

TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

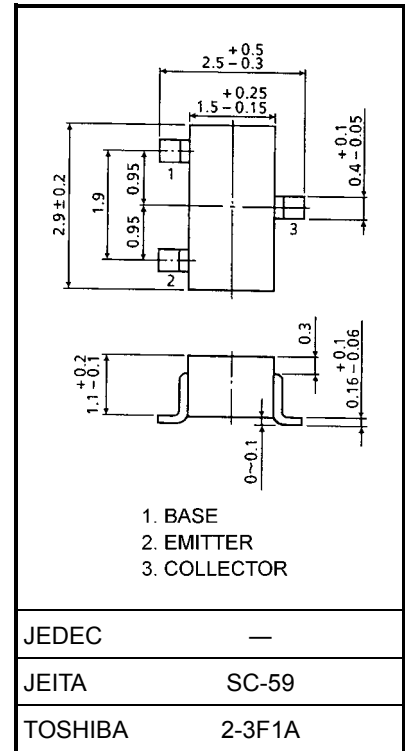
# 2SC3011

## UHF~C Band Low Noise Amplifier Applications

- High gain:  $|S_{21e}|^2 = 12\text{dB}$  (typ.)
- Low noise figure:  $NF = 2.3\text{dB}$  (typ.),  $f = 1\text{ GHz}$
- High  $f_T$ :  $f_T = 6.5\text{ GHz}$

### Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CB0}$	20	V
Collector-emitter voltage	$V_{CEO}$	7	V
Emitter-base voltage	$V_{EBO}$	3	V
Collector current	$I_C$	30	mA
Emitter current	$I_E$	10	mA
Collector power dissipation	$P_C$	150	mW
Junction temperature	$T_j$	125	°C
Storage temperature range	$T_{stg}$	-55~125	°C



### Microwave Characteristics (Ta = 25°C)

Weight: 0.012 g (typ.)

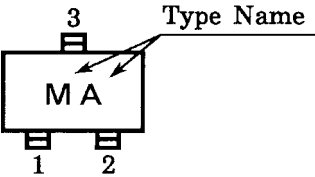
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition frequency	$f_T$	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$	—	6.5	—	GHz
Insertion gain	$ S_{21e} ^2$	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}, f = 1\text{ GHz}$	—	12	—	dB
Noise figure	NF	$V_{CE} = 5\text{ V}, I_C = 5\text{ mA}, f = 1\text{ GHz}$	—	2.3	—	dB

