

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

# 2SC5085

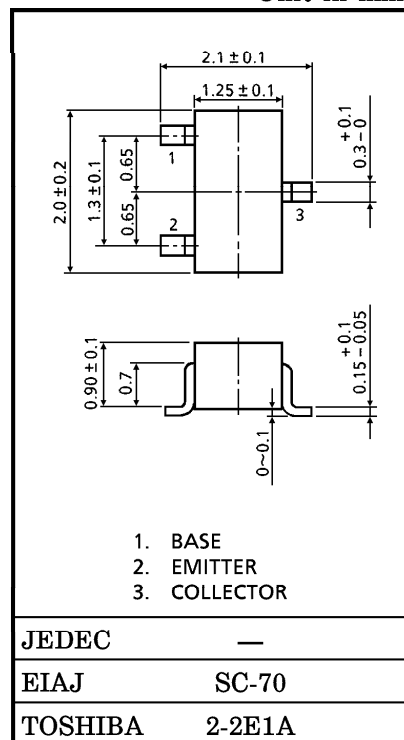
VHF~UHF BAND LOW NOISE AMPLIFIER APPLICATIONS

Unit in mm

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

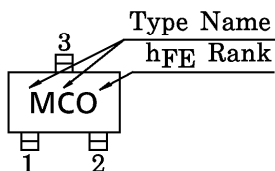
MAXIMUM RATINGS ( $T_a = 25^\circ C$ )

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	$I_B$	40	mA
Collector Current	$I_C$	80	mA
Collector Power Dissipation	$P_C$	100	mW
Junction Temperature	$T_j$	125	$^\circ C$
Storage Temperature Range	$T_{stg}$	-55~125	$^\circ C$



Weight : 0.006g

MARKING



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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Transition Frequency	$f_T$	$V_{CE}=10V, I_C=20mA$	5	7	—	GHz
Insertion Gain	$ S_{21e} ^2 (1)$	$V_{CE}=10V, I_C=20mA, f=500MHz$	—	16.5	—	dB
	$ S_{21e} ^2 (2)$	$V_{CE}=10V, I_C=20mA, f=1GHz$	7.5	11	—	
Noise Figure	NF (1)	$V_{CE}=10V, I_C=5mA, f=500MHz$	—	1	—	dB
	NF (2)	$V_{CE}=10V, I_C=5mA, f=1GHz$	—	1.1	2	

