

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

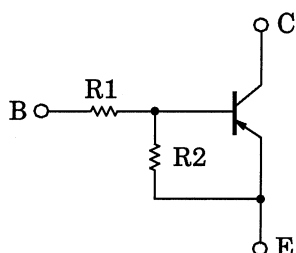
# RN2901, RN2902, RN2903 RN2904, RN2905, RN2906

Switching, Inverter Circuit, Interface Circuit and Driver Circuit

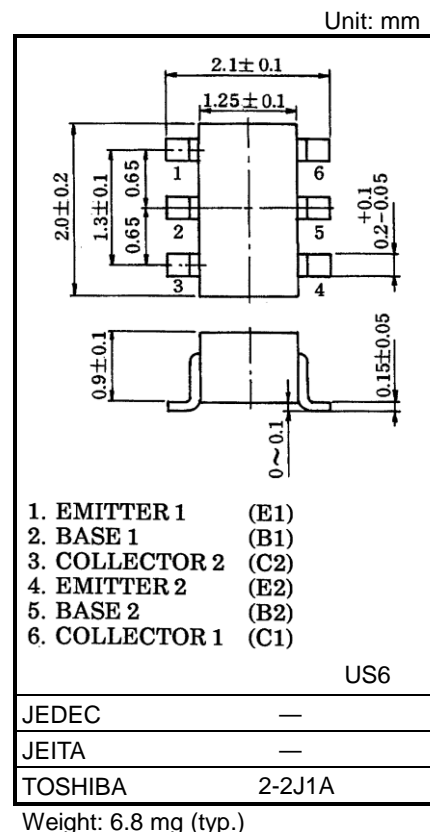
- AEC-Q101 Qualified (Note1)
- Including two devices in US6 (ultra super mini type with 6 leads)
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process and miniaturize equipment.
- Various resistance values are available to suit various circuit designs.
- Complementary to RN1901 to RN1906

Note1: For detail information, please contact to our sales.

## Equivalent Circuit and Bias Resistor Values



Part No.	R1 (kΩ)	R2 (kΩ)
RN2901	4.7	4.7
RN2902	10	10
RN2903	22	22
RN2904	47	47
RN2905	2.2	47
RN2906	4.7	47



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

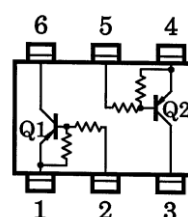
Characteristic	Symbol	Rating	Unit
Collector-base voltage	V <sub>CBO</sub>	-50	V
Collector-emitter voltage	V <sub>CEO</sub>	-50	V
Emitter-base voltage	V <sub>EBO</sub>	-10	V
		-5	V
Collector current	I <sub>C</sub>	-100	mA
Collector power dissipation	P <sub>C</sub> *	200	mW
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature range	T <sub>stg</sub>	-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

