

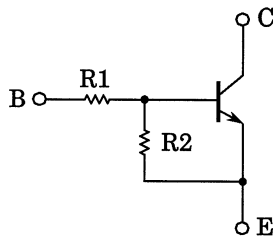
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

## RN1101, RN1102, RN1103, RN1104, RN1105, RN1106

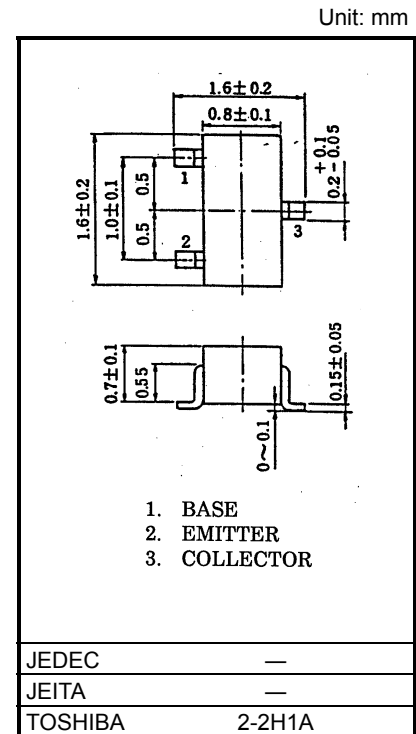
Switching, Inverter Circuit, Interface Circuit  
and Driver Circuit Applications

- With built-in bias resistors
- Simplified circuit design
- Reduced number of parts and simplified manufacturing process
- Complementary to RN2101~ RN2106

### Equivalent Circuit and Bias Resister Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1101	4.7	4.7
RN1102	10	10
RN1103	22	22
RN1104	47	47
RN1105	2.2	47
RN1106	4.7	47



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

Weight: 2.4 mg (typ).

