

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

# 2SC3011

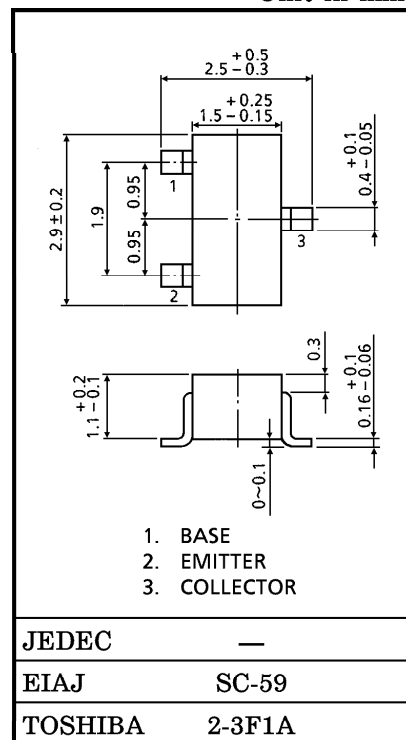
UHF~C BAND LOW NOISE AMPLIFIER APPLICATIONS

Unit in mm

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

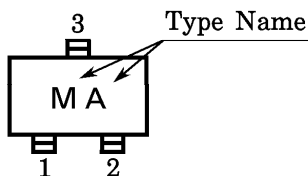
MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

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	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-55~125	$^\circ\text{C}$



Weight : 0.012g

Marking



MICROWAVE CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC	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

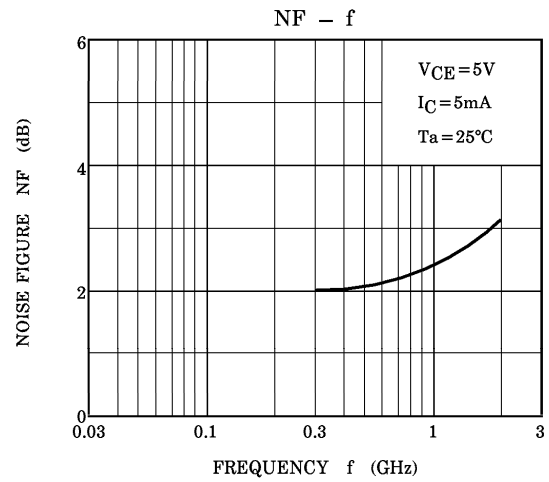
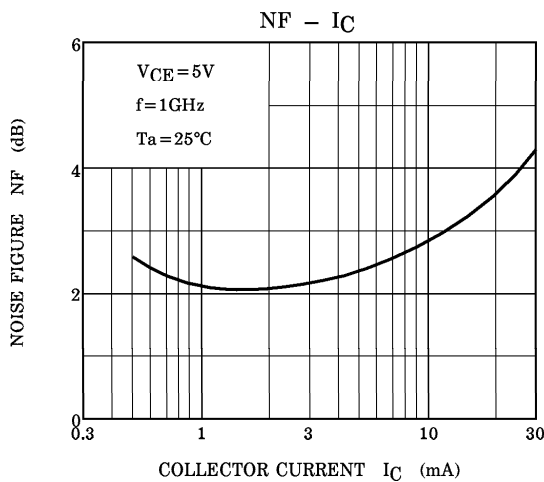
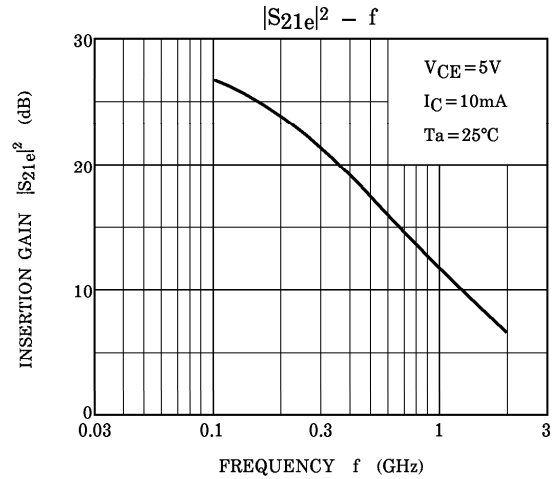
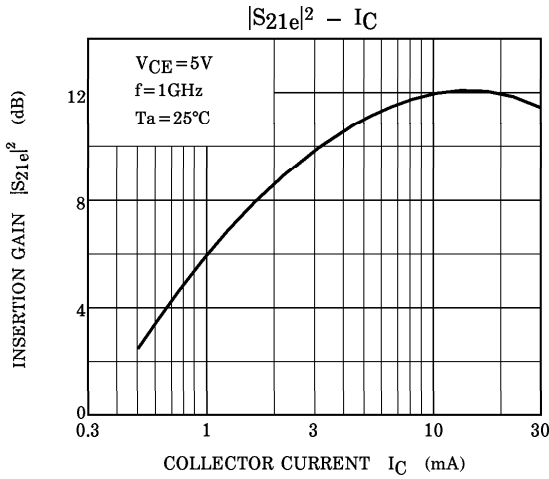
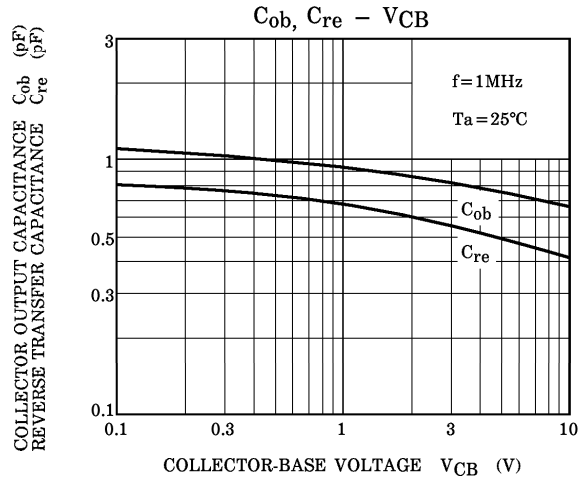
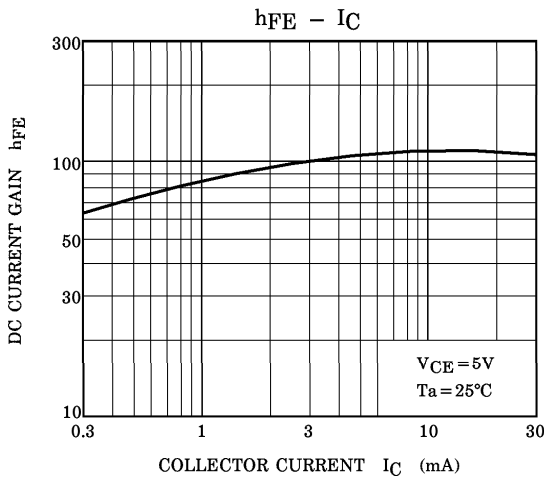
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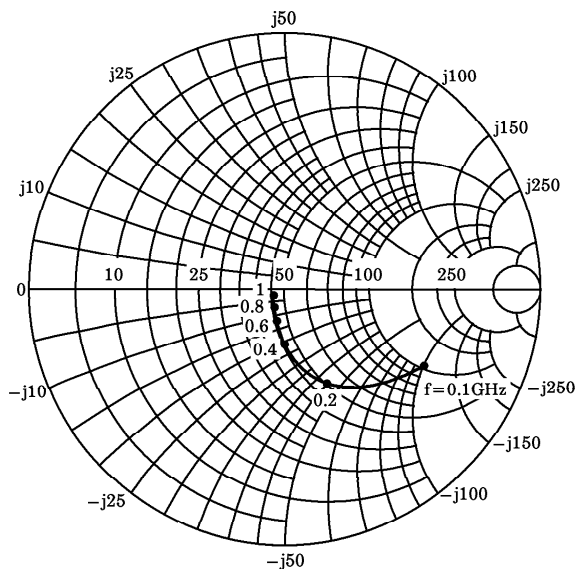
## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	$I_{CBO}$	$V_{CB} = 10V, I_E = 0$	—	—	1.0	$\mu A$
Emitter Cut-off Current	$I_{EBO}$	$V_{EB} = 1.0V, I_C = 0$	—	—	1.0	$\mu A$
Collector-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	—	
Collector 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

