

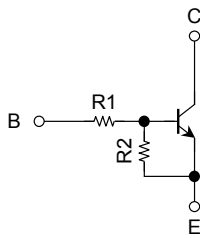
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process) (Bias Resistor Built-in Transistor)

RN1707JE, RN1708JE, RN1709JE

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

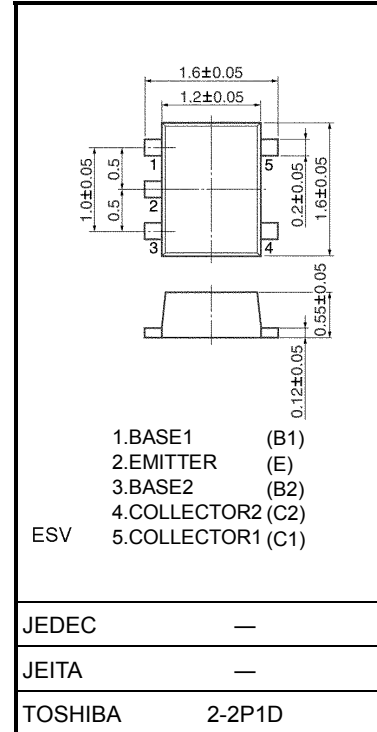
- Two devices are incorporated into an Extreme-Super-Mini (5-pin) package.
- Incorporating a bias resistor into a transistor reduces parts count. Reducing the parts count enables the manufacture of ever more compact equipment and lowers assembly cost.
- A wide range of resistor values is available to use in various circuit designs.
- Complementary to RN2707JE~RN2709JE

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1707JE	10	47
RN1708JE	22	47
RN1709JE	47	22

Unit: mm



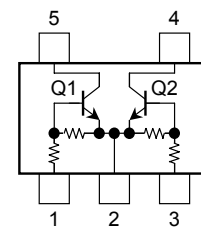
Weight:0.003g (typ.)

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

Characteristics		Symbol	Rating	Unit
Collector-base voltage	RN1707JE~1709JE	V_{CBO}	50	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage	RN1707JE	V_{EBO}	6	V
	RN1708JE		7	
	RN1709JE		15	
Collector current	RN1707JE~1709JE	I_C	100	mA
Collector power dissipation		P_C (Note)	100	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	-55~150	°C

