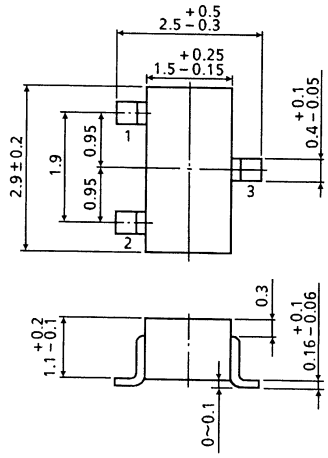
TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

2SC3011

UHF~C Band Low Noise Amplifier Applications

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

Unit: mm



1. BASE
2. EMITTER
3. COLLECTOR

JEDEC	—
JEITA	SC-59
TOSHIBA	2-3F1A

Weight: 0.012 g (typ.)

Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	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)

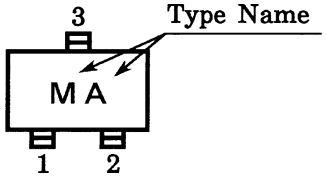
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition frequency	f_T	V_{CE} = 5 V, I_C = 10 mA	—	6.5	—	GHz
Insertion gain	$\|S_{21e}\|^2$	V_{CE} = 5 V, I_C = 10 mA, f = 1 GHz	—	12	—	dB
Noise figure	NF	V_{CE} = 5 V, I_C = 5 mA, f = 1 GHz	—	2.3	—	dB

Electrical Characteristics (Ta = 25°C)

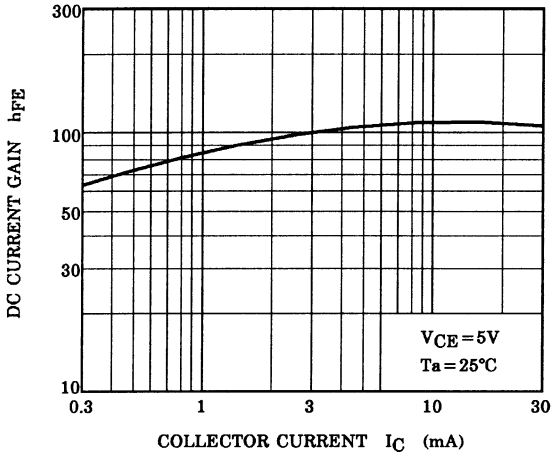
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB} = 10 V, I_E = 0	—	—	1.0	μA
Emitter cut-off current	I_{EBO}	V_{EB} = 1.0 V, I_C = 0	—	—	1.0	μA
Collecter-emitter breakdown voltage	$V_{(BR)\ CEO}$	I_C = 0.5 mA, I_B = 0	7	—	—	V
DC current gain	h_{FE}	V_{CE}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

