

TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

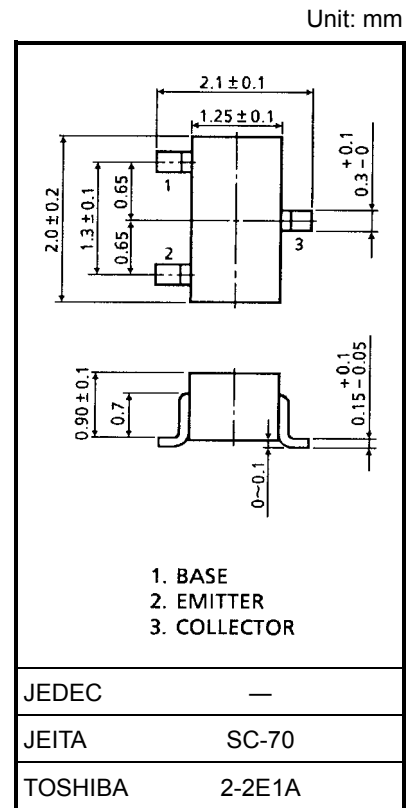
# 2SC4394

## VHF~UHF Band Low Noise Amplifier Applications

- Low noise figure, high gain.
- $NF = 1.1\text{dB}$ ,  $|S_{21e}|^2 = 11\text{dB}$  ( $f = 1\text{GHz}$ )

### Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	20	V
Collector-emitter voltage	$V_{CEO}$	12	V
Emitter-base voltage	$V_{EBO}$	3	V
Collector current	$I_C$	80	mA
Base current	$I_B$	40	mA
Collector power dissipation	$P_C$	100	mW
Junction temperature	$T_j$	125	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-55~125	$^\circ\text{C}$



### Microwave Characteristics ( $T_a = 25^\circ\text{C}$ )

Weight: 0.006 g (typ.)

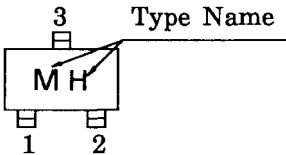
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition frequency	$f_T$	$V_{CE} = 10\text{V}$ , $I_C = 20\text{mA}$	5	7	—	GHz
Insertion gain	$ S_{21e} ^2 (1)$	$V_{CE} = 10\text{V}$ , $I_C = 20\text{mA}$ , $f = 500\text{MHz}$	—	16.5	—	dB
	$ S_{21e} ^2 (2)$	$V_{CE} = 10\text{V}$ , $I_C = 20\text{mA}$ , $f = 1\text{GHz}$	7.5	11	—	
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	

