

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

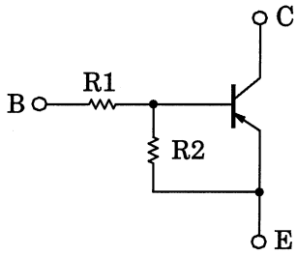
# RN2101, RN2102, RN2103 RN2104, RN2105, RN2106

Switching, Inverter Circuit, Interface Circuit and Driver Circuit

- AEC-Q101 Qualified (Note1)
- 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 RN1101 to RN1106

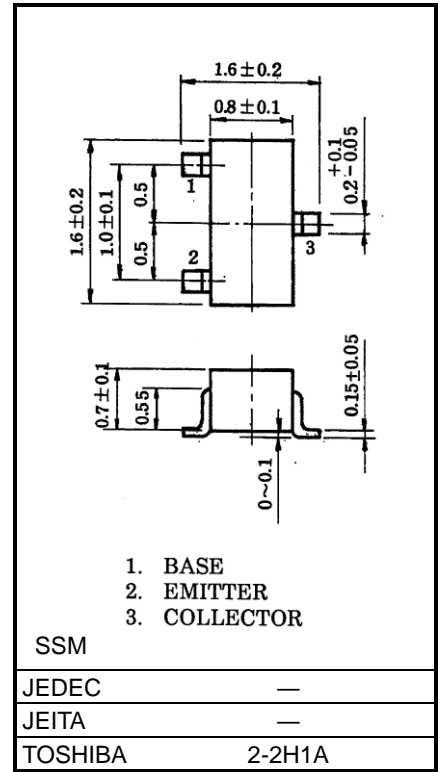
Note1: For detail information, please contact our sales representative.

### Equivalent Circuit and Bias Resistor Values



Part No.	R1 (kΩ)	R2 (kΩ)
RN2101	4.7	4.7
RN2102	10	10
RN2103	22	22
RN2104	47	47
RN2105	2.2	47
RN2106	4.7	47

Unit: mm



### Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN2101 to 2106	VCBO	-50	V
Collector-emitter voltage		VCEO	-50	V
Emitter-base voltage	RN2101 to 2104	VEBO	-10	V
	RN2105, 2106		-5	
Collector current	RN2101 to 2106	IC	-100	mA
Collector power dissipation		PC	100	mW
Junction temperature		Tj	150	°C
Storage temperature range		Tstg	-55 to 150	°C

