

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

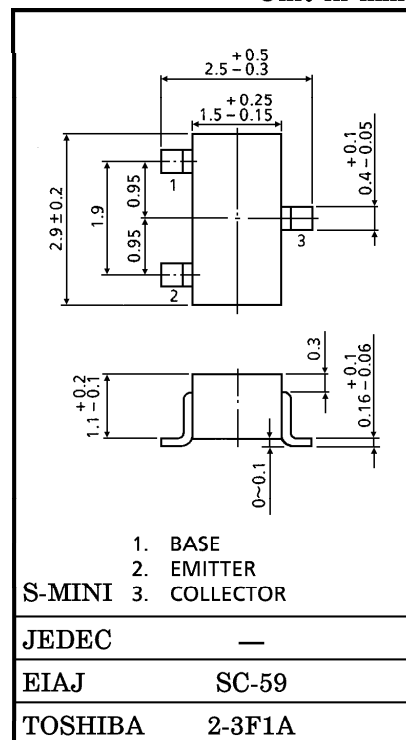
# 2SC5106

FOR VCO APPLICATION

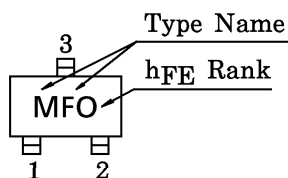
Unit in mm

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>	15	mA
Collector Current	I <sub>C</sub>	30	mA
Collector Power Dissipation	P <sub>C</sub>	150	mW
Junction Temperature	T <sub>j</sub>	125	°C
Storage Temperature Range	T <sub>stg</sub>	-55~125	°C



