TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE (PCT PROCESS)

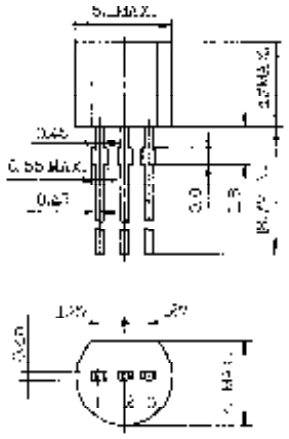
2SC1923

HIGH FREQUENCY AMPLIFIER APPLICATIONS.

FM, RF, MIX, IF AMPLIFIER APPLICATIONS.

- Small Reverse Transfer Capacitance
  : C_{re} = 0.7pF (Typ.)
- Low Noise Figure
  : NF = 2.5dB (Typ.) (f = 100MHz)

Unit in mm



1. EMITTER
2. COLLECTOR
3. BASE

JEDEC	TO-92
EIAJ	SC-43
TOSHIBA	2-5F1B

Weight : 0.21g

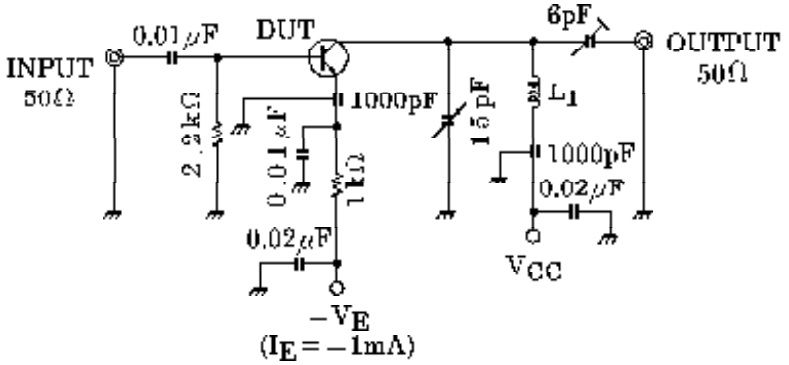
MAXIMUM RATINGS (Ta = 25°C)

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	20	mA
Base Current	I_B	4	mA
Collector Power Dissipation	P_C	100	mW
Junction Temperature	T_j	125	°C
Storage Temperature Range	T_{stg}	−55~125	°C

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I_{CBO}	V_{CB} = 18V, I_E = 0	—	—	0.5	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	—	200	—
Reverse Transfer Capacitance	C_{re}	V_{CE} = 6V, f = 1MHz	—	0.70	—	pF
Transition Frequency	f_T	V_{CE} = 6V, I_C = 1mA	—	550	—	MHz
Collector-Base Time Constant	$C_c \cdot r_{bb'}$	V_{CE} = 6V, I_E = −1mA, f = 30MHz	—	—	30	ps
Noise Figure	NF	V_{CE} = 6V, I_E = −1mA, f = 100MHz, Fig.	—	2.5	4.0*	dB
Power Gain	G_{pe}		16	18	—	

Note : h_{FE} Classification R : 40~80, O : 70~140, Y : 100~200 (* NF = 5.0dB Max.)



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

Fig.1 NF, G_{pe} TEST CIRCUIT

y PARAMETER (Typ.)

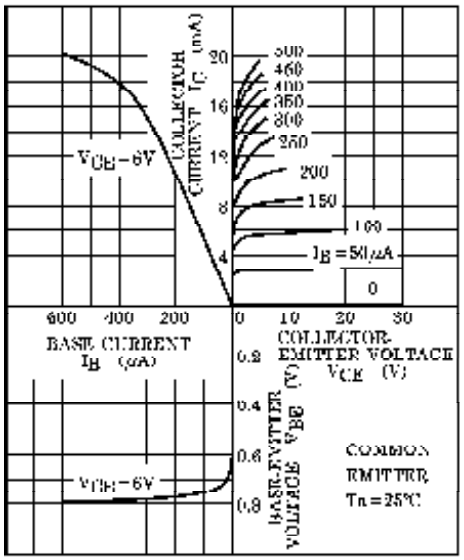
(1) COMMON EMITTER (V_{CE} = 6V, I_E = −1mA, f = 100MHz)