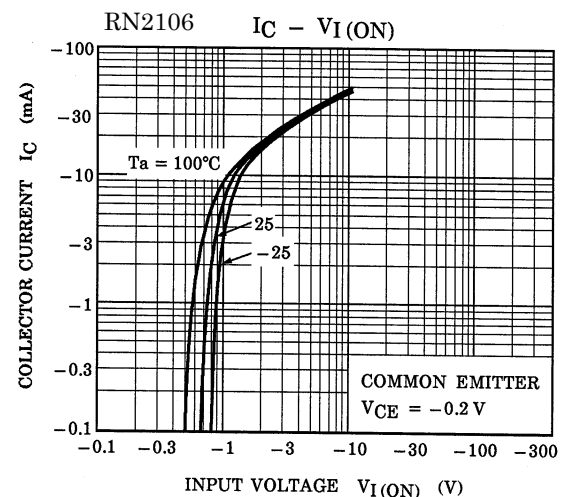
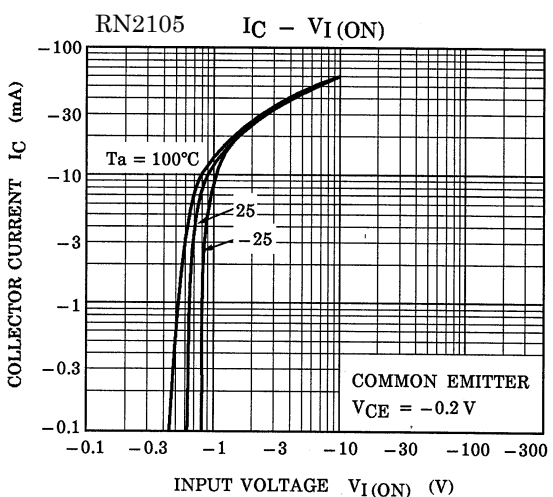
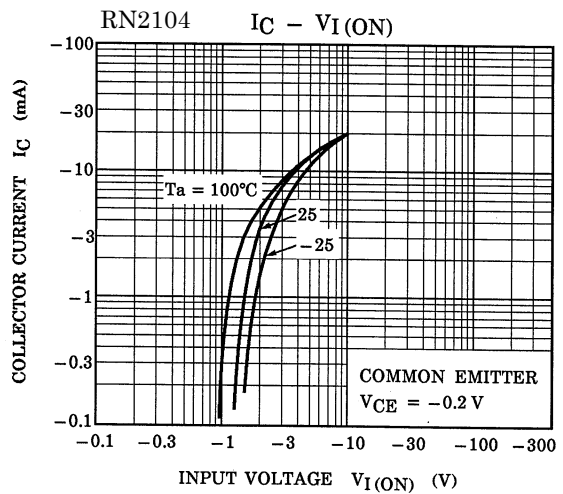
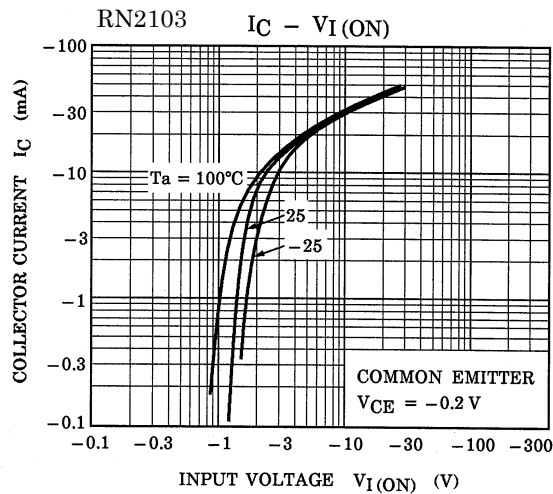
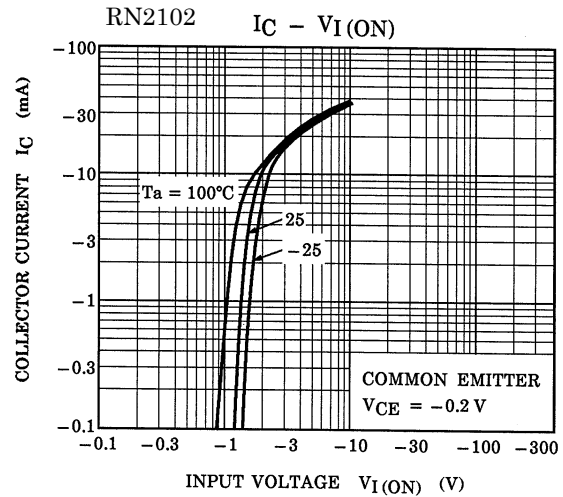
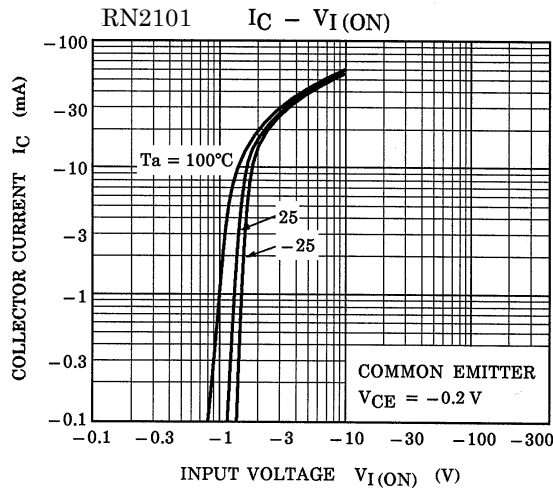
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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.).

Start of commercial production  
1990-12

### Electrical Characteristics (Ta = 25°C)

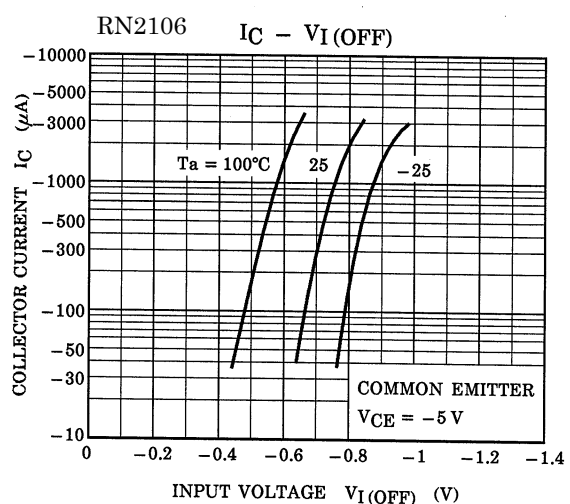
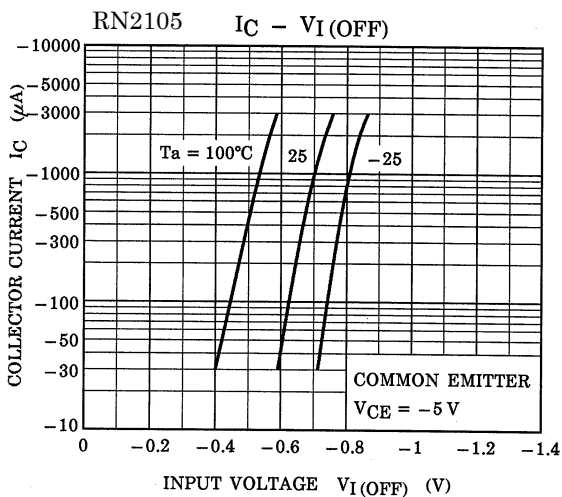
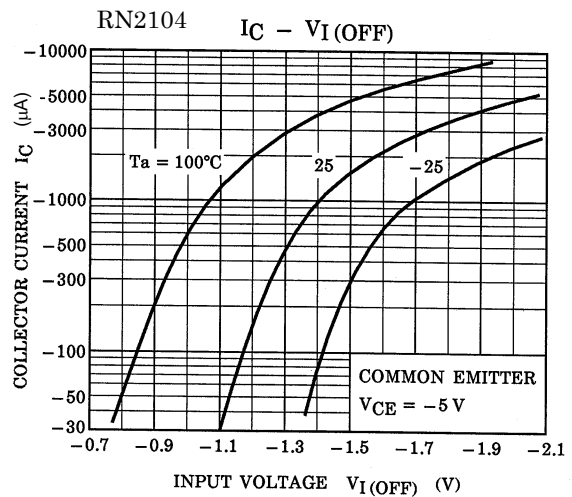
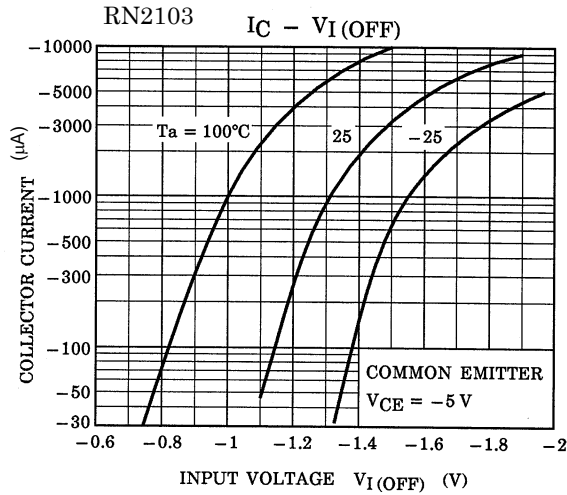
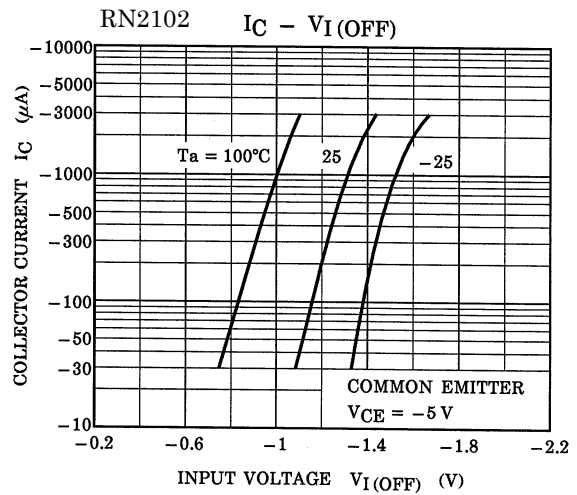
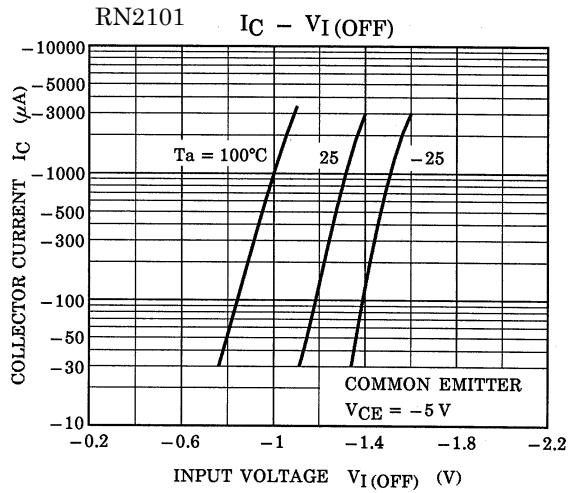
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2101 to 2106	ICBO	$V_{CB} = -50\text{ V}, I_E = 0\text{ mA}$	—	—	-100	nA
		ICEO	$V_{CE} = -50\text{ V}, I_B = 0\text{ mA}$	—	—	-500	
Emitter cut-off current	RN2101	IEBO	$V_{EB} = -10\text{ V}, I_C = 0\text{ mA}$	-0.82	—	-1.52	mA
	RN2102			-0.38	—	-0.71	
	RN2103			-0.17	—	-0.33	
	RN2104			-0.082	—	-0.15	
	RN2105		$V_{EB} = -5\text{ V}, I_C = 0\text{ mA}$	-0.078	—	-0.145	
	RN2106			-0.074	—	-0.138	
DC current gain	RN2101	hFE	$V_{CE} = -5\text{ V}, I_C = -10\text{ mA}$	30	—	—	—
	RN2102			50	—	—	
	RN2103			70	—	—	
	RN2104			80	—	—	
	RN2105			80	—	—	
	RN2106			80	—	—	
