

TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

2SC5108

For VCO Application

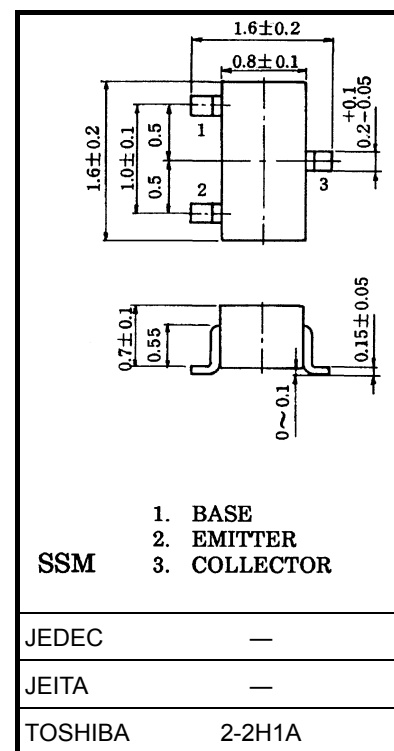
Unit: mm

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	20	V
Collector-emitter voltage	V_{CEO}	10	V
Emitter-base voltage	V_{EBO}	3	V
Base current	I_B	15	mA
Collector current	I_C	30	mA
Collector power dissipation	P_C	100	mW
Junction temperature	T_j	125	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55 to 125	$^\circ\text{C}$

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).



Weight: 2.4 mg (typ.)

Start of commercial production
1993-10

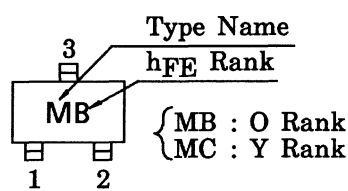
Electrical Characteristics (Ta = 25°C)

