

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

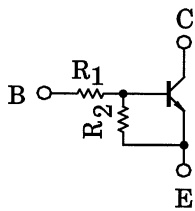
RN1114, RN1115, RN1116, RN1117, RN1118

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

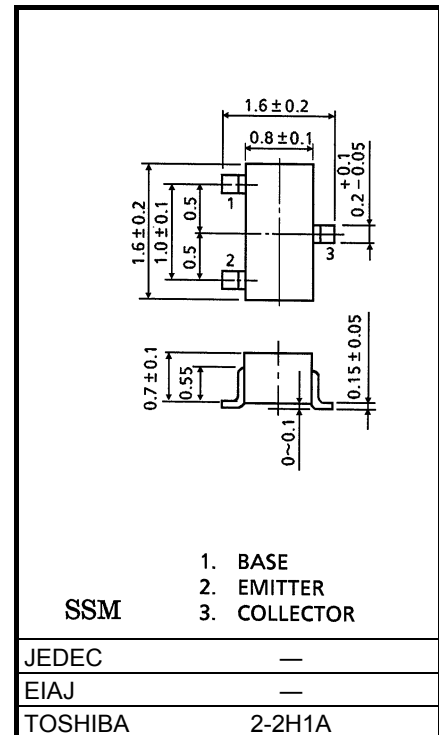
Unit: mm

- With built-in bias resistors.
- Simplified circuit design
- Reduced number of parts and simplified manufacturing process
- Complementary to RN2114~2118

Equivalent Circuit and Bias Resistor Values



Type No.	R ₁ (kΩ)	R ₂ (kΩ)
RN1114	1	10
RN1115	2.2	10
RN1116	4.7	10
RN1117	10	4.7
RN1118	47	10



Weight: 2.4mg

Absolute Maximum Ratings (Ta = 25°C)