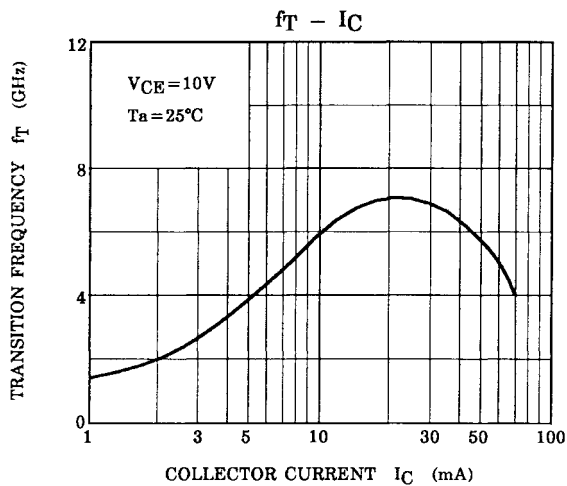
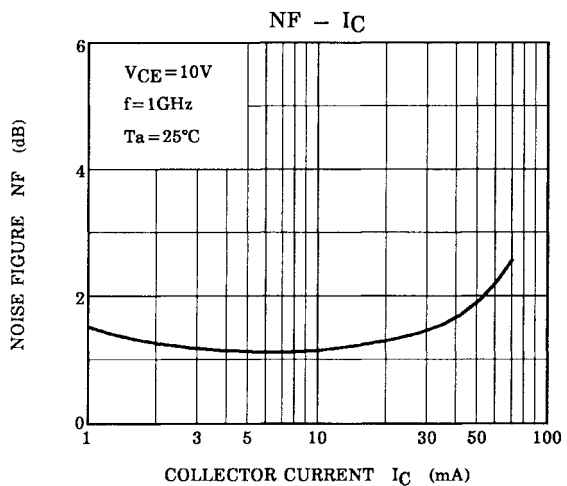
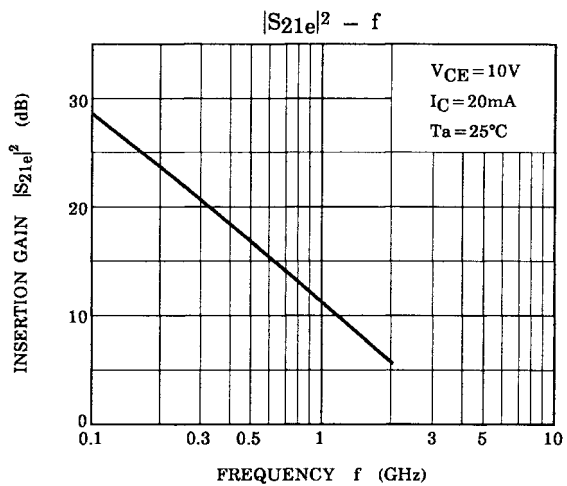
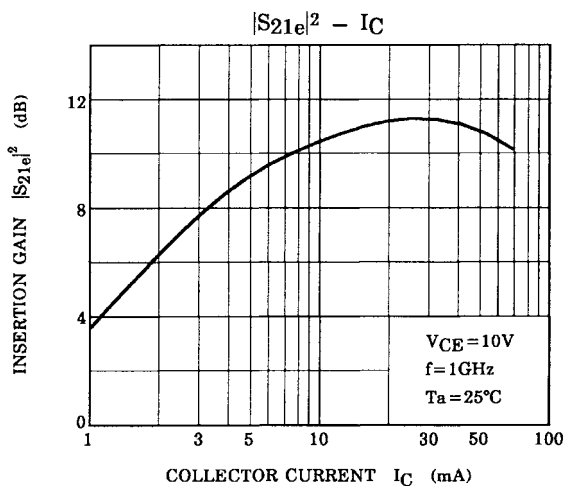
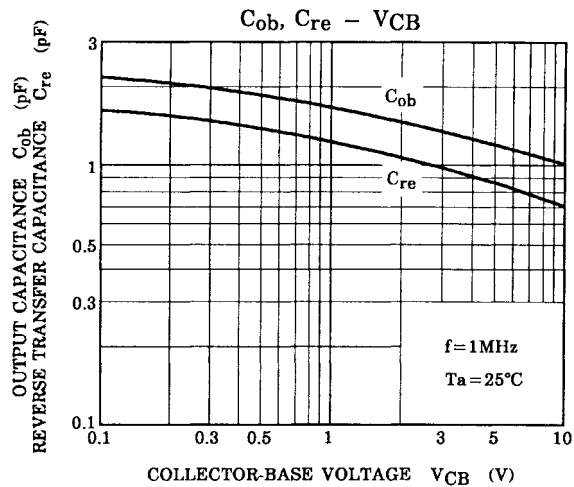
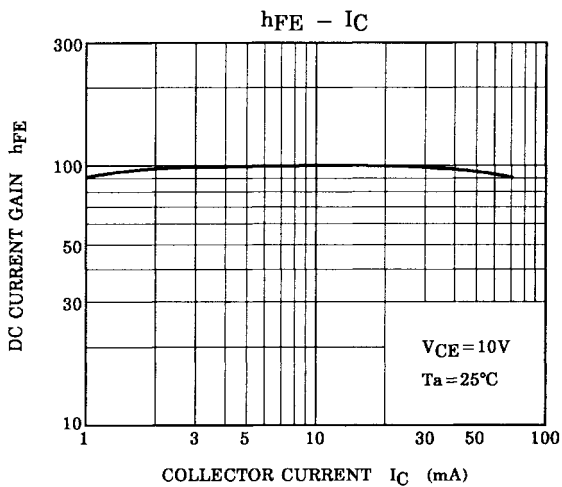
### Electrical Characteristics ( $T_a = 25^\circ\text{C}$ )

