TED1502

SILICON NPN EPITAXIAL TYPE (PCT PROCESS)

HIGH FREQUENCY AMPLIFIER APPLICATIONS.

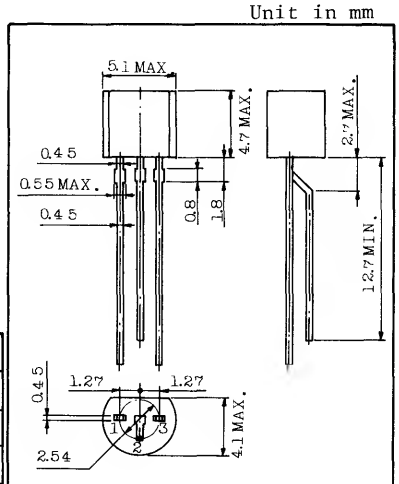
FM, RF, MIX, IF AMPLIFIER APPLICATIONS.

FEATURES:

. Small Reverse Transfer Capacitance : C_{re}=0.7pF (Typ.)

. Low Noise Figure : NF=2.5dB (Typ.) (f=100MHz)

Unit in mm



1. COLLECTOR
2. BASE
3. EMITTER

JEDEC	TO-92
EIAJ	SC-43
TOSHIBA	2-5F2G

Weight : 0.21g

MAXIMUM RATINGS (Ta=25°C)

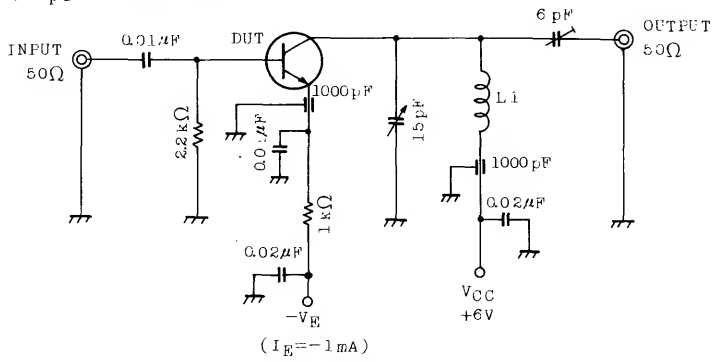
CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	V_{CBO}	40	V
Collector-Emitter Voltage	V_{CEO}	30	V
Emitter-Base Voltage	V_{EBO}	4	V
Collector Current	I_C	30	mA
Emitter Current	I_E	-30	mA
Collector Power Dissipation	P_C	250	mW
Junction Temperature	T_j	125	°C
Storage Temperature Range	T_{stg}	-65 ~ 125	°C

ELECTRICAL CHARACTERISTICS (Ta=25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I_{CBO}	V_{CB}=15V, I_E=0	-	-	50	nA
Base-Emitter Voltage	V_{BE}	V_{CE}=10V, I_C=1mA	0.65	-	0.75	V
DC Current Gain	h_{FE} (Note)	V_{CE}=10V, I_C=1mA	36	-	210	
Reverse Transfer Capacitance	C_{re}	V_{CE}=6V, f=1MHz	-	0.70	-	pF
Transition Frequency	f_T	V_{CE}=10V, I_C=1mA	-	550	-	MHz
Noise Figure	NF(1)	V_{CE}=10V, I_E=-1mA, R_g=650Ω, f=1MHz	-	1.2	-	dB
	NF(2)	V_{CE}=6V, I_E=-1mA, f=100MHz, Fig.	-	2.5	5.0	
Power Gain	G_{pe}		15	18	-	dB

Note : h_{FE} Classification A:36 ~ 55, B:48 ~ 75, C:66 ~ 100, D:84 ~ 127, E:105 ~ 210

Fig. NF(2), G_{pe} TEST CIRCUIT



L1 : 0.8mmφ SILVER PLATED COPPER WIRE, 4T, 10ID, 8 LENGTH

y PARAMETER (Typ.)

