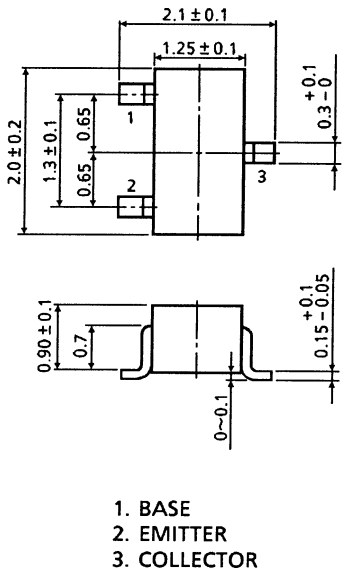
TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

2SC4215

High Frequency Amplifier Applications
FM, RF, MIX, IF Amplifier Applications

- Small reverse transfer capacitance: C_{re} = 0.55 pF (typ.)
- Low noise figure: NF = 2dB (typ.) (f = 100 MHz)

Unit: mm



JEDEC	—
JEITA	SC-70
TOSHIBA	2-2E1A

Weight: 0.006 g (typ.)

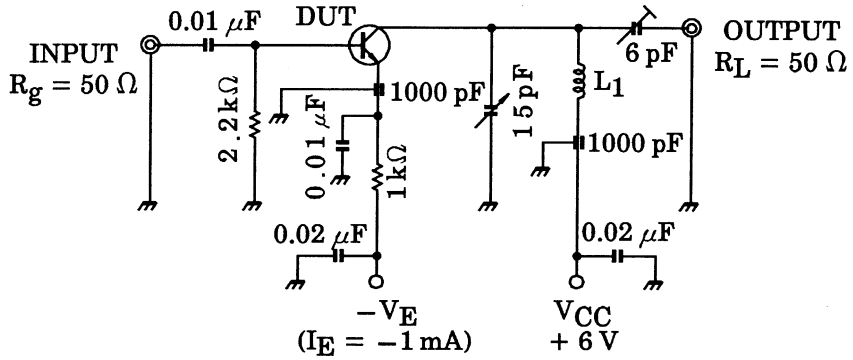
Maximum Ratings (Ta = 25°C)

Characteristics	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)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB} = 40 V, I_E = 0	—	—	0.1	μA
Emitter cut-off current	I_{EBO}	V_{EB} = 4 V, I_C = 0	—	—	0.5	μA
DC current gain	h_{FE} (Note)	V_{CE} = 6 V, I_C = 1 mA	40	—	200	
Reverse transfer capacitance	C_{re}	V_{CB} = 10 V, f = 1 MHz	—	0.55	—	pF
Transition frequency	f_T	V_{CE} = 6 V, I_C = 1 mA	260	550	—	MHz
Collector-base time constant	$C_c.r_{bb'}$	V_{CE} = 6 V, I_E = −1 mA, f = 30 MHz	—	—	25	ps
Noise figure	NF	V_{CC} = 6 V, I_E = −1 mA, f = 100 MHz, Figure 1	—	2	5.0	dB
Power gain	G_{pe}		17	23	—	dB

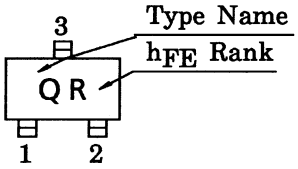
Note: h_{FE} classification R: 40~80, O: 70~140, Y: 100~200



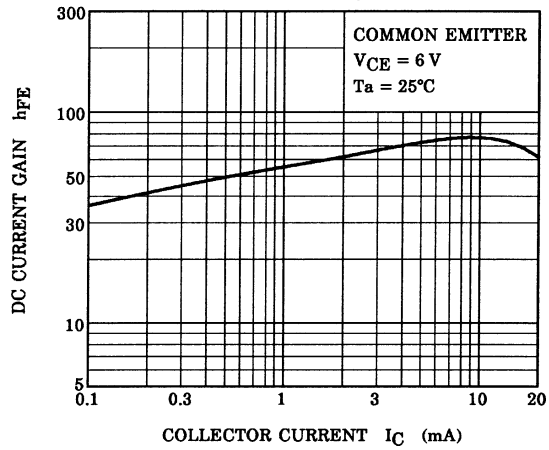
L_1: 0.8 mmϕ silver plated copper wire, 4 T, 10 mm ID, 8 mm length

