

TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

2SC5106

For VCO Application

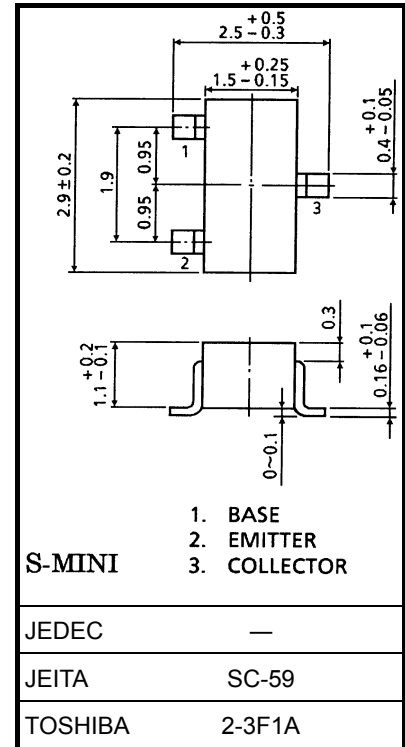
Absolute Maximum Ratings (Ta = 25°C)

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	150	mW
Junction temperature	T _j	125	°C
Storage temperature range	T _{stg}	-55 to 125	°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).

Unit: mm



Weight: 0.012 g (typ.)

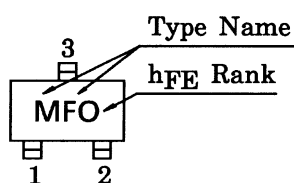
Electrical Characteristics (Ta = 25°C)

