

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

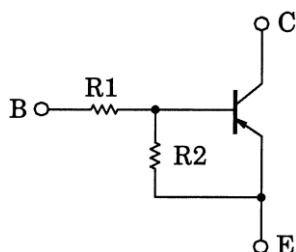
### RN2501, RN2502, RN2503 RN2504, RN2505, RN2506

Unit: mm

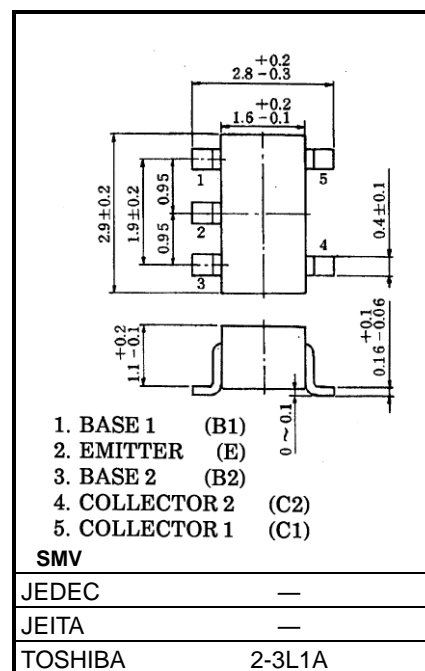
Switching, Inverter Circuit,  
Interface Circuit and Driver Circuit

- Including two devices in SMV (super mini type with 5 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 RN1501 to RN1506

#### Equivalent Circuit and Bias Resistor Values



Part No.	R1 (kΩ)	R2 (kΩ)
RN2501	4.7	4.7
RN2502	10	10
RN2503	22	22
RN2504	47	47
RN2505	2.2	47
RN2506	4.7	47

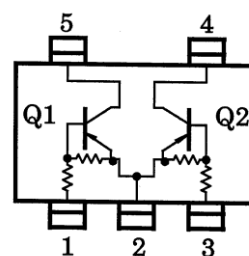


Weight: 14 mg (typ.)

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

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V <sub>CB0</sub>	-50	V
Collector-emitter voltage			
Emitter base voltage	V <sub>EBO</sub>	-10	V
		-5	
Collector current	I <sub>C</sub>	-100	mA
Collector power dissipation	P <sub>C</sub> *	300	mW
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature range	T <sub>stg</sub>	-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).

