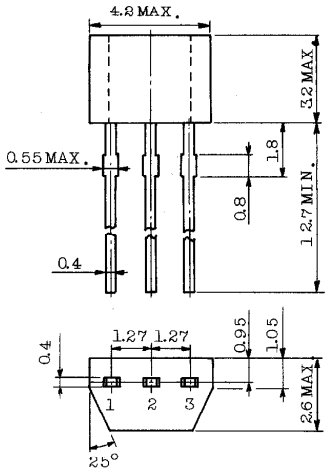
TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE (PCT PROCESS)

2SC2668

HIGH FREQUENCY AMPLIFIER APPLICATIONS.
FM, RF, IF AMPLIFIER APLIFIER APPLICATIONS.

- Small Reverse Transfer Capacitance : C_{re} = 0.70pF (Typ.)
- Low Noise Figure : NF = 2.5dB (Typ.)

Unit in mm



1. EMITTER
2. COLLECTOR
3. BASE

JEDEC	—
EIAJ	—
TOSHIBA	2-4E1A

Weight : 0.13g

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

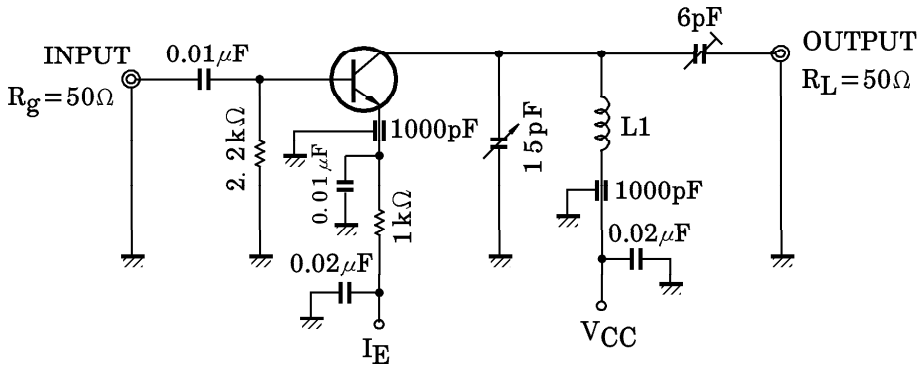
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I_{CBO}	V_{CB} = 40V, 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
Transistion 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_{CC} = 6V, I_E = −1mA, f = 100MHz (Fig.1)	—	2.5	5.0	dB
Power Gain	G_{pe}		—	18	—	dB

Note : h_{FE} Classification R : 40~80, O : 70~140, Y : 100~200

961001EAA2

Fig.1. NF, G_{pe} TEST CIRCUIT



L1 : 0.8mmϕ SILVER PLATED COPPER WIRE, 4Turns. 10mm ID, 8mm Lengh.

Y PARAMETER (Typ.)

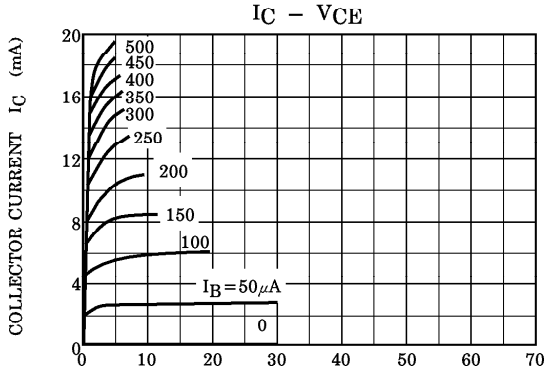
(1) COMMON EMITTER (V_{CE} = 6V, I_E = − 1mA, f = 100MHz)

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	ms
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

