

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

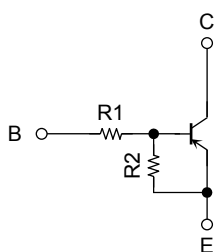
RN2701JE, RN2702JE, RN2703JE RN2704JE, RN2705JE, RN2706JE

Switching, Inverter Circuit, Interface Circuit and
Driver Circuit Applications

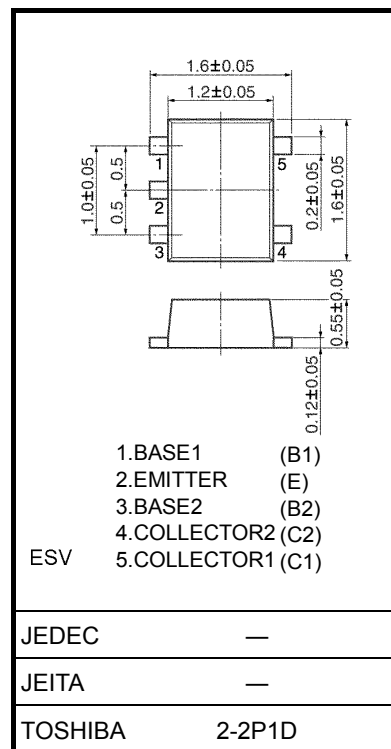
Unit: mm

- 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.
- Complementary to RN1701JE~RN1706JE

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN2701JE	4.7	4.7
RN2702JE	10	10
RN2703JE	22	22
RN2704JE	47	47
RN2705JE	2.2	47
RN2706JE	4.7	47



Weight: 0.003 g (typ.)

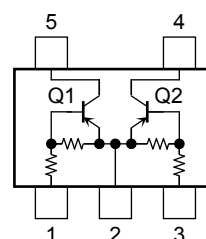
Absolute Maximum Ratings (Ta = 25°C) (Q1, Q2 common)

Characteristics		Symbol	Rating	Unit
Collector-base voltage	RN2701JE~ 2706JE	V _{CBO}	−50	V
Collector-emitter voltage		V _{CEO}	−50	V
Emitter-base voltage	RN2701JE~ 2704JE	V _{EBO}	−10	V
	RN2705JE, RN2706JE		−5	
Collector current	RN2701JE~ 2706JE	I _C	−100	mA
Collector power dissipation		P _C (Note 1)	100	mW
Junction temperature		T _j	150	°C
Storage temperature range		T _{stg}	−55~150	°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).

