

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

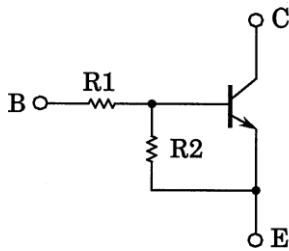
### RN1501, RN1502, RN1503 RN1504, RN1505, RN1506

Unit: mm

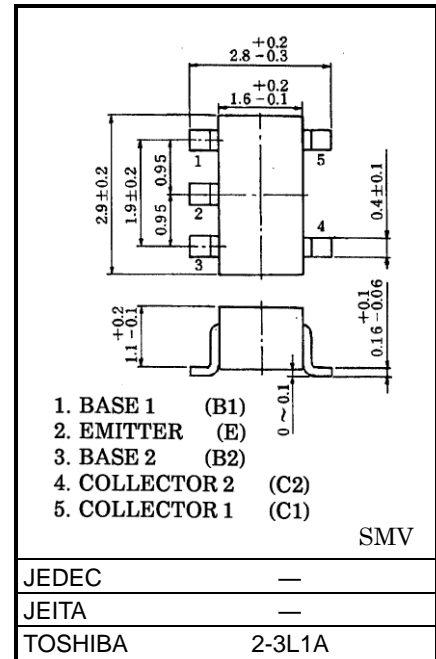
Switching, Inverter Circuit,  
Interface Circuit and Driver Circuit

- Including two devices in SMV (ultra 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 RN2501 to RN2506

#### Equivalent Circuit and Bias Resistor Values



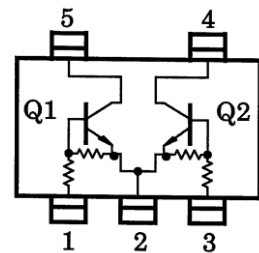
Part No.	R1 (kΩ)	R2 (kΩ)
RN1501	4.7	4.7
RN1502	10	10
RN1503	22	22
RN1504	47	47
RN1505	2.2	47
RN1506	4.7	47



#### Equivalent Circuit (Top View)

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

Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN1501 to 1506	VCBO	50	V
Collector-emitter voltage		VCEO	50	V
Emitter-base voltage	RN1501 to 1504	VEBO	10	V
	RN1505, 1506		5	
Collector current	RN1501 to 1506	IC	100	mA
Collector power dissipation		PC *	300	mW
Junction temperature		Tj	150	°C
Storage temperature range		Tstg	-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).

