

TOSHIBA Transistor Silicon PNP · NPN Epitaxial Type  
(PCT Process) (Bias Resistor Built-in Transistor)

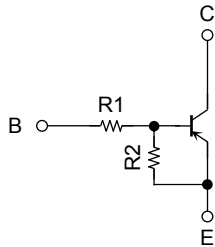
# RN4908FE

Switching, Inverter Circuit, Interface Circuit and  
Driver Circuit Applications

- Two devices are incorporated into an Extreme-Super-Mini (6-pin) package.
- Incorporating a bias resistor into a transistor reduces parts count. Reducing the parts count enables the manufacture of ever more compact equipment and lowers assembly cost.

## Equivalent Circuit and Bias Resistor Values

**Q1**

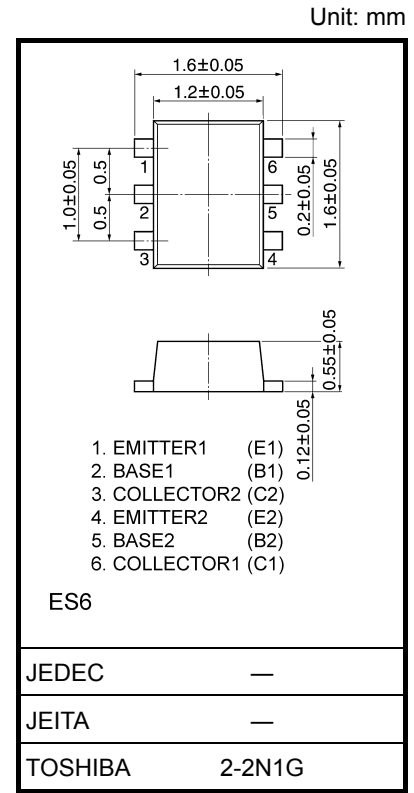
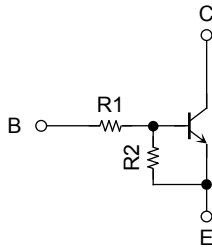


R1: 22 kΩ

R2: 47 kΩ

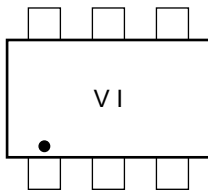
(Q1, Q2 common)

**Q2**

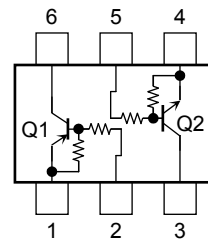


Weight: 0.003g (typ.)

## Marking



## Equivalent Circuit (top view)



Start of commercial production  
2000-05

## Absolute Maximum Ratings (Ta = 25°C) (Q1)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V <sub>CB0</sub>	-50	V
Collector-emitter voltage	V <sub>CEO</sub>	-50	V
Emitter-base voltage	V <sub>EBO</sub>	-7	V
Collector current	I <sub>C</sub>	-100	mA

## Absolute Maximum Ratings (Ta = 25°C) (Q2)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V <sub>CB0</sub>	50	V
Collector-emitter voltage	V <sub>CEO</sub>	50	V
Emitter-base voltage	V <sub>EBO</sub>	7	V
Collector current	I <sub>C</sub>	100	mA

## Absolute Maximum Ratings (Ta = 25°C) (Q1, Q2 common)

Characteristics	Symbol	Rating	Unit
Collector power dissipation	P <sub>C</sub> (Note 1)	100	mW
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature range	T <sub>stg</sub>	-55 to 150	°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).

Note 1: Total rating

## Electrical Characteristics (Ta = 25°C) (Q1)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I <sub>CBO</sub>	V <sub>CB</sub> = -50 V, I <sub>E</sub> = 0	—	—	-100	nA
	I <sub>CEO</sub>	V <sub>CE</sub> = -50 V, I <sub>B</sub> = 0	—	—	-500	
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> = -7 V, I <sub>C</sub> = 0	-0.078	—	-0.145	mA
DC current gain	h <sub>FE</sub>	V <sub>CE</sub> = -5 V, I <sub>C</sub> = -10 mA	80	—	—	
Collector-emitter saturation voltage	V <sub>CE (sat)</sub>	I <sub>C</sub> = -5 mA, I <sub>B</sub> = -0.25 mA	—	-0.1	-0.3	V
Input voltage (ON)	V <sub>I (ON)</sub>	V <sub>CE</sub> = -0.2 V, I <sub>C</sub> = -5 mA	-1.0	—	-2.6	V
Input voltage (OFF)	V <sub>I (OFF)</sub>	V <sub>CE</sub> = -5 V, I <sub>C</sub> = -0.1 mA	-0.6	—	-1.16	V
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> = -10 V, I <sub>C</sub> = -5 mA	—	200	—	MHz
Collector output capacitance	C <sub>ob</sub>	V <sub>CB</sub> = -10 V, I <sub>E</sub> = 0, f = 1 MHz	—	3	6	pF

