

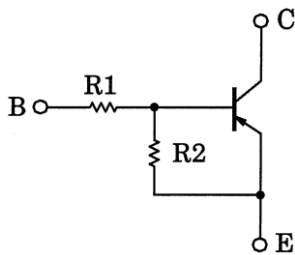
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process) (Bias Resistor built-in Transistor)

# RN2967, RN2968, RN2969

Switching, Inverter Circuit, Interface Circuit and Driver Circuit

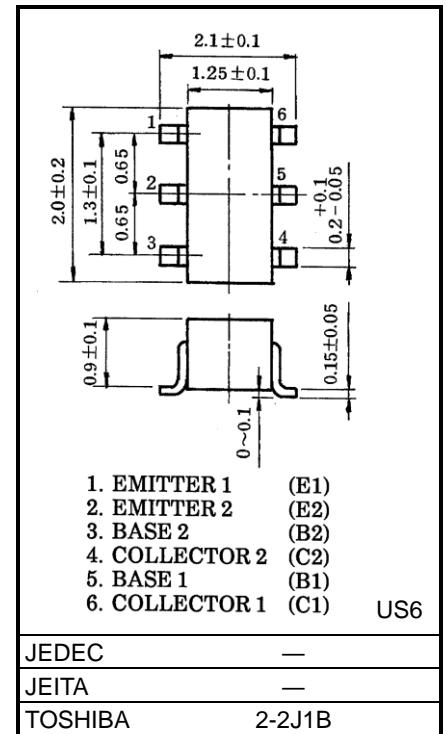
- Including two devices in US6 (ultra super mini type with 6 leads)
- With built-in bias resistors.
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process and miniaturize equipment.
- Various resistance values are available to suit various circuit designs.
- Complementary to RN1967 to RN1969

### Equivalent Circuit and Bias Resistor Values



Part No.	R1 (kΩ)	R2 (kΩ)
RN2967	10	47
RN2968	22	47
RN2969	47	22

Unit: mm

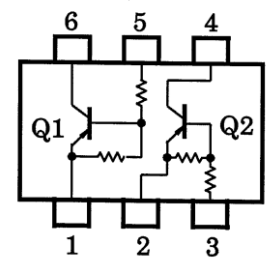


Weight: 6.8mg (typ.)

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

Characteristic	Symbol	Rating	Unit				
Collector-base voltage	RN2967 to 2969	VCBO	-50	V			
Collector-emitter voltage							
Emitter-base voltage	RN2967	VEBO	-6	V			
	RN2968		-7				
	RN2969		-15				
Collector current	RN2967 to 2969	IC	-100	mA			
Collector power dissipation					PC*	200	mW
Junction temperature							
Storage temperature range					Tstg	-55 to 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).