## Equivalent Circuit (Top View)

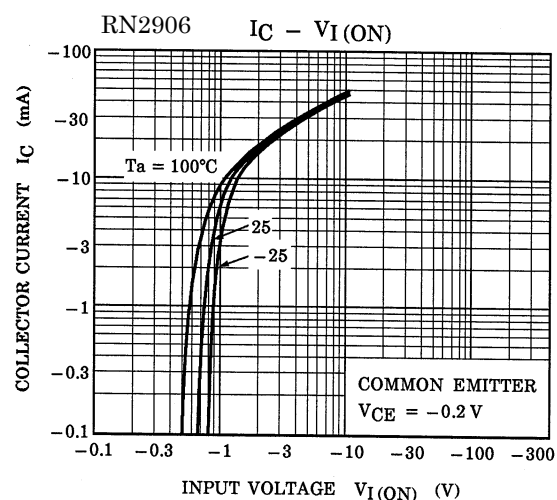
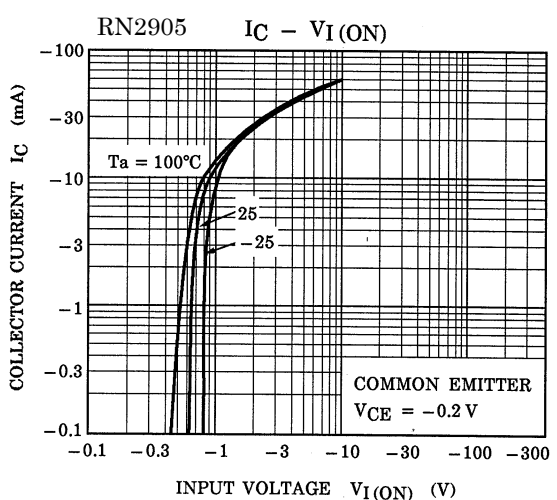
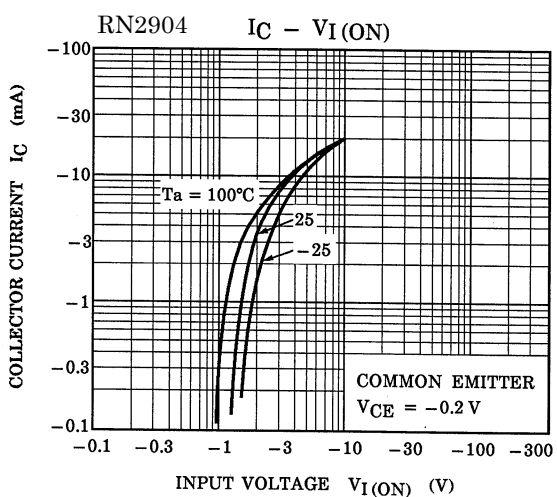
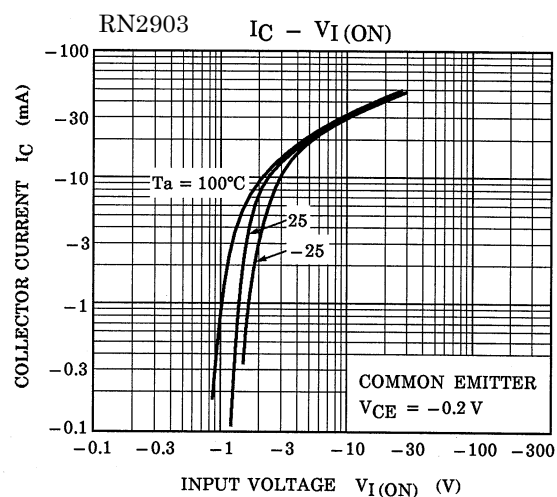
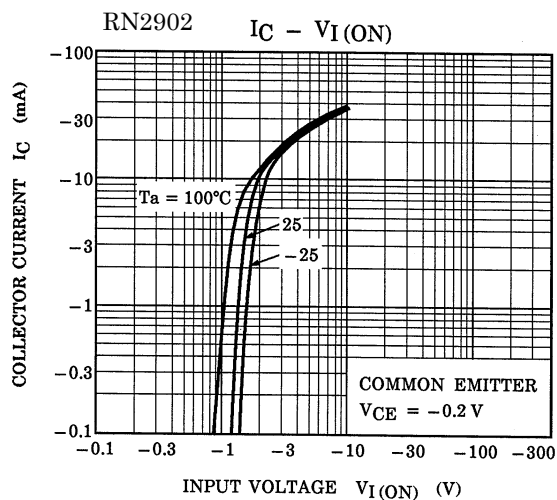
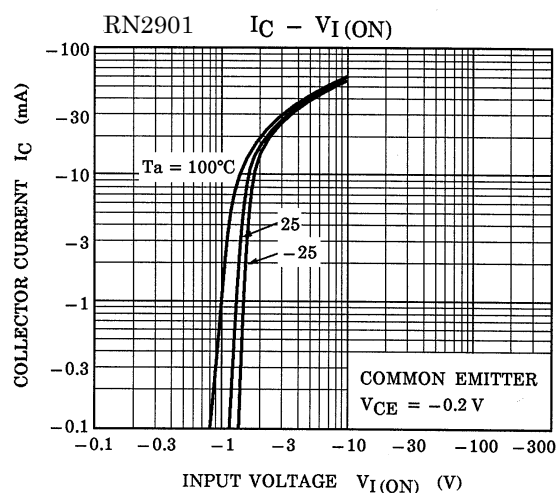


