

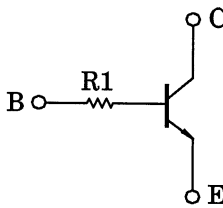
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process) (Bias Resistor built-in Transistor)

# RN1970, RN1971

Switching, Inverter Circuit, Interface Circuit and Driver Circuit

- Including two devices in US6 (ultra super mini type 6 leads)
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process and miniaturize equipment.
- Various resistance values are available to suit various circuit designs.
- Complementary to RN2970 and RN2971

### Equivalent Circuit



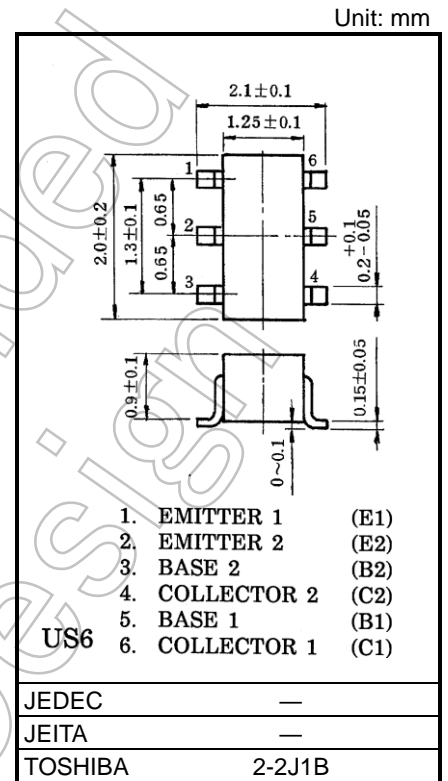
### Absolute Maximum Ratings (Ta = 25°C) (Q1, Q2 Common)

Characterisitic	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>	5	V
Collector current	I <sub>C</sub>	100	mA
Collector power dissipation	P <sub>C</sub> *	200	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.

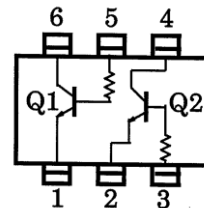
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

\*: Total rating



Weight: 6.8mg (typ.)

### Equivalent Circuit (Top View)



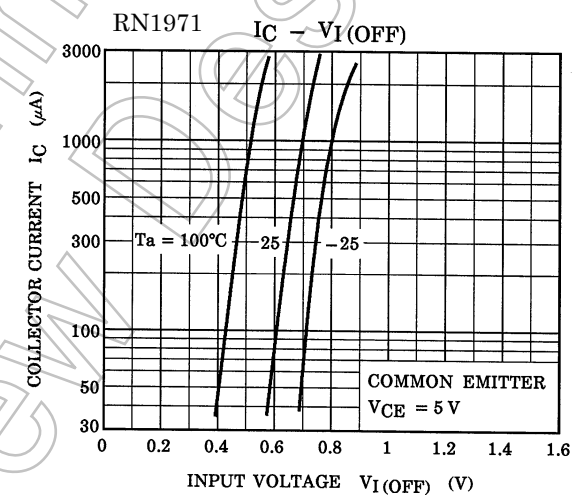
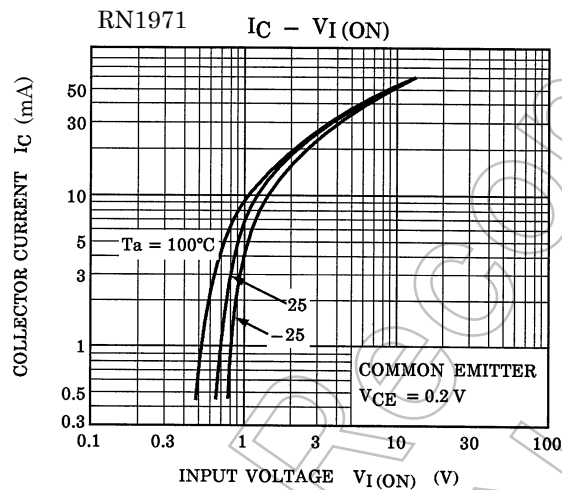
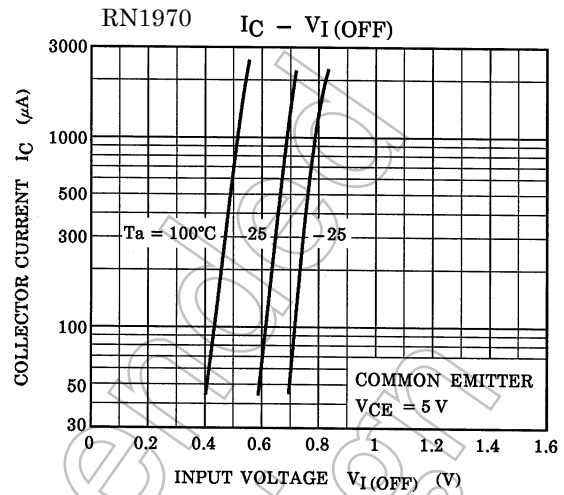
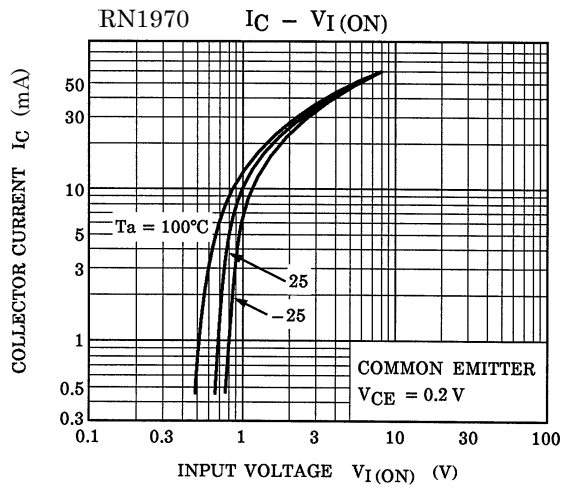
Start of commercial production  
1992-01

