

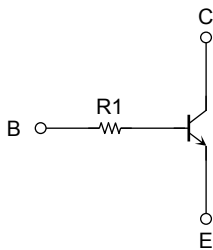
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

## RN1972HFE, RN1973HFE

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 enable the manufacture of ever more compact equipment and save assembly cost.
- Complementary to RN2972HFE, RN2973HFE

### Equivalent Circuit



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

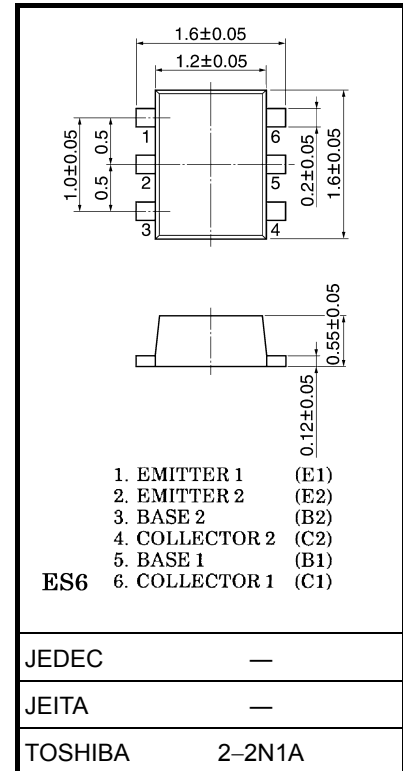
Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	40	V
Collector-emitter voltage	$V_{CEO}$	40	V
Emitter-base voltage	$V_{EBO}$	5	V
Collector current	$I_C$	100	mA
Collector power dissipation	$P_C$ (Note 1)	100	mW
Junction temperature	$T_j$	150	°C
Storage temperature range	$T_{stg}$	-55~150	°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).

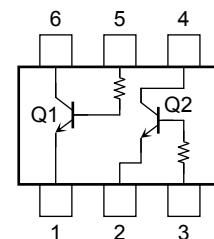
Note 1: Total rating

Unit: mm



Weight: 0.003g (typ.)

