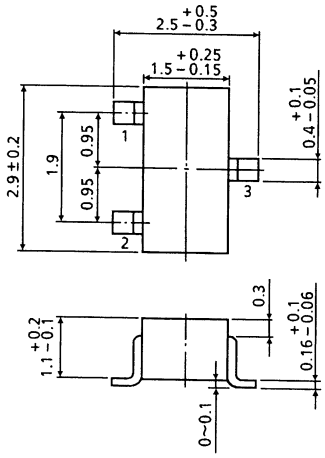
TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

2SC3098

UHF~C Band Low Noise Amplifier Applications

- Low noise figure
- NF = 2.5dB, $|S_{21e}|^2$ = 14.5dB (f = 500 MHz)
- NF = 3.0dB, $|S_{21e}|^2$ = 9.0dB (f = 1 GHz)

Unit: mm



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}	30	V
Collector-emitter voltage	V_{CEO}	20	V
Emitter-base voltage	V_{EBO}	3	V
Collector current	I_C	50	mA
Base current	I_B	25	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)

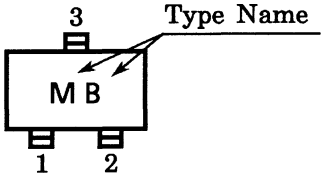
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition frequency	f_T	V_{CE} = 10 V, I_C = 10 mA	—	3.5	—	GHz
Insertion gain	$\|S_{21e}\|^2$ (1)	V_{CE} = 10 V, I_C = 10 mA, f = 500 MHz	—	14.5	—	dB
	$\|S_{21e}\|^2$ (2)	V_{CE} = 10 V, I_C = 10 mA, f = 1 GHz	—	9	—	
Noise figure	NF (1)	V_{CE} = 10 V, I_C = 5 mA, f = 500 MHz	—	2.5	—	dB
	NF (2)	V_{CE} = 10 V, I_C = 5 mA, f = 1 GHz	—	3	—	

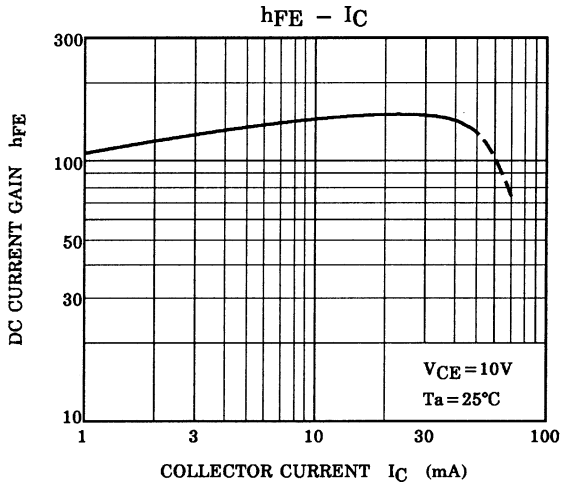
Electrical Characteristics (Ta = 25°C)

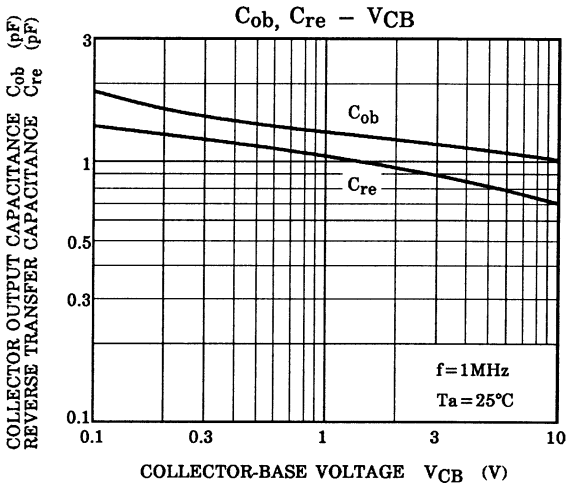
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB} = 10 V, I_E = 0	—	—	1	μA
Emitter cut-off current	I_{EBO}	V_{EB} = 1 V, I_C = 0	—	—	1	μA
DC current gain	h_{FE}	V_{CE} = 10 V, I_C = 10 mA	30	80	300	
Collector output capacitance	C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz (Note)	—	1.15	—	pF
Reverse transfer capacitance	C_{re}		—	0.75	—	pF

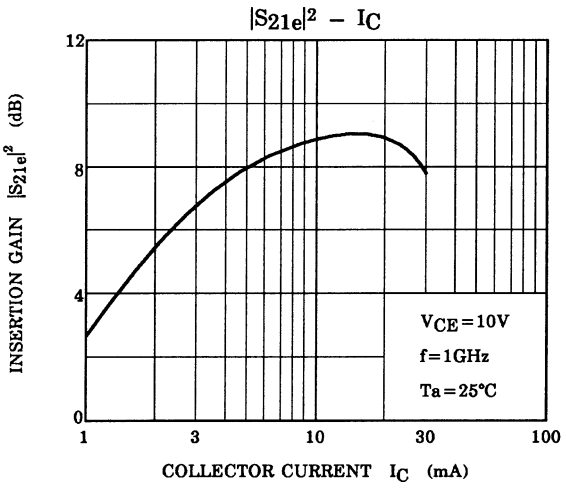
Note: C_{re} is measured by 3-terminal method with capacitance bridge.

