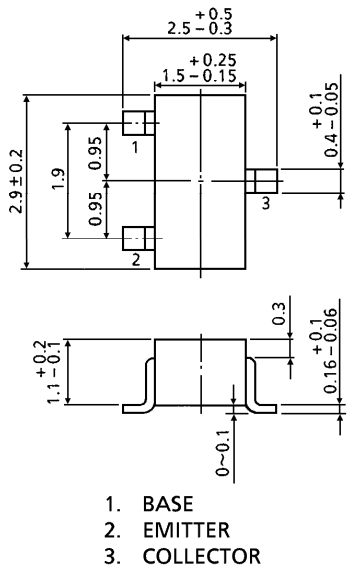
TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

2SC3011

UHF~C BAND LOW NOISE AMPLIFIER APPLICATIONS

Unit in mm

- High Gain : $|S_{21e}|^2 = 12dB$ (Typ.)
- Low Noise Figure : NF = 2.3dB (Typ.), f = 1GHz
- High f_T : $f_T = 6.5GHz$



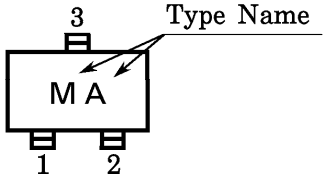
JEDEC	—
EIAJ	SC-59
TOSHIBA	2-3F1A

Weight : 0.012g

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	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

Marking



MICROWAVE CHARACTERISTICS (Ta = 25°C)

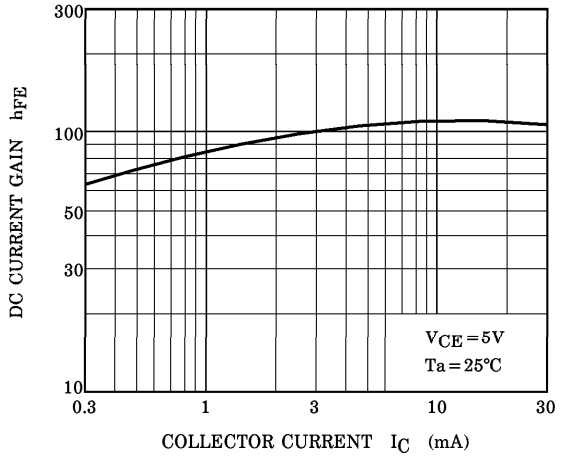
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Transition Frequency	f_T	V_{CE} = 5V, I_C = 10mA	—	6.5	—	GHz
Insertion Gain	$\|S_{21e}\|^2$	V_{CE} = 5V, I_C = 10mA, f = 1GHz	—	12	—	dB
Noise Figure	NF	V_{CE} = 5V, I_C = 5mA, f = 1GHz	—	2.3	—	dB

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

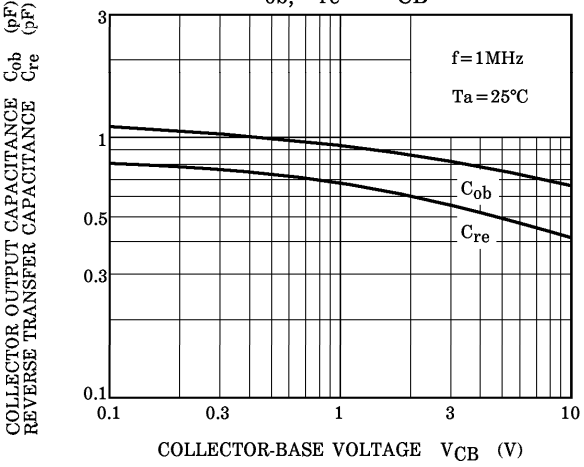
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I_{CBO}	V_{CB} = 10V, I_E = 0	—	—	1.0	μA
Emitter Cut-off Current	I_{EBO}	V_{EB} = 1.0V, I_C = 0	—	—	1.0	μA
Collecter-Emitter Breakdown Voltage	$V_{(BR)\,CEO}$	I_C = 0.5mA, I_B = 0	7	—	—	V
DC Current Gain	h_{FE}	V_{CE} = 5V, I_C = 10mA	30	120	—	—
Collector-Emitter Saturation Voltage	$V_{CE\,(sat)}$	I_C = 10mA, I_B = 1mA	—	0.1	—	V
Base-Emitter Saturation Voltage	$V_{BE\,(sat)}$		—	0.87	—	
Collecter Output Capacitance	C_{ob}	V_{CB} = 5V, I_E = 0, f = 1MHz (Note)	—	0.7	0.9	pF
Reverse Transfer Capacitance	C_{re}		—	0.5	—	
Input Capacitance	C_{ib}	V_{EB} = 0, I_C = 0, f = 1MHz	—	0.8	—	pF

(Note) Cre is measured by 3-terminal method with Capacitance Bridge.

