

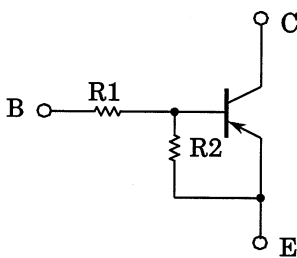
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process)

## RN2321A, RN2322A, RN2323A, RN2324A RN2325A, RN2326A, RN2327A

Switching, Inverter Circuit, Interface Circuit  
And Driver Circuit Applications

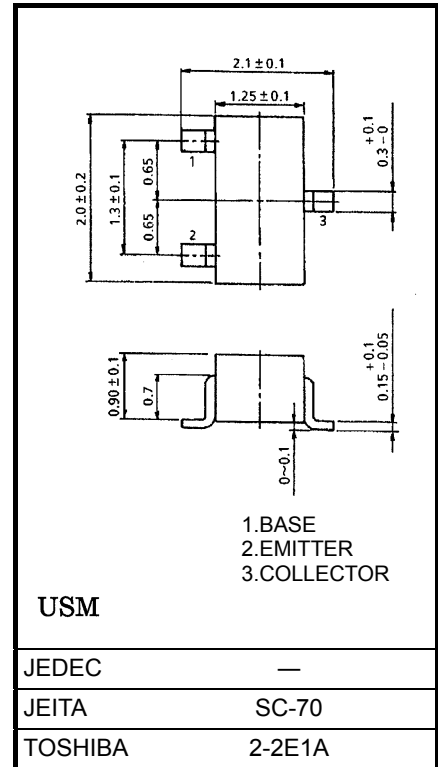
- High current driving is possible.
- Since bias resistors are built in the transistor, the miniaturization of the apparatus by curtailment of the number of parts and laborsaving of an assembly are possible.
- Many kinds of resistance value are lined up in order to support various kinds of circuit design.
- Complementary to RN1321A~RN1327A
- Low  $V_{CE(sat)}$  enable to be low power dissipation on high current driving.

### Equivalent Circuit And Bias Resistance Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN2321A	1	1
RN2322A	2.2	2.2
RN2323A	4.7	4.7
RN2324A	10	10
RN2325A	0.47	10
RN2326A	1	10
RN2327A	2.2	10

Unit in mm



USM

JEDEC	—
JEITA	SC-70
TOSHIBA	2-2E1A

Weight: 0.006 g (typ.)

### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

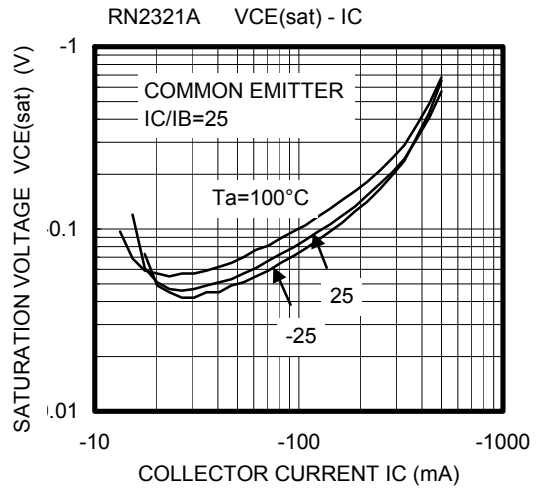
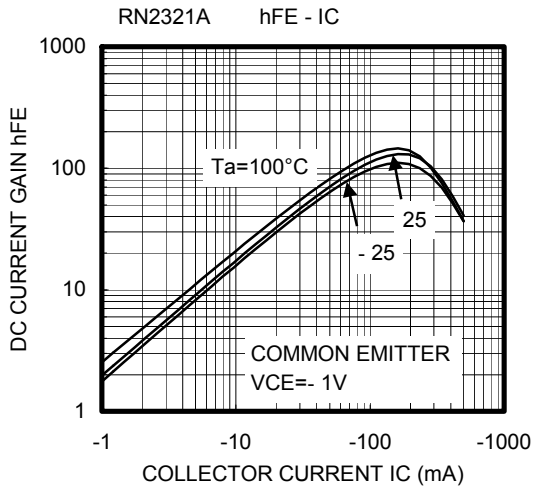
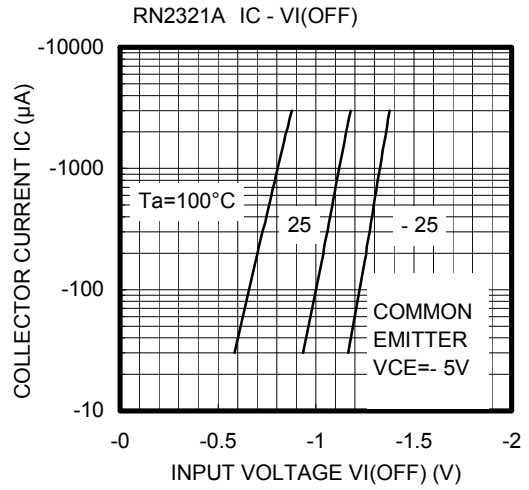
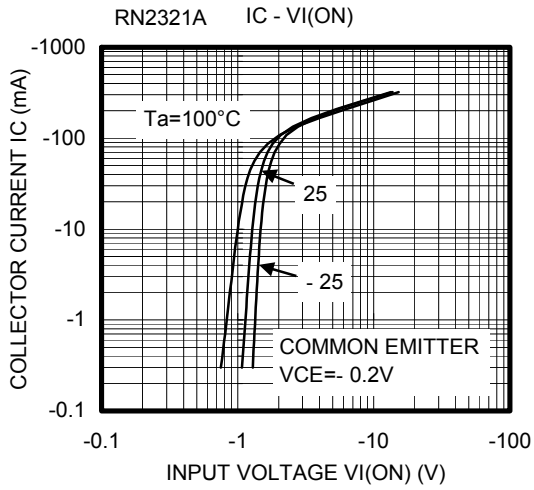
Characteristic	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	-15	V
Collector-emitter voltage	$V_{CEO}$	-12	V
Emitter-base voltage	$V_{EBO}$	-10	V
		-5	