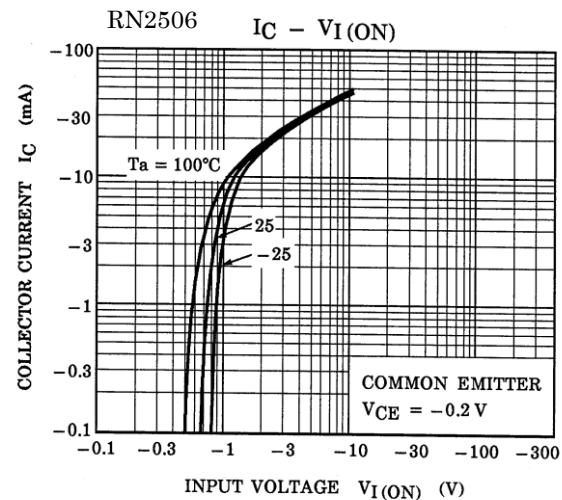
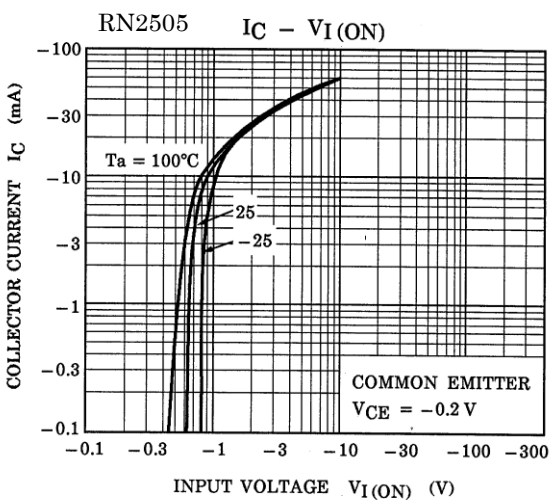
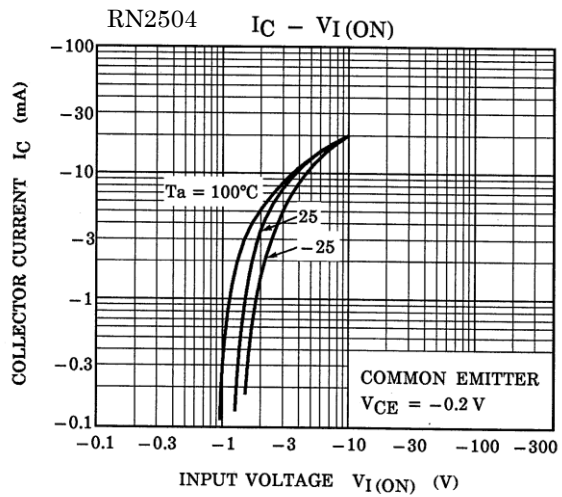
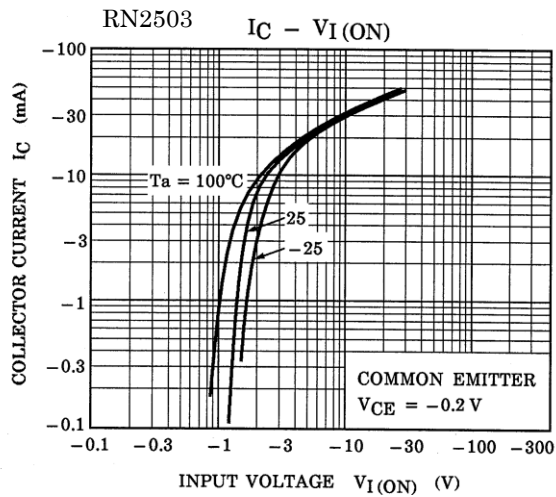
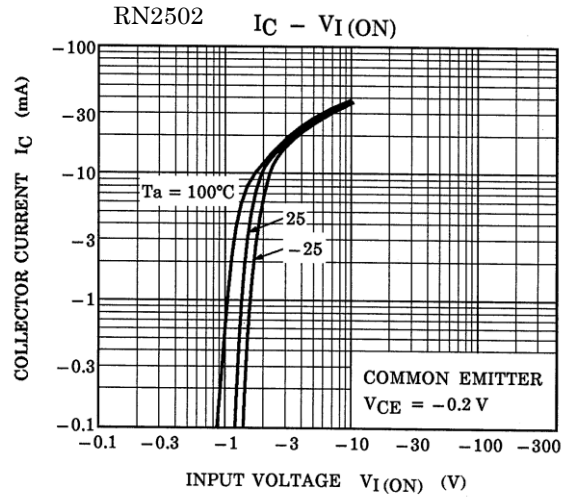
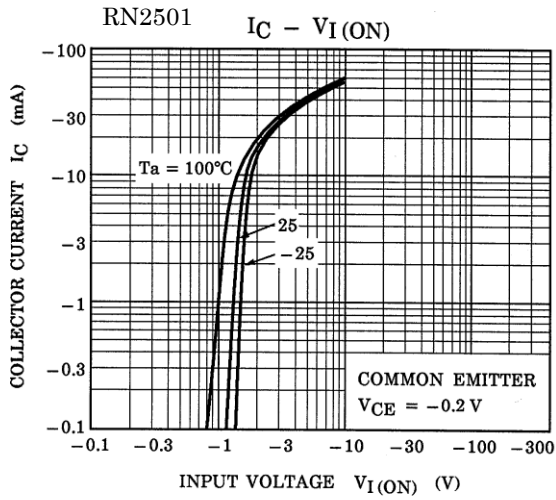
\*Total rating