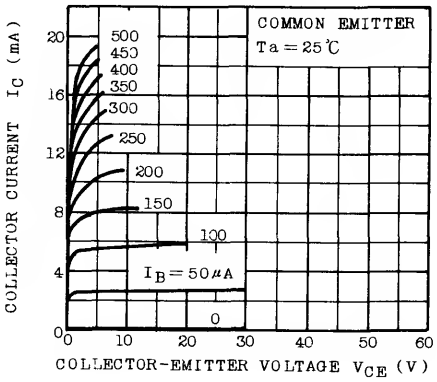
(1) COMMON EMITTER (V_{CE}=6V, I_E=-1mA, f=100MHz)

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

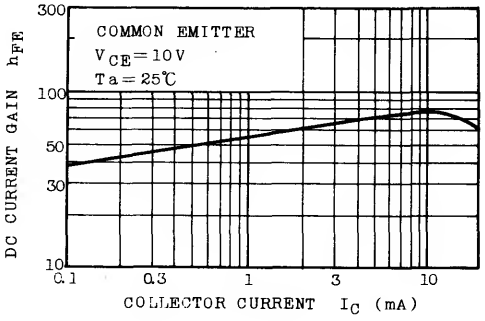
(2) COMMON BASE (V_{CE}=6V, I_E=-1mA, f=100MHz)