MARKING



Weight : 0.012g

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

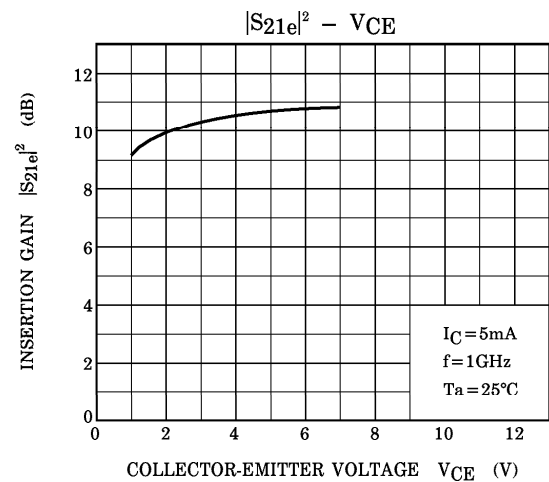
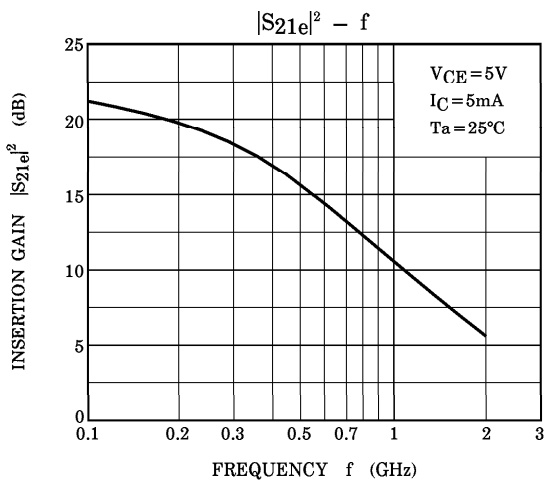
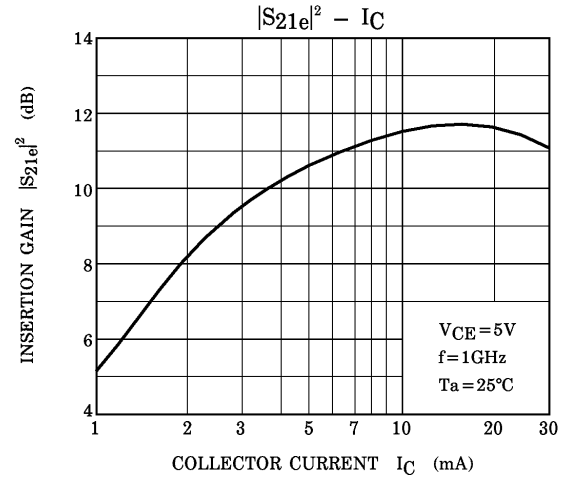
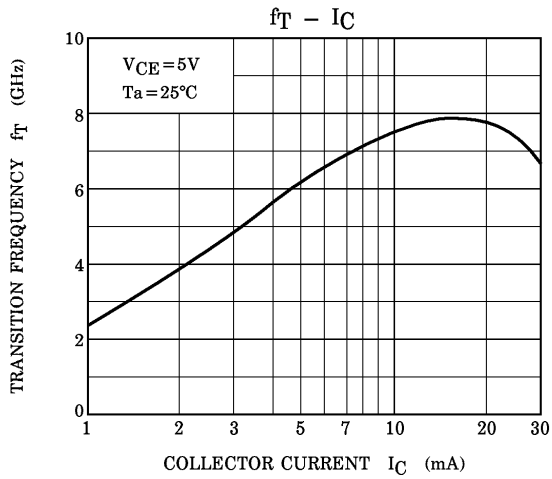
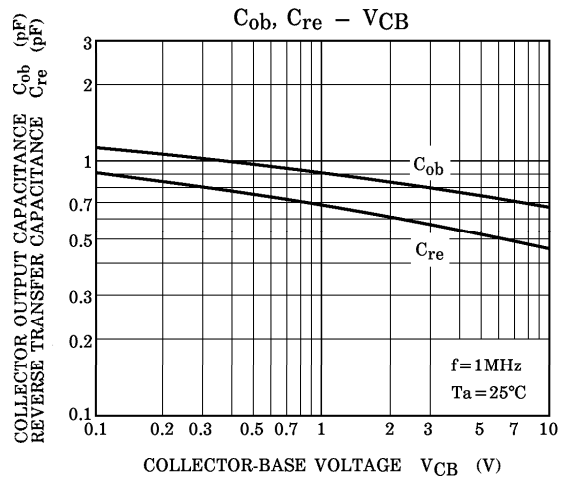
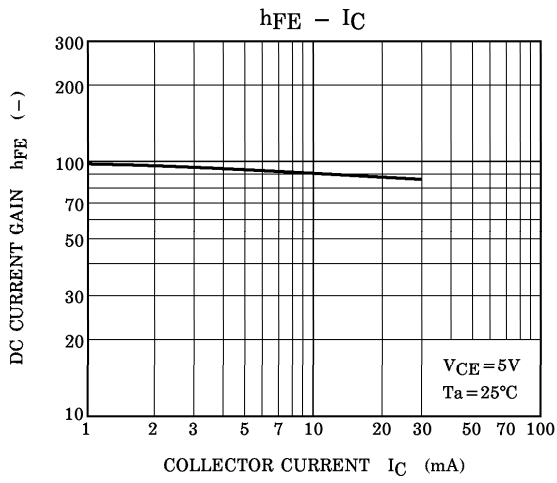
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I <sub>CB0</sub>	V <sub>CB</sub> = 10V, I <sub>E</sub> = 0	—	—	0.1	μA
Emitter Cut-off Current	I <sub>EBO</sub>	V <sub>EB</sub> = 1V, I <sub>C</sub> = 0	—	—	0.1	μA
DC Current Gain	h <sub>FE</sub> (Note 1)	V <sub>CE</sub> = 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,rb</sub> '	V <sub>CB</sub> = 15V, I <sub>C</sub> = 3mA, f = 30MHz	—	5.5	10	ps

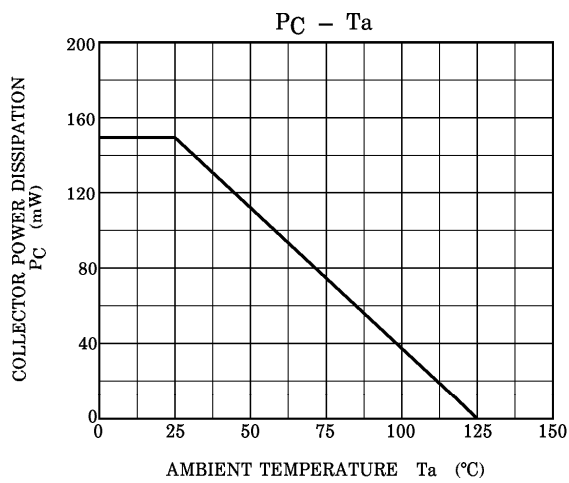
(Note 1) h<sub>FE</sub> Classification O : 80~160, Y : 120~240

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

961001EAA1

- TOSHIBA is continually working to improve the quality and the 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 observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product 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 products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.
- 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.