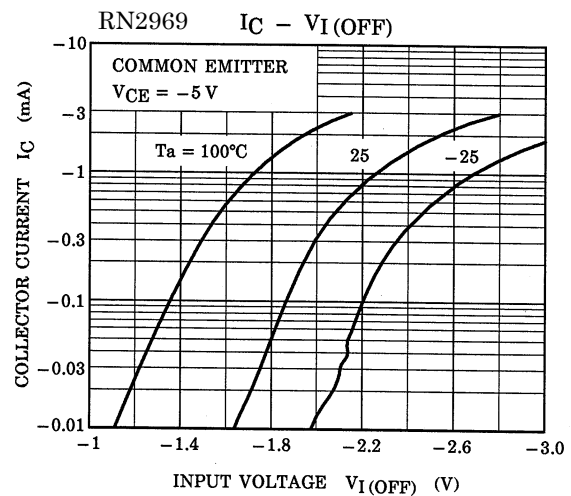
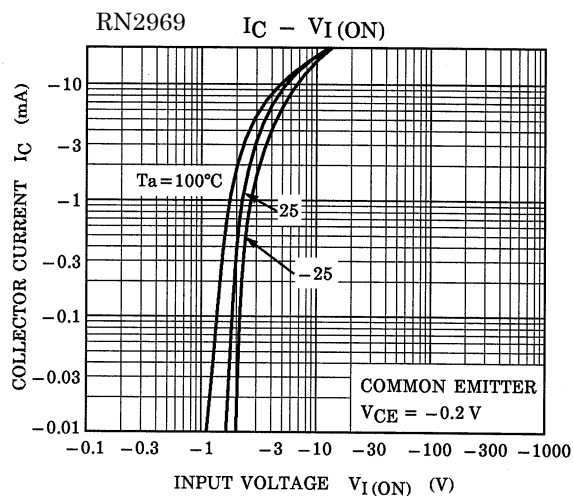
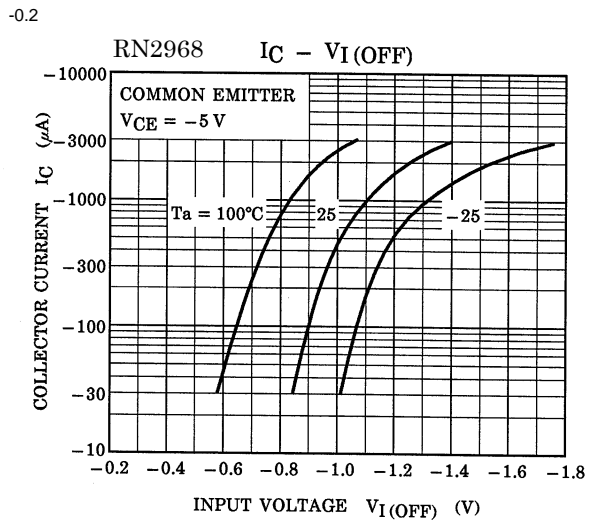
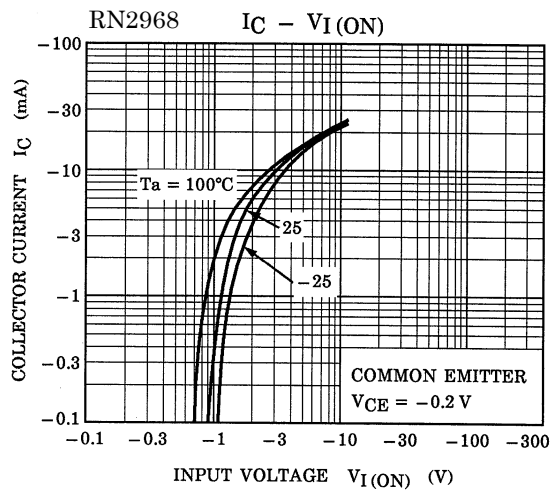
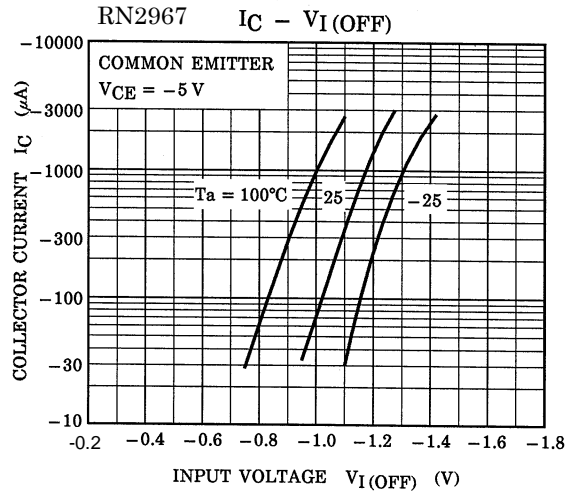
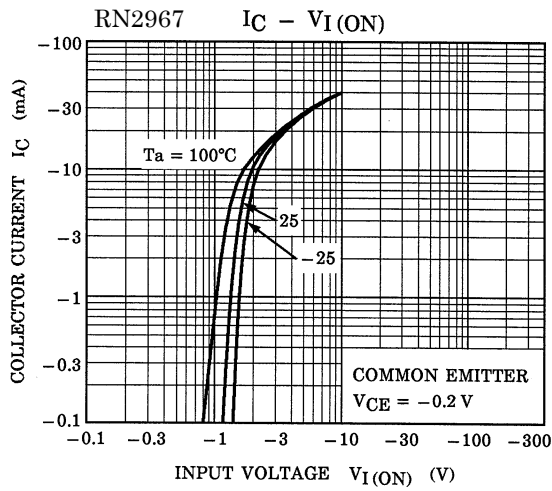
\*: Total rating

