

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process)

# 2SC2716

High Frequency Amplifier Applications  
 AM High Frequency Amplifier Applications  
 AM Frequency Converter Applications

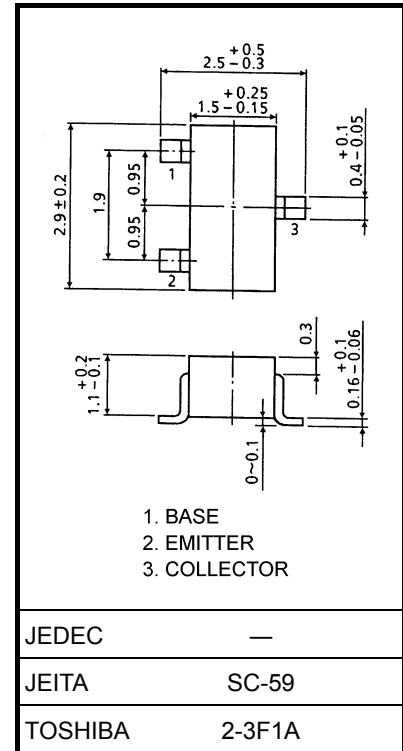
- Low noise figure: NF = 3.5dB (max) (f = 1 MHz)

## Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V <sub>CBO</sub>	35	V
Collector-emitter voltage	V <sub>CEO</sub>	30	V
Emitter-base voltage	V <sub>EBO</sub>	4	V
Collector current	I <sub>C</sub>	100	mA
Emitter current	I <sub>E</sub>	-100	mA
Collector power dissipation	P <sub>C</sub>	150	mW
Junction temperature	T <sub>j</sub>	125	°C
Storage temperature range	T <sub>stg</sub>	-55~125	°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).

Unit: mm



Weight: 0.012 g (typ.)

## Electrical Characteristics (Ta = 25°C)

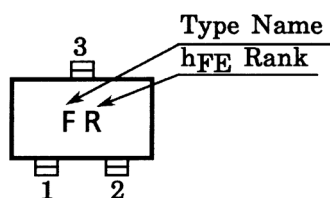
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I <sub>CBO</sub>	V <sub>CB</sub> = 20 V, I <sub>E</sub> = 0	—	—	0.1	μA
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> = 2 V, I <sub>C</sub> = 0	—	—	1.0	μA
DC current gain	h <sub>FE</sub> (Note)	V <sub>CE</sub> = 12 V, I <sub>C</sub> = 2 mA	40	—	240	
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> = 10 mA, I <sub>B</sub> = 1 mA	—	—	0.4	V
Base-emitter saturation voltage	V <sub>BE(sat)</sub>	I <sub>C</sub> = 10 mA, I <sub>B</sub> = 1 mA	—	—	1.0	V
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 2 mA	80	120	—	MHz
Reverse transfer capacitance	C <sub>re</sub>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0, f = 1 MHz	—	2.2	3.0	pF
Collector-base time constant	C <sub>c-rbb'</sub>	V <sub>CE</sub> = 10 V, I <sub>E</sub> = -1 mA, f = 30 MHz	—	30	50	ps
Noise figure	NF	V <sub>CE</sub> = 10 V, I <sub>E</sub> = -1 mA, f = 1 MHz R <sub>g</sub> = 50 Ω	—	2.0	3.5	dB

