TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL TYPE (PCT PROCESS)

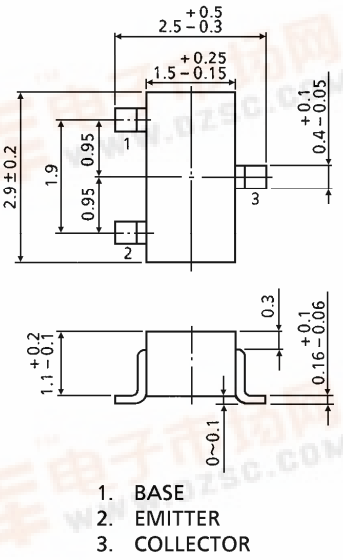
2SC2996

FM / AM, RF, MIX, LOCAL, IF

HIGH FREQUENCY AMPLIFIEP APPLICATIONS

- High Stability Oscillation Voltage On FM Local Oscillator
- Recommend FM / AM RF, MIX, Local and IF

Unit in mm



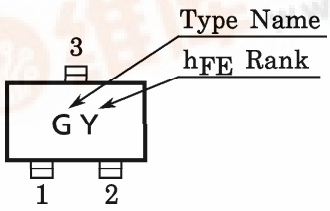
JEDEC	TO-236
EIAJ	—
TOSHIBA	2-3F1A

Weight : 0.012g

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	V_{CBO}	40	V
Collector-Emitter Voltage	V_{CEO}	30	V
Emitter-Base Voltage	V_{EBO}	4	V
Collector Current	I_C	50	mA
Emitter Current	I_E	−50	mA
Collector Power Dissipation	P_C	150	wW
Junction Temperature	T_j	125	°C
Storage Temperature Range	T_{stg}	−55~125	°C

Marking



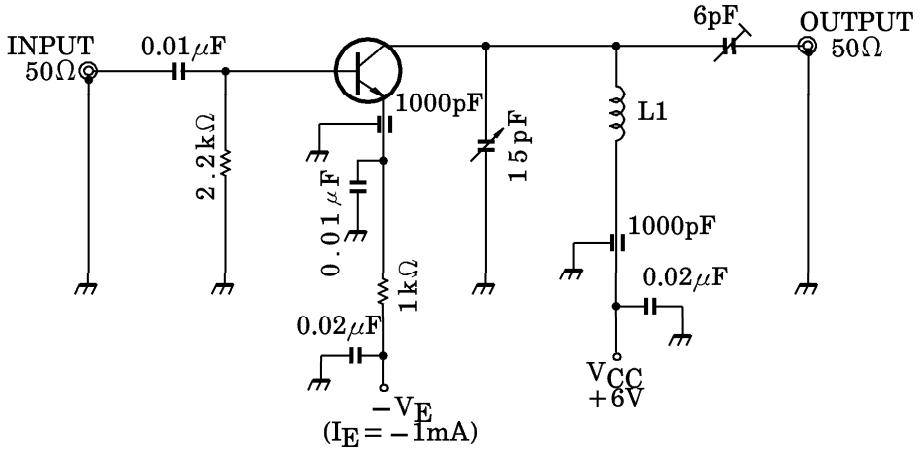
961001EAA1

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I_{CBO}	V_{CB} = 40V, I_E = 0	—	—	0.1	μA
Emitter Cut-off Current	I_{EBO}	V_{EB} = 4V, I_C = 0	—	—	0.5	μA
DC Current Gain	h_{FE} (Note)	V_{CE} = 6V, I_C = 1mA	40	—	240	
Reverse Transfer Capacitance	C_{re}	V_{CB} = 6V, f = 1MHz	—	0.9	1.3	pF
Transition Frequency	f_T	V_{CE} = 6V, I_C = −1mA	150	350	—	MHz
Collector-Base Time Constant	C_c . rbb'	V_{CE} = 6V, I_E = −1mA, f = 30MHz	—	15	30	ps
Noise Figure	NF	V_{CE} = 6V, I_E = −1mA	—	4.0	—	dB
Power Gain	G_{pe}	f = 100MHz (Fig.1)	—	15	—	dB
Oscillation Output Voltage	V_{OSC}	V_{CE} = 6V, f = 100MHz (Fig.2)	—	150	—	mV