Start of commercial production  
1992-01

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

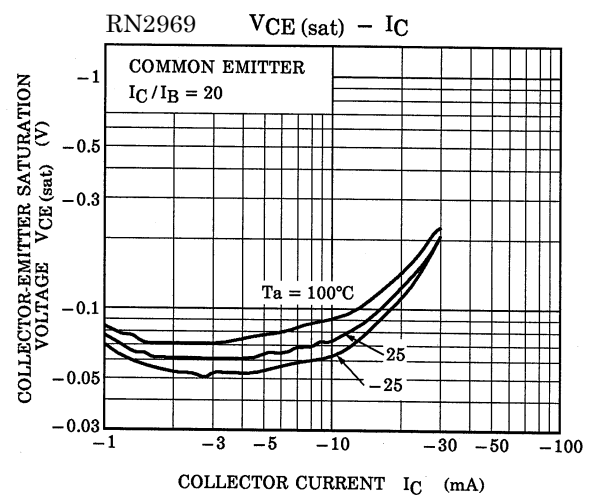
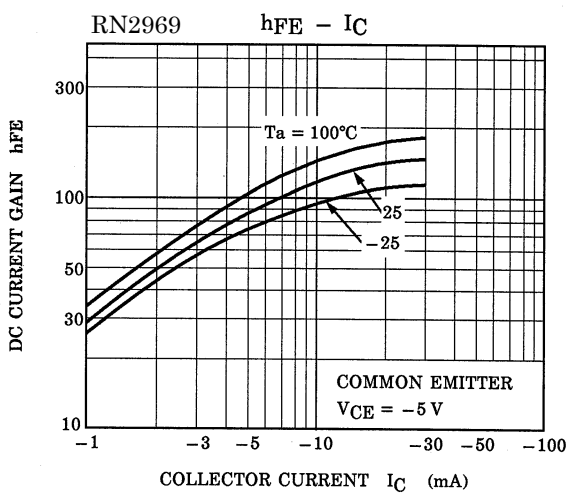
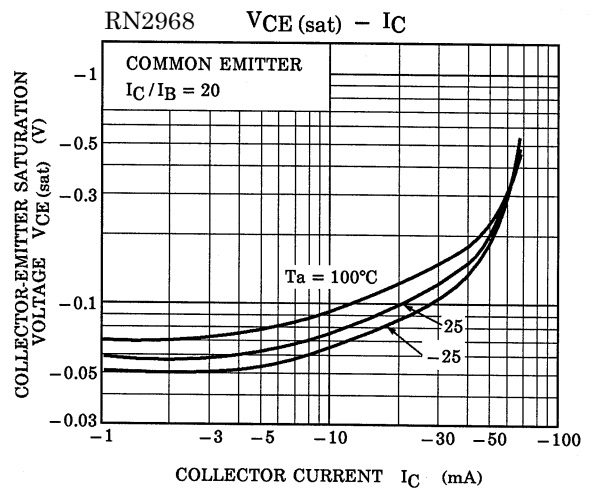
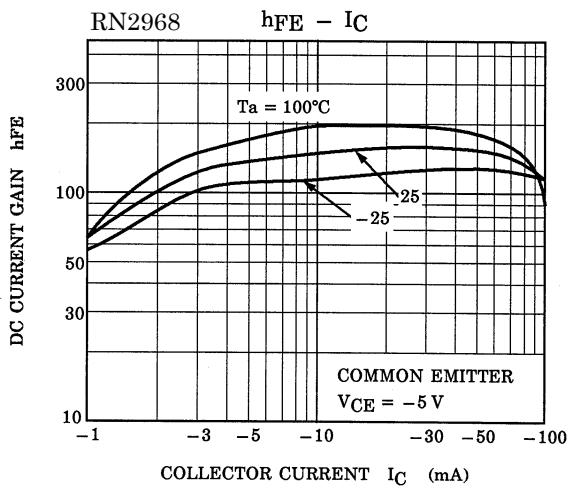
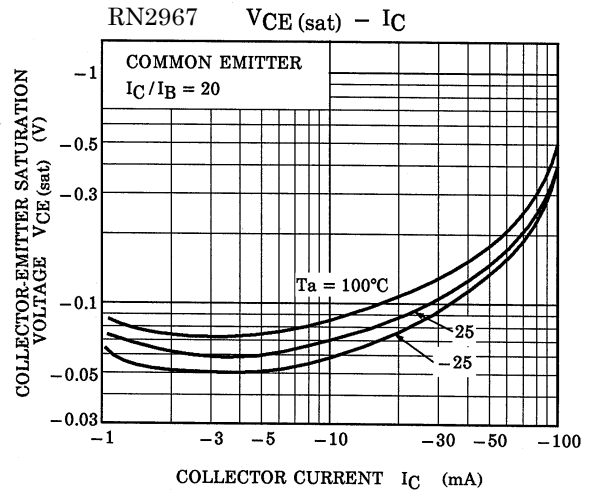
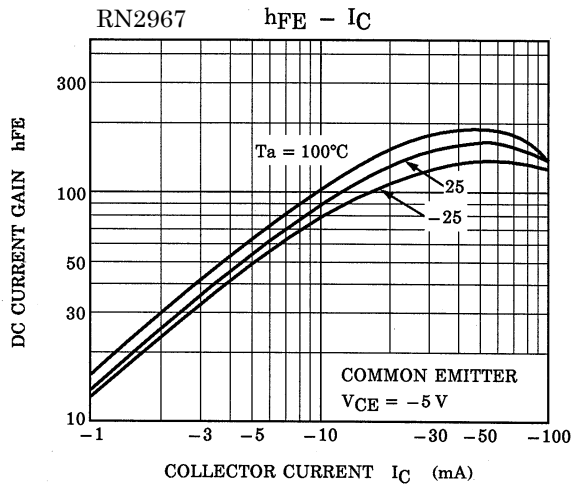
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2967 to 2969	ICBO	V <sub>CB</sub> = -50 V, I <sub>E</sub> = 0 mA	—	—	-100	nA
		ICEO	V <sub>CE</sub> = -50 V, I <sub>B</sub> = 0 mA	—	—	-500	
Emitter cut-off current	RN2967	IEBO	V <sub>EB</sub> = -6 V, I <sub>C</sub> = 0 mA	-0.081	—	-0.15	mA
	RN2968		V <sub>EB</sub> = -7 V, I <sub>C</sub> = 0 mA	-0.078	—	-0.145	
	RN2969		V <sub>EB</sub> = -15 V, I <sub>C</sub> = 0 mA	-0.167	—	-0.311	
DC current gain	RN2967	h <sub>FE</sub>	V <sub>CE</sub> = -5 V, I <sub>C</sub> = -10 mA	80	—	—	—
	RN2968			80	—	—	
	RN2969			70	—	—	
Collector-emitter saturation voltage	RN2967 to 2969	V <sub>CE (sat)</sub>	I <sub>C</sub> = -5 mA, I <sub>B</sub> = -0.25 mA	—	-0.1	-0.3	V
Input voltage (ON)	RN2967	V <sub>I (ON)</sub>	V <sub>CE</sub> = -0.2 V, I <sub>C</sub> = -5 mA	-0.7	—	-1.8	V