CHARACTERISTIC	SYMBOL	TYP.	UNIT
Input Conductance	g_{ie}	2.9	mS
Input Capacitance	C_{ie}	10.2	pF
Reverse Transfer Admittance	$\|y_{re}\|$	0.33	μS
Phase Angle of Reverse Transfer Admittance	θ_{re}	−90	°
Forward Transfer Admittance	$\|y_{fe}\|$	40	mS
Phase Angle of Forward Transfer Admittance	θ_{fe}	−20	°
Output Conductance	g_{oe}	45	μS
Output Capacitance	C_{oe}	1.1	pF

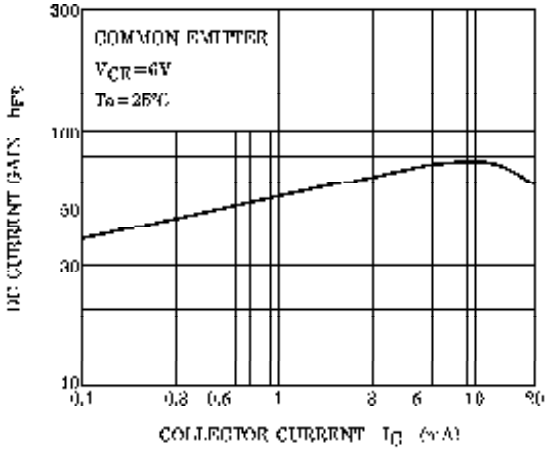
(2) COMMON BASE (V_{CE} = 6V, I_E = −1mA, f = 100MHz)

CHARACTERISTIC	SYMBOL	TYP.	UNIT
Input Conductance	g_{ib}	34	mS
Input Capacitance	C_{ib}	−10	pF
Reverse Transfer Admittance	$\|y_{rb}\|$	0.27	μS
Phase Angle of Reverse Transfer Admittance	θ_{rb}	−105	°
Forward Transfer Admittance	$\|y_{fb}\|$	34	mS
Phase Angle of Forward Transfer Admittance	θ_{fb}	165	°
Output Conductance	g_{ob}	45	μS
Output Capacitance	C_{ob}	1.1	pF