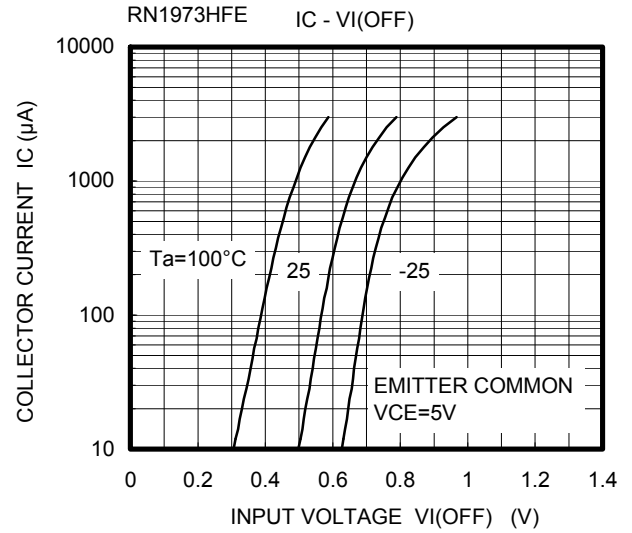
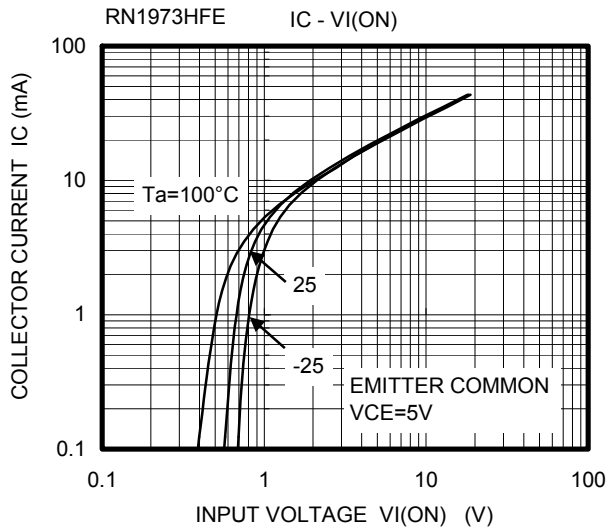
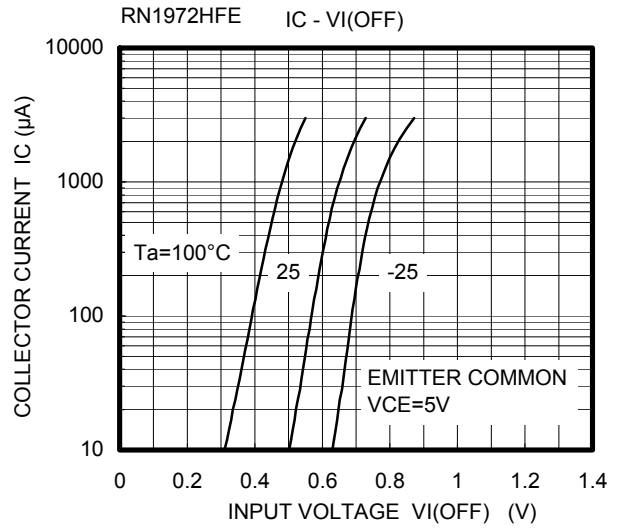
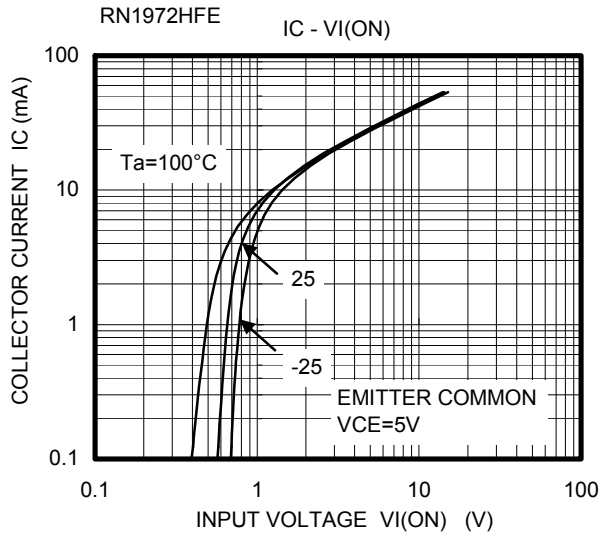
### Equivalent Circuit (top view)