Start of commercial production  
1988-10

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

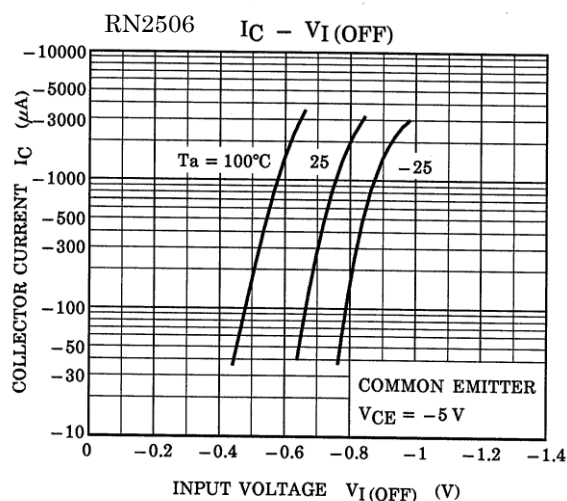
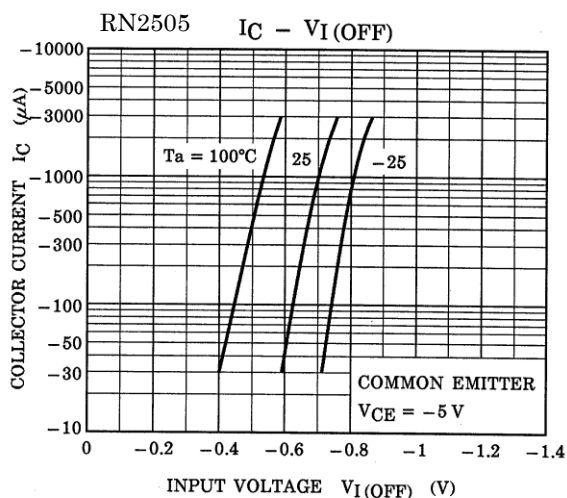
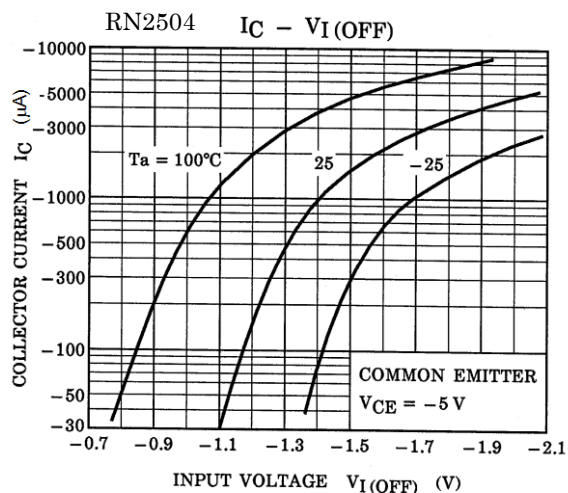
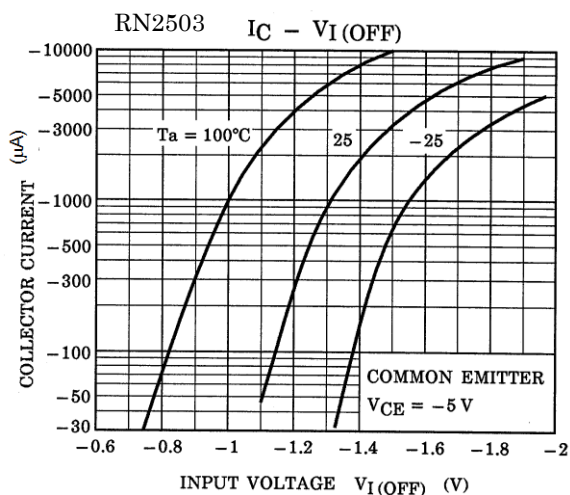
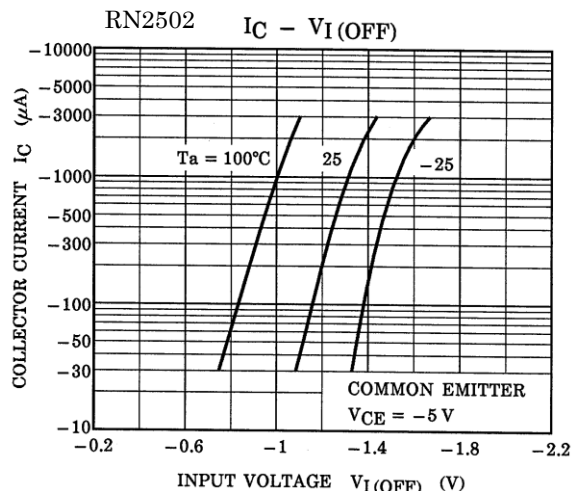
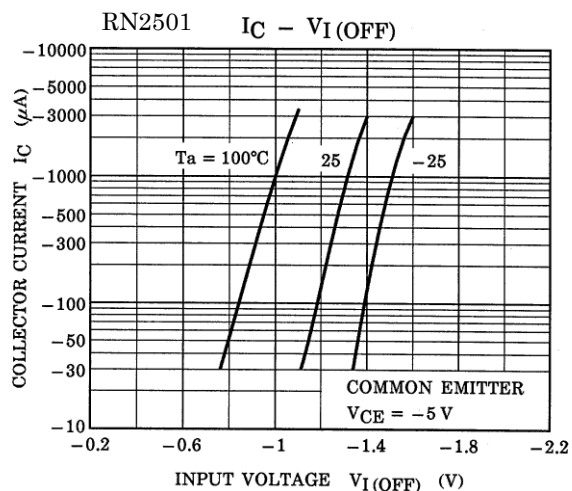
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2501 to 2506	ICBO	V <sub>CB</sub> = -50 V, I <sub>E</sub> = 0 mA	—	—	-100	nA
		ICEO	V <sub>CE</sub> = -50 V, I <sub>B</sub> = 0 mA	—	—	-500	
Emitter cut-off current	RN2501	IEBO	V <sub>EB</sub> = -10 V, I <sub>C</sub> = 0 mA	-0.82	—	-1.52	mA
	RN2502			-0.38	—	-0.71	
	RN2503			-0.17	—	-0.33	
	RN2504			-0.082	—	-0.15	
	RN2505		V <sub>EB</sub> = -5 V, I <sub>C</sub> = 0 mA	-0.078	—	-0.145	
	RN2506			-0.074	—	-0.138	
DC current gain	RN2501	hFE	V <sub>CE</sub> = -5 V, I <sub>C</sub> = -10 mA	30	—	—	—
	RN2502			50	—	—	
	RN2503			70	—	—	
	RN2504			80	—	—	
	RN2505			80	—	—	
	RN2506			80	—	—	
