

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

# 2SC5065

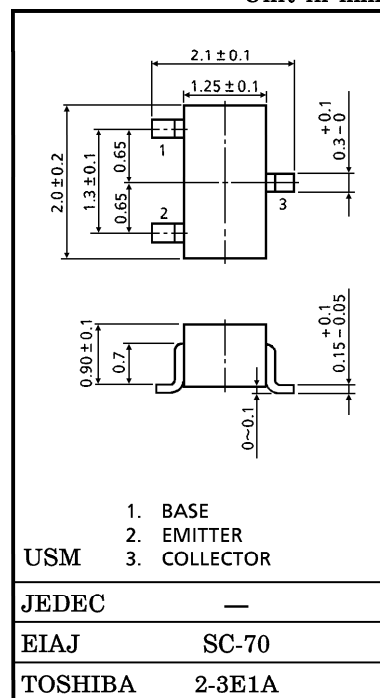
VHF~UHF BAND LOW NOISE AMPLIFIER APPLICATIONS

Unit in mm

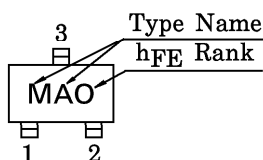
- Low Noise Figure, High Gain.
- $NF = 1.1dB$ ,  $|S_{21e}|^2 = 12dB$  ( $f = 1GHz$ )

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

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	$V_{CBO}$	20	V
Collector-Emitter Voltage	$V_{CEO}$	12	V
Emitter-Base Voltage	$V_{EBO}$	3	V
Base Current	$I_B$	15	mA
Collector Current	$I_C$	30	mA
Collector Power Dissipation	$P_C$	100	mW
Junction Temperature	$T_j$	125	$^\circ C$
Storage Temperature Range	$T_{stg}$	-55~125	$^\circ C$



MARKING



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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Transition Frequency	$f_T$	$V_{CE} = 5V, I_C = 10mA$	5	7	—	GHz
Insertion Gain	$ S_{21e} ^2 (1)$	$V_{CE} = 5V, I_C = 10mA, f = 500MHz$	—	17	—	dB
	$ S_{21e} ^2 (2)$	$V_{CE} = 5V, I_C = 10mA, f = 1GHz$	8.5	12	—	
Noise Figure	NF (1)	$V_{CE} = 5V, I_C = 3mA, f = 500MHz$	—	1	—	dB
	NF (2)	$V_{CE} = 5V, I_C = 3mA, f = 1GHz$	—	1.1	2.0	