Collector-emitter saturation voltage	RN2101 to 2106	VCE (sat)	$I_C = -5\text{ mA}, I_B = -0.25\text{ mA}$	—	-0.1	-0.3	V
Input voltage (ON)	RN2101	VI (ON)	$V_{CE} = -0.2\text{ V}, I_C = -5\text{ mA}$	-1.1	—	-2.0	V
	RN2102			-1.2	—	-2.4	
	RN2103			-1.3	—	-3.0	
	RN2104			-1.5	—	-5.0	
	RN2105			-0.6	—	-1.1	
	RN2106			-0.7	—	-1.3	
Input voltage (OFF)	RN2101 to 2104	VI (OFF)	$V_{CE} = -5\text{ V}, I_C = -0.1\text{ mA}$	-1.0	—	-1.5	V
	RN2105, 2106			-0.5	—	-0.8	
Transition frequency	RN2101 to 2106	fT	$V_{CE} = -10\text{ V}, I_C = -5\text{ mA}$	—	200	—	MHz
Collector Output capacitance	RN2101 to 2106	Cob	$V_{CB} = -10\text{ V}, I_E = 0\text{ mA}, f = 1\text{ MHz}$	—	3	6	pF
Input resistor	RN2101	R1	—	3.29	4.7	6.11	kΩ
	RN2102			7	10	13	
	RN2103			15.4	22	28.6	
	RN2104			32.9	47	61.1	
	RN2105			1.54	2.2	2.86	
	RN2106			3.29	4.7	6.11	
Resistor ratio	RN2101 to 2104	R1/R2	—	0.9	1.0	1.1	—
	RN2105			0.0421	0.0468	0.0515	
	RN2106			0.09	0.1	0.11	