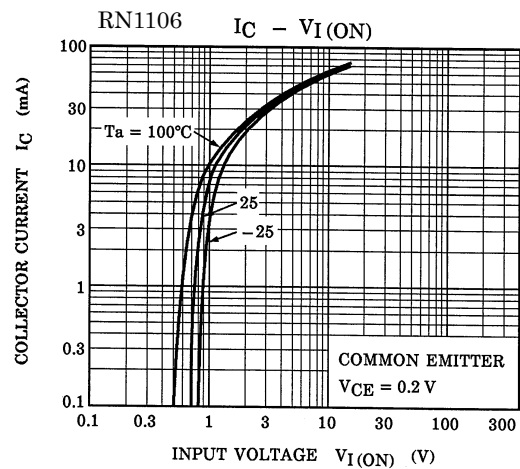
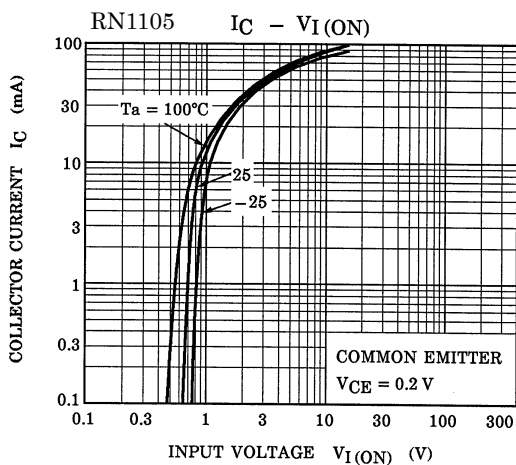
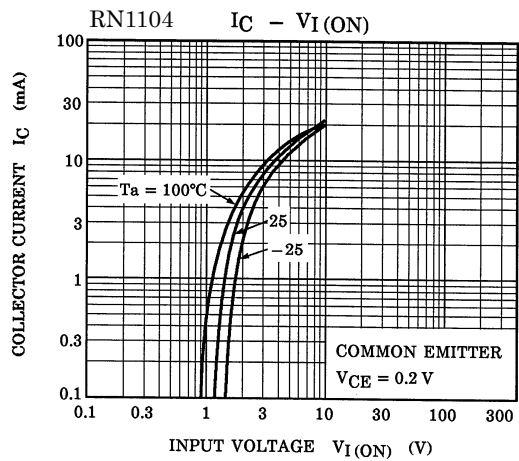
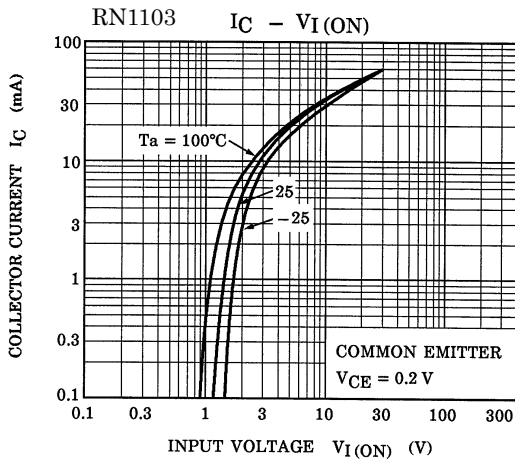
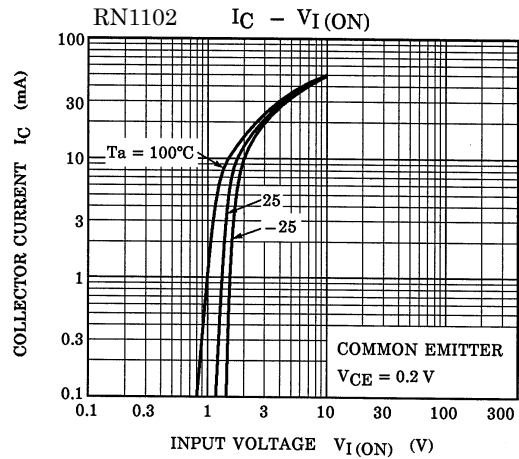
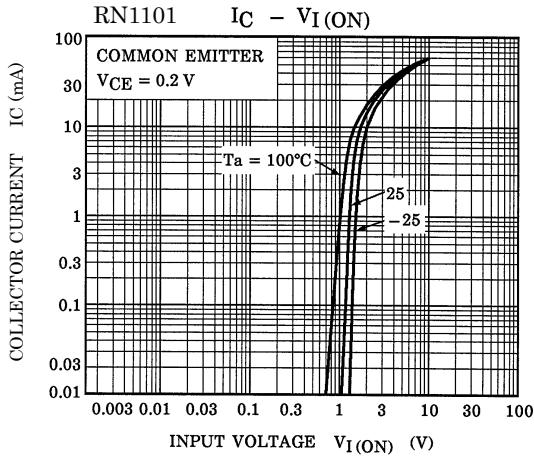
Characteristic	Symbol	Rating	Unit	
Collector-base voltage	RN1101~1106	V <sub>CB0</sub>	50	V
Collector-emitter voltage				
Emitter-base voltage	RN1101~1104	V <sub>EBO</sub>	10	V
	RN1105, 1106		5	
Collector current	RN1101~1106	I <sub>C</sub>	100	mA
Collector power dissipation		P <sub>C</sub>	100	mW
Junction temperature		T <sub>j</sub>	150	°C
Storage temperature range		T <sub>stg</sub>	-55~150	°C