Start of commercial production  
1990-12

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

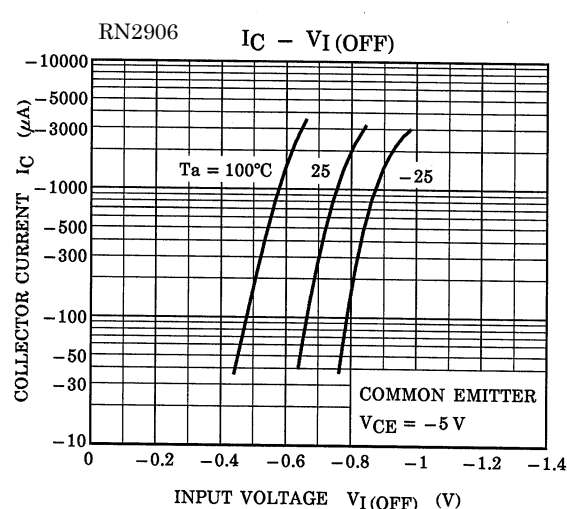
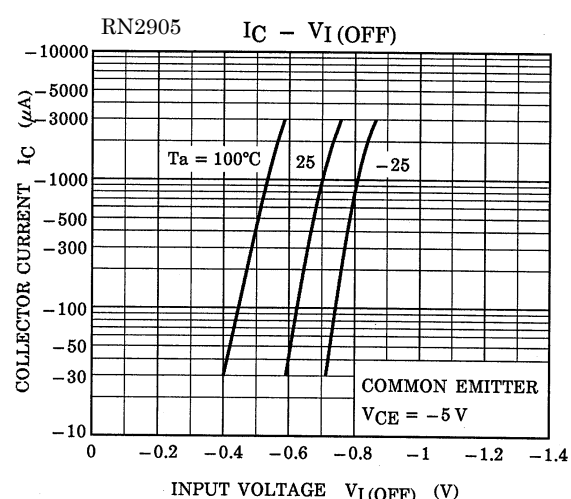
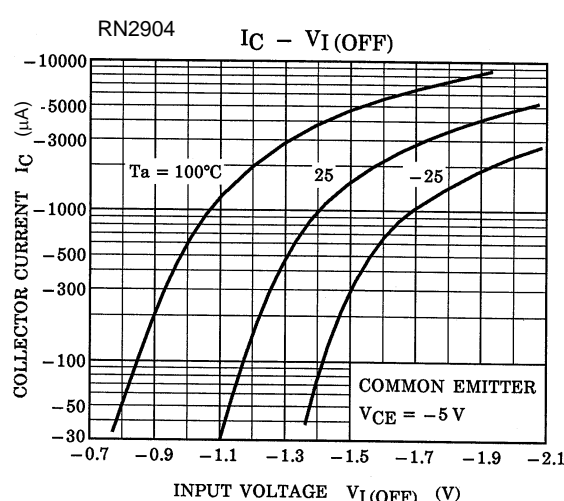
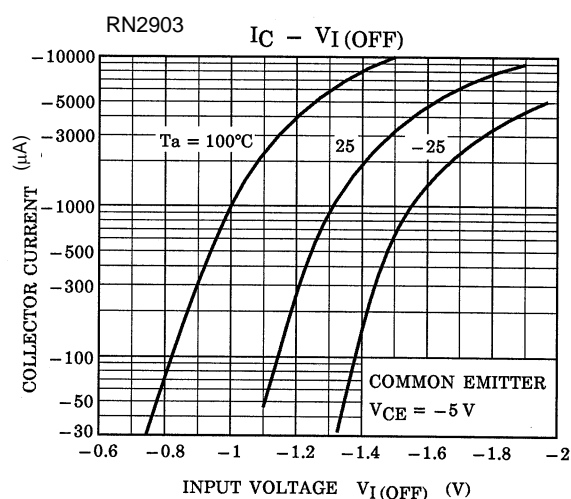
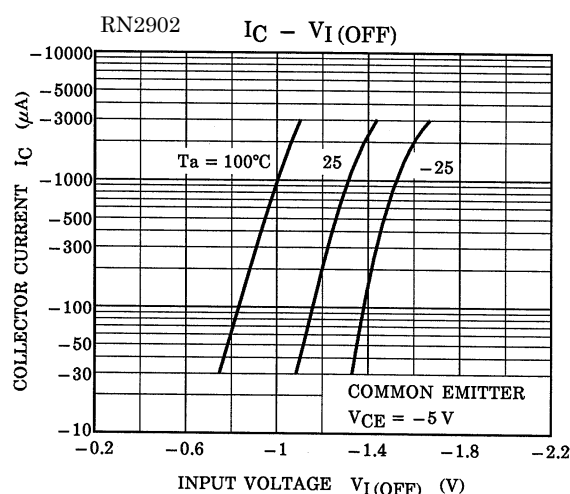
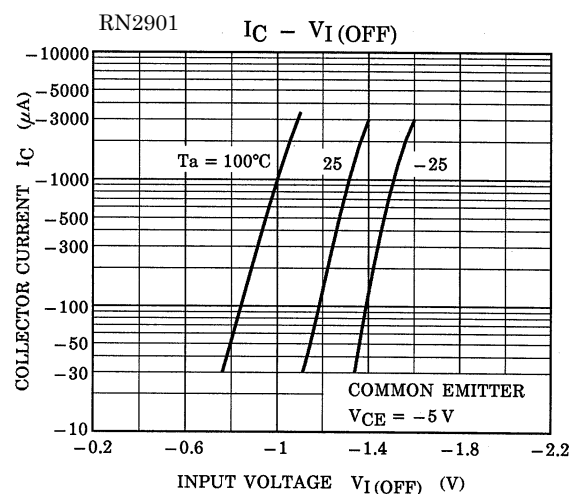
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2901 to 2906	$I_{CBO}$	$V_{CB} = -50\text{ V}, I_E = 0\text{ mA}$	—	—	-100	nA
		$I_{CEO}$	$V_{CE} = -50\text{ V}, I_B = 0\text{ mA}$	—	—	-500	
Emitter cut-off current	RN2901	$I_{EBO}$	$V_{EB} = -10\text{ V}, I_C = 0\text{ mA}$	-0.82	—	-1.52	mA
	RN2902			-0.38	—	-0.71	
	RN2903			-0.17	—	-0.33	
	RN2904			-0.082	—	-0.15	
	RN2905	$I_{EBO}$	$V_{EB} = -5\text{ V}, I_C = 0\text{ mA}$	-0.078	—	-0.145	
	RN2906			-0.074	—	-0.138	
DC current gain	RN2901	$h_{FE}$	$V_{CE} = -5\text{ V}$ $I_C = -10\text{ mA}$	30	—	—	—
	RN2902			50	—	—	
	RN2903			70	—	—	
	RN2904			80	—	—	
	RN2905			80	—	—	
