

TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

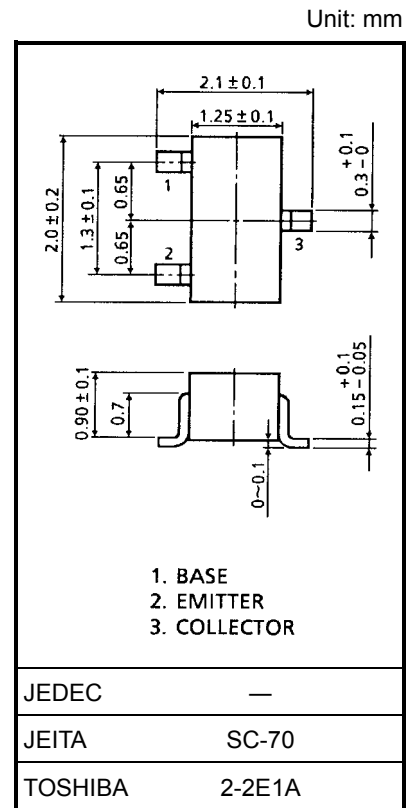
2SC4393

VHF~UHF Band Low Noise Amplifier Applications

- Low noise figure.
- $NF = 1.5\text{dB}$, $|S_{21e}|^2 = 16\text{dB}$ ($f = 500\text{ MHz}$)
- $NF = 1.7\text{dB}$, $|S_{21e}|^2 = 10.5\text{dB}$ ($f = 1000\text{ MHz}$)

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

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CB0}	17	V
Collector-emitter voltage	V_{CE0}	12	V
Emitter-base voltage	V_{EB0}	3	V
Collector current	I_C	70	mA
Base current	I_B	30	mA
Collector power dissipation	P_C	100	mW
Junction temperature	T_j	125	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55~125	$^\circ\text{C}$



Weight: 0.006 g (typ.)

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

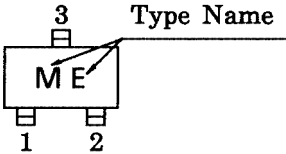
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition frequency	f_T	$V_{CE} = 10\text{ V}$, $I_C = 20\text{ mA}$	—	5	—	GHz
Insertion gain	$ S_{21e} ^2$ (1)	$V_{CE} = 10\text{ V}$, $I_C = 20\text{ mA}$, $f = 500\text{ MHz}$	—	16	—	dB
	$ S_{21e} ^2$ (2)	$V_{CE} = 10\text{ V}$, $I_C = 20\text{ mA}$, $f = 1\text{ GHz}$	—	10.5	—	
Noise figure	NF (1)	$V_{CE} = 10\text{ V}$, $I_C = 5\text{ mA}$, $f = 500\text{ MHz}$	—	1.5	—	dB
	NF (2)	$V_{CE} = 10\text{ V}$, $I_C = 5\text{ mA}$, $f = 1\text{ GHz}$	—	1.7	—	