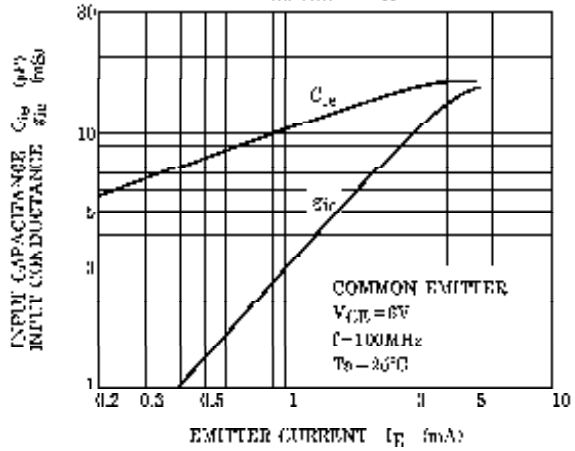
STATIC CHARACTERISTICS



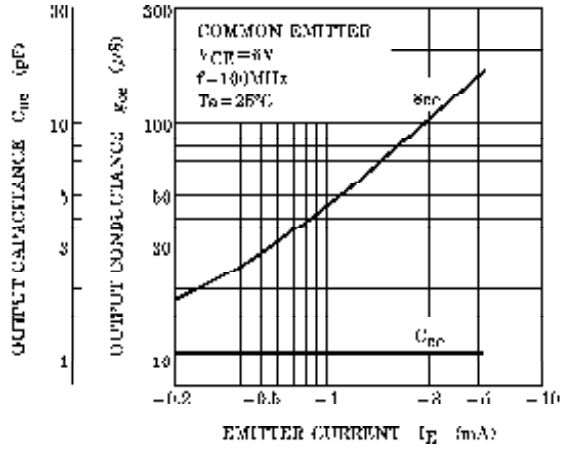
h_{FE} – I_C



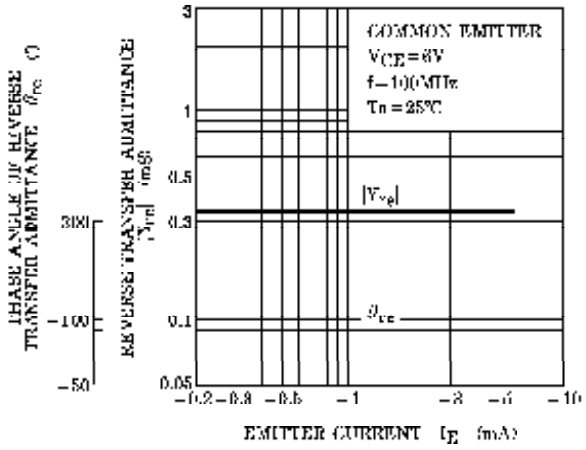
C_{ie}, g_{ie} – I_E

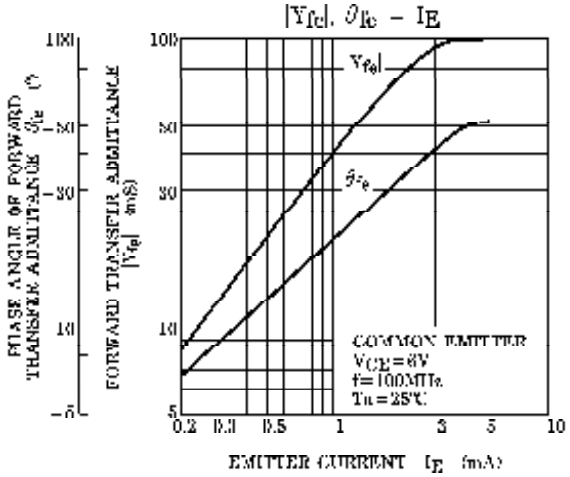


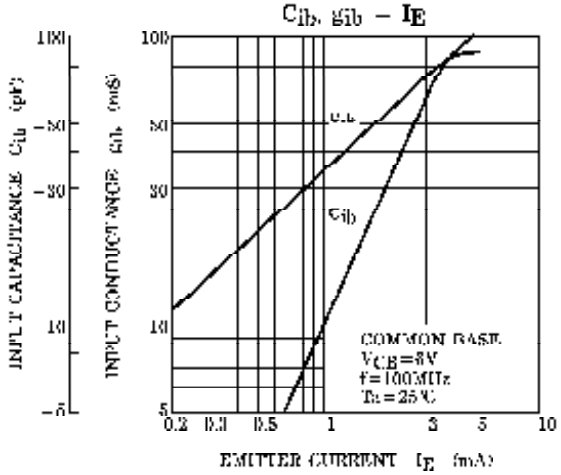
C_{oe}, g_{oe} – I_E

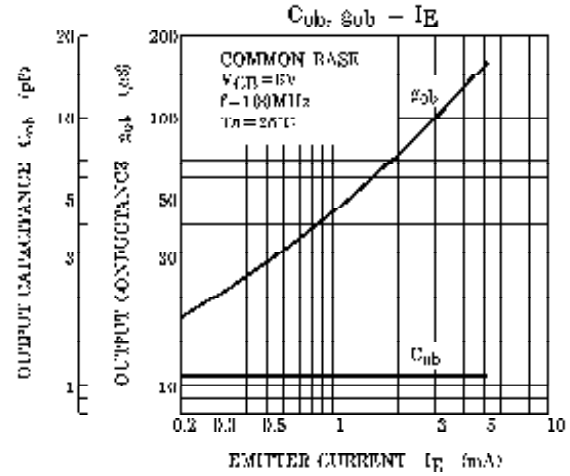


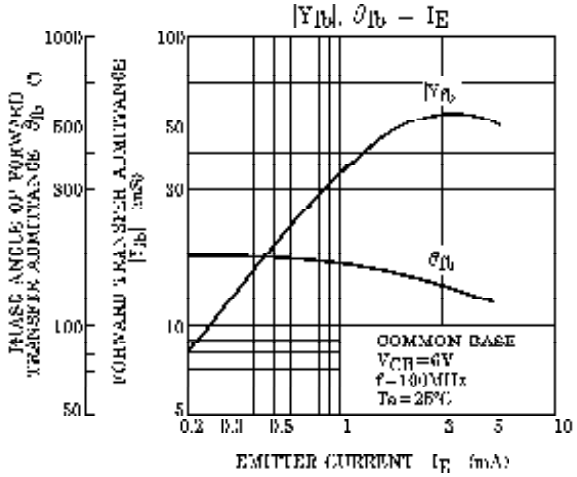
$|Y_{re}|$, θ_{ry} – I_E