	RN2968			-1.0	—	-2.6	
	RN2969			-2.2	—	-5.8	
Input voltage (OFF)	RN2967	V <sub>I (OFF)</sub>	V <sub>CE</sub> = -5 V, I <sub>C</sub> = -0.1 mA	-0.5	—	-1.0	V
	RN2968			-0.6	—	-1.16	
	RN2969			-1.5	—	-2.6	
Translation frequency	RN2967 to 2969	f <sub>T</sub>	V <sub>CE</sub> = -10 V, I <sub>C</sub> = -5 mA	—	200	—	MHz
Collector output capacitance	RN2967 to 2969	C <sub>ob</sub>	V <sub>CB</sub> = -10 V, I <sub>E</sub> = 0 mA, f = 1 MHz	—	3	6	pF
Input resistor	RN2967	R1	—	7	10	13	kΩ
	RN2968			15.4	22	28.6	
	RN2969			32.9	47	61.1	
Resistor ratio	RN2967	R1/R2	—	0.191	0.213	0.232	—
	RN2968			0.421	0.468	0.515	
	RN2969			1.92	2.14	2.35	

### Characteristics Curves (Q1, Q2 Common)






The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

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### Marking

Part No.	Marking
RN2967	<p data-bbox="571 342 831 365">Part No.(abbreviation code)</p> 
RN2968	<p data-bbox="571 584 831 607">Part No.(abbreviation code)</p> 
RN2969	<p data-bbox="571 819 831 842">Part No.(abbreviation code)</p> 

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