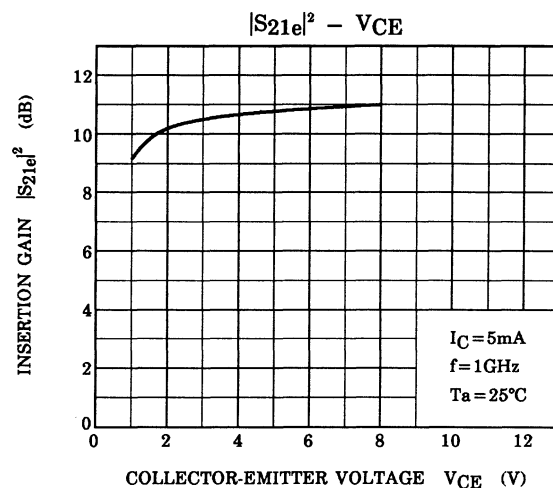
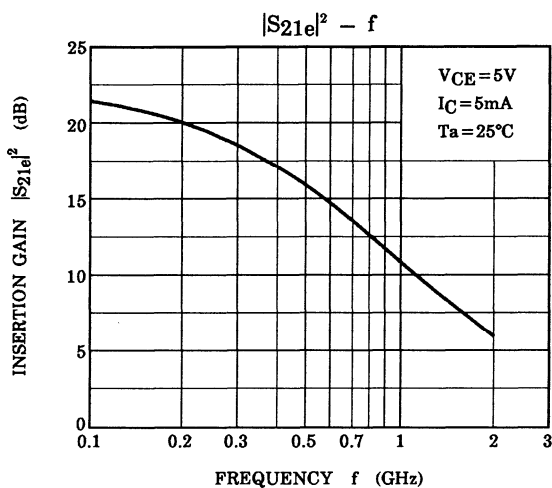
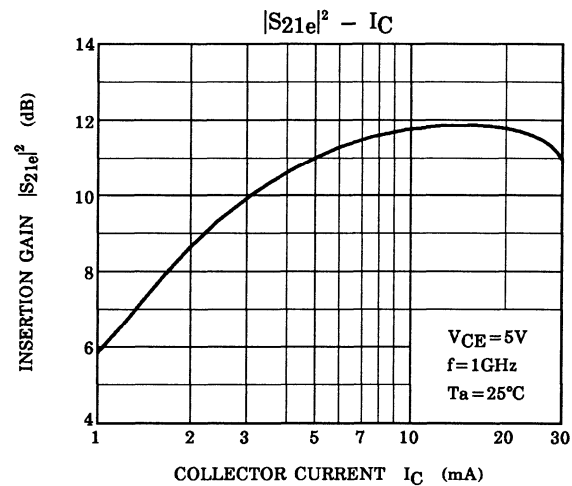
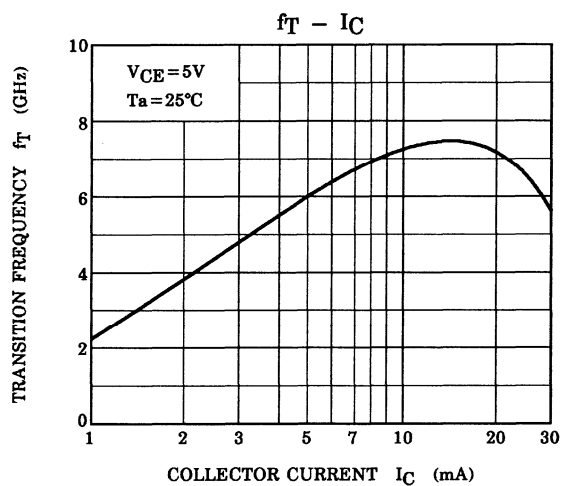
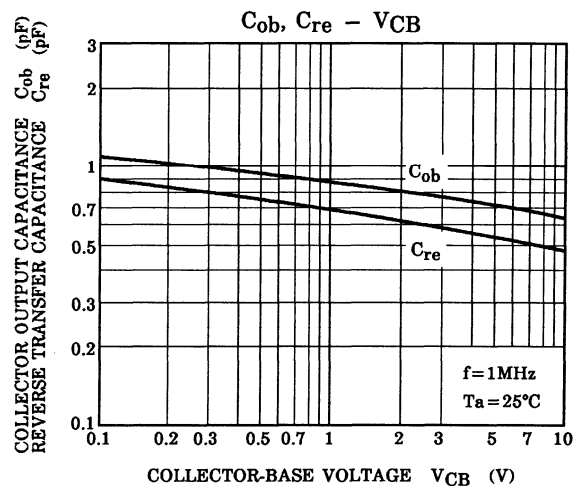
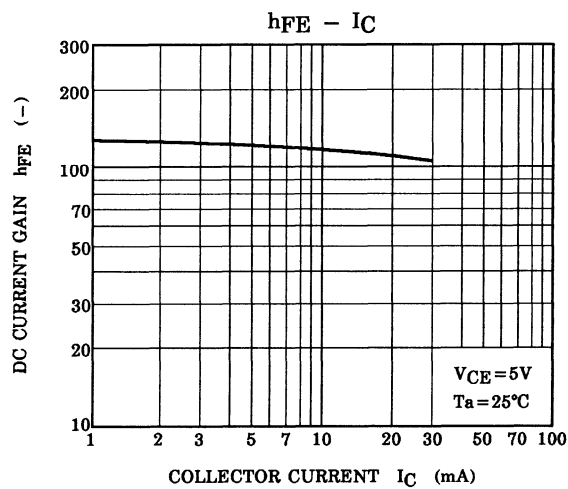
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	ICBO	V _{CB} = 10 V, I _E = 0	—	—	1	μA
Emitter cut-off current	IEBO	V _{EB} = 1 V, I _C = 0	—	—	1	μA
DC current gain	h _{FE} (Note 1)	V _{CE} = 5 V, I _C = 5 mA	80	—	240	
Transition frequency	f _T	V _{CE} = 5 V, I _C = 5 mA	4	6	—	GHz
Insertion gain	S _{21e} ²	V _{CE} = 5 V, I _C = 5 mA, f = 1 GHz	7	11	—	dB
Output capacitance	C _{ob}	V _{CB} = 5 V, I _E = 0, f = 1 MHz (Note 2)	—	0.7	—	pF
Reverse transfer capacitance	C _{re}		—	0.5	0.9	pF
Collector-base time constant	C _{c.rbb'}	V _{CB} = 5 V, I _C = 3 mA, f = 30 MHz	—	5.5	15	ps

