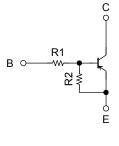
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process) (Bias Resistor Built-in Transistor)

### RN2701JE, RN2702JE, RN2703JE RN2704JE, RN2705JE, RN2706JE

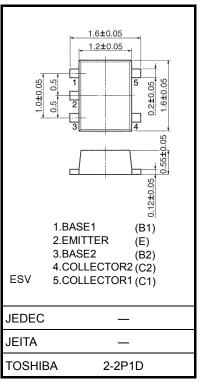
Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- 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 to 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

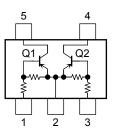


### Absolute Maximum Ratings (Ta = 25°C) (Q1, Q2 common)

Characteristics		Symbol	Rating	Unit	
Collector-base voltage	RN2701JE	V <sub>CBO</sub>	-50	V	
Collector-emitter voltage	to 2706JE	V <sub>CEO</sub>	-50	V	
Emitter-base voltage	RN2701JE to 2704JE		-10	V	
	RN2705JE RN2706JE	V <sub>EBO</sub>	-5		
Collector current		Ι <sub>C</sub>	-100	mA	
Collector power dissipation	RN2701JE	P <sub>C</sub> (Note 1)	100	mW	
Junction temperature	to 2706JE	Tj	150	°C	
Storage temperature range		T <sub>stg</sub>	-55 to 150	°C	

### Weight: 0.003 g (typ.)

# 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

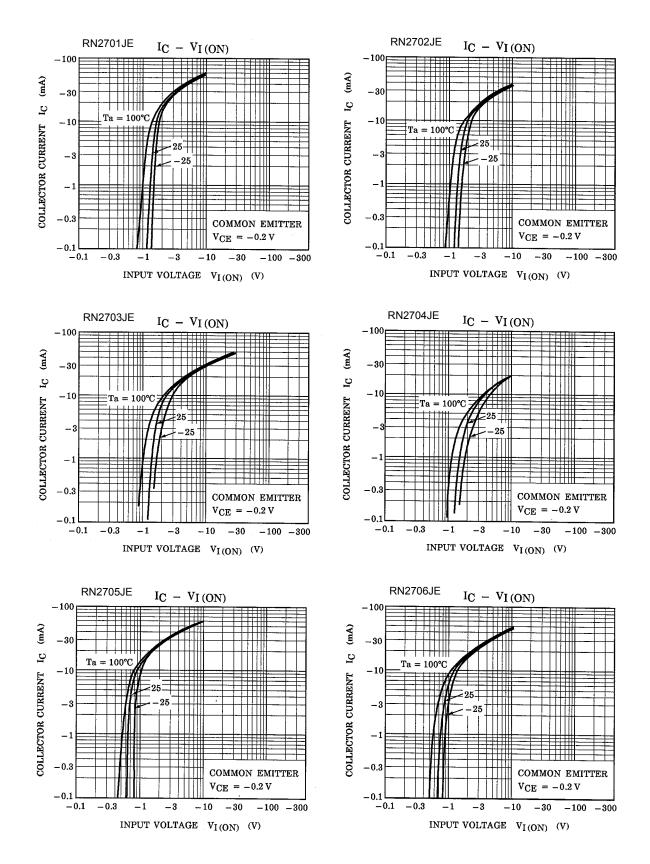
Start of commercial production 2000-06

Unit: mm

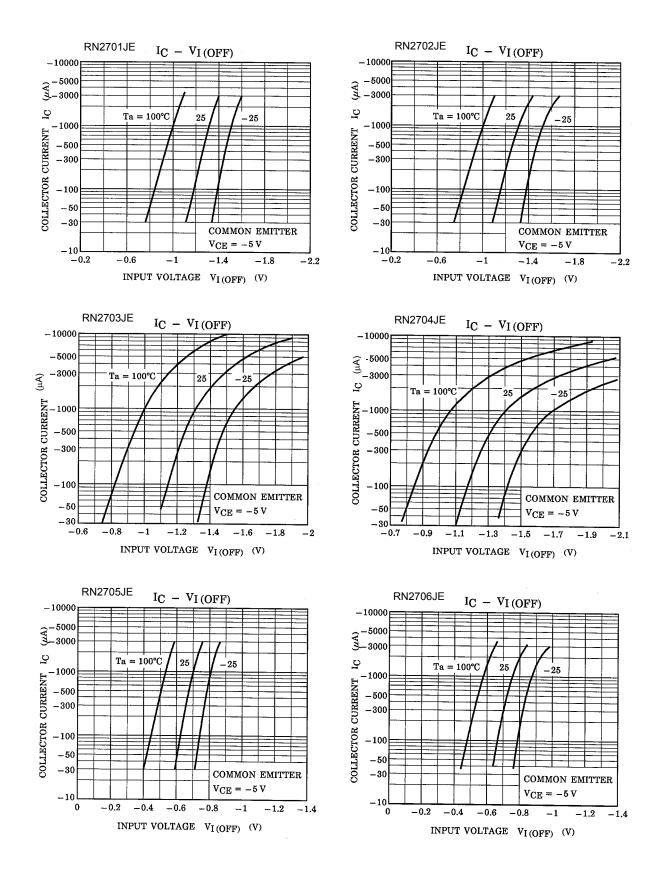
### Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

