

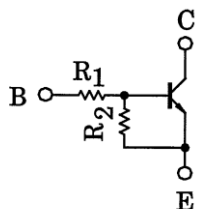
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process) (Bias Resistor built-in Transistor)

RN1314, RN1315, RN1316 RN1317, RN1318

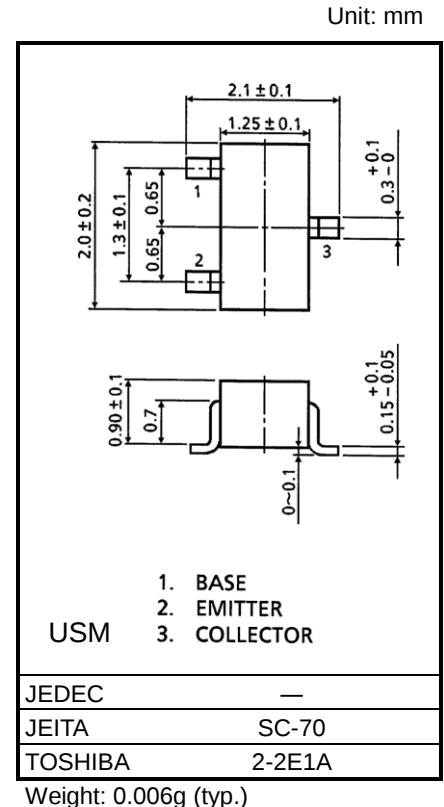
Switching, Inverter Circuit, Interface Circuit and Driver Circuit

- 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



Absolute Maximum Ratings (Ta = 25°C)