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

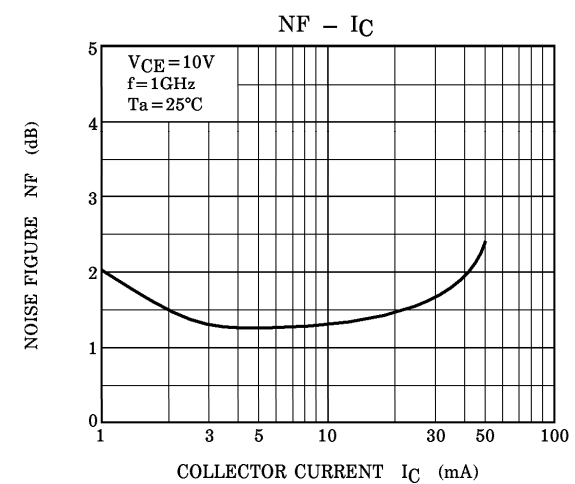
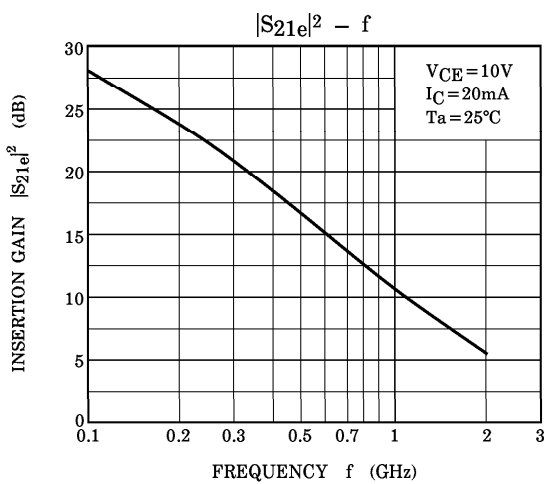
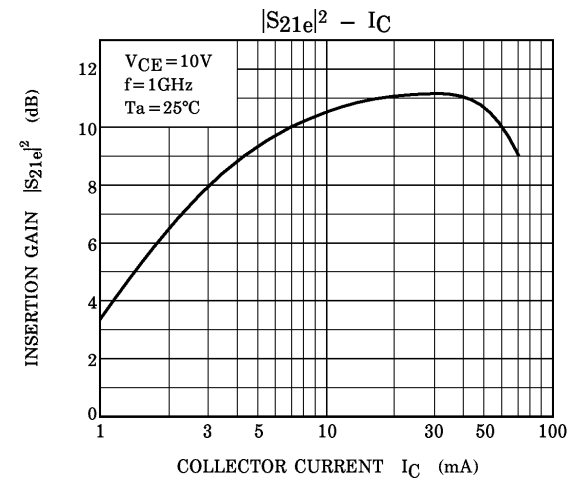
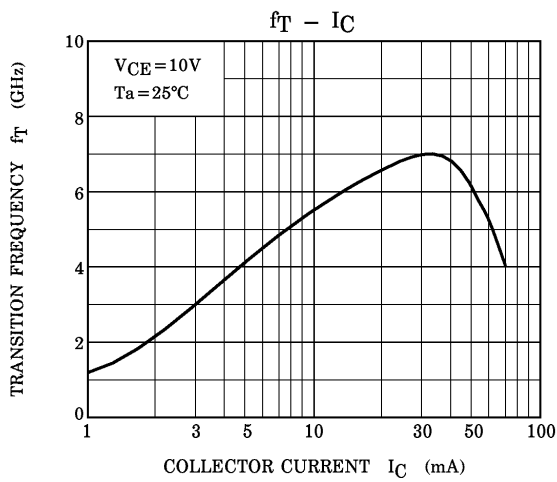
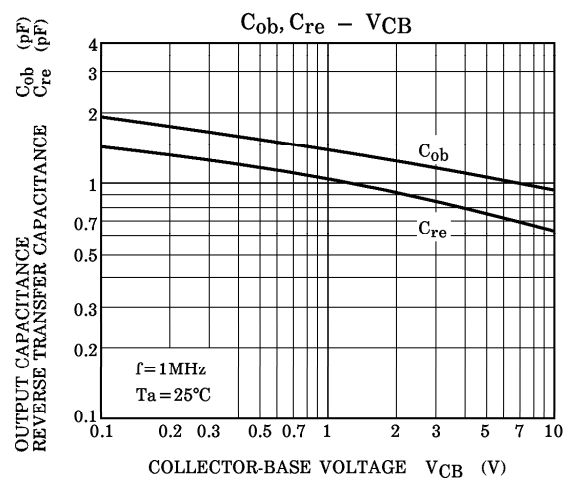
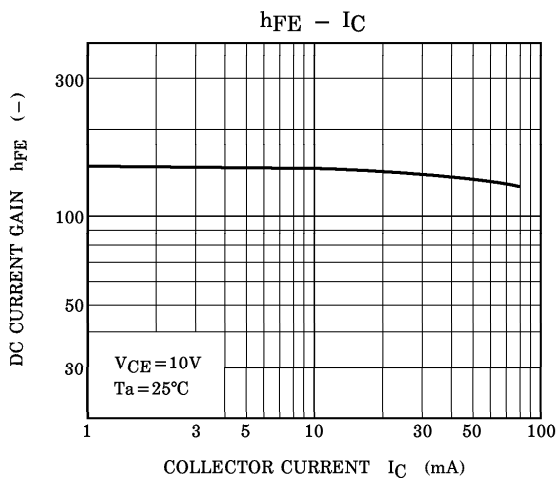
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	$I_{CBO}$	$V_{CB}=10V, I_E=0$	—	—	1	$\mu A$
Emitter Cut-off Current	$I_{EBO}$	$V_{EB}=1V, I_C=0$	—	—	1	$\mu A$
DC Current Gain	$h_{FE}$ (Note 1)	$V_{CE}=10V, I_C=20mA$	80	—	240	—
Output Capacitance	$C_{ob}$	$V_{CB}=10V, I_E=0, f=1MHz$	—	1.0	—	pF
Reverse Transfer Capacitance	$C_{re}$		(Note 2)	—	0.65	1.15