		-6	
Collector current	$I_C$	-500	mA
Collector power dissipation	$P_C$	100	mW
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-55~150	$^\circ\text{C}$

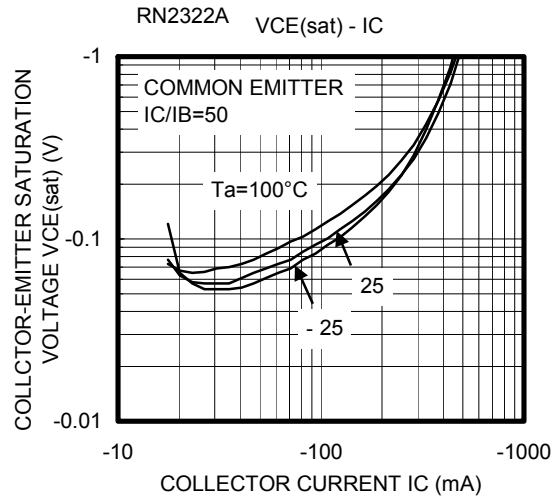
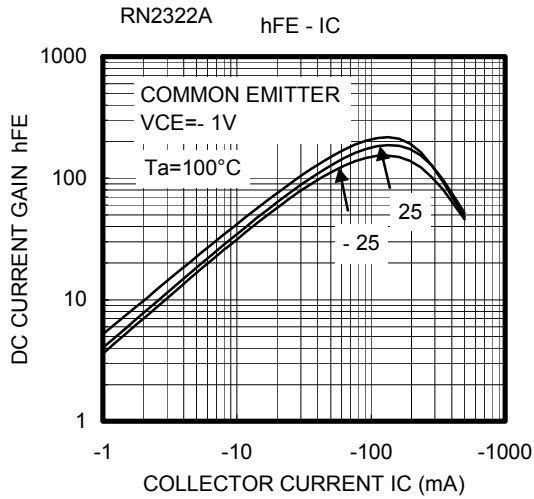
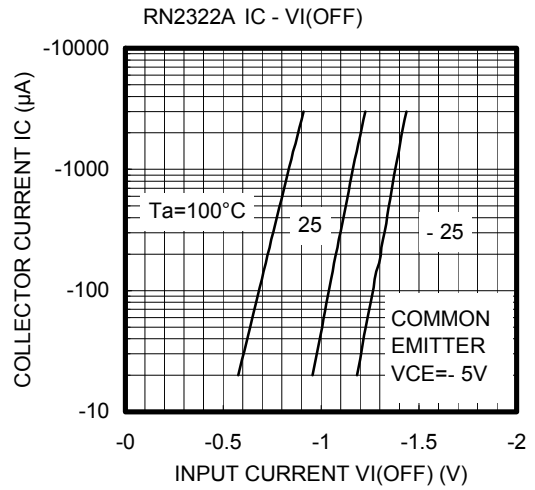
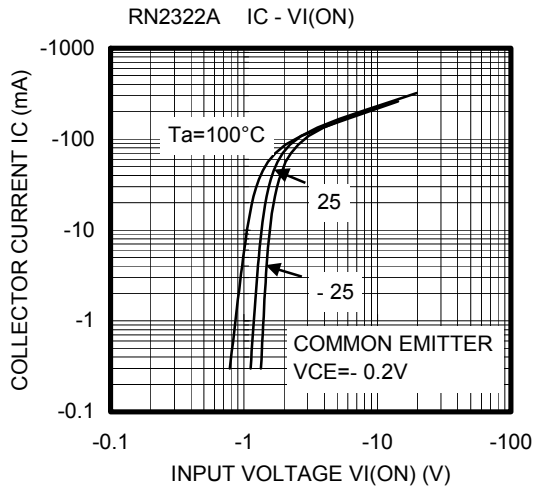
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