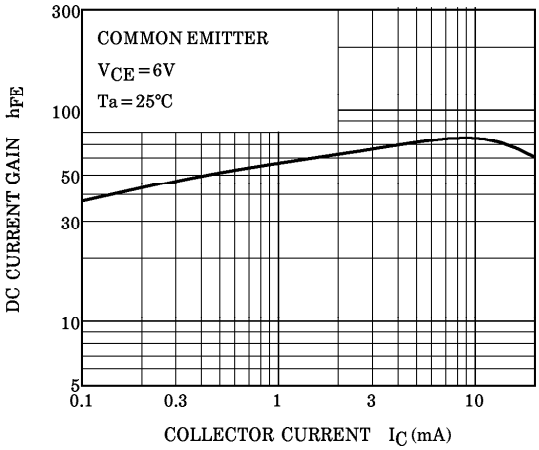
(2) COMMON BASE (V_{CB} = 6V, I_E = − 1mA, f = 100MHz)

CHARACTERISTIC	SYMBOL	TYP.	UNIT
Input Conductance	g_{ib}	34	ms
Input Capacitance	C_{ib}	−10	pF
Reverse Transfer Admittance	$\|Y_{rb}\|$	0.27	ms
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

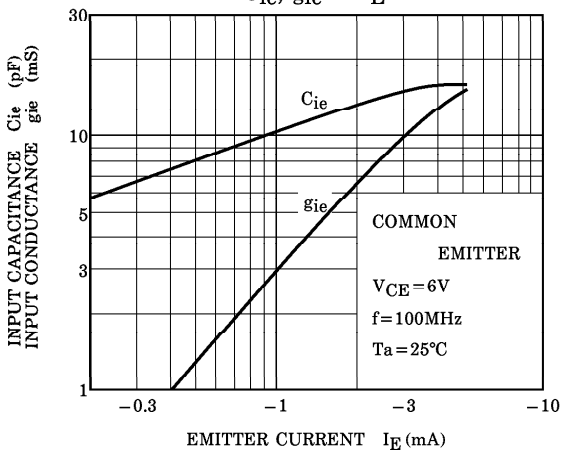
$I_C - V_{CE}$



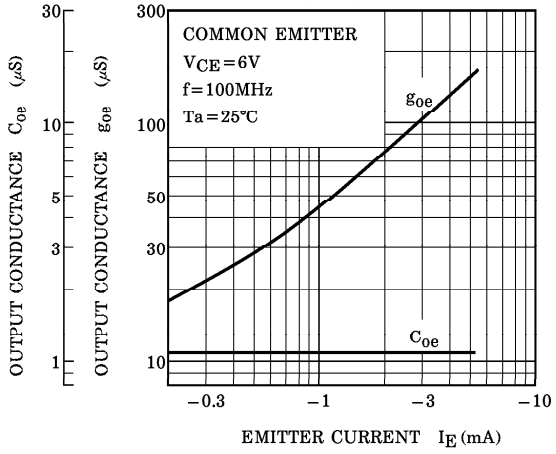
$h_{FE} - I_C$



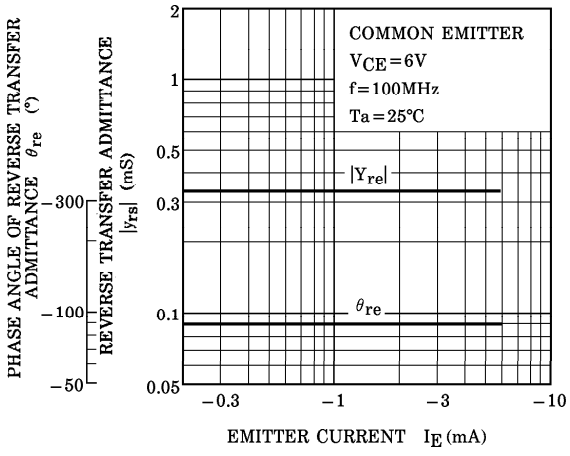
C_{ie}, $g_{ie} - I_E$

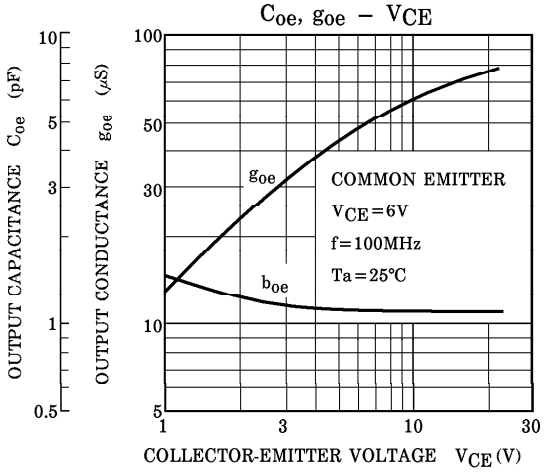


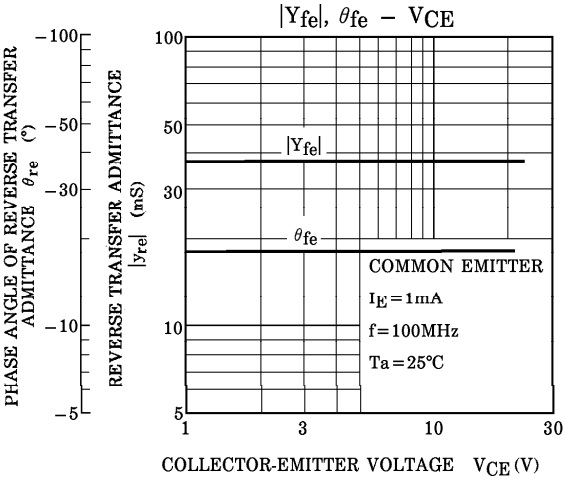