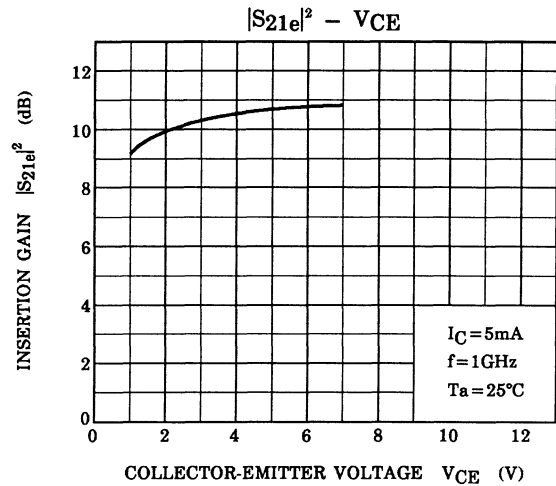
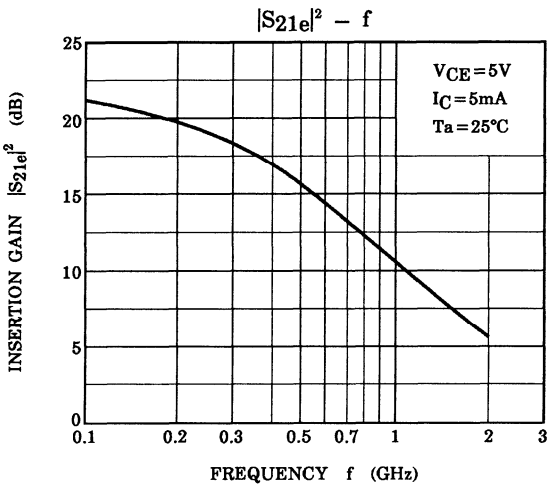
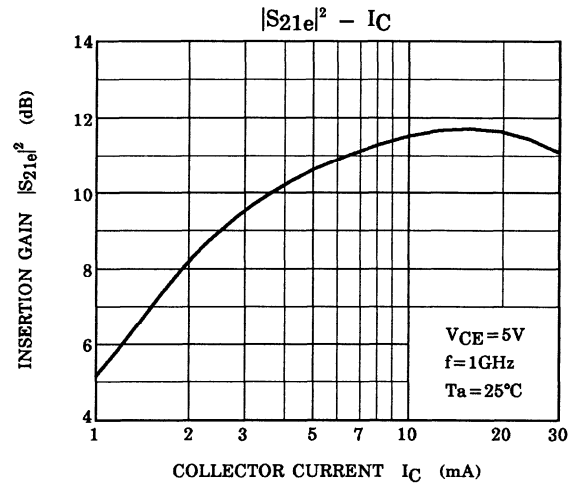
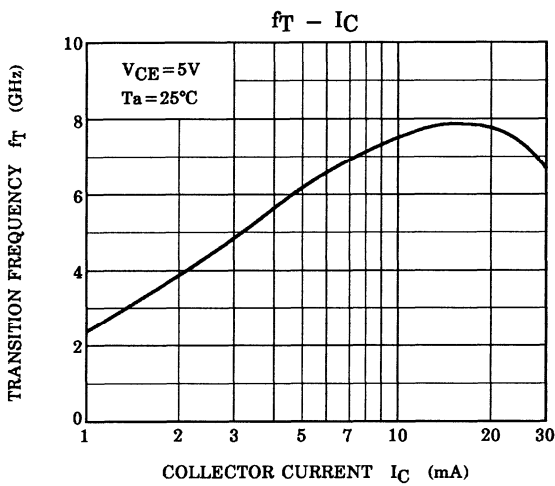
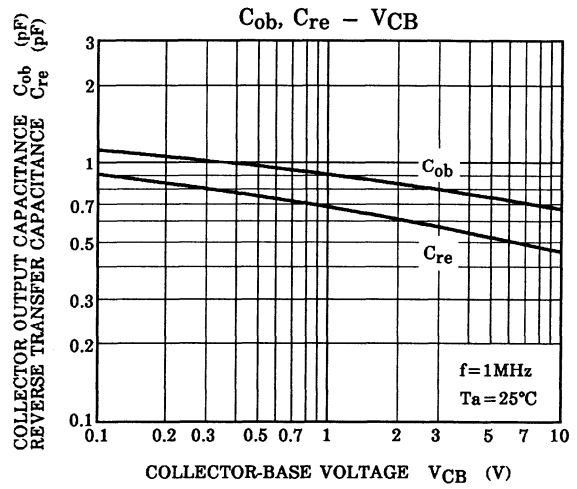
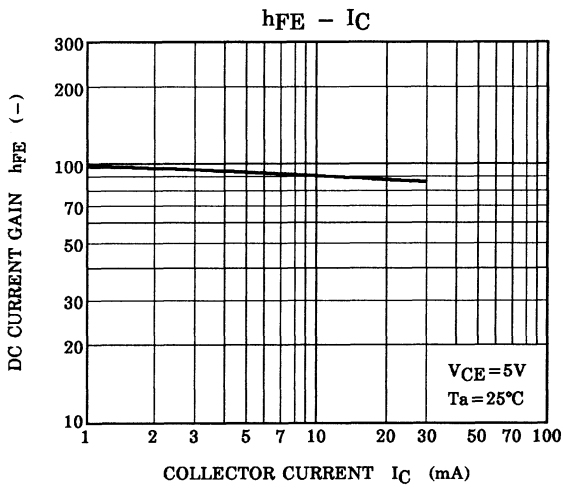
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	$V_{CB} = 10\text{ V}, I_E = 0$	—	—	1	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = 1\text{ V}, I_C = 0$	—	—	1	μA
DC current gain	h_{FE} (Note 1)	$V_{CE} = 5\text{ V}, I_C = 5\text{ mA}$	80	—	240	
Transition frequency	f_T	$V_{CE} = 5\text{ V}, I_C = 5\text{ mA}$	4	6	—	GHz
Insertion gain	$ S_{21e} ^2$	$V_{CE} = 5\text{ V}, I_C = 5\text{ mA}, f = 1\text{ GHz}$	7	11	—	dB
Output capacitance	C_{ob}	$V_{CB} = 5\text{ V}, I_E = 0, f = 1\text{ MHz}$ (Note 2)	—	0.75	—	pF
Reverse transfer capacitance	C_{re}		—	0.55	0.95	pF
Collector-base time constant	$C_{c.rbb'}$	$V_{CB} = 5\text{ V}, I_C = 3\text{ mA}, f = 30\text{ MHz}$	—	6	15	ps

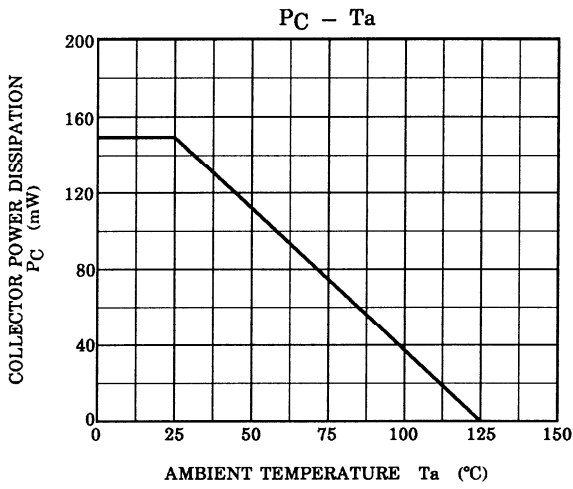
Note 1: h_{FE} classification O: 80 to 160, Y: 120 to 240