Note 1: Total rating

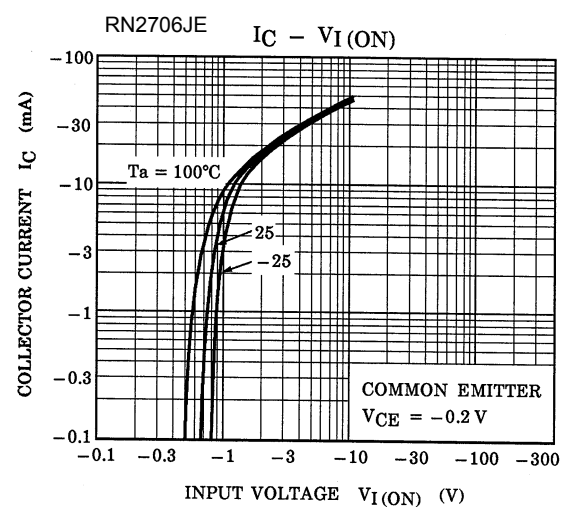
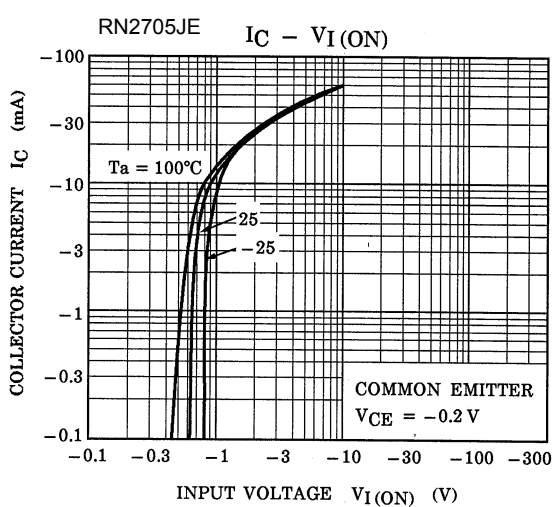
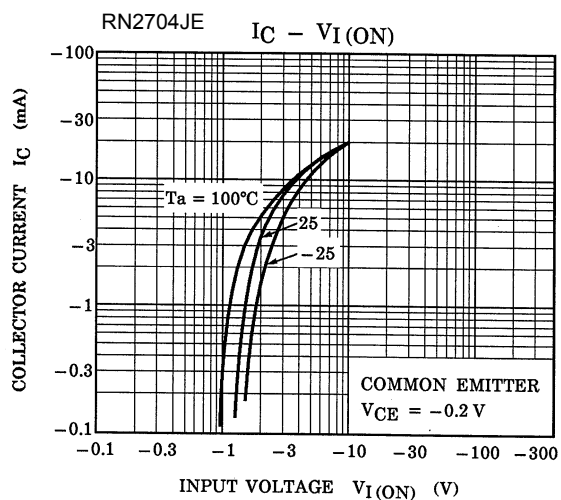
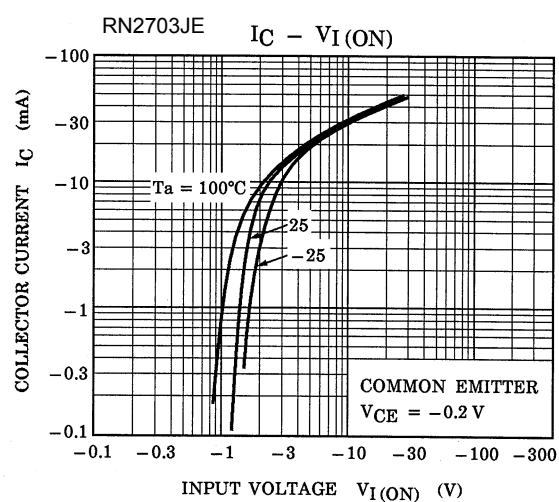
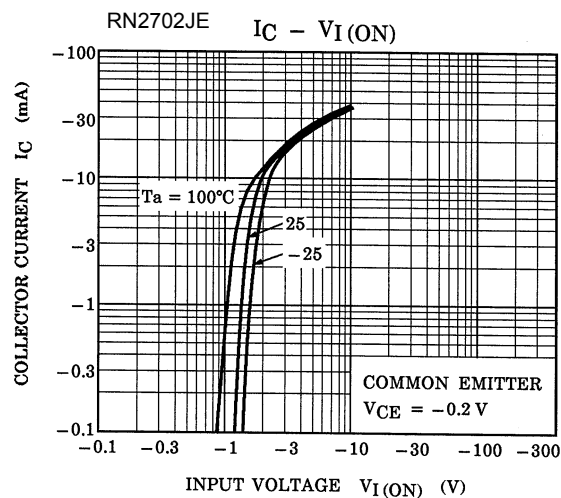
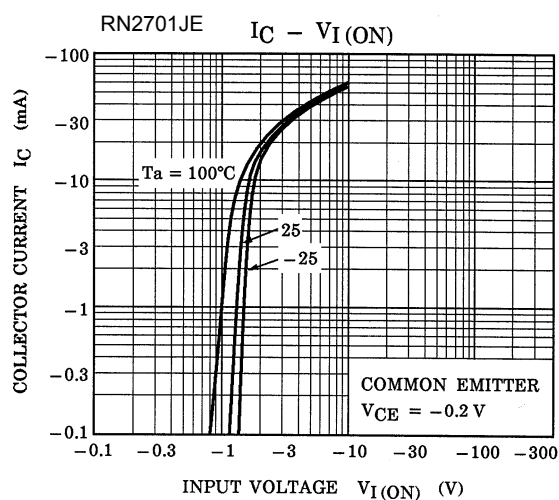
Equivalent Circuit (top view)