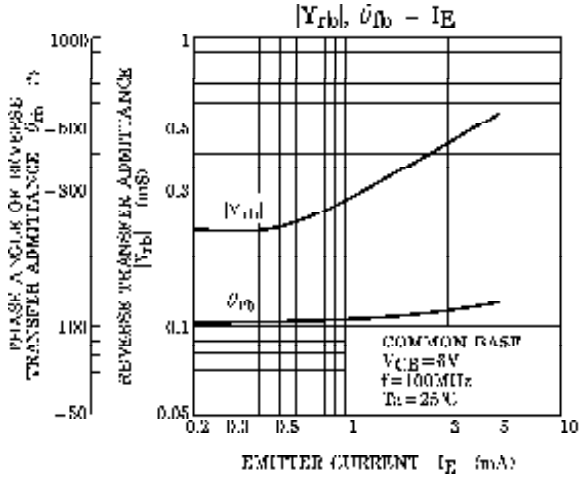


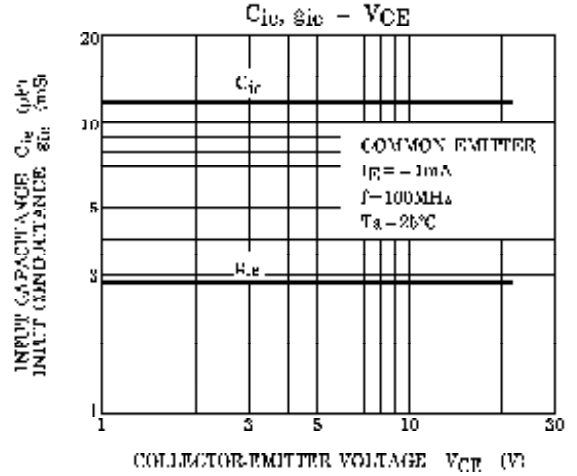

|Yfe|, θfe – IE
PHASE ANGLE OF FORWARD TRANSFER ADMITTANCE θfe (°)
FORWARD TRANSFER ADMITTANCE |Yfe| (mS)
|Yfe|
θfe
COMMON EMITTER
VCB=6V
f=100MHz
Ta=25°C
EMITTER CURRENT IE (mA)

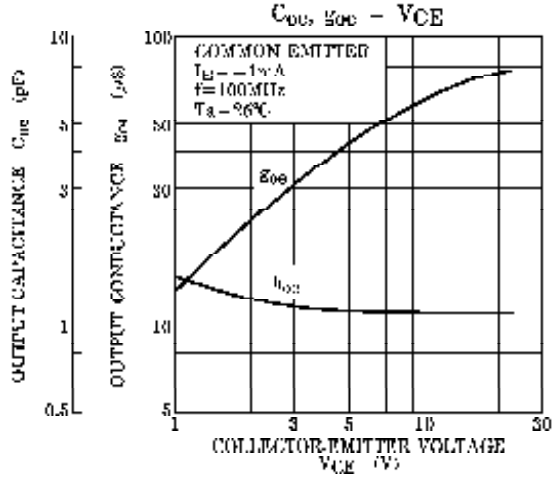

Cib, gib – IE
INPUT CAPACITANCE Cib (pF)
INPUT CONDUCTANCE gib (mS)
Cib
gib
COMMON BASE
VCB=6V
f=100MHz
Ta=25°C
EMITTER CURRENT IE (mA)