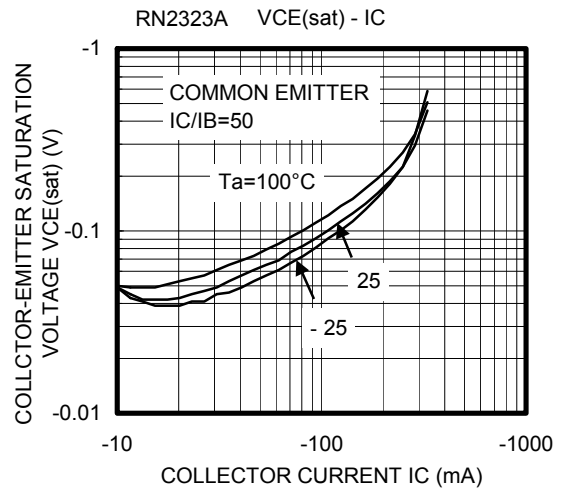
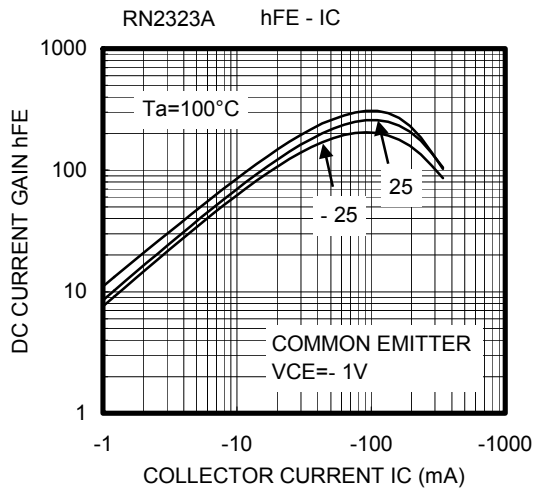
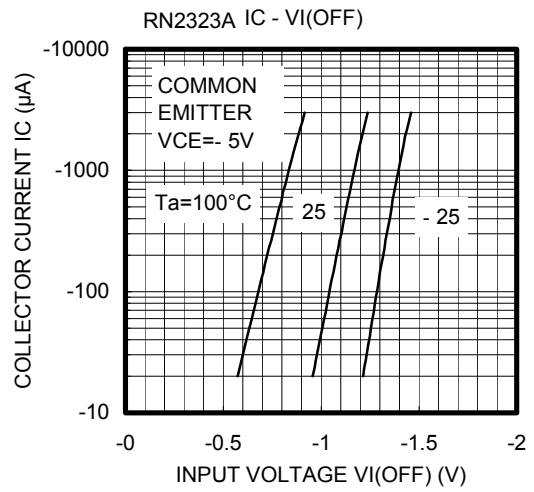
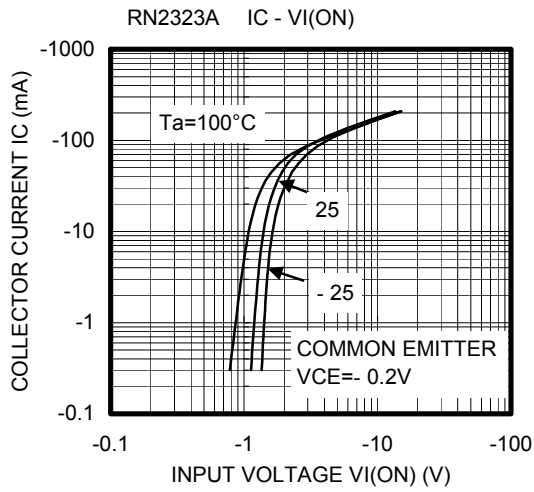
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