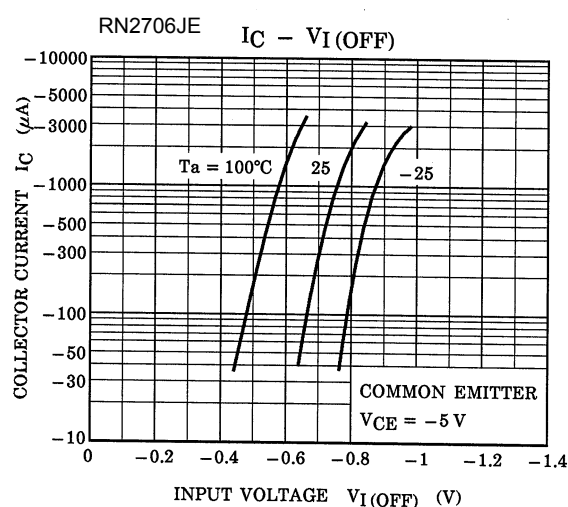
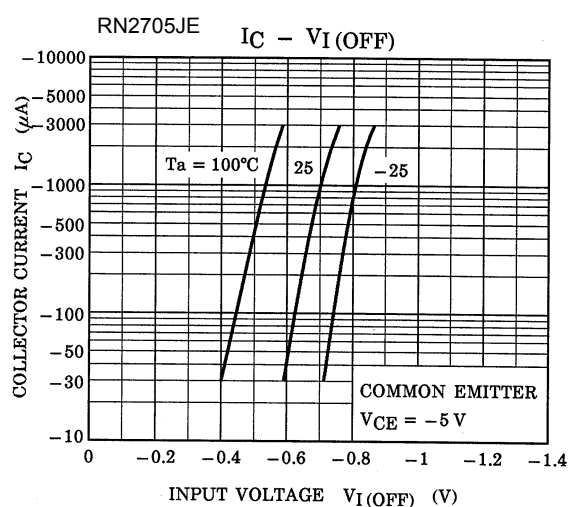
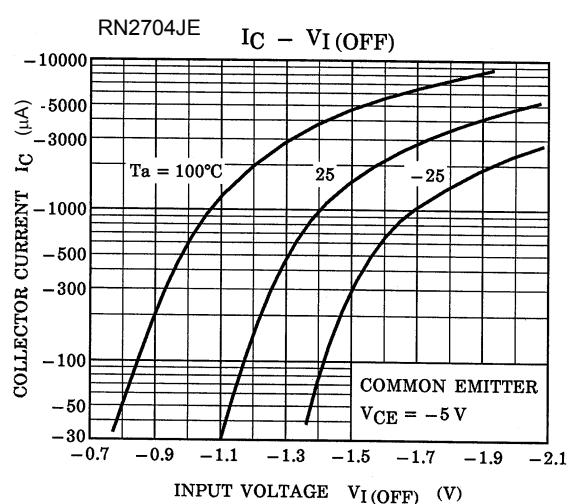
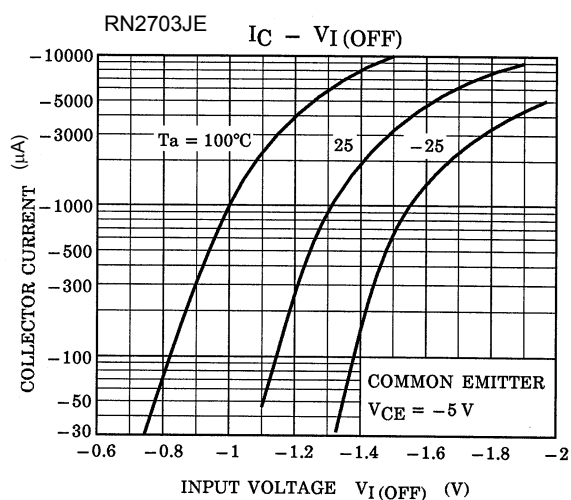
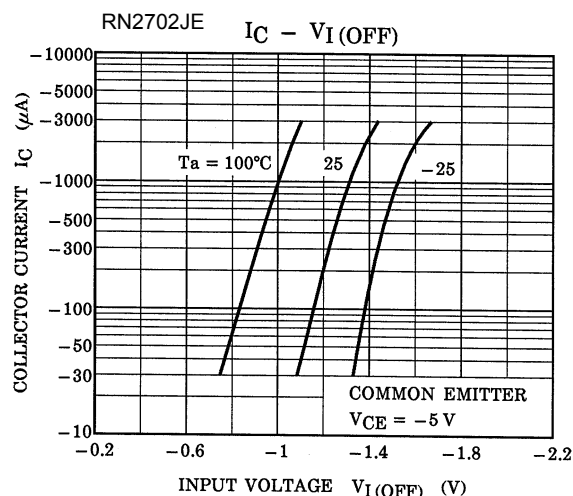
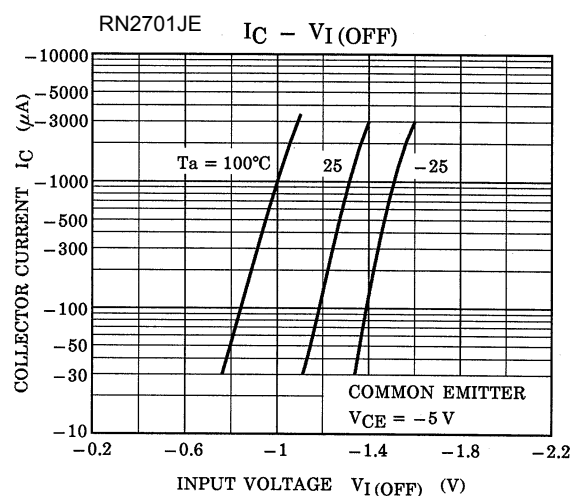
Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