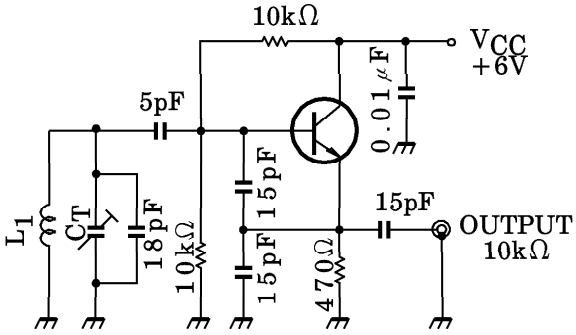
(Note) h_{FE} Classification R : 40~80, O : 70~140, Y : 120~240

Fig.1 NF, G_{pe} TEST CIRCUIT



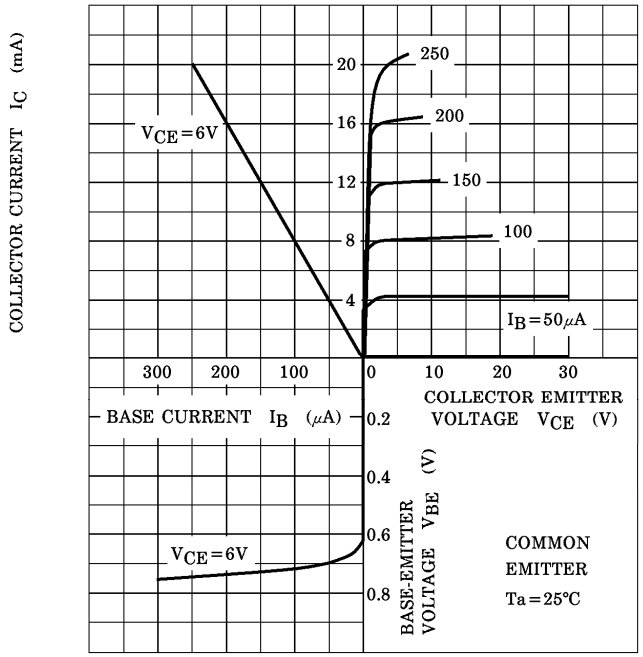
L_1 : 0.8mmϕ SILVER PLATED COPPER WIRE, 4T, 10ID, 8 LENGTH