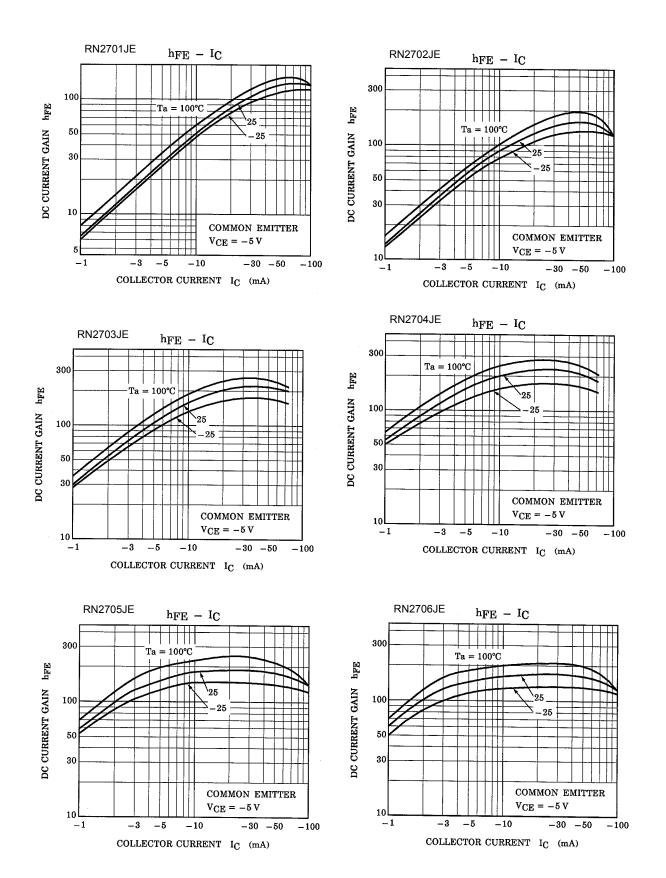
Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current	RN2701JE to 2706JE	I <sub>CBO</sub>	$V_{CB} = -50 \text{ V}, \text{ I}_{E} = 0$	—	_	-100	nA
	RN2701JE to 2706JE	ICEO	$V_{CE} = -50 \text{ V}, I_B = 0$	_		-500	ПА
Emitter cut-off current	RN2701JE	I <sub>EBO</sub>	$V_{EB} = -10 \text{ V}, \text{ I}_{C} = 0$	-0.82		-1.52	mA
	RN2702JE			-0.38		-0.71	
	RN2703JE			-0.17		-0.33	
	RN2704JE			-0.082		-0.15	
	RN2705JE		$V_{EB} = -5 \text{ V}, \text{ I}_{C} = 0$	-0.078		-0.145	
	RN2706JE			-0.074		-0.138	
DC current gain	RN2701JE			30		_	
	RN2702JE		$V_{CE} = -5 V,$ $I_{C} = -10 mA$	50	—	_	
	RN2703JE			70	—	_	
	RN2704JE	h <sub>FE</sub>		80	—	_	
	RN2705JE			80	—	_	
	RN2706JE			80	—	—	
Collector-emitter saturation voltage	RN2701JE to 2706JE	V <sub>CE (sat)</sub>	$I_{C} = -5 \text{ mA},$ $I_{B} = -0.25 \text{ mA}$	_	-0.1	-0.3	V
	RN2701JE	- VI (ON)	$V_{CE} = -0.2 V,$ $I_{C} = -5 mA$	-1.1	—	-2.0	V
Input voltage (ON)	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 to 2704JE		$V_{CE} = -5 V$ , $I_C = -0.1 mA$	-1.0	—	-1.5	v
	RN2705JE, 2706JE	VI (OFF)		-0.5		-0.8	
Transition frequency	RN2701JE to 2706JE	fT	V <sub>CE</sub> = -10 V, I <sub>C</sub> = -5 mA	_	200	_	MHz
Collector output capacitance	RN2701JE to 2706JE	C <sub>ob</sub>	$\label{eq:VCB} \begin{array}{l} V_{CB} = -10 \ V, \ I_E = 0, \\ f = 1 \ MHz \end{array}$	_	3	6	pF
	RN2701JE	- R1		3.29	4.7	6.11	kΩ
	RN2702JE			7	10	13	
Input resistor	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 to 2704JE	R1/R2	_	0.9	1.0	1.1	-
	RN2705JE			0.0421	0.0468	0.0515	
	RN2706JE			0.09	0.1	0.11	