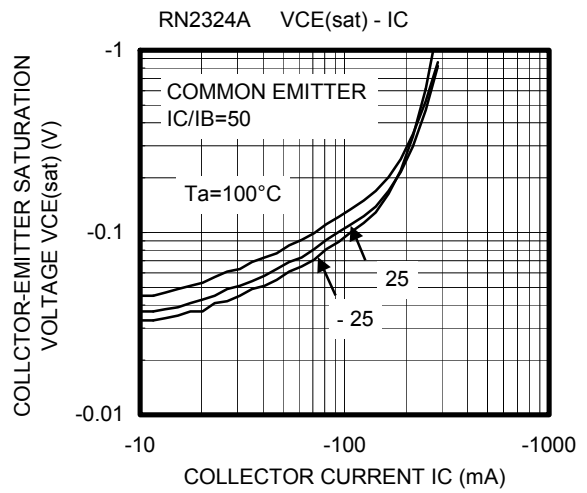
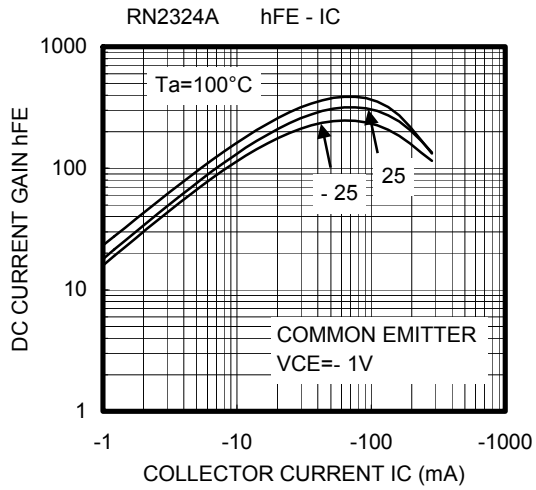
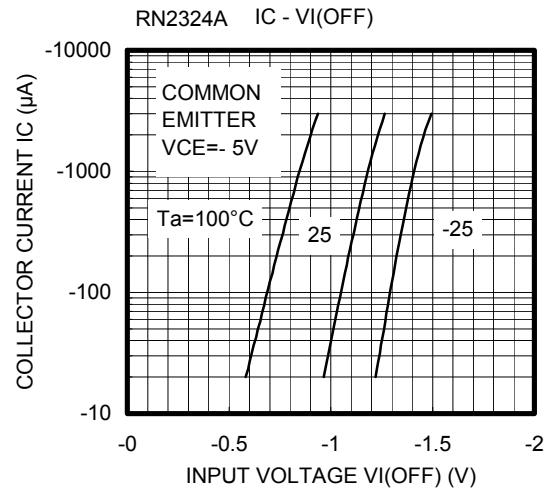
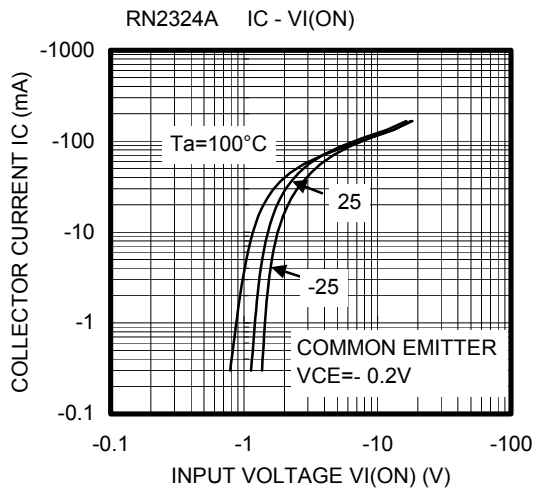
## Electrical Characteristics (Ta = 25°C)