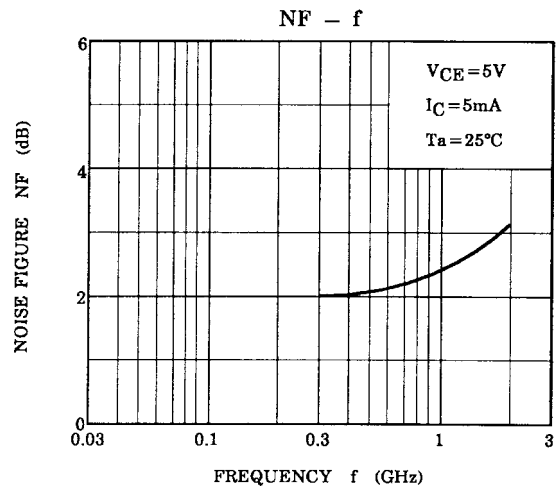
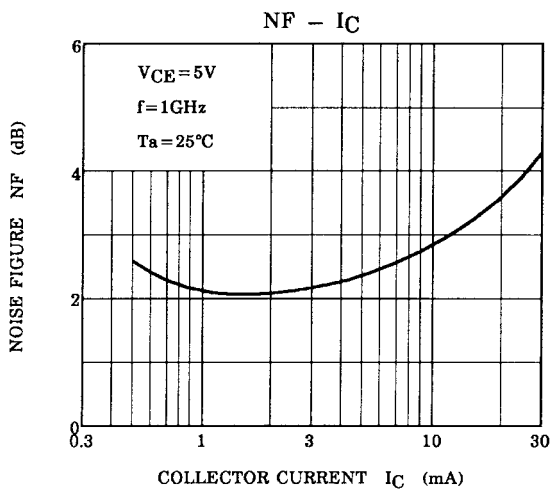
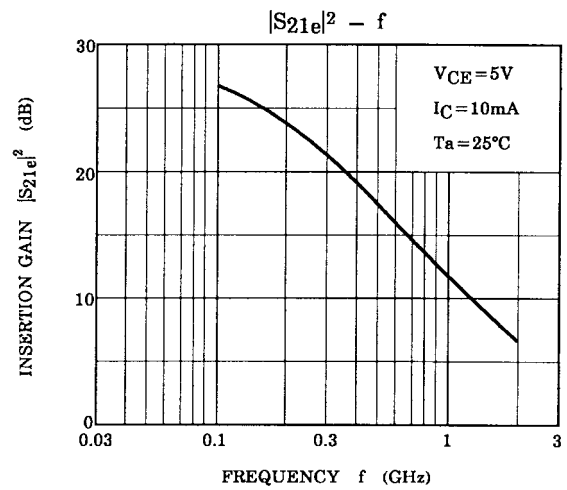
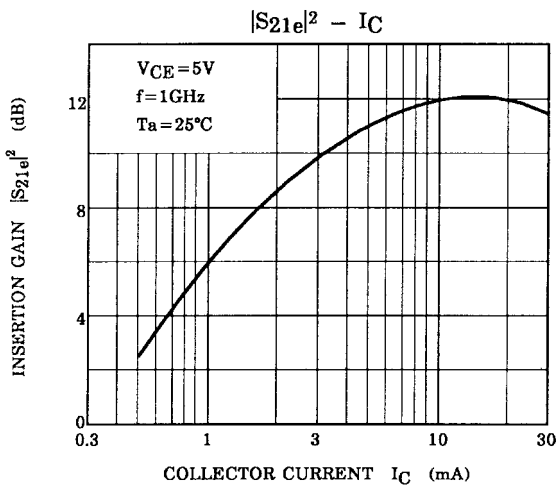
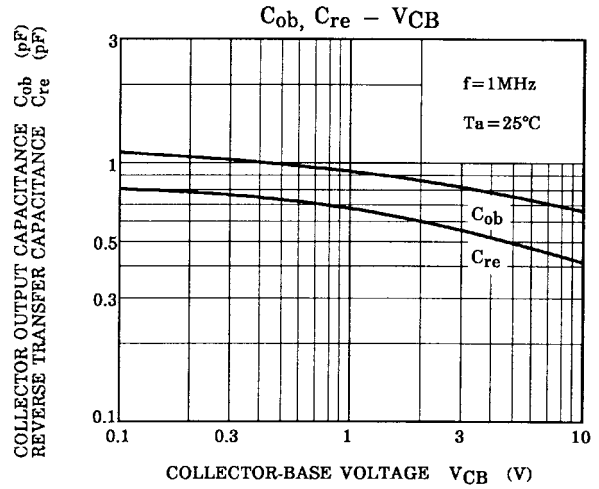
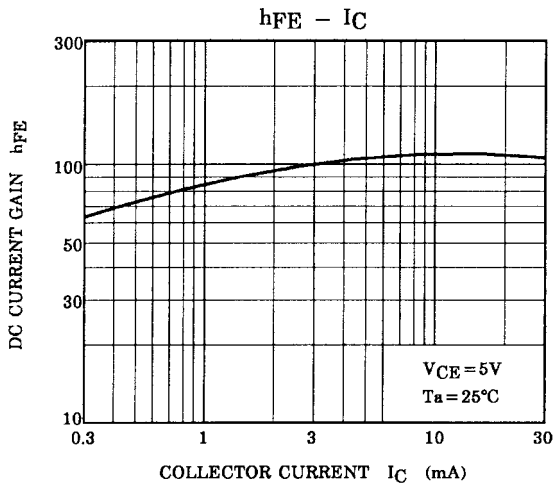
### Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	$I_{CBO}$	$V_{CB} = 10\text{ V}, I_E = 0$	—	—	1.0	μA
Emitter cut-off current	$I_{EBO}$	$V_{EB} = 1.0\text{ V}, I_C = 0$	—	—	1.0	μA
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 0.5\text{ mA}, I_B = 0$	7	—	—	V
DC current gain	$h_{FE}$	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$	30	120	—	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 10\text{ mA}, I_B = 1\text{ mA}$	—	0.1	—	V
Base-emitter saturation voltage	$V_{BE(sat)}$		—	0.87	—	V
Collector output capacitance	$C_{ob}$	$V_{CB} = 5\text{ V}, I_E = 0, f = 1\text{ MHz}$ (Note)	—	0.7	0.9	pF
Reverse transfer capacitance	$C_{re}$		—	0.5	—	pF
Input capacitance	$C_{ib}$	$V_{EB} = 0, I_C = 0, f = 1\text{ MHz}$	—	0.8	—	pF