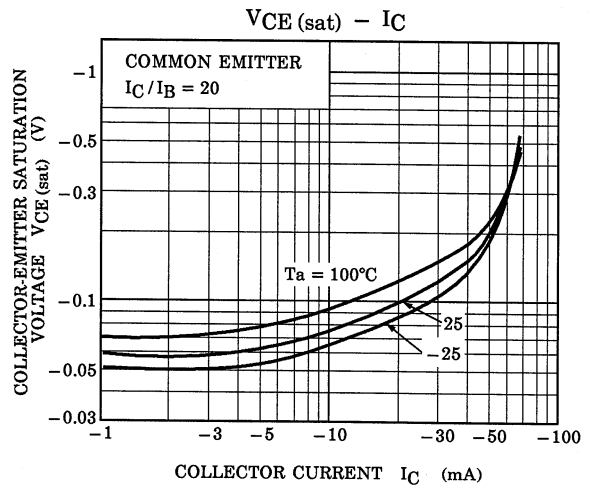
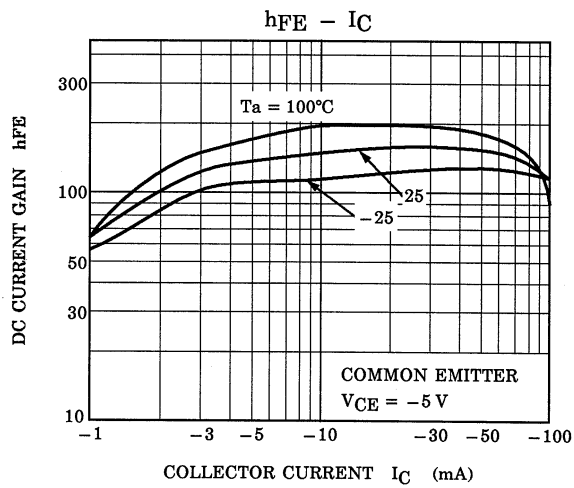
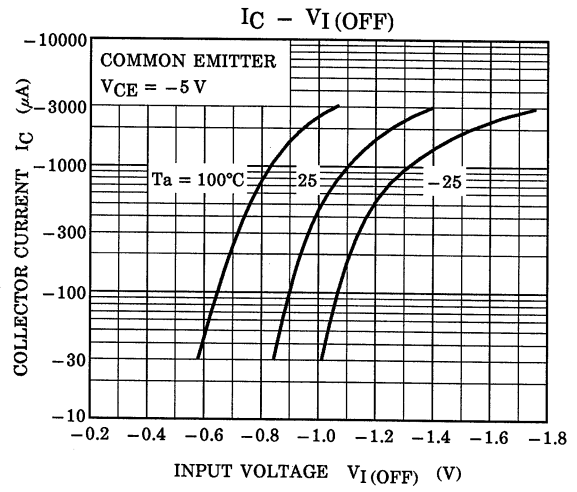
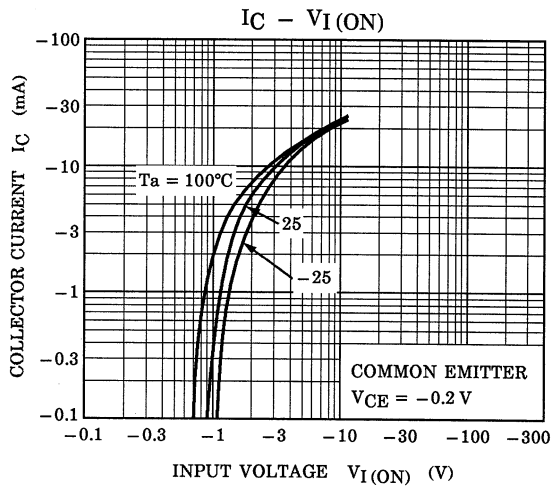
## Electrical Characteristics (Ta = 25°C) (Q2)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I <sub>CBO</sub>	V <sub>CB</sub> = 50 V, I <sub>E</sub> = 0	—	—	100	nA
	I <sub>CEO</sub>	V <sub>CE</sub> = 50 V, I <sub>B</sub> = 0	—	—	500	
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> = 7 V, I <sub>C</sub> = 0	0.078	—	0.145	mA
DC current gain	h <sub>FE</sub>	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 10 mA	80	—	—	
Collector-emitter saturation voltage	V <sub>CE (sat)</sub>	I <sub>C</sub> = 5 mA, I <sub>B</sub> = 0.25 mA	—	0.1	0.3	V
Input voltage (ON)	V <sub>I (ON)</sub>	V <sub>CE</sub> = 0.2 V, I <sub>C</sub> = 5 mA	1.0	—	2.6	V
Input voltage (OFF)	V <sub>I (OFF)</sub>	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 0.1 mA	0.6	—	1.16	V
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 5 mA	—	250	—	MHz
Collector output capacitance	C <sub>ob</sub>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0, f = 1 MHz	—	3	6	pF