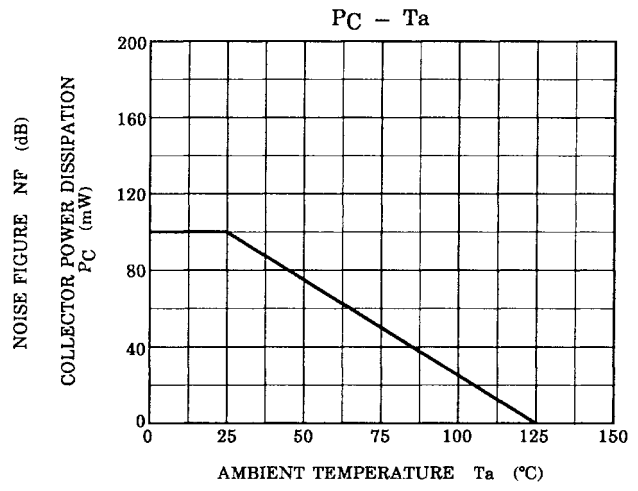
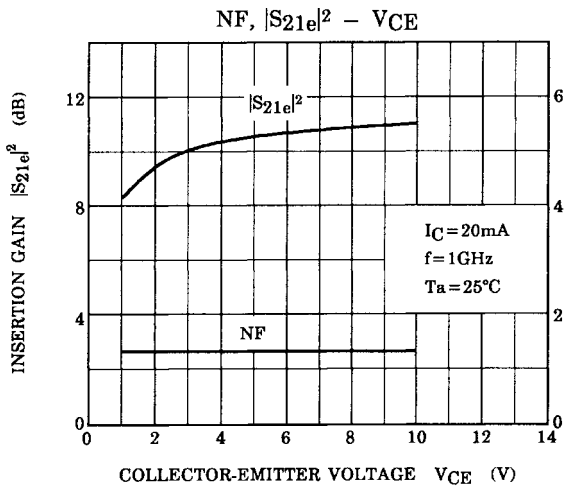
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	$I_{CBO}$	$V_{CB} = 10\text{V}$ , $I_E = 0$	—	—	1	$\mu\text{A}$
Emitter cut-off current	$I_{EBO}$	$V_{EB} = 1\text{V}$ , $I_C = 0$	—	—	1	$\mu\text{A}$
DC current gain	$h_{FE}$	$V_{CE} = 10\text{V}$ , $I_C = 20\text{mA}$	30	—	250	
Output capacitance	$C_{ob}$	$V_{CB} = 10\text{V}$ , $I_E = 0$ , $f = 1\text{MHz}$ (Note)	—	1.0	—	pF
Reverse transfer capacitance	$C_{re}$		—	0.7	1.15	pF

