

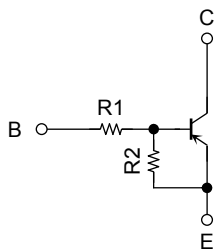
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

## RN2101ACT, RN2102ACT, RN2103ACT RN2104ACT, RN2105ACT, RN2106ACT

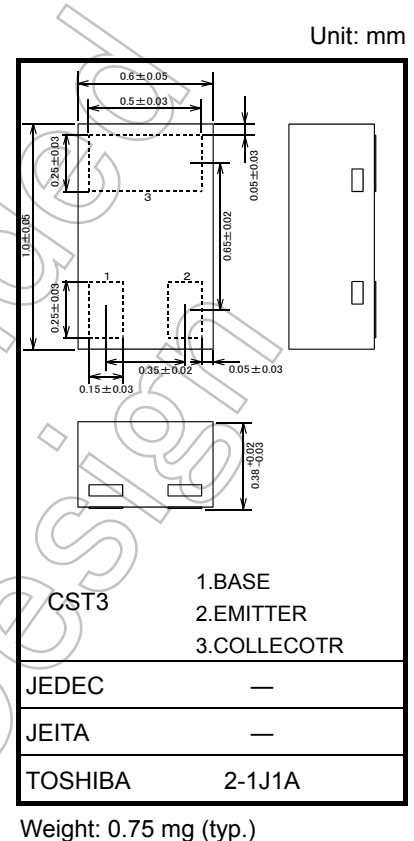
Switching, Inverter Circuit, Interface Circuit and  
Driver Circuit Applications

- Extra small package (CST3) is applicable for extra high density fabrication.
- Incorporating a bias resistor into a transistor reduces parts count. Reducing the parts count enable the manufacture of ever more compact equipment and save assembly cost.
- Complementary to RN1101ACT to RN1106ACT

### Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN2101ACT	4.7	4.7
RN2102ACT	10	10
RN2103ACT	22	22
RN2104ACT	47	47
RN2105ACT	2.2	47
RN2106ACT	4.7	47



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

Characteristics	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>	-80	mA
Collector power dissipation	P <sub>C</sub>	100*	mW
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature range	T <sub>stg</sub>	-55 to 150	°C

\* : Mounted on FR4 board (10 mm × 10 mm × 1 mm)

