TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

2SC4315

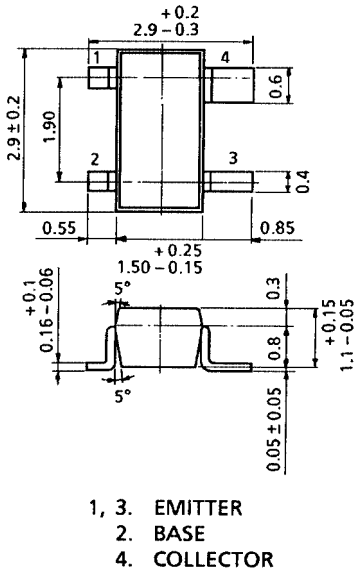
VHF~UHF Band Low Noise Amplifier Applications

- Low noise figure, high gain.
- NF = 1.1dB, $|S_{21e}|^2$ = 14dB (f = 1 GHz)

Maximum Ratings (Ta = 25°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	150	mW
Junction temperature	T_j	125	°C
Storage temperature range	T_{stg}	−55~125	°C

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	2-3J1C

Weight: 0.012 g (typ.)

Microwave Characteristics (Ta = 25°C)

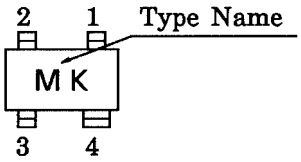
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition frequency	f_T	V_{CE} = 10 V, I_C = 20 mA	5	7	—	GHz
Insertion gain	$\|S_{21e}\|^2$ (1)	V_{CE} = 10 V, I_C = 20 mA, f = 500 MHz	—	19.5	—	dB
	$\|S_{21e}\|^2$ (2)	V_{CE} = 10 V, I_C = 20 mA, f = 1 GHz	10.5	14	—	
Noise figure	NF (1)	V_{CE} = 10 V, I_C = 5 mA, f = 500 MHz	—	1	—	dB
	NF (2)	V_{CE} = 10 V, I_C = 5 mA, f = 1 GHz	—	1.1	2	

Electrical Characteristics (Ta = 25°C)

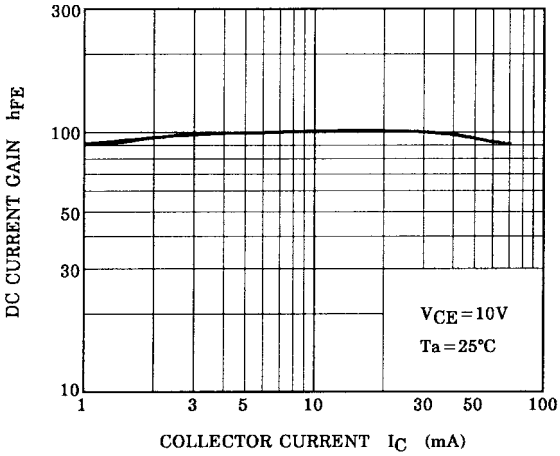
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB} = 10 V, I_E = 0	—	—	1	μA
Emitter cut-off current	I_{EBO}	V_{EB} = 1 V, I_C = 0	—	—	1	μA
DC current gain	h_{FE}	V_{CE} = 10 V, I_C = 20 mA	30	—	250	
Output capacitance	C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz (Note)	—	1	—	pF
Reverse transfer capacitance	C_{re}		—	0.55	1	pF

