

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

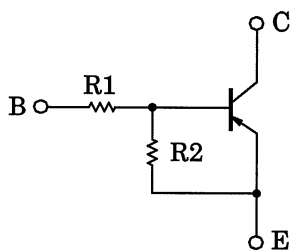
# RN2967, RN2968, RN2969

Unit: mm

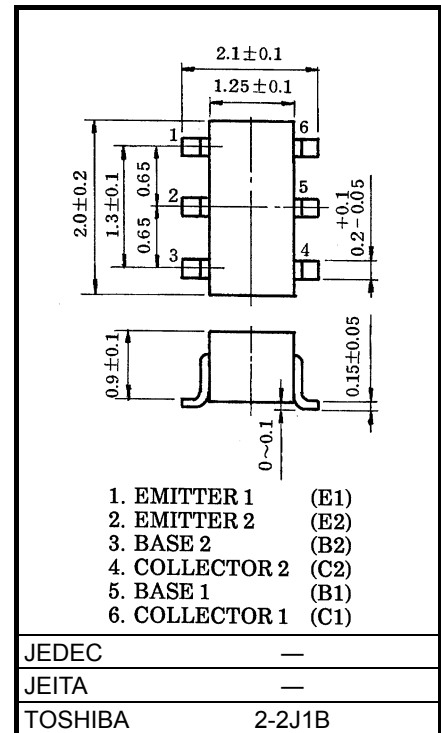
Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- 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
- Complementary to RN1967 to RN1969

## Equivalent Circuit and Bias Resistor Values



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

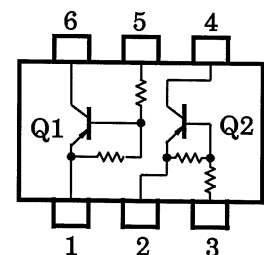


Weight: 6.8mg (typ.)

## Equivalent Circuit (Top View)

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

Characteristic	Symbol	Rating	Unit	
Collector-base voltage	RN2967 to 2969	$V_{CB0}$	-50	V
Collector-emitter voltage				
Emitter-base voltage	RN2967	$V_{EBO}$	-6	V
	RN2968		-7	
	RN2969		-15	
Collector current	RN2967 to 2969	$I_C$	-100	mA
Collector power dissipation		$P_C^*$	200	mW
Junction temperature		$T_j$	150	°C
Storage temperature range		$T_{stg}$	-55 to 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).