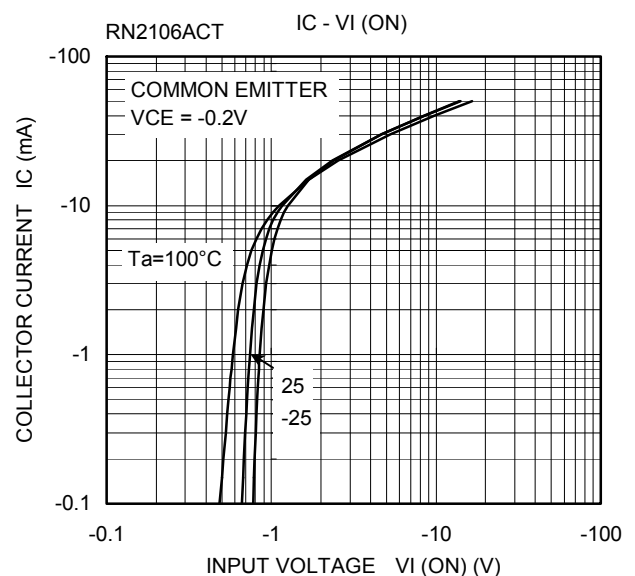
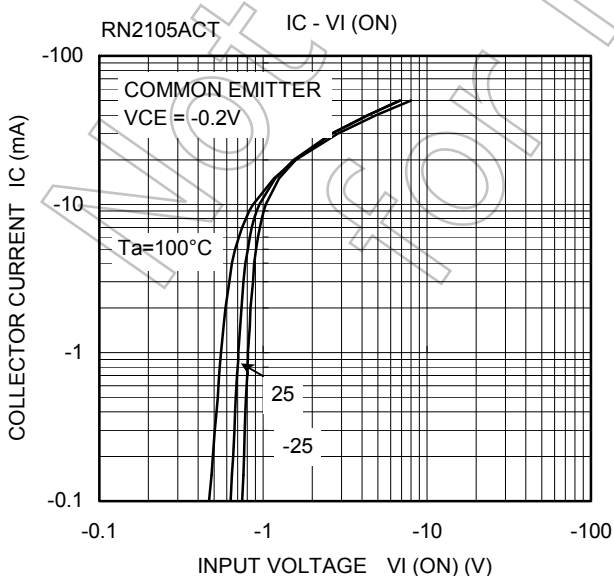
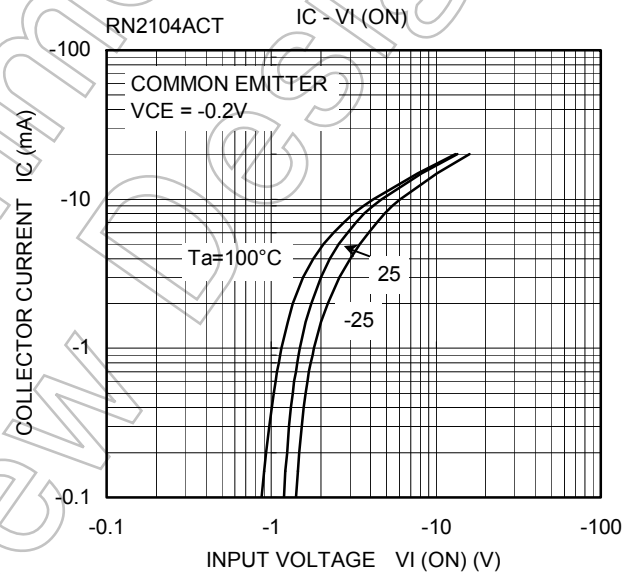
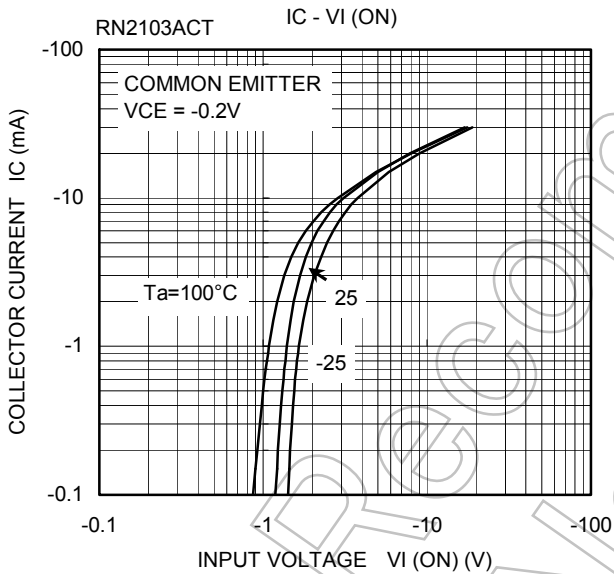
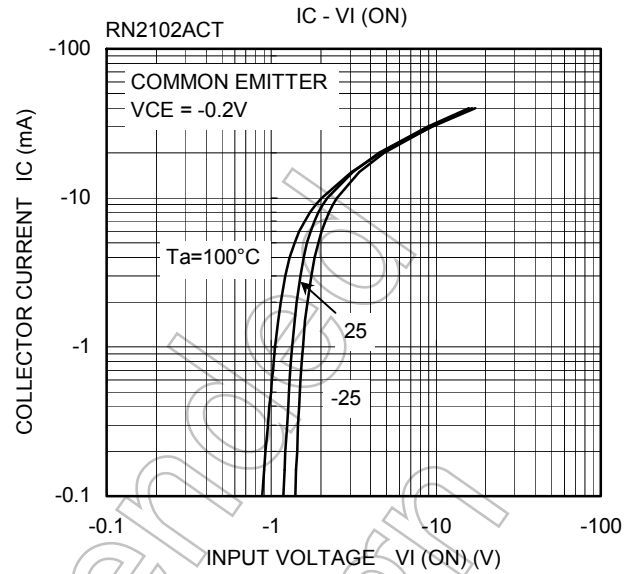
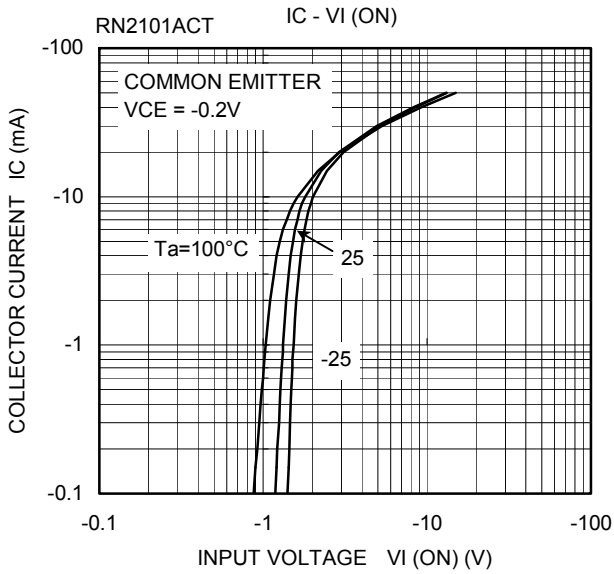
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e.operatingtemperature/current/voltage, etc.) are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