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

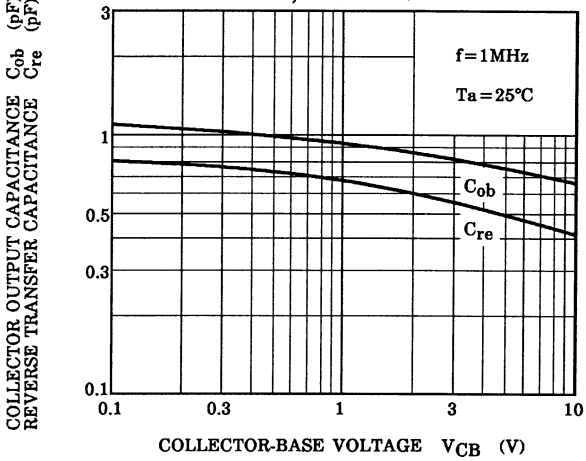
Marking



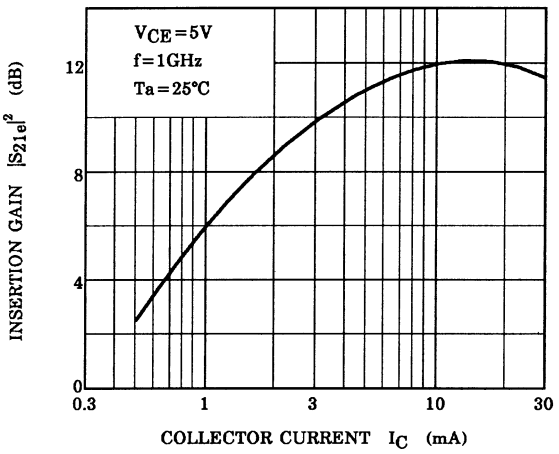
h_{FE} – I_C



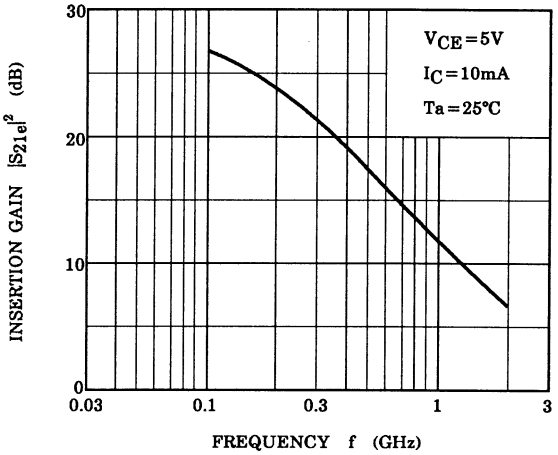
C_{ob}, C_{re} – V_{CB}



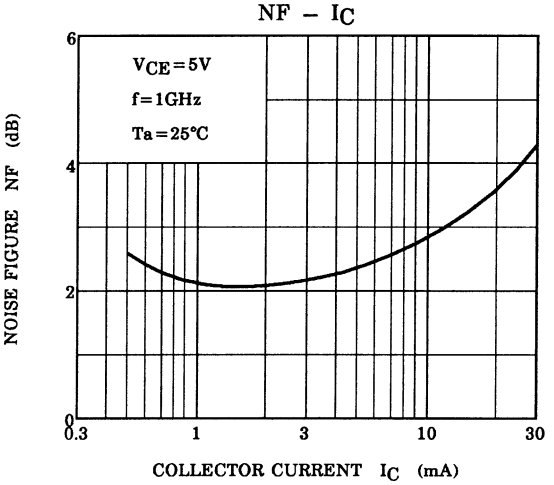
$|S_{21e}|^2$ – I_C



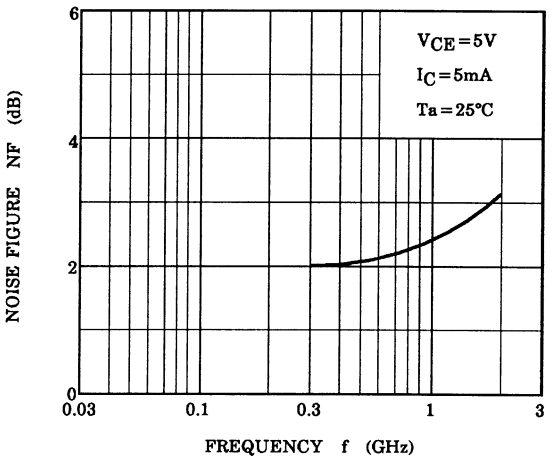
$|S_{21e}|^2$ – f



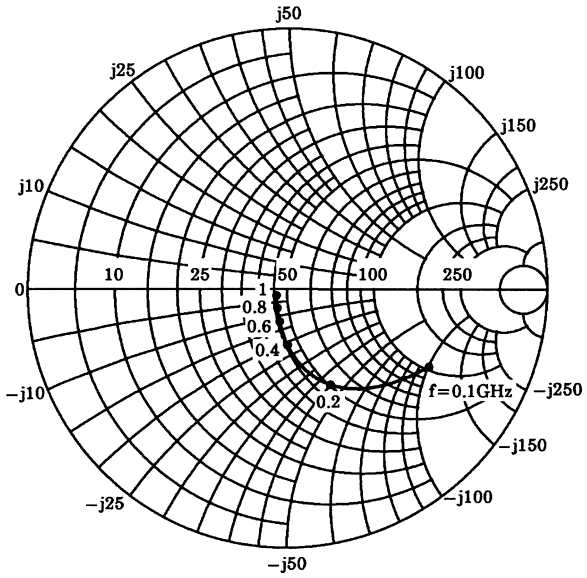
NF – I_C