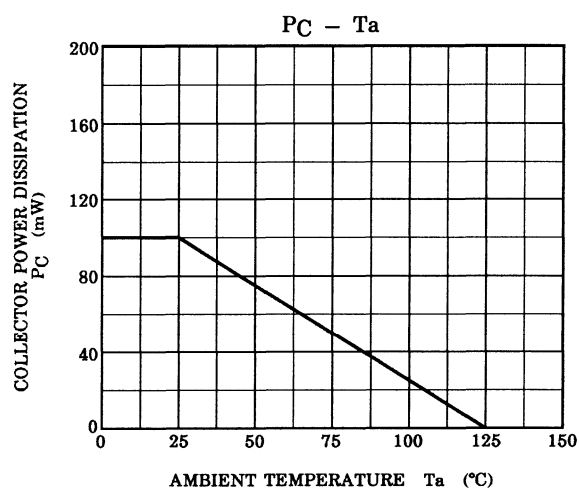
Note 1: h_{FE} classification O: 80 to 160, Y: 120 to 240

Note 2: C_{re} is measured by 3 terminal method with capacitance bridge.

Marking





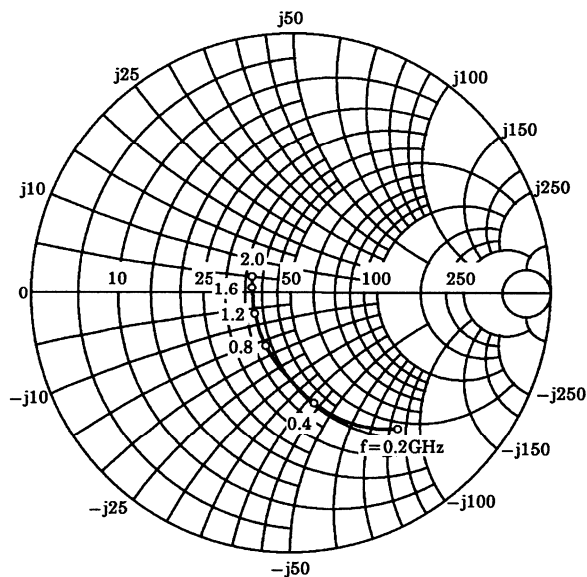


S-Parameter $Z_O = 50 \Omega$, $T_a = 25^\circ\text{C}$

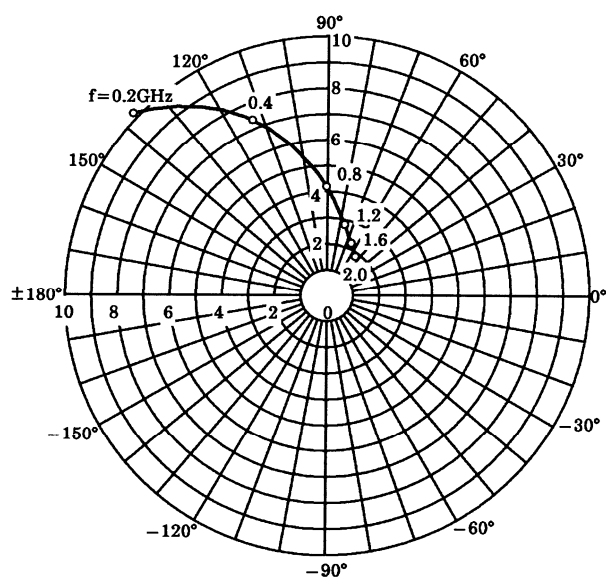
$V_{CE} = 5 \text{ V}$, $I_C = 5 \text{ mA}$