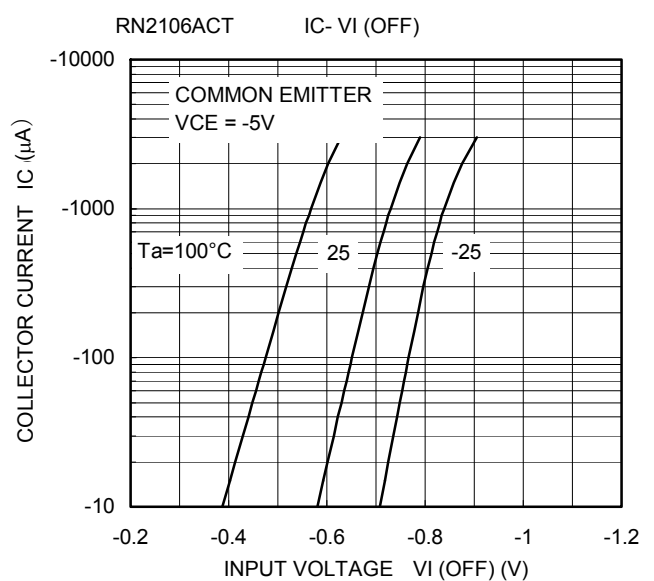
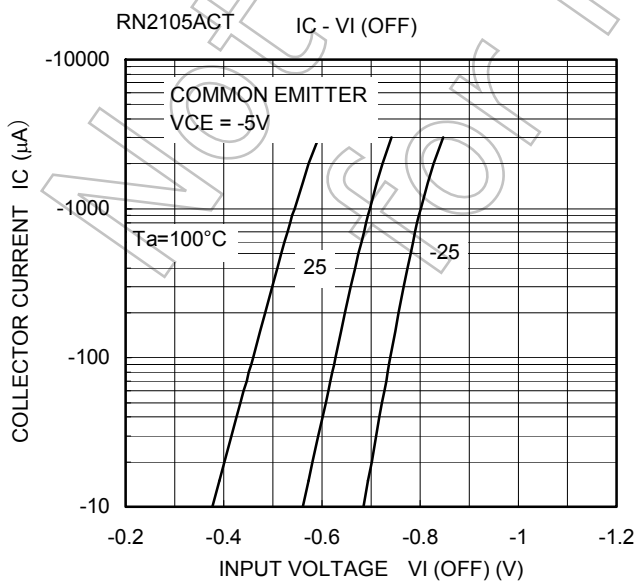
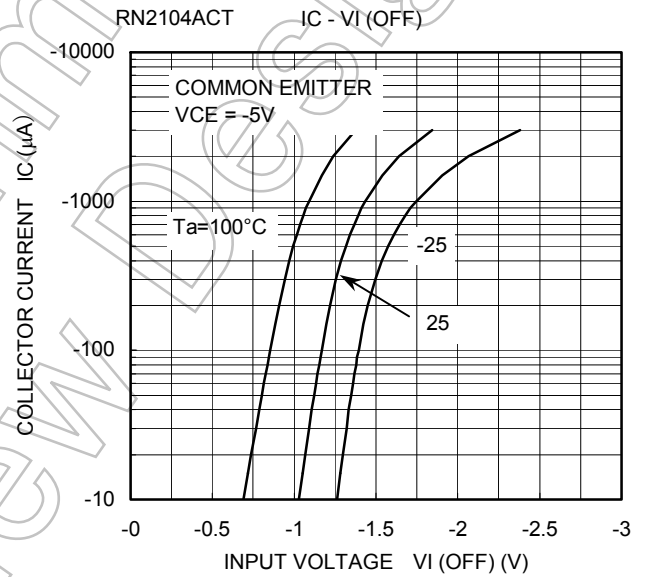
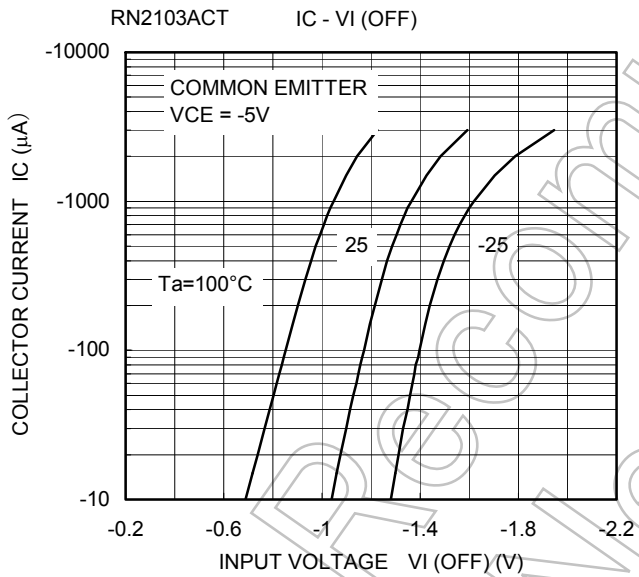