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

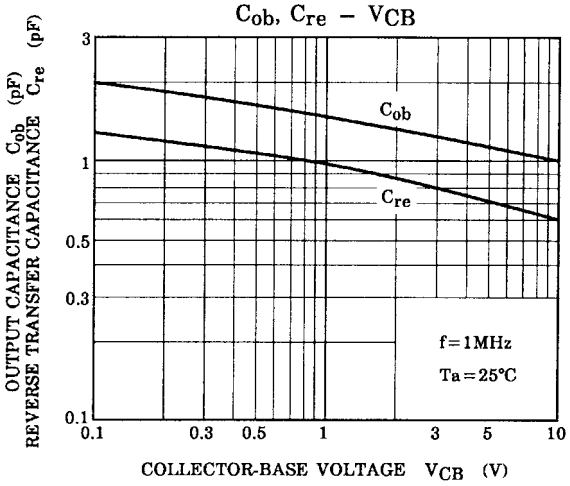
Marking



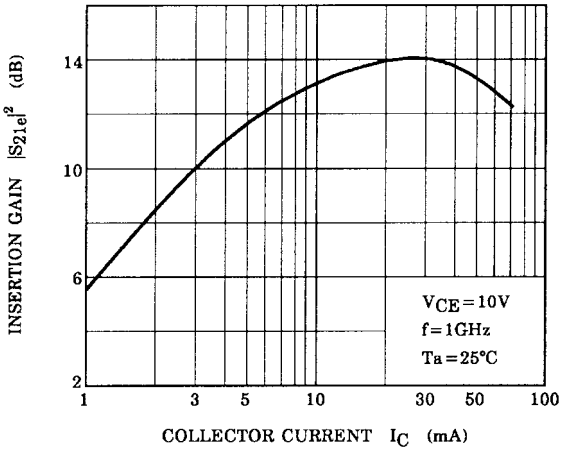
h_{FE} – I_C



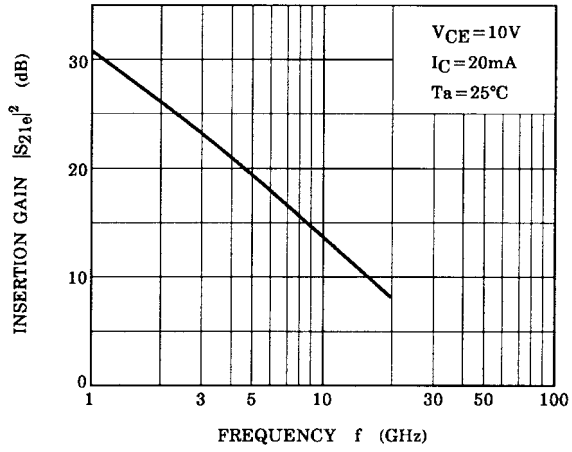
C_{ob}, C_{re} – V_{CB}



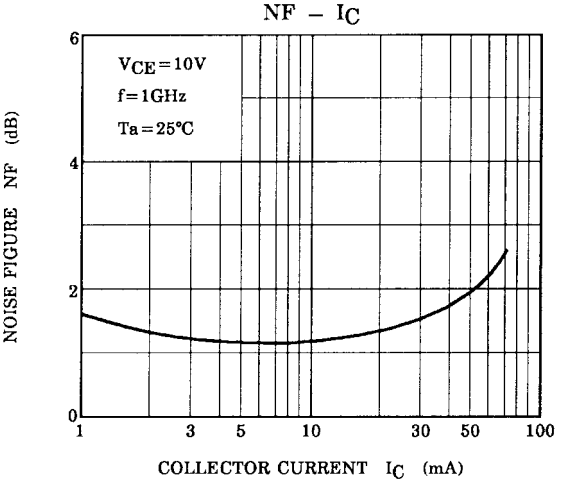
$|S_{21e}|^2$ – I_C



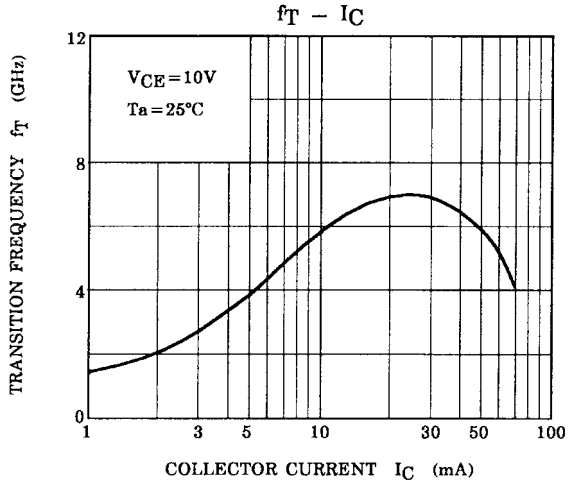
$|S_{21e}|^2$ – f

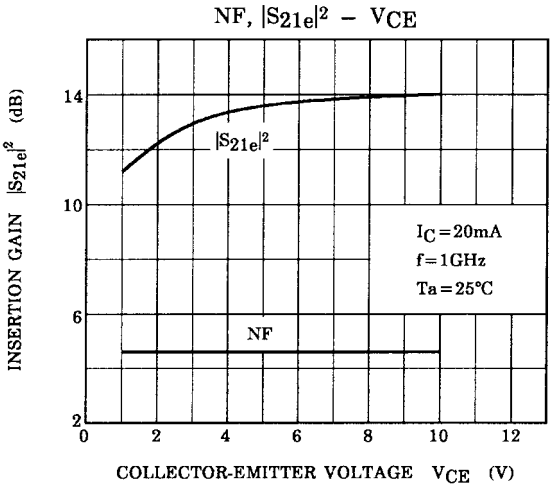


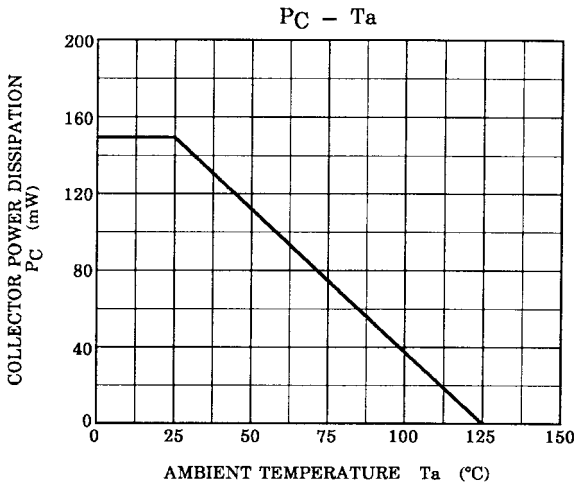