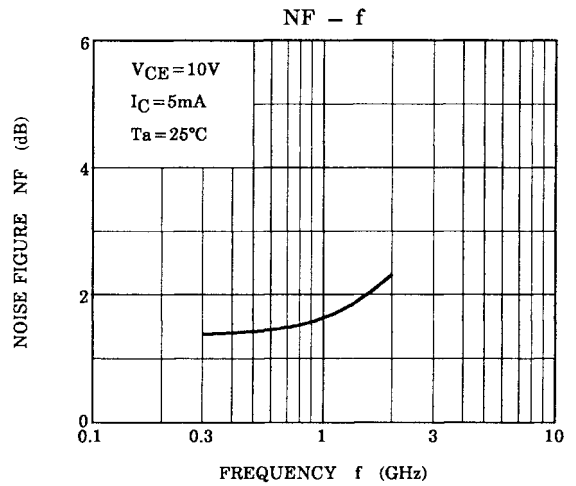
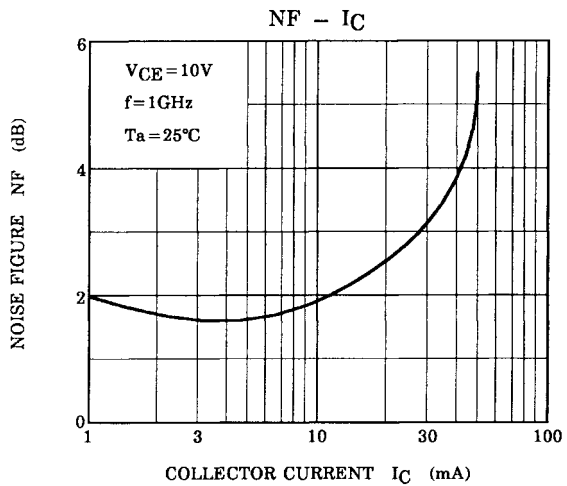
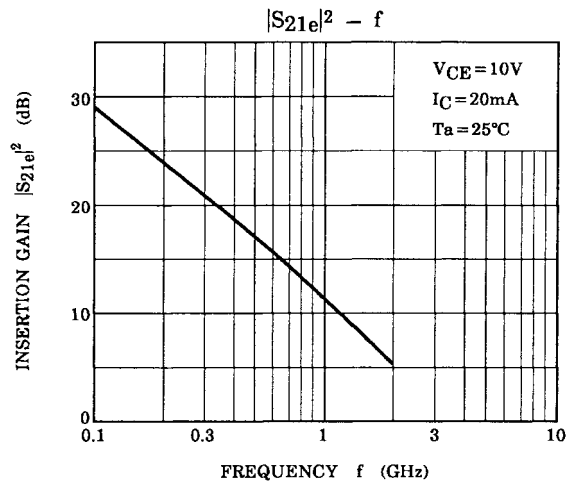
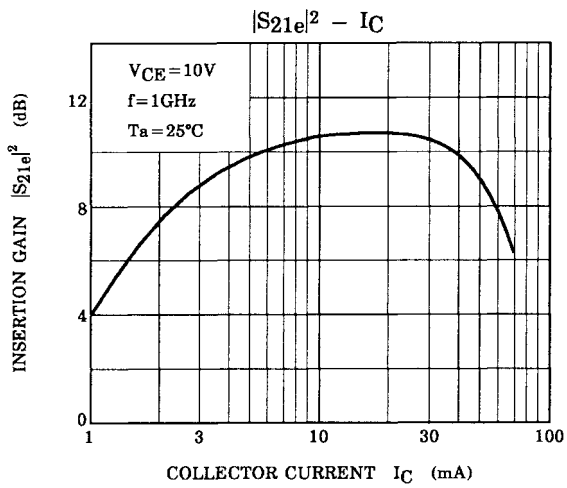
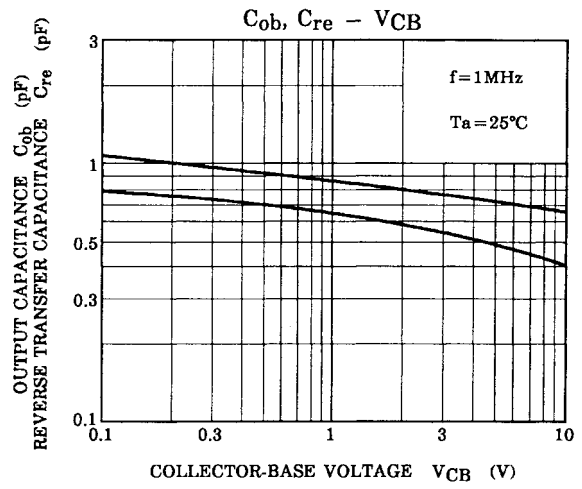
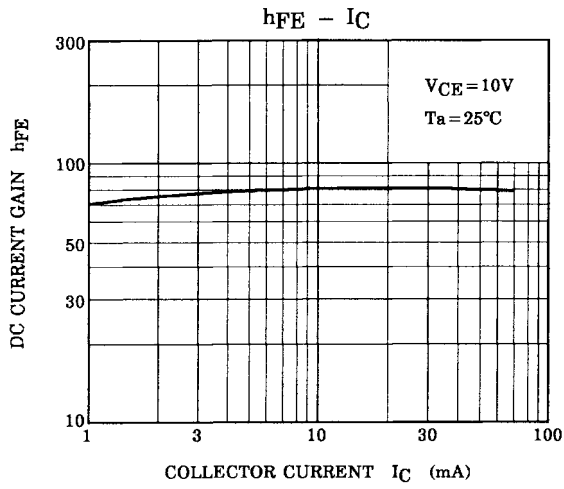
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CB0}	$V_{CB} = 10\text{ V}$, $I_E = 0$	—	—	1	μA
Emitter cut-off current	I_{EB0}	$V_{EB} = 1\text{ V}$, $I_C = 0$	—	—	1	μA
DC current gain	h_{FE}	$V_{CE} = 10\text{ V}$, $I_C = 20\text{ mA}$	25	—	—	
Output capacitance	C_{ob}	$V_{CB} = 10\text{ V}$, $I_E = 0$, $f = 1\text{ MHz}$ (Note)	—	0.85	—	pF
Reverse transfer capacitance	C_{re}		—	0.57	—	pF