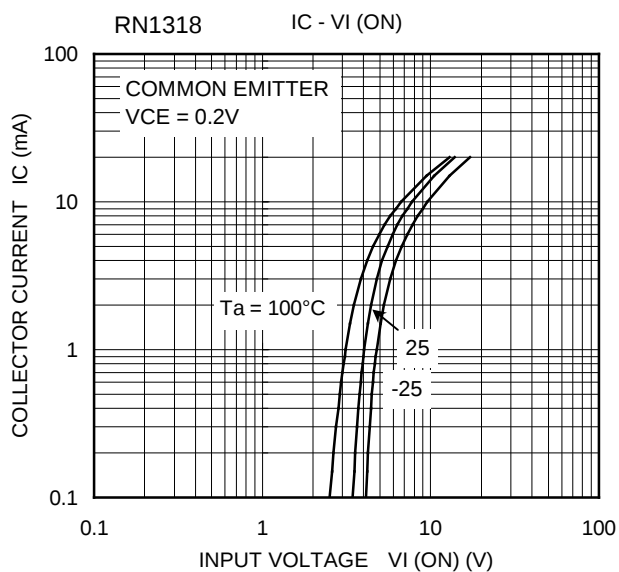
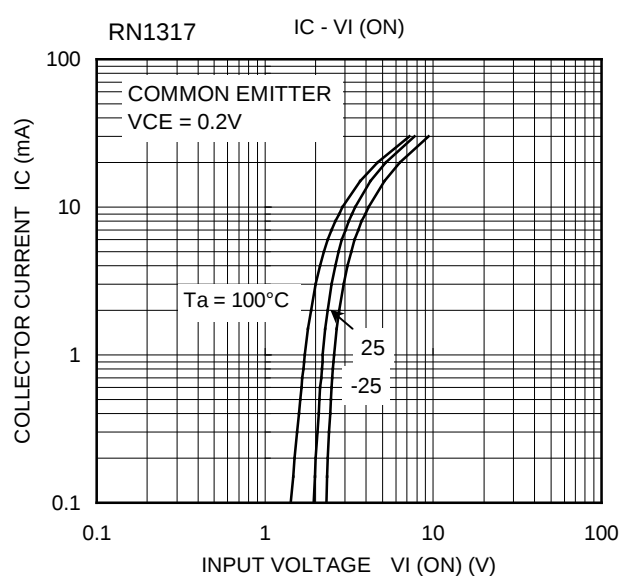
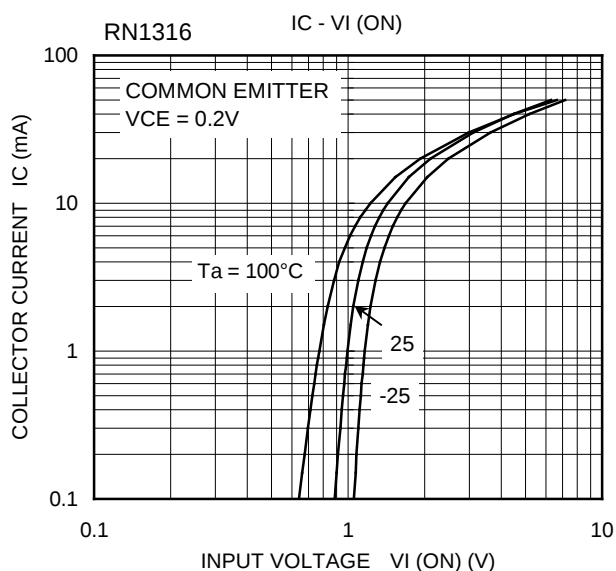
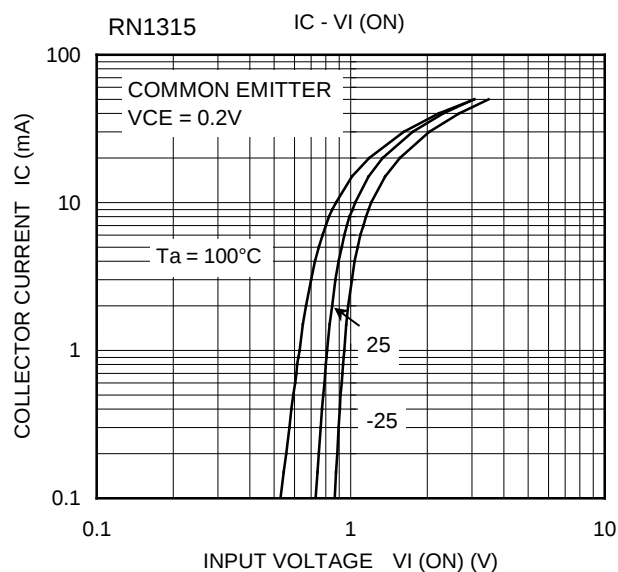
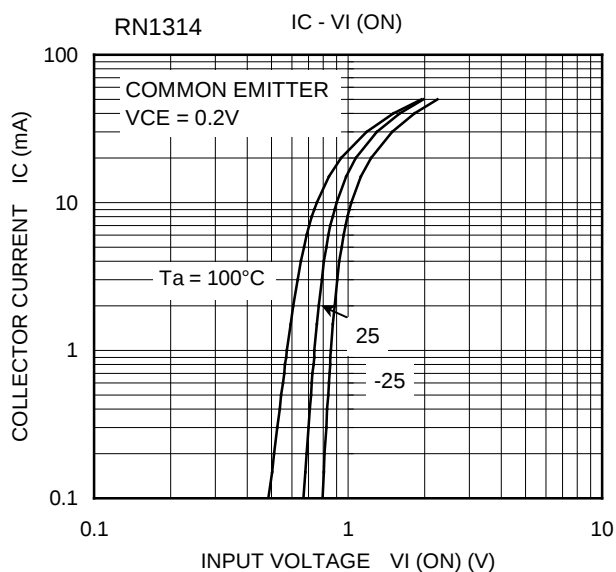
Characteristic	Symbol	Rating	Unit
Collector-base voltage	V _{CBO}	50	V
Collector-emitter voltage	V _{CEO}	50	V
Emitter-base voltage	V _{EBO}	5	V
		6	
		7	
		15	
		25	
Collector current	I _C	100	mA
Collector power dissipation	P _C	100	mW
Junction temperature	T _j	150	°C
Storage temperature range	T _{stg}	-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.).

