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

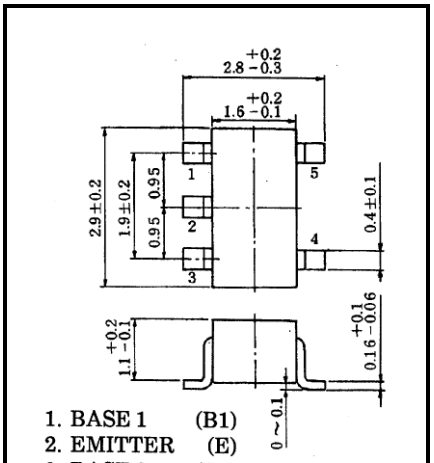
RN2501, RN2502, RN2503
RN2504, RN2505, RN2506

Unit: mm

Switching, Inverter Circuit,

Interface Circuit and Driver Circuit

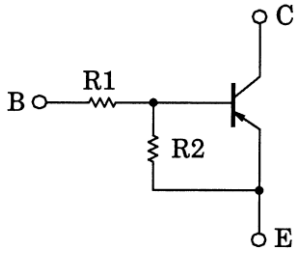
- Including two devices in SMV (super mini type with 5 leads)
- With built-in bias resistors.
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process and miniaturize equipment.
- Various resistance values are available to suit various circuit designs.
- Complementary to RN1501 to RN1506



SMV	
JEDEC	—
JEITA	—
TOSHIBA	2-3L1A

Weight: 14 mg (typ.)

Equivalent Circuit and Bias Resistor Values

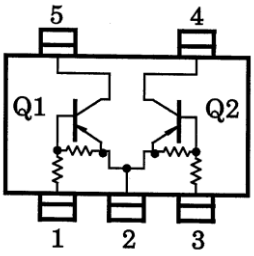


Part No .	R1 (kΩ)	R2 (kΩ)
RN2501	4.7	4.7
RN2502	10	10
RN2503	22	22
RN2504	47	47
RN2505	2.2	47
RN2506	4.7	47

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

Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN2501 to 2506	V_{CBO}	−50	V
Collector-emitter voltage		V_{CEO}	−50	V
Emitter base voltage	RN2501 to 2504	V_{EBO}	−10	V
	RN2505, 2506		−5	
Collector current	RN2501 to 2506	I_C	−100	mA
Collector power dissipation		P_C*	300	mW
Junction temperature		Tj	150	°C
Storage temperature range		Tstg	−55 to150	°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

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

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2501 to 2506	I_{CBO}	V_{CB} = −50 V, I_E = 0 mA	—	—	−100	nA
		I_{CEO}	V_{CE} = −50 V, I_B = 0 mA	—	—	−500	
Emitter cut-off current	RN2501	I_{EBO}	V_{EB} = −10 V, I_C = 0 mA	−0.82	—	−1.52	mA
	RN2502			−0.38	—	−0.71	
	RN2503			−0.17	—	−0.33	
	RN2504			−0.082	—	−0.15	
	RN2505		V_{EB} = −5 V, I_C = 0 mA	−0.078	—	−0.145	
	RN2506			−0.074	—	−0.138	
DC current gain	RN2501	h_{FE}	V_{CE} = −5 V, I_C = −10 mA	30	—	—	—
	RN2502			50	—	—	
	RN2503			70	—	—	
	RN2504			80	—	—	
	RN2505			80	—	—	
	RN2506			80	—	—	
Collector-emitter saturation voltage	RN2501 to 2506	$V_{CE\ (sat)}$	I_C = −5 mA, I_B = −0.25 mA	—	−0.1	−0.3	V
Input voltage (ON)	RN2501	$V_{I\ (ON)}$	V_{CE} = −0.2 V, I_C = −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	$V_{I\ (OFF)}$	V_{CE} = −5 V, I_C = −0.1 mA	−1.0	—	−1.5	V
	RN2505, 2506			−0.5	—	−0.8	
Transition frequency	RN2501 to 2506	f_T	V_{CE} = −10 V, I_C = −5 mA	—	200	—	MHz
Collector output capacitance	RN2501 to 2506	C_{ob}	V_{CB} = −10 V, I_E = 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	

