

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

2SC5087

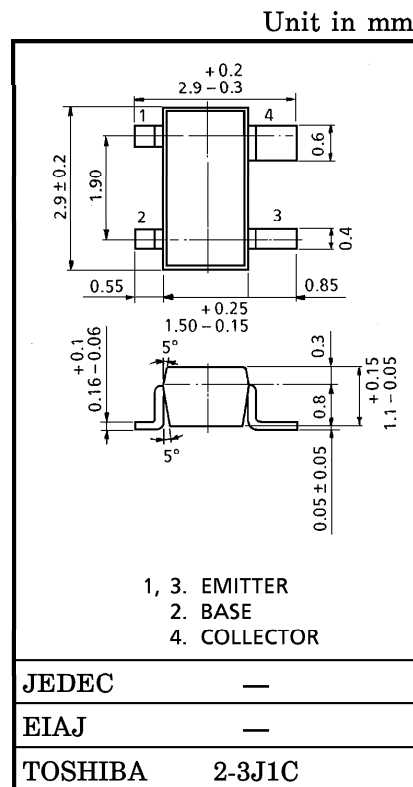
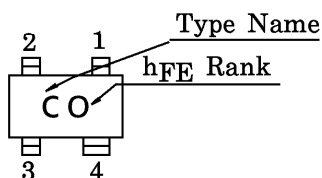
VHF~UHF BAND LOW NOISE AMPLIFIER APPLICATIONS

- Low Noise Figure, High Gain.
- $NF=1.1\text{dB}$, $|S_{21e}|^2=13\text{dB}$ ($f=1\text{GHz}$)

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

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	V_{CB0}	20	V
Collector-Emitter Voltage	V_{CEO}	12	V
Emitter-Base Voltage	V_{EB0}	3	V
Base Current	I_B	40	mA
Collector Current	I_C	80	mA
Collector Power Dissipation	P_C	150	mW
Junction Temperature	T_j	125	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	$-55\sim 125$	$^\circ\text{C}$