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

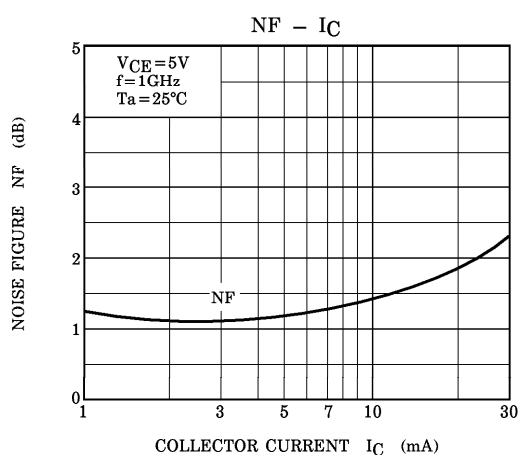
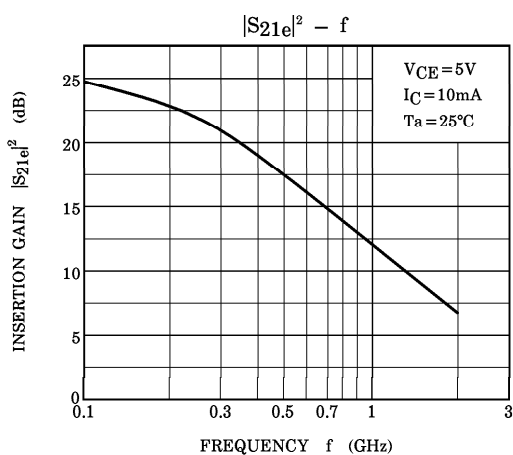
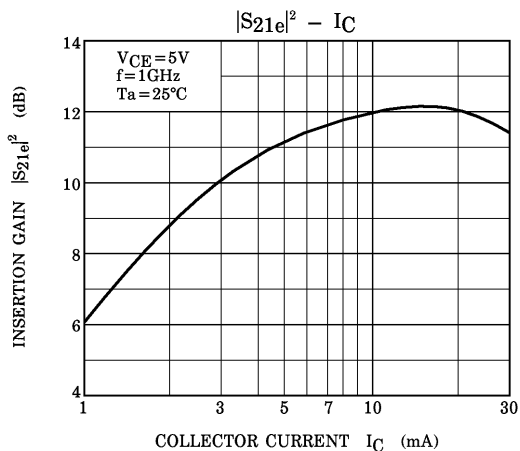
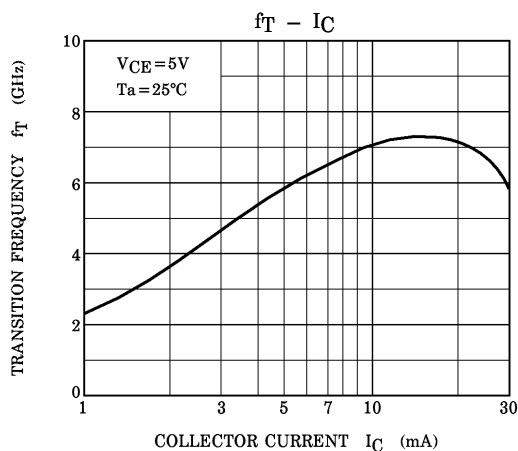
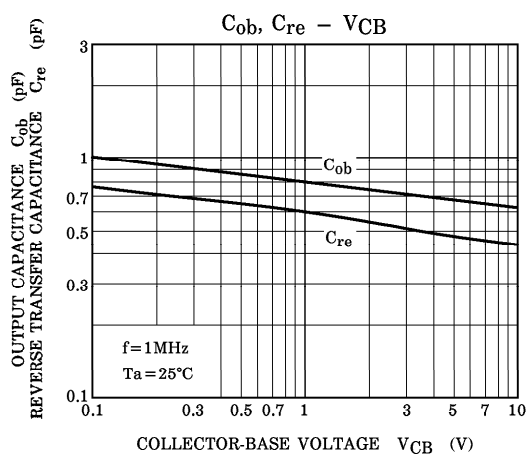
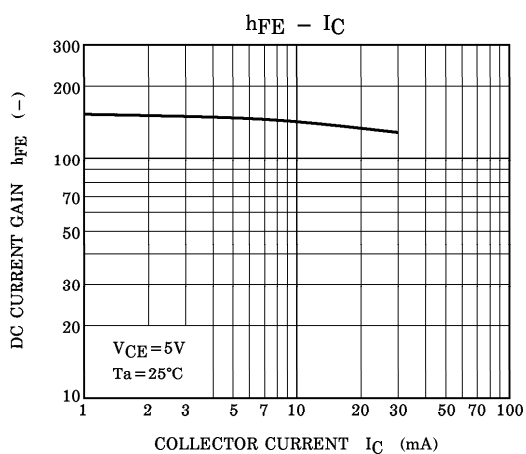
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	$I_{CBO}$	$V_{CB} = 10V, I_E = 0$	—	—	1	$\mu A$
Emitter Cut-off Current	$I_{EBO}$	$V_{EB} = 1V, I_C = 0$	—	—	1	$\mu A$
DC Current Gain	$h_{FE}$ (Note 1)	$V_{CE} = 5V, I_C = 10mA$	80	—	240	—
Output Capacitance	$C_{ob}$	$V_{CB} = 5V, I_E = 0, f = 1MHz$ (Note 2)	—	0.7	—	pF
Reverse Transfer Capacitance	$C_{re}$		—	0.45	0.9	pF

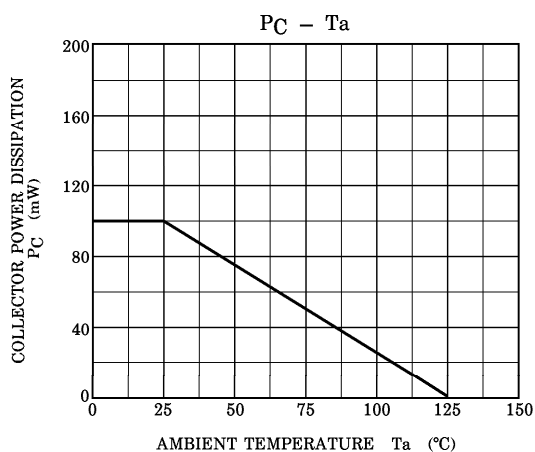
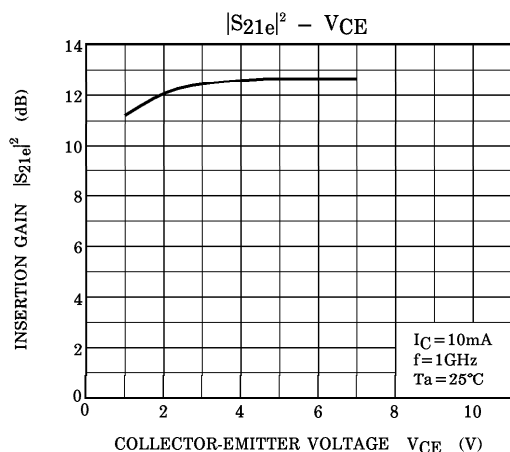
(Note 1)  $h_{FE}$  Classification O : 80~160, Y : 120~240