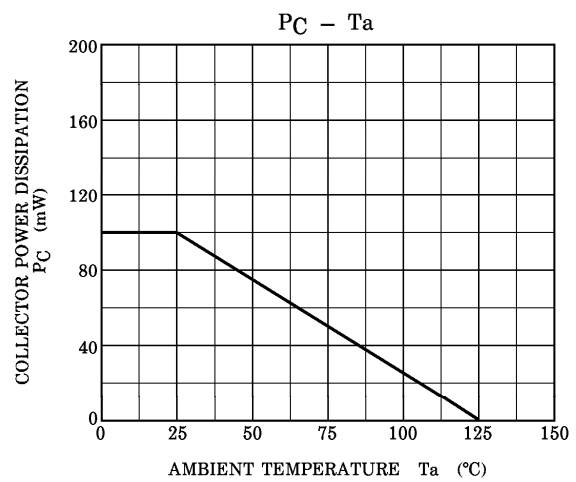
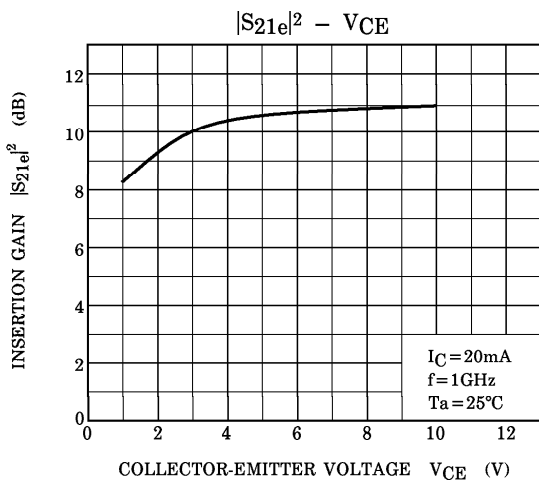
(Note 1)  $h_{FE}$  Classification O : 80~160, Y : 120~240

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

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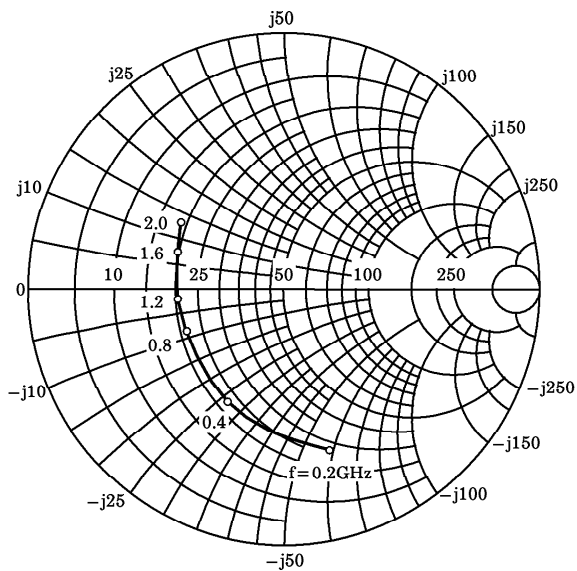
S-Parameter  $Z_0 = 50\Omega$ ,  $T_a = 25^\circ\text{C}$   
 $V_{CE} = 10\text{V}$ ,  $I_C = 5\text{mA}$

frequency (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.672	-73.0	9.460	128.6	0.052	53.6	0.707	-31.3
400	0.498	-115.9	6.268	105.9	0.068	46.8	0.513	-36.2
600	0.443	-141.7	4.554	93.3	0.078	49.0	0.437	-36.6
800	0.426	-158.7	3.556	84.5	0.088	53.2	0.401	-36.8
1000	0.422	-171.9	2.948	77.5	0.099	57.9	0.383	-38.3
1200	0.428	177.5	2.526	71.1	0.113	62.7	0.373	-40.6
1400	0.437	168.3	2.240	65.5	0.133	65.8	0.367	-43.9
1600	0.449	159.9	1.997	60.1	0.152	67.6	0.362	-48.2
1800	0.464	153.1	1.821	55.0	0.171	68.7	0.358	-52.8
2000	0.485	146.7	1.686	50.9	0.195	70.6	0.350	-57.6