MARKING



Weight : 0.012g

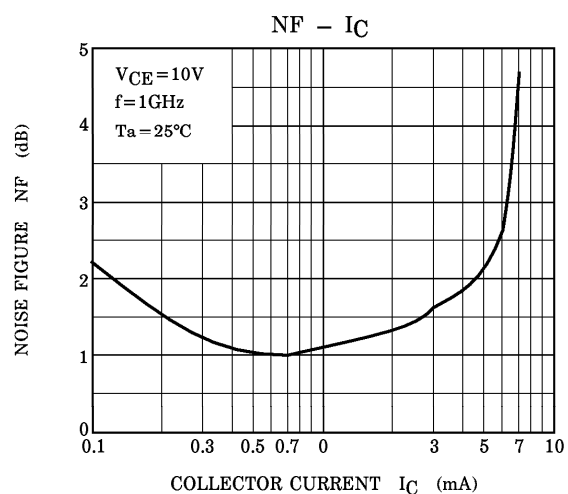
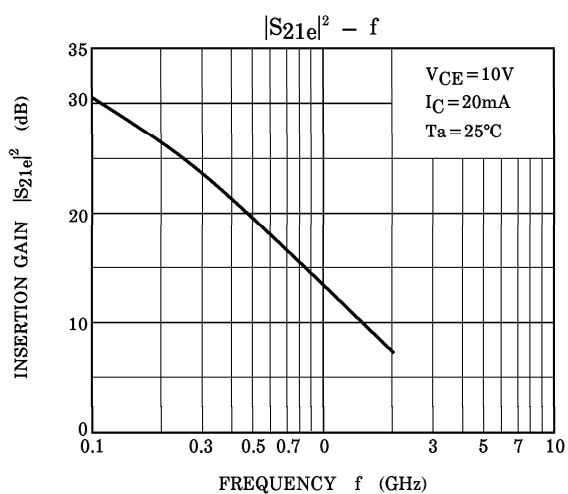
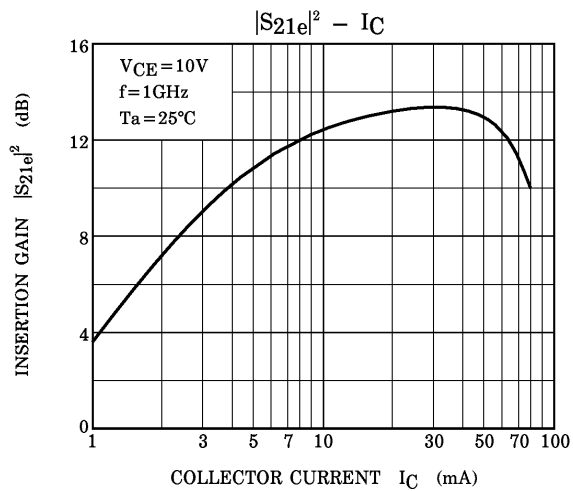
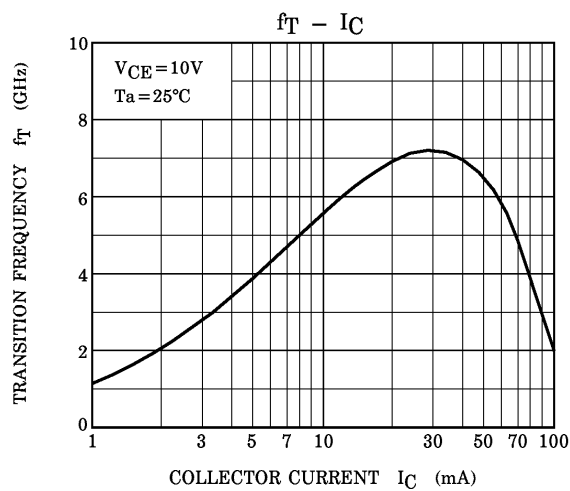
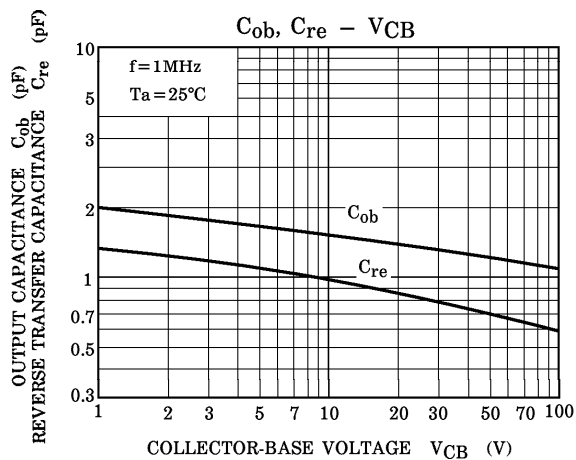
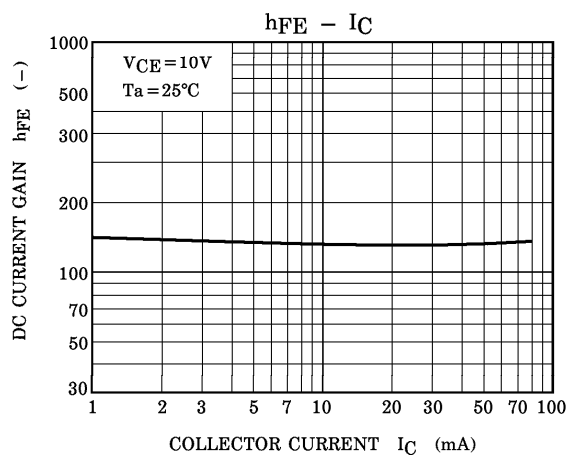
MICROWAVE CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