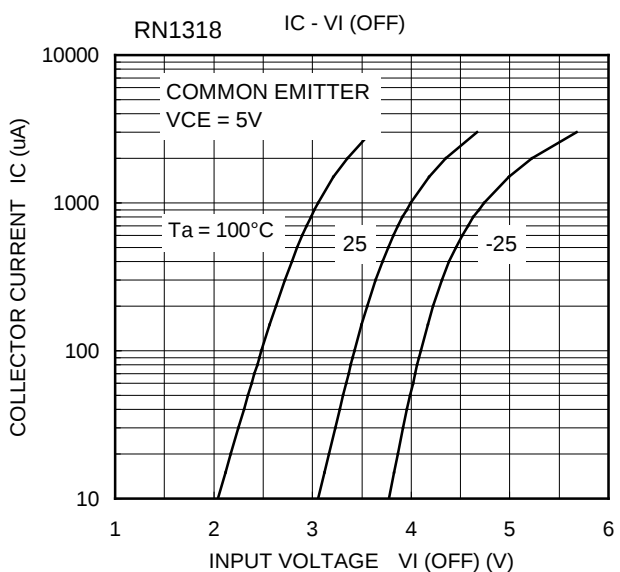
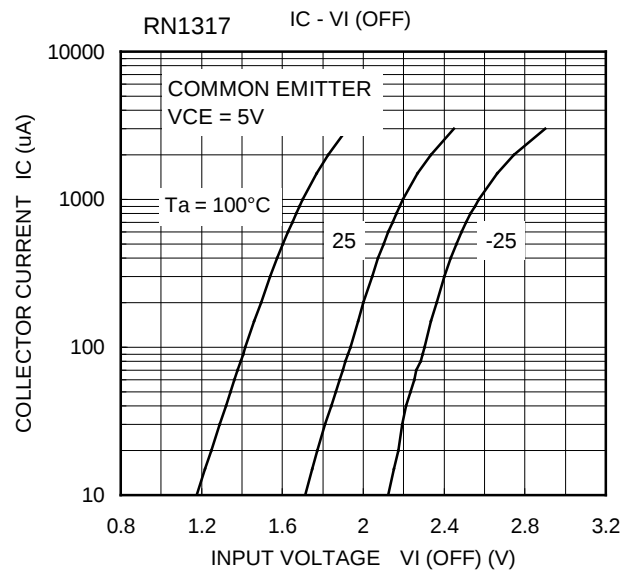
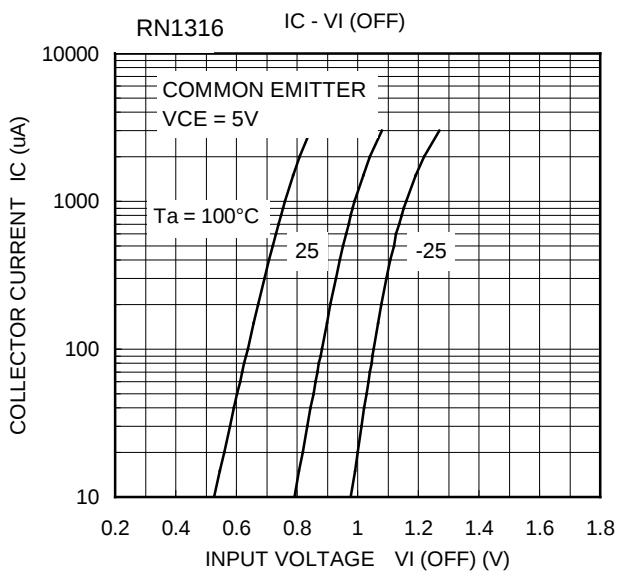
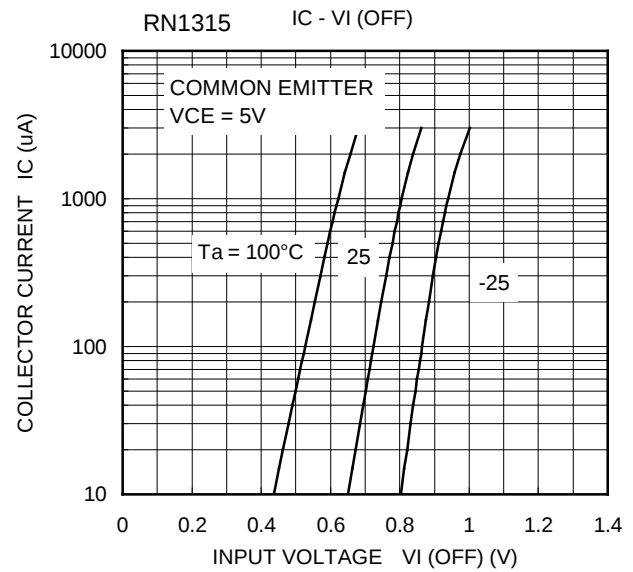
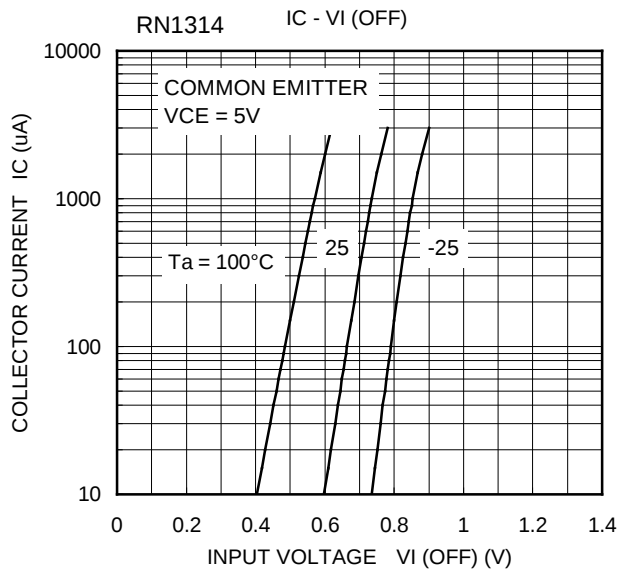
Start of commercial production
2002-11