C_{oe}, $g_{oe} - I_E$

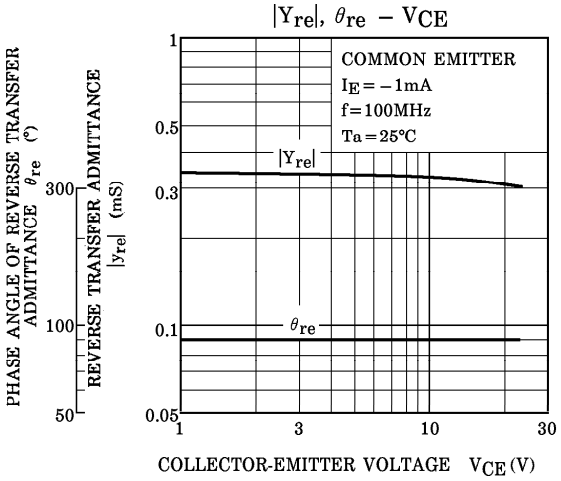


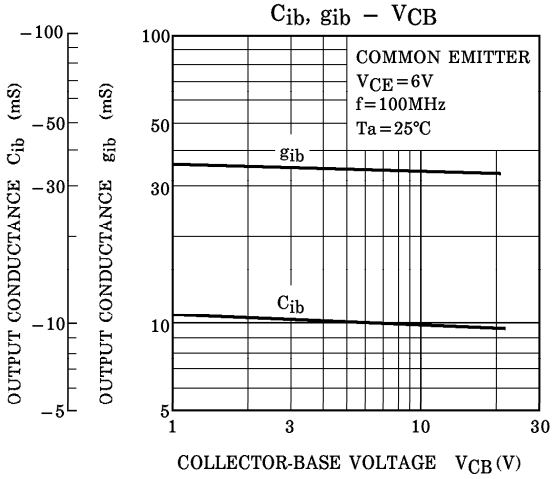
$|Y_{re}|$, $\theta_{re} - I_E$

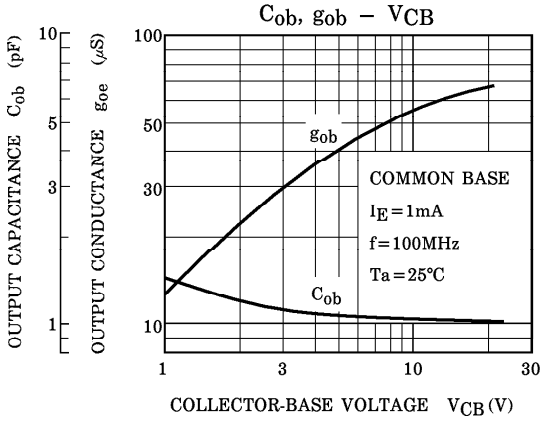


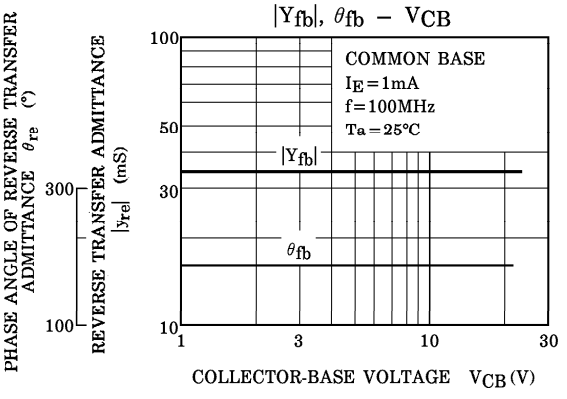

C_{oe}, g_{oe} – V_{CE}
OUTPUT CAPACITANCE C_{oe} (pF)
OUTPUT CONDUCTANCE g_{oe} (μS)
g_{oe}
b_{oe}
COMMON EMITTER
V_{CE}=6V
f=100MHz
Ta=25°C
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)


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

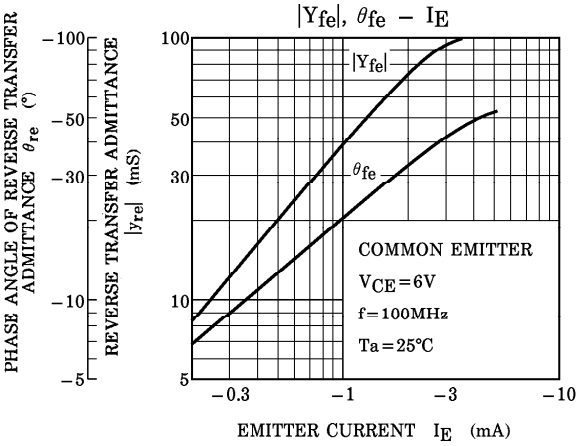

$|Y_{re}|$, θ_{re} – V_{CE}
PHASE ANGLE OF REVERSE TRANSFER ADMITTANCE θ_{re} (°)
