

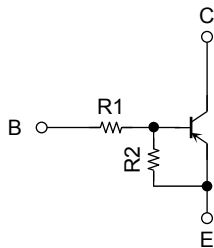
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process) (Bias Resistor Built-in Transistor)

## RN2707JE, RN2708JE, RN2709JE

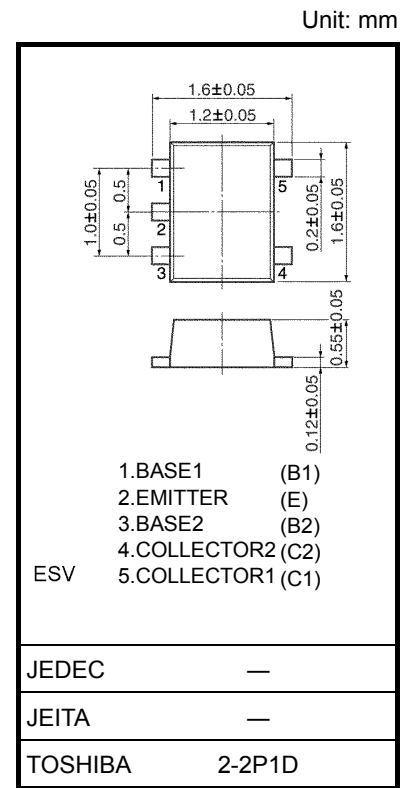
Switching, Inverter Circuit, Interface Circuit and  
Driver Circuit Applications

- Two devices are incorporated into an Extreme-Super-Mini (5 pin) package.
- 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.
- A wide range of resistor values are available for use in various circuit designs.
- Complementary to RN1707JE to RN1709JE

### Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN2707JE	10	47
RN2708JE	22	47
RN2709JE	47	22

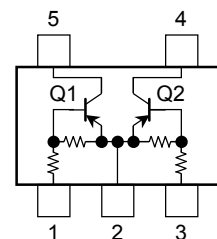


Weight: 3 mg (typ.)

### Absolute Maximum Ratings (Ta = 25°C) (Q1, Q2 common)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	RN2707JE to 2709JE V <sub>CB0</sub>	−50	V
Collector-emitter voltage	V <sub>CEO</sub>	−50	V
Emitter-base voltage	RN2707JE RN2708JE RN2709JE V <sub>EB0</sub>	−6 −7 −15	V
Collector current	I <sub>C</sub>	−100	mA
Collector power dissipation	RN2707JE to 2709JE P <sub>C</sub> (Note 1)	100	mW
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature range	T <sub>stg</sub>	−55~150	°C

### Equivalent Circuit (top view)



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.