Collector-emitter saturation voltage	RN2501 to 2506	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)	RN2501	V <sub>I (ON)</sub>	V <sub>CE</sub> = -0.2 V, I <sub>C</sub> = -5 mA	-1.1	—	-2.0	V
	RN2502			-1.2	—	-2.4	
	RN2503			-1.3	—	-3.0	
	RN2504			-1.5	—	-5.0	
	RN2505			-0.6	—	-1.1	
	RN2506			-0.7	—	-1.3	
Input voltage (OFF)	RN2501 to 2504	V <sub>I (OFF)</sub>	V <sub>CE</sub> = -5 V, I <sub>C</sub> = -0.1 mA	-1.0	—	-1.5	V
	RN2505, 2506			-0.5	—	-0.8	
Transition frequency	RN2501 to 2506	f <sub>T</sub>	V <sub>CE</sub> = -10 V, I <sub>C</sub> = -5 mA	—	200	—	MHz
Collector output capacitance	RN2501 to 2506	C <sub>ob</sub>	V <sub>CB</sub> = -10 V, I <sub>E</sub> = 0 mA, f = 1 MHz	—	3	6	pF
Input resistance	RN2501	R1	—	3.29	4.7	6.11	kΩ
	RN2502			7	10	13	
	RN2503			15.4	22	28.6	
	RN2504			32.9	47	61.1	
	RN2505			1.54	2.2	2.86	
	RN2506			3.29	4.7	6.11	
Resistance ratio	RN2501 to 2504	R1/R2	—	0.9	1.0	1.1	—
	RN2505			0.0421	0.0468	0.0515	
	RN2506			0.09	0.1	0.11	