REVERSE TRANSFER ADMITTANCE $|y_{re}|$ (mS)
$|Y_{re}|$
θ_{re}
COMMON EMITTER
I_E=–1mA
f=100MHz
Ta=25°C
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)


C_{ib}, g_{ib} – V_{CB}
OUTPUT CONDUCTANCE C_{ib} (mS)
OUTPUT CONDUCTANCE g_{ib} (mS)
g_{ib}
C_{ib}
COMMON EMITTER
V_{CE}=6V
f=100MHz
Ta=25°C
COLLECTOR-BASE VOLTAGE V_{CB} (V)

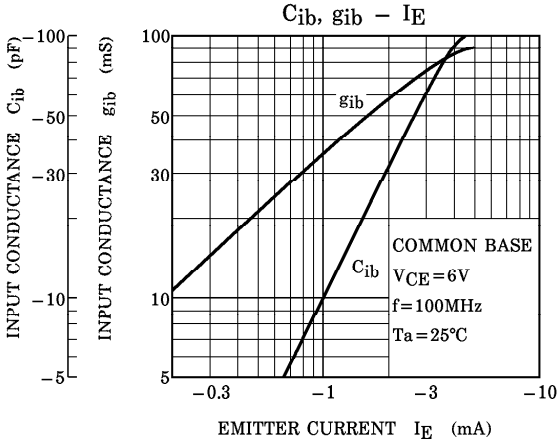

C_{ob}, g_{ob} – V_{CB}
OUTPUT CAPACITANCE C_{ob} (pF)
OUTPUT CONDUCTANCE g_{oe} (μS)
g_{ob}
C_{ob}
COMMON BASE
I_E=1mA
f=100MHz
Ta=25°C
COLLECTOR-BASE VOLTAGE V_{CB} (V)


