

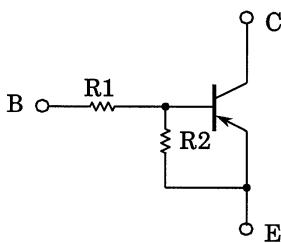
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process)

## RN2101, RN2102, RN2103, RN2104, RN2105, RN2106

Switching, