

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

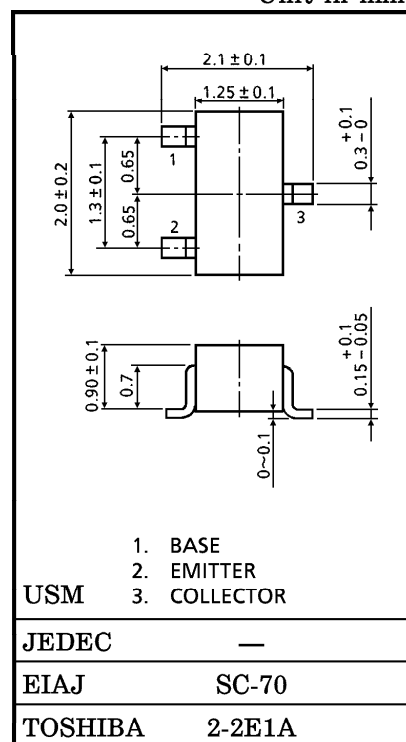
# 2SC5110

FOR VCO APPLICATION

Unit in mm

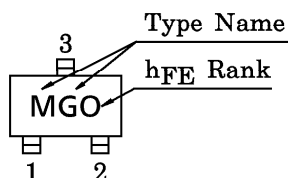
MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	V <sub>CB0</sub>	20	V
Collector-Emitter Voltage	V <sub>CEO</sub>	10	V
Emitter-Base Voltage	V <sub>EBO</sub>	3	V
Base Current	I <sub>B</sub>	30	mA
Collector Current	I <sub>C</sub>	60	mA
Collector Power Dissipation	P <sub>C</sub>	100	mW
Junction Temperature	T <sub>j</sub>	125	°C
Storage Temperature Range	T <sub>stg</sub>	-55~125	°C



Weight : 0.006g

MARKING



ELECTRICAL CHARACTERISTICS (Ta = 25°C)

