

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

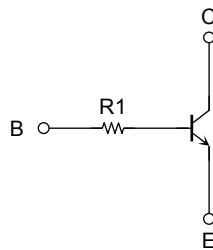
RN1970HFE,RN1971HFE

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

Unit: mm

- 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 enable the manufacture of ever more compact equipment and save assembly cost.
- Complementary to RN2970HFE, RN2971HFE

Equivalent Circuit



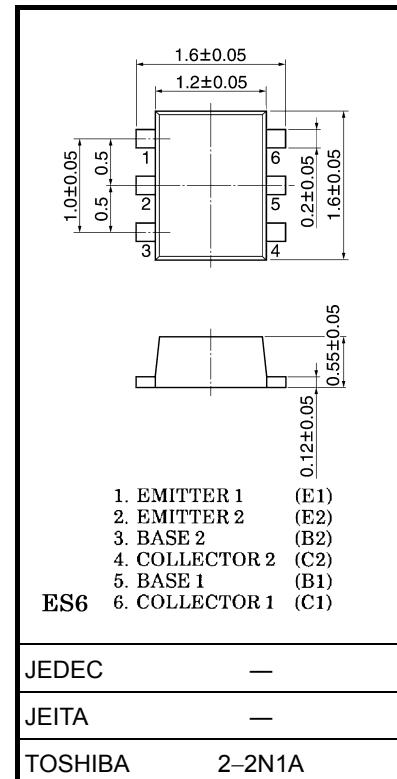
Absolute Maximum Ratings (Ta = 25°C) (Q1, Q2 common)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V _{CBO}	40	V
Collector-emitter voltage	V _{CEO}	40	V
Emitter-base voltage	V _{EBO}	5	V
Collector current	I _C	100	mA
Collector power dissipation	P _C (Note 1)	100	mW
Junction temperature	T _j	150	°C
Storage temperature range	T _{stg}	-55~150	°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.

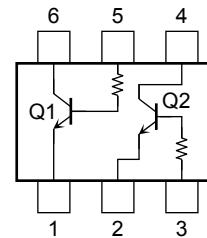
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1: Total rating



Weight:0.003g (typ.)

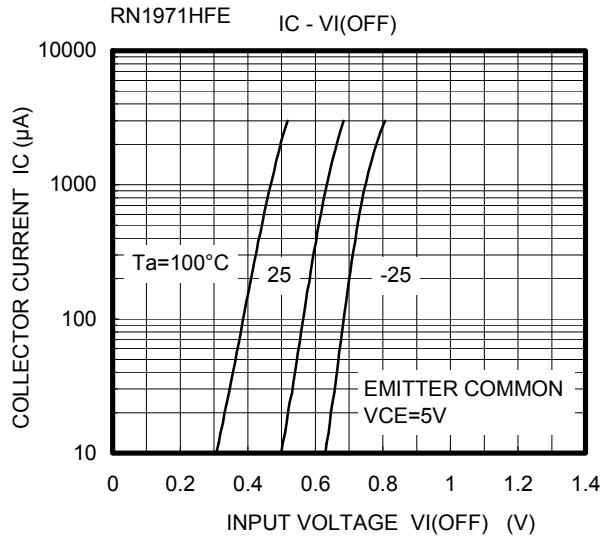
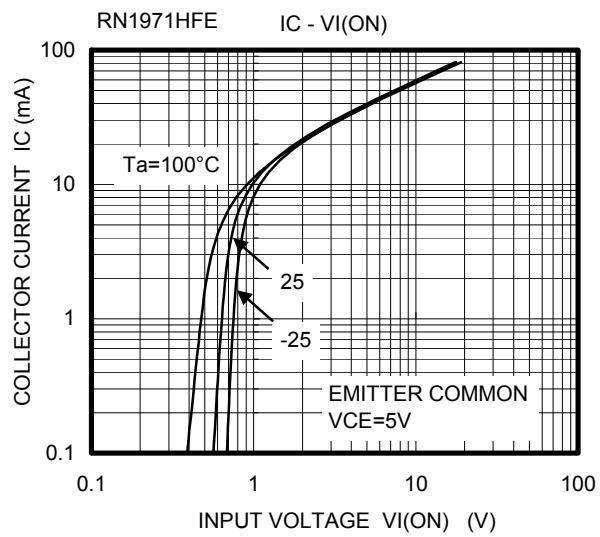
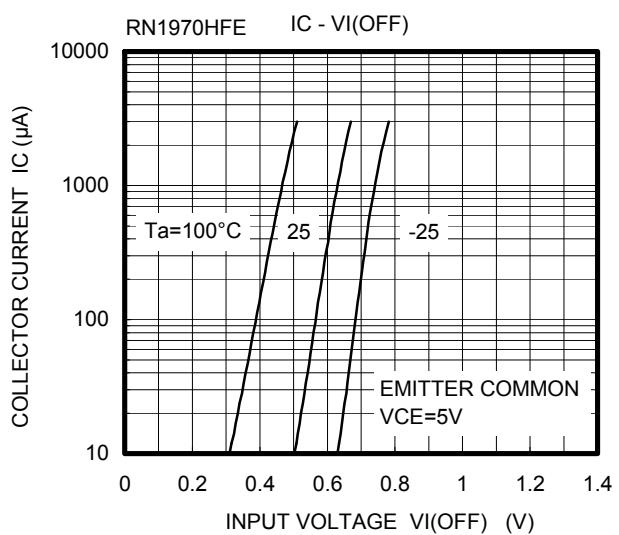
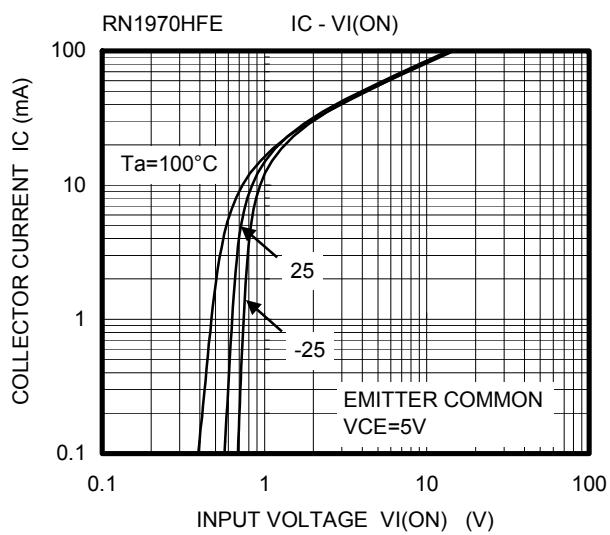
Equivalent Circuit (top view)