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

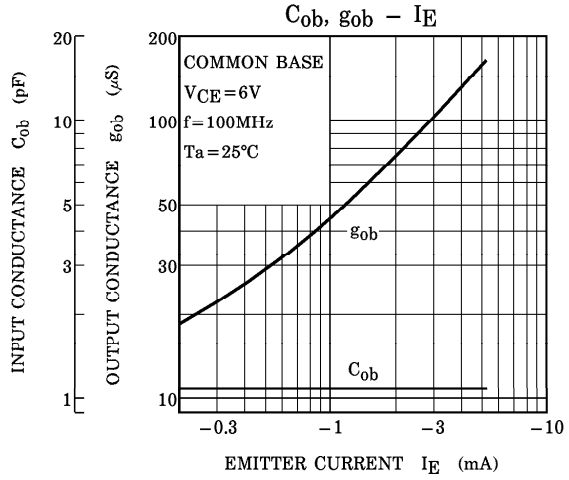
$|Y_{fe}|$, θ_{fe} – I_E



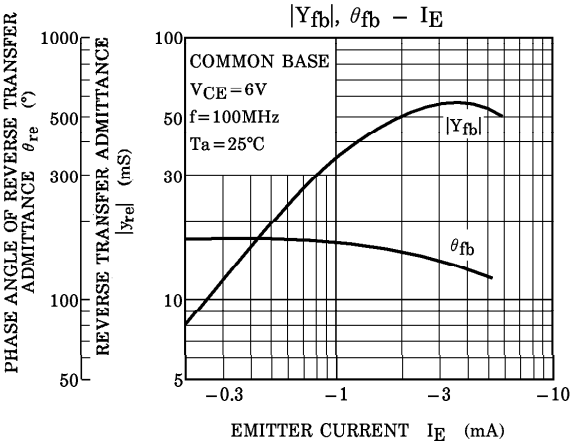
C_{ib}, g_{ib} – I_E



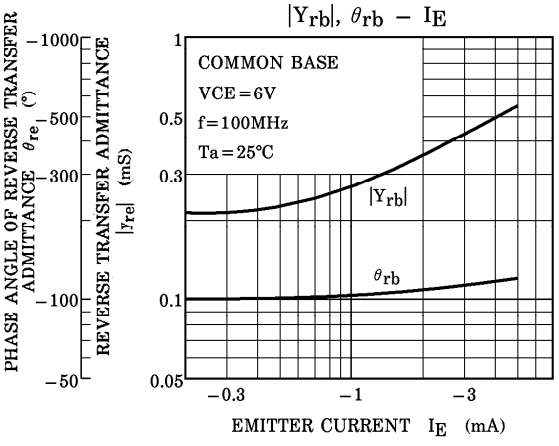
C_{ob}, g_{ob} – I_E



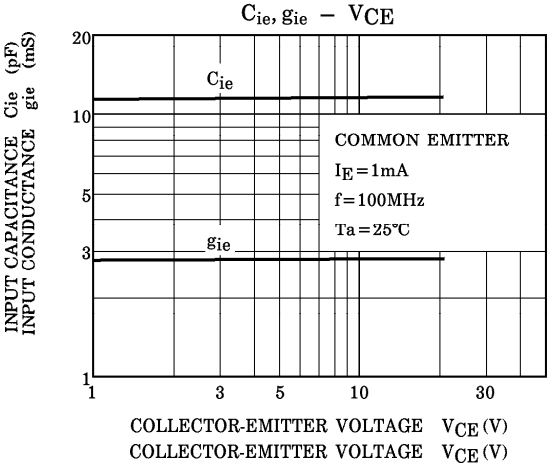
$|Y_{fb}|$, θ_{fb} – I_E



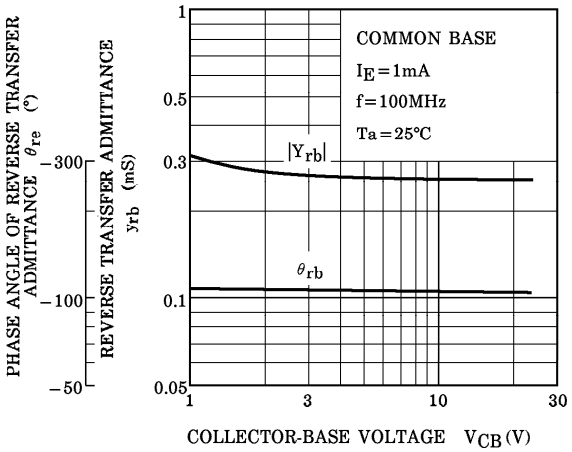