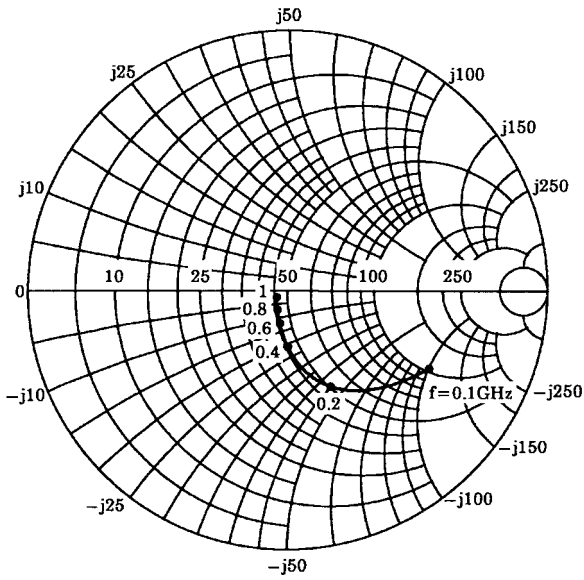
Note:  $C_{re}$  is measured by 3-terminal method with capacitance bridge.

**Marking**

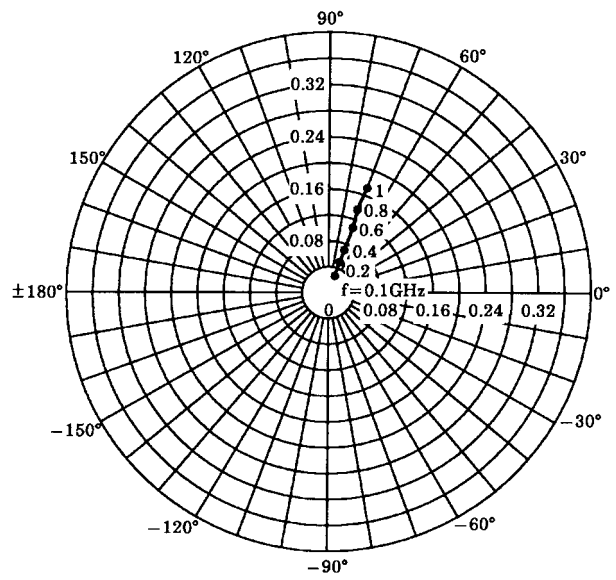




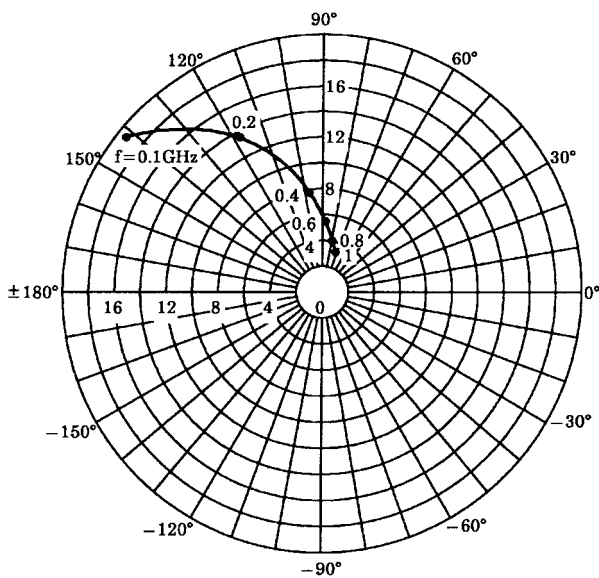
S11e  
 VCE=5V  
 IC=10mA  
 Ta=25°C  
 (UNIT: Ω)



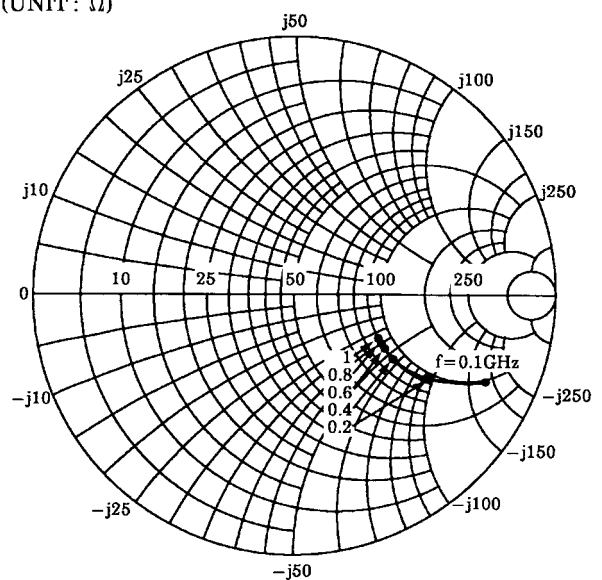
S12e  
 VCE=5V  
 IC=10mA  
 Ta=25°C



S21e  
 VCE=5V  
 IC=10mA  
 Ta=25°C



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



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