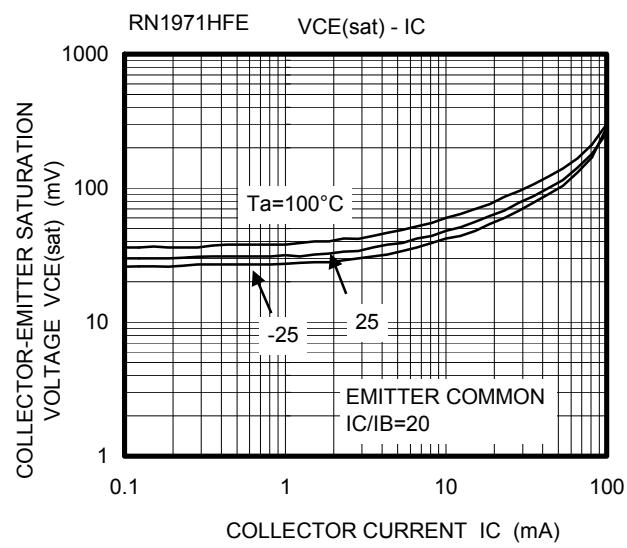
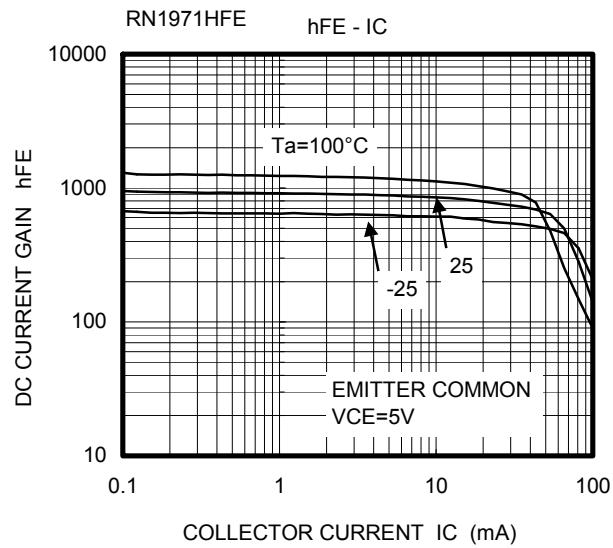
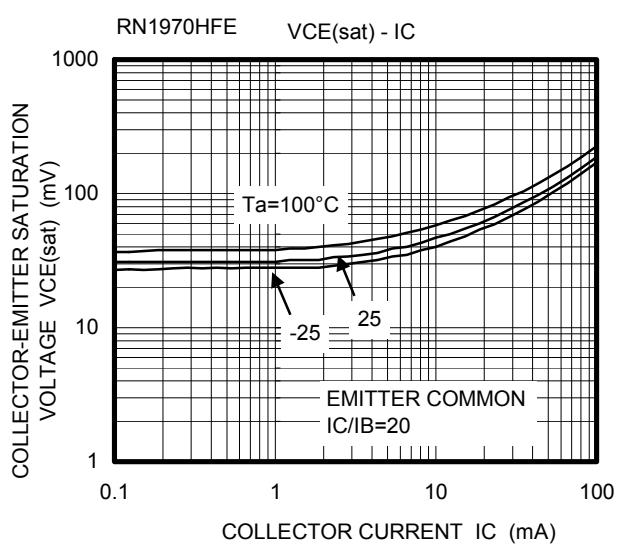
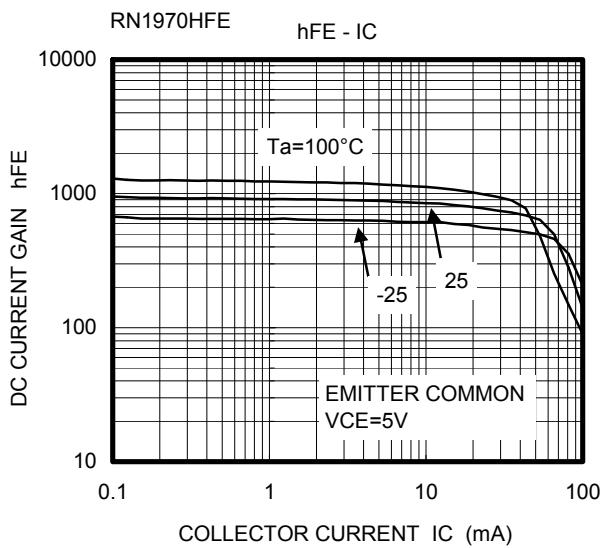
Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

