

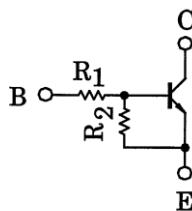
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process) (Bias Resistor built-in Transistor)

# RN1314, RN1315, RN1316 RN1317, RN1318

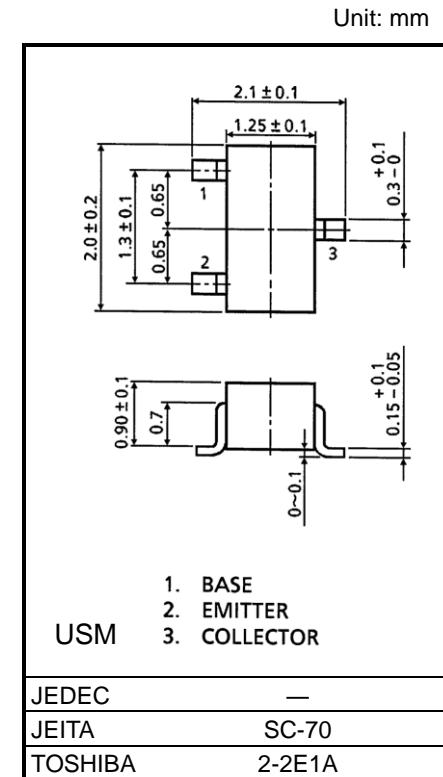
Switching, Inverter Circuit, Interface Circuit and Driver Circuit

- 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 RN2314 to RN2318

## Equivalent Circuit and Bias Resistor Values



Part No.	R1 (kΩ)	R2 (kΩ)
RN1314	1	10
RN1315	2.2	10
RN1316	4.7	10
RN1317	10	4.7
RN1318	47	10



Weight: 0.006g (typ.)

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

Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN1314 to RN1318	V <sub>CBO</sub>	50	V
Collector-emitter voltage		V <sub>CEO</sub>	50	V
Emitter-base voltage	RN1314 RN1315 RN1316 RN1317 RN1318	V <sub>EBO</sub>	5	V
			6	
			7	
			15	
			25	
Collector current	RN1314 to RN1318	I <sub>C</sub>	100	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