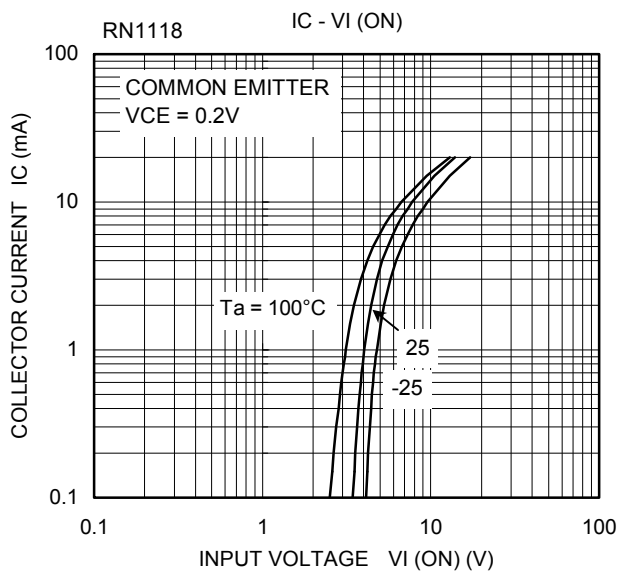
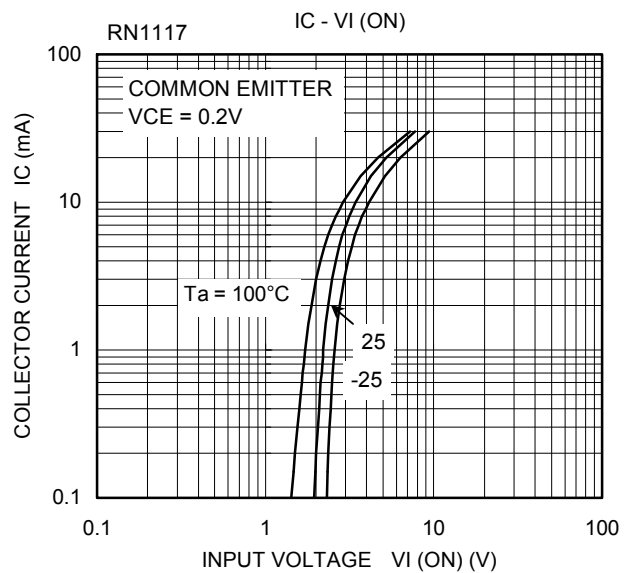
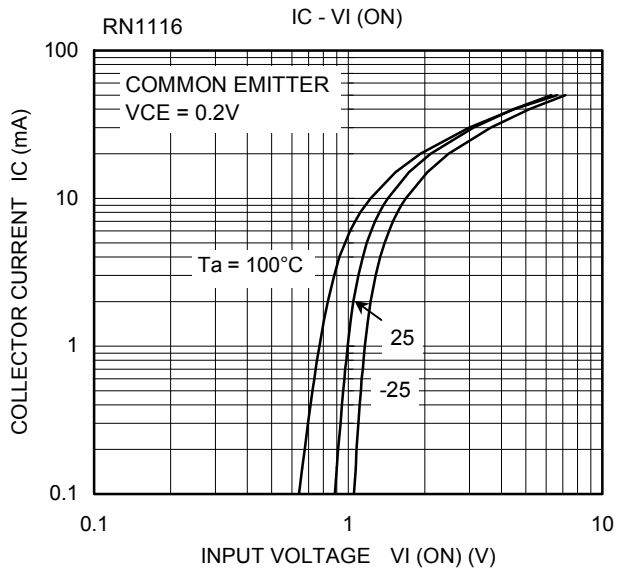
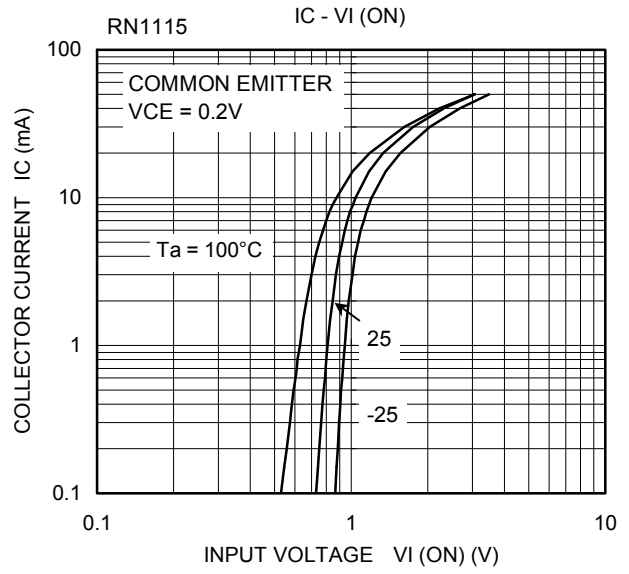
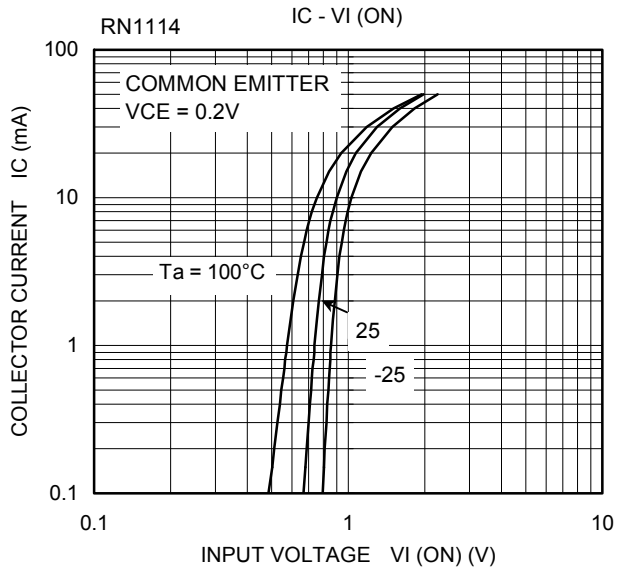
Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN1114~1118	V _{CBO}	50	V
Collector-emitter voltage		V _{CEO}	50	V
Emitter-base voltage	RN1114	V _{EBO}	5	V
	RN1115		6	
	RN1116		7	
	RN1117		15	
	RN1118		25	
Collector current	RN1114~1118	I _c	100	mA
Collector power dissipation		P _c	100	mW
Junction temperature		T _j	150	°C
Storage temperature range		T _{stg}	-55~150	°C