NF – I_C



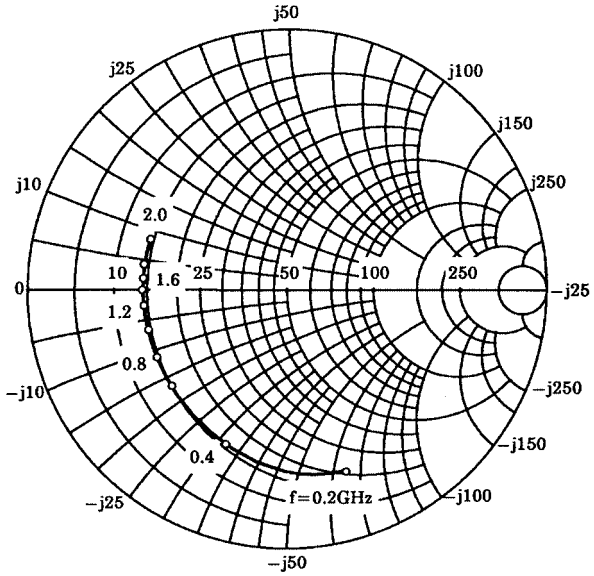
f_T – I_C



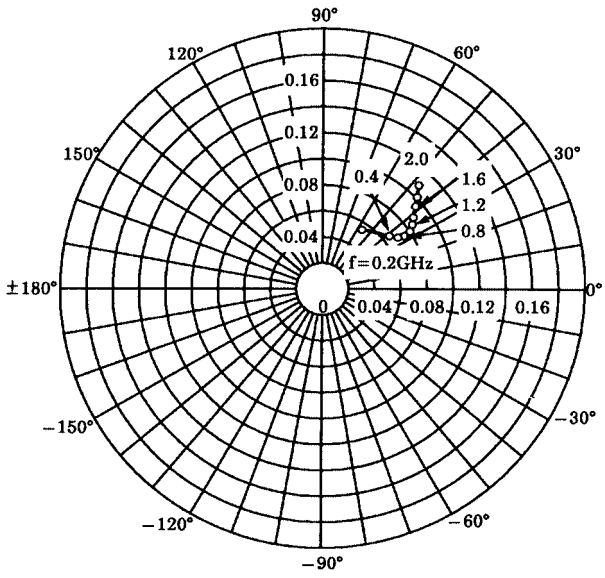

NF, $|S_{21e}|^2$ – V_{CE}
INSERTION GAIN $|S_{21e}|^2$ (dB)
14
10
6
2
$|S_{21e}|^2$
I_C = 20mA
f = 1GHz
Ta = 25°C
NF
0
2
4
6
8
10
12
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)


P_C – Ta
COLLECTOR POWER DISSIPATION P_C (mW)
200
160
120
80
40
0
0
25
50
75
100
125
150
AMBIENT TEMPERATURE Ta (°C)

