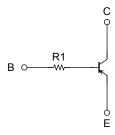
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

# RN2970FS,RN2971FS

# Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- Two devices are incorporated into a fine pitch Small Mold (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 RN1970FS, RN1971FS

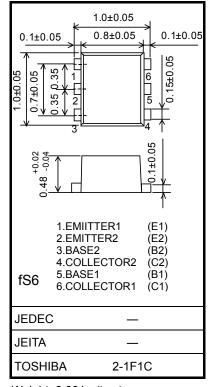
## **Equivalent Circuit and Bias Resistor Values**



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

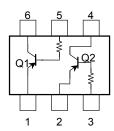
Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	-20	V
Collector-emitter voltage	$V_{CEO}$	-20	V
Emitter-base voltage	$V_{EBO}$	<b>-5</b>	V
Collector current	Ic	-50	mA
Collector power dissipation	P <sub>C</sub> (Note 1)	50	mW
Junction temperature	Tj	150	°C
Storage temperature range	T <sub>stg</sub>	-55~150	°C

Unit: mm



Weight: 0.001g (typ.)

## Equivalent Circuit (top view)



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.

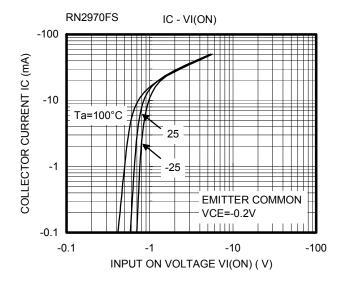
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

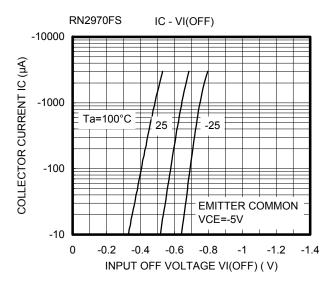
Note 1: Total rating

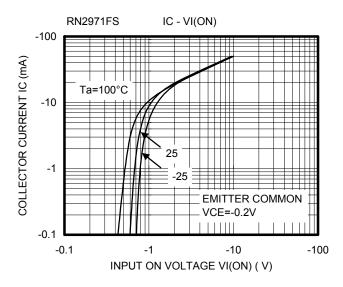
#### Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

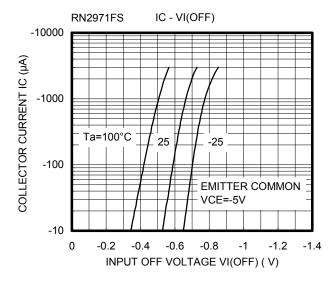
Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off curre	ent	I <sub>CBO</sub>	$V_{CB} = -20 \text{ V}, I_E = 0$	_	_	-100	nA
Emitter cut-off curren	t	I <sub>EBO</sub>	$V_{EB} = -5 \text{ V}, I_C = 0$	_	_	-100	nA
DC current gain		h <sub>FE</sub>	$V_{CE} = -5 \text{ V}, I_{C} = -1 \text{ mA}$	300	_	_	
Collector-emitter saturation voltage		V <sub>CE (sat)</sub>	$I_C = -5 \text{ mA}, I_B = -0.25 \text{ mA}$	_		-0.15	V
Collector output capacitance		C <sub>ob</sub>	$V_{CB} = -10 \text{ V}, I_{E} = 0, f = 1 \text{ MHz}$	_	1.2	_	pF
Input resistor	RN2970FS	R1	_	3.76	4.7	5.64	kΩ
	RN2971FS			8	10	12	

### (Q1,Q2 common)

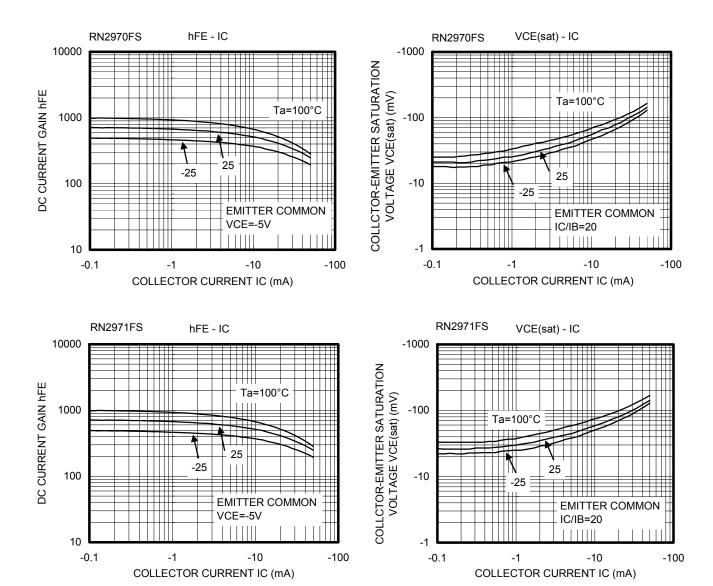


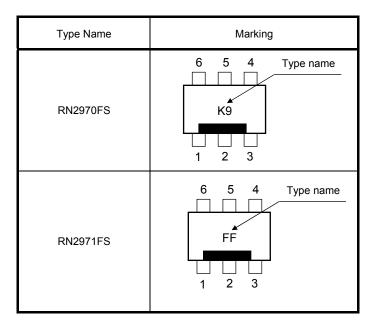






### (Q1,Q2 common)





## **Handling Precaution**

When handling individual devices (which are not yet mounted on a circuit board), be sure that the environment is protected against electrostatic electricity. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static materials.

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