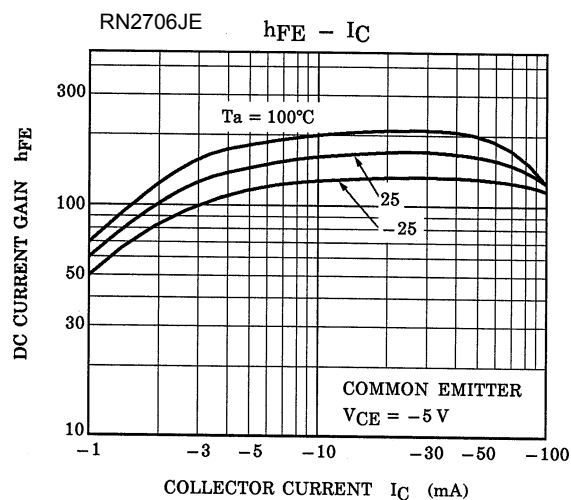
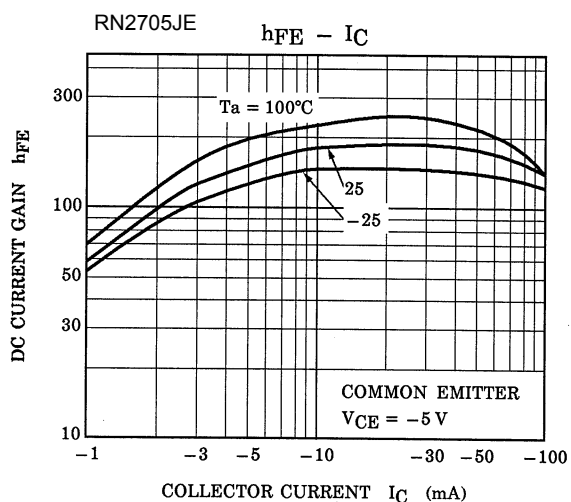
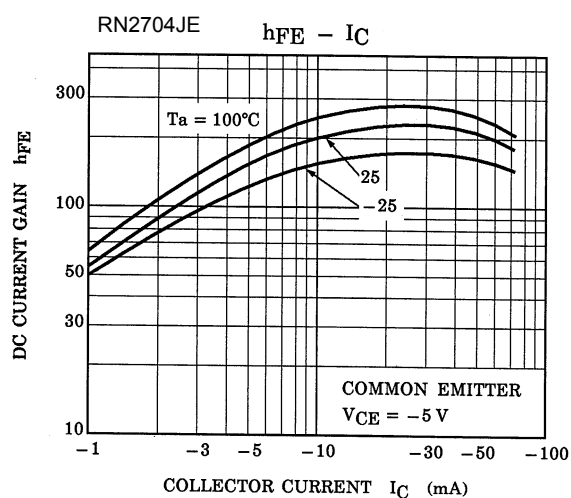
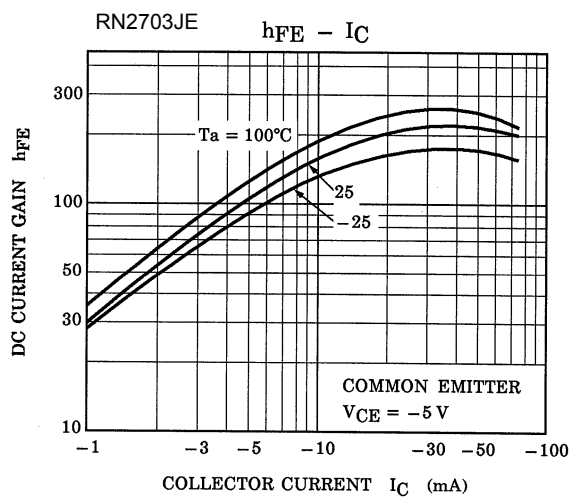
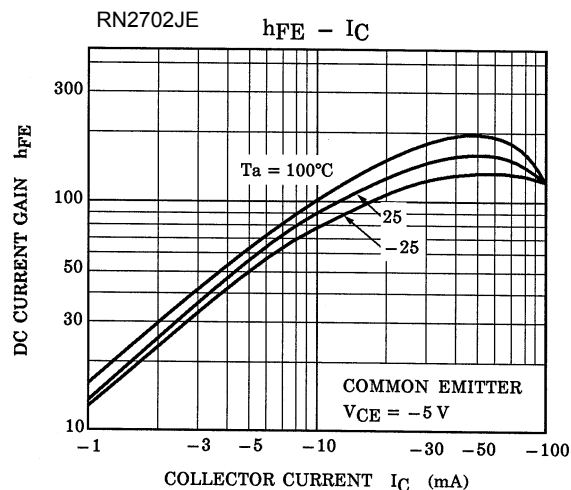
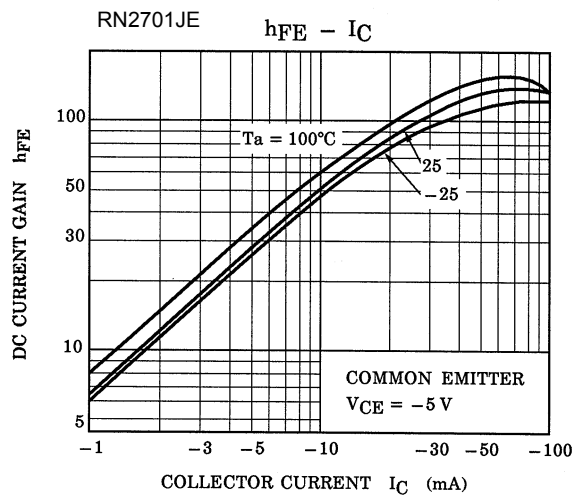
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2701JE~2706JE	I_{CBO}	$V_{CB} = -50 \text{ V}, I_E = 0$	—	—	-100	nA
		I_{CEO}	$V_{CE} = -50 \text{ V}, I_B = 0$	—	—	-500	
Emitter cut-off current	RN2701JE	I_{EBO}	$V_{EB} = -10 \text{ V}, I_C = 0$	-0.82	—	-1.52	mA
	RN2702JE			-0.38	—	-0.71	
	RN2703JE			-0.17	—	-0.33	
	RN2704JE			-0.082	—	-0.15	
	RN2705JE	I_{EBO}	$V_{EB} = -5 \text{ V}, I_C = 0$	-0.078	—	-0.145	
	RN2706JE			-0.074	—	-0.138	
DC current gain	RN2701JE	h_{FE}	$V_{CE} = -5 \text{ V}, I_C = -10 \text{ mA}$	30	—	—	
	RN2702JE			50	—	—	
	RN2703JE			70	—	—	
	RN2704JE			80	—	—	
	RN2705JE			80	—	—	
	RN2706JE			80	—	—	
Collector-emitter saturation voltage	RN2701JE~2706JE	$V_{CE(sat)}$	$I_C = -5 \text{ mA}, I_B = -0.25 \text{ mA}$	—	-0.1	-0.3	V