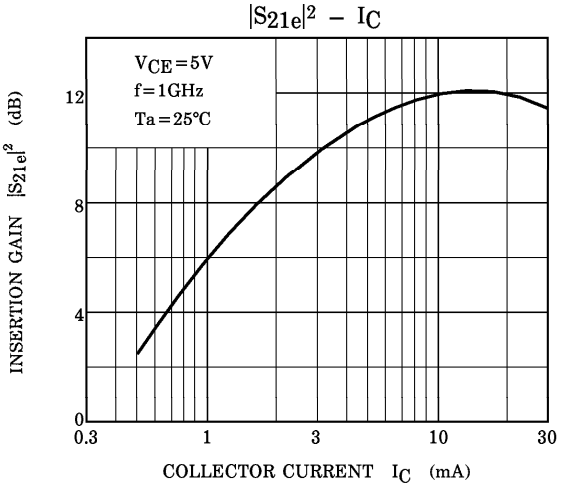
h_{FE} – I_C



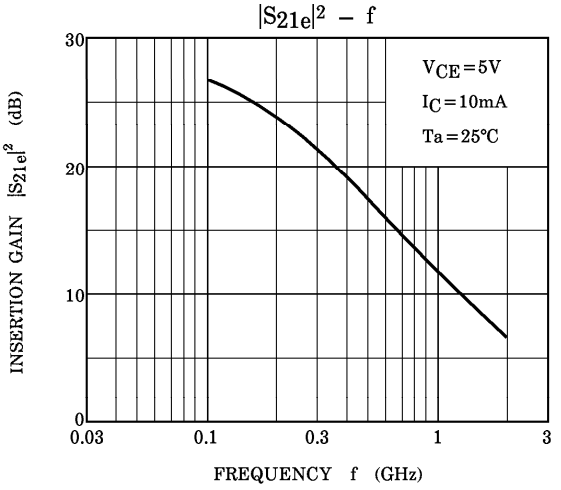
C_{ob}, C_{re} – V_{CB}



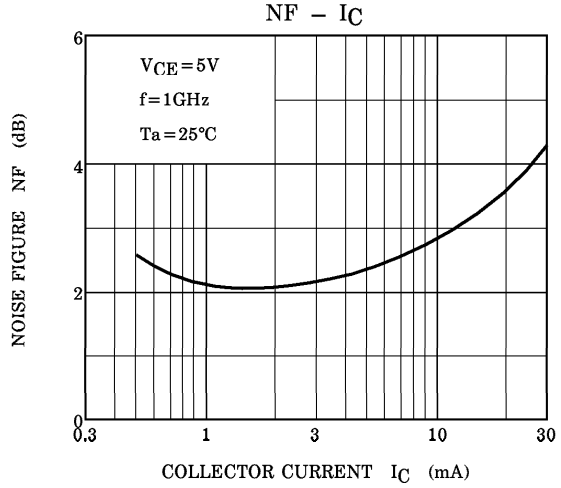
$|S_{21e}|^2$ – I_C



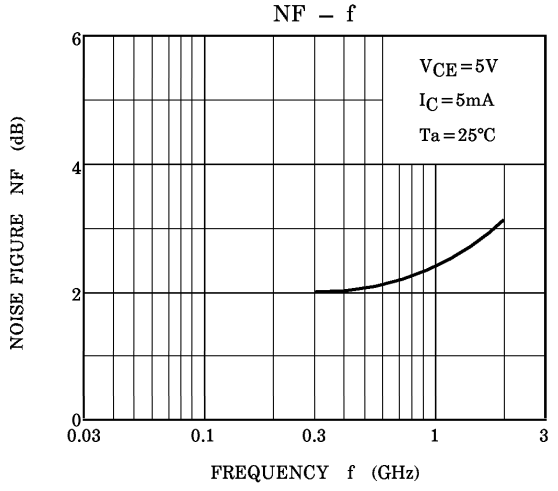
$|S_{21e}|^2$ – f



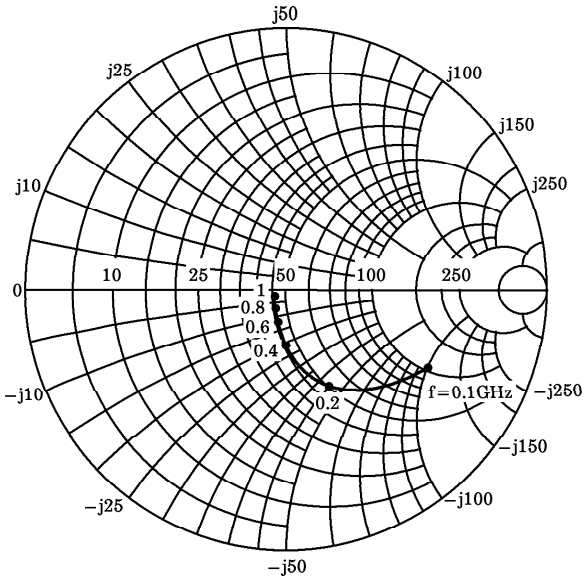
NF – I_C



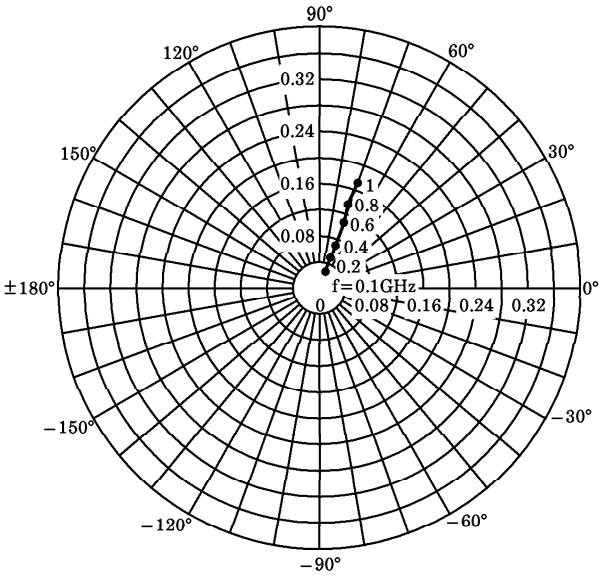
NF – f



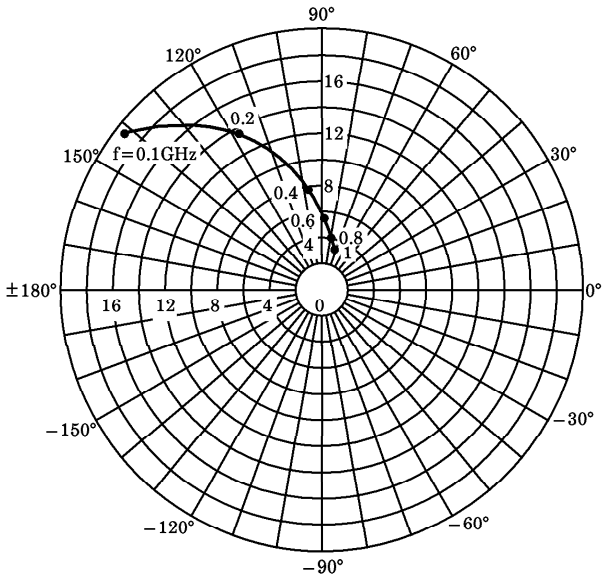