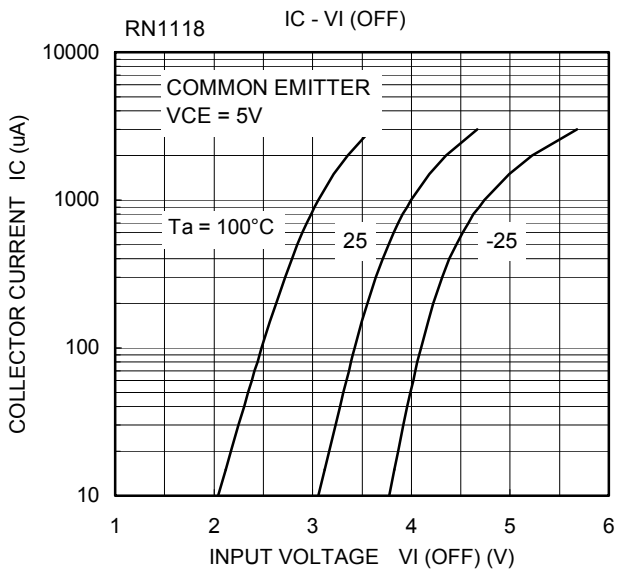
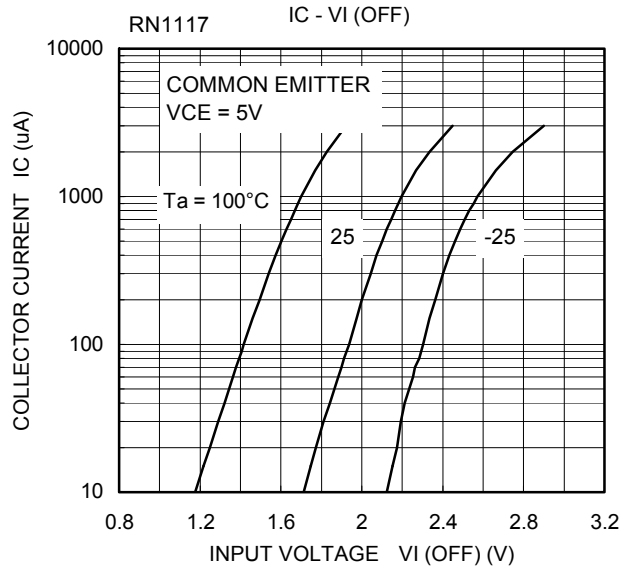
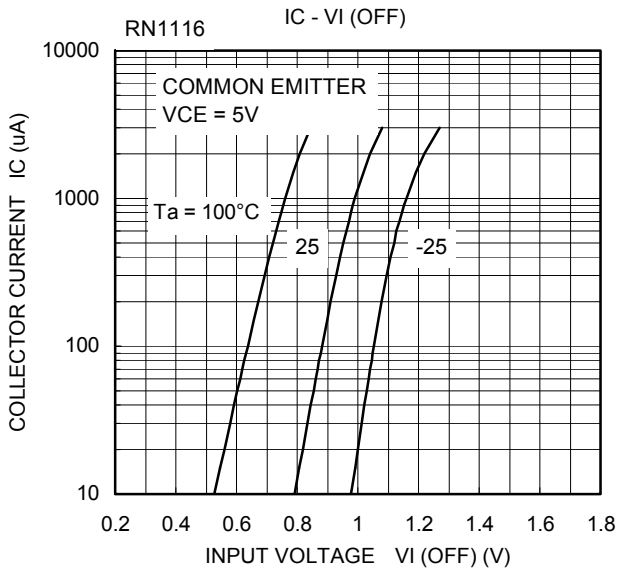
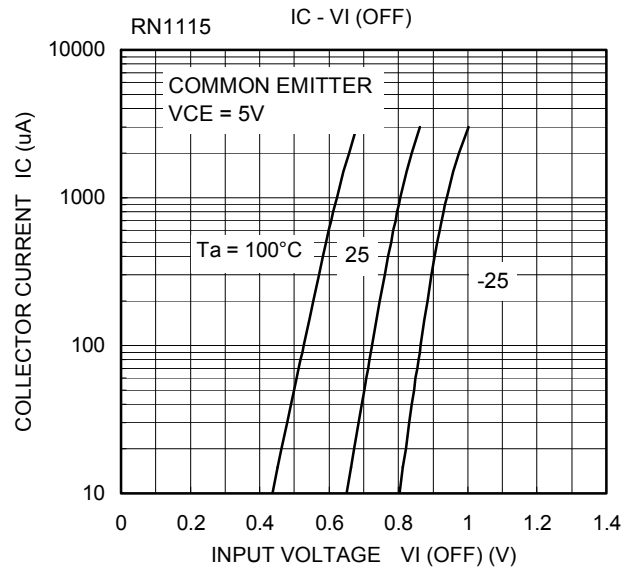
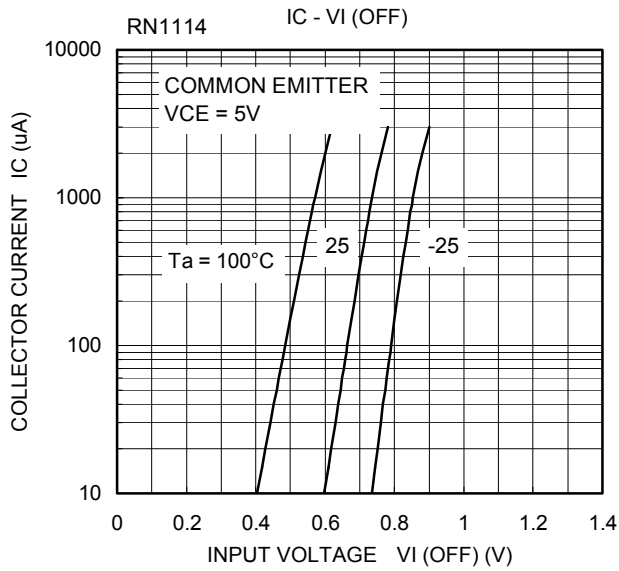
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