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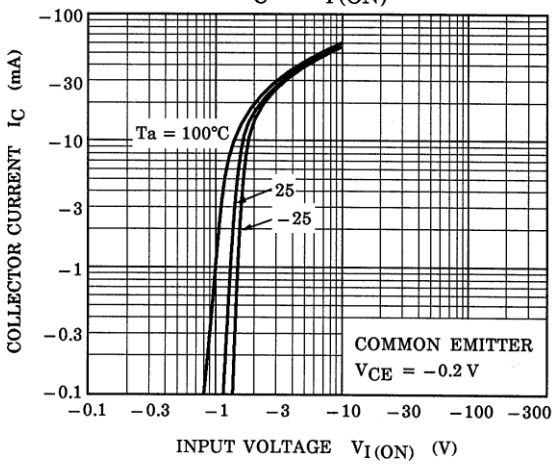
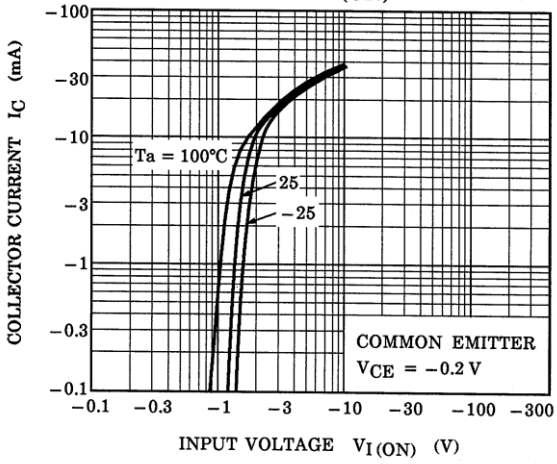
Characteristics Curves(Q1, Q2 Common)