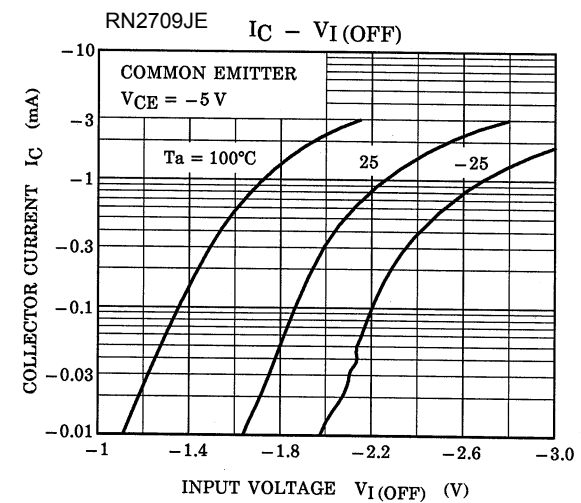
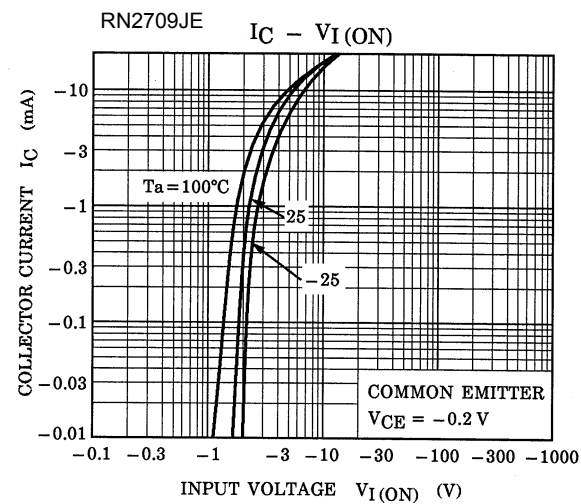
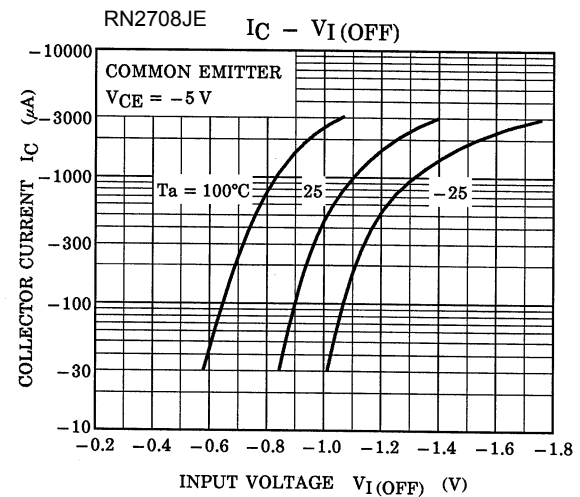
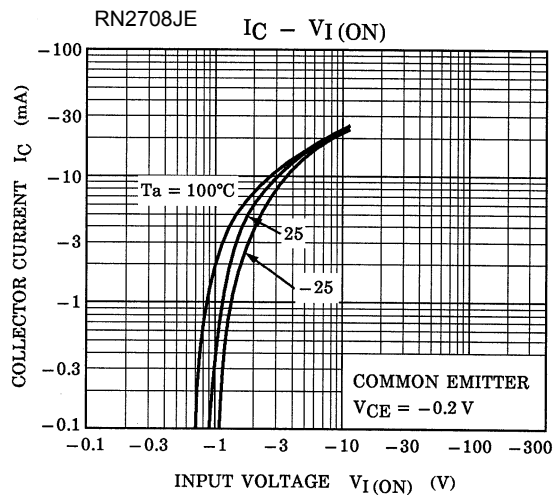
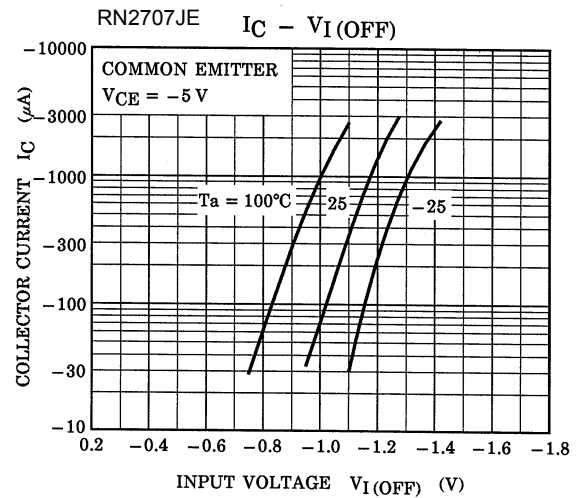
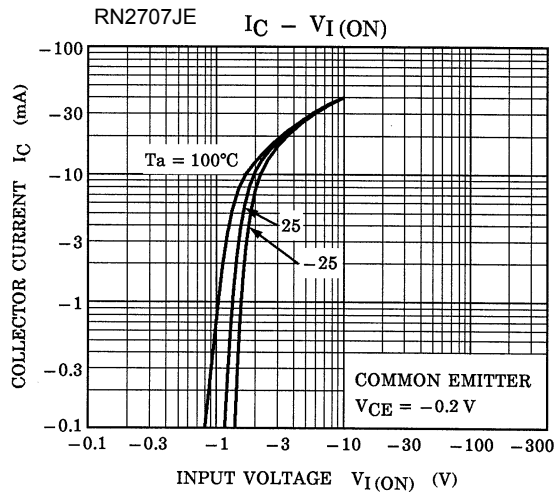
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1: Total rating