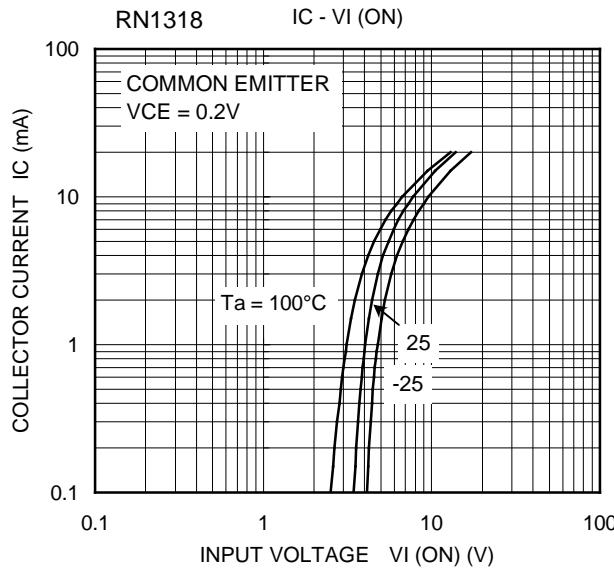
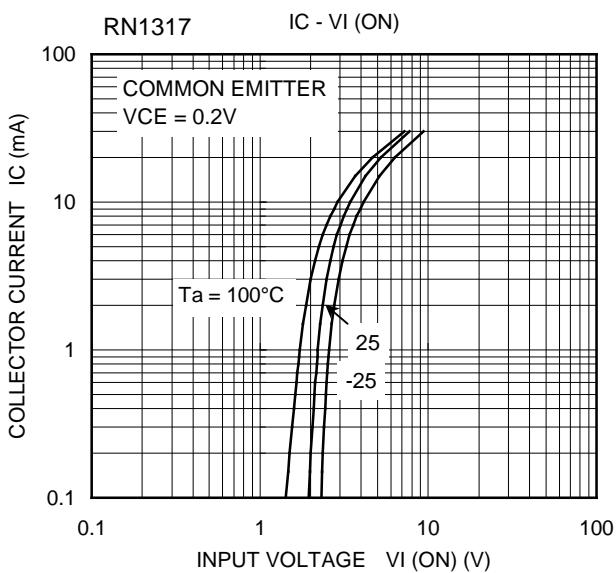
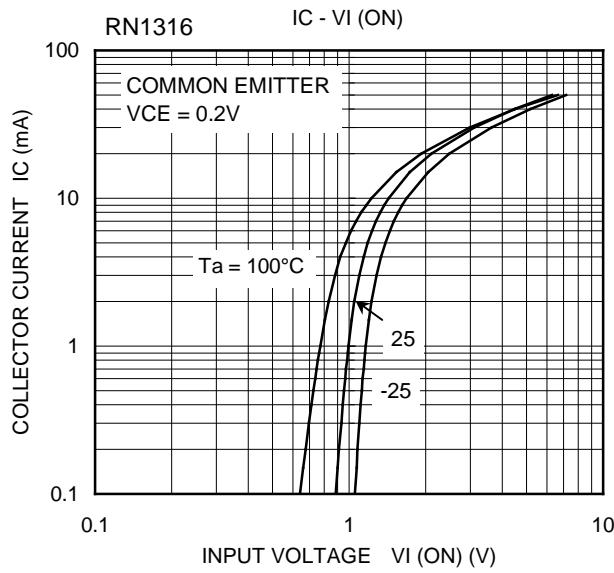
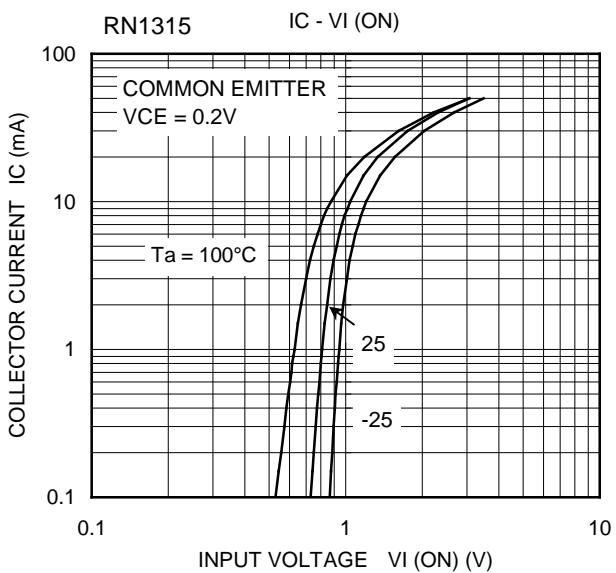
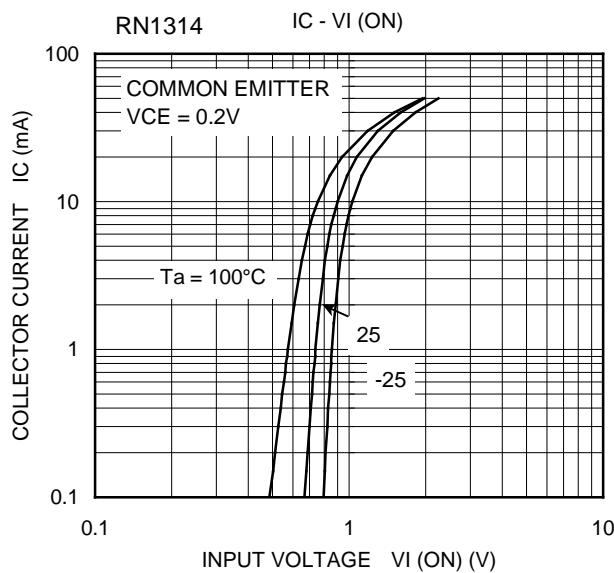
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