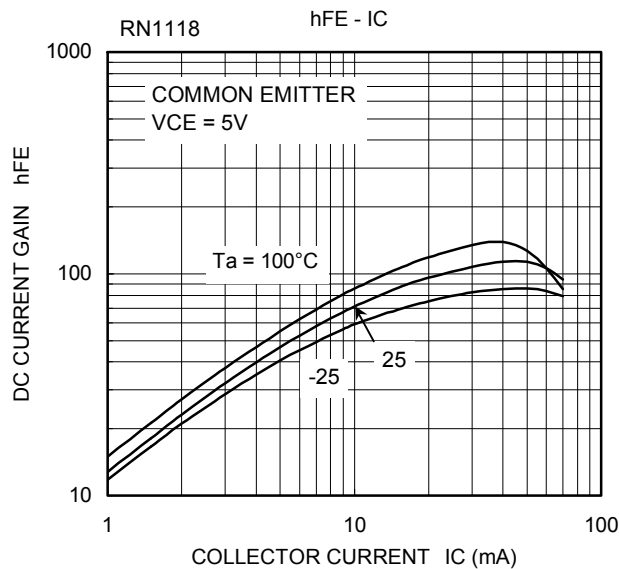
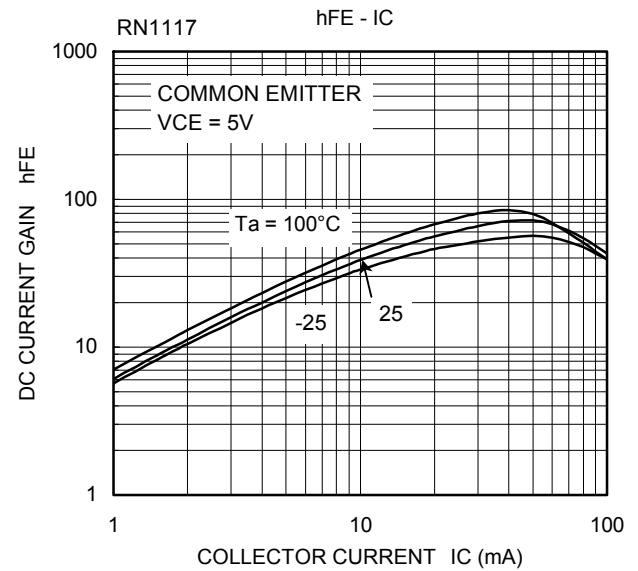
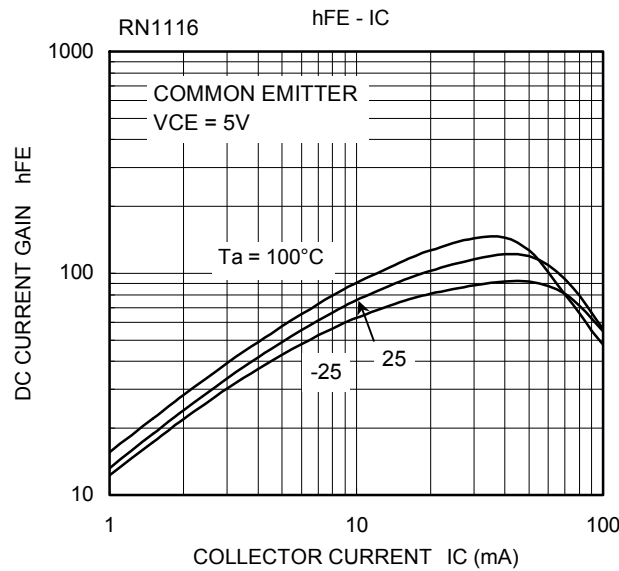
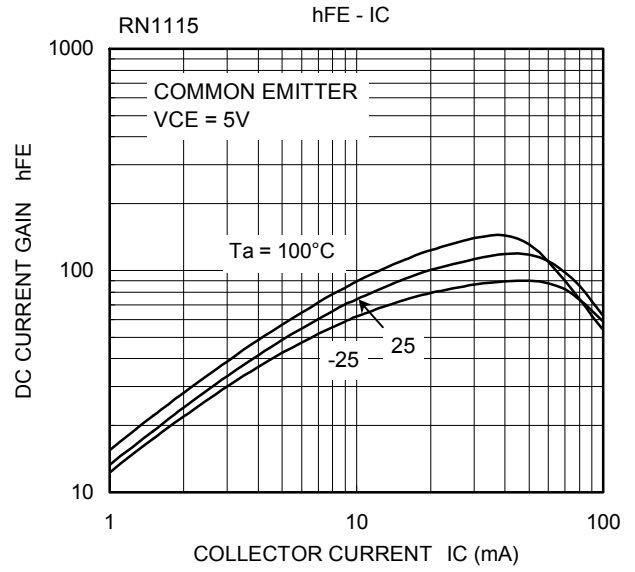
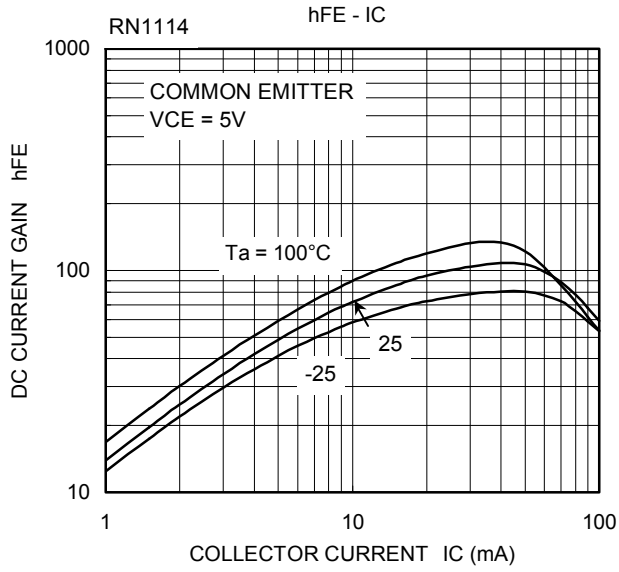
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