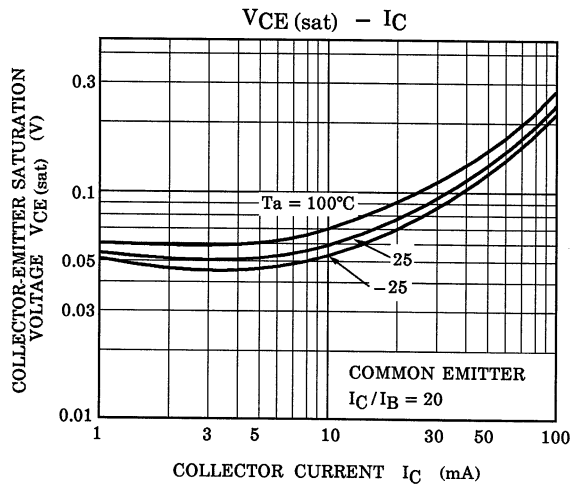
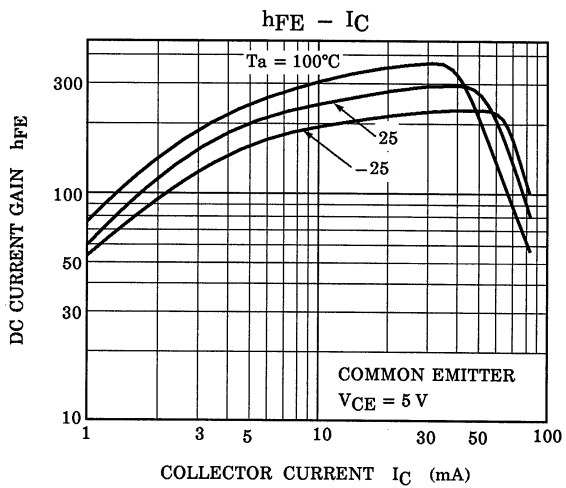
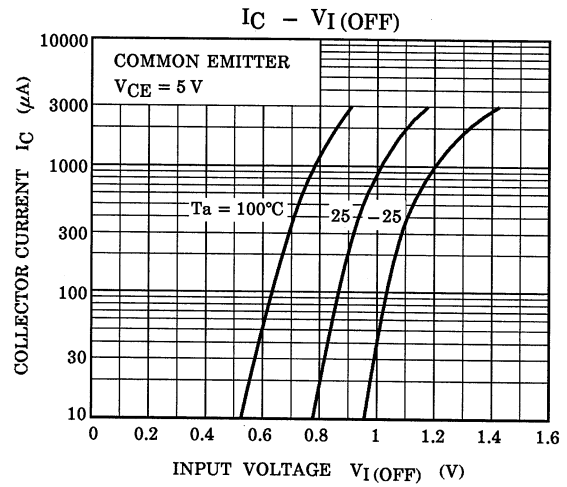
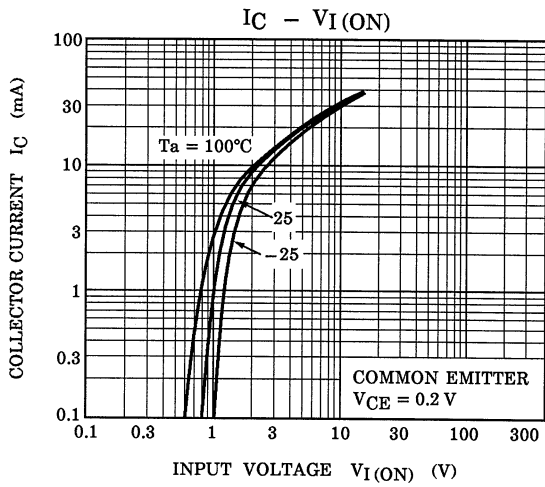
## Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Input resistor	R1	—	15.4	22	28.6	kΩ
Resistor ratio	R1/R2	—	0.421	0.468	0.515	

Q1



Q2



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