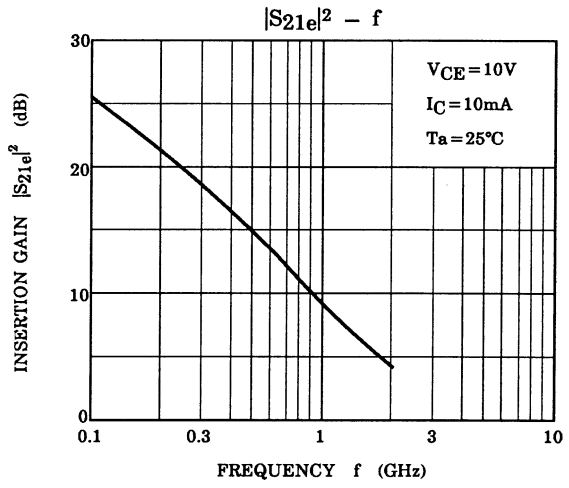
Marking

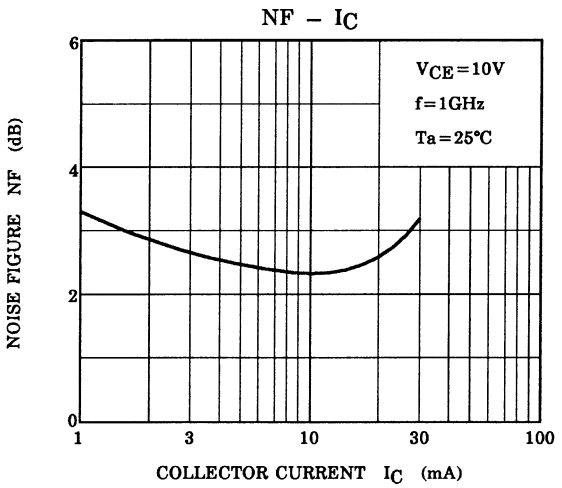


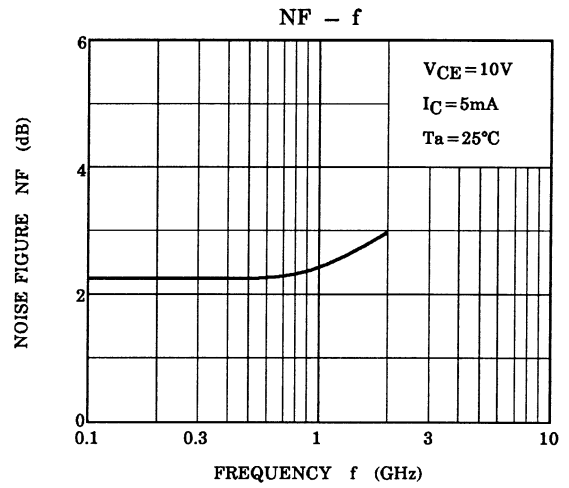

hFE – IC
DC CURRENT GAIN hFE
300
100
50
30
10
1
3
10
30
100
VCE = 10V
Ta = 25°C
COLLECTOR CURRENT IC (mA)


Cob, Cre – VCB
COLLECTOR OUTPUT CAPACITANCE Cob (pF)
REVERSE TRANSFER CAPACITANCE Cre (pF)
3
1
0.5
0.3
0.1
Cob
Cre
f = 1MHz
Ta = 25°C
0.1
0.3
1
3
10
COLLECTOR-BASE VOLTAGE VCB (V)

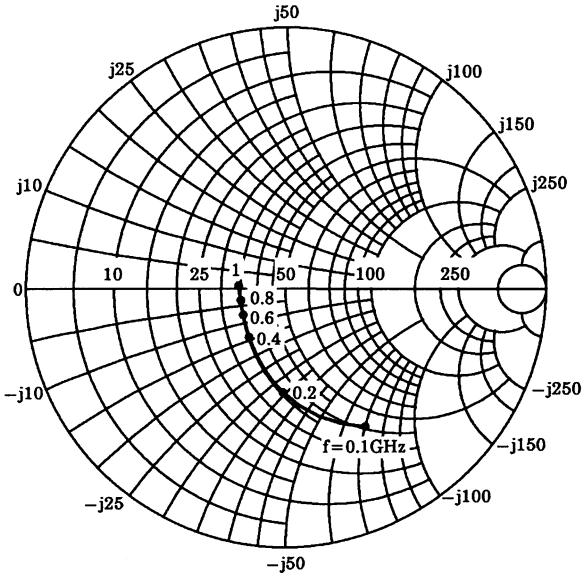

|S21e|2 – IC
INSERTION GAIN |S21e|2 (dB)
12
8
4
0
1
3
10
30
100
VCE = 10V
f = 1GHz
Ta = 25°C
COLLECTOR CURRENT IC (mA)


|S21e|2 – f
INSERTION GAIN |S21e|2 (dB)
30
20
10
0
0.1
0.3
1
3
10
VCE = 10V
IC = 10mA
Ta = 25°C
FREQUENCY f (GHz)