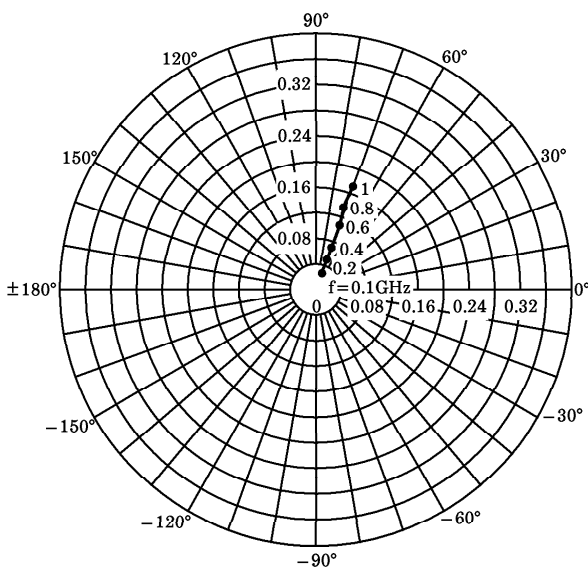
(Note)  $C_{re}$  is measured by 3-terminal method with Capacitance Bridge.



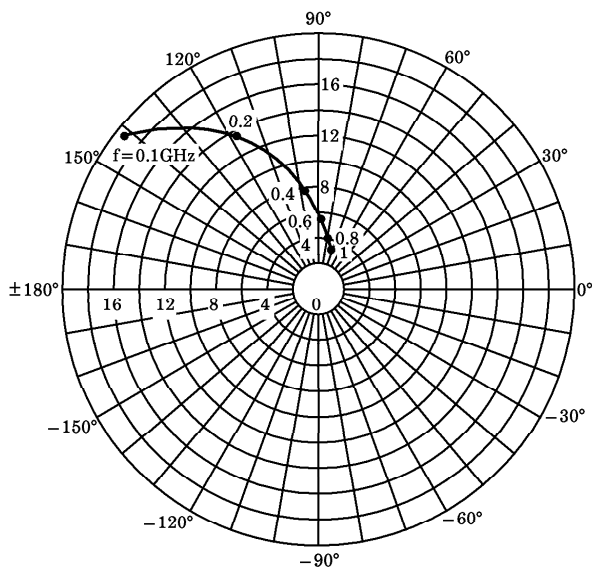
**S<sub>11e</sub>**  
 V<sub>CE</sub> = 5V  
 I<sub>C</sub> = 10mA  
 T<sub>a</sub> = 25°C  
 (UNIT: Ω)



**S<sub>12e</sub>**  
 V<sub>CE</sub> = 5V  
 I<sub>C</sub> = 10mA  
 T<sub>a</sub> = 25°C



**S<sub>21e</sub>**  
 V<sub>CE</sub> = 5V  
 I<sub>C</sub> = 10mA  
 T<sub>a</sub> = 25°C



**S<sub>22e</sub>**  
 V<sub>CE</sub> = 5V  
 I<sub>C</sub> = 10mA  
 T<sub>a</sub> = 25°C  
 (UNIT: Ω)