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

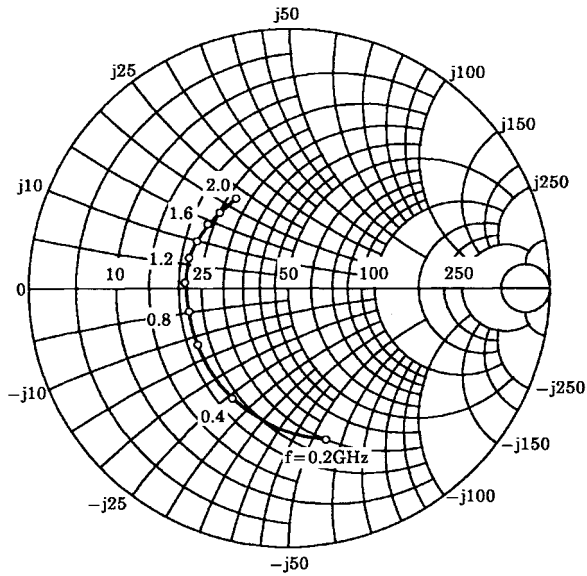
**Marking**



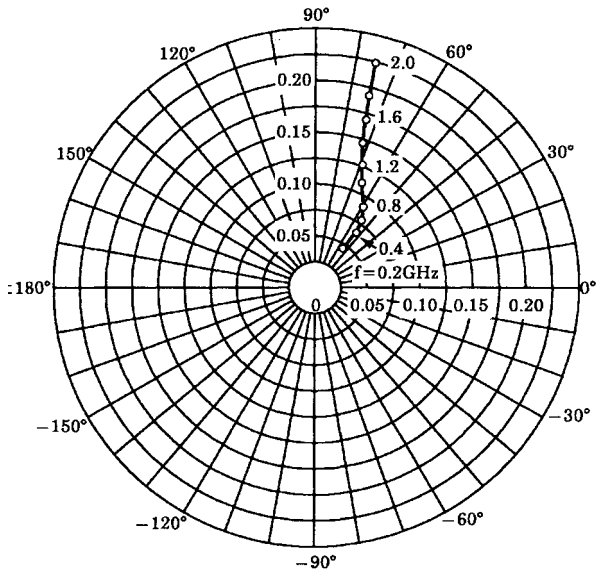




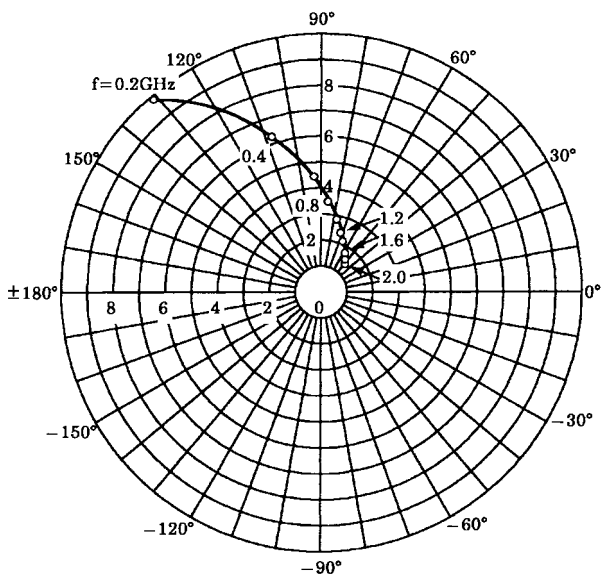
S11e  
 VCE = 10V  
 IC = 5mA  
 Ta = 25°C  
 (UNIT : Ω)



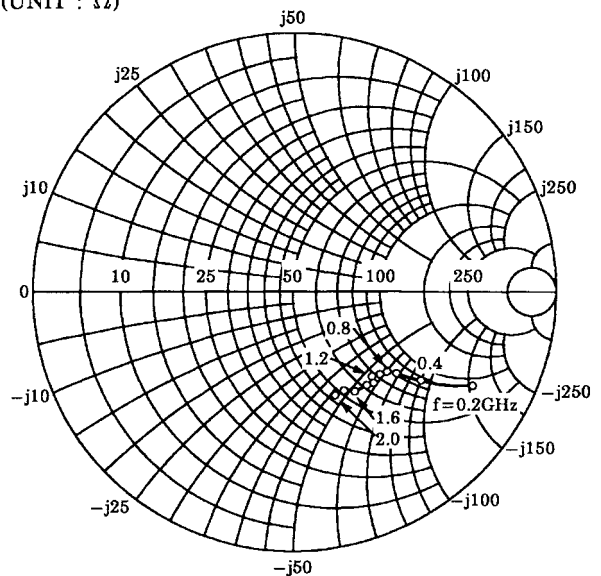
S12e  
 VCE = 10V  
 IC = 5mA  
 Ta = 25°C



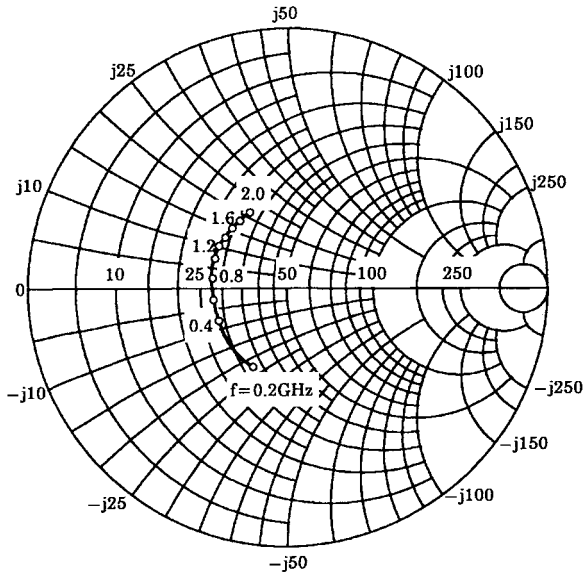
S21e  
 VCE = 10V  
 IC = 5mA  
 Ta = 25°C