Input voltage (ON)	RN2701JE	$V_I(ON)$	$V_{CE} = -0.2 \text{ V}, I_C = -5 \text{ mA}$	-1.1	—	-2.0	V
	RN2702JE			-1.2	—	-2.4	
	RN2703JE			-1.3	—	-3.0	
	RN2704JE			-1.5	—	-5.0	
	RN2705JE			-0.6	—	-1.1	
	RN2706JE			-0.7	—	-1.3	
Input voltage (OFF)	RN2701JE~2704JE	$V_I(OFF)$	$V_{CE} = -5 \text{ V}, I_C = -0.1 \text{ mA}$	-1.0	—	-1.5	V
	RN2705JE, 2706JE			-0.5	—	-0.8	
Transition frequency	RN2701JE~2706JE	f_T	$V_{CE} = -10 \text{ V}, I_C = -5 \text{ mA}$	—	200	—	MHz
Collector output capacitance	RN2701JE~2706JE	C_{ob}	$V_{CB} = -10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$	—	3	6	pF
Input resistor	RN2701JE	R_1	—	3.29	4.7	6.11	kΩ
	RN2702JE			7	10	13	
	RN2703JE			15.4	22	28.6	
	RN2704JE			32.9	47	61.1	
	RN2705JE			1.54	2.2	2.86	
	RN2706JE			3.29	4.7	6.11	
Resistor ratio	RN2701JE~2704JE	R_1/R_2	—	0.9	1.0	1.1	
	RN2705JE			0.0421	0.0468	0.0515	
	RN2706JE			0.09	0.1	0.11	