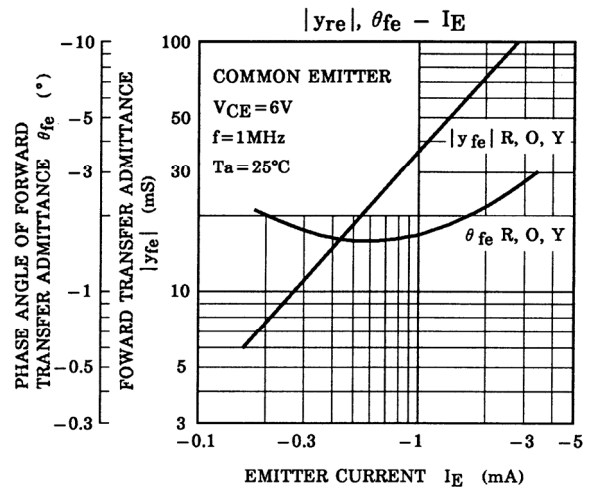
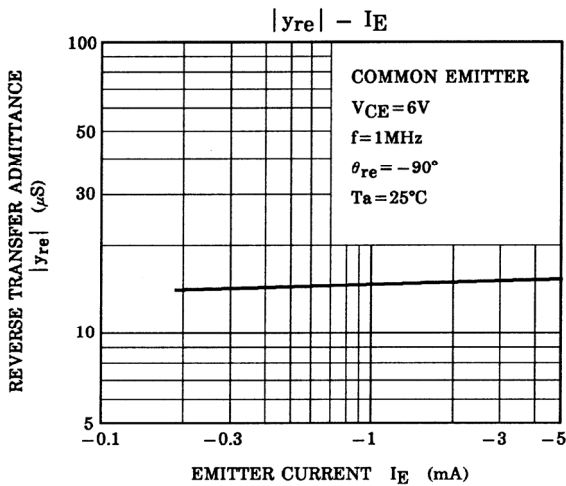
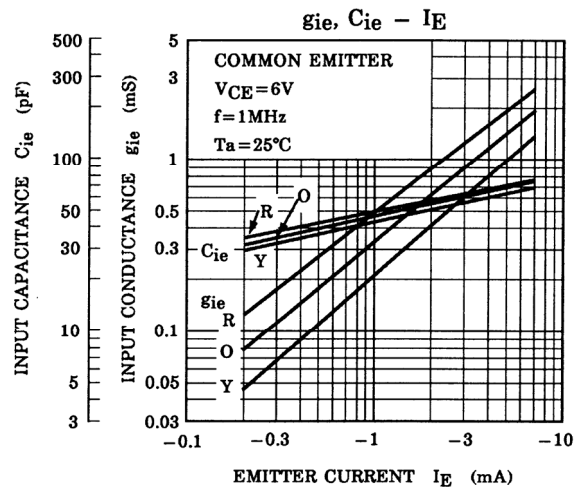
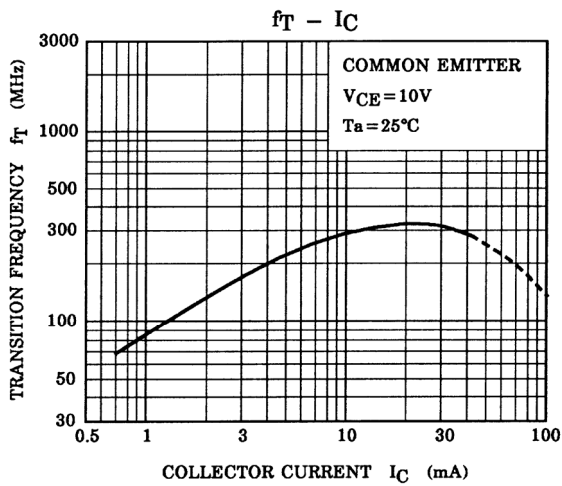
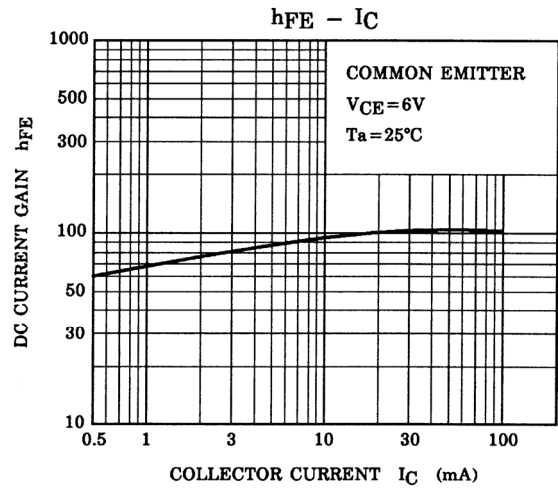
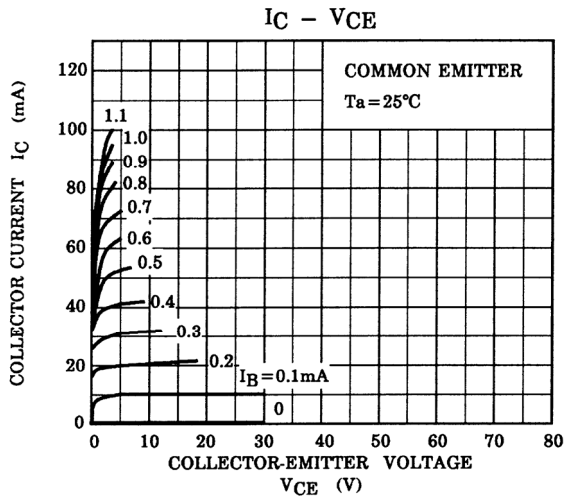
Note: h<sub>FE</sub> classification R: 40~80, O: 70~140, Y: 120~240