### Characteristics Curves



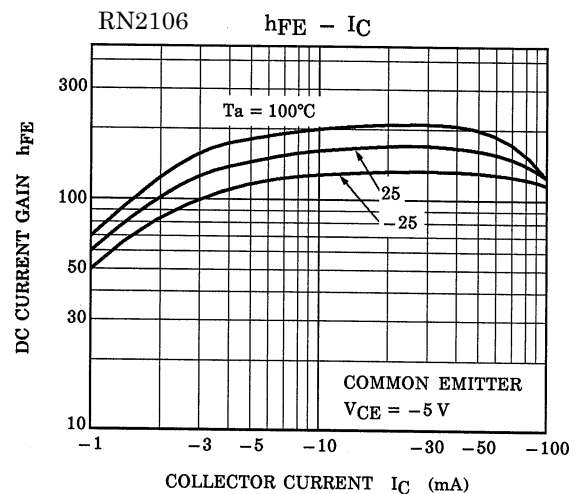
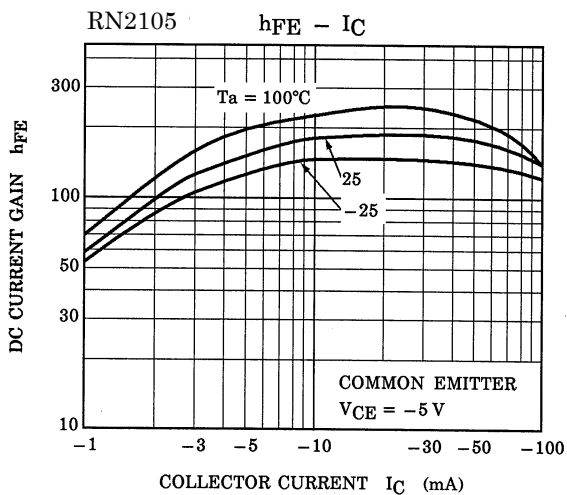
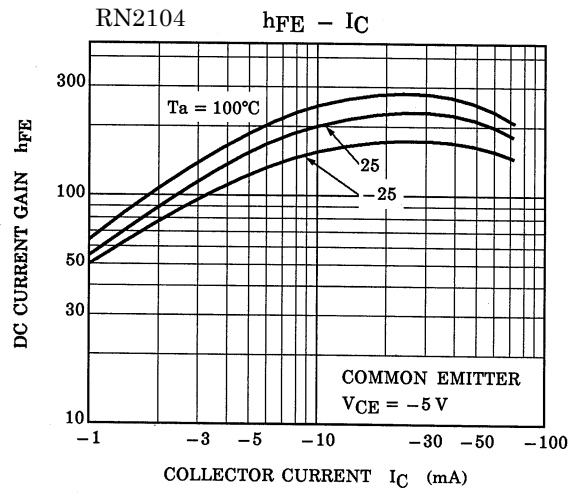
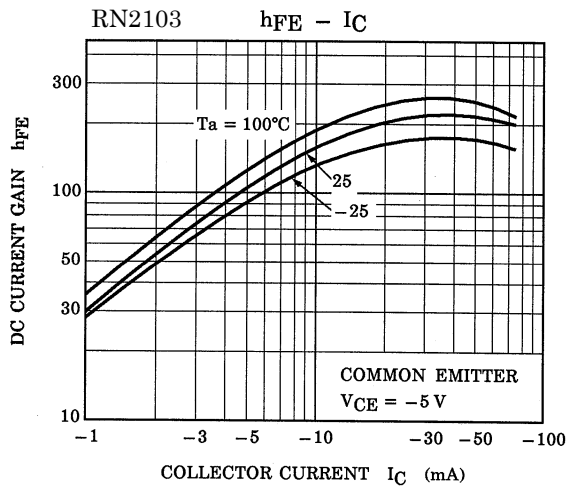
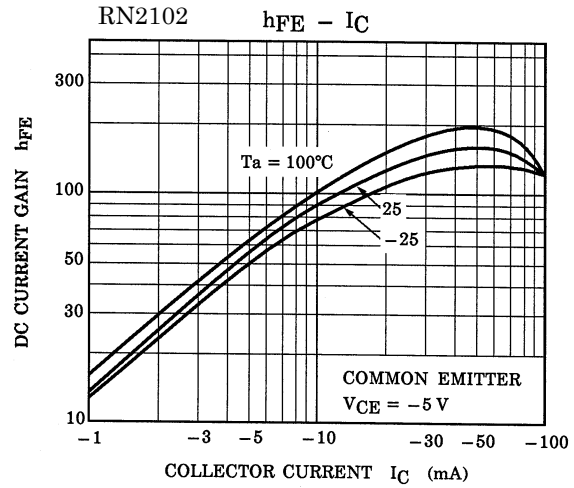
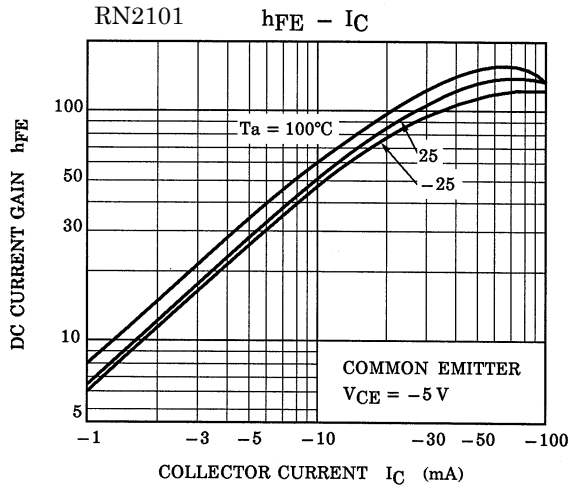
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### Characteristics Curves