Fig.2 V_{OSC} TEST CIRCUIT

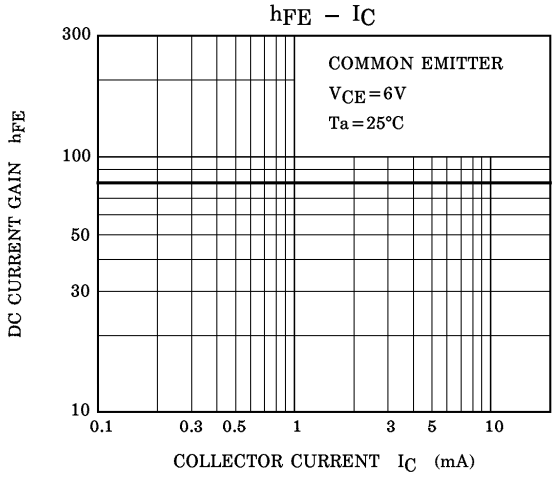


L_1 : 0.8mmϕ SILVER PLATED COPPER WIRE, 4T, 10ID, 8 LENGTH

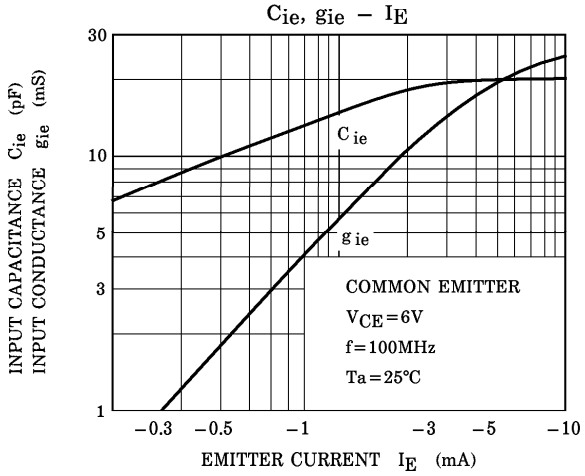
STATIC CHARACTERISTICS



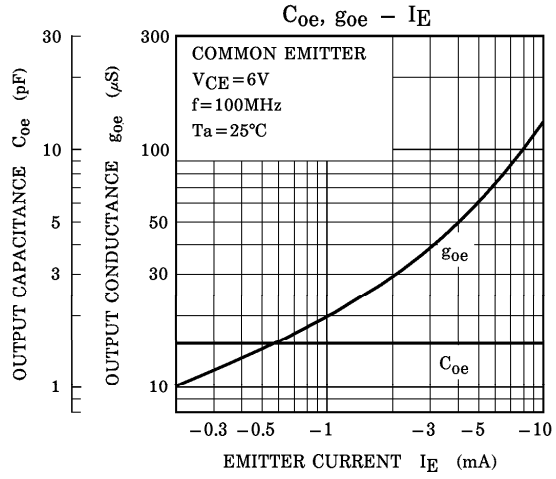
h_{FE} – I_C



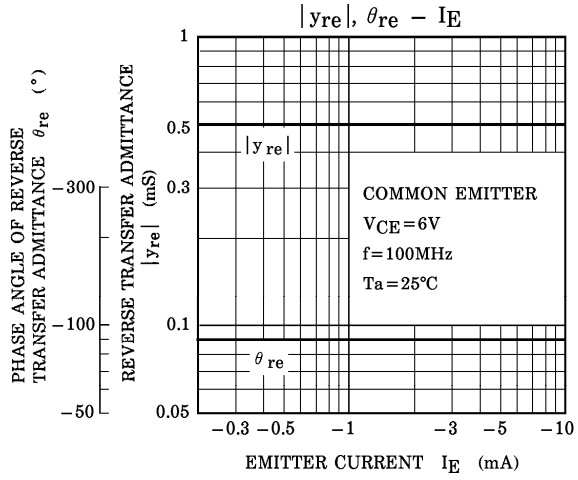
C_{ie}, g_{ie} – I_E

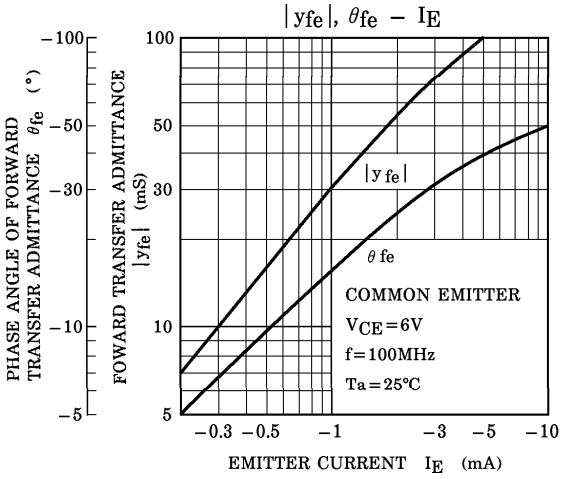


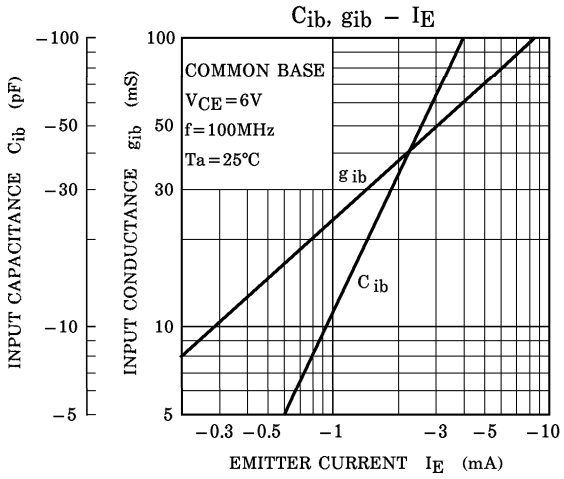
C_{oe}, g_{oe} – I_E

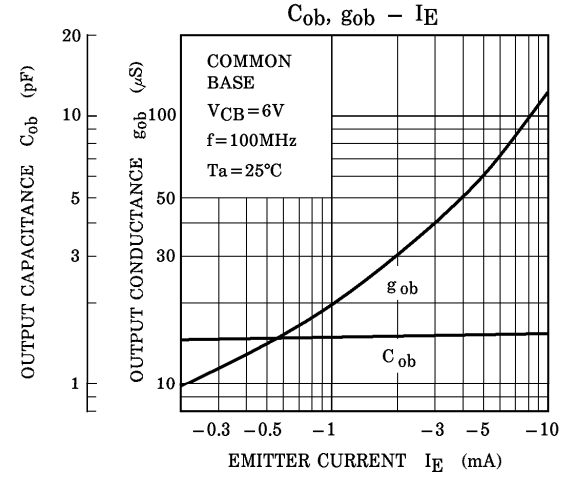


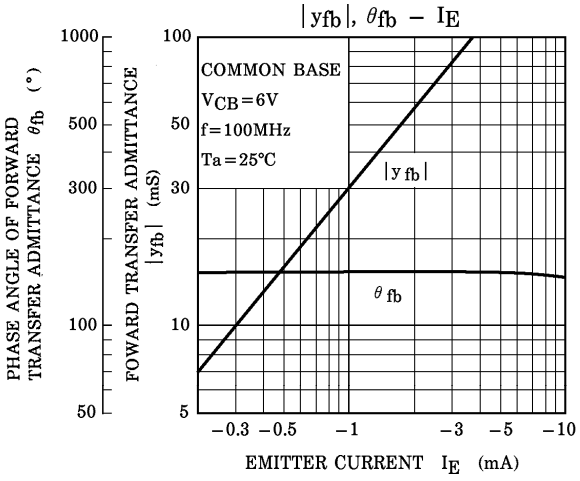