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



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



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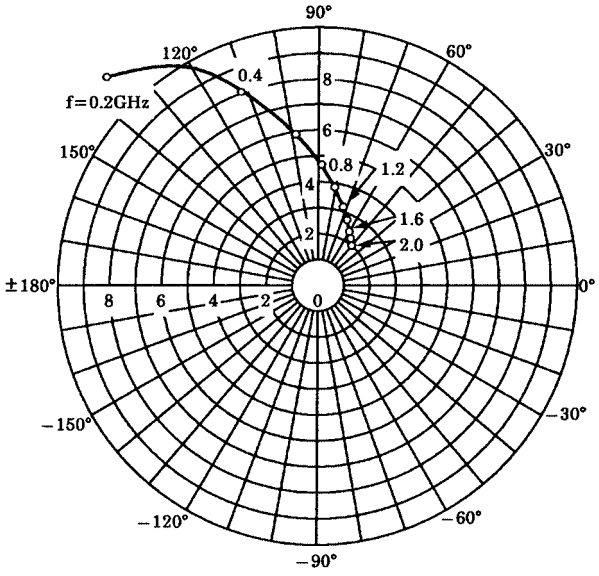

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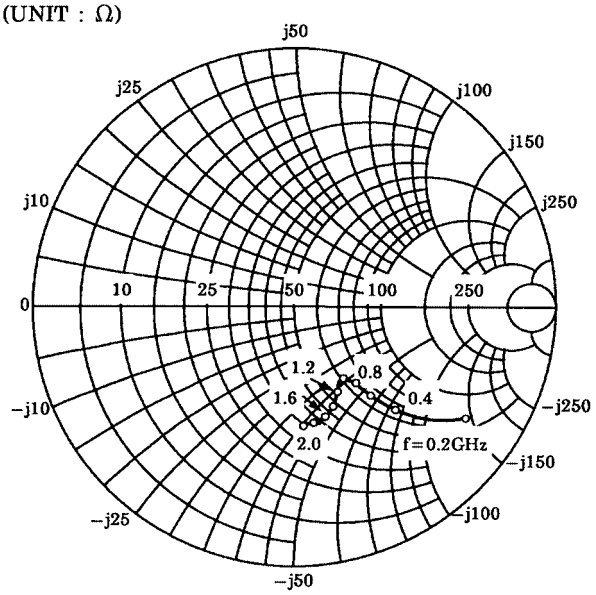

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I_C = 20mA
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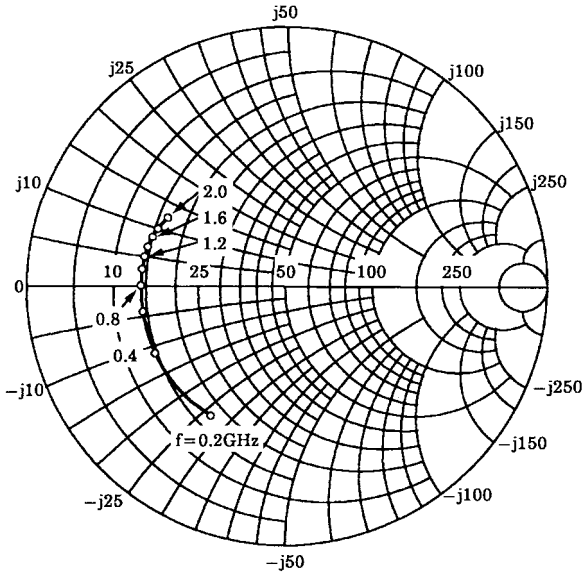

