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

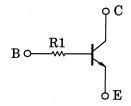
RN1110FS, RN1111FS

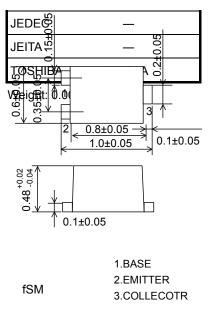
Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

Unit: mm

- 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 RN2110FS, RN2111FS

Equivalent Circuit and Bias Resistor Values





Absolute Maximum Ratings (Ta = 25°C)

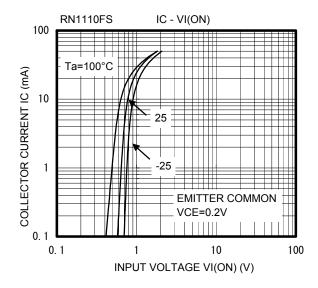
Characteristics	Symbol	Rating	Unit
Collector-base voltage	V _{CBO}	20	V
Collector-emitter voltage	V _{CEO}	20	V
Emitter-base voltage	V _{EBO}	5	V
Collector current	IC	50	mA
Collector power dissipation	PC	50	mW
Junction temperature	Tj	150	°C
Storage temperature range	T _{stg}	-55~150	°C

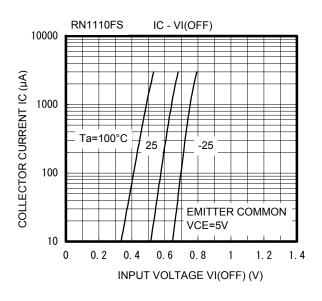
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

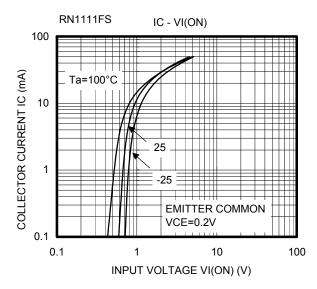
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

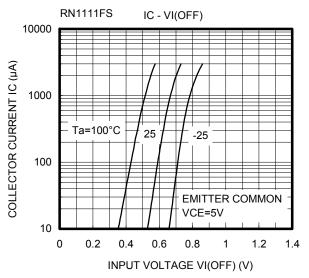
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off curre	ent	I _{CBO}	$V_{CB} = 20 \text{ V}, I_E = 0$	_	_	100	nA
Emitter cut-off curren	t	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 satu	ration voltage	V _{CE} (sat)	$I_C = 5 \text{ mA}, I_B = 0.25 \text{ mA}$	_	_	0.15	V
Collector output capacitance		$C_{\sf ob}$	$V_{CB} = 10 \text{ V}, I_{E} = 0, f = 1 \text{ MHz}$	_	1.2		pF
Input resistor	RN1110FS	- R1	_	3.76	4.7	5.64	kΩ
	RN1111FS			8	10	12	

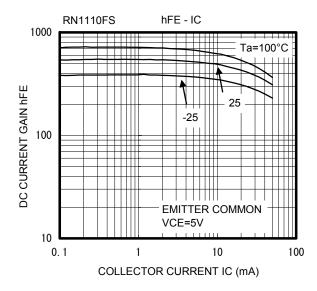


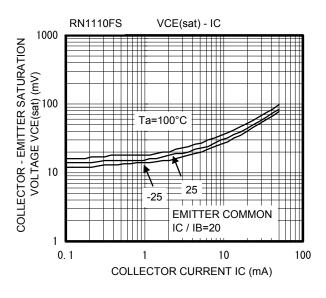


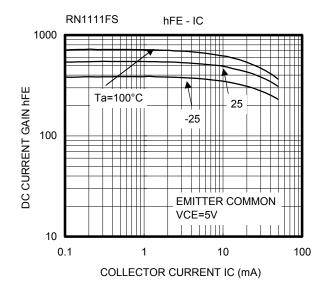


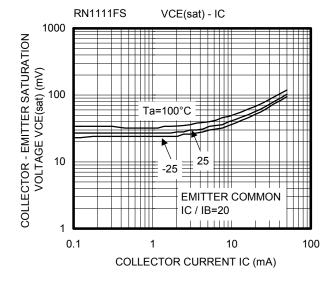


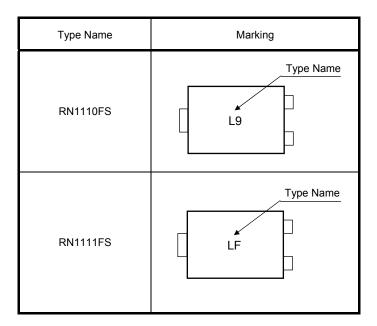
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Handling Precaution

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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