Electrical Characteristics (Ta = 25°C)

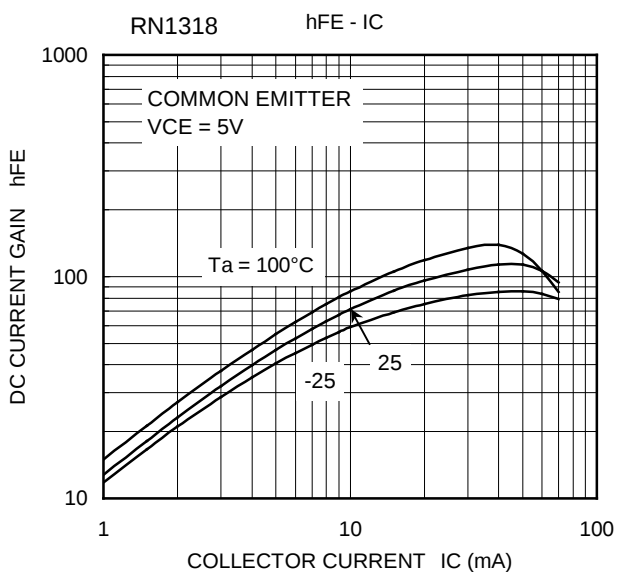
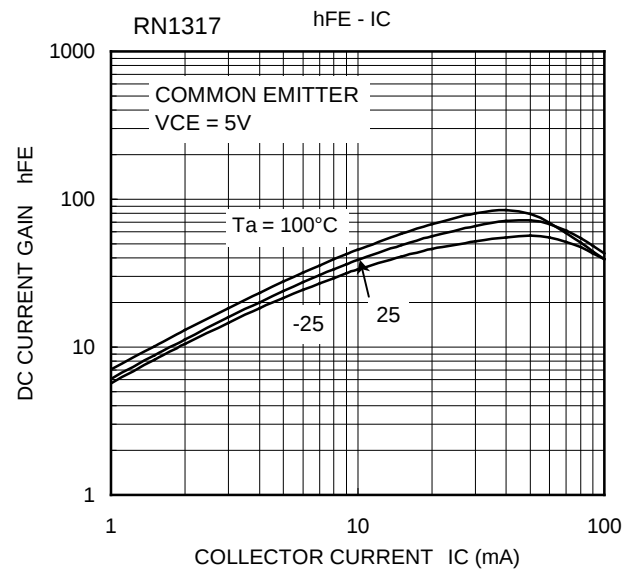
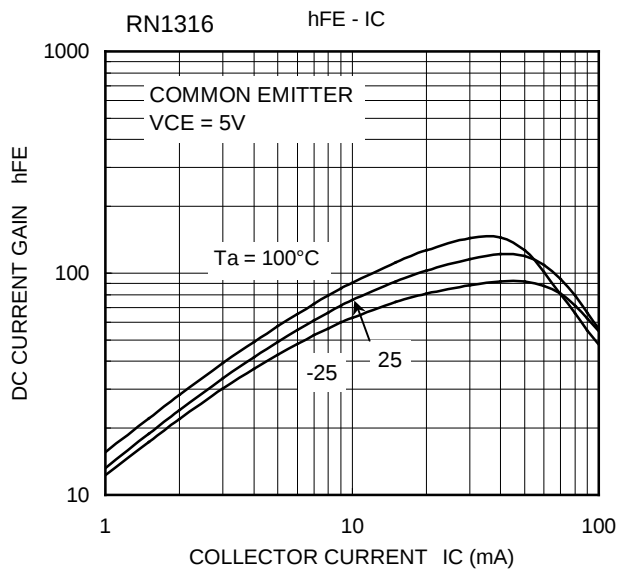
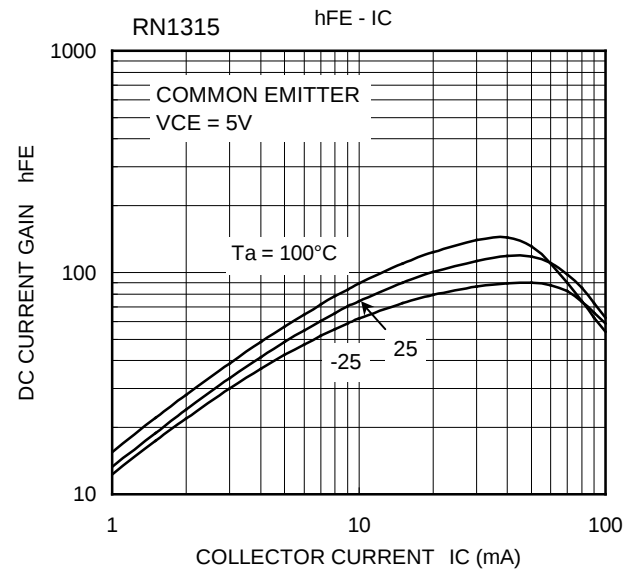
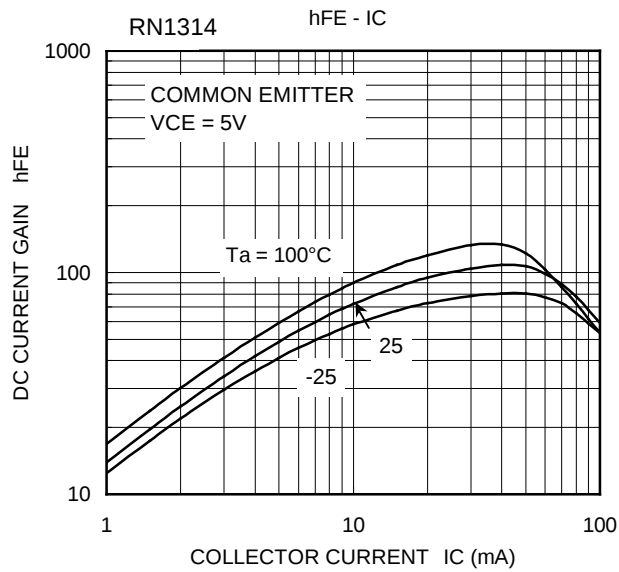
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1314 to 1318	I_{CBO}	—	$V_{CB} = 50\text{ V}, I_E = 0\text{ mA}$	—	—	100	nA
	RN1314 to 1318	I_{CEO}		$V_{CE} = 50\text{ V}, I_B = 0\text{ mA}$	—	—	500	nA
Emitter cut-off current	RN1314	I_{EBO}	—	$V_{EB} = 5\text{ V}, I_C = 0\text{ mA}$	0.35	—	0.65	mA
	RN1315			$V_{EB} = 6\text{ V}, I_C = 0\text{ mA}$	0.37	—	0.71	
	RN1316			$V_{EB} = 7\text{ V}, I_C = 0\text{ mA}$	0.36	—	0.68	
	RN1317			$V_{EB} = 15\text{ V}, I_C = 0\text{ mA}$	0.78	—	1.46	
	RN1318			$V_{EB} = 25\text{ V}, I_C = 0\text{ mA}$	0.33	—	0.63	
DC current gain	RN1314 to 16,18	h_{FE}	—	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$	50	—	—	—
	RN1317				30	—	—	
Collector-emitter saturation voltage	RN1314 to 1318	$V_{CE(sat)}$	—	$I_C = 5\text{ mA}, I_B = 0.25\text{ mA}$	—	0.1	0.3	V
Input voltage (ON)	RN1314	$V_I(ON)$	—	$V_{CE} = 0.2\text{ V}, I_C = 5\text{ mA}$	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	$V_I(OFF)$	—	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ mA}$	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_T	—	$V_{CE} = 10\text{ V}, I_C = 5\text{ mA}$	—	250	—	MHz
Collector Output capacitance	RN1314 to 1318	C_{ob}	—	$V_{CB} = 10\text{ V}, I_E = 0\text{ mA}, f = 1\text{ MHz}$	—	3.0	6.0	pF
Input resistor	RN1314	R_1	—	—	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_1/R_2	—	—	—	0.1	—	—
	RN1315				—	0.22	—	
	RN1316				—	0.47	—	
	RN1317				—	2.13	—	
	RN1318				—	4.7	—	