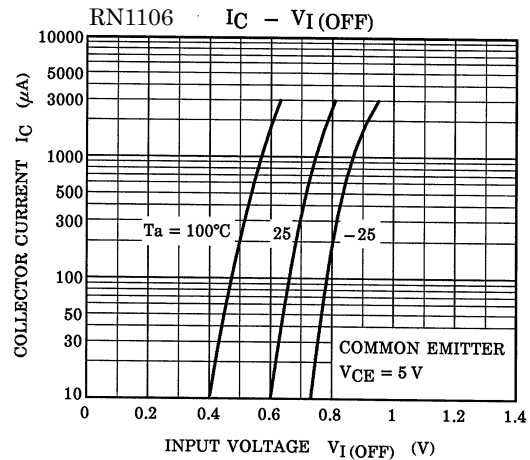
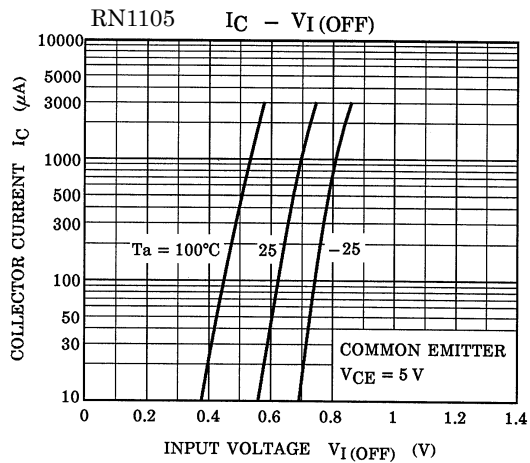
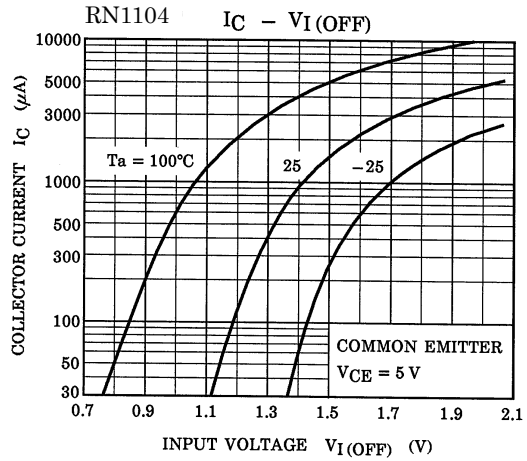
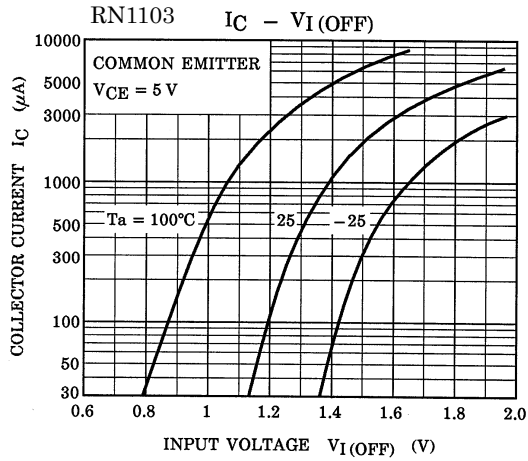
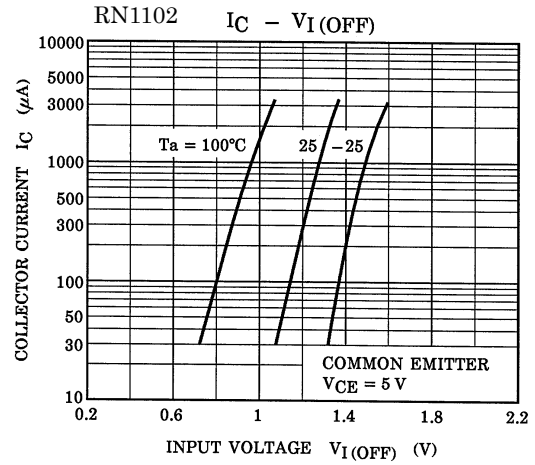
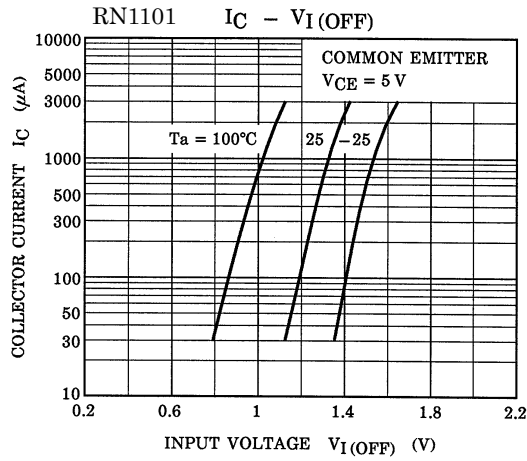
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