$|y_{re}|$, θ_{re} – I_E

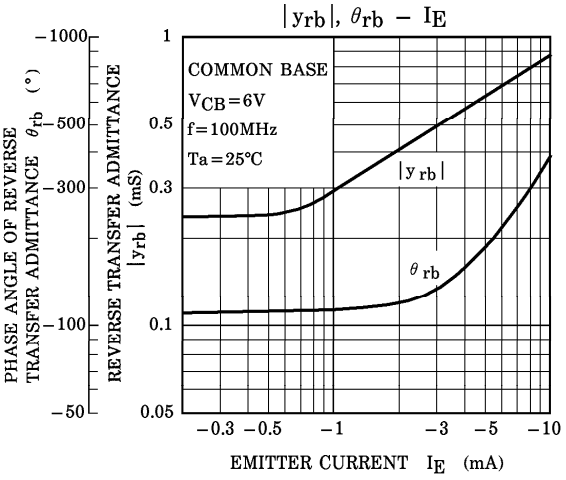


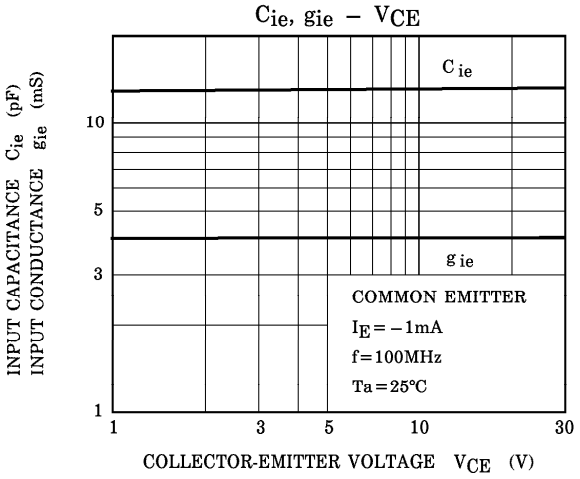

|yfe|, θfe – IE
PHASE ANGLE OF FORWARD TRANSFER ADMITTANCE θfe (°)
FOWARD TRANSFER ADMITTANCE |yfe| (mS)
|yfe|
θfe
COMMON EMITTER
VCE=6V
f=100MHz
Ta=25°C
EMITTER CURRENT IE (mA)


Cib, gib – IE
INPUT CAPACITANCE Cib (pF)
INPUT CONDUCTANCE gib (mS)
COMMON BASE
VCE=6V
f=100MHz
Ta=25°C
gib
Cib
EMITTER CURRENT IE (mA)

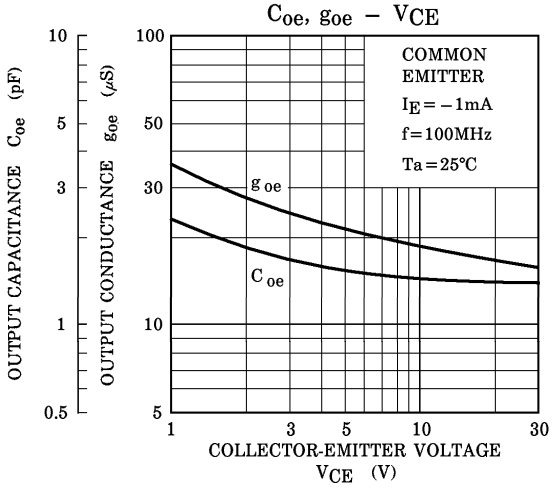

Cob, gob – IE
OUTPUT CAPACITANCE Cob (pF)
