Unit: mm

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

# **RN1112FS**, **RN1113FS**

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

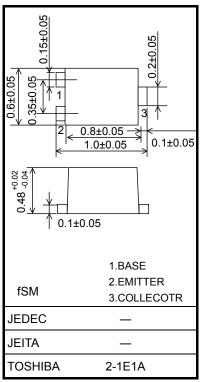
- Incorporating a bias resistor into a transistor reduces parts count.
   Reducing the parts count enables the manufacture of ever more compact equipment and lowers assembly cost.
- Complementary to RN2112FS, RN2113FS

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

$$B \circ \stackrel{R1}{\longrightarrow} C$$

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

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



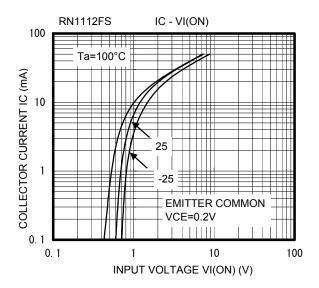
Weight: 0.0006 g (typ.)

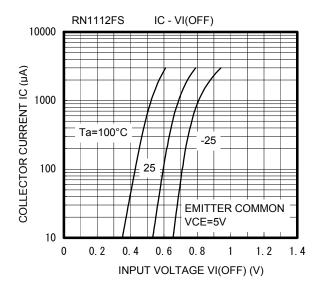
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

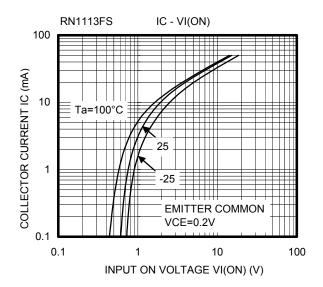
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

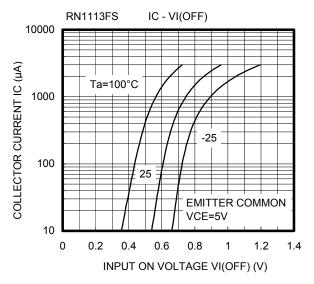
#### **Electrical Characteristics (Ta = 25°C)**

Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current		I <sub>CBO</sub>	$V_{CB} = 20 \text{ V}, I_{E} = 0$	_	_	100	nA
Emitter cut-off curren	t	I <sub>EBO</sub>	V <sub>EB</sub> = 5 V, I <sub>C</sub> = 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</sub> (sat)	$I_C = 5 \text{ mA}, I_B = 0.25 \text{ mA}$	_	_	0.15	V
Collector output capacitance		C <sub>ob</sub>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0, f = 1 MHz	_	1.2	_	pF
Input resistor	RN1112FS	- R1	_	17.6	22	26.4	kΩ
	RN1113FS			37.6	47	56.4	

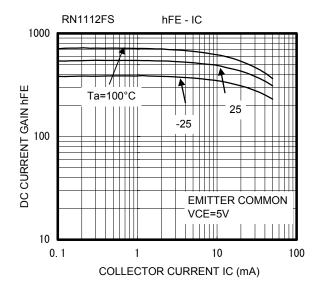


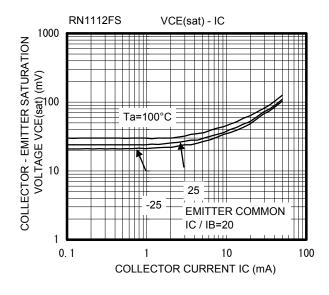


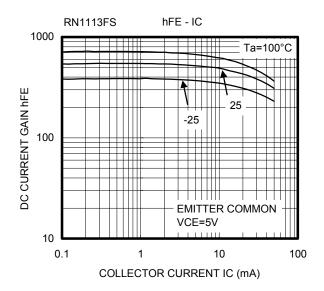


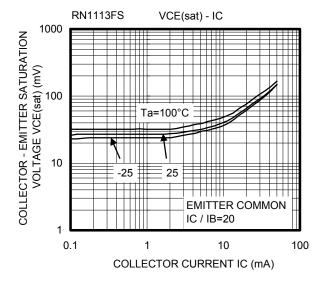


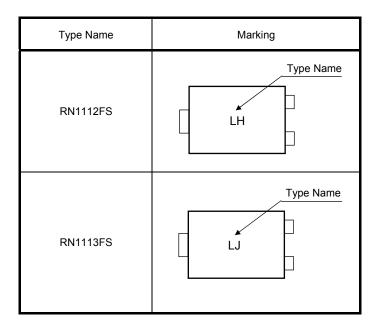
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## **Handling Precaution**

When handling individual devices (which are not yet mounted on a circuit board), be sure that the environment is protected against electrostatic discharge. 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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