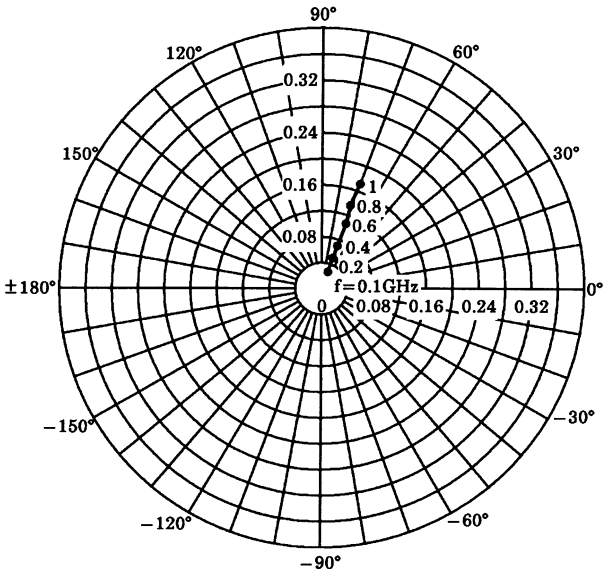
NF – f



S_{11e}
V_{CE} = 5V
I_C = 10mA
Ta = 25°C
(UNIT : Ω)



S_{12e}
V_{CE} = 5V
I_C = 10mA
Ta = 25°C



S_{21e}
V_{CE} = 5V
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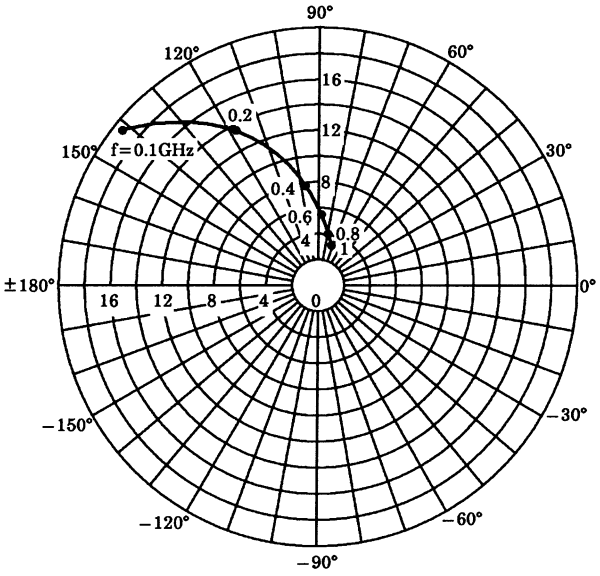
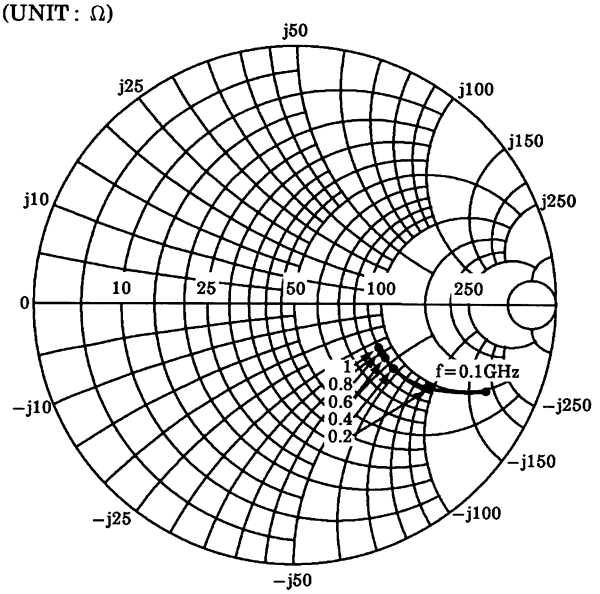


S_{22e}
V_{CE} = 5V
I_C = 10mA
Ta = 25°C
(UNIT : Ω)



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