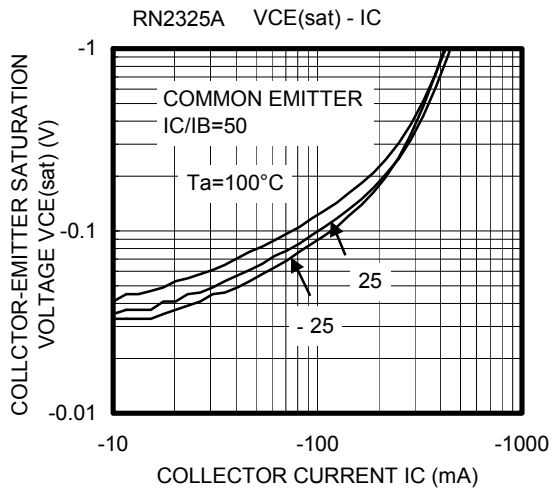
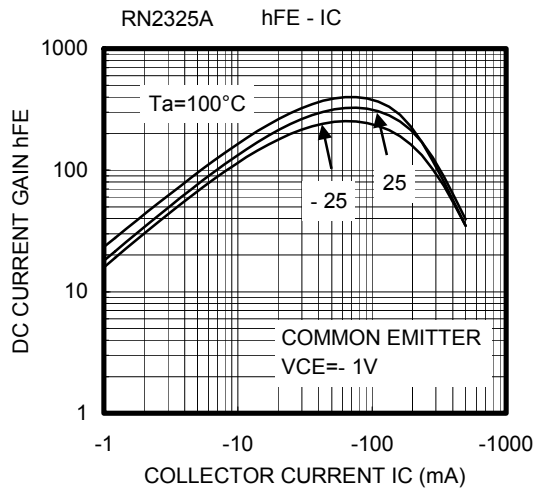
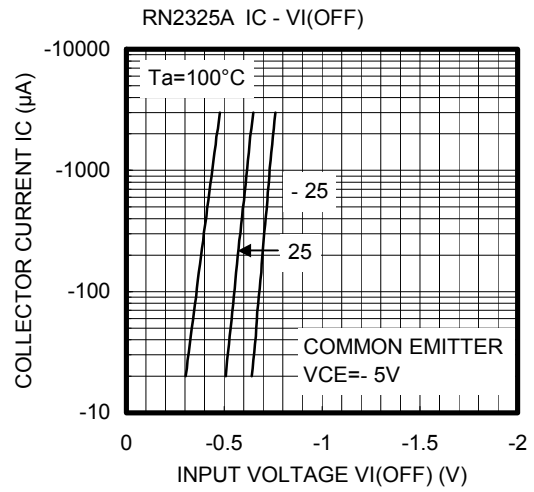
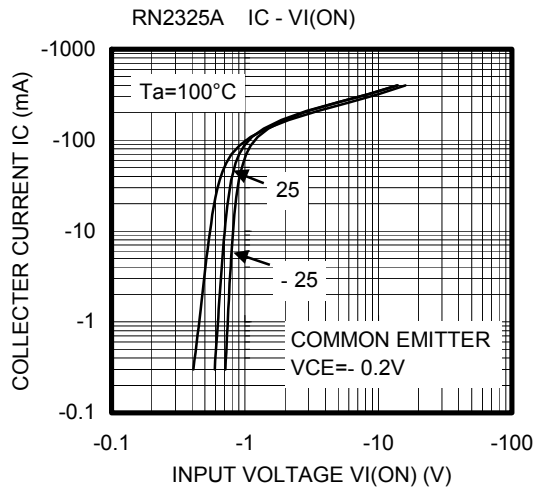
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2321A~2327A	I <sub>CBO</sub>	—	V <sub>CB</sub> = -15V, I <sub>E</sub> = 0	—	—	-100	nA
		I <sub>CEO</sub>		V <sub>CE</sub> = -12V, I <sub>B</sub> = 0	—	—	-500	
Emitter cut-off current	RN2321A	I <sub>EBO</sub>	—	V <sub>EB</sub> = -10V, I <sub>C</sub> = 0	-3.85	—	-7.14	mA
	RN2322A				-1.75	—	-3.25	
	RN2323A				-0.82	—	-1.52	
	RN2324A			-0.38	—	-0.71		
	RN2325A			V <sub>EB</sub> = -5V, I <sub>C</sub> = 0	-0.365	—	-0.682	
	RN2326A				-0.35	—	-0.65	
	RN2327A				V <sub>EB</sub> = -6V, I <sub>C</sub> = 0	-0.378	—	
DC current gain	RN2321A	h <sub>FE</sub>	—	V <sub>CE</sub> = -1V, I <sub>C</sub> = -50mA	35	—	—	
	RN2322A				65	—	—	
	RN2323A				100	—	—	
	RN2324A				140	—	—	
	RN2325A				140	—	—	
	RN2326A				140	—	—	
	RN2327A				140	—	—	
Collector-emitter saturation voltage	RN2321A	V <sub>CE (sat)</sub>	—	I <sub>C</sub> = -50mA, I <sub>B</sub> = -2mA	—	—	-0.25	V
	RN2322A~2327A			I <sub>C</sub> = -50mA, I <sub>B</sub> = -1mA				
Input voltage (ON)	RN2321A	V <sub>I (ON)</sub>	—	V <sub>CE</sub> = -0.2V, I <sub>C</sub> = -50mA	-1.0	—	-2.4	V
	RN2322A				-1.1	—	-2.7	
	RN2323A				-1.3	—	-3.5	
	RN2324A				-1.5	—	-5.2	
	RN2325A				-0.5	—	-1.2	
	RN2326A				-0.6	—	-1.4	
	RN2327A				-0.7	—	-1.9	
Input voltage (OFF)	RN2321A~2324A	V <sub>I (OFF)</sub>	—	V <sub>CE</sub> = -5V, I <sub>C</sub> = -0.1mA	-0.8	—	-1.4	V
	RN2325A, 2326A				-0.4	—	-0.8	
	RN2327A				-0.5	—	-1.0	
Transition frequency	RN2321A~2327A	f <sub>T</sub>	—	V <sub>CE</sub> = -5V, I <sub>C</sub> = -20mA	—	200	—	MHz
Collector Output capacitance	RN2321A~2327A	C <sub>ob</sub>	—	V <sub>CB</sub> = 10V, I <sub>E</sub> = 0, f = 1MHz	—	5	—	pF
Input resistor	RN2321A	R1	—	—	0.7	1	1.3	kΩ
	RN2322A				1.54	2.2	2.86	
	RN2323A				3.29	4.7	6.11	
	RN2324A				7	10	13	
	RN2325A				0.329	0.47	0.611	
	RN2326A				0.7	1	1.3	
	RN2327A				1.54	2.2	2.86	
Resistor ratio	RN2321A~2324A	R1/R2	—	—	0.85	1.0	1.15	
	RN2325A				0.040	0.047	0.054	
	RN2326A				0.085	0.1	0.115	
	RN2327A				0.187	0.220	0.253	