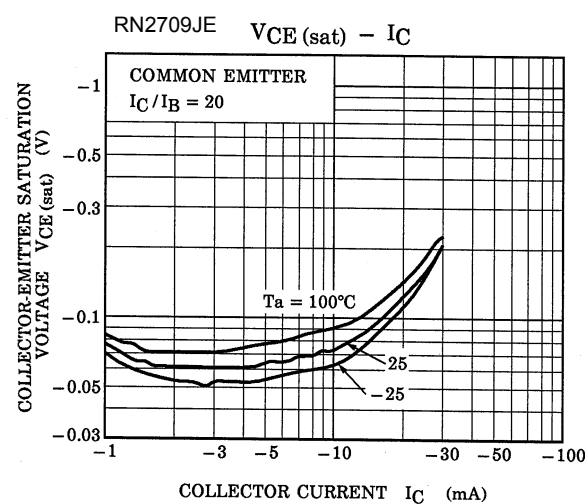
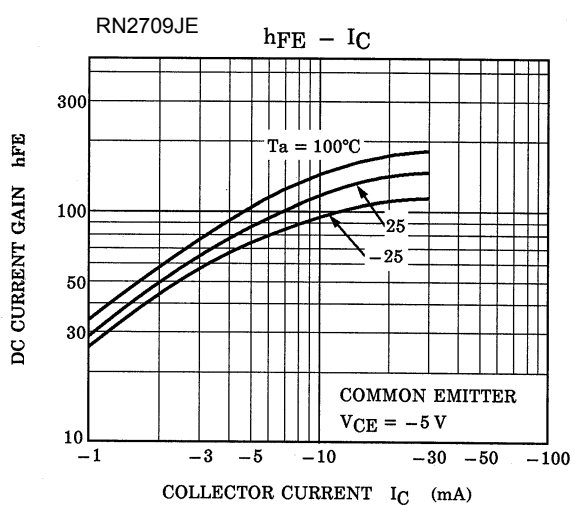
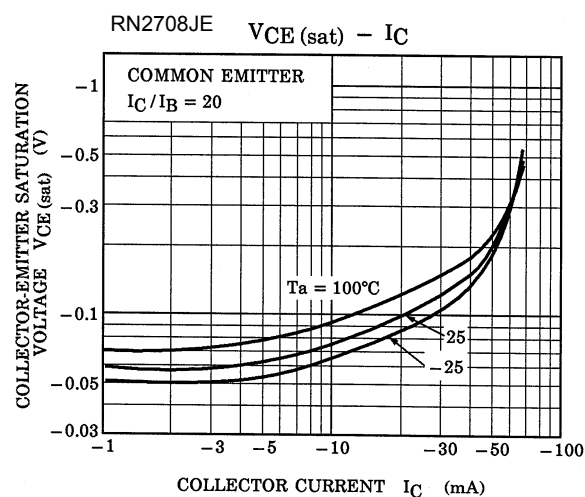
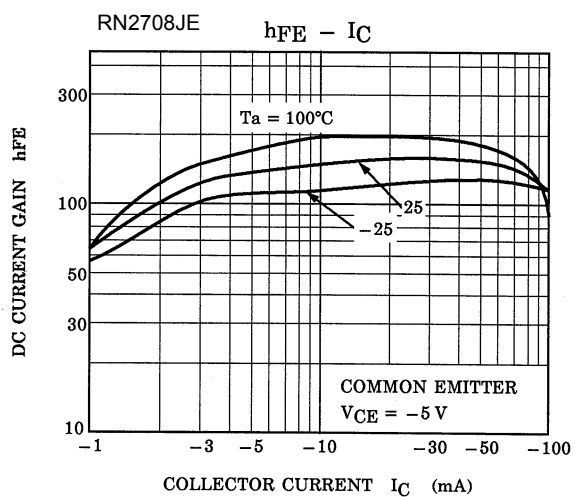
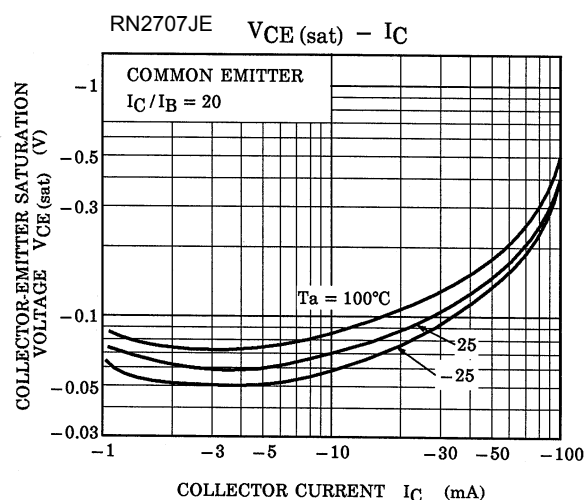
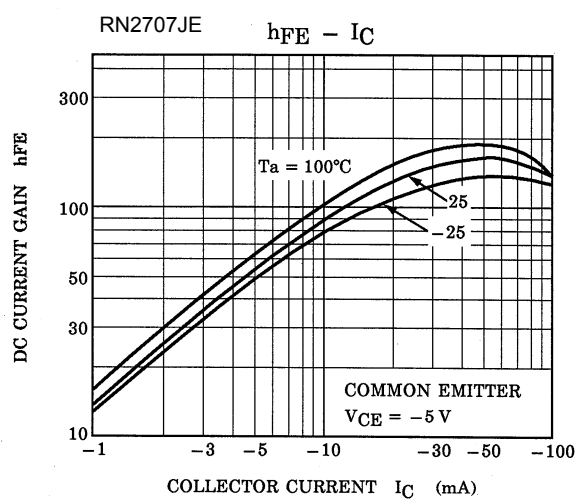
**Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)**