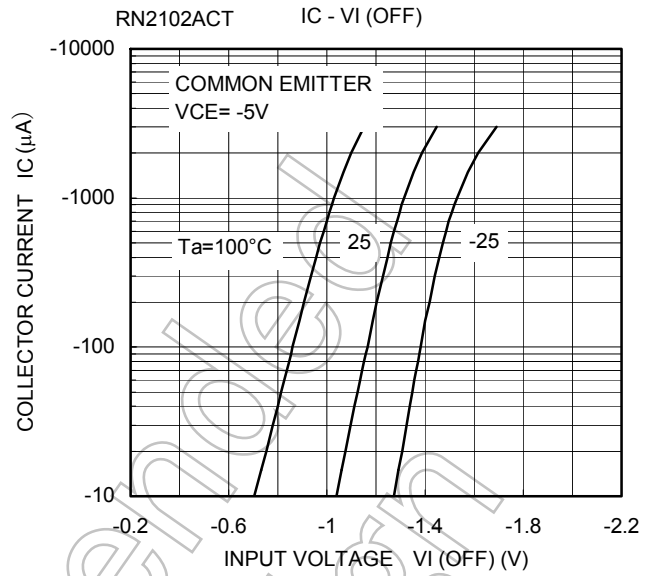
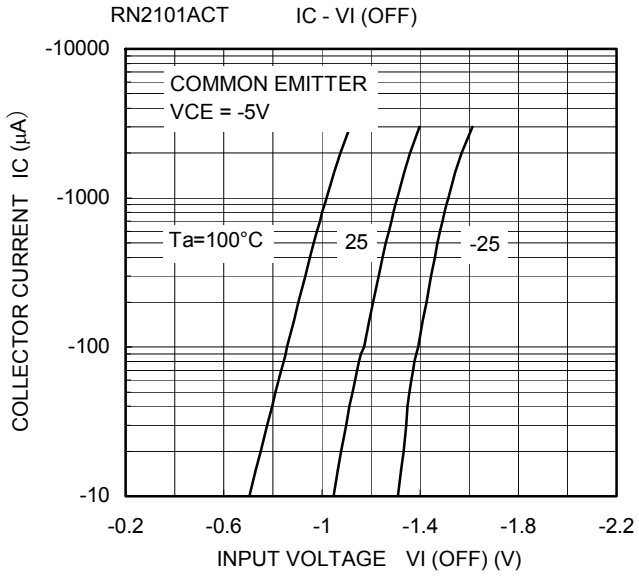
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