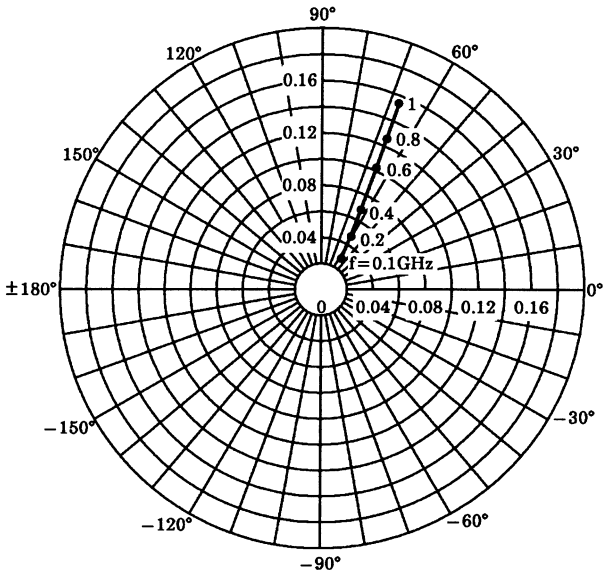

NF – IC
NOISE FIGURE NF (dB)
6
4
2
0
1
3
10
30
100
VCE = 10V
f = 1GHz
Ta = 25°C
COLLECTOR CURRENT IC (mA)


NF – f
NOISE FIGURE NF (dB)
6
4
2
0
0.1
0.3
1
3
10
VCE = 10V
IC = 5mA
Ta = 25°C
FREQUENCY f (GHz)

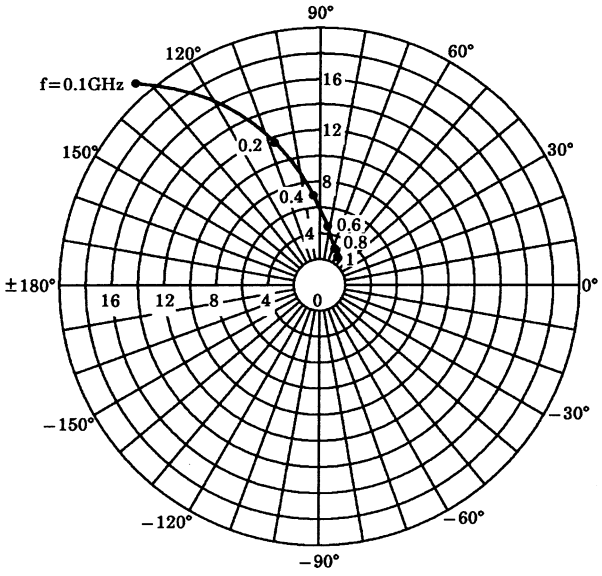
S_{11e}
V_{CE} = 10V
I_C = 10mA
Ta = 25°C
(UNIT : Ω)



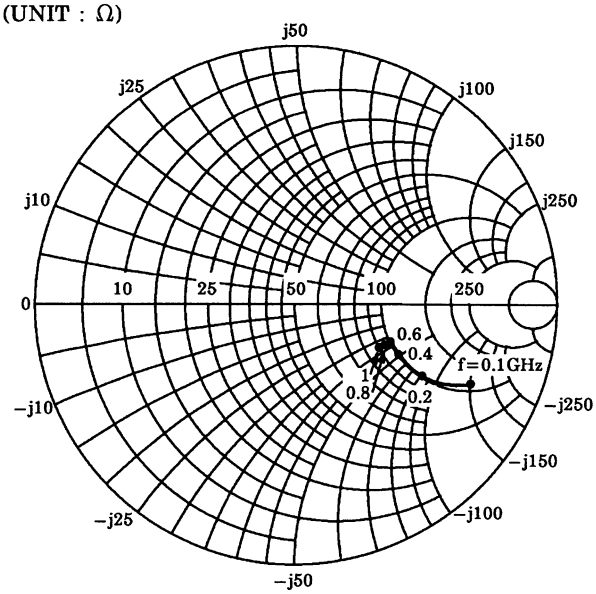
S_{12e}
V_{CE} = 10V
I_C = 10mA
Ta = 25°C



S_{21e}
V_{CE} = 10V
I_C = 10mA
Ta = 25°C



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



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