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

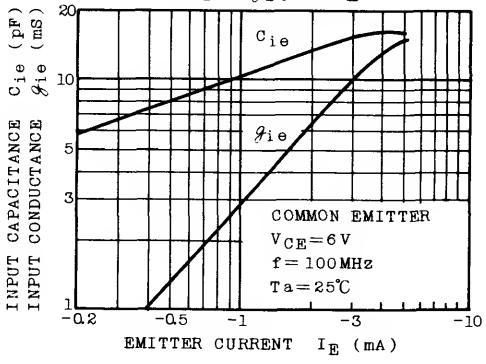
$I_C - V_{CE}$



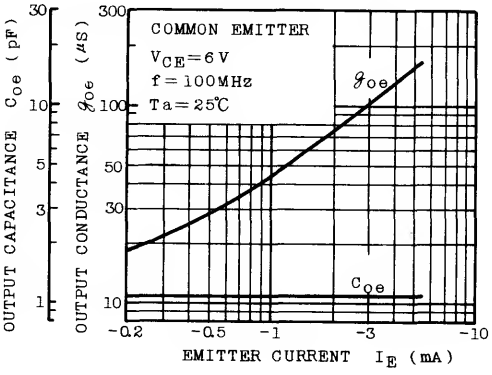
$h_{FE} - I_C$



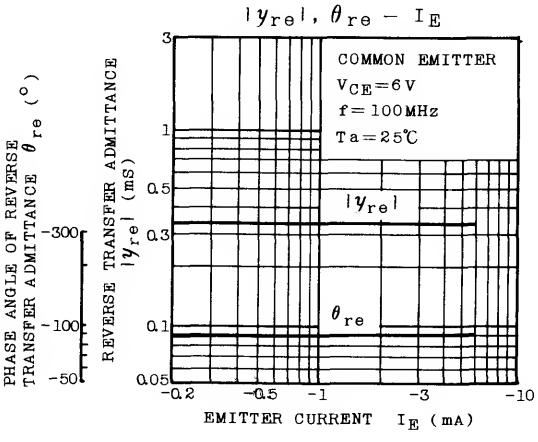
$C_{ie}, g_{ie} - I_E$

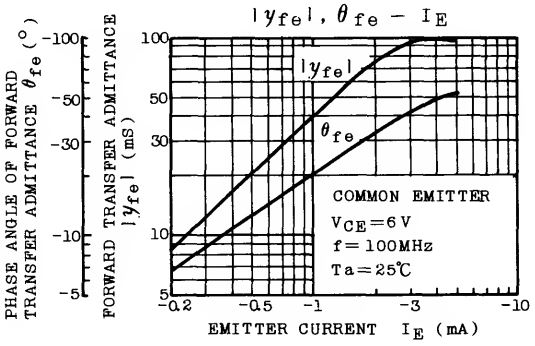


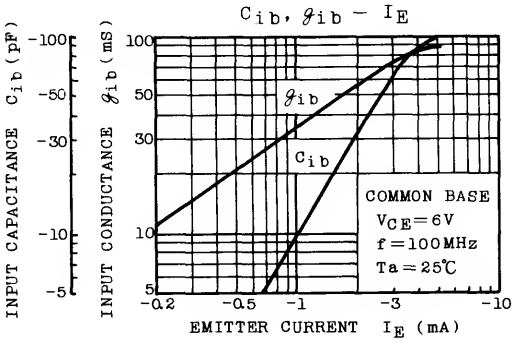
$C_{oe}, g_{oe} - I_E$

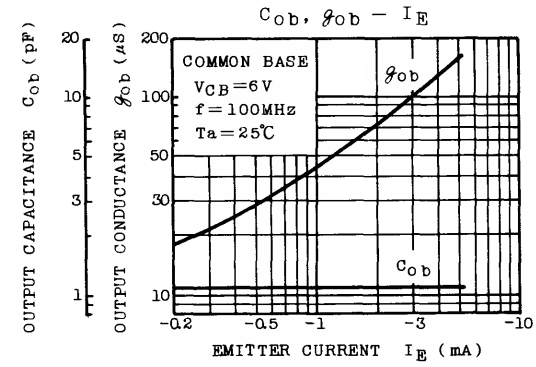


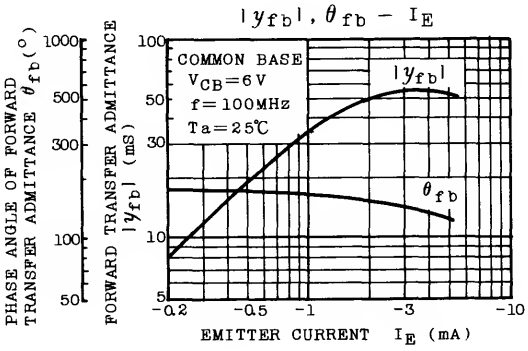
$|y_{re}|, \theta_{re} - I_E$

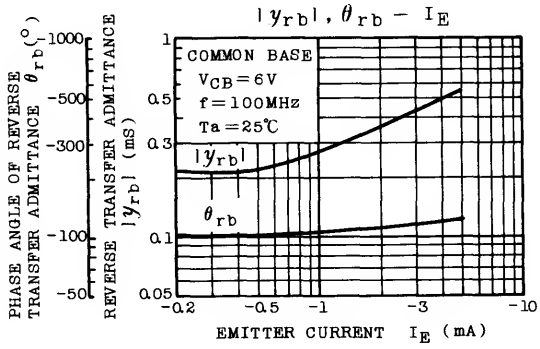


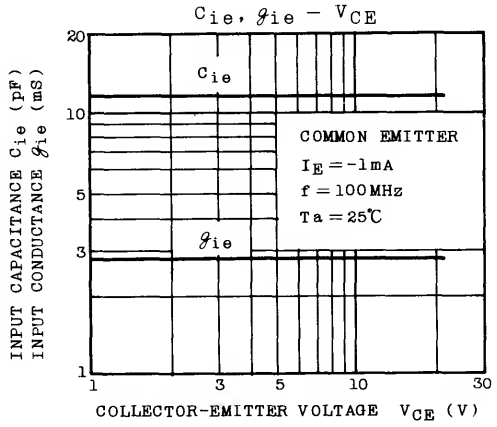

$|y_{fe}|, \theta_{fe} - I_E$
PHASE ANGLE OF FORWARD TRANSFER ADMITTANCE θ_{fe} (°)
FORWARD TRANSFER ADMITTANCE $|y_{fe}|$ (mS)
$|y_{fe}|$
θ_{fe}
COMMON EMITTER
V_{CE}=6V
f=100MHz
Ta=25℃
EMITTER CURRENT I_E (mA)

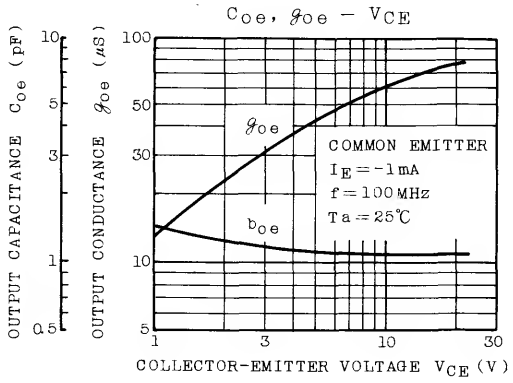

$C_{ib}, g_{ib} - I_E$
INPUT CAPACITANCE C_{ib} (pF)
INPUT CONDUCTANCE g_{ib} (mS)
g_{ib}
C_{ib}
COMMON BASE
V_{CE}=6V
f=100MHz
Ta=25℃
EMITTER CURRENT I_E (mA)

