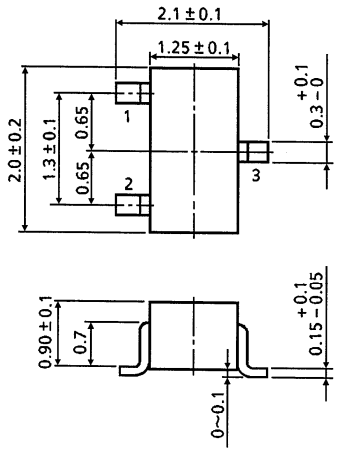
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process) (Bias Resistor built-in Transistor)

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

Unit: mm

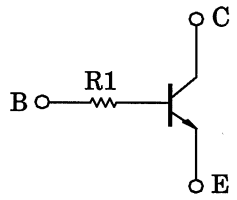


1. BASE
2. EMITTER
3. COLLECTOR

USM	
JEDEC	—
JEITA	SC-70
TOSHIBA	2-2E1A

Weight: 6 mg (typ.)

Equivalent Circuit



Absolute Maximum Ratings (Ta = 25°C)

Characterisstic	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

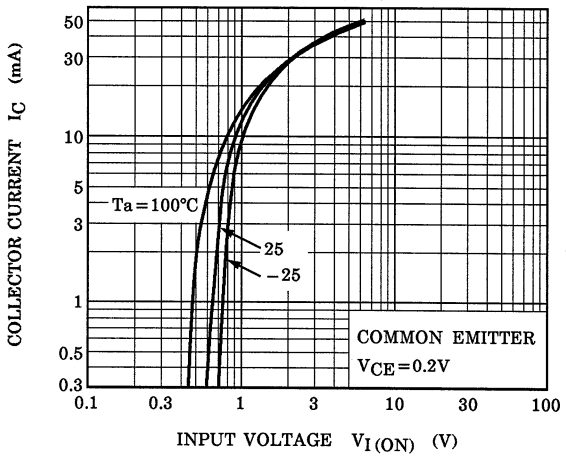
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

Electrical Characteristics (Ta = 25°C)

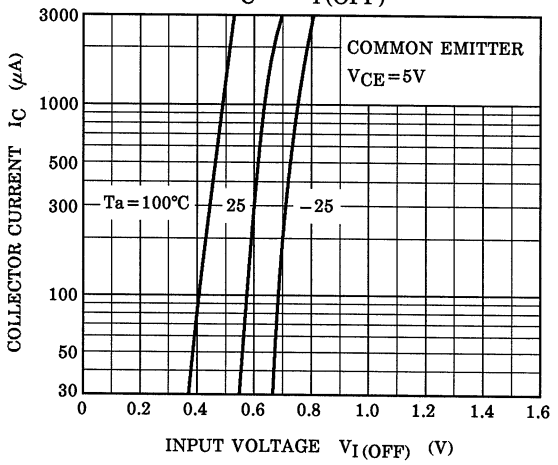
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	—	V_{CB} = 50V, I_E = 0	—	—	100	nA
Emitter cut-off current		I_{EBO}	—	V_{EB} = 5V, I_C = 0	—	—	100	nA
DC current gain		h_{FE}	—	V_{CE} = 5V, I_C = 1mA	120	—	700	—
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	—	I_C = 5mA, I_B = 0.25mA	—	0.1	0.3	V
Transition frequency		f_T	—	V_{CE} = 10V, I_C = 5mA	—	250	—	MHz
Collector output capacitance		C_{ob}	—	V_{CB} = 10V, I_E = 0, f = 1MHz	—	3	6	pF
Input resistor	RN1310	R1	—	—	3.29	4.7	6.11	kΩ
	RN1311				7	10	13	