### Characteristics Curves(Q1, Q2 Common)

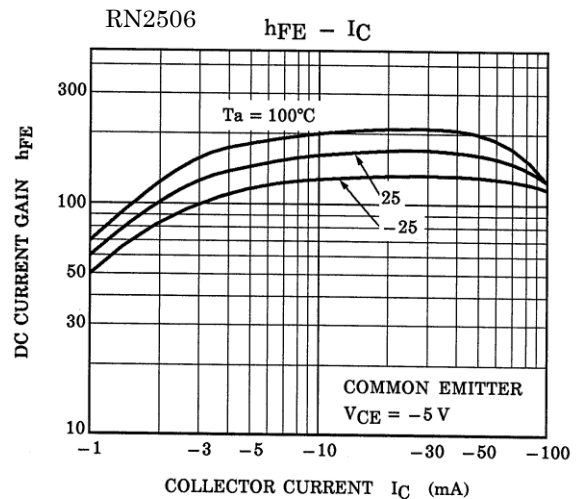
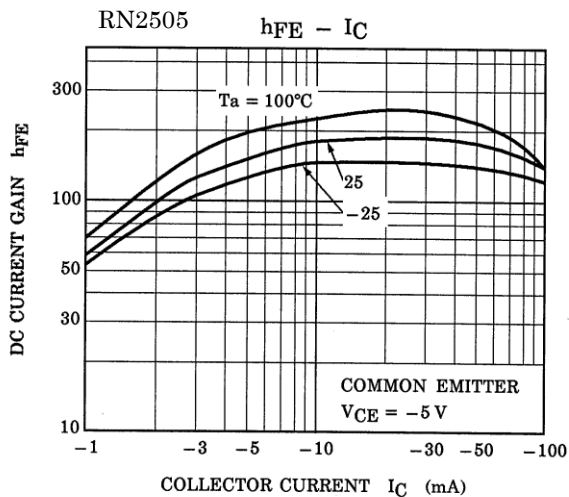
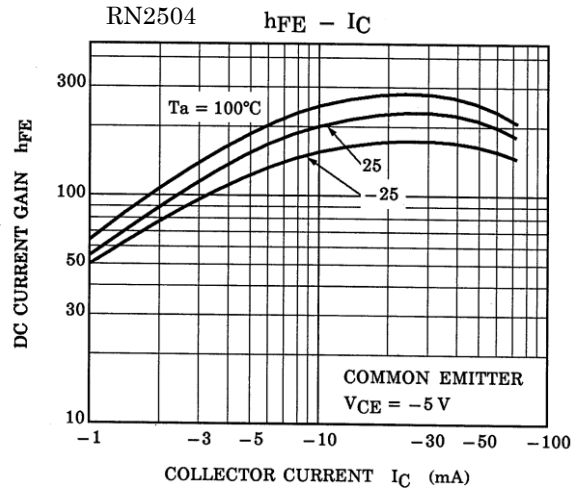
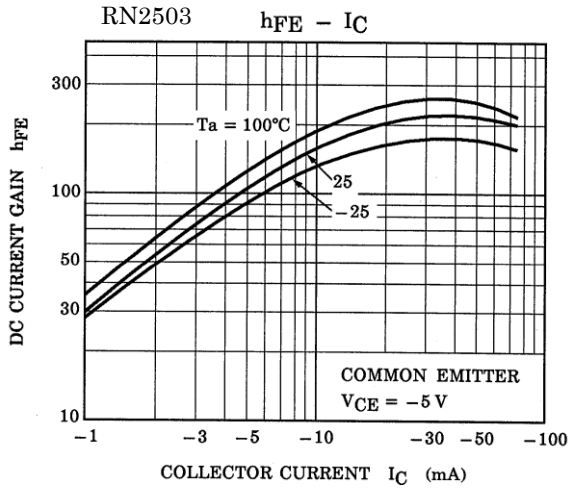
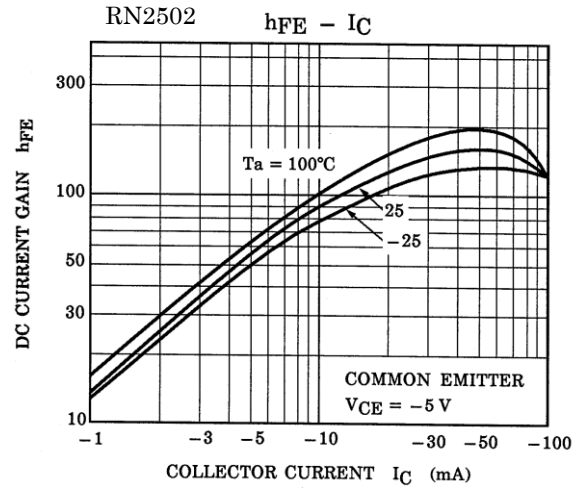
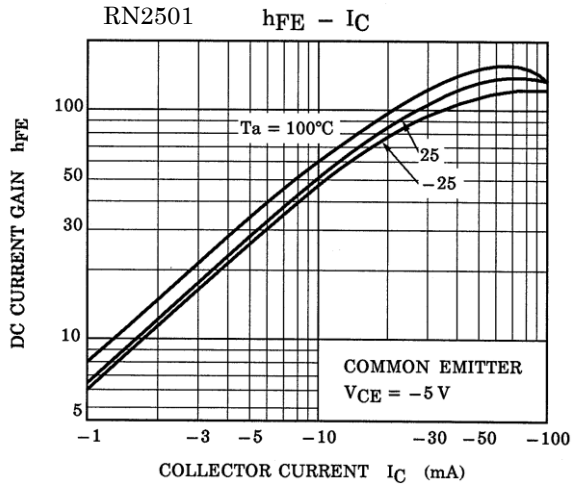


The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

### Characteristics Curves(Q1, Q2 Common)

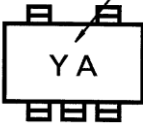
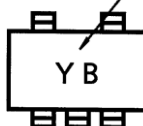
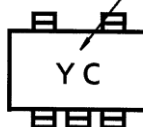
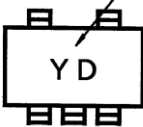

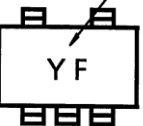


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## Marking

Part No	Marking
RN2501	<p data-bbox="603 300 863 322">Part No.(abbreviation code)</p> 
RN2502	<p data-bbox="603 528 863 551">Part No.(abbreviation code)</p> 
RN2503	<p data-bbox="603 766 863 788">Part No.(abbreviation code)</p> 
RN2504	<p data-bbox="603 1012 863 1034">Part No.(abbreviation code)</p> 
RN2505	<p data-bbox="603 1254 863 1276">Part No.(abbreviation code)</p> 
RN2506	<p data-bbox="603 1496 863 1518">Part No.(abbreviation code)</p> 

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