S_{11e}
V_{CE} = 5V
I_C = 10mA
Ta = 25°C
(UNIT : Ω)



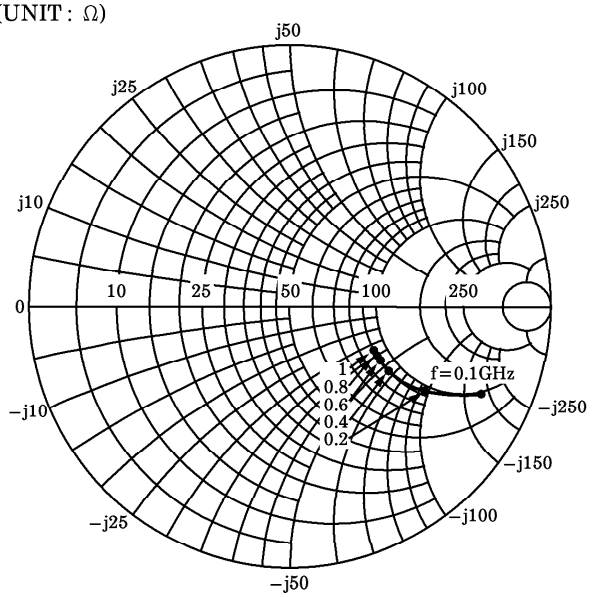
S_{12e}
V_{CE} = 5V
I_C = 10mA
Ta = 25°C



S_{21e}
V_{CE} = 5V
I_C = 10mA
Ta = 25°C



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



RESTRICTIONS ON PRODUCT USE

000707EAA

- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
  In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.