Start of commercial production
1987-07

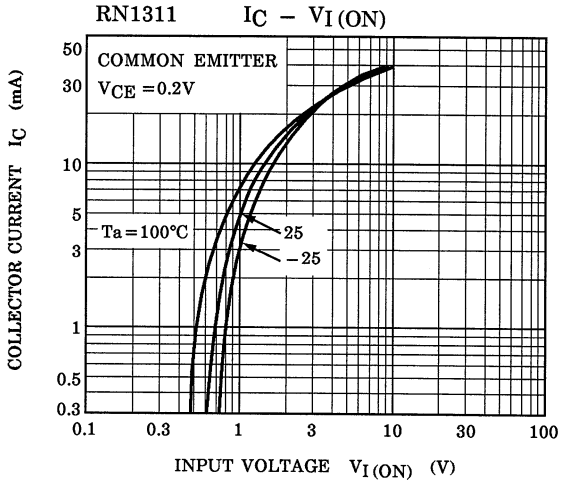
RN1310 $I_C - V_{I(ON)}$



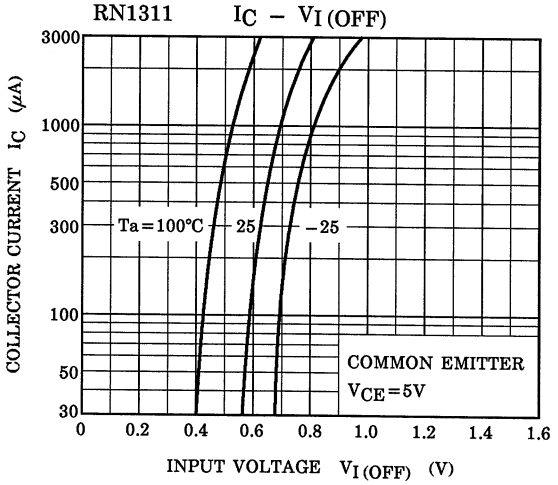
RN1310 $I_C - V_{I(OFF)}$



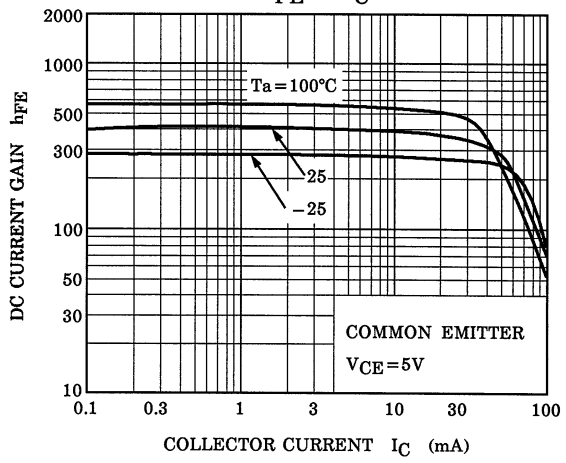
RN1311 $I_C - V_{I(ON)}$



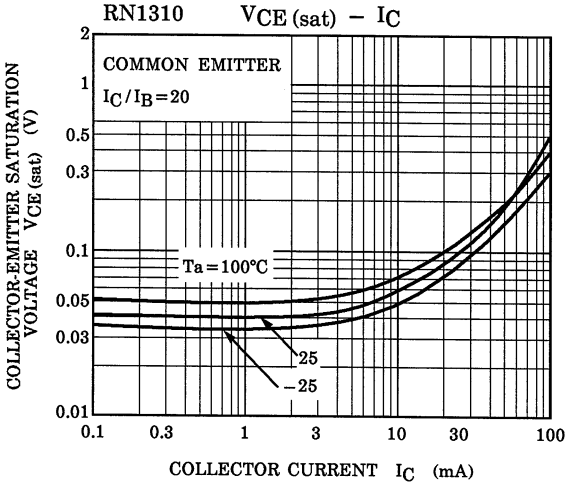
RN1311 $I_C - V_{I(OFF)}$



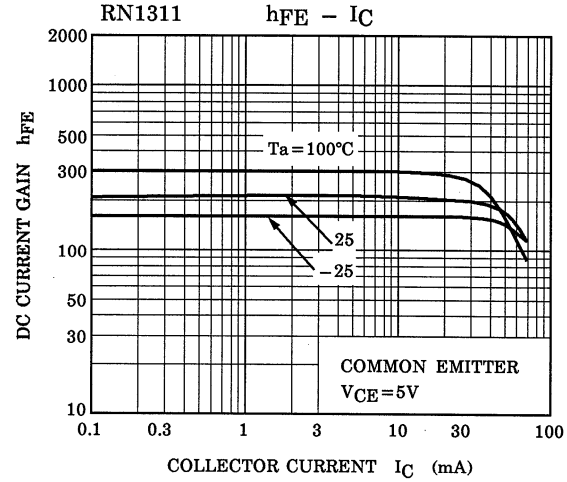
RN1310 h_{FE} – I_C



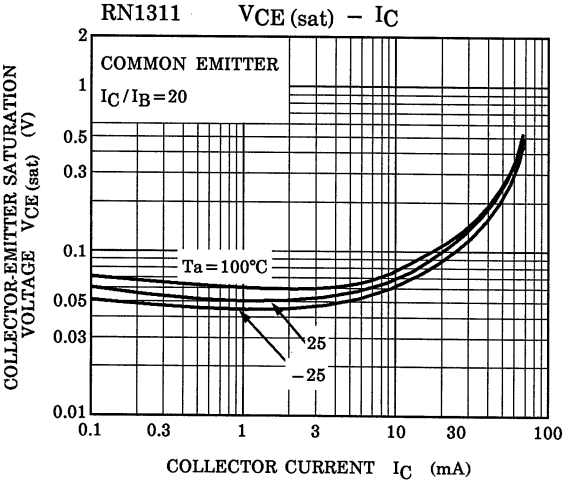
RN1310 $V_{CE\,(sat)}$ – I_C



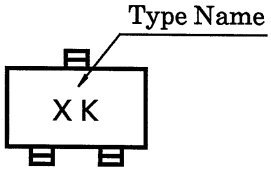
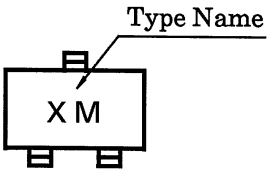
RN1311 h_{FE} – I_C



RN1311 $V_{CE\,(sat)}$ – I_C



Marking

Type Name	Marking
RN1310	
RN1311	

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