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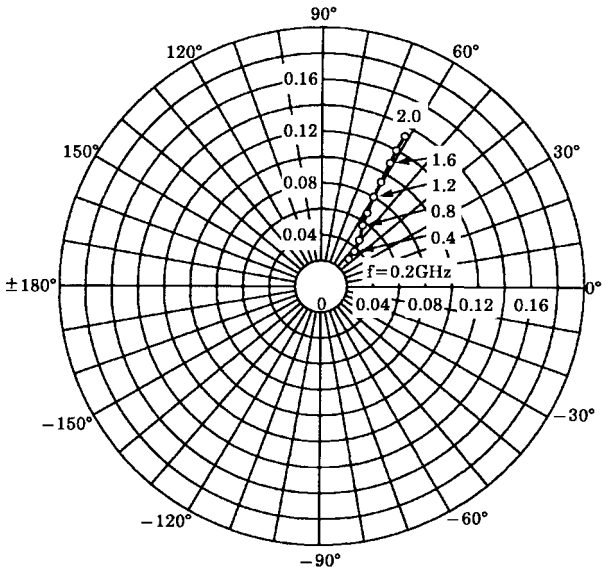

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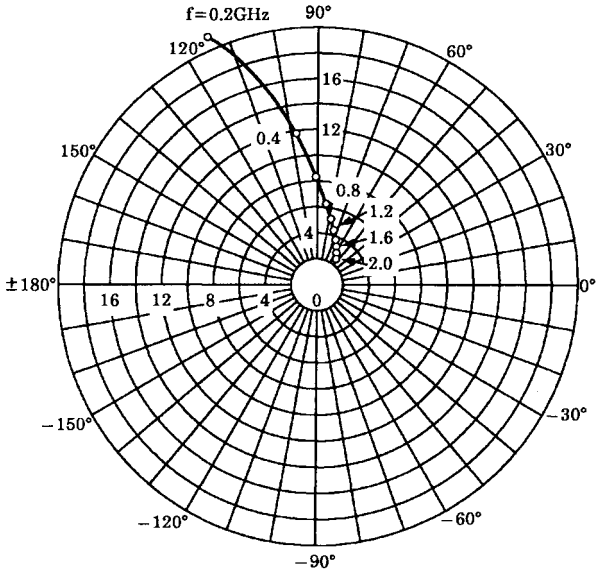

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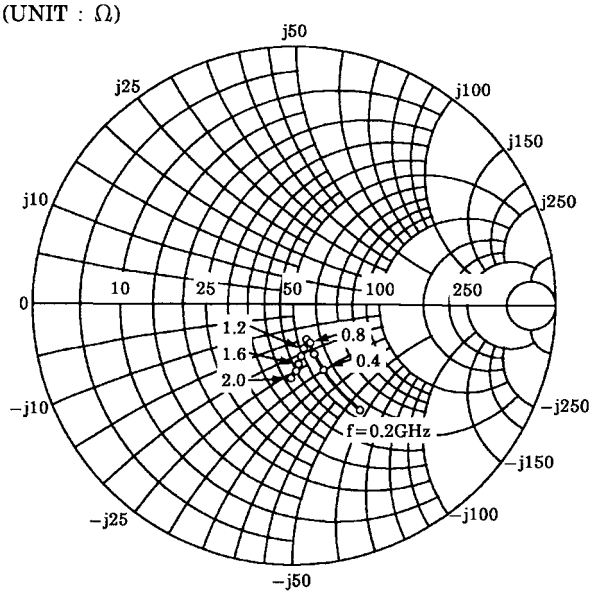

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