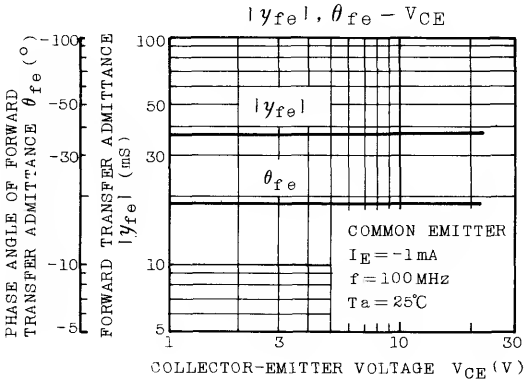

$C_{ob}, g_{ob} - I_E$
OUTPUT CAPACITANCE C_{ob} (pF)
OUTPUT CONDUCTANCE g_{ob} (μS)
COMMON BASE
V_{CB}=6V
f=100MHz
Ta=25℃
g_{ob}
C_{ob}
EMITTER CURRENT I_E (mA)

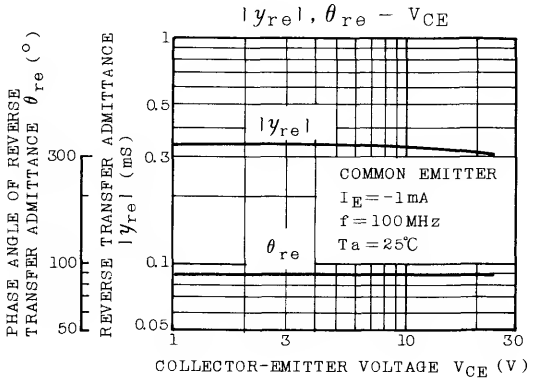

$|y_{fb}|, \theta_{fb} - I_E$
PHASE ANGLE OF FORWARD TRANSFER ADMITTANCE θ_{fb} (°)
FORWARD TRANSFER ADMITTANCE $|y_{fb}|$ (mS)
COMMON BASE
V_{CB}=6V
f=100MHz
Ta=25℃
$|y_{fb}|$
θ_{fb}
EMITTER CURRENT I_E (mA)

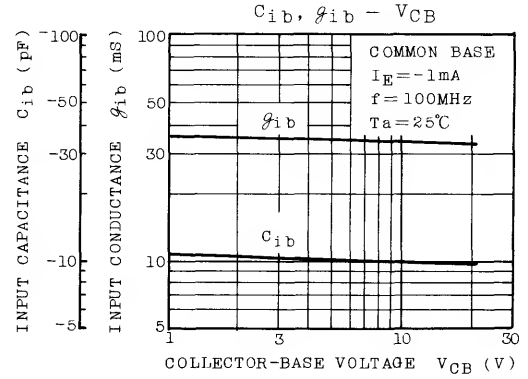

$|y_{rb}|, \theta_{rb} - I_E$
PHASE ANGLE OF REVERSE TRANSFER ADMITTANCE θ_{rb} (°)
REVERSE TRANSFER ADMITTANCE $|y_{rb}|$ (mS)
COMMON BASE
V_{CB}=6V
f=100MHz
Ta=25℃
$|y_{rb}|$
θ_{rb}
EMITTER CURRENT I_E (mA)

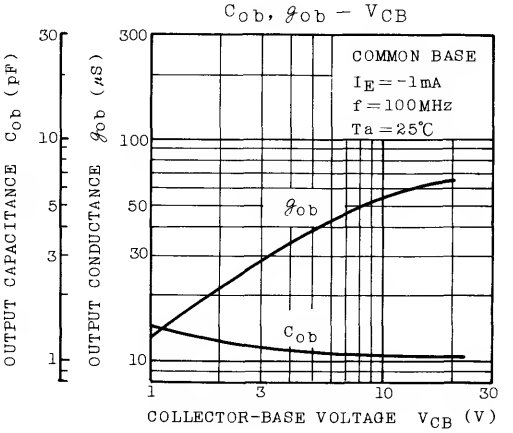

$C_{ie}, g_{ie} - V_{CE}$
INPUT CAPACITANCE C_{ie} (pF)
INPUT CONDUCTANCE g_{ie} (mS)
C_{ie}
g_{ie}
COMMON EMITTER
I_E=-1mA
f=100MHz
Ta=25℃
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)