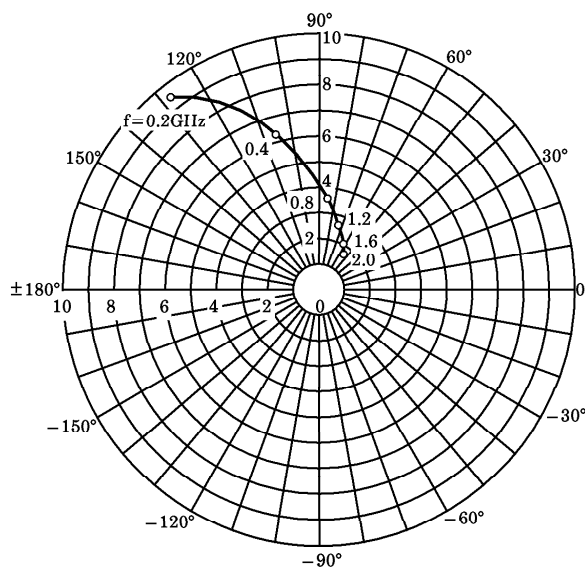
$V_{CE} = 10\text{V}$ ,  $I_C = 20\text{mA}$

frequency (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.392	-116.4	16.247	109.3	0.034	59.7	0.420	-43.7
400	0.329	-152.1	8.775	94.5	0.054	66.0	0.280	-38.4
600	0.321	-170.6	6.018	86.3	0.075	69.5	0.244	-33.7
800	0.321	177.5	4.598	80.2	0.097	70.7	0.231	-31.7
1000	0.324	167.9	3.767	74.8	0.119	71.2	0.225	-31.3
1200	0.332	160.3	3.191	70.0	0.142	71.3	0.225	-32.7
1400	0.341	153.5	2.812	65.2	0.168	70.0	0.225	-36.2
1600	0.352	146.6	2.502	60.7	0.190	68.4	0.222	-40.3
1800	0.362	142.2	2.264	56.5	0.212	66.8	0.217	-44.9
2000	0.379	137.7	2.092	52.8	0.236	66.3	0.212	-49.4

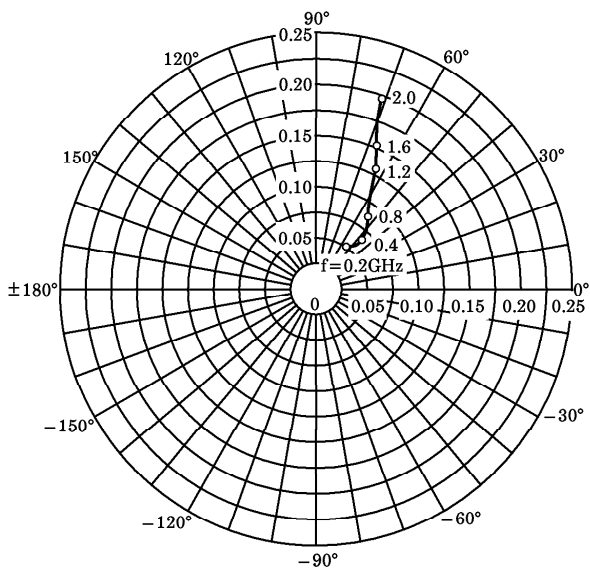
**S<sub>11e</sub>**  
 V<sub>CE</sub> = 10V  
 I<sub>C</sub> = 5mA  
 T<sub>a</sub> = 25°C  
 (UNIT : Ω)



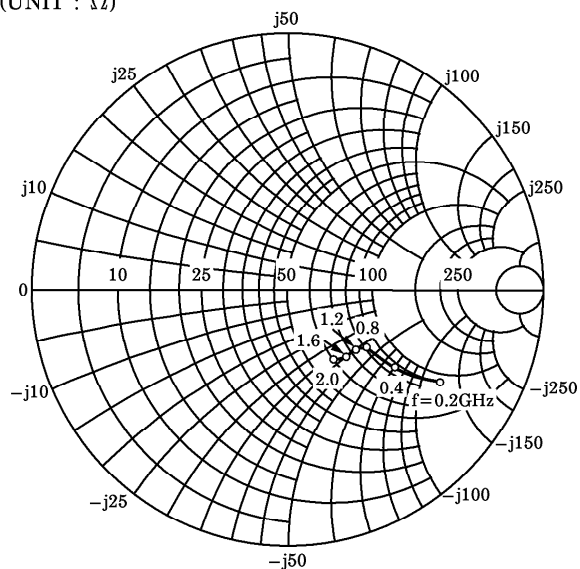
**S<sub>21e</sub>**  
 V<sub>CE</sub> = 10V  
 I<sub>C</sub> = 5mA  
 T<sub>a</sub> = 25°C