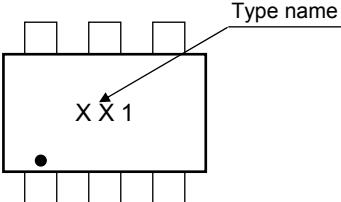
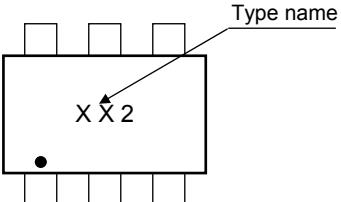
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit	
Collector cut-off current	I_{CBO}	$V_{CB} = 40 \text{ V}$, $I_E = 0$	—	—	100	nA	
Emitter cut-off current	I_{EBO}	$V_{EB} = 5 \text{ V}$, $I_C = 0$	—	—	100	nA	
DC current gain	h_{FE}	$V_{CE} = 5 \text{ V}$, $I_C = 1 \text{ mA}$	300	—	—		
Collector-emitter saturation voltage	$V_{CE} \text{ (sat)}$	$I_C = 5 \text{ mA}$, $I_B = 0.25 \text{ mA}$	—	0.06	0.15	V	
Transition frequency	f_T	$V_{CE} = 10 \text{ V}$, $I_C = 5 \text{ mA}$	—	250	—	MHz	
Collector output capacitance	C_{ob}	$V_{CB} = 10 \text{ V}$, $I_E = 0$, $f = 1 \text{ MHz}$	—	3	—	pF	
Input resistor	RN1970HFE	R1	—	3.76	4.7	5.64	kΩ
	RN1971HFE			8	10	12	

Q1, Q2 Common



Q1, Q2 Common



Type Name	Marking
RN1970HFE	 <p>Diagram showing the marking for RN1970HFE. The component is a rectangular package with a central rectangular marking area. Inside the marking area, the text 'XX1' is printed. Above the 'XX1' text, there is a small black dot. Above the central marking area, there are four small square pads arranged in a horizontal row. A line with an arrow points from the text 'Type name' to the 'XX1' marking.</p>
RN1971HFE	 <p>Diagram showing the marking for RN1971HFE. The component is a rectangular package with a central rectangular marking area. Inside the marking area, the text 'XX2' is printed. Above the 'XX2' text, there is a small black dot. Above the central marking area, there are four small square pads arranged in a horizontal row. A line with an arrow points from the text 'Type name' to the 'XX2' marking.</p>

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20070701-EN GENERAL

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