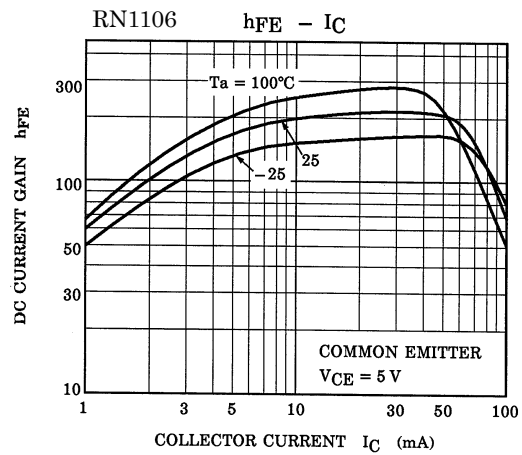
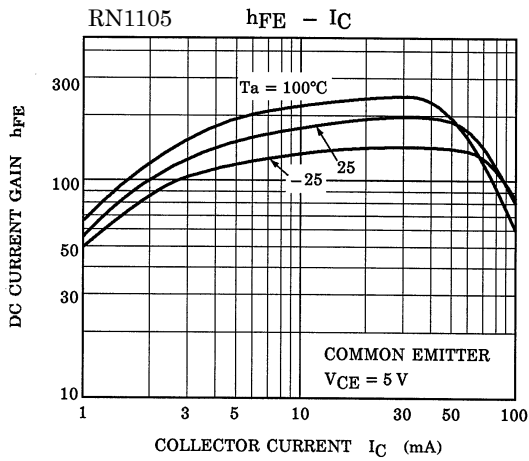
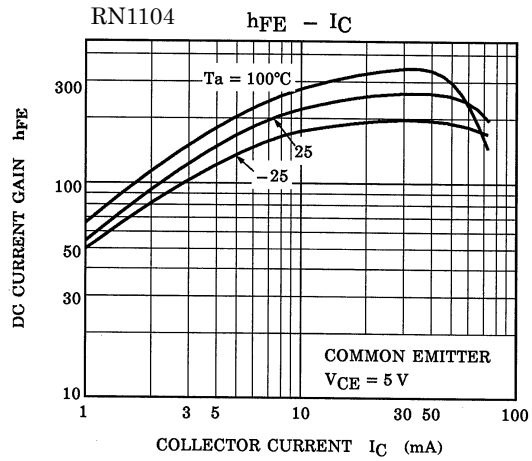
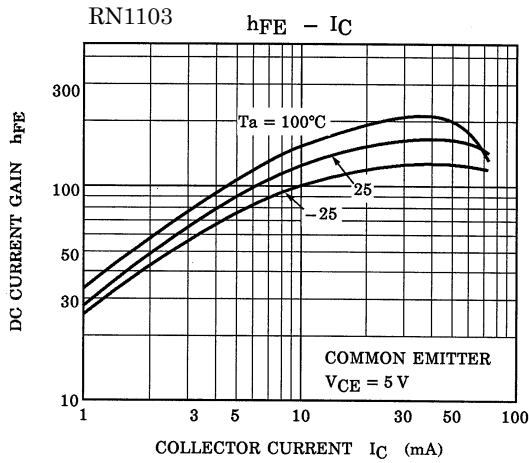
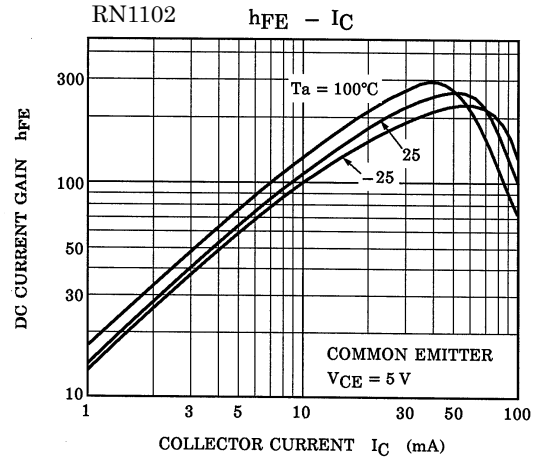
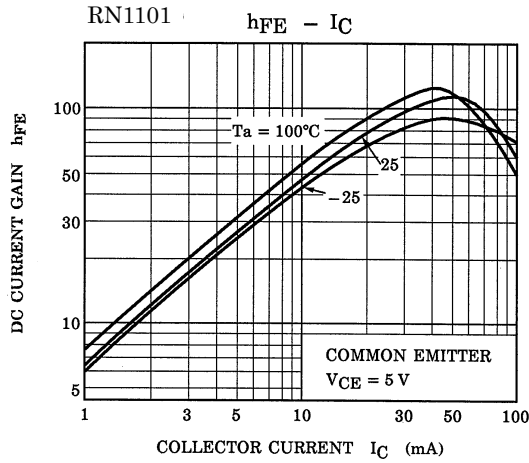
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