Figure 1 NF, G_{pe} Test Circuit

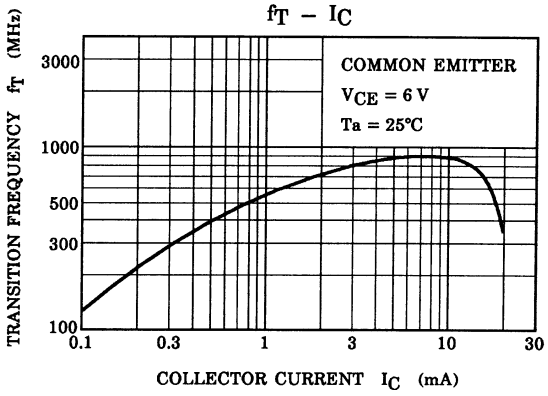
Marking



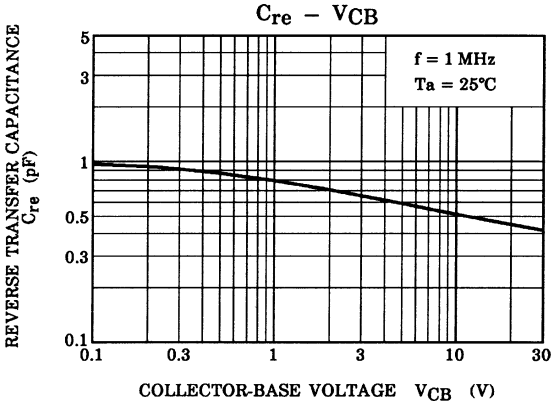
h_{FE} – I_C



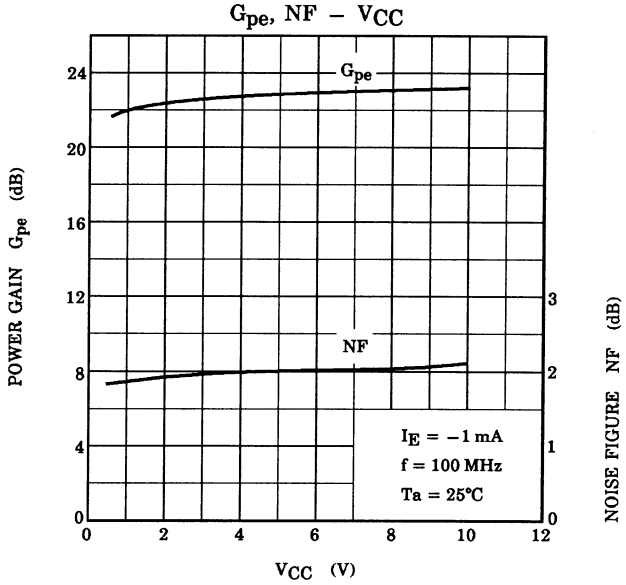
f_T – I_C



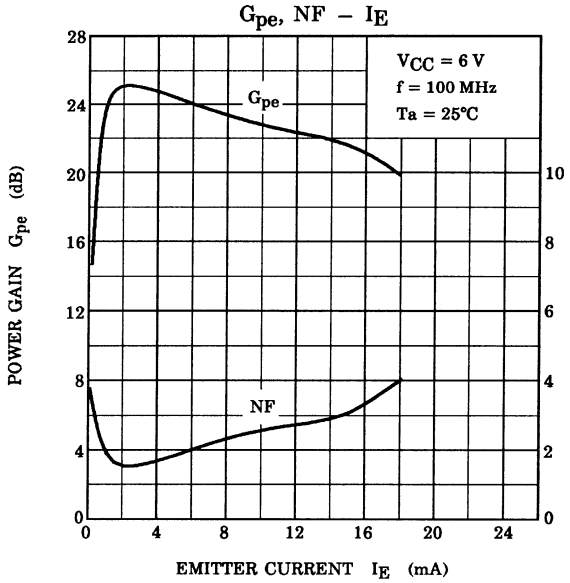
C_{re} – V_{CB}



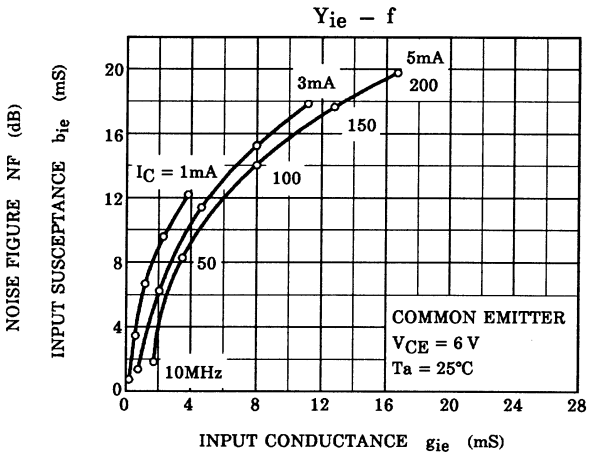
G_{pe}, NF – V_{CC}

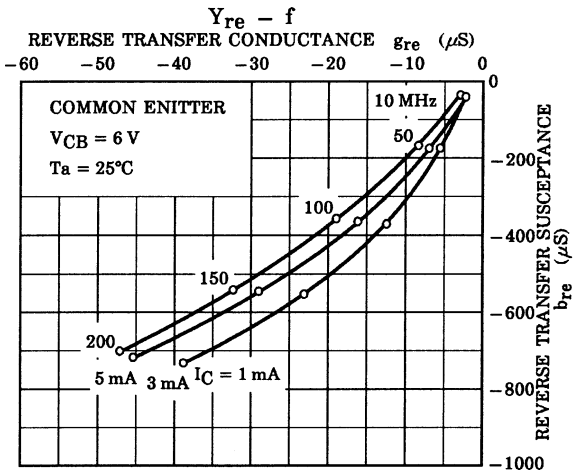


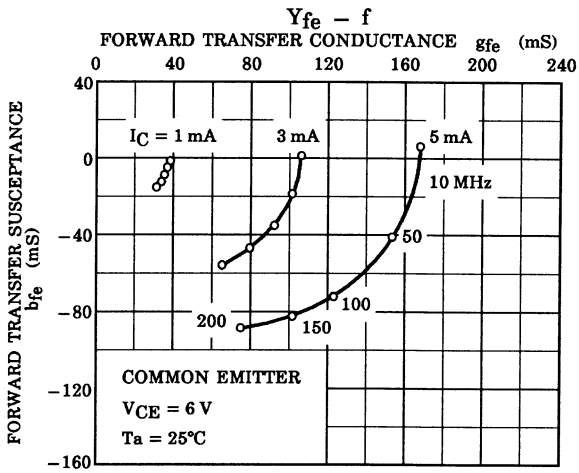
G_{pe}, NF – I_E

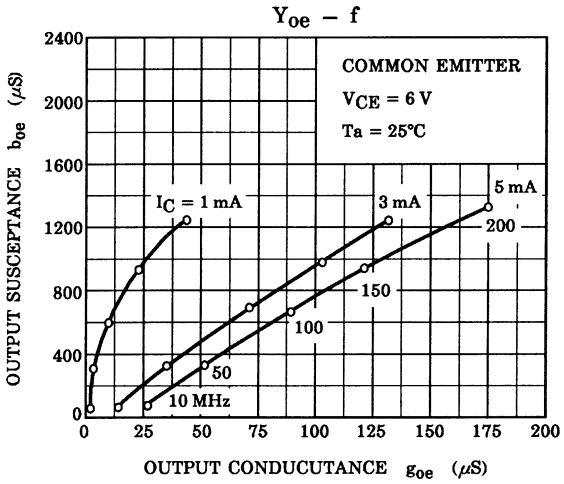


Y_{ie} – f




Yre – f
REVERSE TRANSFER CONDUCTANCE gre (μS)
−60 −50 −40 −30 −20 −10 0
COMMON ENITTER
VCB = 6 V
Ta = 25°C
10 MHz
50
100
150
200
5 mA 3 mA IC = 1 mA
0 −200 −400 −600 −800 −1000
REVERSE TRANSFER SUSCEPTANCE bre (μS)


Yfe – f
FORWARD TRANSFER CONDUCTANCE gfe (mS)
0 40 80 120 160 200 240
IC = 1 mA
3 mA
5 mA
10 MHz
50
100
150
200
COMMON EMITTER
VCE = 6 V
Ta = 25°C
40 0 −40 −80 −120 −160
FORWARD TRANSFER SUSCEPTANCE bfe (mS)


Yoe – f
COMMON EMITTER
VCE = 6 V
Ta = 25°C
IC = 1 mA
3 mA
5 mA
200
150
100
50
10 MHz
2400 2000 1600 1200 800 400 0
OUTPUT SUSCEPTANCE boe (μS)
0 25 50 75 100 125 150 175 200
OUTPUT CONDUCUTANCE goe (μS)

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