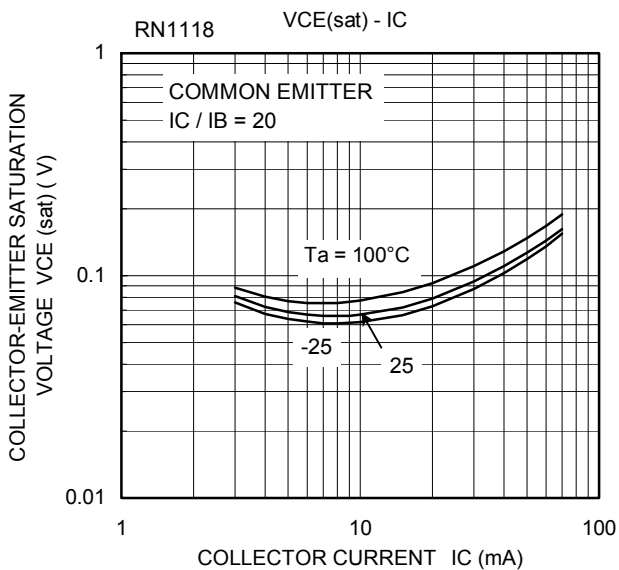
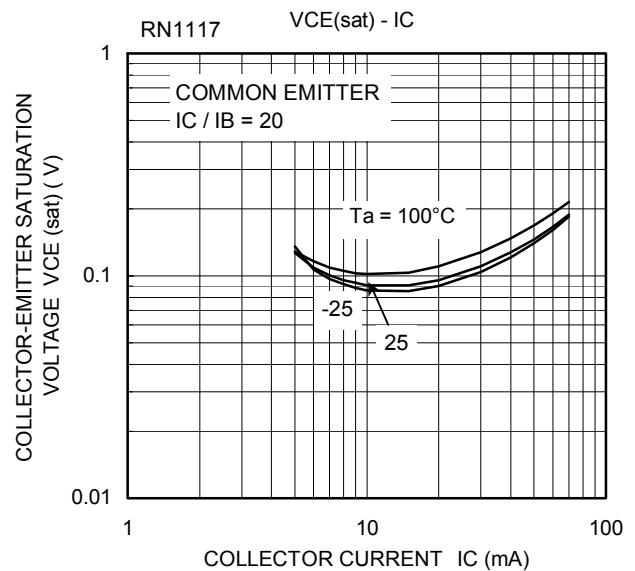
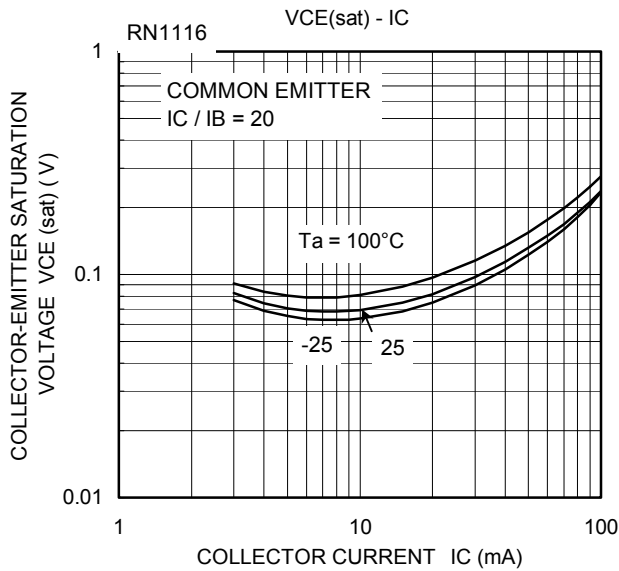