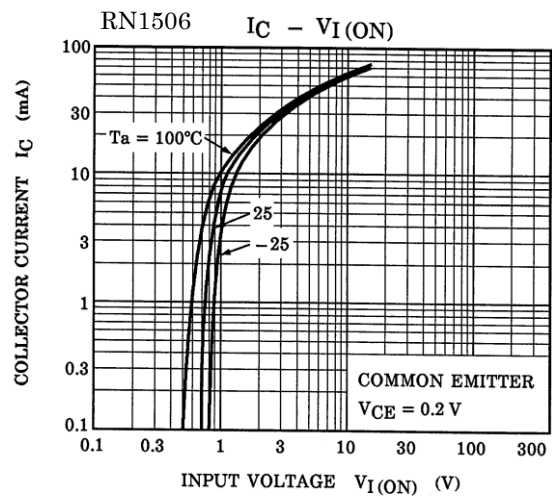
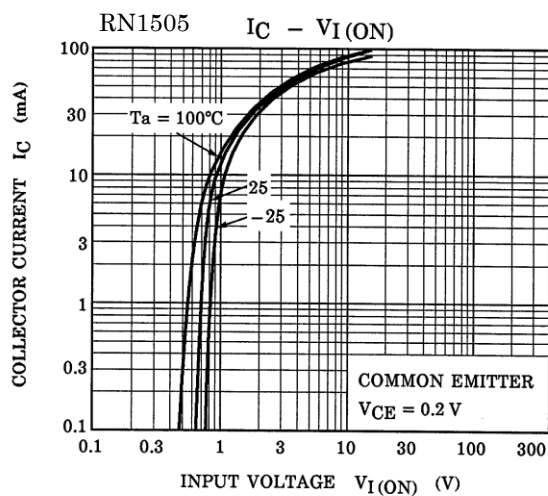
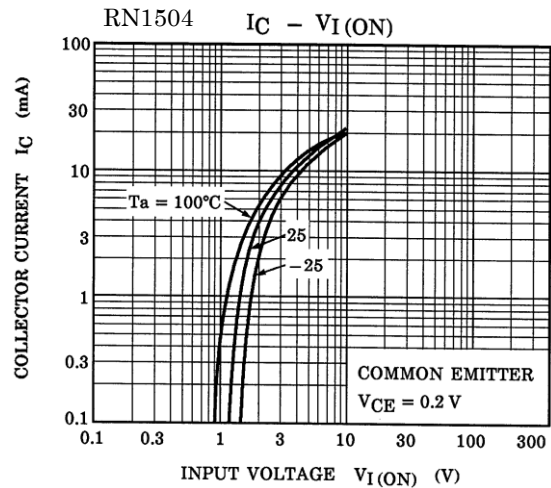
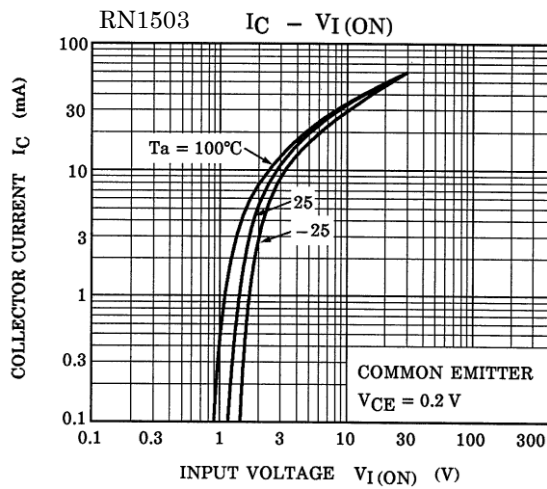
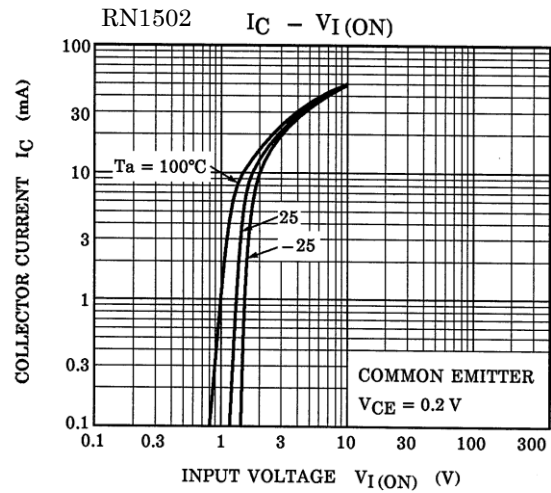
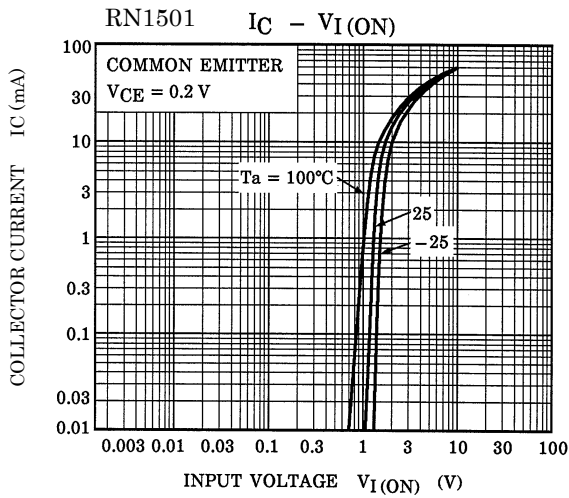
\* Total rating