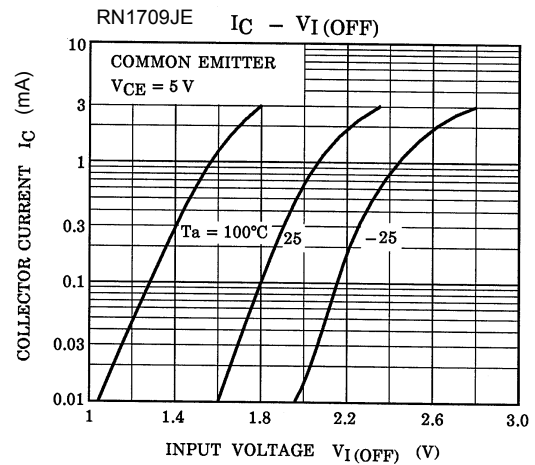
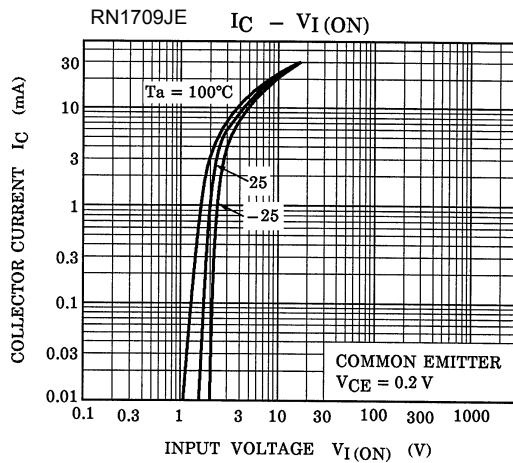
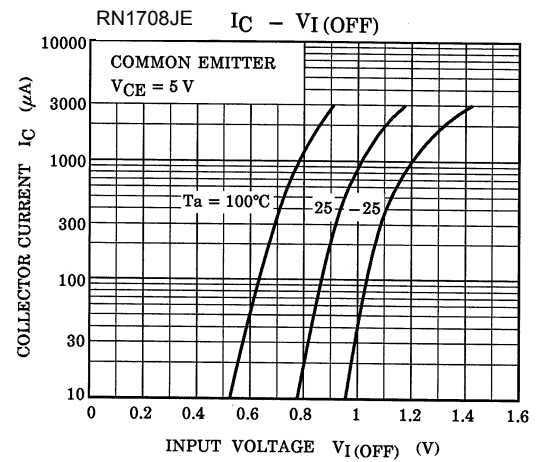
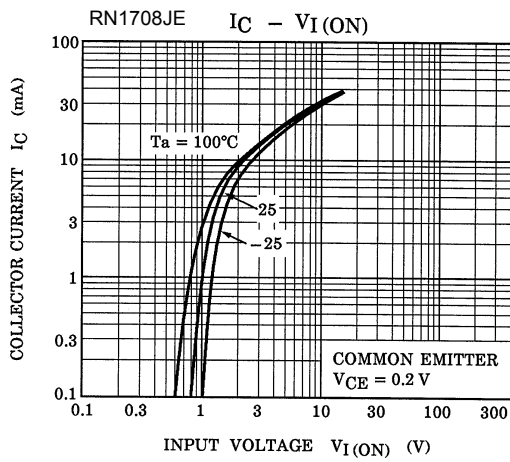
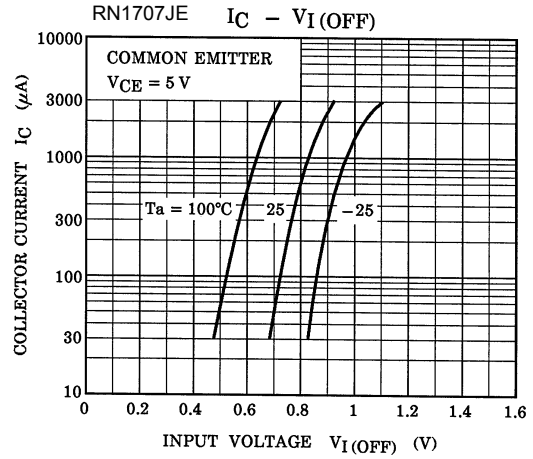
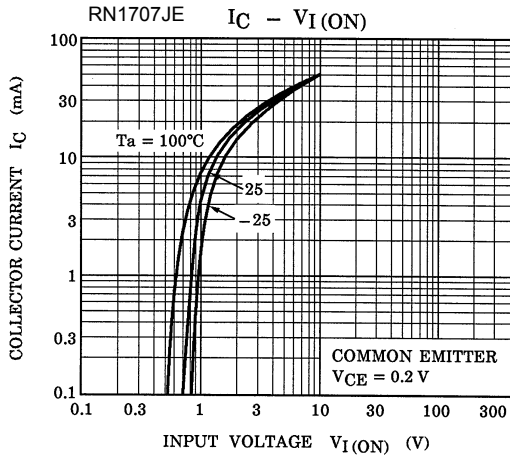
Note: Total rating