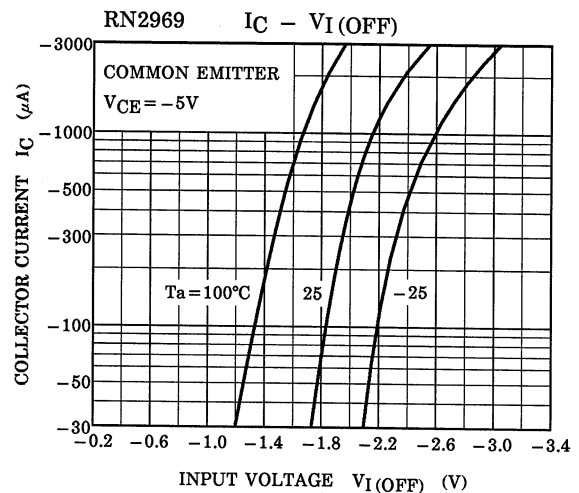
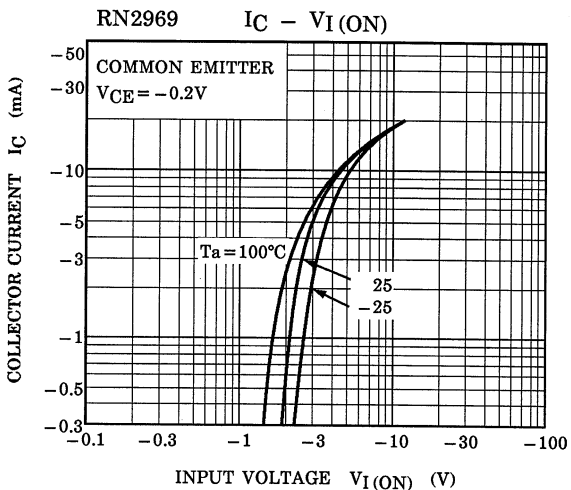
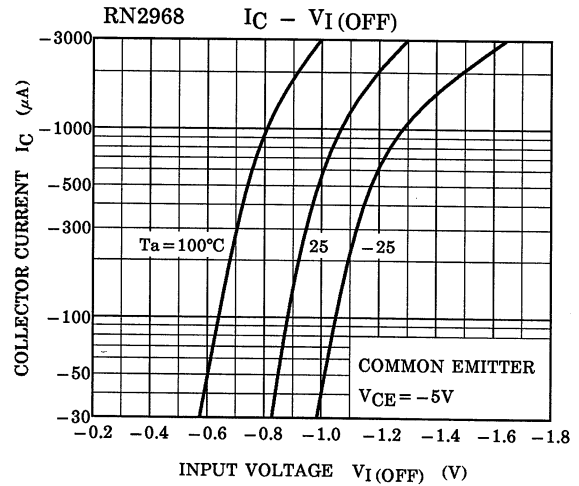
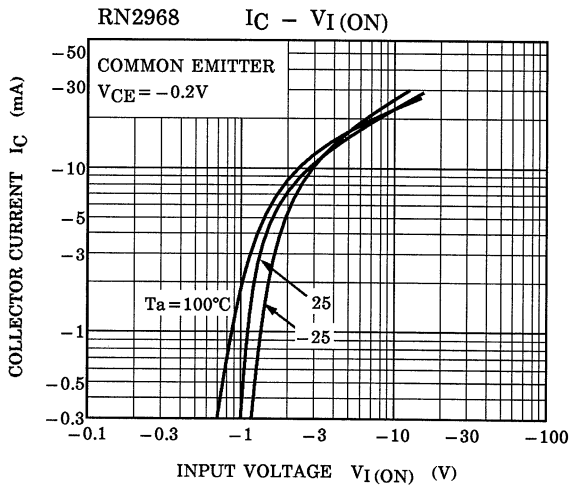
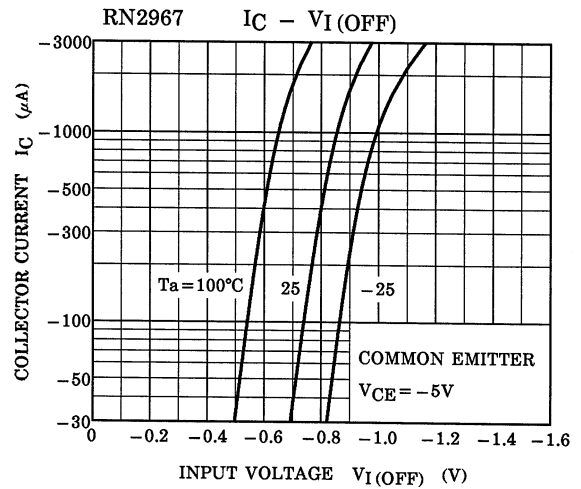
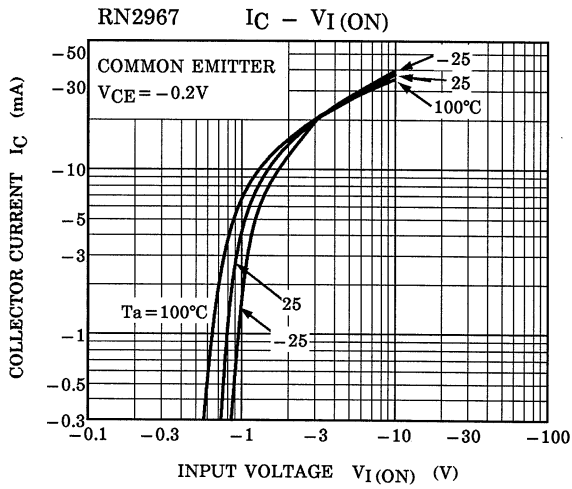
\*: Total rating