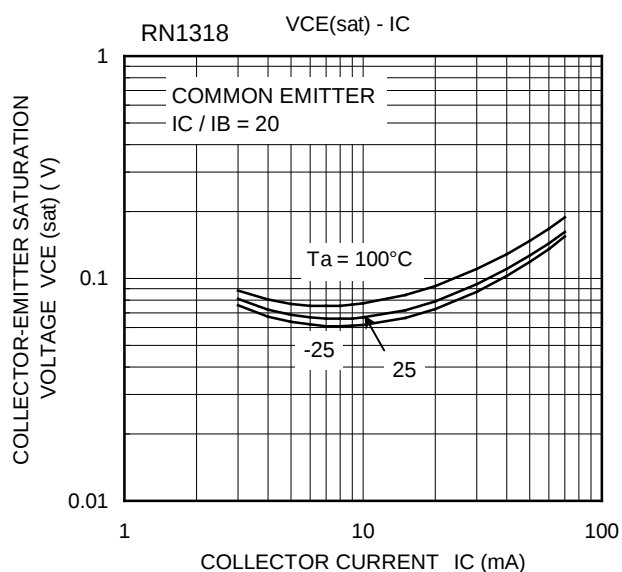
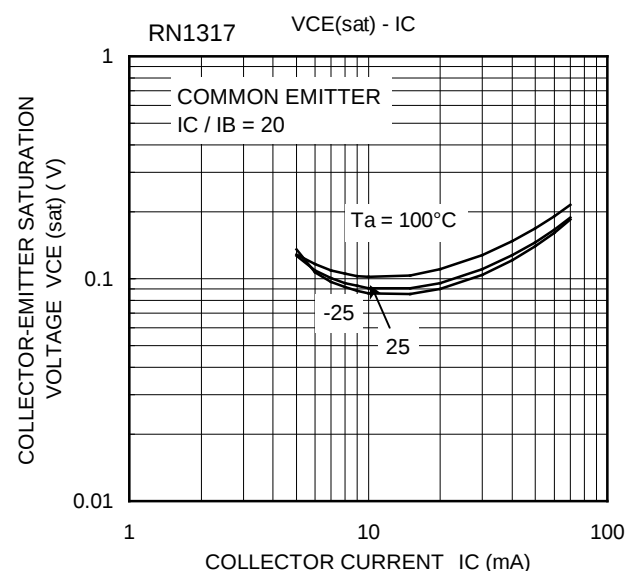
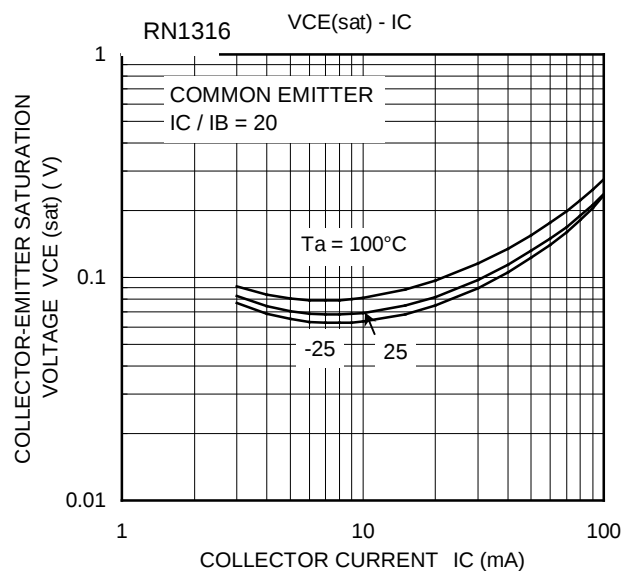
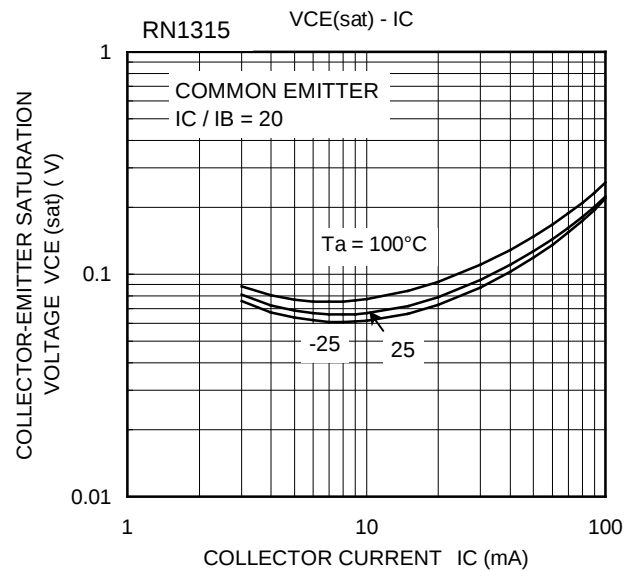
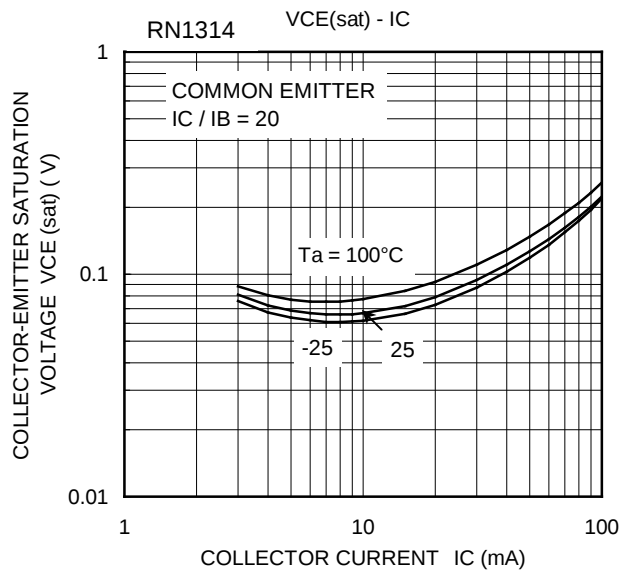
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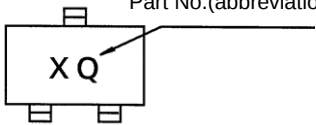
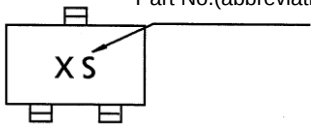
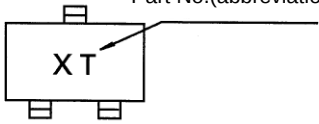
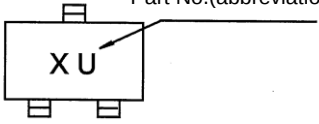
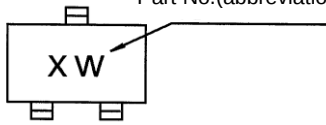


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Marking

Part No.	Marking
RN1314	Part No.(abbreviation code) 
RN1315	Part No.(abbreviation code) 
RN1316	Part No.(abbreviation code) 
RN1317	Part No.(abbreviation code) 
RN1318	Part No.(abbreviation code) 

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