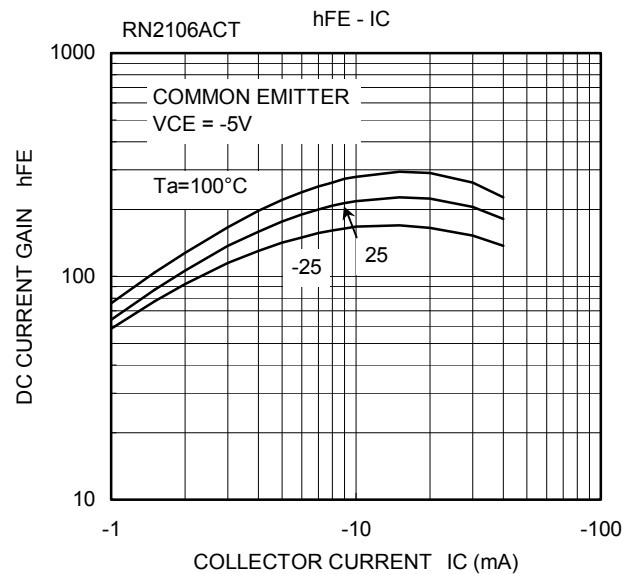
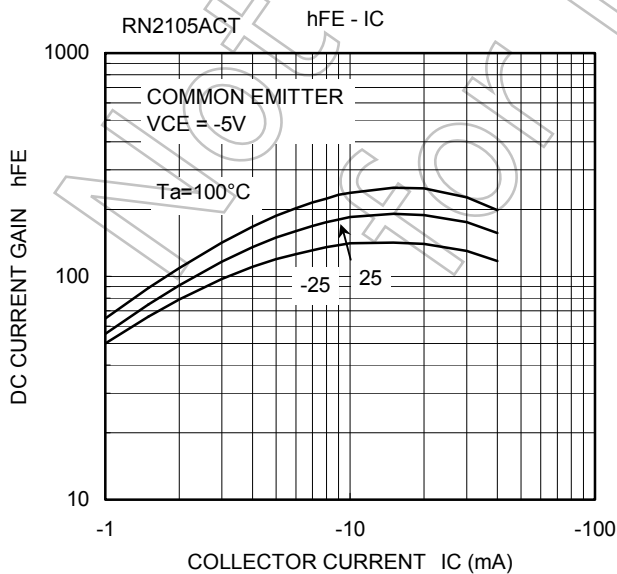
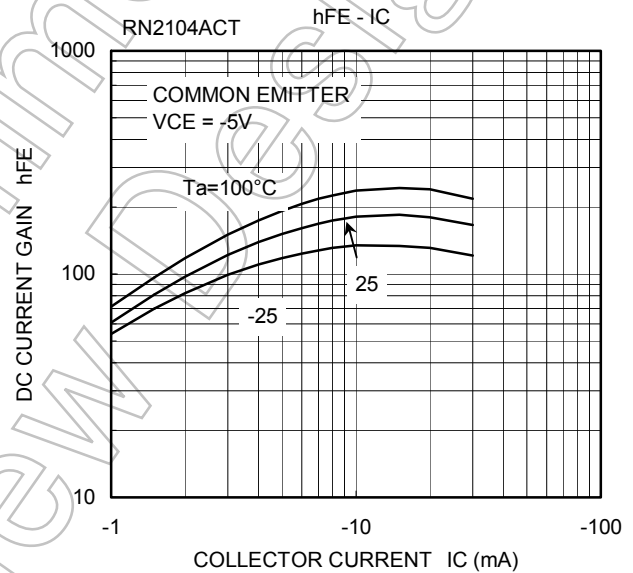
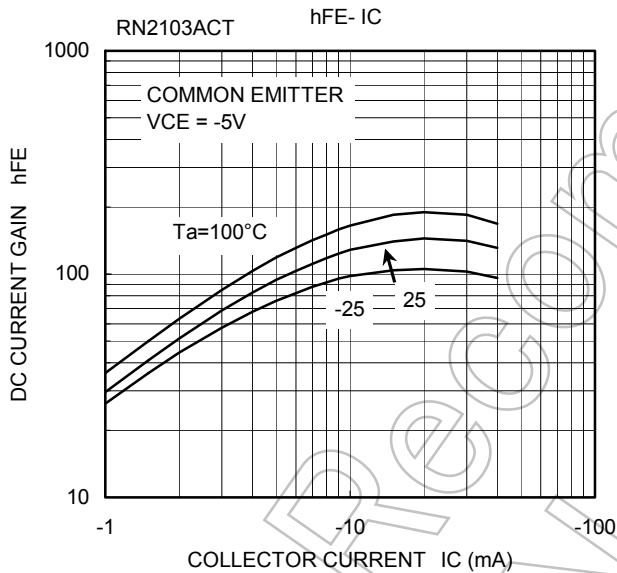
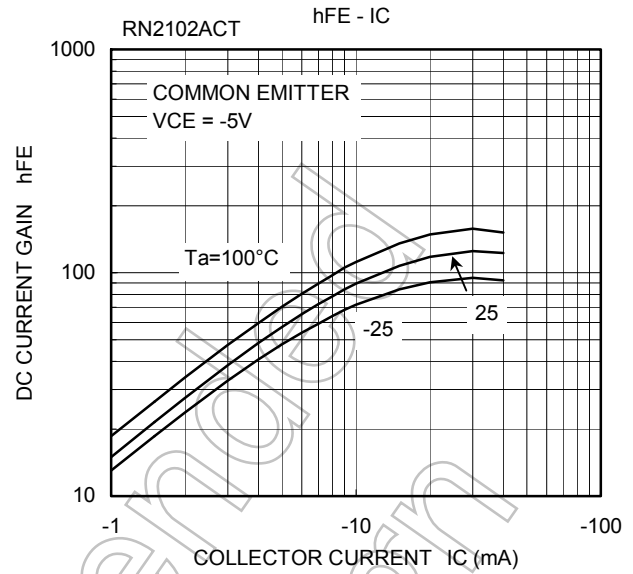
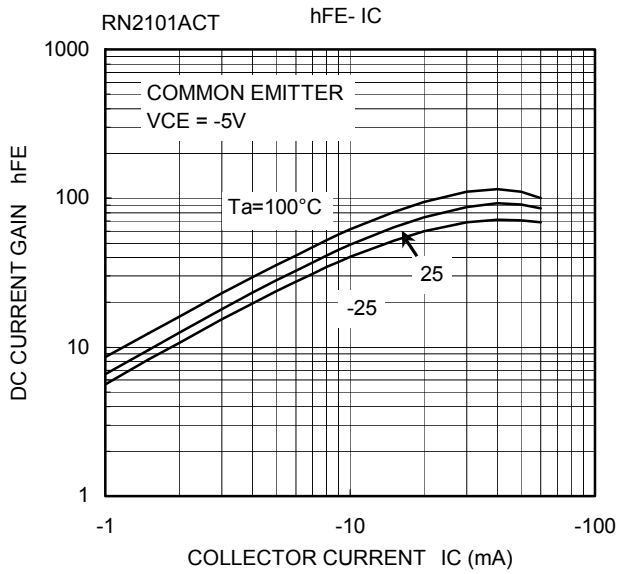
Start of commercial production  
2004-08