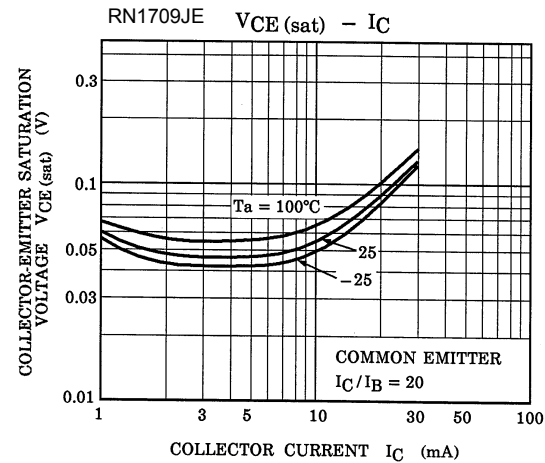
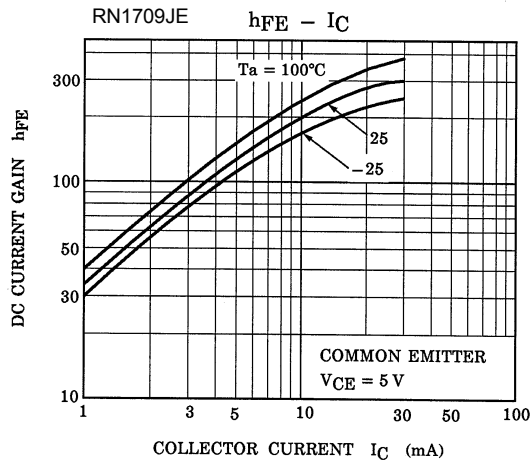
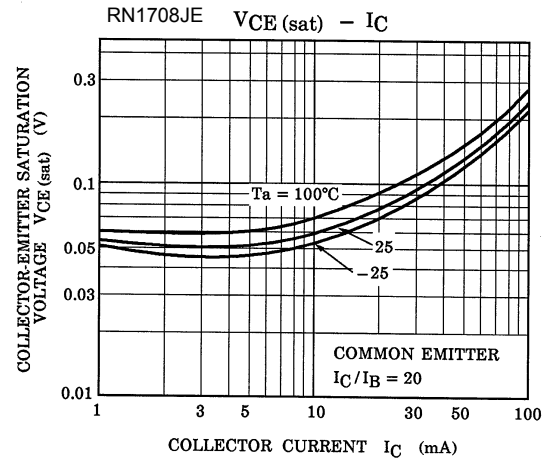
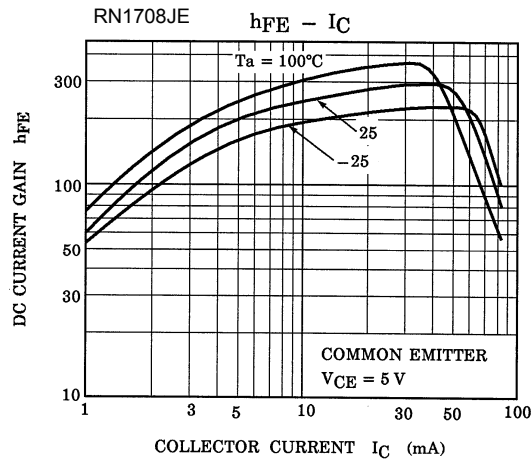
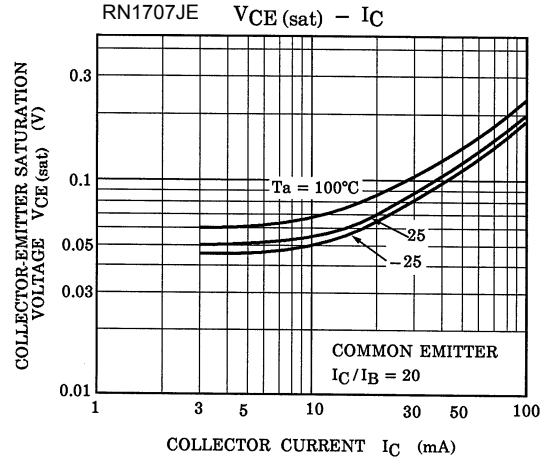
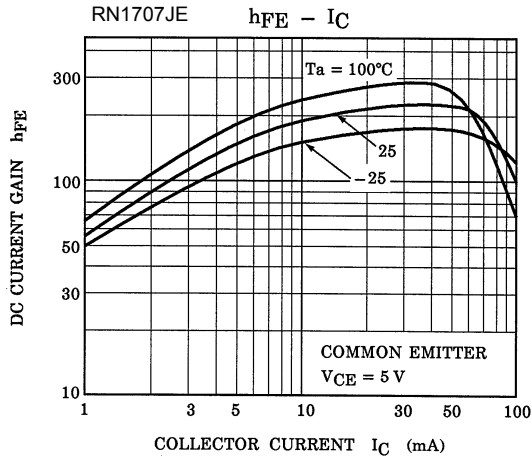
Equivalent Circuit (top view)