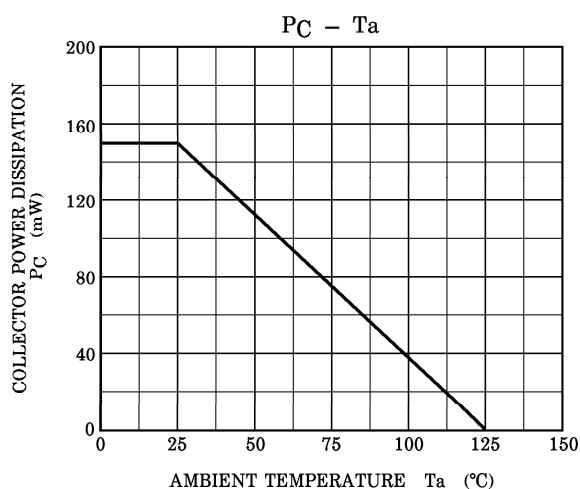
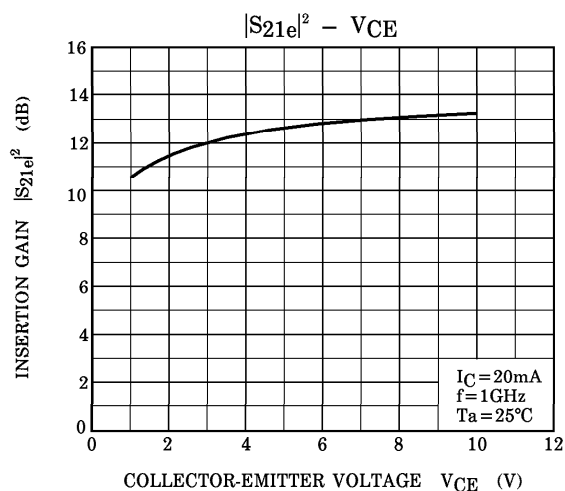
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Transition Frequency	f_T	$V_{CE}=10\text{V}$, $I_C=20\text{mA}$	5	7	—	GHz
Insertion Gain	$ S_{21e} ^2 (1)$	$V_{CE}=10\text{V}$, $I_C=20\text{mA}$, $f=500\text{MHz}$	—	18	—	dB
	$ S_{21e} ^2 (2)$	$V_{CE}=10\text{V}$, $I_C=20\text{mA}$, $f=1\text{GHz}$	9.5	13	—	
Noise Figure	NF (1)	$V_{CE}=10\text{V}$, $I_C=5\text{mA}$, $f=500\text{MHz}$	—	1	—	dB
	NF (2)	$V_{CE}=10\text{V}$, $I_C=5\text{mA}$, $f=1\text{GHz}$	—	1.1	2	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I_{CBO}	$V_{CB}=10\text{V}$, $I_E=0$	—	—	1	μA
Emitter Cut-off Current	I_{EBO}	$V_{EB}=1\text{V}$, $I_C=0$	—	—	1	μA
DC Current Gain	h_{FE} (Note 1)	$V_{CE}=10\text{V}$, $I_C=20\text{mA}$	80	—	240	—
Output Capacitance	C_{ob}	$V_{CB}=10\text{V}$, $I_E=0$, $f=1\text{MHz}$ (Note 2)	—	1.1	1.6	pF
Reverse Transfer Capacitance	C_{re}		—	0.65	1.05	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.





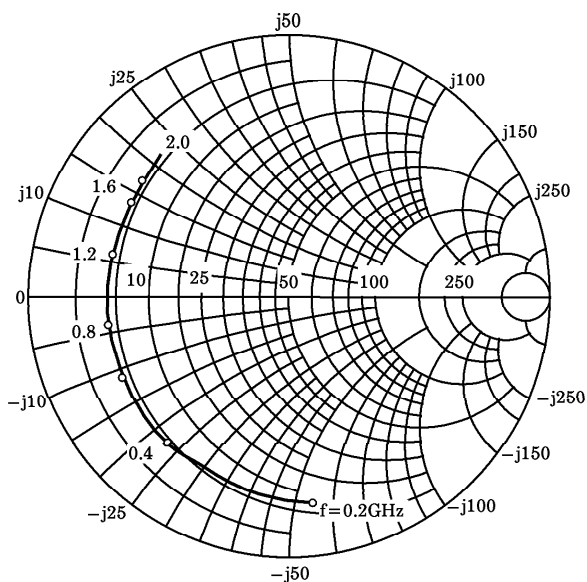
S-Parameter $Z_0 = 50\Omega$, $T_a = 25^\circ\text{C}$
 $V_{CE} = 10\text{V}$, $I_C = 5\text{mA}$