(Note 2)  $C_{re}$  is measured by 3 terminal method with capacitance bridge.

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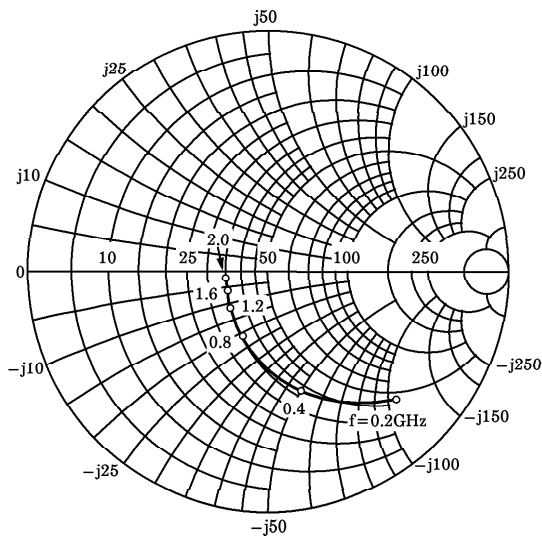
S-Parameter  $Z_0 = 50\Omega$ ,  $T_a = 25^\circ\text{C}$   
 $V_{CE} = 5\text{V}$ ,  $I_C = 5\text{mA}$

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

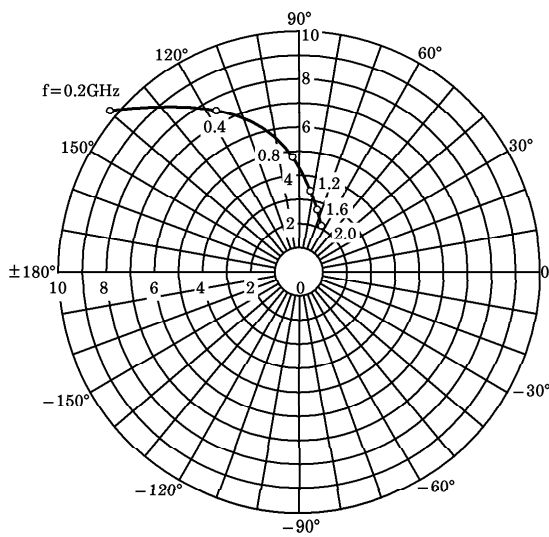
$V_{CE} = 5\text{V}$ ,  $I_C = 10\text{mA}$

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

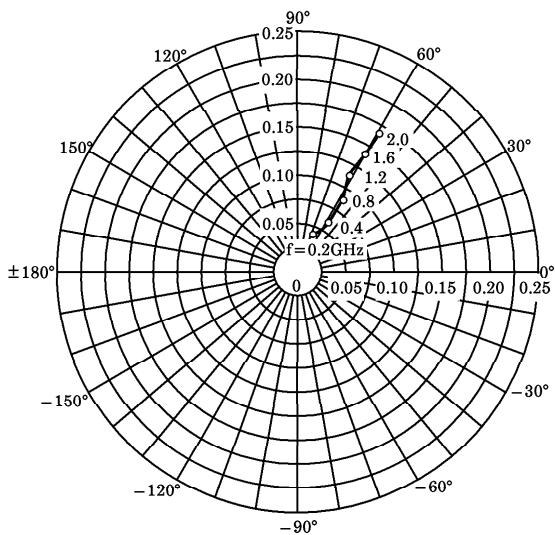
S<sub>11e</sub>  
 V<sub>CE</sub> = 5V  
 I<sub>C</sub> = 5mA  
 T<sub>a</sub> = 25°C  
 (UNIT : Ω)