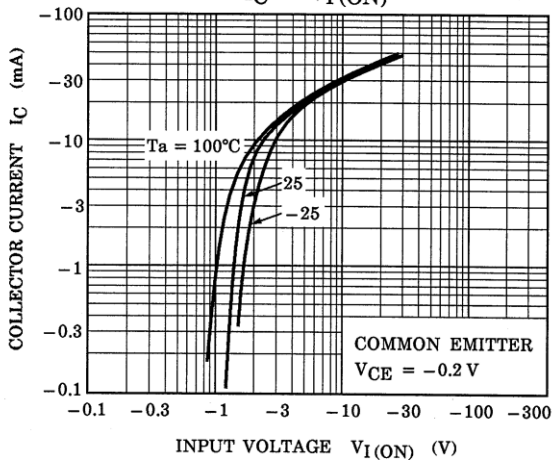
RN2501 $I_C - V_{I(ON)}$



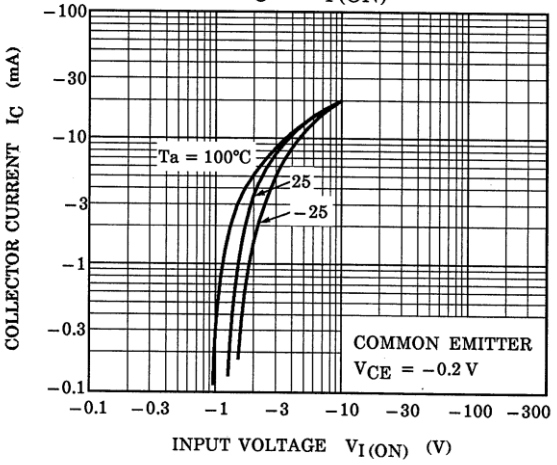
RN2502 $I_C - V_{I(ON)}$



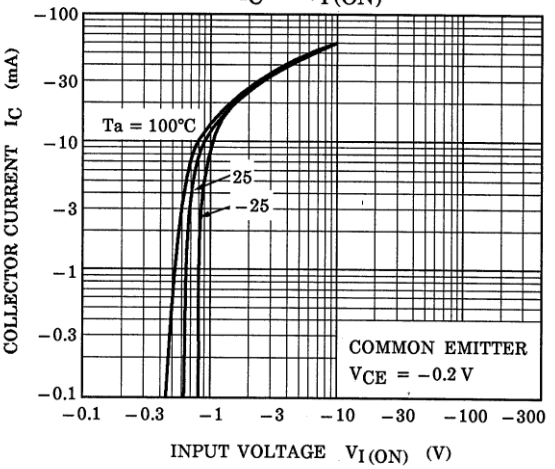
RN2503 $I_C - V_{I(ON)}$



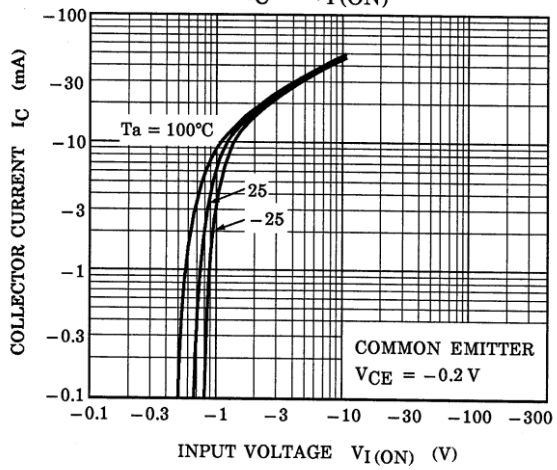
RN2504 $I_C - V_{I(ON)}$



RN2505 $I_C - V_{I(ON)}$



RN2506 $I_C - V_{I(ON)}$



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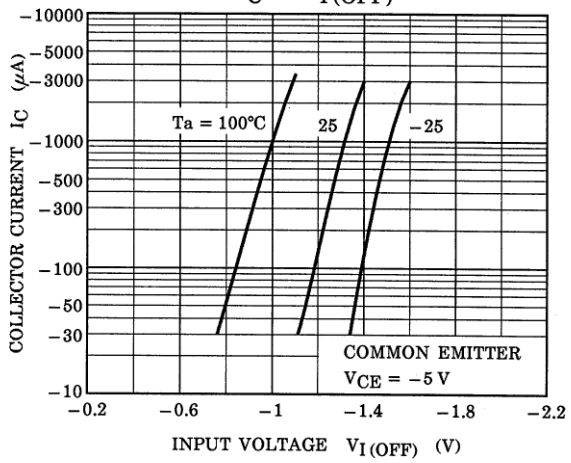
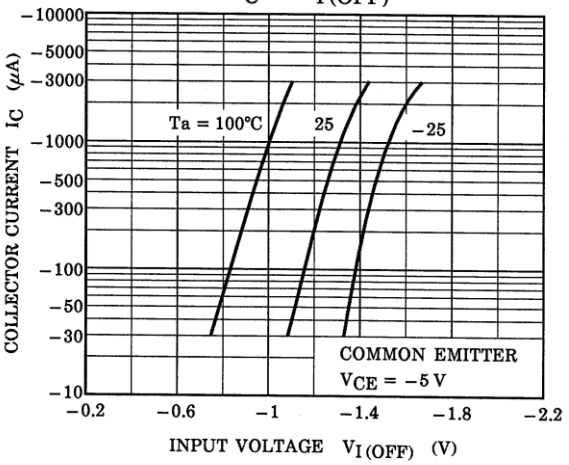
Characteristics Curves(Q1, Q2 Common)