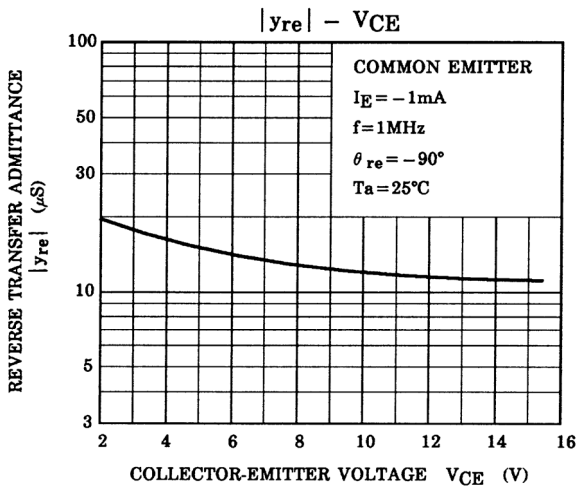
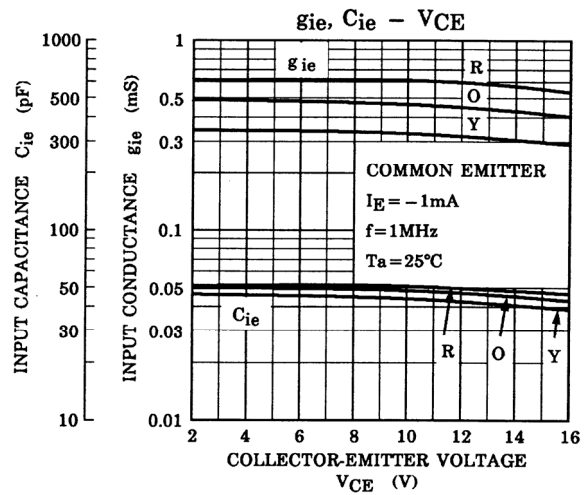
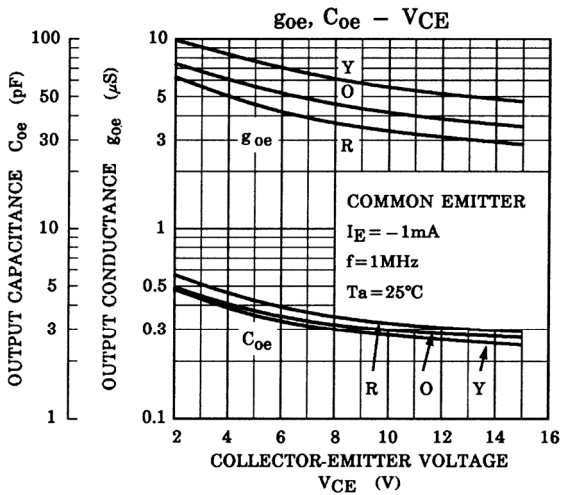
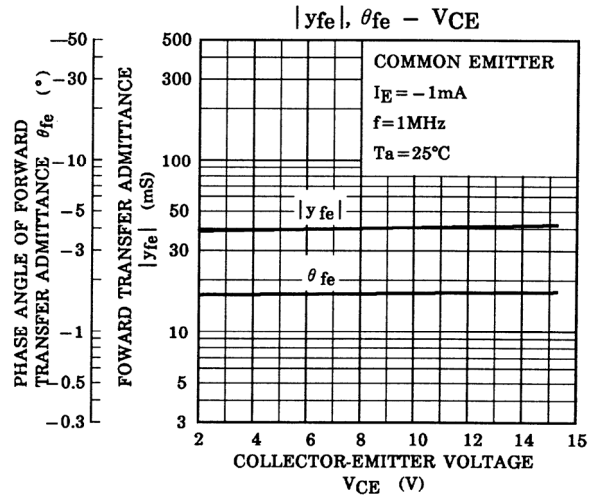
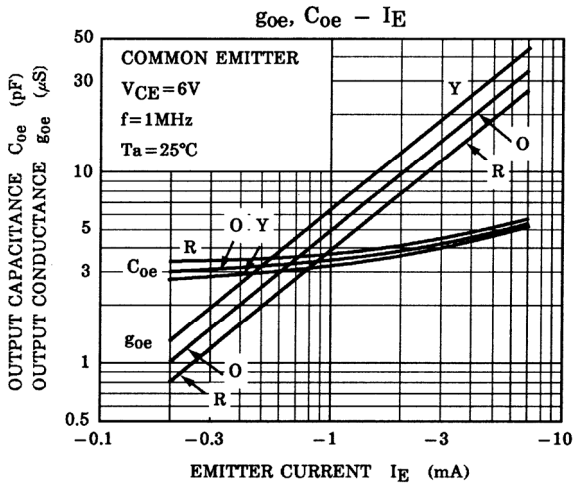
## y Parameter (typ.) (common emitter VCE = 6 V, IE = -1 mA, f = 1 MHz)

Characteristics	Symbol	2SC2716-R	2SC2716-O	2SC2716-Y	Unit
Input conductance	$g_{ie}$	0.5	0.35	0.22	mS
Input capacitance	$C_{ie}$	50	48	46	pF
Output conductance	$g_{oe}$	4	5	6.5	$\mu$ S
Output capacitance	$C_{oe}$	3.7	3.4	3.2	pF
Forward transfer admittance	$ y_{fe} $	36	36	36	mS
Phase angle of forward transfer admittance	$\theta_{fe}$	-1.6	-1.6	-1.6	°
Reverse transfer admittance	$ y_{re} $	14	14	14	$\mu$ S
Phase angle of reverse transfer admittance	$\theta_{re}$	-90	-90	-90	°

## Marking







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20070701-EN GENERAL

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