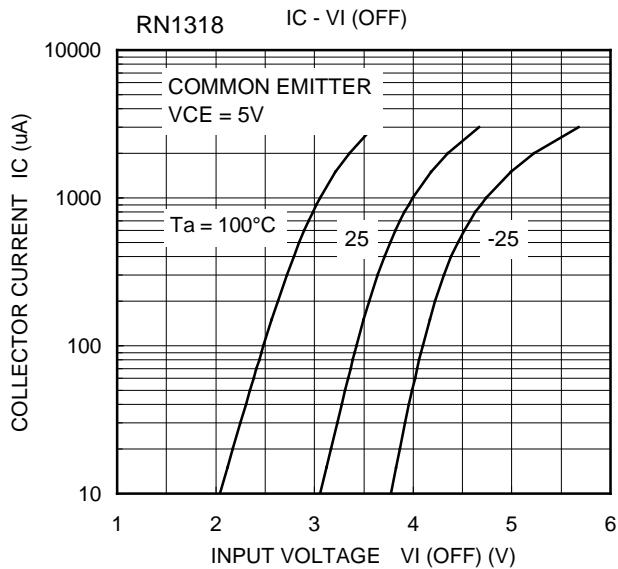
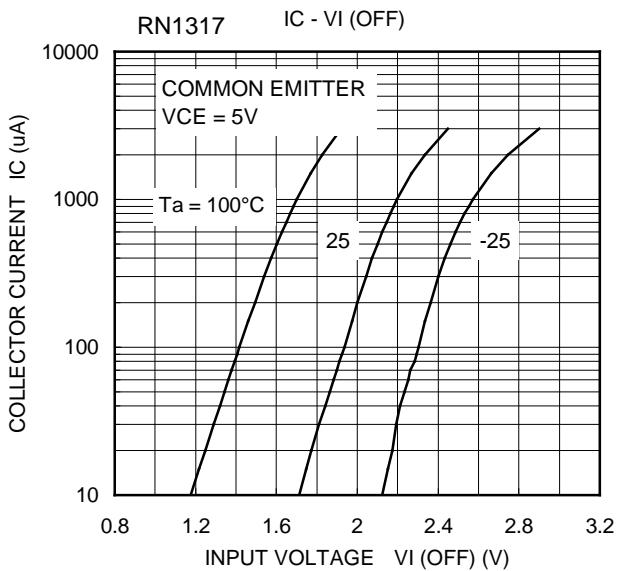
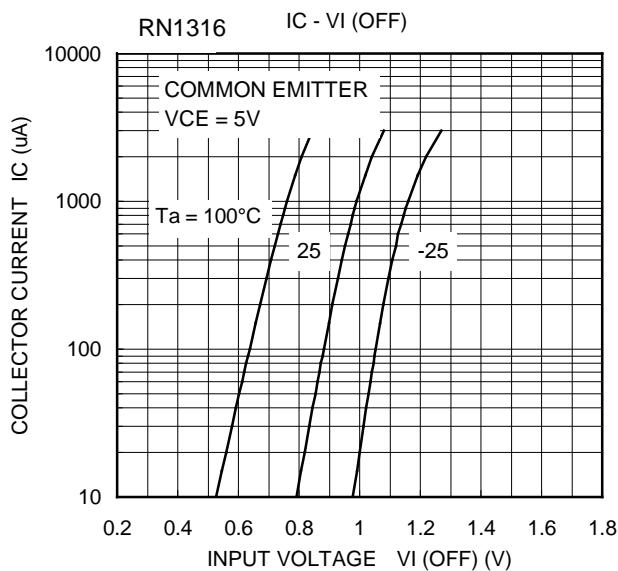
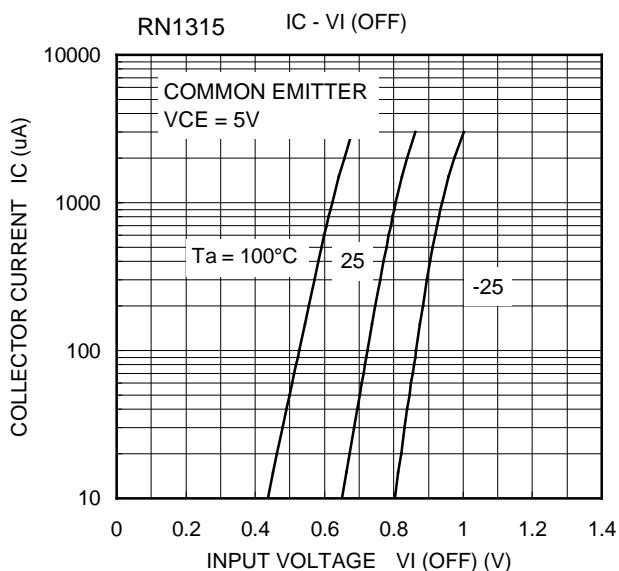
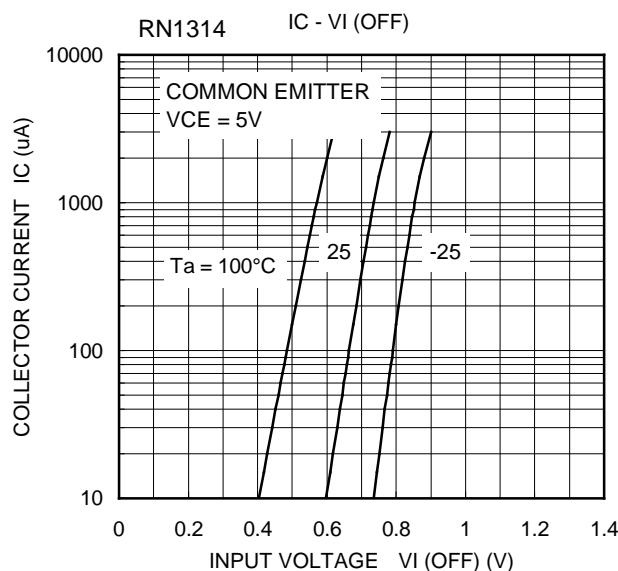
Start of commercial production  
2002-11