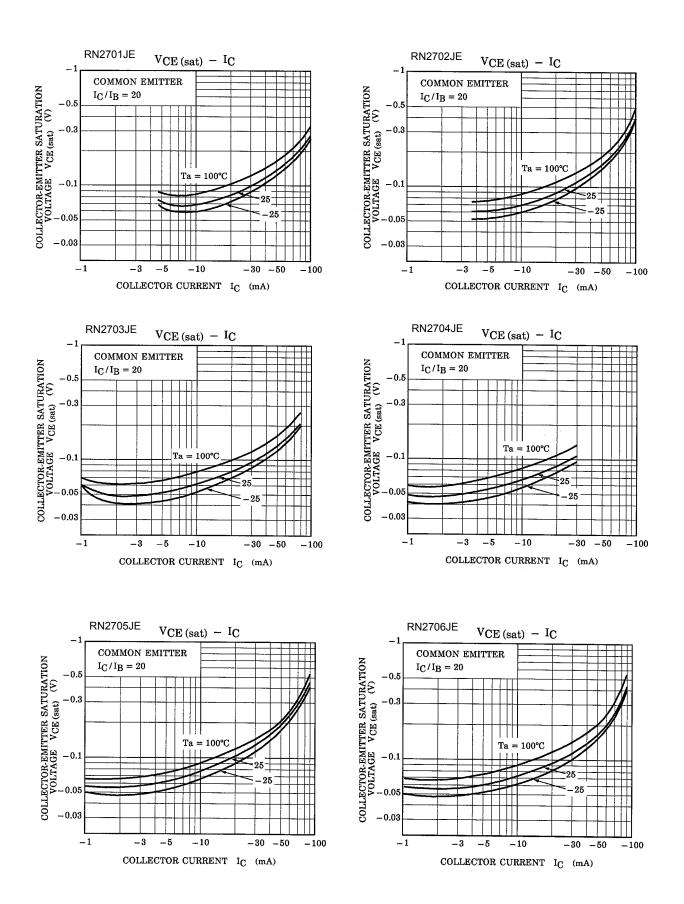
#### Q1, Q2 Common

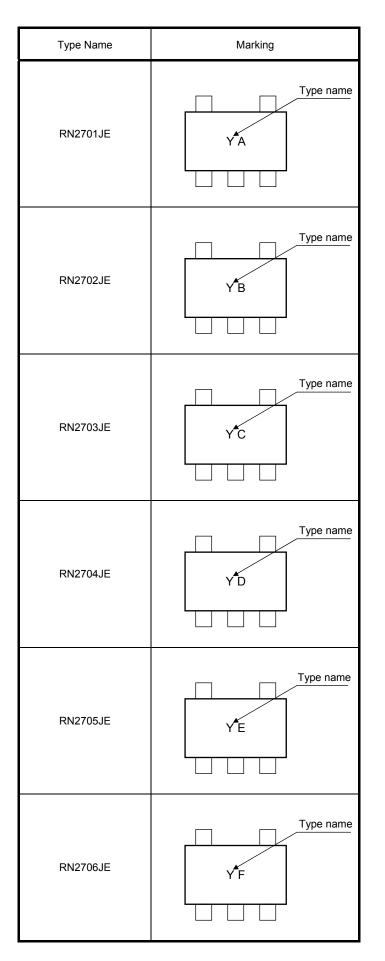


#### Q1, Q2 Common









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