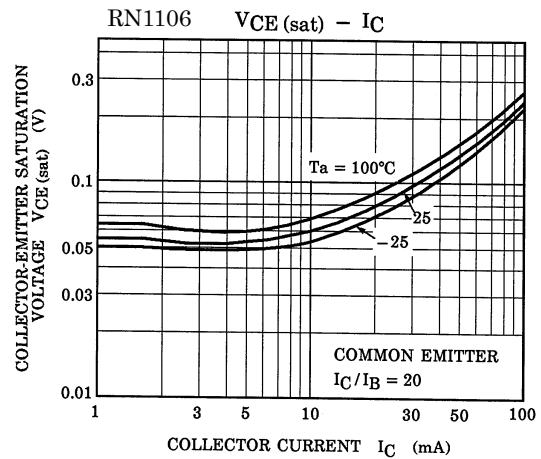
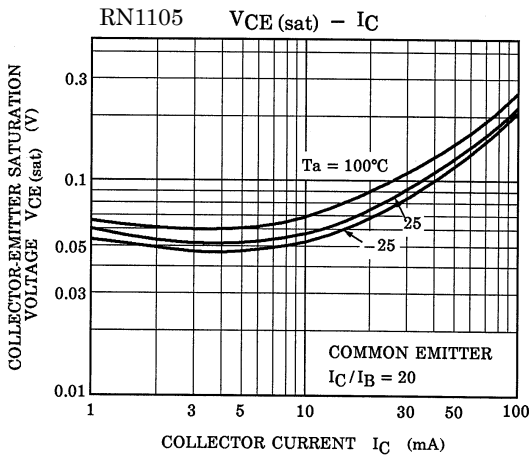
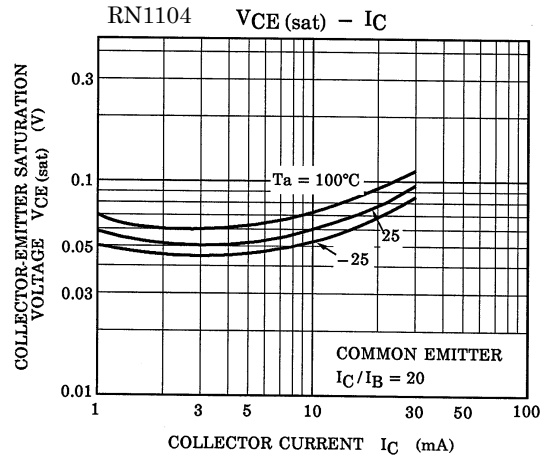
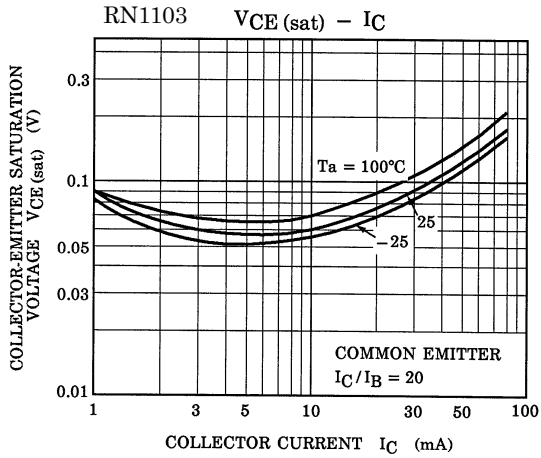
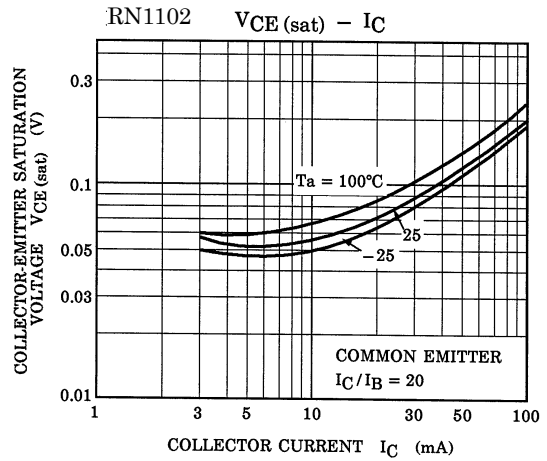
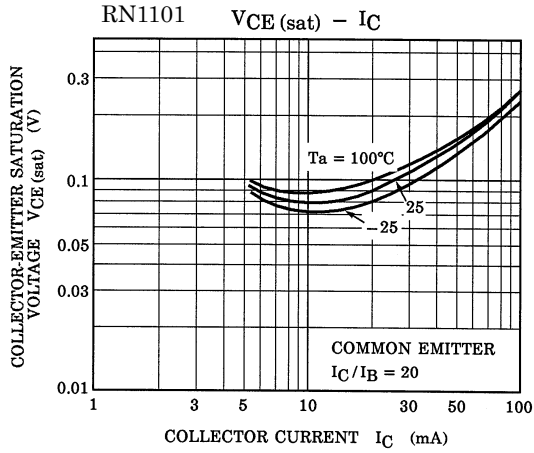
## Electrical Characteristics (Ta = 25°C)