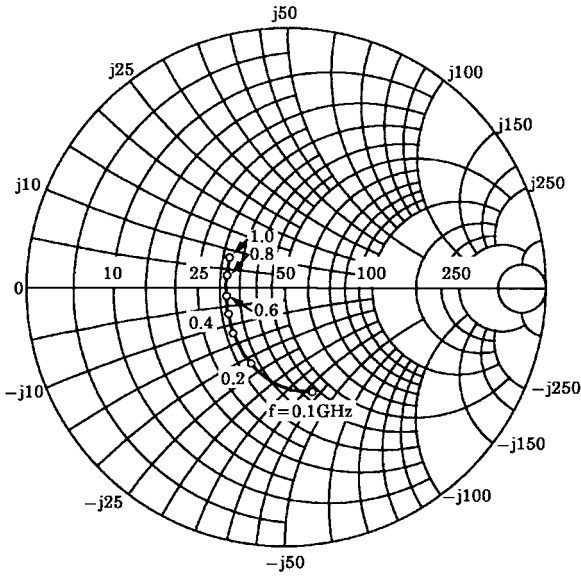
Note: C_{re} is measured by 3 terminal method with capacitance bridge.

Marking

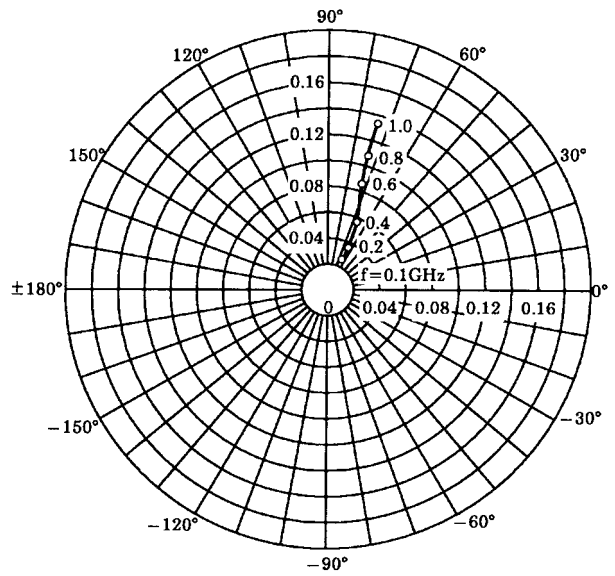




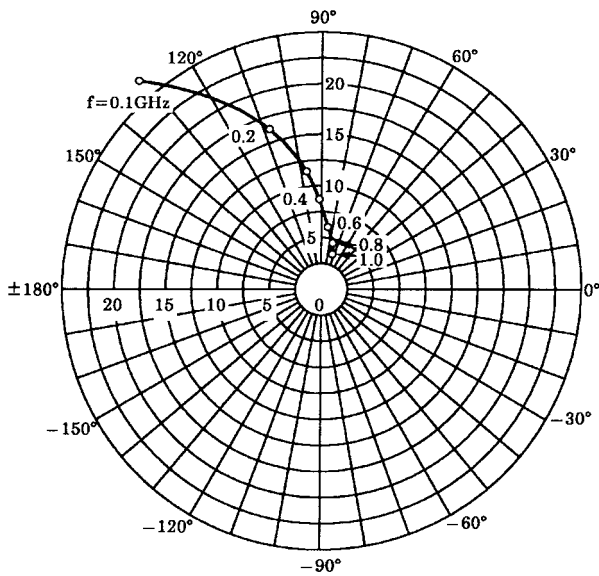
S11e
 $V_{CE} = 10V$
 $I_C = 20mA$
 $T_a = 25^\circ C$
 (UNIT : Ω)



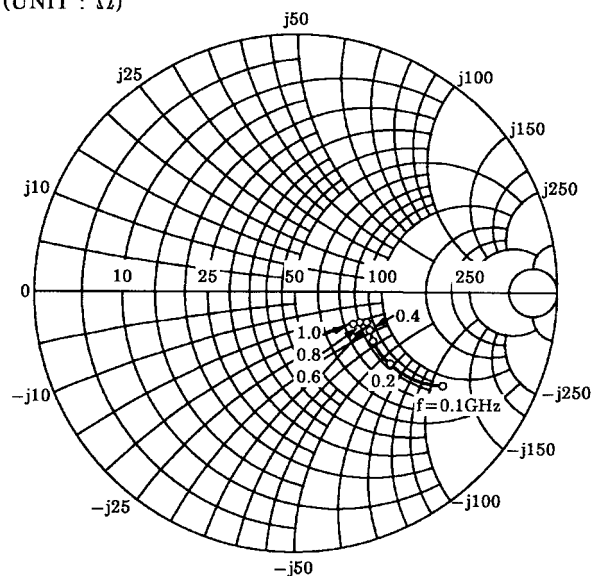
S12e
 $V_{CE} = 10V$
 $I_C = 20mA$
 $T_a = 25^\circ C$



S21e
 $V_{CE} = 10V$
 $I_C = 20mA$
 $T_a = 25^\circ C$



S22e
 $V_{CE} = 10V$
 $I_C = 20mA$
 $T_a = 25^\circ C$
 (UNIT : Ω)



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