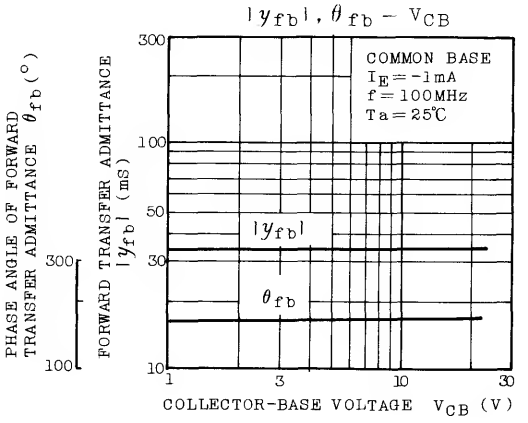

C_{oe}, g_{oe} – V_{CE}
OUTPUT CAPACITANCE C_{oe} (pF)
OUTPUT CONDUCTANCE g_{oe} (μS)
g_{oe}
b_{oe}
COMMON EMITTER
I_E = -1mA
f = 100MHz
Ta = 25℃
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)

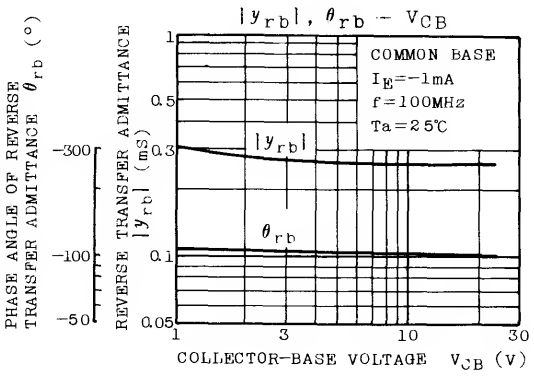

$|y_{fe}|$, θ_{fe} – V_{CE}
PHASE ANGLE OF FORWARD TRANSFER ADMITTANCE θ_{fe} (°)
FORWARD TRANSFER ADMITTANCE $|y_{fe}|$ (mS)
$|y_{fe}|$
θ_{fe}
COMMON EMITTER
I_E = -1mA
f = 100MHz
Ta = 25℃
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)

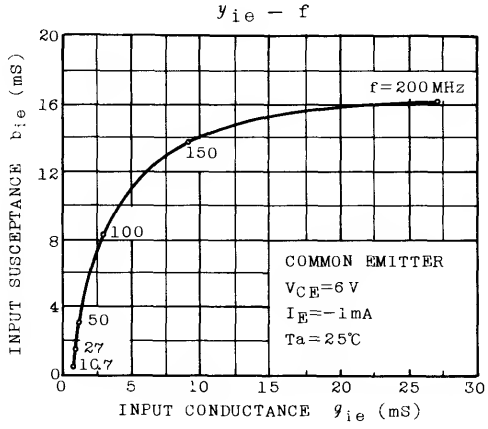

$|y_{re}|$, θ_{re} – V_{CE}
PHASE ANGLE OF REVERSE TRANSFER ADMITTANCE θ_{re} (°)
REVERSE TRANSFER ADMITTANCE $|y_{re}|$ (mS)
$|y_{re}|$
θ_{re}
COMMON EMITTER
I_E = -1mA
f = 100MHz
Ta = 25℃
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)

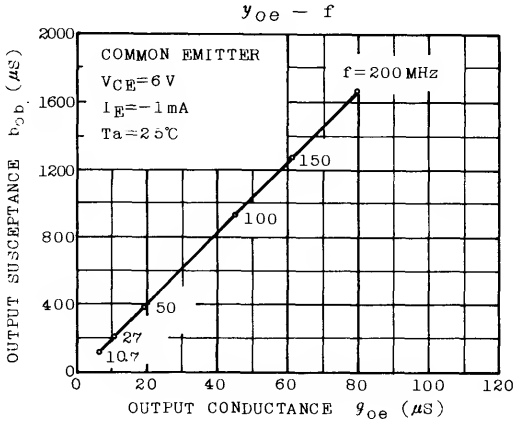

C_{ib}, g_{ib} – V_{CB}
INPUT CAPACITANCE C_{ib} (pF)
INPUT CONDUCTANCE g_{ib} (mS)
g_{ib}
C_{ib}
COMMON BASE
I_E = -1mA
f = 100MHz
Ta = 25℃
COLLECTOR-BASE VOLTAGE V_{CB} (V)