	RN2906			80	—	—	
Collector-emitter saturation voltage	RN2901 to 2906	$V_{CE(sat)}$	$I_C = -5\text{ mA}$ $I_B = -0.25\text{ mA}$	—	-0.1	-0.3	V
Input voltage (ON)	RN2901	$V_I(ON)$	$V_{CE} = -0.2\text{ V}$ $I_C = -5\text{ mA}$	-1.1	—	-2.0	V
	RN2902			-1.2	—	-2.4	
	RN2903			-1.3	—	-3.0	
	RN2904			-1.5	—	-5.0	
	RN2905			-0.6	—	-1.1	
	RN2906			-0.7	—	-1.3	
Input voltage (OFF)	RN2901 to 2904	$V_I(OFF)$	$V_{CE} = -5\text{ V},$ $I_C = -0.1\text{ mA}$	-1.0	—	-1.5	V
	RN2905, 2906			-0.5	—	-0.8	
Transition frequency	RN2901 to 2906	$f_T$	$V_{CE} = -10\text{ V},$ $I_C = -5\text{ mA}$	—	200	—	MHz
Collector output capacitance	RN2901 to 2906	$C_{ob}$	$V_{CB} = -10\text{ V}, I_E = 0\text{ mA}$ $f = 1\text{ MHz}$	—	3	6	pF
Input resistor	RN2901	$R_1$	—	3.29	4.7	6.11	kΩ
	RN2902			7	10	13	
	RN2903			15.4	22	28.6	
	RN2904			32.9	47	61.1	
	RN2905			1.54	2.2	2.86	
	RN2906			3.29	4.7	6.11	
Resistor ratio	RN2901 to 2904	$R_1/R_2$	—	0.9	1.0	1.1	—
	RN2905			0.0421	0.0468	0.0515	
	RN2906			0.09	0.1	0.11	