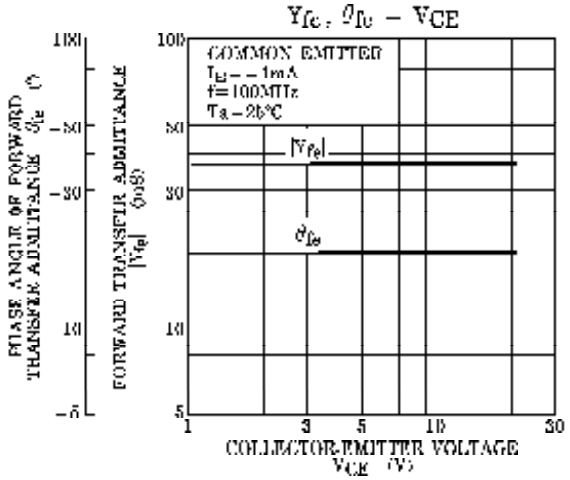

Cob, gob – IE
OUTPUT CAPACITANCE Cob (pF)
OUTPUT CONDUCTANCE gob (mS)
COMMON BASE
VCB=6V
f=100MHz
Ta=25°C
gob
Cob
EMITTER CURRENT IE (mA)

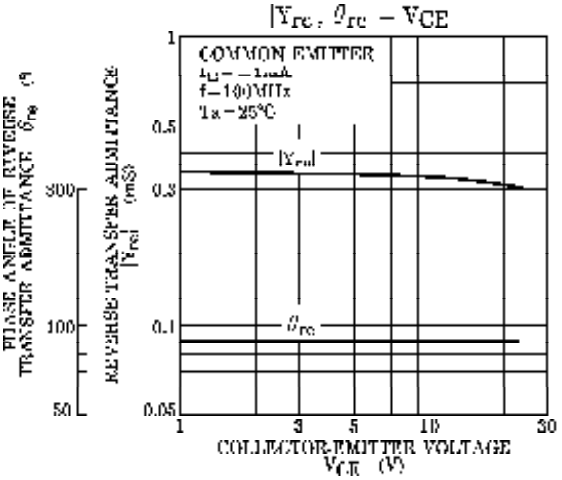

|Yfb|, θfb – IE
PHASE ANGLE OF FORWARD TRANSFER ADMITTANCE θfb (°)
FORWARD TRANSFER ADMITTANCE |Yfb| (mS)
|Yfb|
θfb
COMMON BASE
VCB=6V
f=100MHz
Ta=25°C
EMITTER CURRENT IE (mA)

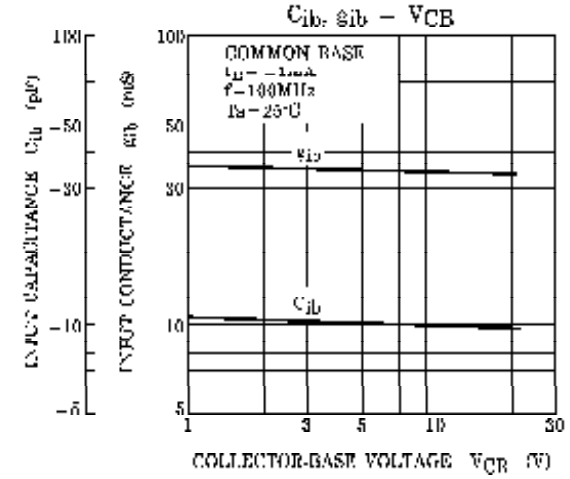

|Yrb|, θrb – IE
PHASE ANGLE OF REVERSE TRANSFER ADMITTANCE θrb (°)
REVERSE TRANSFER ADMITTANCE |Yrb| (mS)
|Yrb|
θrb
COMMON BASE
VCB=6V
f=100MHz
Ta=25°C
EMITTER CURRENT IE (mA)

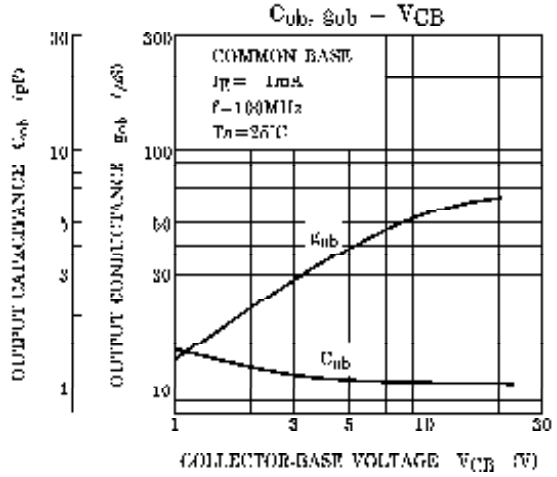

Cic, gie – VCE
INPUT CAPACITANCE Cie (pF)
INPUT CONDUCTANCE gie (mS)
Cie
gie
COMMON EMITTER
IE=–1mA
f=100MHz
Ta=25°C
COLLECTOR-EMITTER VOLTAGE VCE (V)