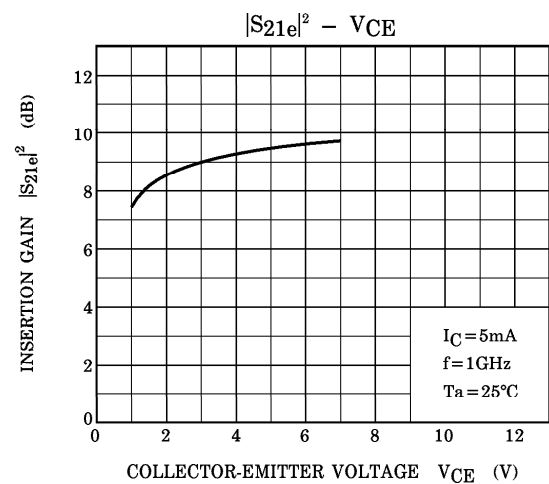
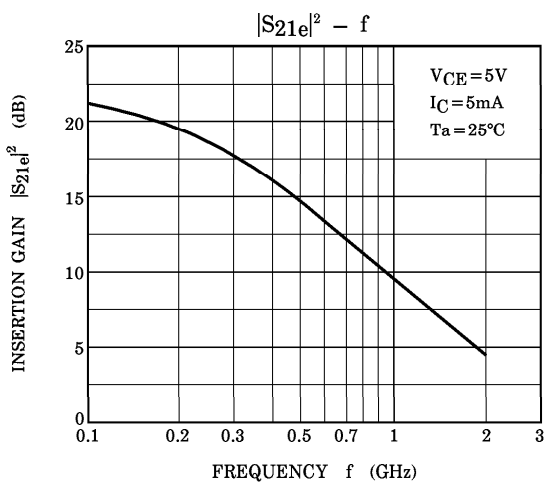
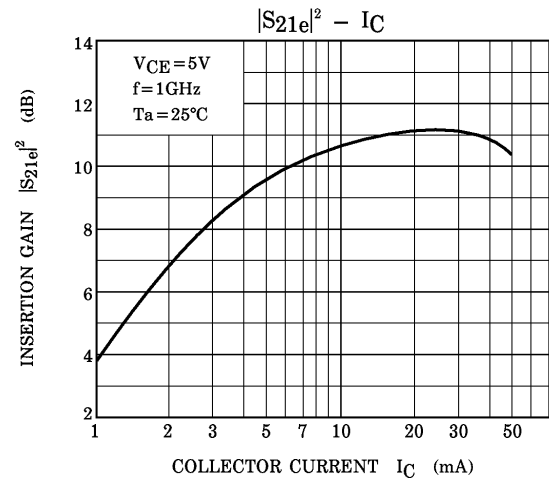
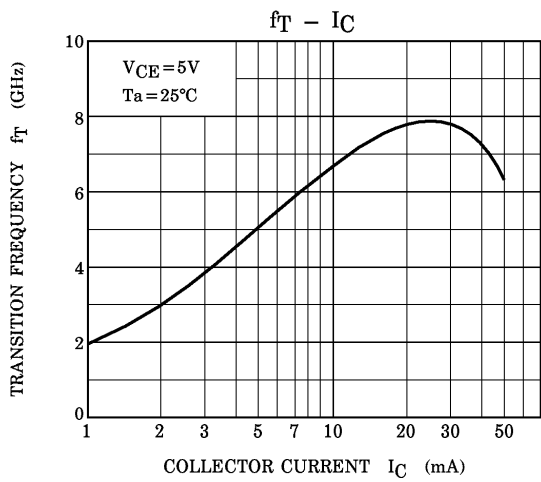
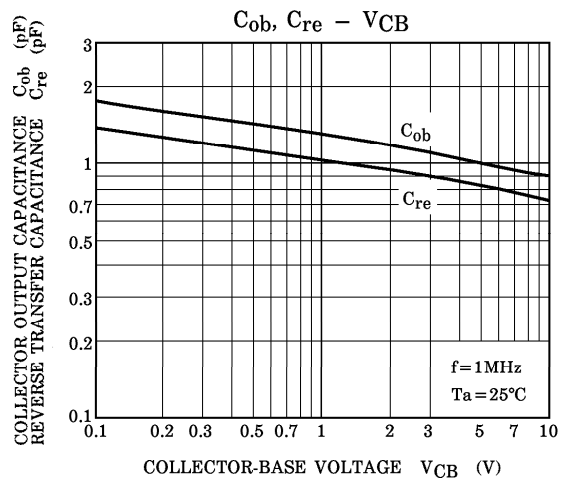
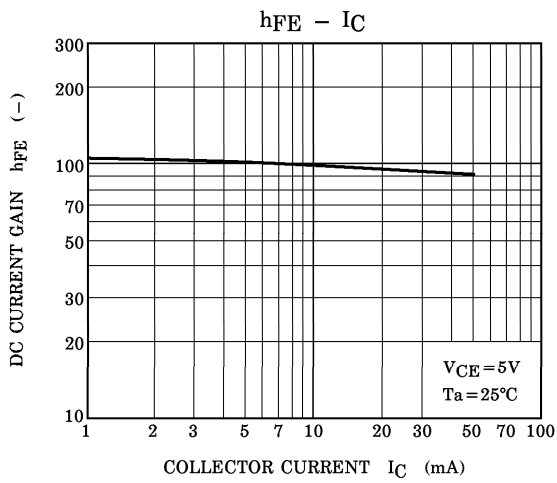
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I <sub>CB0</sub>	V <sub>CB</sub> = 10V, I <sub>E</sub> = 0	—	—	0.1	μA
Emitter Cut-off Current	I <sub>EBO</sub>	V <sub>EB</sub> = 1V, I <sub>C</sub> = 0	—	—	0.1	μA
DC Current Gain	h <sub>FE</sub> (Note 1)	V <sub>CE</sub> = 5V, I <sub>C</sub> = 5mA	80	—	240	—
Transition Frequency	f <sub>T</sub>	V <sub>CE</sub> = 5V, I <sub>C</sub> = 5mA	4	6	—	GHz
Insertion Gain	S <sub>21e</sub>   <sup>2</sup>	V <sub>CE</sub> = 5V, I <sub>C</sub> = 5mA, f = 1GHz	7	11	—	dB
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> = 5V, I <sub>E</sub> = 0, f = 1MHz (Note 2)	—	0.7	—	pF
Reverse Transfer Capacitance	C <sub>re</sub>		—	0.5	0.9	pF
Collector-Base Time Constant	C <sub>c</sub> ·r <sub>bb</sub> '	V <sub>CB</sub> = 5V, I <sub>C</sub> = 3mA, f = 30MHz	—	5.5	10	ps

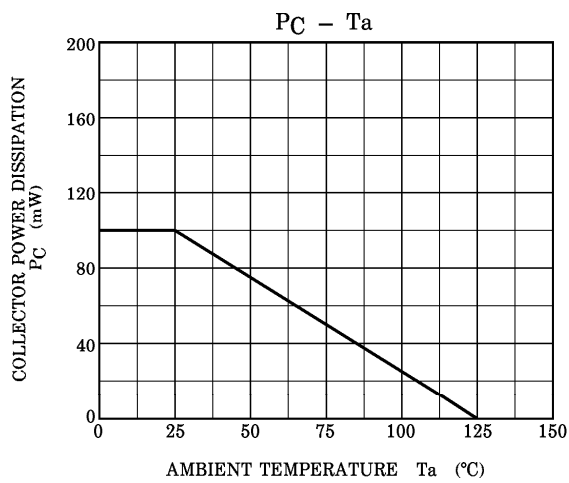
(Note 1) h<sub>FE</sub> Classification O : 80~160, Y : 120~240

(Note 2) C<sub>re</sub> is measured by 3 terminal method with capacitance bridge.