### Characteristics Curves (Q1, Q2 Common)



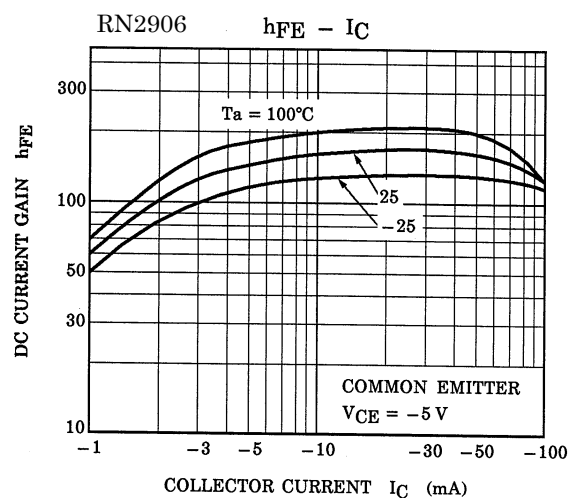
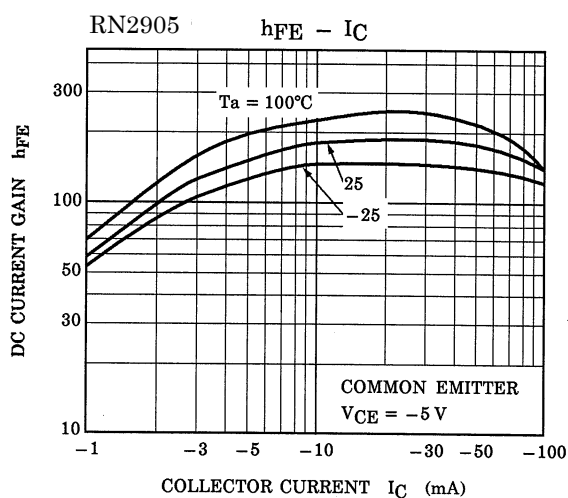
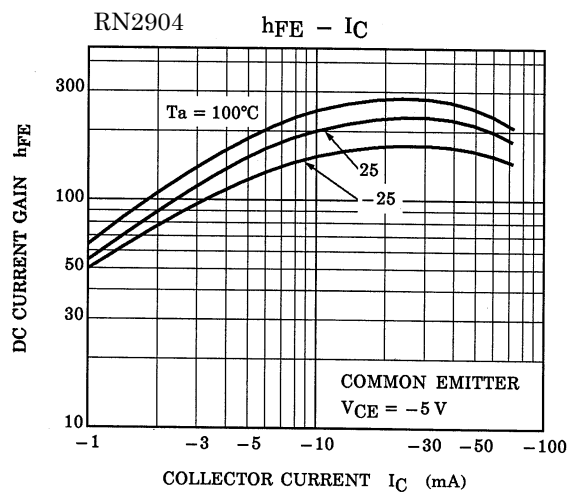
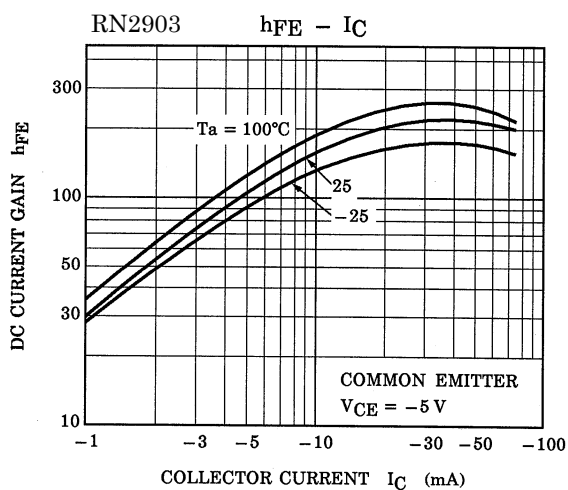
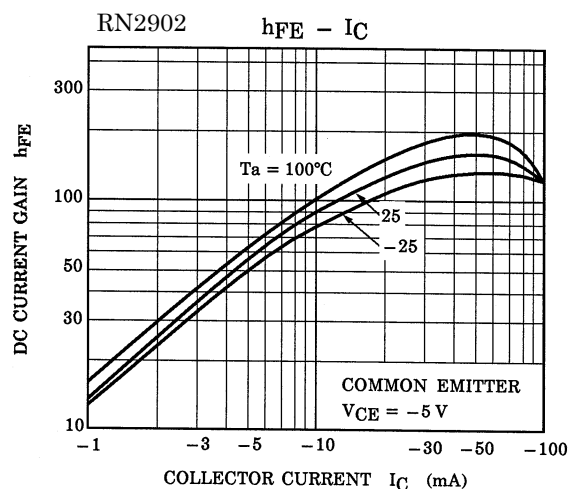
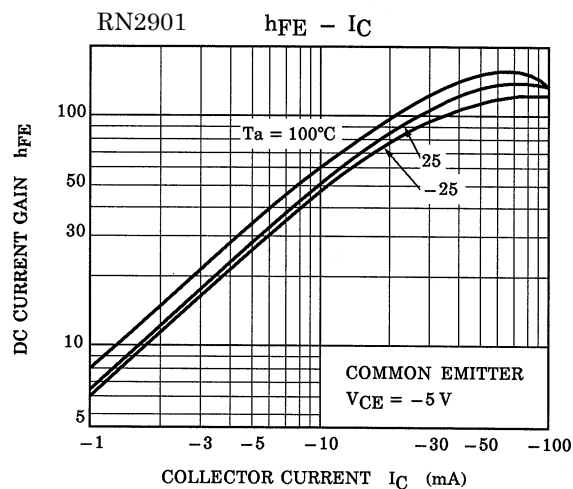
The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