## Electrical Characteristics (Ta = 25°C)

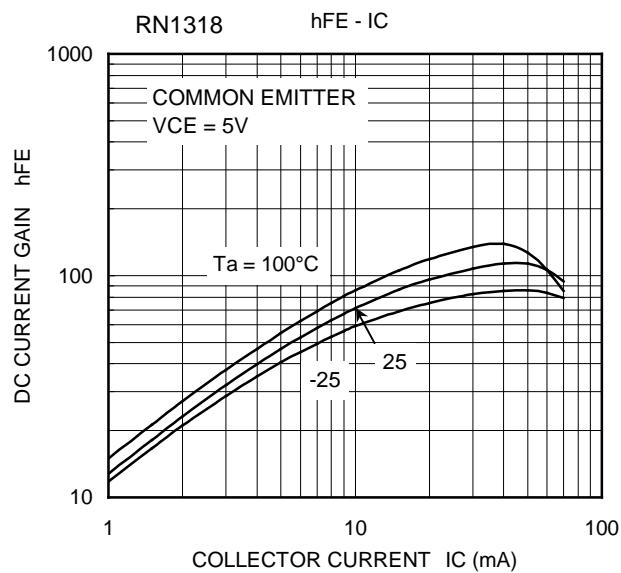
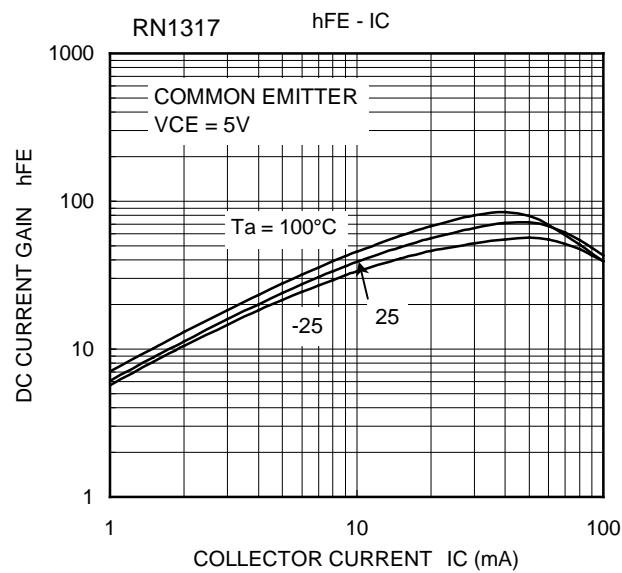
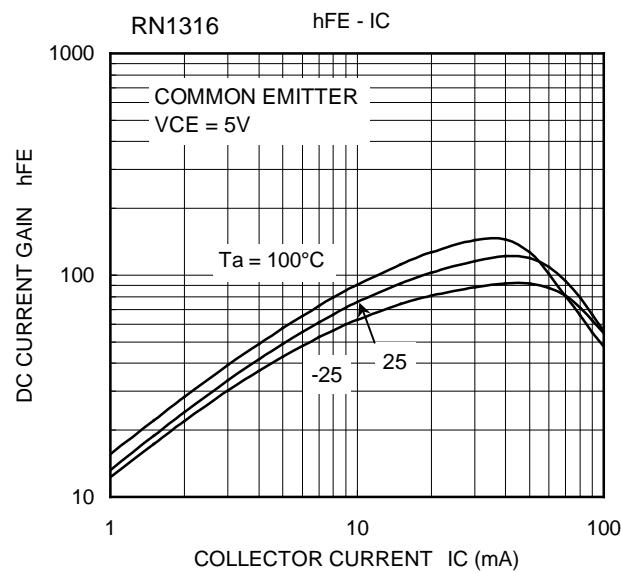
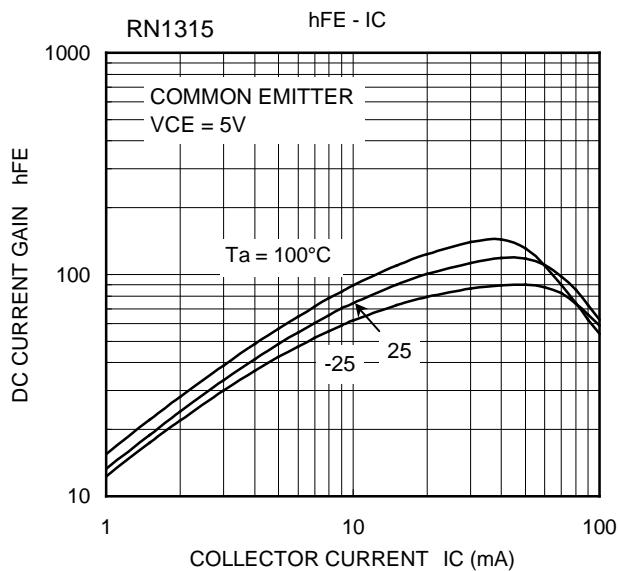
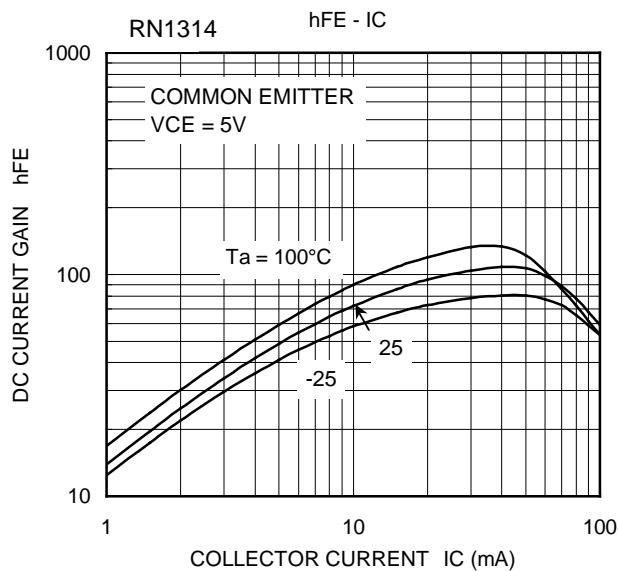
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1314 to 1318	I <sub>CBO</sub>	—	V <sub>CB</sub> = 50 V, I <sub>E</sub> = 0 mA	—	—	100	nA
	RN1314 to 1318	I <sub>CEO</sub>		V <sub>CE</sub> = 50 V, I <sub>B</sub> = 0 mA	—	—	500	nA
Emitter cut-off current	RN1314	I <sub>EBO</sub>	—	V <sub>EB</sub> = 5 V, I <sub>C</sub> = 0 mA	0.35	—	0.65	mA
	RN1315			V <sub>EB</sub> = 6 V, I <sub>C</sub> = 0 mA	0.37	—	0.71	
	RN1316			V <sub>EB</sub> = 7 V, I <sub>C</sub> = 0 mA	0.36	—	0.68	
	RN1317			V <sub>EB</sub> = 15 V, I <sub>C</sub> = 0 mA	0.78	—	1.46	
	RN1318			V <sub>EB</sub> = 25 V, I <sub>C</sub> = 0 mA	0.33	—	0.63	
DC current gain	RN1314 to 16,18	h <sub>FE</sub>	—	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 10 mA	50	—	—	—
	RN1317				30	—	—	