frequency (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.793	-82.4	11.923	133.4	0.050	52.7	0.788	-36.4
400	0.736	-128.0	7.835	108.5	0.066	38.0	0.584	-53.4
600	0.719	-152.1	5.578	94.5	0.071	34.1	0.490	-63.5
800	0.701	-168.6	4.279	84.4	0.073	33.9	0.445	-72.2
1000	0.698	178.9	3.451	76.6	0.074	36.7	0.424	-80.5
1200	0.697	168.3	2.855	69.9	0.076	40.8	0.413	-88.9
1400	0.699	159.4	2.440	64.0	0.078	46.6	0.404	-97.3
1600	0.703	150.8	2.121	59.3	0.084	52.5	0.401	-105.4
1800	0.713	142.9	1.876	54.5	0.091	58.3	0.398	-112.6
2000	0.722	134.7	1.681	50.3	0.100	63.5	0.398	-119.6

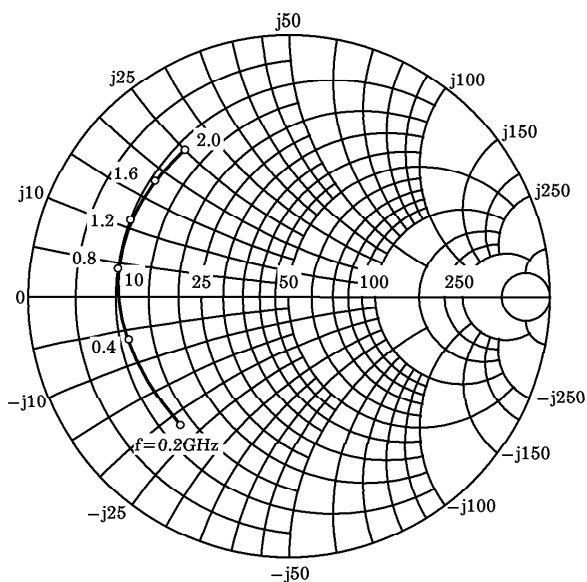
$V_{CE} = 10\text{V}$, $I_C = 20\text{mA}$

frequency (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.655	-129.4	20.724	113.2	0.031	48.0	0.496	-59.6
400	0.650	-161.5	11.288	95.5	0.040	50.4	0.319	-74.1
600	0.660	-176.3	7.643	86.4	0.049	56.4	0.263	-83.5
800	0.666	172.8	5.758	79.6	0.059	60.0	0.242	-92.9
1000	0.667	164.0	4.605	74.2	0.070	63.6	0.233	-102.0
1200	0.668	156.8	3.809	69.3	0.080	65.9	0.229	-111.0
1400	0.677	148.4	3.277	65.1	0.091	68.2	0.226	-119.1
1600	0.676	141.1	2.862	61.2	0.104	70.0	0.223	-126.5
1800	0.688	133.9	2.559	57.5	0.117	71.2	0.220	-132.4
2000	0.690	126.7	2.303	54.1	0.131	72.4	0.217	-137.8