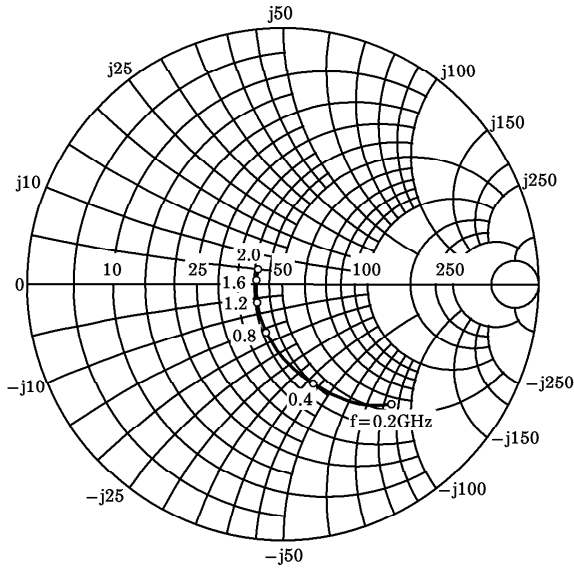




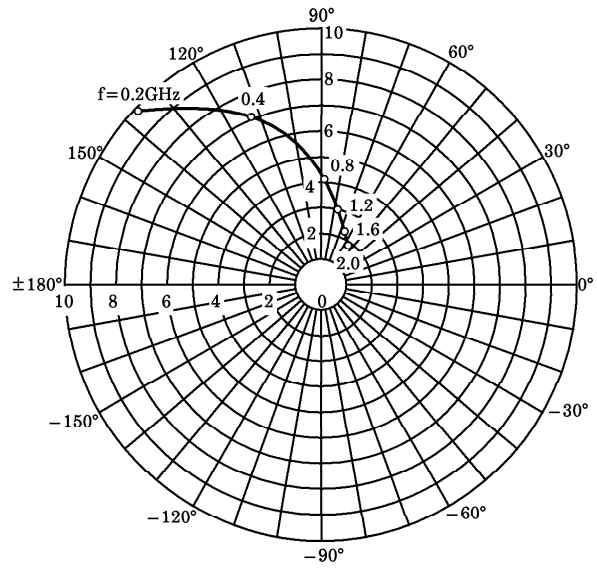
S-Parameter  $Z_0 = 50\Omega$ ,  $T_a = 25^\circ\text{C}$   
 $V_{CE} = 5\text{V}$ ,  $I_C = 5\text{mA}$

frequency (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.654	-45.3	9.794	136.6	0.047	64.8	0.775	-27.8
400	0.414	-75.6	7.062	112.6	0.071	58.7	0.570	-35.0
600	0.273	-94.9	5.232	98.7	0.090	58.5	0.472	-35.8
800	0.193	-111.7	4.118	89.4	0.108	59.5	0.424	-35.5
1000	0.146	-128.1	3.412	82.0	0.127	60.4	0.398	-35.5
1200	0.116	-147.4	2.927	75.5	0.147	61.0	0.381	-36.2
1400	0.101	-169.6	2.571	69.8	0.169	60.7	0.373	-37.9
1600	0.098	171.6	2.299	64.4	0.189	59.5	0.363	-40.4
1800	0.105	155.8	2.079	59.8	0.208	58.6	0.351	-43.5
2000	0.118	142.1	1.928	55.4	0.230	58.4	0.338	-46.1

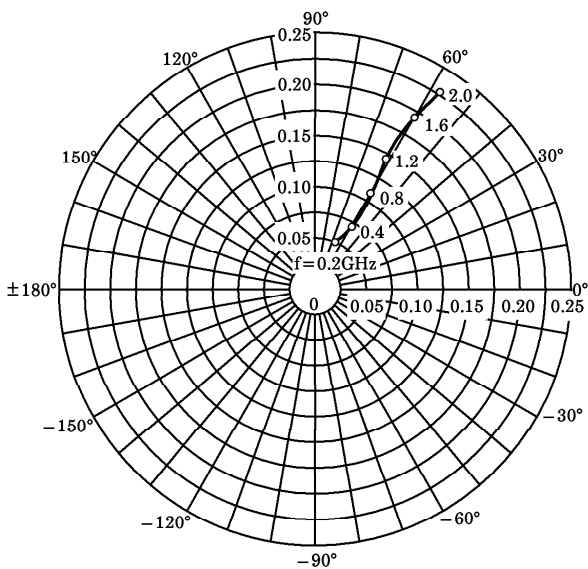
**S<sub>11e</sub>**  
 V<sub>CE</sub>=5V  
 I<sub>C</sub>=5mA  
 T<sub>a</sub>=25°C  
 (UNIT : Ω)



**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)