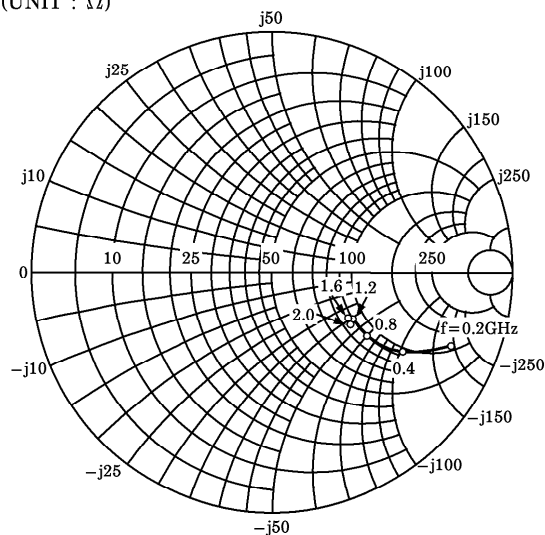
S<sub>21e</sub>  
 V<sub>CE</sub> = 5V  
 I<sub>C</sub> = 5mA  
 T<sub>a</sub> = 25°C



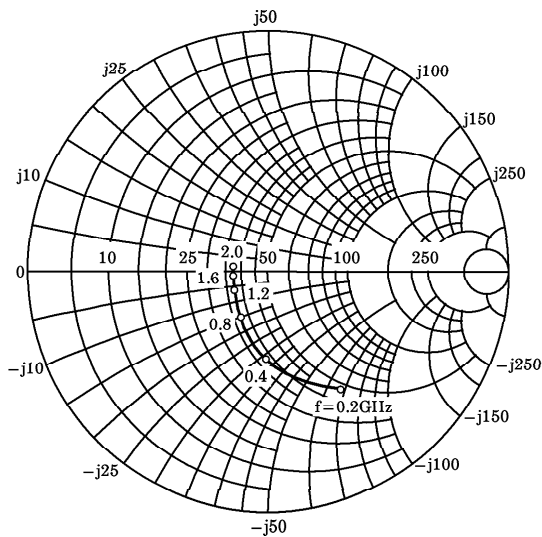
S<sub>12e</sub>  
 V<sub>CE</sub> = 5V  
 I<sub>C</sub> = 5mA  
 T<sub>a</sub> = 25°C



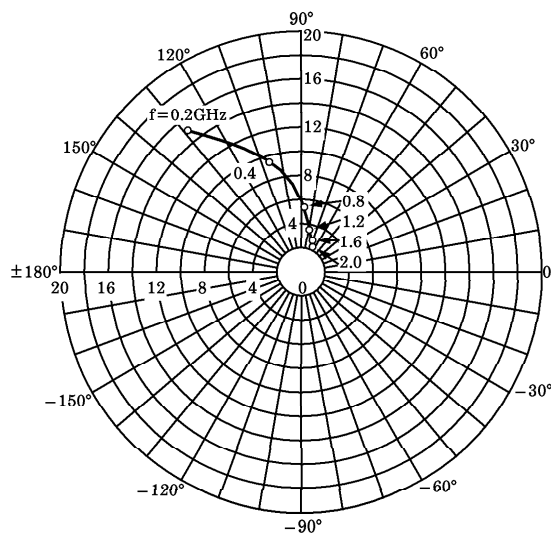
S<sub>22e</sub>  
 V<sub>CE</sub> = 5V  
 I<sub>C</sub> = 5mA  
 T<sub>a</sub> = 25°C  
 (UNIT : Ω)



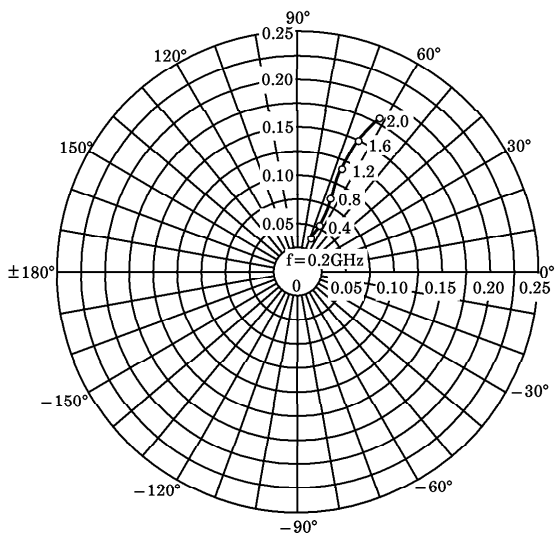
S<sub>11e</sub>  
 V<sub>CE</sub> = 5V  
 I<sub>C</sub> = 10mA  
 T<sub>a</sub> = 25°C  
 (UNIT : Ω)



S<sub>21e</sub>  
 V<sub>CE</sub> = 5V  
 I<sub>C</sub> = 10mA  
 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)