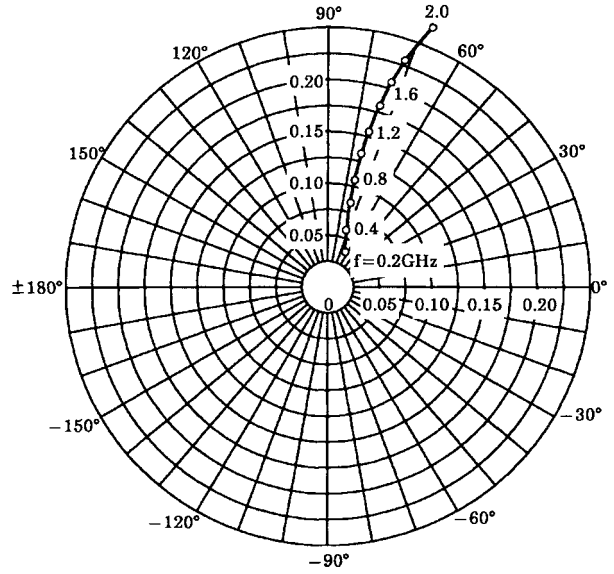
S22e  
 VCE = 10V  
 IC = 5mA  
 Ta = 25°C  
 (UNIT : Ω)



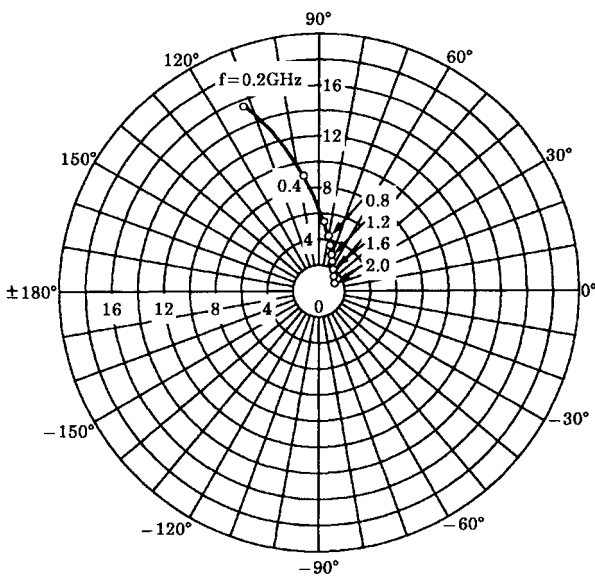
**S<sub>11e</sub>**  
 V<sub>CE</sub> = 10V  
 I<sub>C</sub> = 20mA  
 T<sub>a</sub> = 25°C  
 (UNIT : Ω)



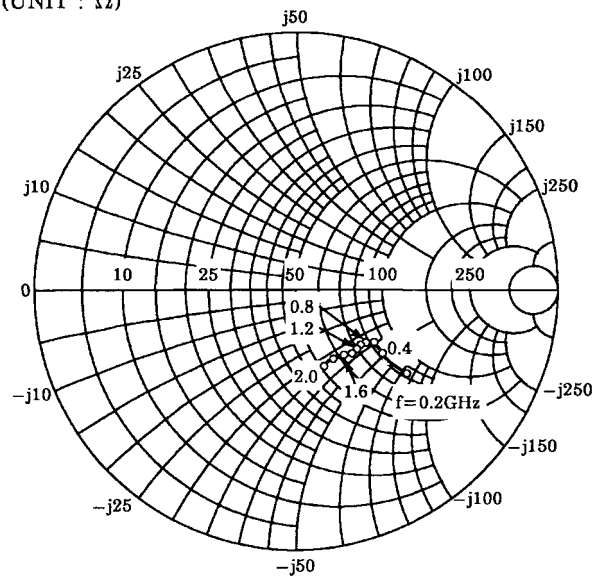
**S<sub>12e</sub>**  
 V<sub>CE</sub> = 10V  
 I<sub>C</sub> = 20mA  
 T<sub>a</sub> = 25°C



**S<sub>21e</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)



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