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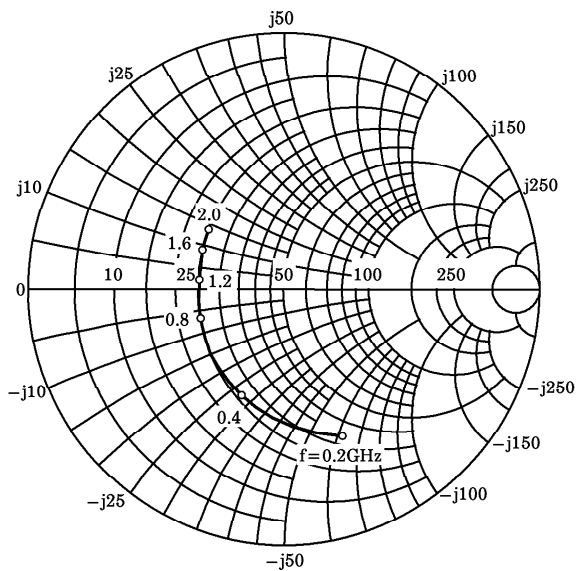




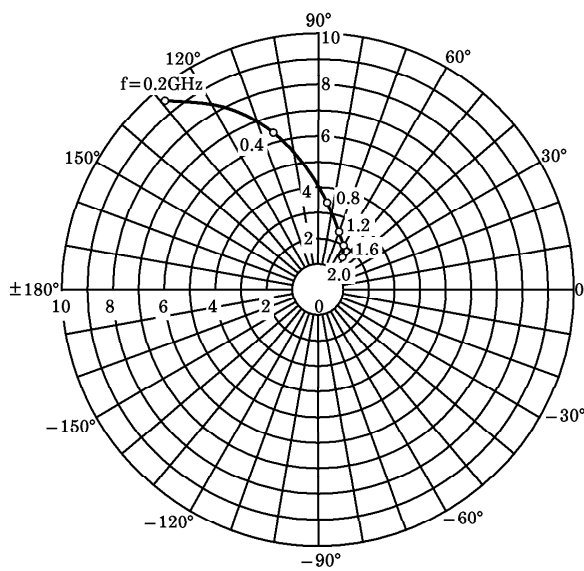
S-Parameter  $Z_0 = 50\Omega$ ,  $T_a = 25^\circ\text{C}$   
 $V_{CE} = 5\text{V}$ ,  $I_C = 5\text{mA}$

frequency (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.631	-67.7	9.526	129.8	0.062	55.9	0.687	-38.7
400	0.441	-111.7	6.393	106.3	0.084	49.5	0.459	-48.5
600	0.363	-139.8	4.611	93.6	0.100	50.6	0.360	-50.6
800	0.338	-159.8	3.599	84.6	0.117	52.9	0.312	-51.1
1000	0.331	-175.0	2.990	77.5	0.134	55.1	0.286	-51.6
1200	0.337	171.9	2.556	71.2	0.152	57.2	0.271	-53.0
1400	0.344	161.7	2.252	65.3	0.174	58.6	0.265	-55.7
1600	0.359	152.1	2.011	60.3	0.196	58.5	0.259	-59.5
1800	0.373	144.6	1.845	55.4	0.217	57.9	0.254	-63.6
2000	0.391	138.5	1.691	50.8	0.238	58.3	0.249	-68.8

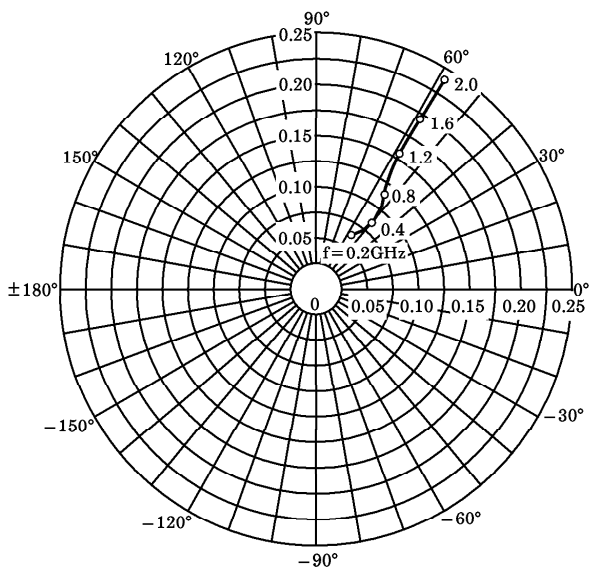
**S<sub>11e</sub>**  
 V<sub>CE</sub>=5V  
 I<sub>C</sub>=5mA  
 T<sub>a</sub>=25°C  
 (UNIT : Ω)



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



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



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