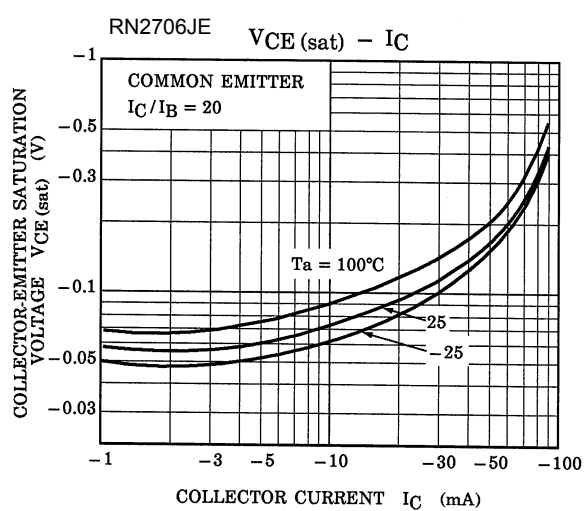
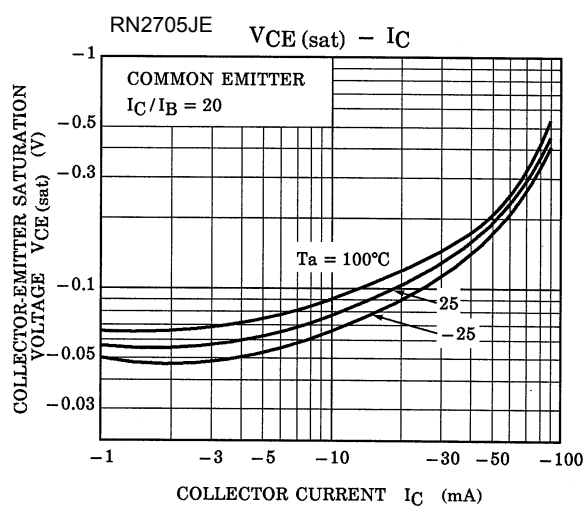
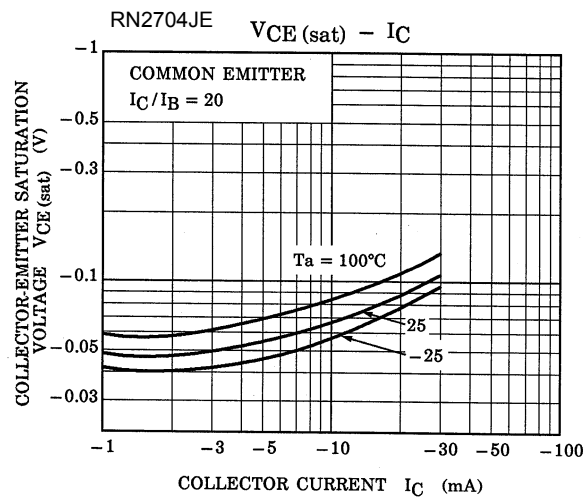
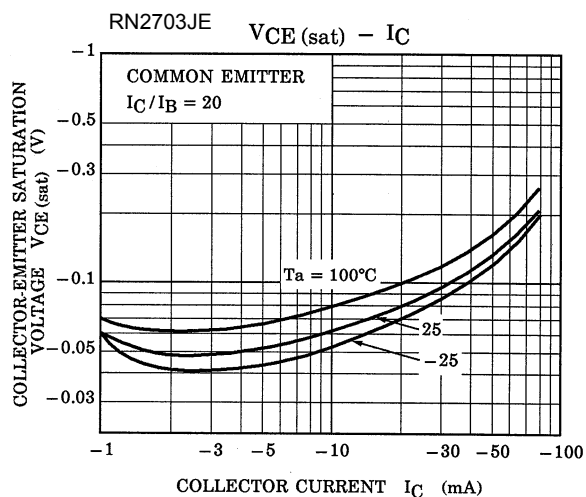
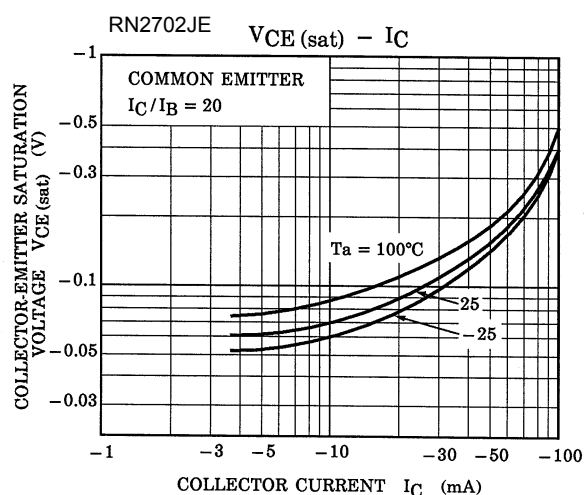
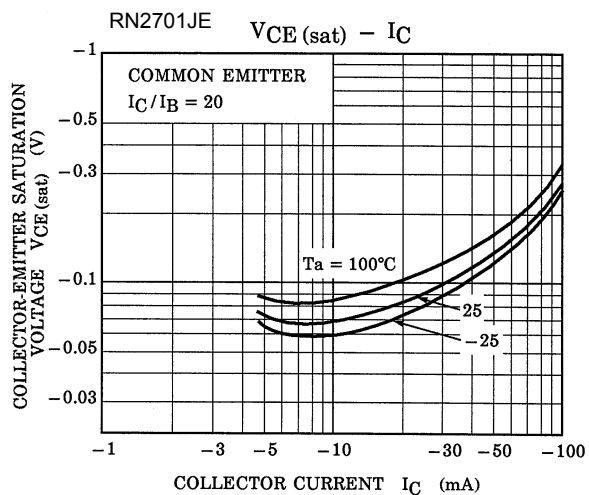
Q1, Q2 Common