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2707JE to 2709JE	$I_{CBO}$	$V_{CB} = -50\text{ V}, I_E = 0$	—	—	-100	nA
		$I_{CEO}$	$V_{CE} = -50\text{ V}, I_B = 0$	—	—	-500	
Emitter cut-off current	RN2707JE	$I_{EBO}$	$V_{EB} = -6\text{ V}, I_C = 0$	-0.081	—	-0.15	mA
	RN2708JE		$V_{EB} = -7\text{ V}, I_C = 0$	-0.078	—	-0.145	
	RN2709JE		$V_{EB} = -15\text{ V}, I_C = 0$	-0.167	—	-0.311	
DC current gain	RN2707JE	$h_{FE}$	$V_{CE} = -5\text{ V}, I_C = -10\text{ mA}$	80	—	—	—
	RN2708JE			80	—	—	
	RN2709JE			70	—	—	
Collector-emitter saturation voltage	RN2707JE to 2709JE	$V_{CE(sat)}$	$I_C = -5\text{ mA}, I_B = -0.25\text{ mA}$	—	-0.1	-0.3	V
Input voltage (ON)	RN2707JE	$V_I(ON)$	$V_{CE} = -0.2\text{ V}, I_C = -5\text{ mA}$	-0.7	—	-1.8	V
	RN2708JE			-1.0	—	-2.6	
	RN2709JE			-2.2	—	-5.8	
Input voltage (OFF)	RN2707JE	$V_I(OFF)$	$V_{CE} = -5\text{ V}, I_C = -0.1\text{ mA}$	-0.5	—	-1.0	V
	RN2708JE			-0.6	—	-1.16	
	RN2709JE			-1.5	—	-2.6	
Transition frequency	RN2707JE to 2709JE	$f_T$	$V_{CE} = -10\text{ V}, I_C = -5\text{ mA}$	—	200	—	MHz
Collector output capacitance	RN2707JE to 2709JE	$C_{ob}$	$V_{CB} = -10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	3	6	pF
Input resistor	RN2707JE	R1	—	7	10	13	kΩ
	RN2708JE			15.4	22	28.6	
	RN2709JE			32.9	47	61.1	
Resistor ratio	RN2707JE	R1/R2	—	0.191	0.213	0.232	—
	RN2708JE			0.421	0.468	0.515	
	RN2709JE			1.92	2.14	2.35	

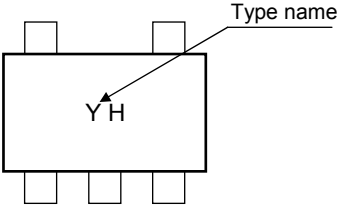
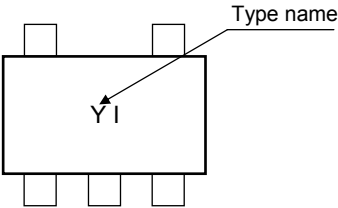
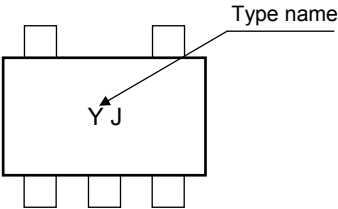
## Q1, Q2 Common



## Q1, Q2 Common



**Marking**

Type Name	Marking
RN2707JE	 <p>The diagram shows a rectangular component with four pins on each of the longer sides. An arrow points from the text 'Type name' to the marking 'YH' on the component.</p>
RN2708JE	 <p>The diagram shows a rectangular component with four pins on each of the longer sides. An arrow points from the text 'Type name' to the marking 'YI' on the component.</p>
RN2709JE	 <p>The diagram shows a rectangular component with four pins on each of the longer sides. An arrow points from the text 'Type name' to the marking 'YJ' on the component.</p>

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