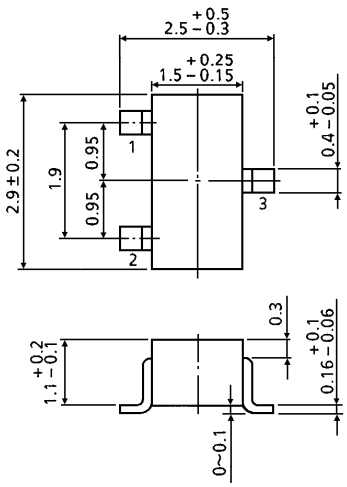
TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

2SC5109

FOR VCO APPLICATION

Unit in mm



1. BASE
2. EMITTER
3. COLLECTOR

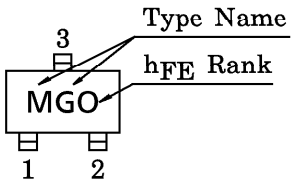
S-MINI	
JEDEC	—
EIAJ	SC-59
TOSHIBA	2-3F1A

Weight : 0.012g

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	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	30	mA
Collector Current	I_C	60	mA
Collector Power Dissipation	P_C	150	mW
Junction Temperature	T_j	125	°C
Storage Temperature Range	T_{stg}	−55~125	°C

MARKING



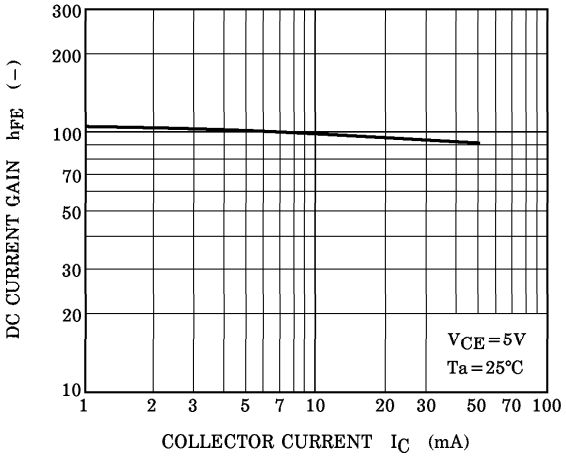
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I_{CBO}	V_{CB}=10V, I_E=0	—	—	0.1	μA
Emitter Cut-off Current	I_{EBO}	V_{EB}=1V, I_C=0	—	—	0.1	μA
DC Current Gain	h_{FE} (Note 1)	V_{CE}=5V, I_C=5mA	80	—	240	—
Transition Frequency	f_T	V_{CE}=5V, I_C=5mA	4	6	—	GHz
Insertion Gain	$\|S_{21e}\|^2$	V_{CE}=5V, I_C=5mA, f=1GHz	7	11	—	dB
Output Capacitance	C_{ob}	V_{CB}=5V, I_E=0, f=1MHz	—	0.7	—	pF
Reverse Transfer Capacitance	C_{re}	(Note 2)	—	0.5	0.9	pF
Collector-Base Time Constant	C_c.rbb'	V_{CB}=5V, I_C=3mA, f=30MHz	—	5.5	10	ps

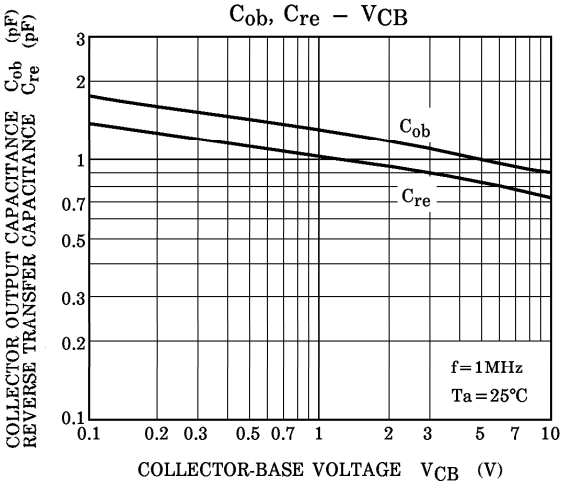
(Note 1) h_{FE} Classification O : 80~160, Y : 120~240