$|Y_{rb}|$, θ_{rb} – I_E



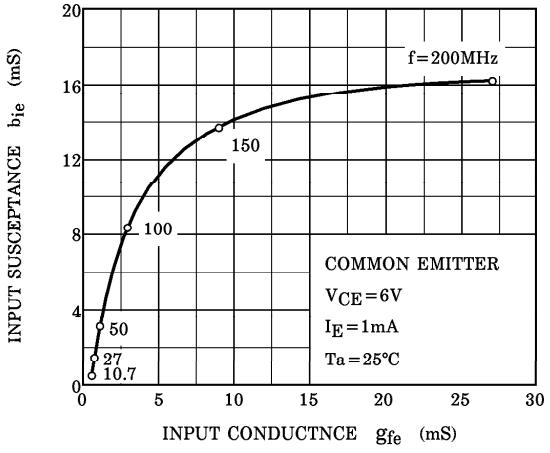
C_{ie}, g_{ie} – V_{CE}



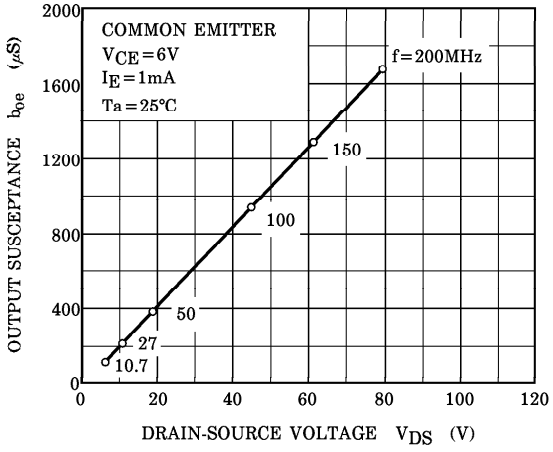
$|Y_{rb}|, \theta_{rb} - V_{CB}$



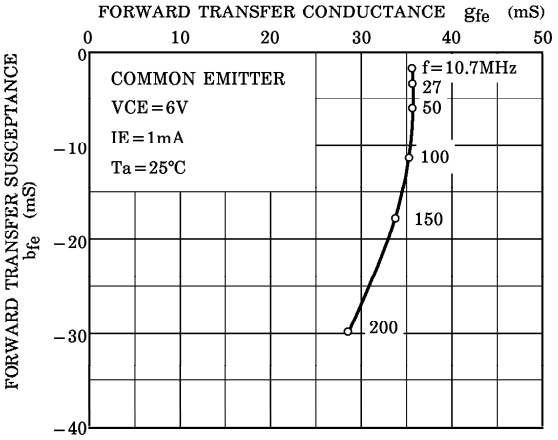
$Y_{ie} - f$



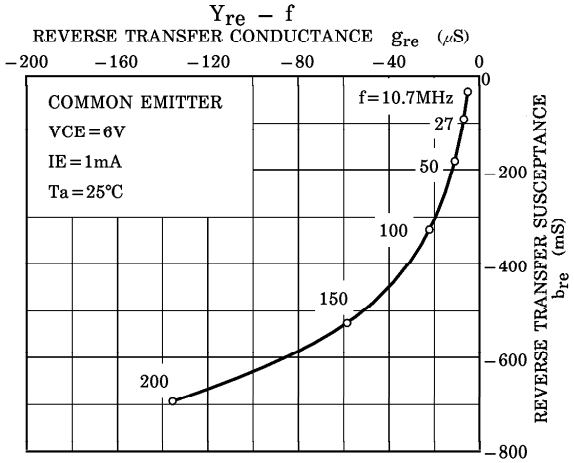
$Y_{oe} - f$



$Y_{fe} - f$



$Y_{re} - f$



$P_C - Ta$