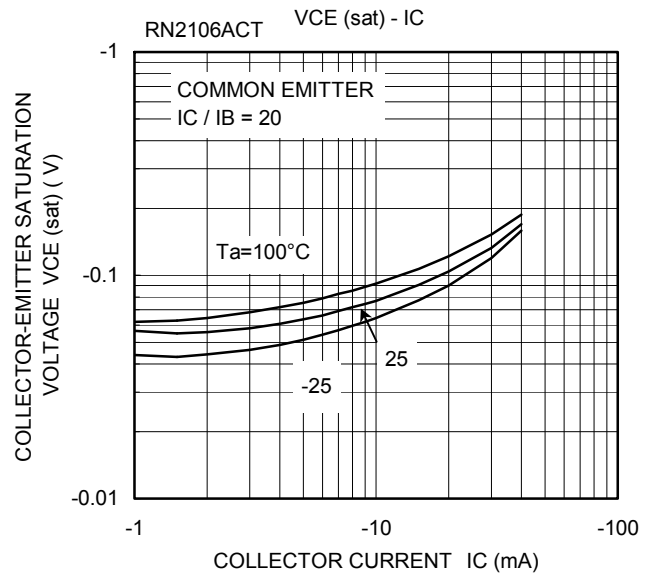
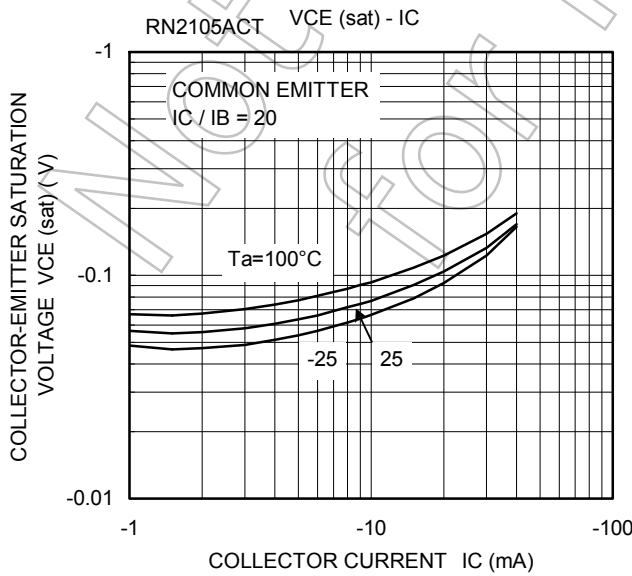
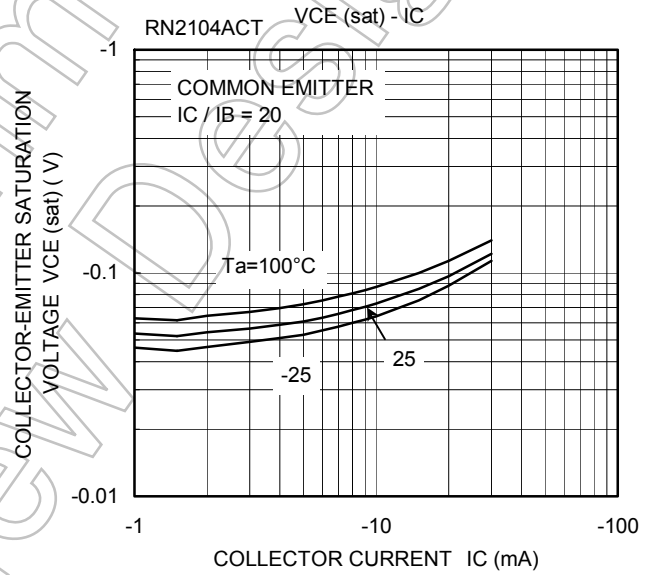
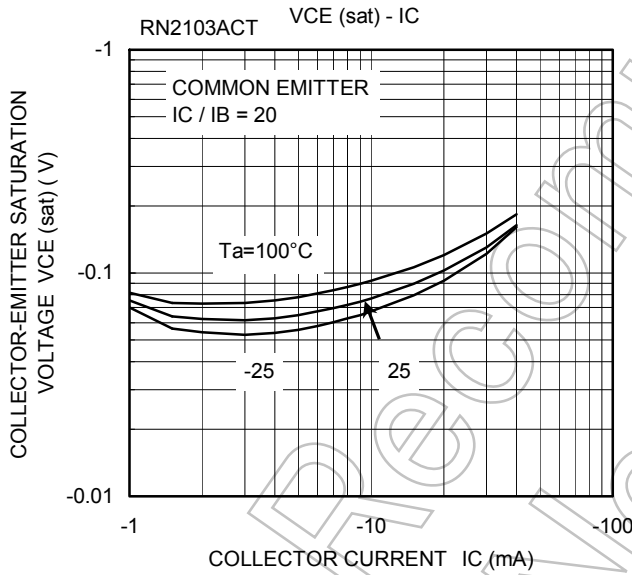
