

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

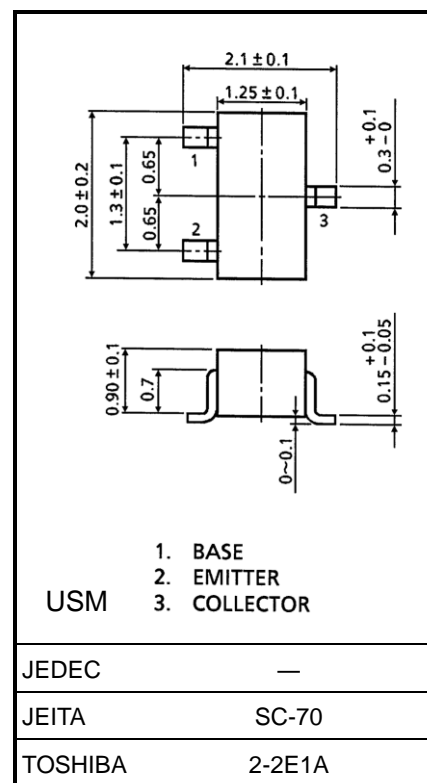
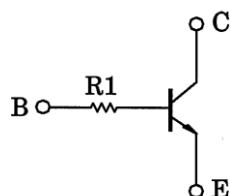
# RN1310, RN1311

Switching, Inverter Circuit, Interface Circuit and Driver Circuit

Unit: mm

- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process and miniaturize equipment.
- Various resistance values are available to suit various circuit designs.
- Complementary to RN2310 and RN2311

## Equivalent Circuit



Weight: 6 mg (typ.)

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

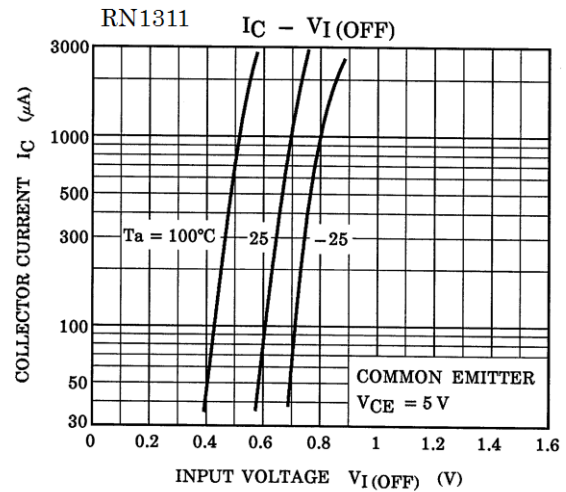
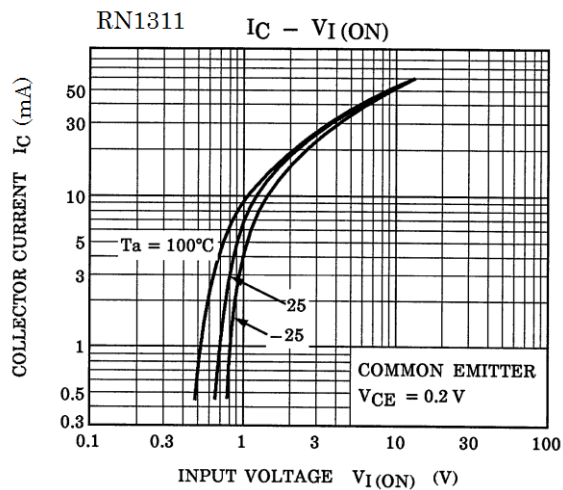
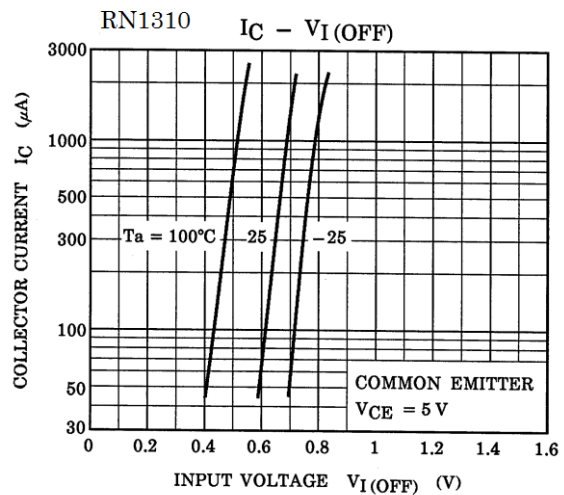
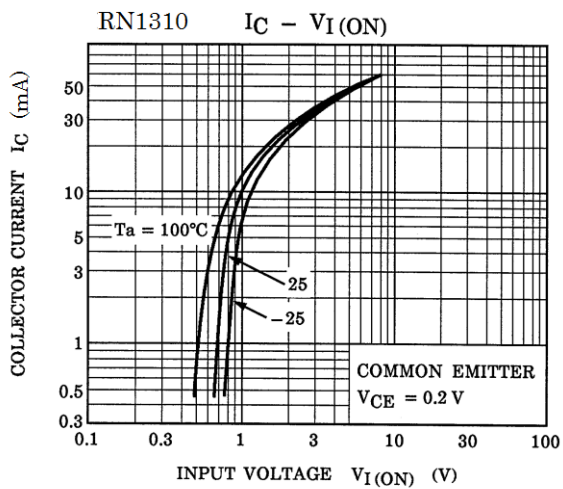
Characterisctic	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	50	V
Collector-emitter voltage	$V_{CEO}$	50	V
Emitter-base voltage	$V_{EBO}$	5	V
Collector current	$I_C$	100	mA
Collector power dissipation	$P_C$	100	mW
Junction temperature	$T_j$	150	°C
Storage temperature range	$T_{stg}$	-55 to 150	°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).

