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TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

# 2SC4215

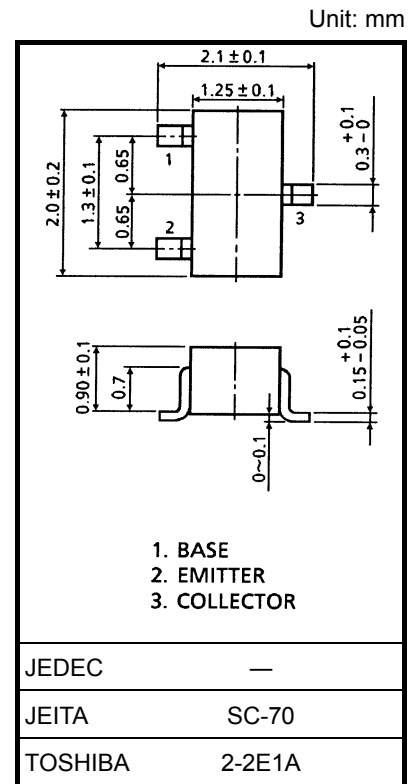
High Frequency Amplifier Applications  
FM, RF, MIX, IF Amplifier Applications

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

## Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

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	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-55 to 125	$^\circ\text{C}$

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings. Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).



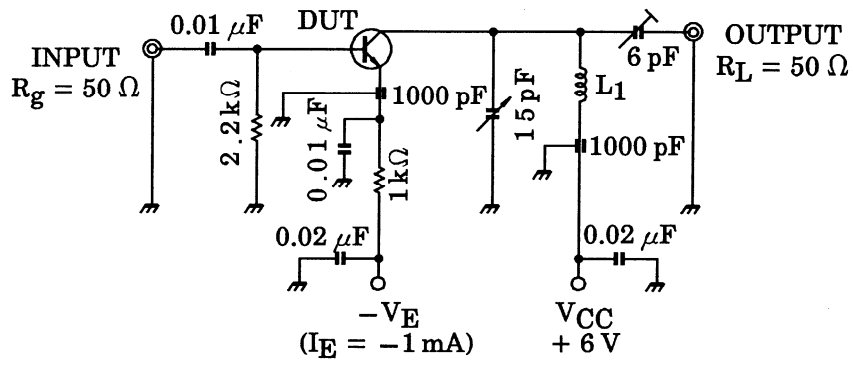
Weight: 0.006 g (typ.)

## Electrical Characteristics ( $T_a = 25^\circ\text{C}$ )

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

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

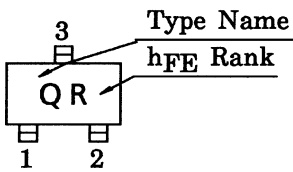
Start of commercial production  
1987-06