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

Marking





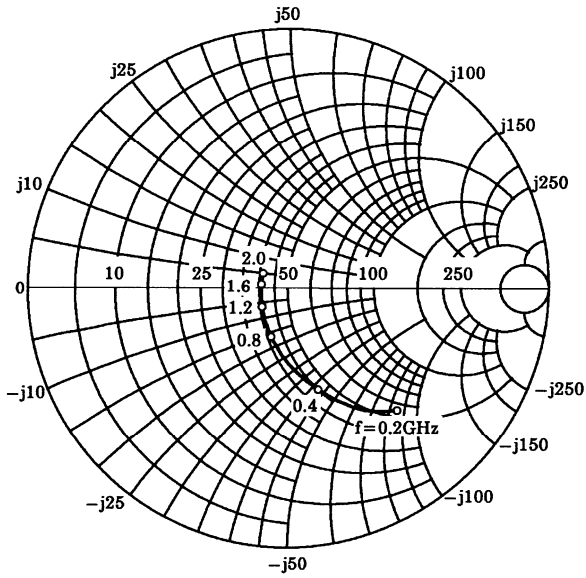


S-Parameter $Z_O = 50 \Omega, T_a = 25^\circ\text{C}$

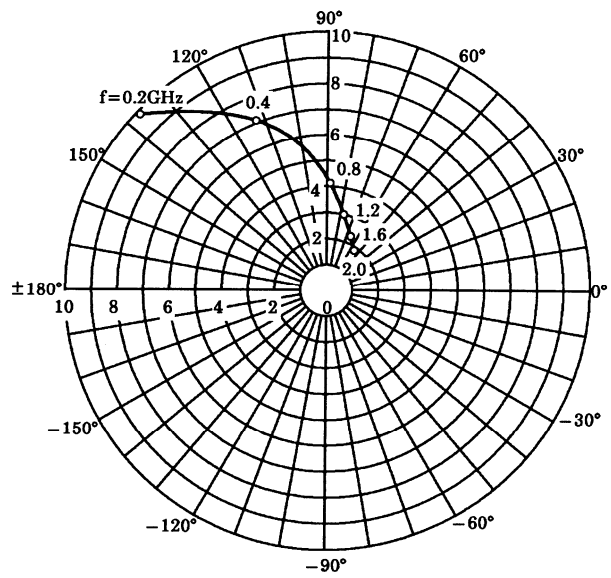
$V_{CE} = 5 \text{ V}, I_C = 5 \text{ mA}$

Frequency (MHz)	S11		S21		S12		S22	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
200	0.654	-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

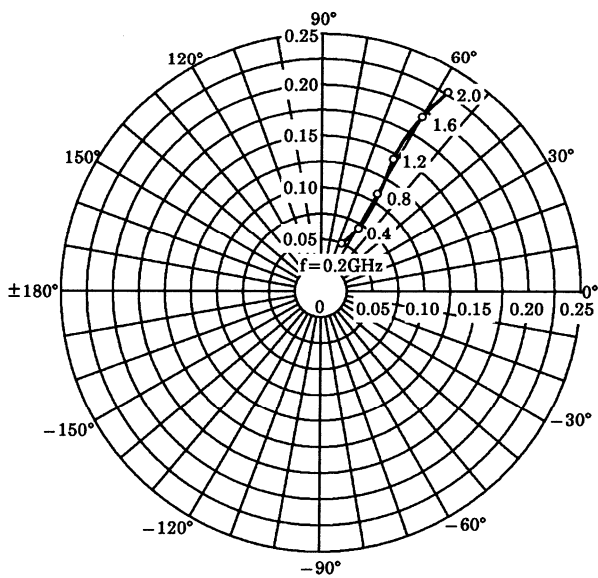
S_{11e}
 V_{CE} = 5V
 I_C = 5mA
 T_a = 25°C
 (UNIT : Ω)



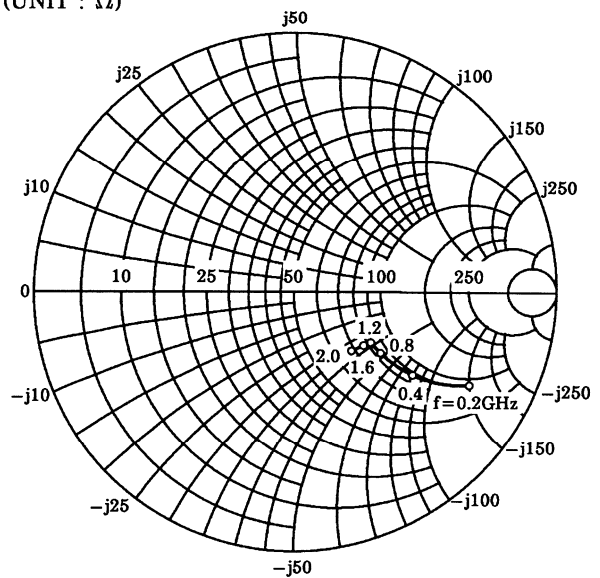
S_{21e}
 V_{CE} = 5V
 I_C = 5mA
 T_a = 25°C



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



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



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