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

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit	
Collector cut-off current	ICBO	V <sub>CB</sub> = 5 V, I <sub>E</sub> = 0 mA	—	—	100	nA	
Emitter cut-off current	IEBO	V <sub>EB</sub> = 5 V, I <sub>C</sub> = 0 mA	—	—	100	nA	
DC current gain	hFE	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 1 mA	120	—	700	—	
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	
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 mA, f = 1 MHz	—	3	6	pF	
Input resistor	RN1970	R1	—	3.29	4.7	6.11	kΩ
	RN1971			7	10	13	

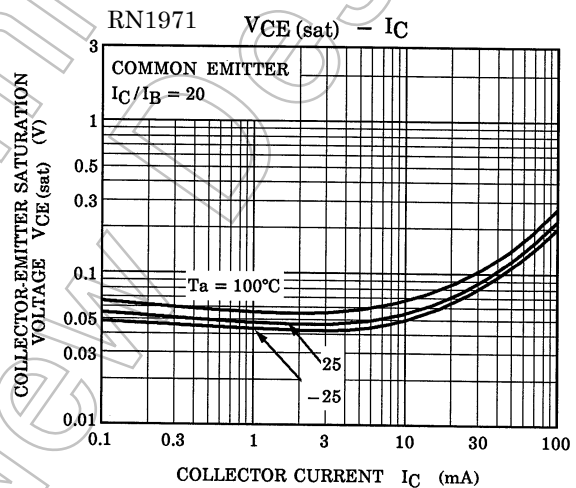
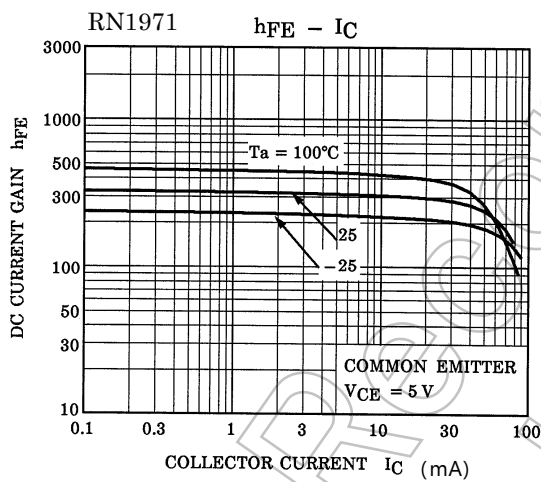
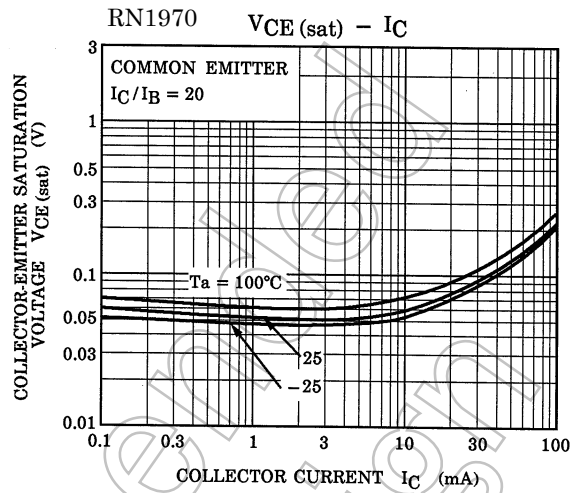
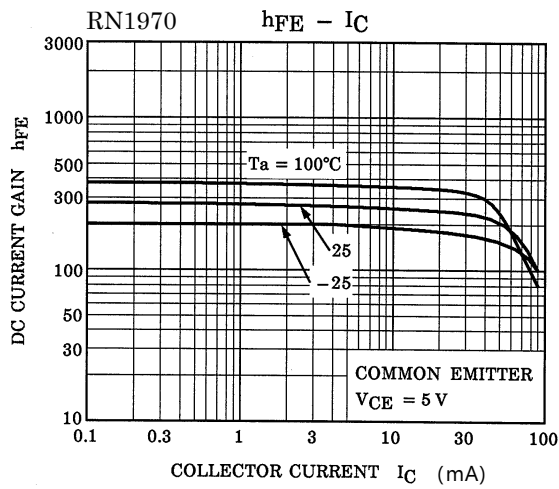
Not Recommended for New Design

### Characteristics Curves (Q1, Q2 Common)





The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

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### Marking

Part No.	Marking
RN1970	<p data-bbox="566 338 831 365">Part No.(abbreviation code)</p> 
RN1971	<p data-bbox="566 568 831 595">Part No.(abbreviation code)</p> 

Not Recommended for New Design

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