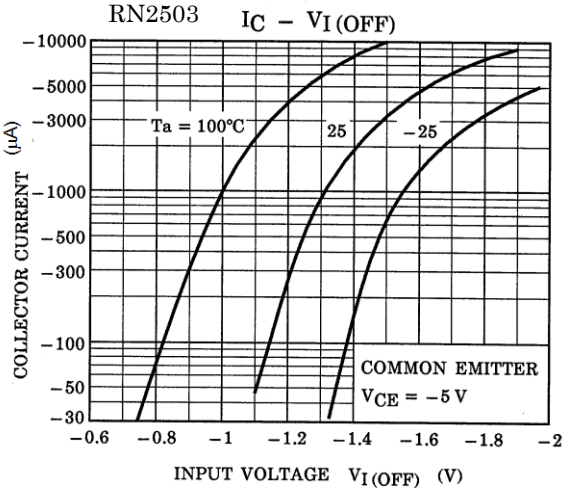
RN2501 I_C – $V_{I(OFF)}$



RN2502 I_C – $V_{I(OFF)}$



RN2503 I_C – $V_{I(OFF)}$



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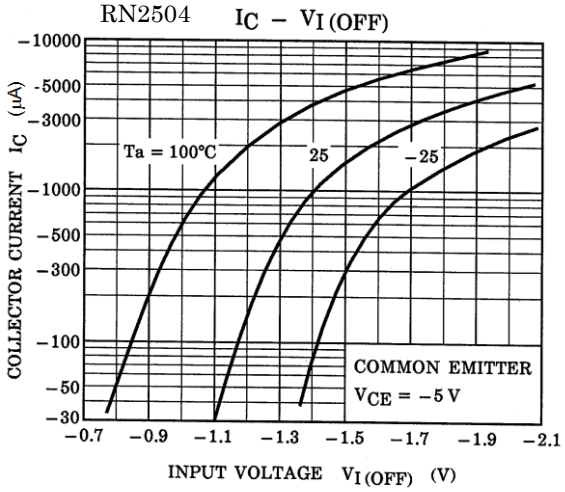
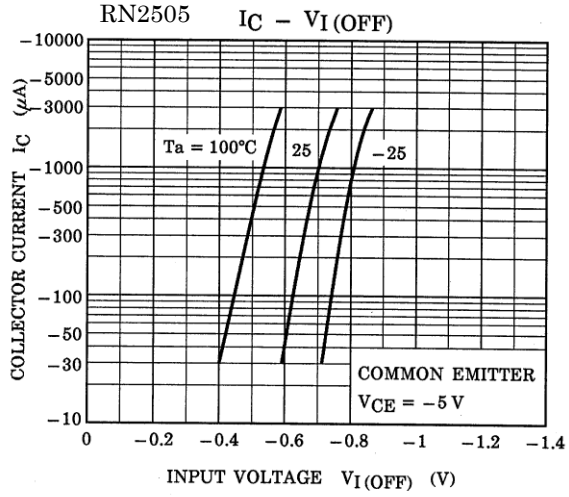
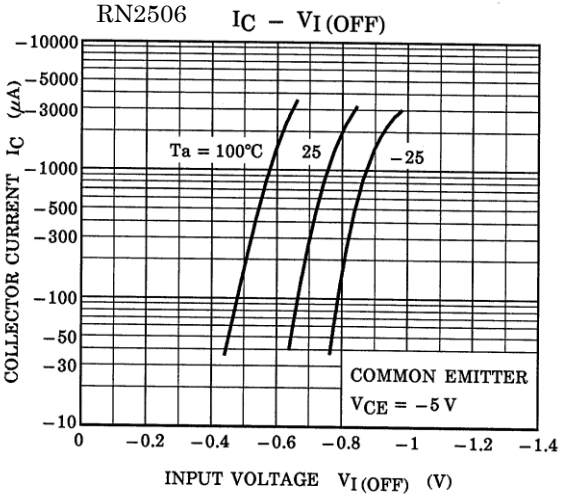


RN2505 I_C – $V_{I(OFF)}$



RN2506 I_C – $V_{I(OFF)}$



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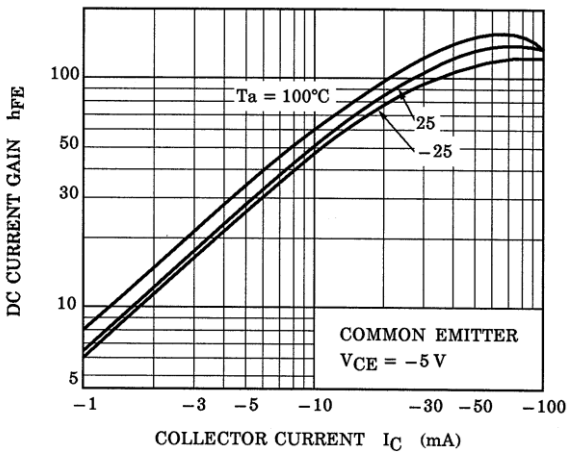
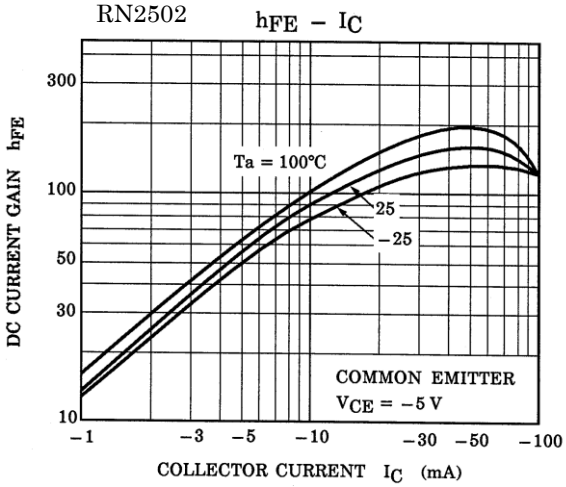
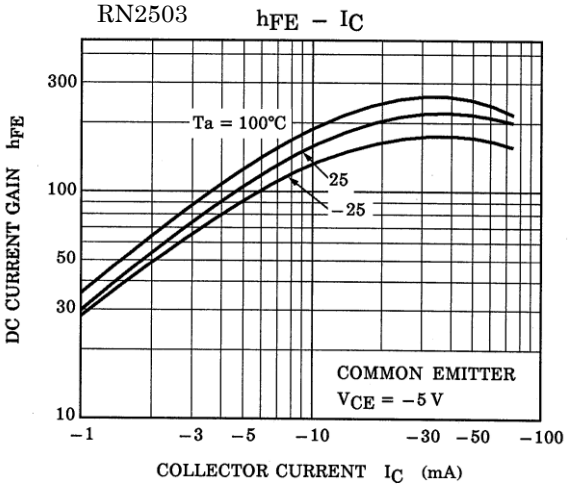
RN2501 h_{FE} – I_C