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

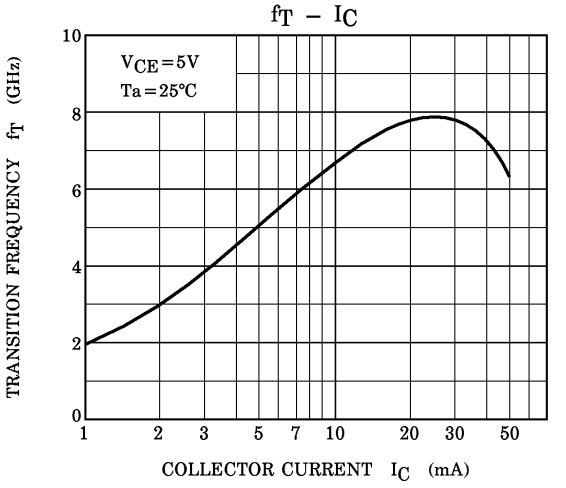
h_{FE} – I_C



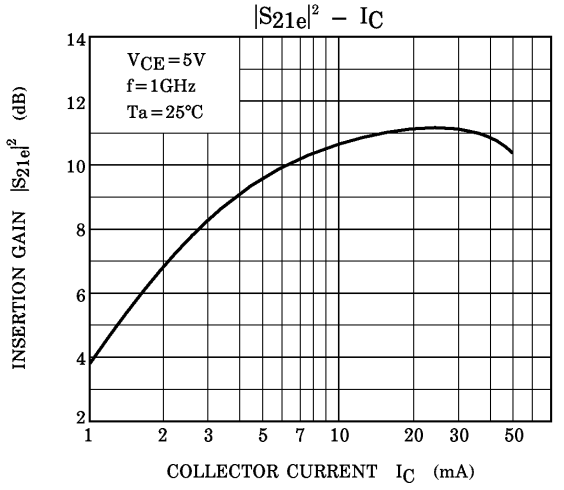
C_{ob}, C_{re} – V_{CB}



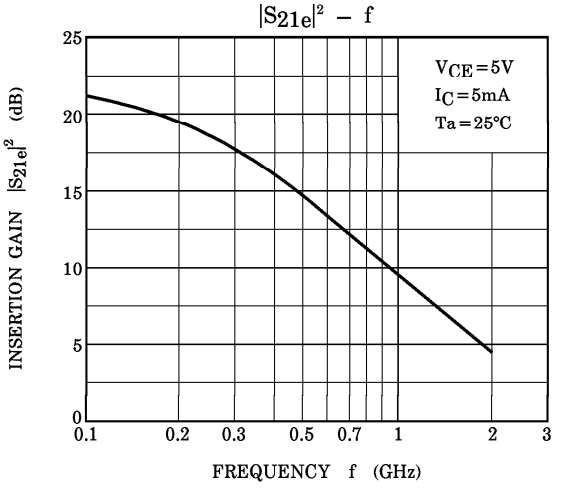
f_T – I_C



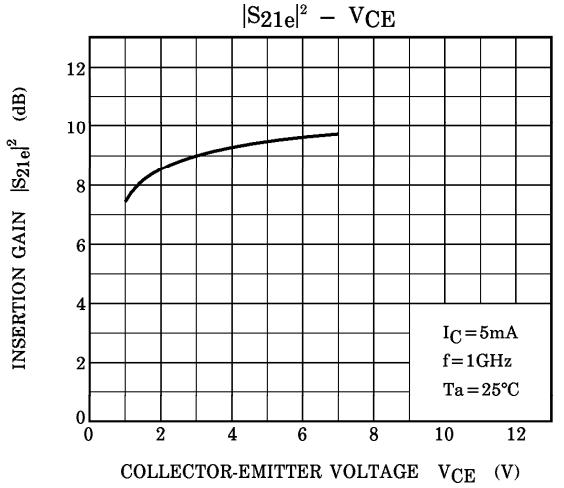
$|S_{21e}|^2$ – I_C

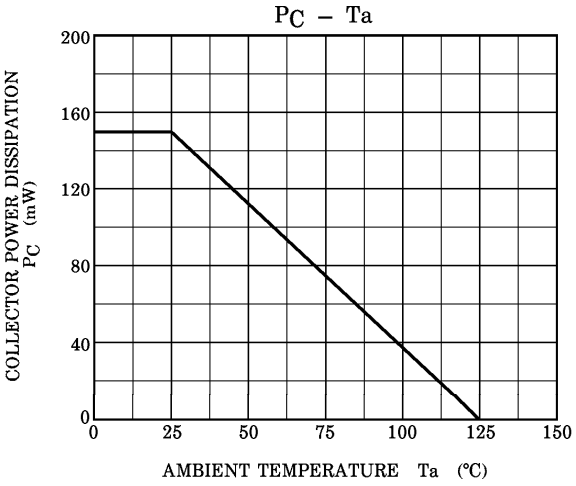


$|S_{21e}|^2$ – f



$|S_{21e}|^2$ – V_{CE}

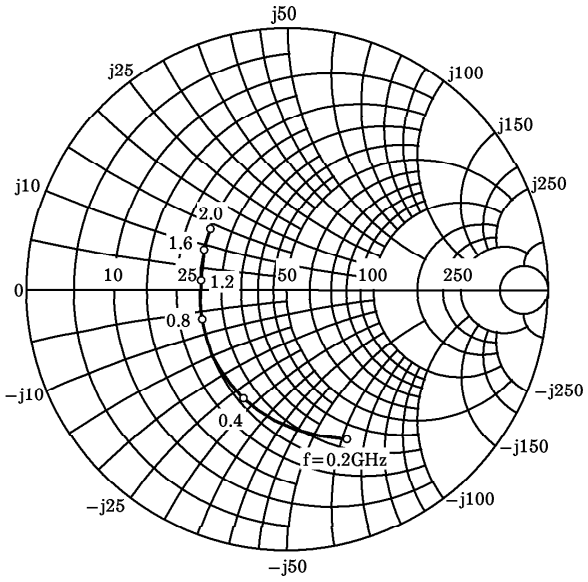




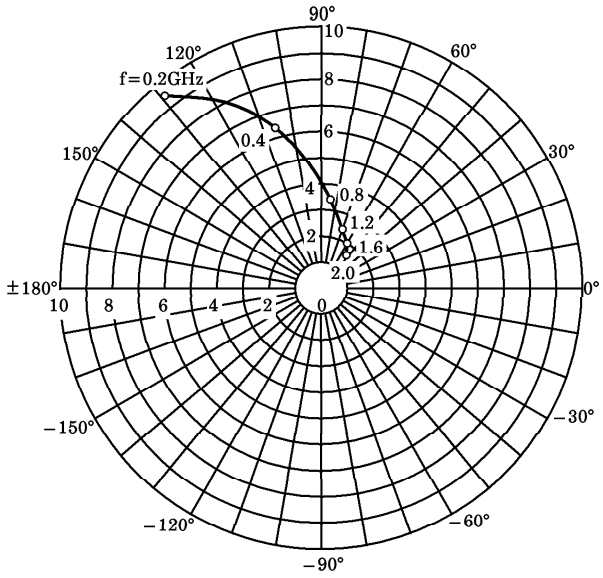