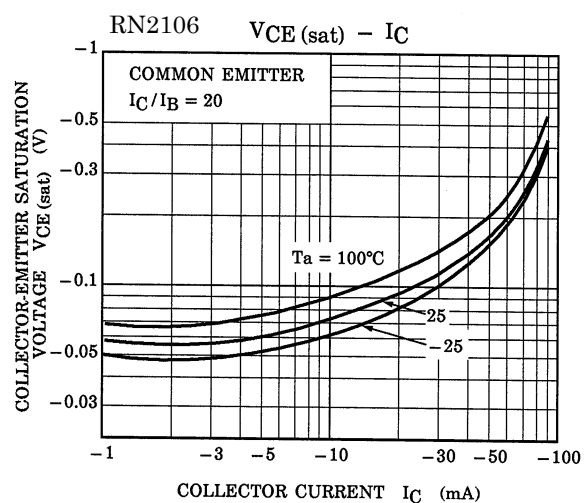
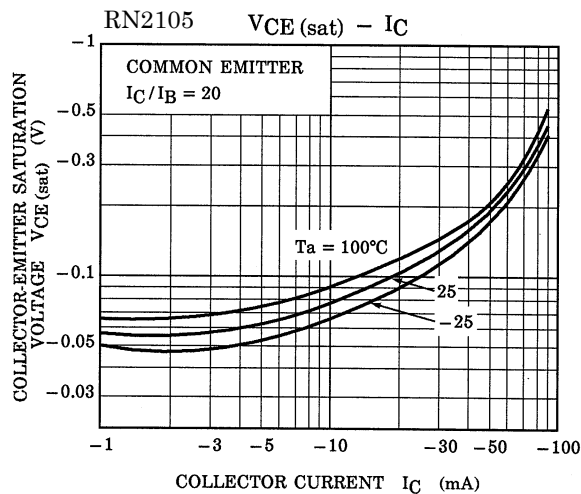
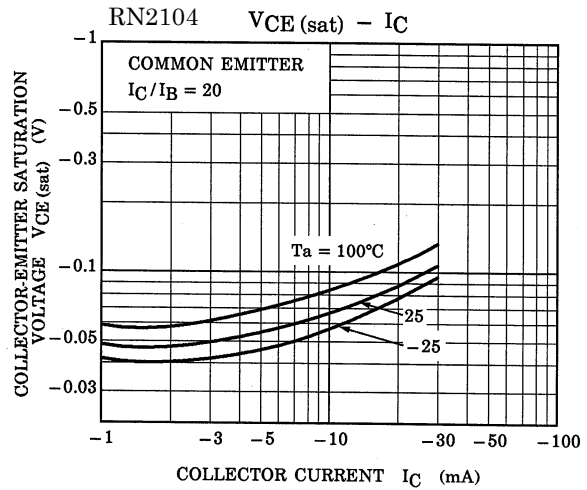
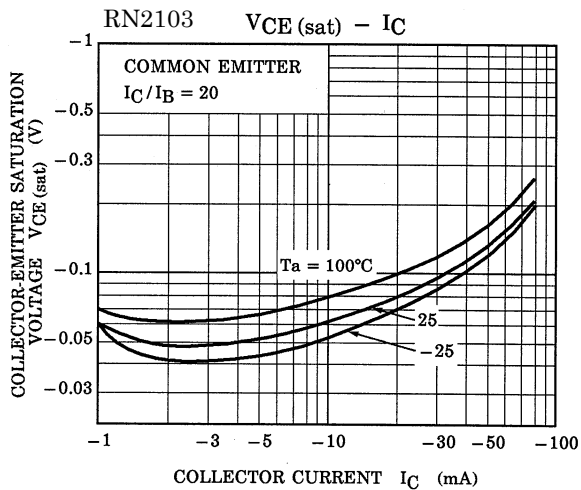
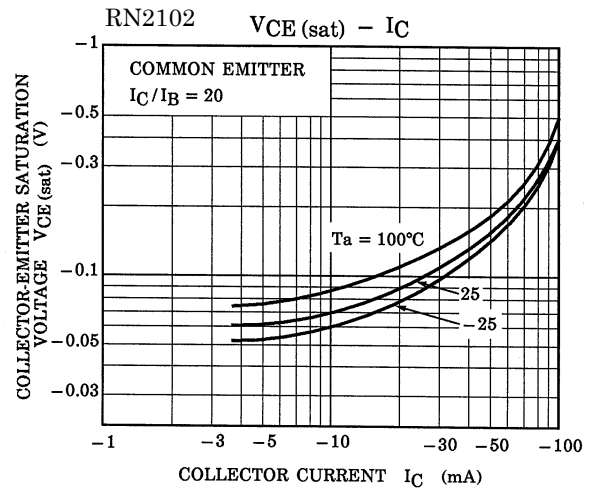
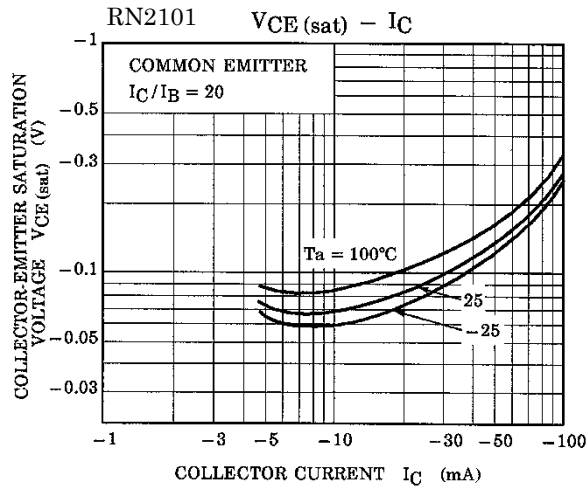
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### Characteristics Curves



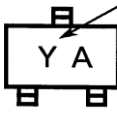
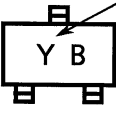
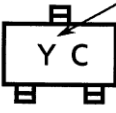
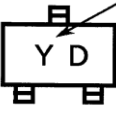
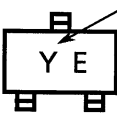
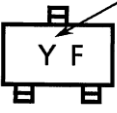
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### Marking

Part No.	Marking
RN2101	<p data-bbox="564 349 831 376">Part No.(abbreviation code)</p> 
RN2102	<p data-bbox="564 584 831 611">Part No.(abbreviation code)</p> 
RN2103	<p data-bbox="564 808 831 835">Part No.(abbreviation code)</p> 
RN2104	<p data-bbox="564 1032 831 1059">Part No.(abbreviation code)</p> 
RN2105	<p data-bbox="564 1256 831 1283">Part No.(abbreviation code)</p> 
RN2106	<p data-bbox="564 1491 831 1518">Part No.(abbreviation code)</p> 



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