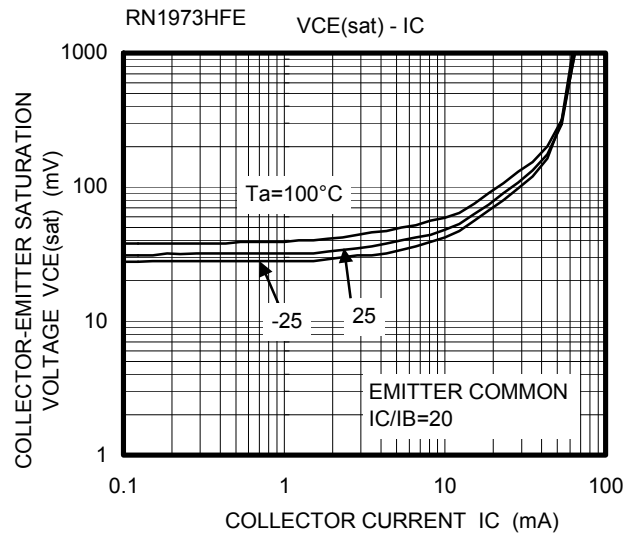
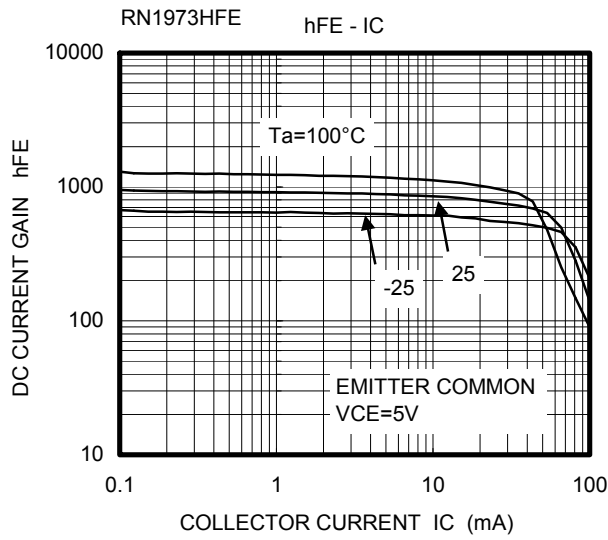
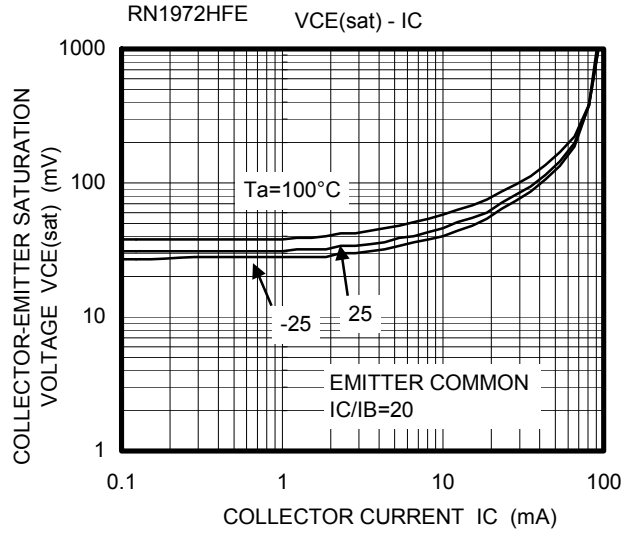
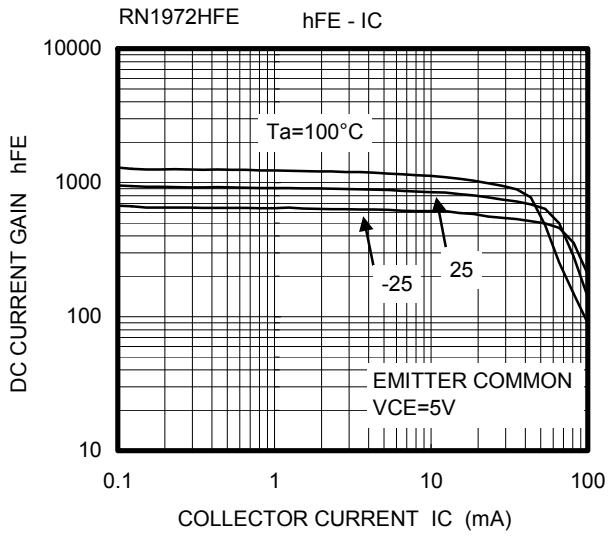
## Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

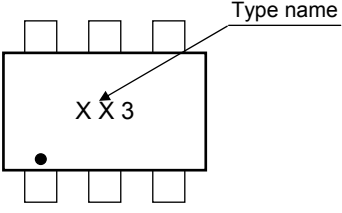
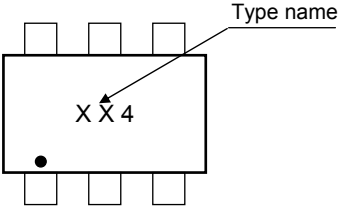
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		$I_{CBO}$	$V_{CB} = 40\text{ V}, I_E = 0$	—	—	100	nA
Emitter cut-off current		$I_{EBO}$	$V_{EB} = 5\text{ V}, I_C = 0$	—	—	100	nA
DC current gain		$h_{FE}$	$V_{CE} = 5\text{ V}, I_C = 1\text{ mA}$	300	—	—	
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 5\text{ mA}, I_B = 0.25\text{ mA}$	—	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	RN1972HFE	R1	—	17.6	22	26.4	kΩ
	RN1973HFE			37.6	47	56.4	

### Q1, Q2 Common



## Q1, Q2 Common



Type Name	Marking
RN1972HFE	 <p>The diagram shows a rectangular component with six pins (three on top, three on bottom). The marking on the component is "X X 3". A small black dot is located at the bottom-left corner of the component. An arrow labeled "Type name" points to the "X X 3" marking.</p>
RN1973HFE	 <p>The diagram shows a rectangular component with six pins (three on top, three on bottom). The marking on the component is "X X 4". A small black dot is located at the bottom-left corner of the component. An arrow labeled "Type name" points to the "X X 4" marking.</p>

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