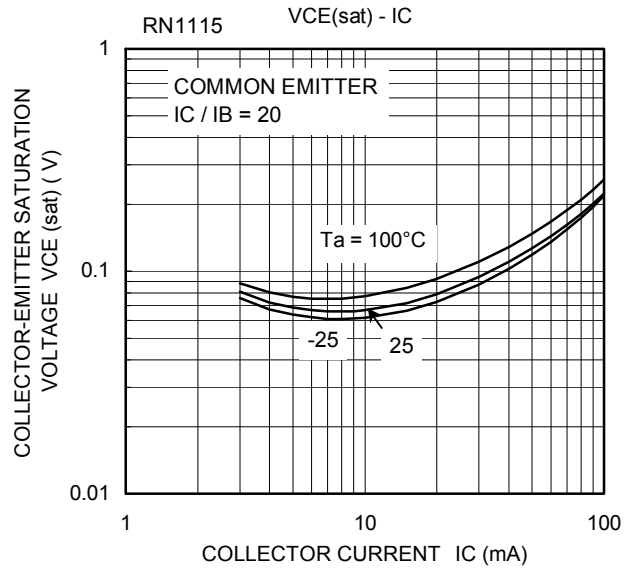
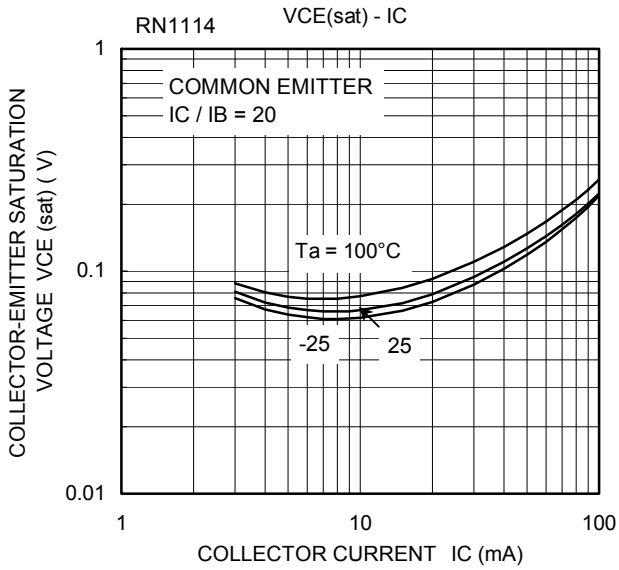
Electrical Characteristics (Ta = 25°C)