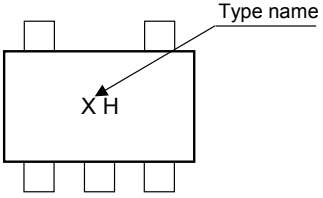
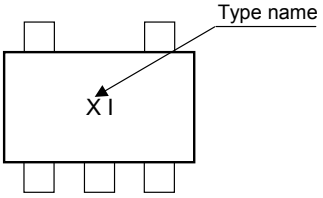
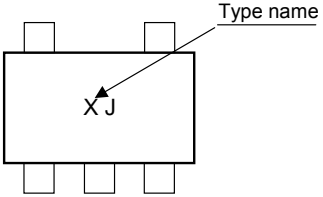


Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1707JE~1709JE	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	RN1707JE	I_{EBO}	$V_{EB} = 6\text{ V}, I_C = 0$	0.081	—	0.15	mA
	RN1708JE		$V_{EB} = 7\text{ V}, I_C = 0$	0.078	—	0.145	
	RN1709JE		$V_{EB} = 15\text{ V}, I_C = 0$	0.167	—	0.311	
DC current gain	RN1707JE	h_{FE}	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$	80	—	—	
	RN1708JE			80	—	—	
	RN1709JE			70	—	—	
Collector-emitter saturation voltage	RN1707JE~1709JE	$V_{CE(sat)}$	$I_C = 5\text{ mA}, I_B = 0.25\text{ mA}$	—	0.1	0.3	V
Input voltage (ON)	RN1707JE	$V_{I(ON)}$	$V_{CE} = 0.2\text{ V}, I_C = 5\text{ mA}$	0.7	—	1.8	V
	RN1708JE			1.0	—	2.6	
	RN1709JE			2.2	—	5.8	
Input voltage (OFF)	RN1707JE	$V_{I(OFF)}$	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ mA}$	0.5	—	1	V
	RN1708JE			0.6	—	1.16	
	RN1709JE			1.5	—	2.6	
Transition frequency	RN1707JE~1709JE	f_T	$V_{CE} = 10\text{ V}, I_C = 5\text{ mA}$	—	250	—	MHz
Collector output capacitance	RN1707JE~1709JE	C_{ob}	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	3	6	pF
Input resistor	RN1707JE	R1	—	7	10	13	k Ω
	RN1708JE			15.4	22	28.6	
	RN1709JE			32.9	47	61.1	
Resistor ratio	RN1707JE	R1/R2	—	0.191	0.213	0.232	
	RN1708JE			0.421	0.468	0.515	
	RN1709JE			1.92	2.14	2.35	





Type Name	Marking
RN1707JE	 The diagram shows a rectangular component with two pins on top and three on the bottom. An arrow points from the text "Type name" to the marking "XH" on the component.
RN1708JE	 The diagram shows a rectangular component with two pins on top and three on the bottom. An arrow points from the text "Type name" to the marking "XI" on the component.
RN1709JE	 The diagram shows a rectangular component with two pins on top and three on the bottom. An arrow points from the text "Type name" to the marking "XJ" on the component.

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