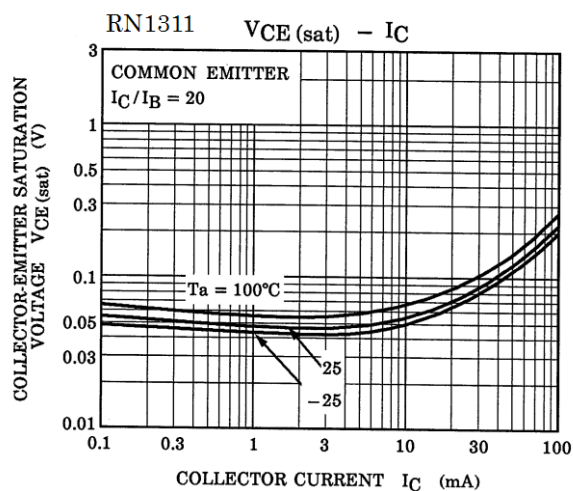
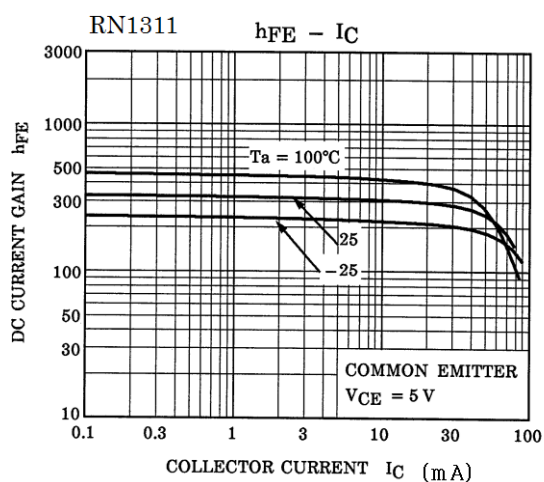
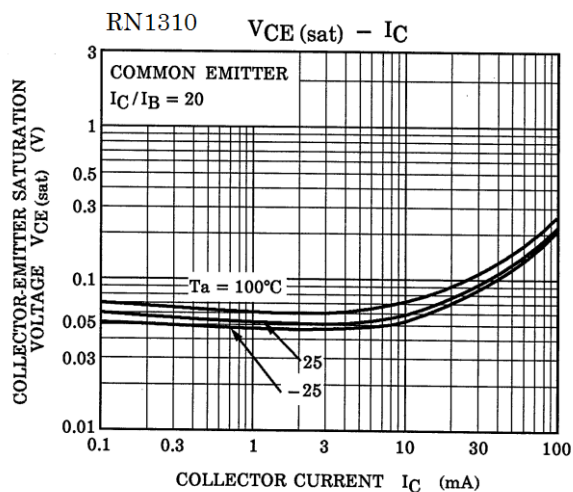
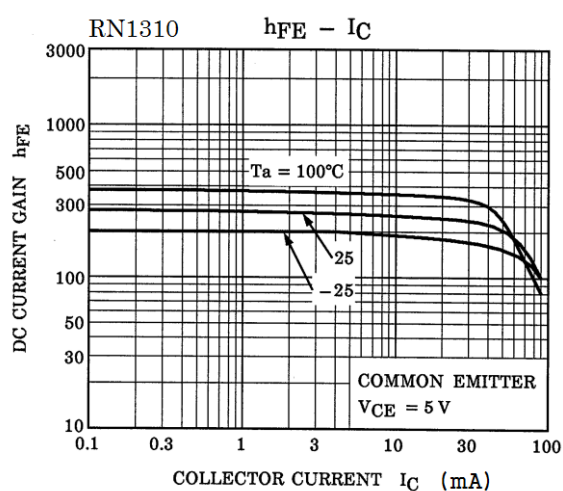
Start of commercial production  
1987-07

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

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

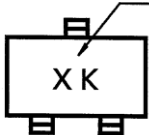
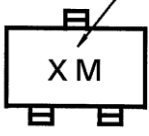


The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.



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### Marking

Part No	Marking
RN1310	<p>Part No.(abbreviation code)</p> 
RN1311	<p>Part No.(abbreviation code)</p> 

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