Frequency (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.684	-47.0	10.116	136.8	0.049	63.1	0.765	-29.5
400	0.438	-79.2	7.260	112.9	0.072	56.5	0.553	-37.8
600	0.301	-101.2	5.388	99.1	0.090	56.5	0.452	-39.1
800	0.226	-119.2	4.227	90.0	0.107	57.6	0.402	-39.0
1000	0.182	-136.2	3.494	82.7	0.124	58.8	0.374	-38.9
1200	0.159	-153.3	2.988	76.9	0.142	59.6	0.359	-39.4
1400	0.147	-170.3	2.632	71.2	0.163	59.9	0.348	-40.7
1600	0.145	174.4	2.345	66.0	0.182	59.2	0.339	-43.2
1800	0.149	162.6	2.128	61.4	0.200	58.4	0.329	-46.3
2000	0.161	150.9	1.967	57.1	0.219	58.1	0.318	-49.5

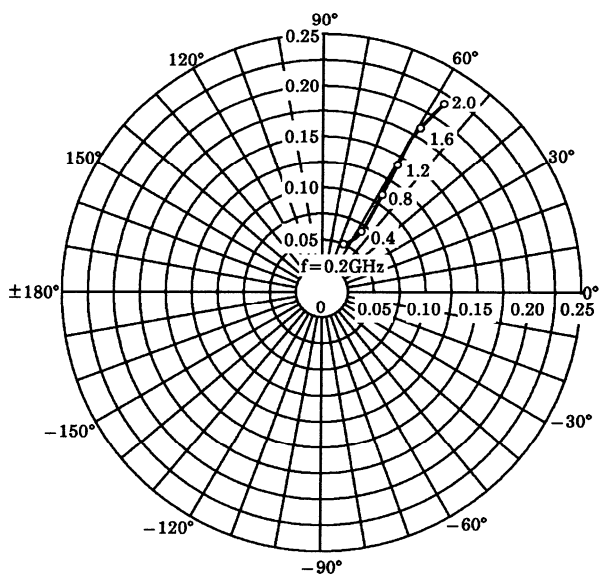
S_{11e}
 $V_{CE} = 5V$
 $I_C = 5mA$
 $T_a = 25^\circ C$
 (UNIT : Ω)



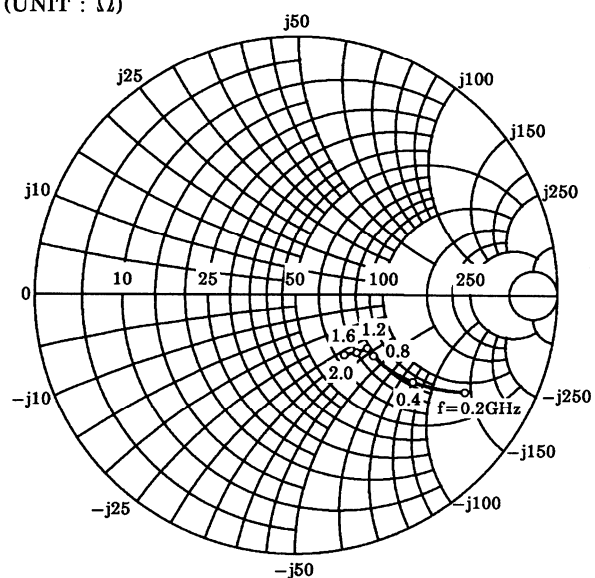
S_{21e}
 $V_{CE} = 5V$
 $I_C = 5mA$
 $T_a = 25^\circ C$



S_{12e}
 $V_{CE} = 5V$
 $I_C = 5mA$
 $T_a = 25^\circ C$



S_{22e}
 $V_{CE} = 5V$
 $I_C = 5mA$
 $T_a = 25^\circ C$
 (UNIT : Ω)



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