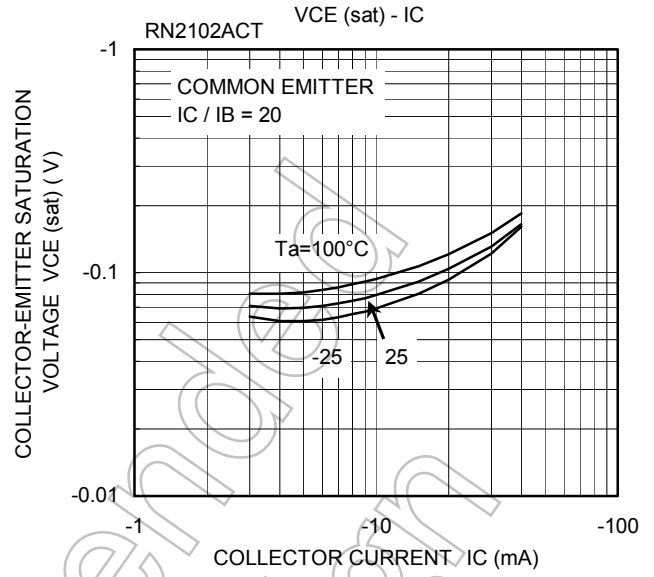
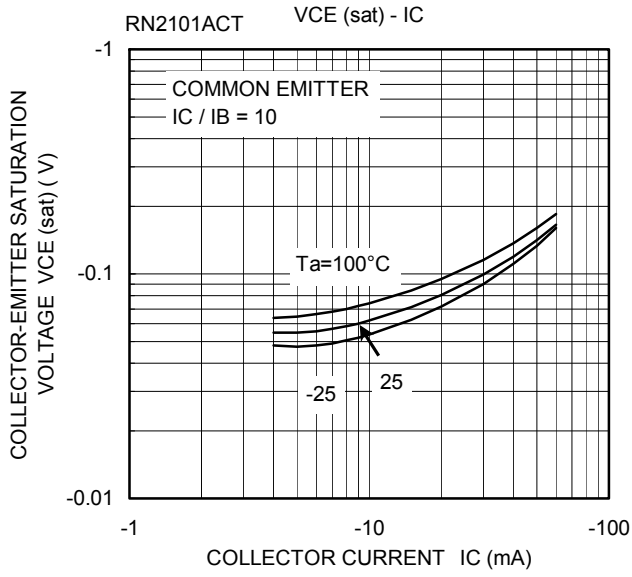
## Electrical Characteristics (Ta = 25°C)