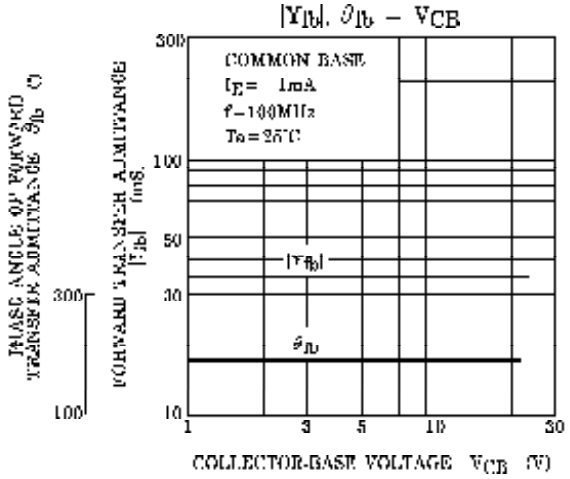

C_{oe}, g_{oe} – V_{CE}
COMMON EMITTER
I_E = −1mA
f=100MHz
Ta=25°C
OUTPUT CAPACITANCE C_{oe} (pF)
OUTPUT CONDUCTANCE g_{oe} (μS)
g_{oe}
b_{oe}
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)


Y_{fe}, θ_{fe} – V_{CE}
COMMON EMITTER
I_E = −1mA
f=100MHz
Ta=25°C
PHASE ANGLE OF FORWARD TRANSFER ADMITTANCE θ_{fe} (°)
FORWARD TRANSFER ADMITTANCE $|Y_{fe}|$ (mS)
$|Y_{fe}|$
θ_{fe}
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)

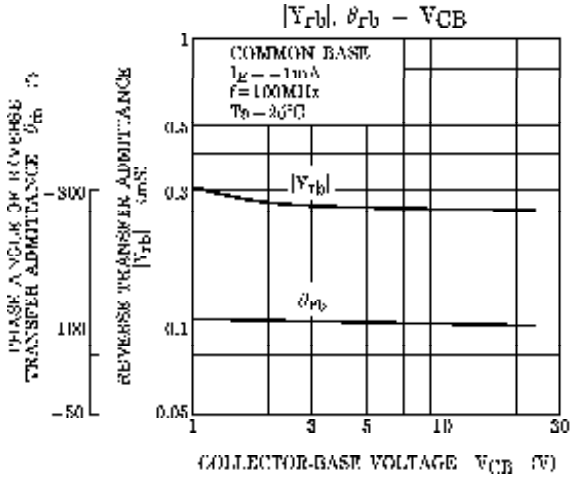

$|Y_{re}|$, θ_{re} – V_{CE}
COMMON EMITTER
I_E = −1mA
f=100MHz
Ta=25°C
PHASE ANGLE OF REVERSE TRANSFER ADMITTANCE θ_{re} (°)
REVERSE TRANSFER ADMITTANCE $|Y_{re}|$ (mS)
$|Y_{re}|$
θ_{re}
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)


C_{ib}, g_{ib} – V_{CB}
COMMON BASE
I_E = −1mA
f=100MHz
Ta=25°C
INPUT CAPACITANCE C_{ib} (pF)
INPUT CONDUCTANCE g_{ib} (mS)
g_{ib}
C_{ib}
COLLECTOR-BASE VOLTAGE V_{CB} (V)