Collector-emitter saturation voltage	RN1314 to 1318	V <sub>CE</sub> (sat)	—	I <sub>C</sub> = 5 mA, I <sub>B</sub> = 0.25 mA	—	0.1	0.3	V
Input voltage (ON)	RN1314	V <sub>I</sub> (ON)	—	V <sub>CE</sub> = 0.2 V, I <sub>C</sub> = 5 mA	0.6	—	2.0	V
	RN1315				0.7	—	2.5	
	RN1316				0.8	—	2.5	
	RN1317				1.5	—	3.5	
	RN1318				2.5	—	10.0	
Input voltage (OFF)	RN1314	V <sub>I</sub> (OFF)	—	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 0.1 mA	0.3	—	0.9	V
	RN1315				0.3	—	1.0	
	RN1316				0.3	—	1.1	
	RN1317				0.3	—	2.3	
	RN1318				0.5	—	5.7	
Transition frequency	RN1314 to 1318	f <sub>T</sub>	—	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 5 mA	—	250	—	MHz
Collector Output capacitance	RN1314 to 1318	C <sub>ob</sub>	—	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0 mA, f = 1 MHz	—	3.0	6.0	pF
Input resistor	RN1314	R <sub>1</sub>	—	—	0.7	1.0	1.3	kΩ
	RN1315				1.54	2.2	2.86	
	RN1316				3.29	4.7	6.11	
	RN1317				7.0	10.0	13.0	
	RN1318				32.9	47.0	61.1	
Resistor ratio	RN1314	R <sub>1</sub> /R <sub>2</sub>	—	—	—	0.1	—	—
	RN1315				—	0.22	—	
	RN1316				—	0.47	—	
	RN1317				—	2.13	—	
	RN1318				—	4.7	—	