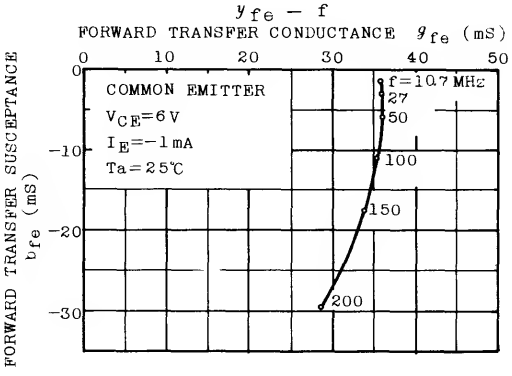

C_{ob}, g_{ob} – V_{CB}
OUTPUT CAPACITANCE C_{ob} (pF)
OUTPUT CONDUCTANCE g_{ob} (μS)
g_{ob}
C_{ob}
COMMON BASE
I_E = -1mA
f = 100MHz
Ta = 25℃
COLLECTOR-BASE VOLTAGE V_{CB} (V)

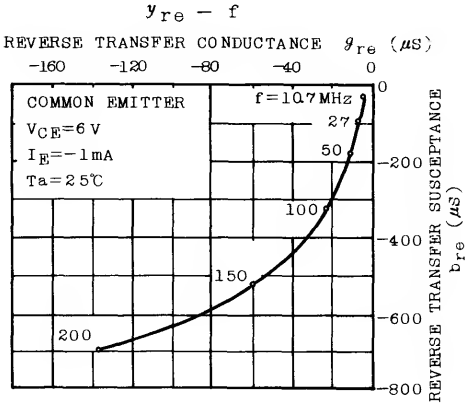

$|y_{fb}|$, θ_{fb} – V_{CB}
PHASE ANGLE OF FORWARD TRANSFER ADMITTANCE θ_{fb} (°)
FORWARD TRANSFER ADMITTANCE $|y_{fb}|$ (mS)
$|y_{fb}|$
θ_{fb}
COMMON BASE
I_E = -1mA
f = 100MHz
Ta = 25℃
COLLECTOR-BASE VOLTAGE V_{CB} (V)

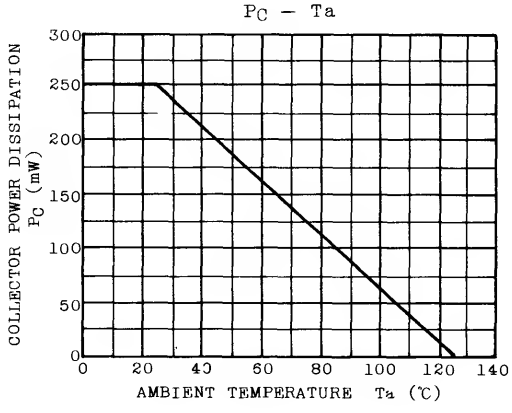

$|y_{rb}|, \theta_{rb}$ – V_{CB}
COMMON BASE
I_E=−1mA
f=100MHz
Ta=25℃
$|y_{rb}|$
θ_{rb}
PHASE ANGLE OF REVERSE TRANSFER ADMITTANCE θ_{rb} (°)
REVERSE TRANSFER ADMITTANCE $|y_{rb}|$ (mS)
COLLECTOR–BASE VOLTAGE V_{CB} (V)


y_{ie} – f
f=200MHz
150
100
50
27
10.7
COMMON EMITTER
V_{CE}=6V
I_E=−1mA
Ta=25℃
INPUT SUSCEPTANCE b_{ie} (mS)
INPUT CONDUCTANCE g_{ie} (mS)


y_{oe} – f
COMMON EMITTER
V_{CE}=6V
I_E=−1mA
Ta=25℃
f=200MHz
150
100
50
27
10.7
OUTPUT SUSCEPTANCE b_{ob} (μS)
OUTPUT CONDUCTANCE g_{oe} (μS)


y_{fe} – f
FORWARD TRANSFER CONDUCTANCE g_{fe} (mS)
COMMON EMITTER
V_{CE}=6V
I_E=−1mA
Ta=25℃
f=10.7MHz
27
50
100
150
200
FORWARD TRANSFER SUSCEPTANCE b_{fe} (mS)


y_{re} – f
REVERSE TRANSFER CONDUCTANCE g_{re} (μS)
COMMON EMITTER
V_{CE}=6V
I_E=−1mA
Ta=25℃
f=10.7MHz
27
50
100
150
200
REVERSE TRANSFER SUSCEPTANCE b_{re} (μS)


P_C – Ta
COLLECTOR POWER DISSIPATION P_C (mW)
AMBIENT TEMPERATURE Ta (℃)