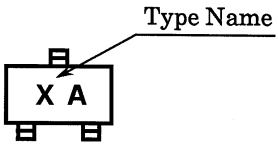
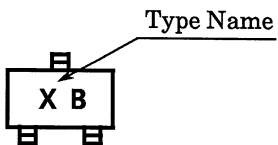
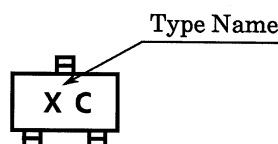
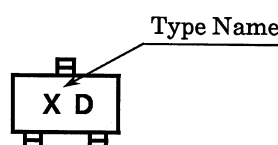
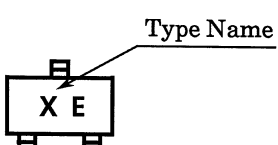
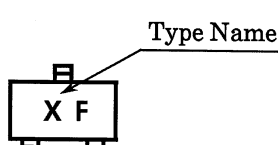
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1101~1106	$I_{CBO}$	—	$V_{CB} = 50\text{ V}, I_E = 0$	—	—	100	nA
		$I_{CEO}$		$V_{CE} = 50\text{ V}, I_B = 0$	—	—	500	
Emitter cut-off current	RN1101	$I_{EBO}$	—	$V_{EB} = 10\text{ V}, I_C = 0$	0.82	—	1.52	mA
	RN1102				0.38	—	0.71	
	RN1103				0.17	—	0.33	
	RN1104			0.082	—	0.15		
	RN1105			$V_{EB} = 5\text{ V}, I_C = 0$	0.078	—	0.145	
	RN1106				0.074	—	0.138	
DC current gain	RN1101	$h_{FE}$	—	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$	30	—	—	—
	RN1102				50	—	—	
	RN1103				70	—	—	
	RN1104				80	—	—	
	RN1105				80	—	—	
	RN1106				80	—	—	
Collector-emitter saturation voltage	RN1101~1106	$V_{CE(sat)}$	—	$I_C = 5\text{ mA}, I_B = 0.25\text{ mA}$	—	0.1	0.3	V
Input voltage (ON)	RN1101	$V_{I(ON)}$	—	$V_{CE} = 0.2\text{ V}, I_C = 5\text{ mA}$	1.1	—	2.0	V
	RN1102				1.2	—	2.4	
	RN1103				1.3	—	3.0	
	RN1104				1.5	—	5.0	
	RN1105				0.6	—	1.1	
	RN1106				0.7	—	1.3	
Input voltage (OFF)	RN1101~1104	$V_{I(OFF)}$	—	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ mA}$	1.0	—	1.5	V
	RN1105, 1106				0.5	—	0.8	
Transition frequency	RN1101~1106	$f_T$	—	$V_{CE} = 10\text{ V}, I_C = 5\text{ mA}$	—	250	—	MHz
Collector output capacitance	RN1101~1106	$C_{ob}$	—	$V_{CB} = 10\text{ V}, I_E = 0,$ $f = 1\text{ MHz}$	—	3	6	pF
Input resistor	RN1101	R1	—		3.29	4.7	6.11	kΩ
	RN1102				7	10	13	
	RN1103				15.4	22	28.6	
	RN1104				32.9	47	61.1	
	RN1105				1.54	2.2	2.86	
	RN1106				3.29	4.7	6.11	
Resistor ratio	RN1101~1104	R1/R2	—		0.9	1.0	1.1	—
	RN1105				0.0421	0.0468	0.0515	
	RN1106				0.09	0.1	0.11	









Type Name	Marking
RN1101	
RN1102	
RN1103	
RN1104	
RN1105	
RN1106	

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