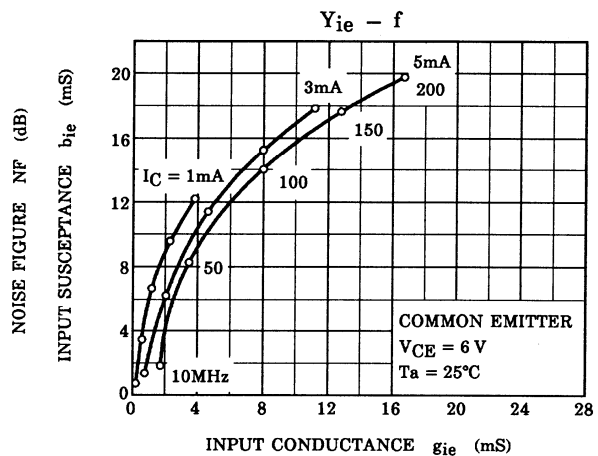
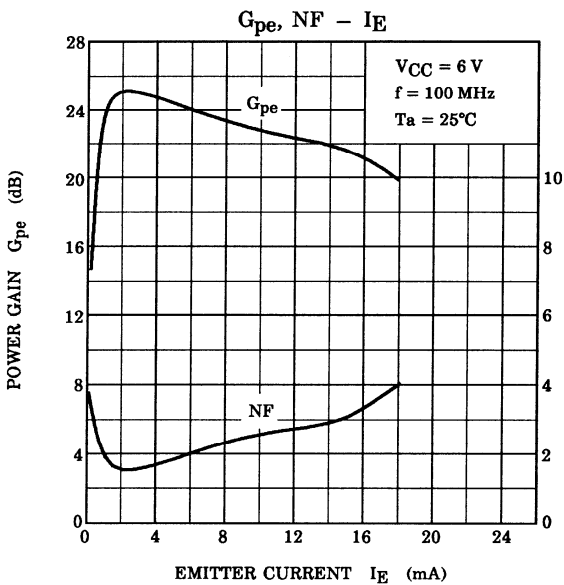
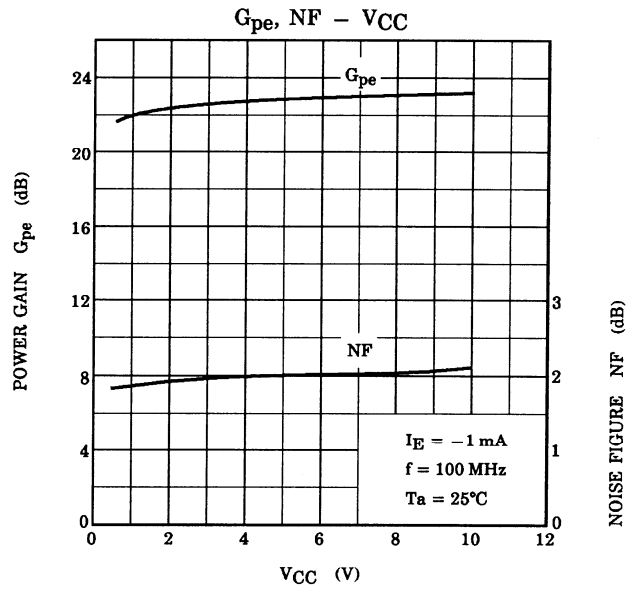
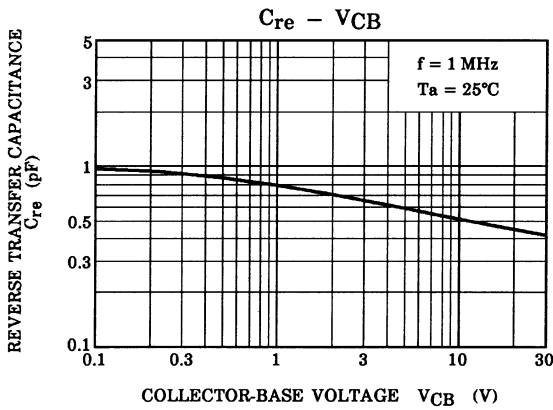
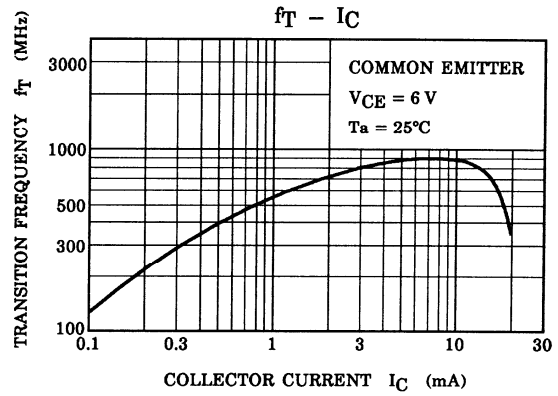
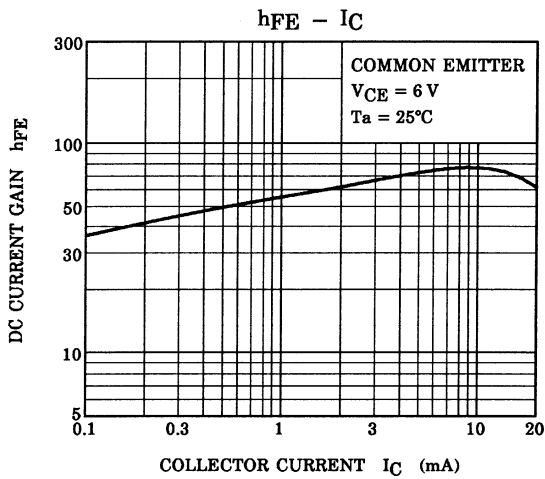