Start of commercial production  
1988-10

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

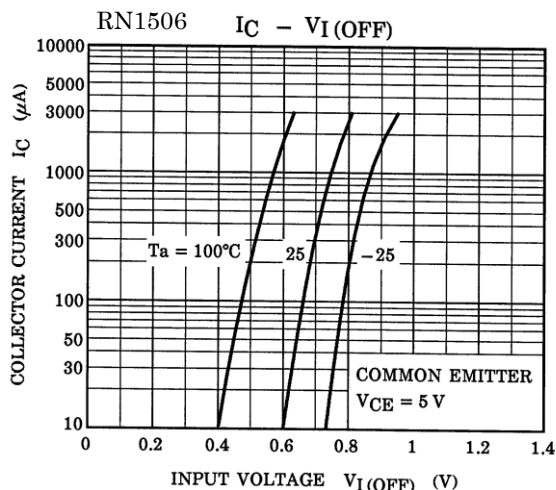
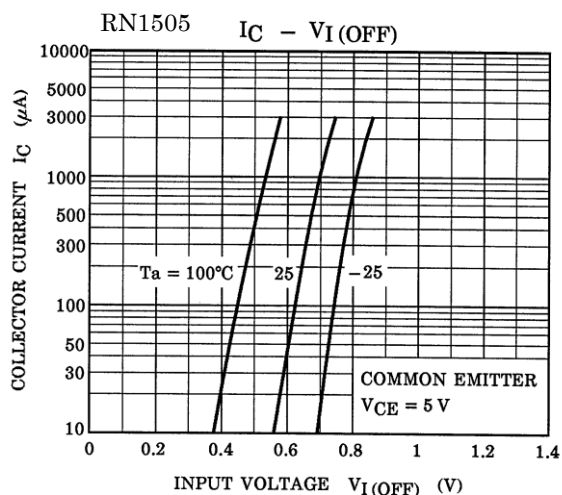
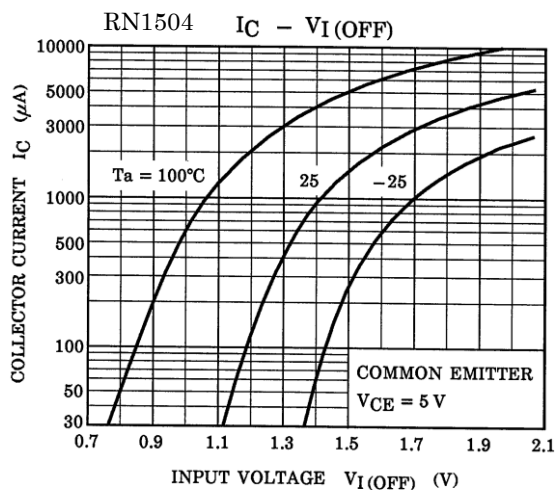
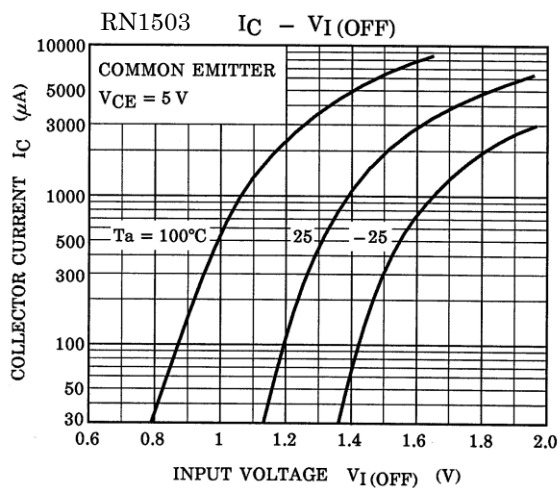
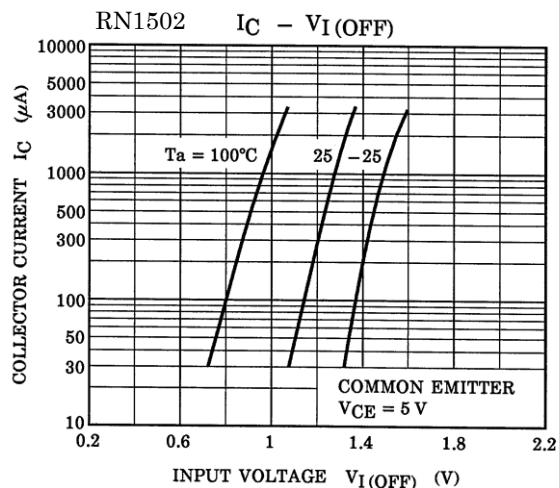
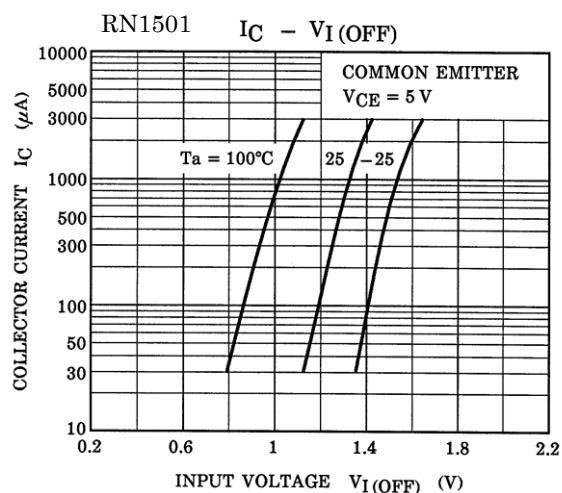
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1501 to 1506	ICBO	V <sub>CB</sub> = 50 V, I <sub>E</sub> = 0 mA	—	—	100	nA
		ICEO	V <sub>CE</sub> = 50 V, I <sub>B</sub> = 0 mA	—	—	500	
Emitter cut-off current	RN1501	I <sub>EBO</sub>	V <sub>EB</sub> = 10 V, I <sub>C</sub> = 0 mA	0.82	—	1.52	mA
	RN1502			0.38	—	0.71	
	RN1503			0.17	—	0.33	
	RN1504		0.082	—	0.15		
	RN1505		V <sub>EB</sub> = 5 V, I <sub>C</sub> = 0 mA	0.078	—	0.145	
	RN1506			0.074	—	0.138	
DC current gain	RN1501	h <sub>FE</sub>	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 10 mA	30	—	—	—
	RN1502			50	—	—	
	RN1503			70	—	—	
	RN1504			80	—	—	
	RN1505			80	—	—	
	RN1506			80	—	—	