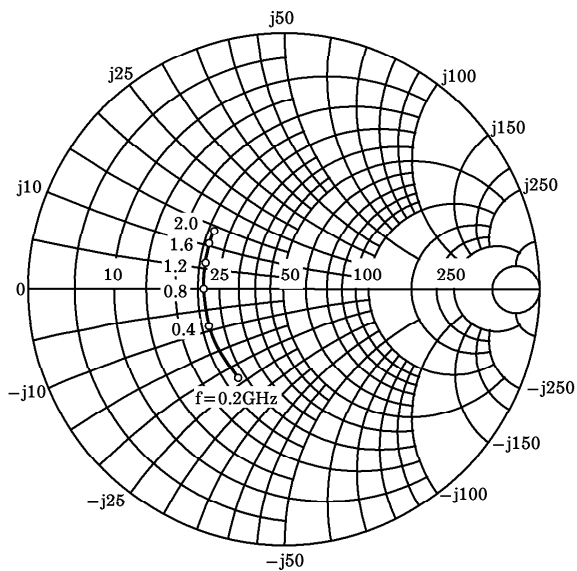
**S<sub>12e</sub>**  
 V<sub>CE</sub> = 10V  
 I<sub>C</sub> = 5mA  
 T<sub>a</sub> = 25°C



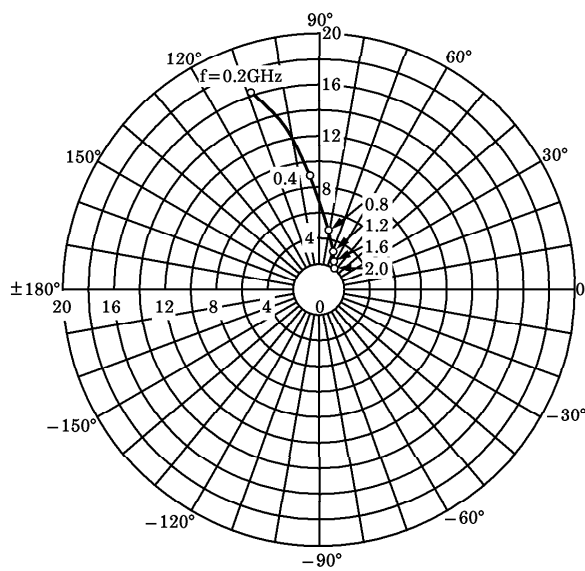
**S<sub>22e</sub>**  
 V<sub>CE</sub> = 10V  
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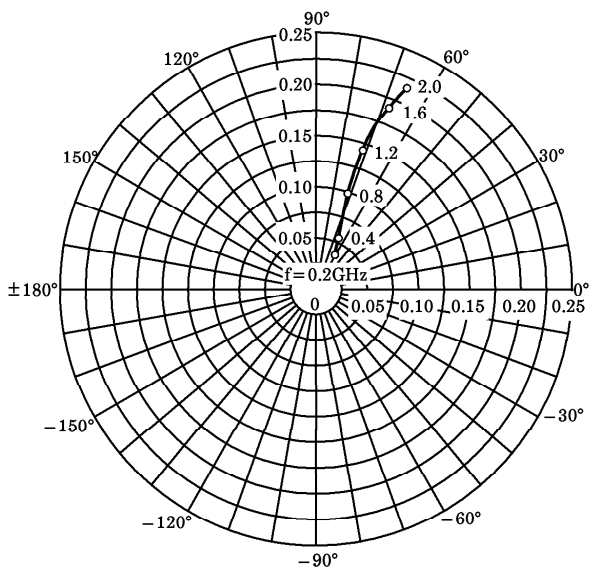
**S<sub>11e</sub>**  
 V<sub>CE</sub> = 10V  
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**S<sub>21e</sub>**  
 V<sub>CE</sub> = 10V  
 I<sub>C</sub> = 20mA  
 T<sub>a</sub> = 25°C



**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)