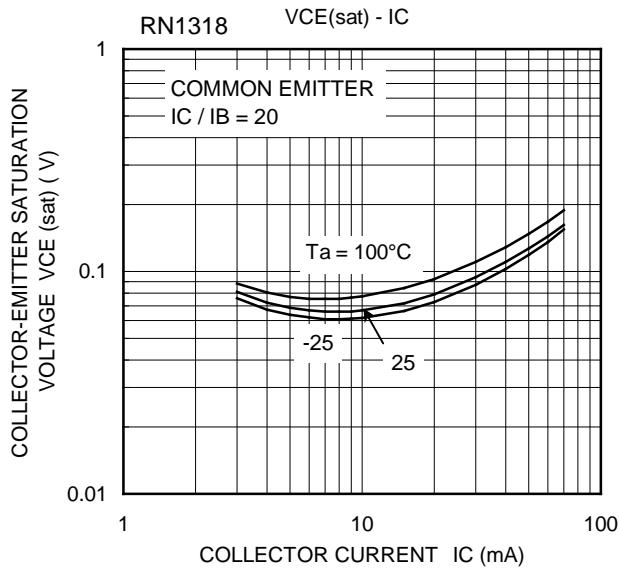
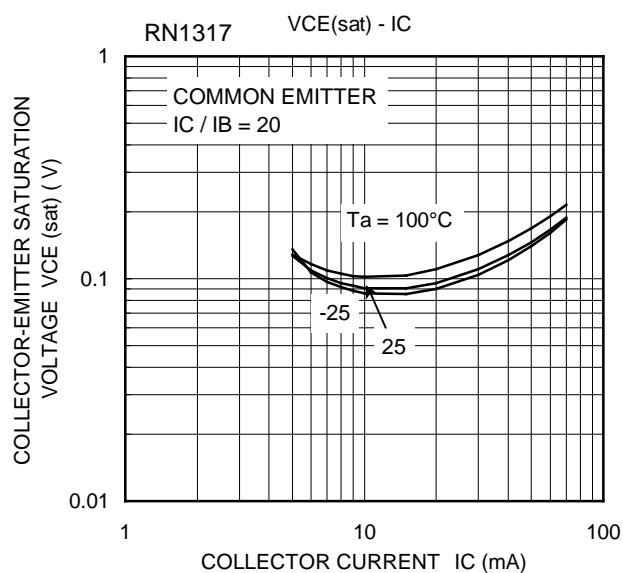
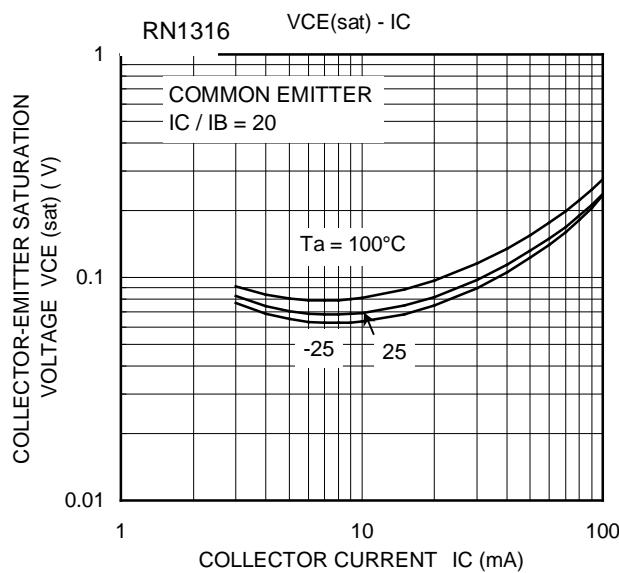
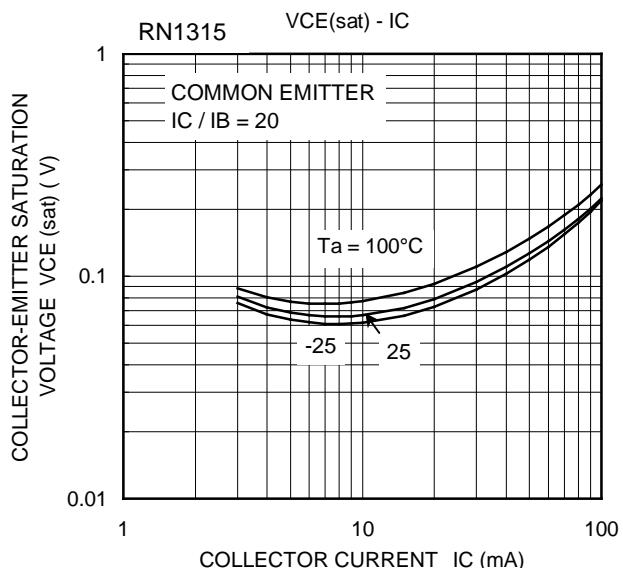
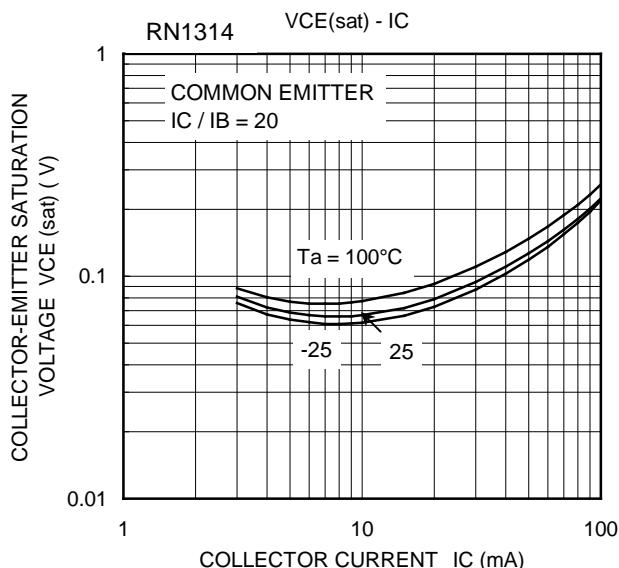
The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.



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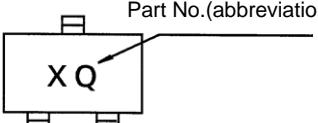
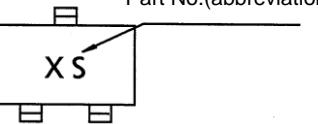
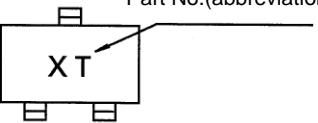
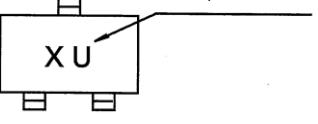
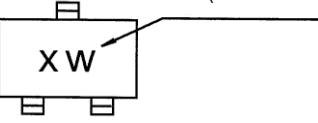


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**Marking**

Part No.	Marking
RN1314	
RN1315	
RN1316	
RN1317	
RN1318	

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