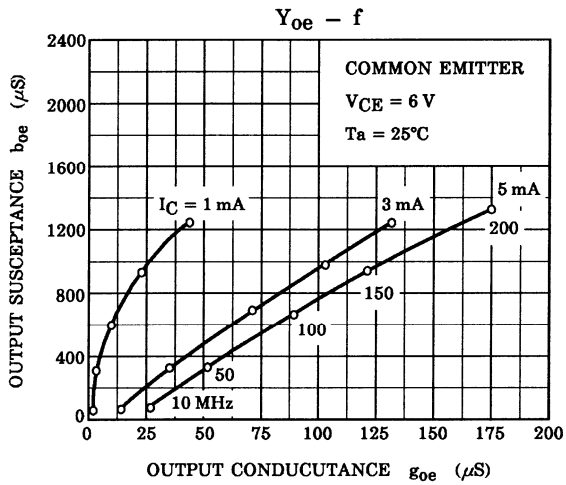
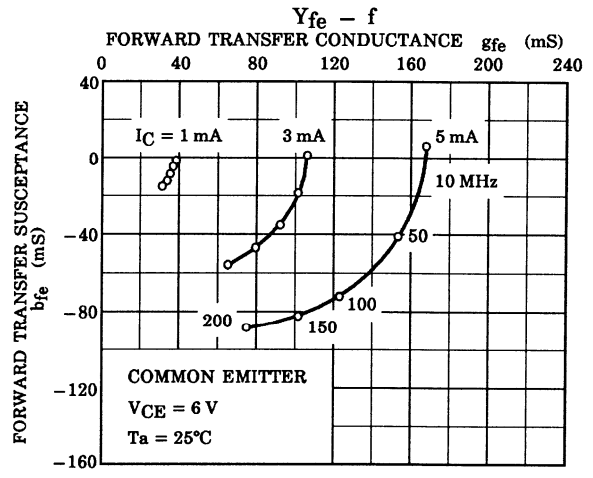
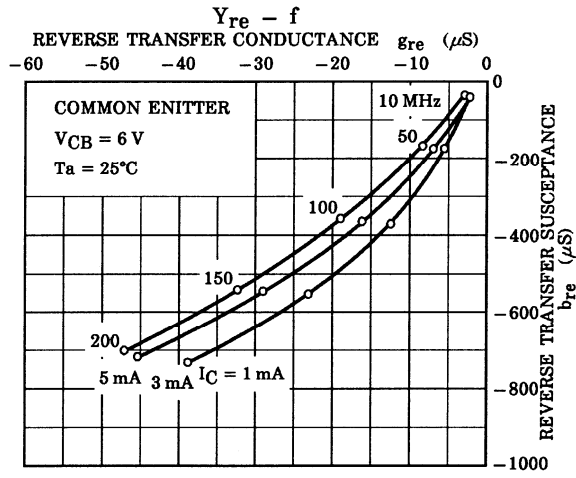
L<sub>1</sub>: 0.8 mmφ silver plated copper wire, 4 T, 10 mm ID, 8 mm length

**Figure 1 NF, G<sub>pe</sub> Test Circuit**

**Marking**







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