OUTPUT CONDUCTANCE gob (μS)
COMMON BASE
VCB=6V
f=100MHz
Ta=25°C
gob
Cob
EMITTER CURRENT IE (mA)


|yfb|, θfb – IE
PHASE ANGLE OF FORWARD TRANSFER ADMITTANCE θfb (°)
FOWARD TRANSFER ADMITTANCE |yfb| (mS)
COMMON BASE
VCB=6V
f=100MHz
Ta=25°C
|yfb|
θfb
EMITTER CURRENT IE (mA)

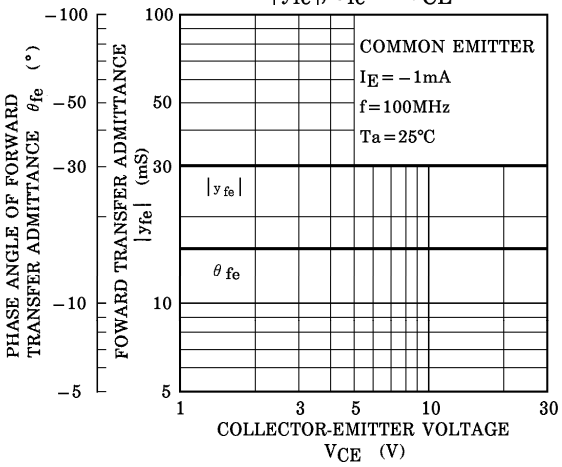

|yrb|, θrb – IE
PHASE ANGLE OF REVERSE TRANSFER ADMITTANCE θrb (°)
REVERSE TRANSFER ADMITTANCE |yrb| (mS)
COMMON BASE
VCB=6V
f=100MHz
Ta=25°C
|yrb|
θrb
EMITTER CURRENT IE (mA)