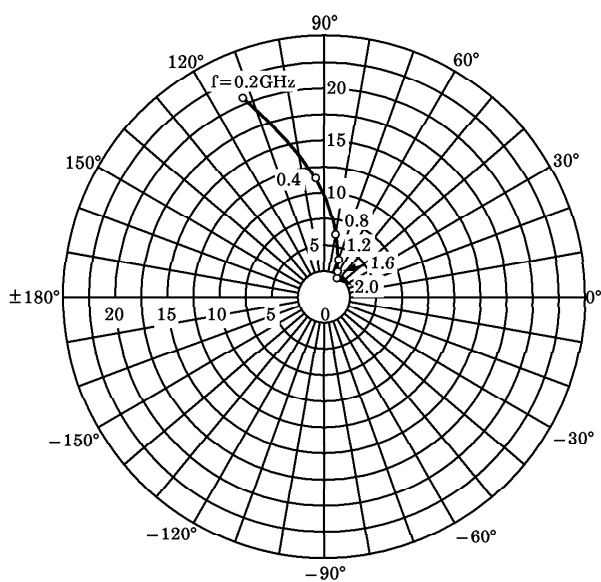
S_{11e}
 $V_{CE} = 10V$
 $I_C = 5mA$
 $T_a = 25^\circ C$
 (Unit : Ω)



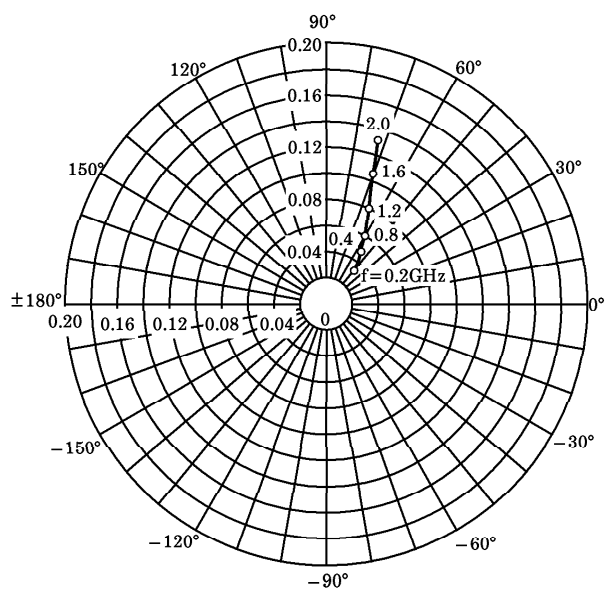
S_{11e}
 $V_{CE} = 10V$
 $I_C = 20mA$
 $T_a = 25^\circ C$
 (Unit : Ω)



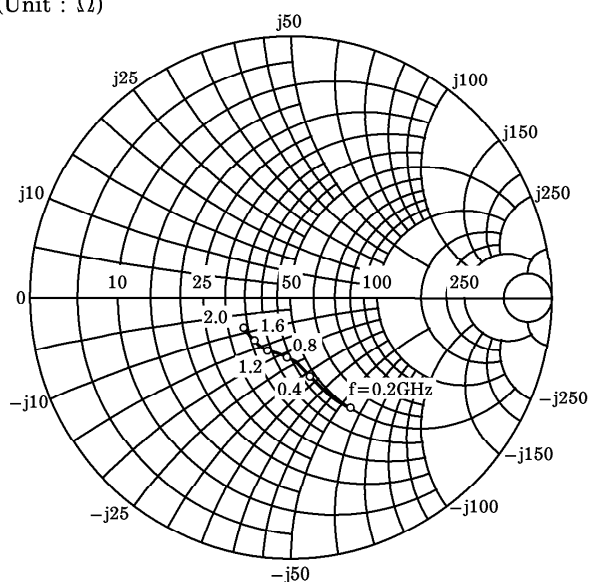
S_{21e}
 $V_{CE} = 10V$
 $I_C = 20mA$
 $T_a = 25^\circ C$



S_{12e}
 $V_{CE} = 10V$
 $I_C = 20mA$
 $T_a = 25^\circ C$



S_{22e}
 $V_{CE} = 10V$
 $I_C = 20mA$
 $T_a = 25^\circ C$
 (Unit : Ω)



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