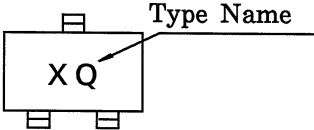
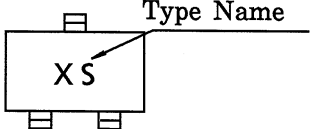
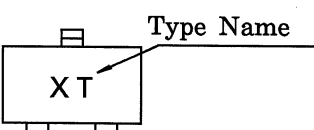
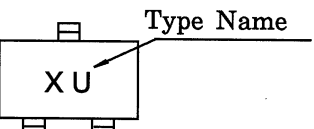
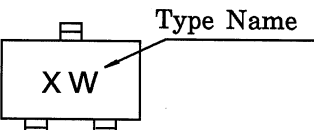
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1114~1118	I_{CBO}	—	$V_{CB} = 50\text{ V}, I_E = 0$	—	—	100	nA
	RN1114~1118	I_{CEO}	—	$V_{CE} = 50\text{ V}, I_B = 0$	—	—	500	nA
Emitter cut-off current	RN1114	I_{EBO}	—	$V_{EB} = 5\text{ V}, I_C = 0$	0.35	—	0.65	mA
	RN1115		—	$V_{EB} = 6\text{ V}, I_C = 0$	0.37	—	0.71	
	RN1116		—	$V_{EB} = 7\text{ V}, I_C = 0$	0.36	—	0.68	
	RN1117		—	$V_{EB} = 15\text{ V}, I_C = 0$	0.78	—	1.46	
	RN1118		—	$V_{EB} = 25\text{ V}, I_C = 0$	0.33	—	0.63	
DC current gain	RN1114~16, 18	h_{FE}	—	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$	50	—	—	—
	RN1117		—		30	—	—	
Collector-emitter saturation voltage	RN1114~1118	$V_{CE(sat)}$	—	$I_C = 5\text{ mA}, I_B = 0.25\text{ mA}$	—	0.1	0.3	V
Input voltage (ON)	RN1114	$V_{I(ON)}$	—	$V_{CE} = 0.2\text{ V}, I_C = 5\text{ mA}$	0.6	—	2.0	V
	RN1115		—		0.7	—	2.5	
	RN1116		—		0.8	—	2.5	
	RN1117		—		1.5	—	3.5	
	RN1118		—		2.5	—	10.0	
Input voltage (OFF)	RN1114	$V_{I(OFF)}$	—	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ mA}$	0.3	—	0.9	V
	RN1115		—		0.3	—	1.0	
	RN1116		—		0.3	—	1.1	
	RN1117		—		0.3	—	2.3	
	RN1118		—		0.5	—	5.7	
Translation Frequency	RN1114~1118	f_T	—	$V_{CE} = 10\text{ V}, I_C = 5\text{ mA}$	—	250	—	MHz
Collector output capacitance	RN1114~1118	C_{ob}	—	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	3.0	6.0	pF
Input Resistor	RN1114	R_1	—	—	0.7	1.0	1.3	kΩ
	RN1115		—		1.54	2.2	2.86	
	RN1116		—		3.29	4.7	6.11	
	RN1117		—		7.0	10.0	13.0	
	RN1118		—		32.9	47.0	61.1	
Resistor Ratio	RN1114	R_1/R_2	—	—	—	0.1	—	—
	RN1115		—		—	0.22	—	
	RN1116		—		—	0.47	—	
	RN1117		—		—	2.13	—	
	RN1118		—		—	4.7	—	









Type Name	Marking
RN1114	 <p>The diagram shows a rectangular component with four mounting tabs (two on top, two on bottom). The letters 'XQ' are printed inside. An arrow points from the text 'Type Name' to the 'Q' in 'XQ'.</p>
RN1115	 <p>The diagram shows a rectangular component with four mounting tabs (two on top, two on bottom). The letters 'XS' are printed inside. An arrow points from the text 'Type Name' to the 'S' in 'XS'.</p>
RN1116	 <p>The diagram shows a rectangular component with four mounting tabs (two on top, two on bottom). The letters 'XT' are printed inside. An arrow points from the text 'Type Name' to the 'T' in 'XT'.</p>
RN1117	 <p>The diagram shows a rectangular component with four mounting tabs (two on top, two on bottom). The letters 'XU' are printed inside. An arrow points from the text 'Type Name' to the 'U' in 'XU'.</p>
RN1118	 <p>The diagram shows a rectangular component with four mounting tabs (two on top, two on bottom). The letters 'XW' are printed inside. An arrow points from the text 'Type Name' to the 'W' in 'XW'.</p>

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20070701-EN GENERAL

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