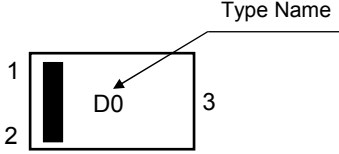
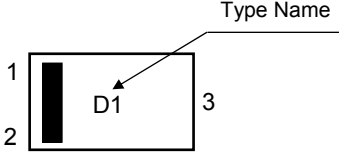
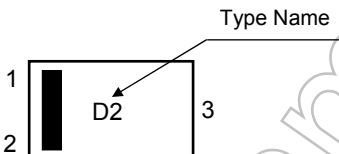
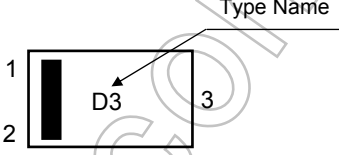
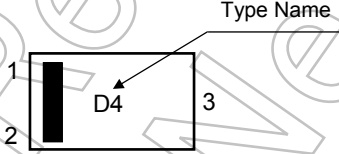
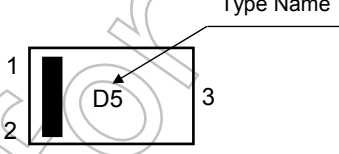
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2101ACT to 2106ACT	$I_{CBO}$	$V_{CB} = -50\text{ V}, I_E = 0$	—	—	-100	nA
		$I_{CEO}$	$V_{CE} = -50\text{ V}, I_B = 0$	—	—	-500	
Emitter cut-off current	RN2101ACT	$I_{EBO}$	$V_{EB} = -10\text{ V}, I_C = 0$	-0.89	—	-1.33	mA
	RN2102ACT			-0.41	—	-0.63	
	RN2103ACT			-0.18	—	-0.29	
	RN2104ACT		-0.088	—	-0.133		
	RN2105ACT		$V_{EB} = -5\text{ V}, I_C = 0$	-0.085	—	-0.127	
	RN2106ACT			-0.08	—	-0.121	
DC current gain	RN2101ACT	$h_{FE}$	$V_{CE} = -5\text{ V}, I_C = -10\text{ mA}$	30	—	—	—
	RN2102ACT			50	—	—	
	RN2103ACT			70	—	—	
	RN2104ACT			80	—	—	
	RN2105ACT			80	—	—	
	RN2106ACT			80	—	—	
Collector-emitter saturation voltage	RN2101ACT	$V_{CE(sat)}$	$I_C = -5\text{ mA}, I_B = -0.5\text{ mA}$	—	—	-0.15	V
	RN2102ACT to 2106ACT		$I_C = -5\text{ mA}, I_B = -0.25\text{ mA}$	—	—	-0.15	
Input voltage (ON)	RN2101ACT	$V_{I(ON)}$	$V_{CE} = -0.2\text{ V}, I_C = -5\text{ mA}$	-1.2	—	-2.2	V
	RN2102ACT			-1.2	—	-2.6	
	RN2103ACT			-1.3	—	-3.5	
	RN2104ACT			-1.5	—	-5.0	
	RN2105ACT			-0.6	—	-1.1	
	RN2106ACT			-0.7	—	-1.3	
Input voltage (OFF)	RN2101ACT to 2104ACT	$V_{I(OFF)}$	$V_{CE} = -5\text{ V}, I_C = -0.1\text{ mA}$	-0.8	—	-1.5	V
	RN2105ACT, 2106ACT			-0.5	—	-0.8	
Collector output capacitance	RN2101ACT to 2106ACT	$C_{ob}$	$V_{CB} = -10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	0.9	—	pF
Input resistor	RN2101ACT	R1	—	3.76	4.7	5.64	kΩ
	RN2102ACT			8	10	12	
	RN2103ACT			17.6	22	26.4	
	RN2104ACT			37.6	47	56.4	
	RN2105ACT			1.76	2.2	2.64	
	RN2106ACT			3.76	4.7	5.64	
Resistor ratio	RN2101ACT to 2104ACT	R1/R2	—	0.8	1.0	1.2	—
	RN2105ACT			0.0376	0.0468	0.0562	
	RN2106ACT			0.08	0.1	0.12	









Type Name	Marking
RN2101ACT	
RN2102ACT	
RN2103ACT	
RN2104ACT	
RN2105ACT	
RN2106ACT	

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