Cie, gie – VCE
INPUT CAPACITANCE Cie (pF)
INPUT CONDUCTANCE gie (mS)
Cie
gie
COMMON EMITTER
IE=–1mA
f=100MHz
Ta=25°C
COLLECTOR-EMITTER VOLTAGE VCE (V)

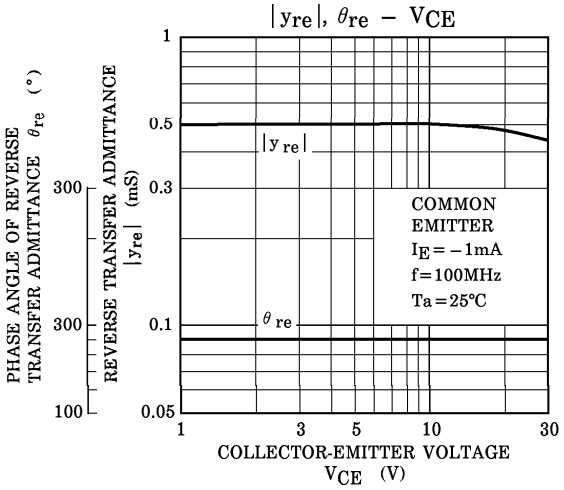
C_{oe}, g_{oe} – V_{CE}



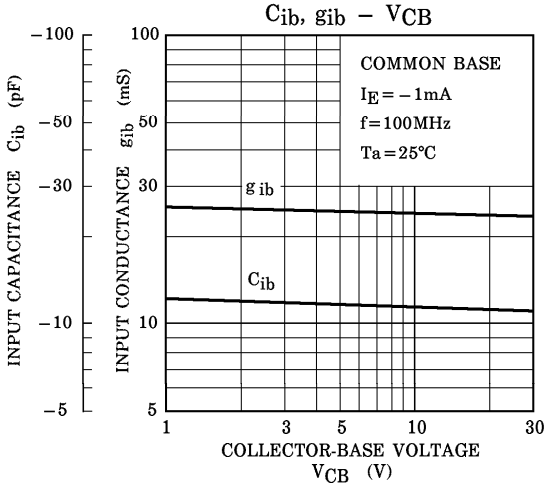
$|y_{fe}|$, θ_{fe} – V_{CE}



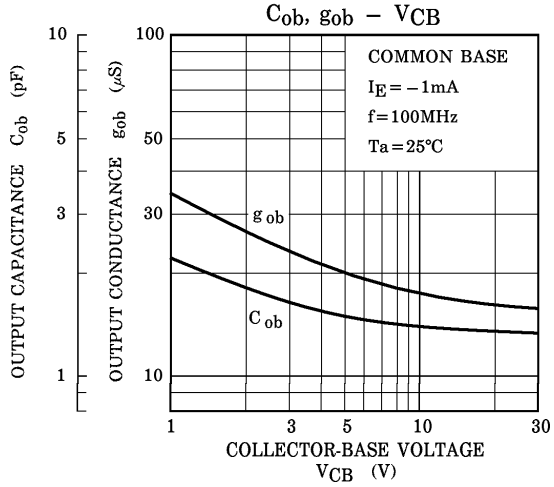
$|y_{re}|$, θ_{re} – V_{CE}



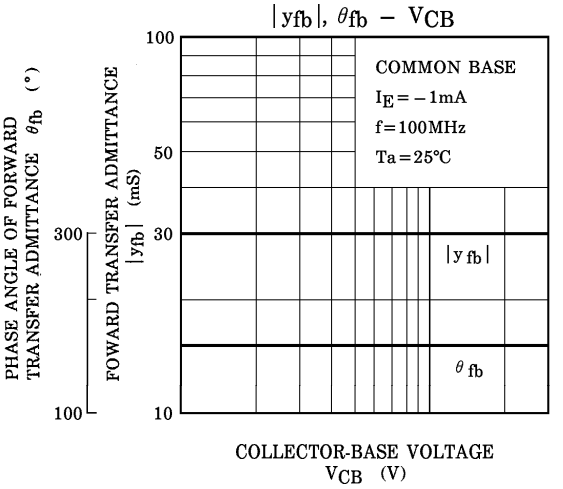
C_{ib}, g_{ib} – V_{CB}

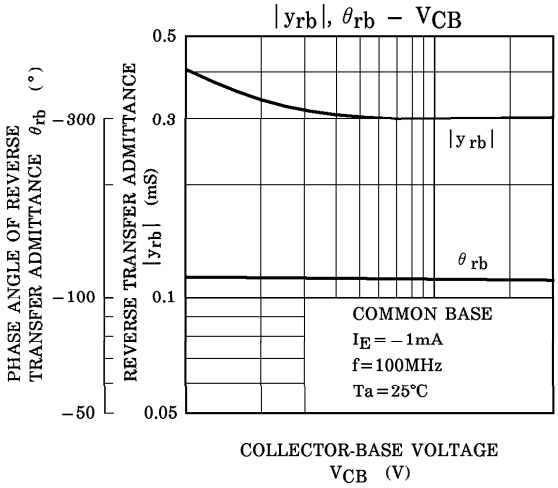


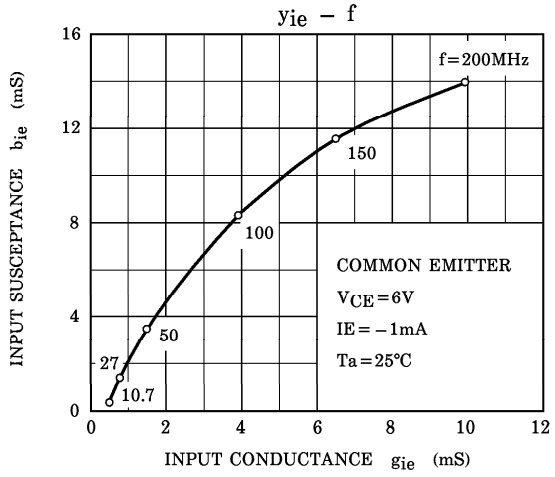
C_{ob}, g_{ob} – V_{CB}

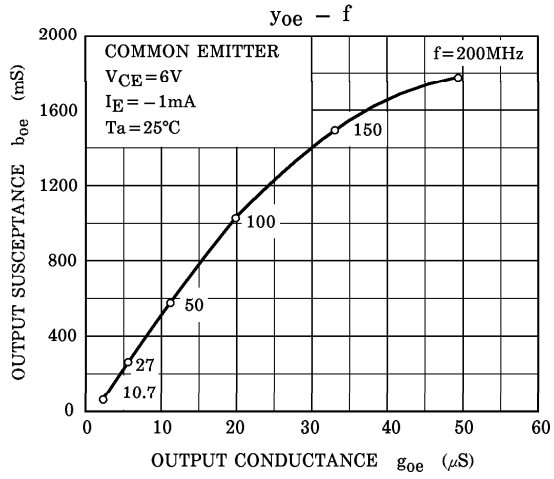