Start of commercial production  
1992-01

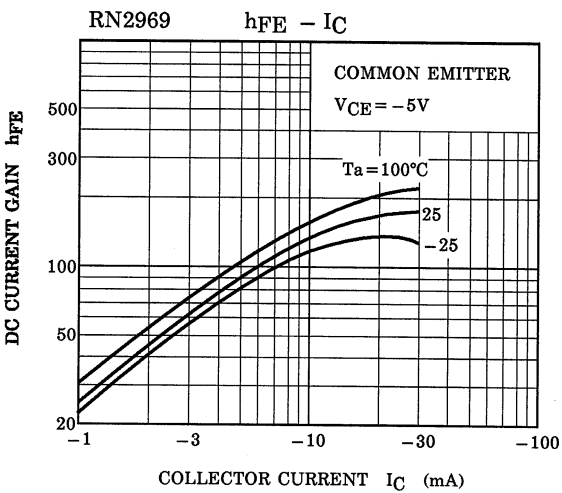
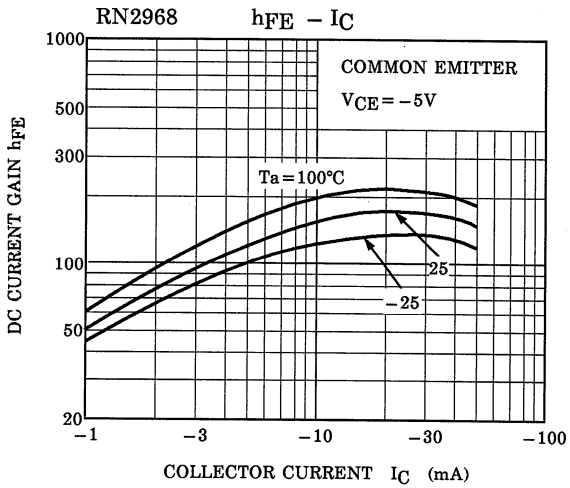
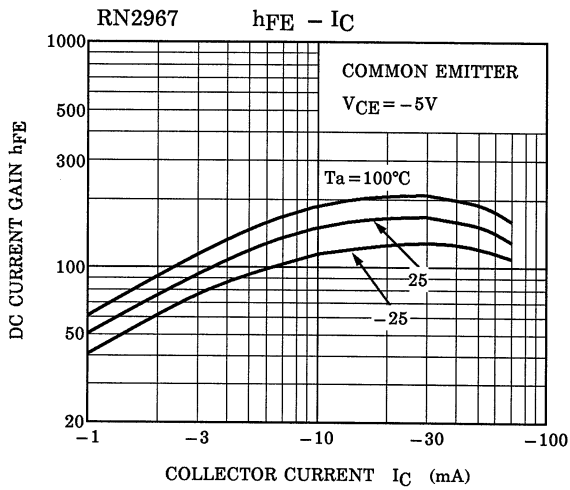
## Electrical Characteristics (Ta = 25°C) (Q1, Q2 Common)

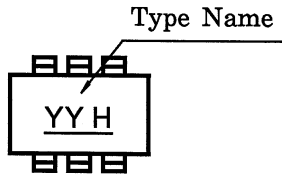
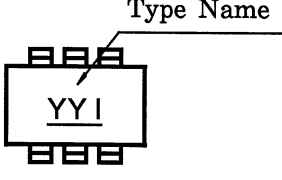
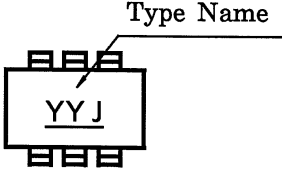
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2967 to 2969	$I_{CBO}$	—	$V_{CB} = -50V, I_E = 0$	—	—	-100	nA
		$I_{CEO}$	—	$V_{CE} = -50V, I_B = 0$	—	—	-500	
Emitter cut-off current	RN2967	$I_{EBO}$	—	$V_{EB} = -6V, I_C = 0$	-0.081	—	-0.15	mA
	RN2968		—	$V_{EB} = -7V, I_C = 0$	-0.078	—	-0.145	
	RN2969		—	$V_{EB} = -15V, I_C = 0$	-0.167	—	-0.311	
DC current gain	RN2967	$h_{FE}$	—	$V_{CE} = -5V, I_C = -10mA$	80	—	—	—
	RN2968		—		80	—	—	
	RN2969		—		70	—	—	
Collector-emitter saturation voltage	RN2967 to 2969	$V_{CE(sat)}$	—	$I_C = -5mA, I_B = -0.25mA$	—	-0.1	-0.3	V
Input voltage (ON)	RN2967	$V_I(ON)$	—	$V_{CE} = -0.2V, I_C = -5mA$	-0.7	—	-1.8	V
	RN2968		—		-1.0	—	-2.6	
	RN2969		—		-2.2	—	-5.8	
Input voltage (OFF)	RN2967	$V_I(OFF)$	—	$V_{CE} = -5V, I_C = -0.1mA$	-0.5	—	-1.0	V
	RN2968		—		-0.6	—	-1.16	
	RN2969		—		-1.5	—	-2.6	
Translation frequency	RN2967 to 2969	$f_T$	—	$V_{CE} = -10V, I_C = -5mA$	—	200	—	MHz
Collector output capacitance	RN2967 to 2969	$C_{ob}$	—	$V_{CB} = -10V, I_E = 0, f = 1MHz$	—	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		—		0.09	2.14	2.35	

(Q1, Q2 Common)



(Q1, Q2 Common)



Type Name	Marking
RN2967	
RN2968	
RN2969	

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