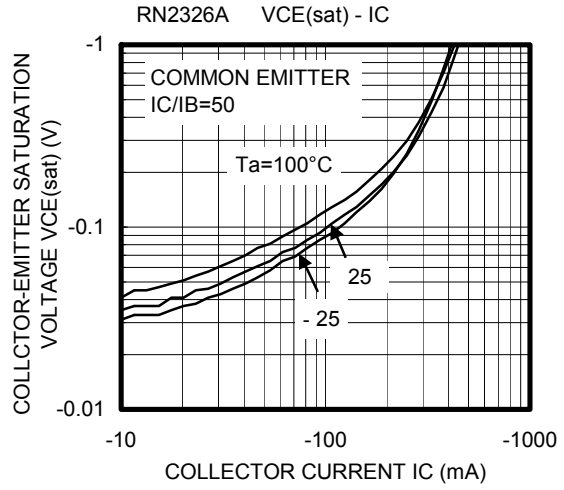
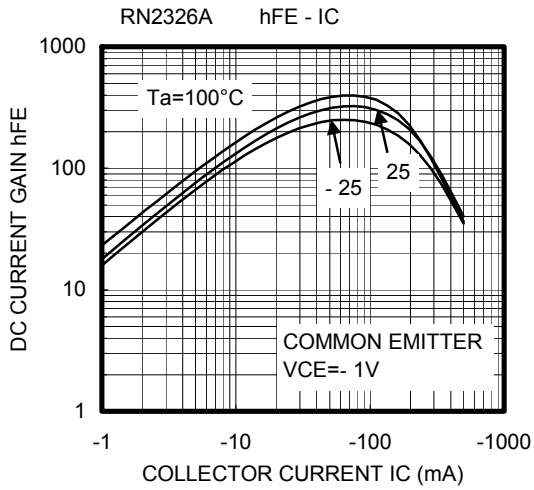
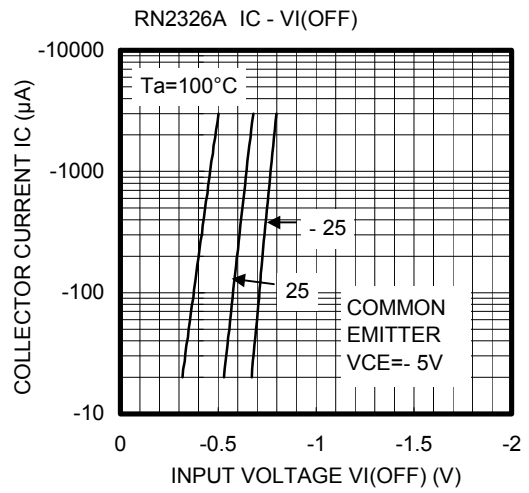
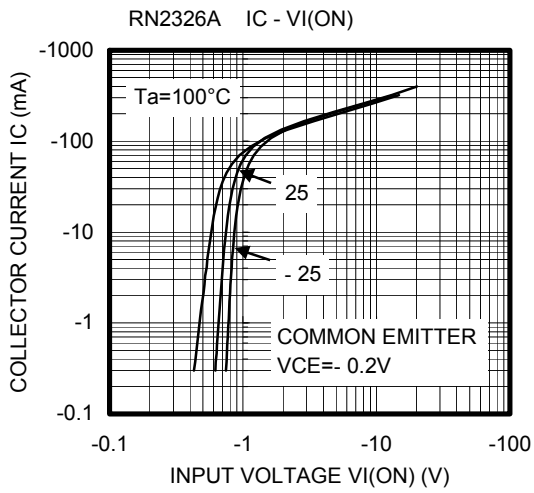