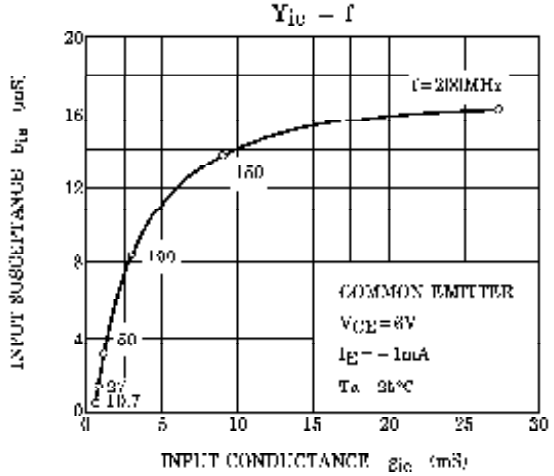

C_{ob}, g_{ob} – V_{CB}
COMMON BASE
I_E = 1mA
f=100MHz
Ta=25°C
OUTPUT CAPACITANCE C_{ob} (pF)
OUTPUT CONDUCTANCE g_{ob} (μS)
g_{ob}
C_{ob}
COLLECTOR-BASE VOLTAGE V_{CB} (V)


$|Y_{fb}|$, θ_{fb} – V_{CB}
COMMON BASE
I_E = 1mA
f=100MHz
Ta=25°C
PHASE ANGLE OF FORWARD TRANSFER ADMITTANCE θ_{fb} (°)
FORWARD TRANSFER ADMITTANCE $|Y_{fb}|$ (mS)
$|Y_{fb}|$
θ_{fb}
COLLECTOR-BASE VOLTAGE V_{CB} (V)

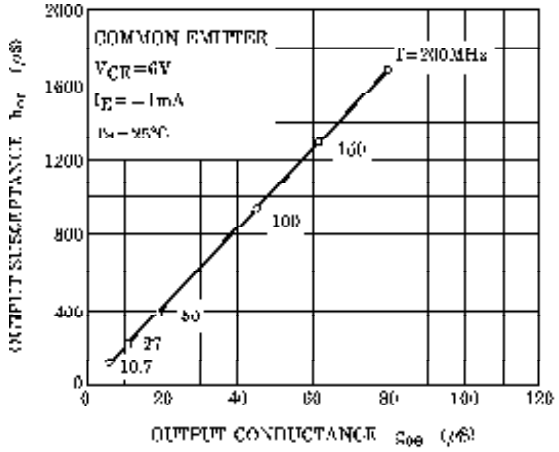
$|Y_{rb}|, \theta_{rb} - V_{CB}$



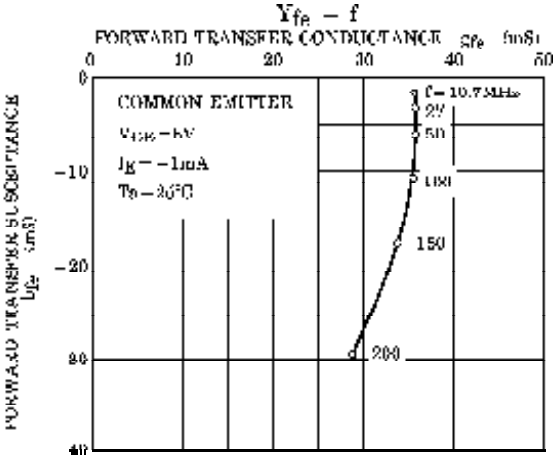
$Y_{ie} - f$



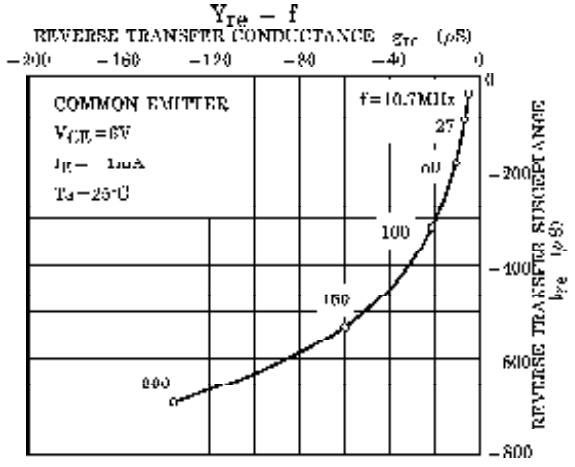
$Y_{oe} - f$



$Y_{fe} - f$



$Y_{re} - f$



$P_C - T_a$