Collector-emitter saturation voltage	RN1501 to 1506	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)	RN1501	V <sub>I (ON)</sub>	V <sub>CE</sub> = 0.2 V, I <sub>C</sub> = 5 mA	1.1	—	2.0	V
	RN1502			1.2	—	2.4	
	RN1503			1.3	—	3.0	
	RN1504			1.5	—	5.0	
	RN1505			0.6	—	1.1	
	RN1506			0.7	—	1.3	
Input voltage (OFF)	RN1501 to 1504	V <sub>I (OFF)</sub>	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 0.1 mA	1.0	—	1.5	V
	RN1505, 1506			0.5	—	0.8	
Transition frequency	RN1501 to 1506	f <sub>T</sub>	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 5 mA	—	250	—	MHz
Collector Output capacitance	RN1501 to 1506	C <sub>ob</sub>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0 mA, f = 1 MHz	—	3	6	pF
Input resistance	RN1501	R <sub>1</sub>	—	3.29	4.7	6.11	kΩ
	RN1502			7	10	13	
	RN1503			15.4	22	28.6	
	RN1504			32.9	47	61.1	
	RN1505			1.54	2.2	2.86	
	RN1506			3.29	4.7	6.11	
Resistance ratio	RN1501 to 1504	R <sub>1/R2</sub>	—	0.9	1.0	1.1	—
	RN1505			0.0421	0.0468	0.0515	
	RN1506			0.09	0.1	0.11	