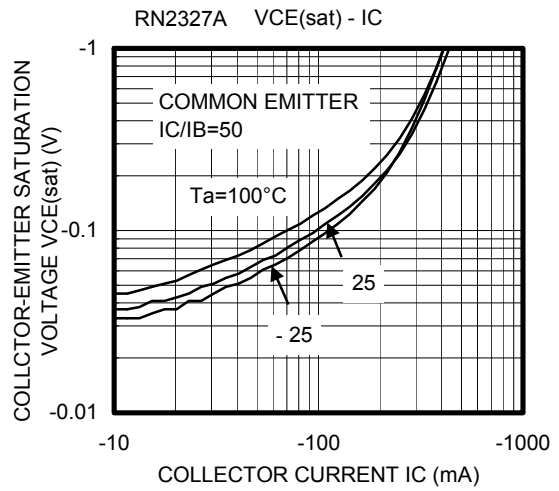
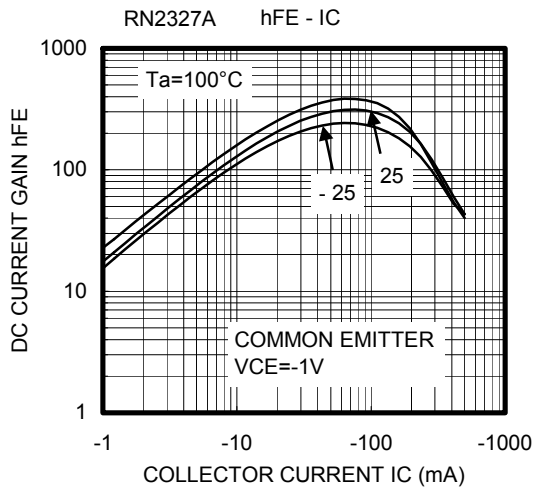
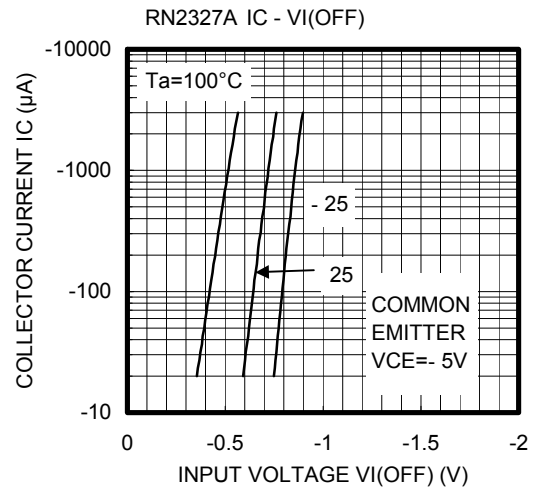
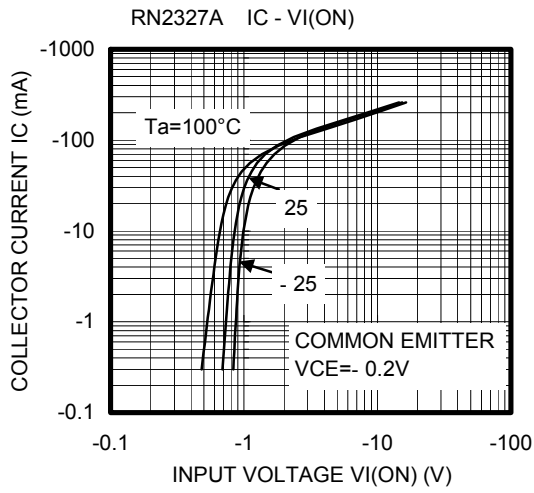


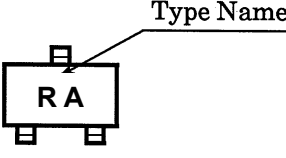
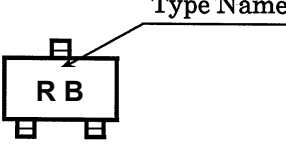
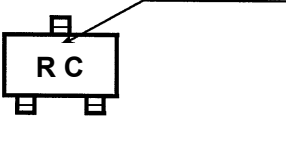
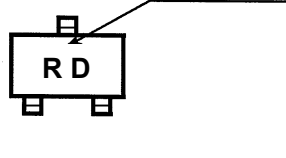
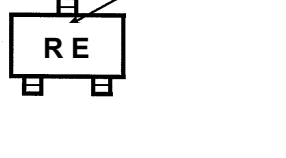
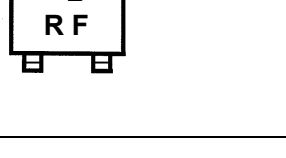











Type Name	Marking
RN2321A	
RN2322A	
RN2323A	
RN2324A	
RN2325A	
RN2326A	
RN2327A	

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20070701-EN GENERAL

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