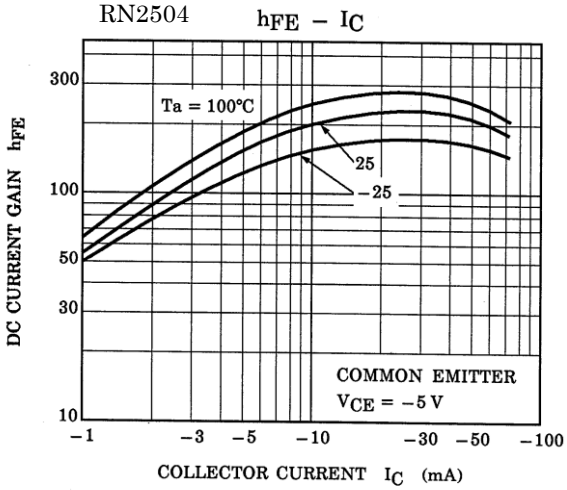
RN2502 h_{FE} – I_C



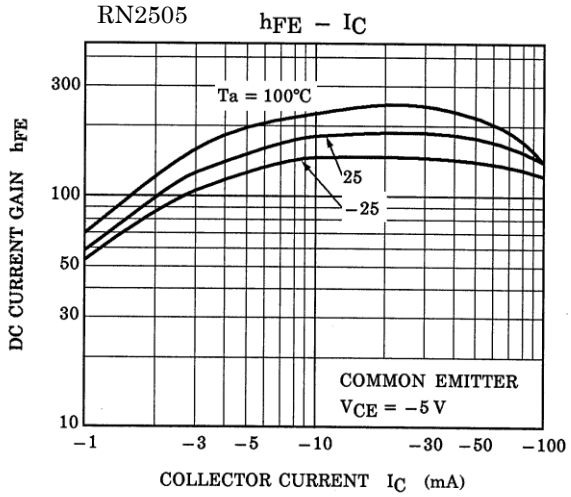
RN2503 h_{FE} – I_C



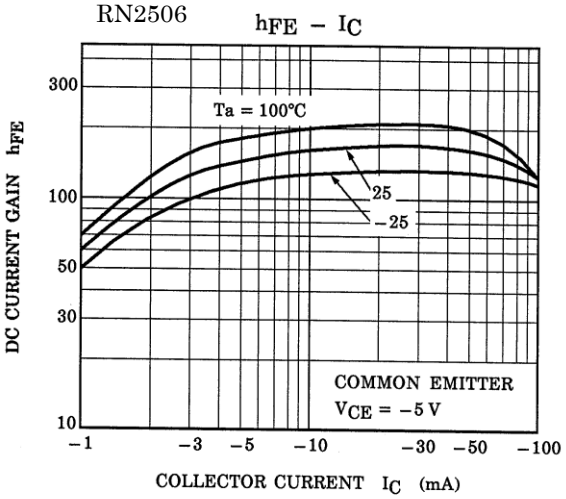
RN2504 h_{FE} – I_C



RN2505 h_{FE} – I_C



RN2506 h_{FE} – I_C



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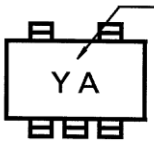
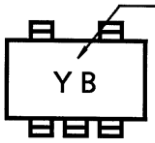
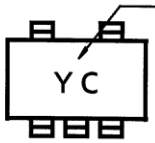
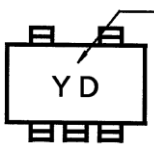
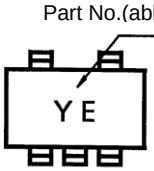
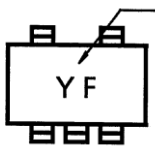
Marking

Part No	Marking
RN2501	Part No.(abbreviation code) 
RN2502	Part No.(abbreviation code) 
RN2503	Part No.(abbreviation code) 
RN2504	Part No.(abbreviation code) 
RN2505	Part No.(abbreviation code) 
RN2506	Part No.(abbreviation code) 

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