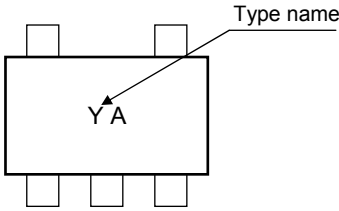
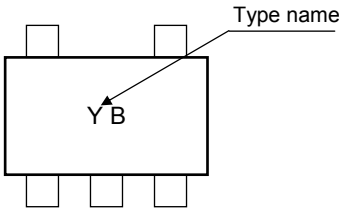
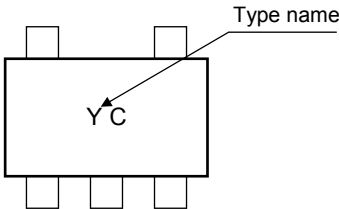
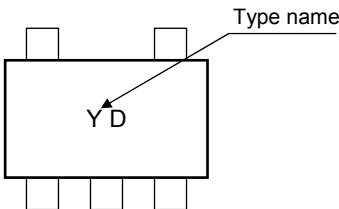
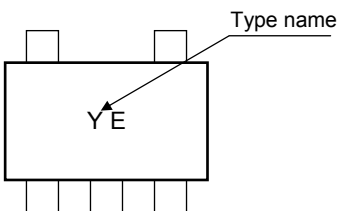
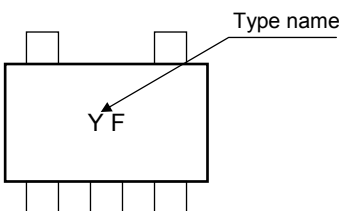


Q1, Q2 Common







Type Name	Marking
RN2701JE	
RN2702JE	
RN2703JE	
RN2704JE	
RN2705JE	
RN2706JE	

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