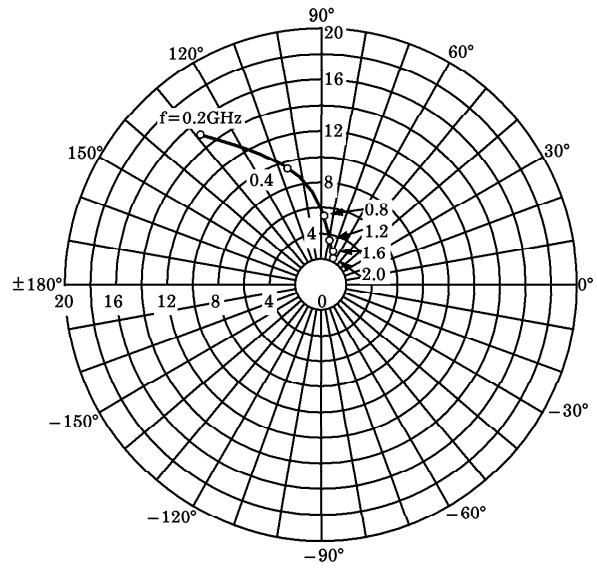
**S<sub>22e</sub>**  
 V<sub>CE</sub>=5V  
 I<sub>C</sub>=5mA  
 T<sub>a</sub>=25°C  
 (UNIT : Ω)



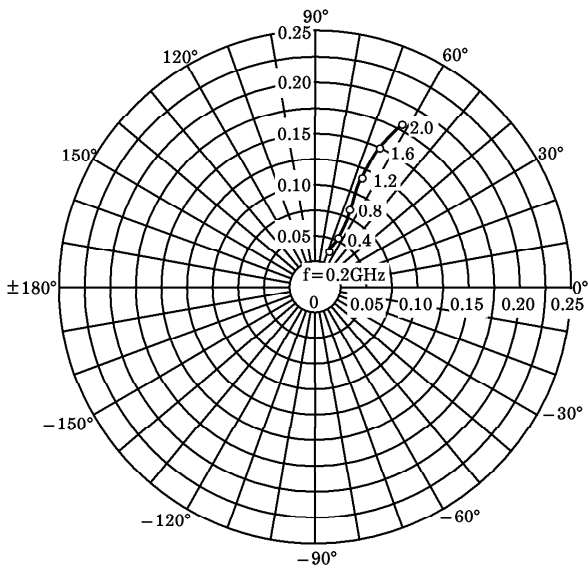
**S<sub>11e</sub>**  
 V<sub>CE</sub>=5V  
 I<sub>C</sub>=10mA  
 T<sub>a</sub>=25°C  
 (UNIT : Ω)



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



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



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