### Characteristics Curves(Q1, Q2 COMMON)



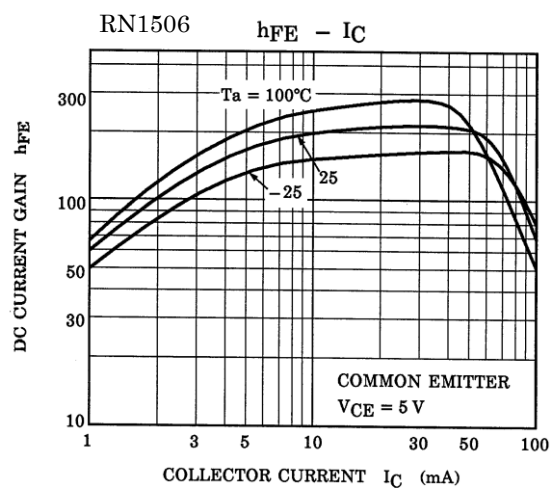
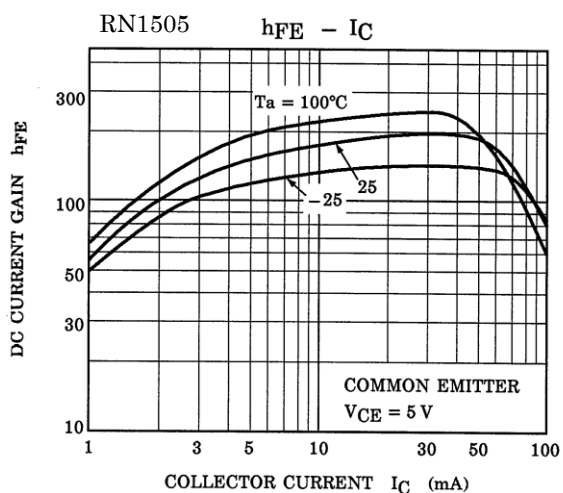
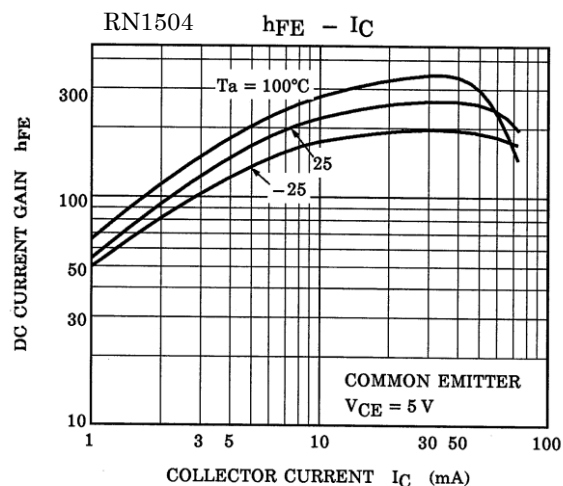
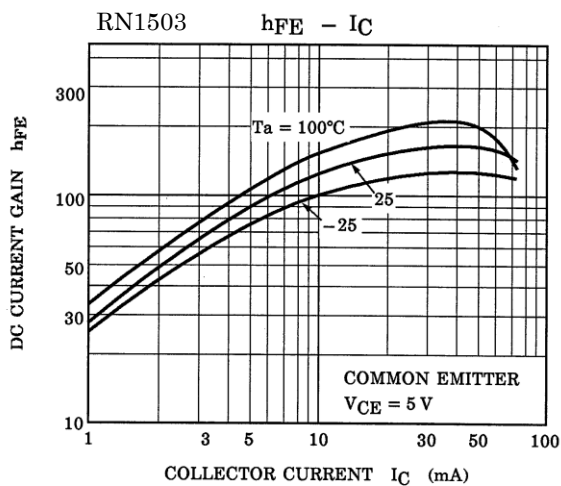
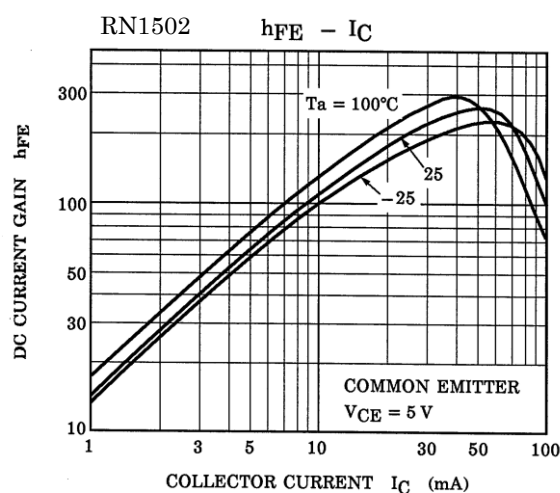
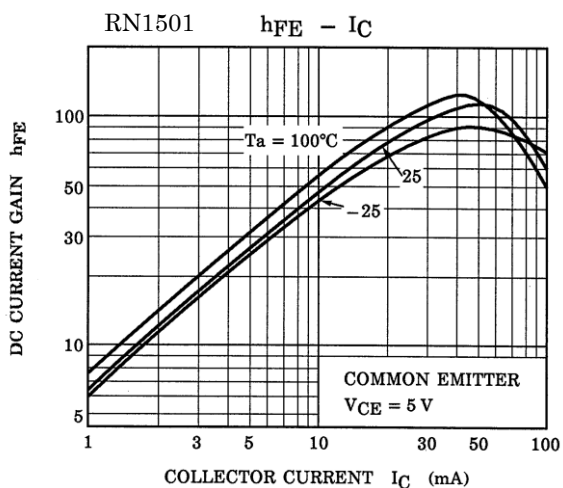
The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

### Characteristics Curves(Q1, Q2 COMMON)



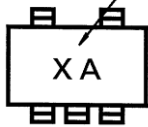
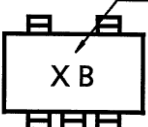
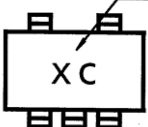
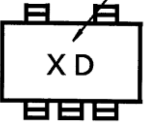
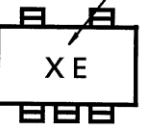
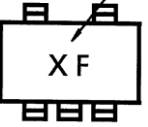
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### Characteristics Curves(Q1, Q2 COMMON)



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## Marking

Part No	Marking
RN1501	<p data-bbox="603 286 863 315">Part No.(abbreviation code)</p> 
RN1502	<p data-bbox="603 495 863 524">Part No.(abbreviation code)</p> 
RN1503	<p data-bbox="603 725 863 754">Part No.(abbreviation code)</p> 
RN1504	<p data-bbox="603 956 863 985">Part No.(abbreviation code)</p> 
RN1505	<p data-bbox="603 1187 863 1216">Part No.(abbreviation code)</p> 
RN1506	<p data-bbox="603 1417 863 1447">Part No.(abbreviation code)</p> 

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