S-Parameter $Z_O = 50\Omega$, Ta = 25°C
V_{CE} = 5V, I_C = 5mA

frequency	S11		S21		S12		S22	
(MHz)	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

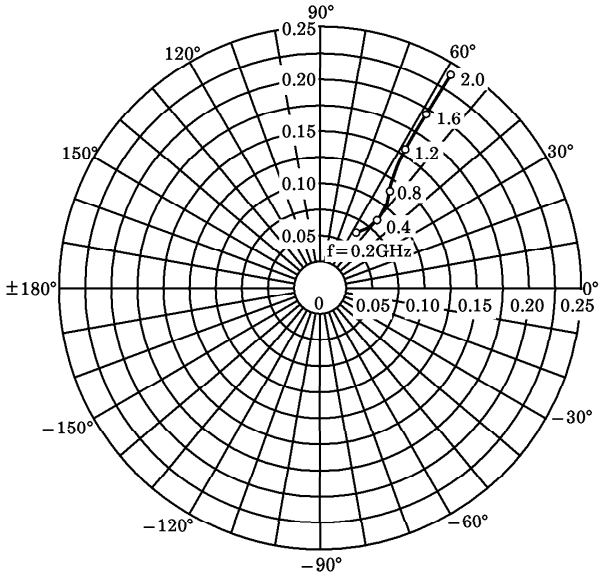
S_{11e}
V_{CE} = 5V
I_C = 5mA
Ta = 25°C
(UNIT : Ω)



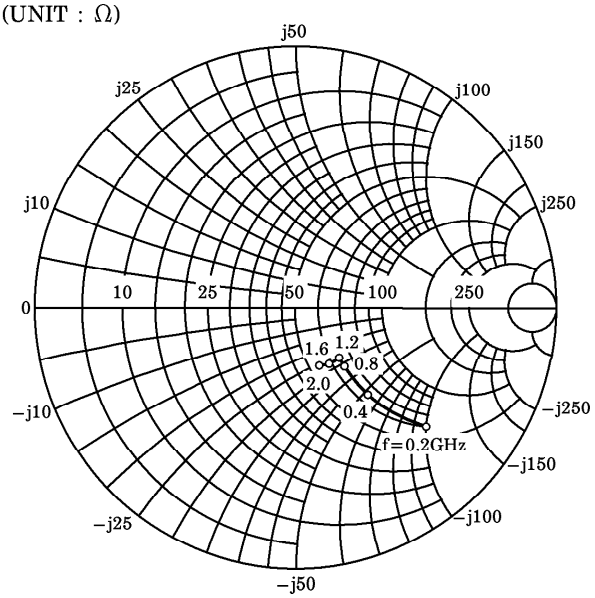
S_{21e}
V_{CE} = 5V
I_C = 5mA
Ta = 25°C



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



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



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