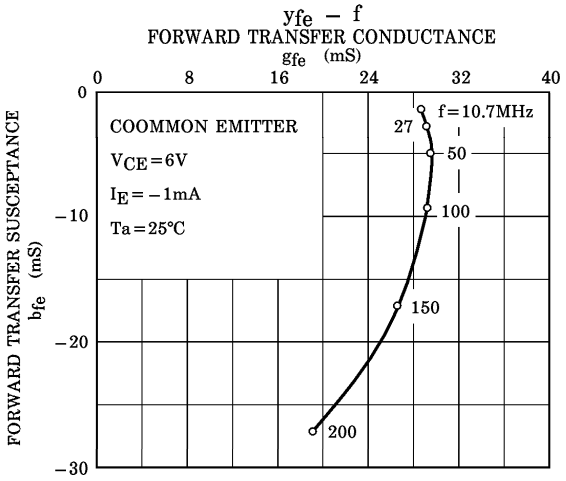
$|y_{fb}|$, θ_{fb} – V_{CB}

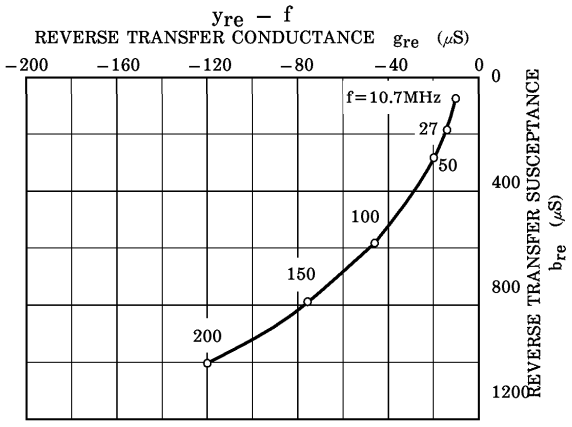


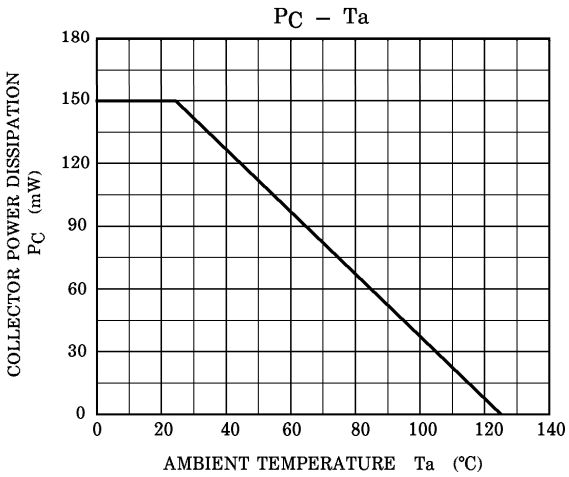

|yrb|, θrb – VCB
PHASE ANGLE OF REVERSE TRANSFER ADMITTANCE θrb (°)
REVERSE TRANSFER ADMITTANCE |yrb| (mS)
−300
−100
−50
0.5
0.3
0.1
0.05
|yrb|
θrb
COMMON BASE
IE = −1mA
f=100MHz
Ta=25°C
COLLECTOR-BASE VOLTAGE
VCB (V)


yie – f
INPUT SUSCEPTANCE bie (mS)
16
12
8
4
0
f=200MHz
150
100
50
27
10.7
COMMON EMITTER
VCE=6V
IE=−1mA
Ta=25°C
0
2
4
6
8
10
12
INPUT CONDUCTANCE gie (mS)


yoe – f
OUTPUT SUSCEPTANCE boe (mS)
2000
1600
1200
800
400
0
COMMON EMITTER
VCE=6V
IE=−1mA
Ta=25°C
f=200MHz
150
100
50
27
10.7
0
10
20
30
40
50
60
OUTPUT CONDUCTANCE goe (μS)


yfe – f
FORWARD TRANSFER CONDUCTANCE gfe (mS)
0
8
16
24
32
40
FORWARD TRANSFER SUSCEPTANCE bfe (mS)
0
−10
−20
−30
COOMMON EMITTER
VCE=6V
IE=−1mA
Ta=25°C
f=10.7MHz
27
50
100
150
200


yre – f
REVERSE TRANSFER CONDUCTANCE gre (μS)
−200
−160
−120
−80
−40
0
0
400
800
1200
REVERSE TRANSFER SUSCEPTANCE bre (μS)
f=10.7MHz
27
50
100
150
200


PC – Ta
COLLECTOR POWER DISSIPATION PC (mW)
180
150
120
90
60
30
0
0
20
40
60
80
100
120
140
AMBIENT TEMPERATURE Ta (°C)