Unit: mm

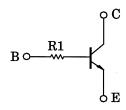
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process) (Bias Resistor built-in Transistor)

# RN1310,RN1311

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

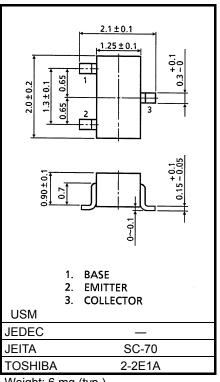
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN2310 and RN2311

#### **Equivalent Circuit**



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

Characterisstic	Symbol	Rating	Unit
Collector-base voltage	V <sub>CBO</sub>	50	V
Collector-emitter voltage	V <sub>CEO</sub>	50	<b>V</b>
Emitter-base voltage	V <sub>EBO</sub>	5	<b>V</b>
Collector current	IC	100	mA
Collector power dissipation	PC	100	mW
Junction temperature	Tj	150	°C
Storage temperature range	T <sub>stg</sub>	−55 to 150	°C



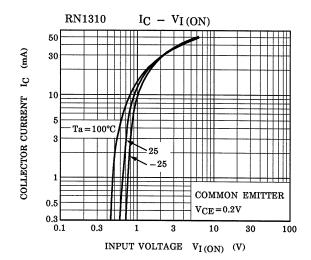
Weight: 6 mg (typ.)

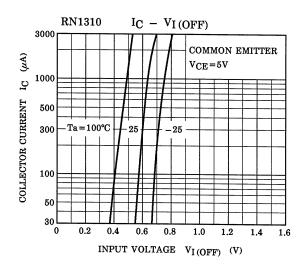
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

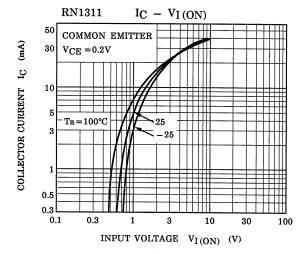
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

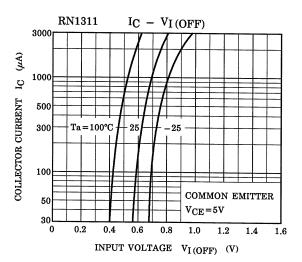
#### **Electrical Characteristics (Ta = 25°C)**

Characteristic		Symbol	Test Circuit	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current		I <sub>CBO</sub>	_	V <sub>CB</sub> = 50V, I <sub>E</sub> = 0	_	_	100	nA
Emitter cut-off current		I <sub>EBO</sub>	_	$V_{EB} = 5V, I_{C} = 0$	_	_	100	nA
DC current gain		h <sub>FE</sub>	_	$V_{CE}$ = 5V, $I_{C}$ = 1mA	120	_	700	_
Collector-emitter saturation voltage		V <sub>CE</sub> (sat)	_	I <sub>C</sub> = 5mA, I <sub>B</sub> = 0.25mA	_	0.1	0.3	V
Transition frequency		f <sub>T</sub>	_	V <sub>CE</sub> = 10V, I <sub>C</sub> = 5mA	_	250	_	MHz
Collector output capacitance		C <sub>ob</sub>	_	V <sub>CB</sub> = 10V, I <sub>E</sub> = 0, f = 1MHz	_	3	6	pF
Input resistor	RN1310	- R1	_	_	3.29	4.7	6.11	kΩ
	RN1311				7	10	13	

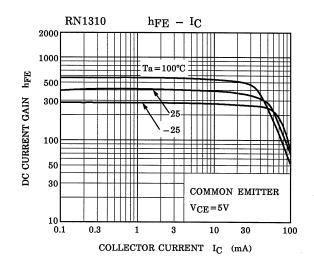


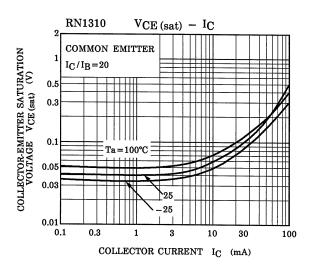


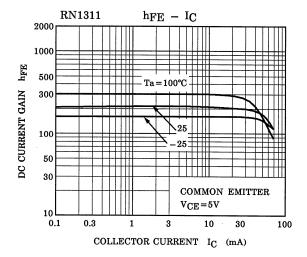


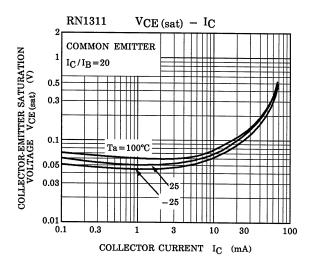


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## Marking

Type Name	Marking	
RN1310	Type Name  X K	
RN1311	Type Name  X M	

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