### Characteristics Curves (Q1, Q2 Common)



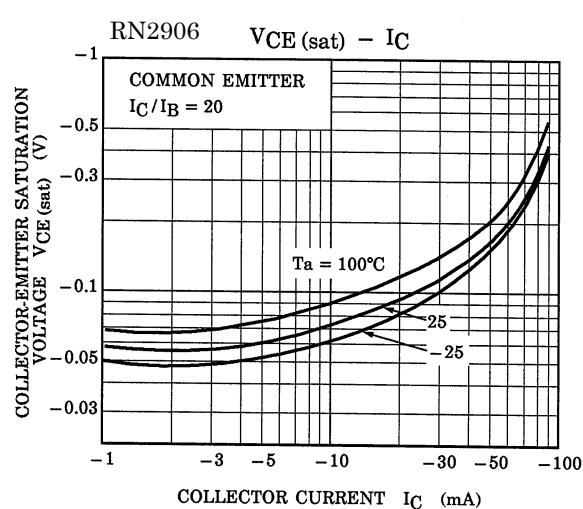
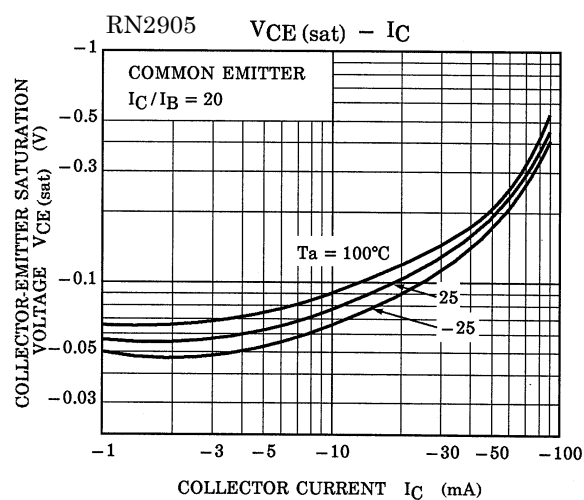
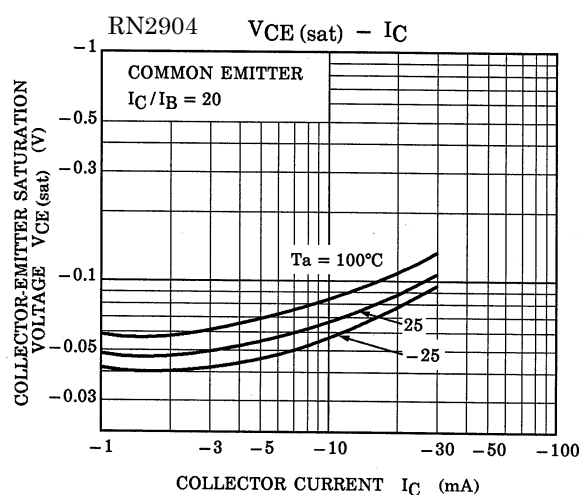
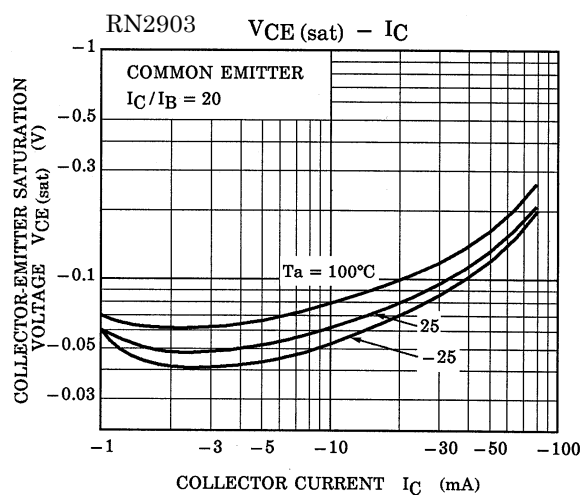
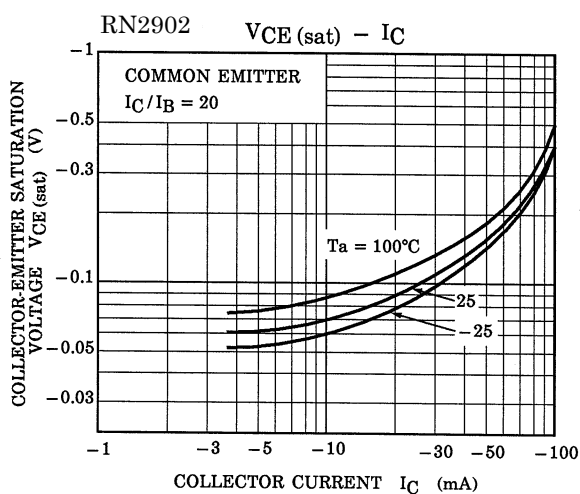
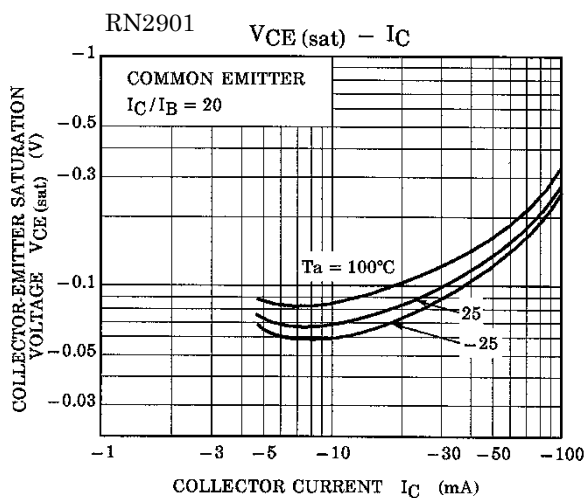
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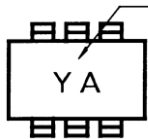
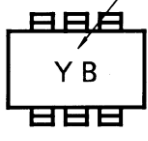
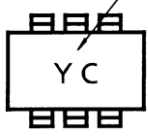
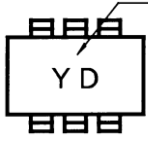
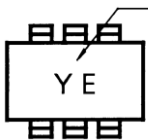
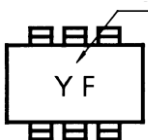
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### Characteristics Curves (Q1, Q2 Common)



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### Marking

Part No.	Marking
RN2901	<p>Part No.(abbreviation code)</p> 
RN2902	<p>Part No.(abbreviation code)</p> 
RN2903	<p>Part No.(abbreviation code)</p> 
RN2904	<p>Part No.(abbreviation code)</p> 
RN2905	<p>Part No.(abbreviation code)</p> 
RN2906	<p>Part No.(abbreviation code)</p> 



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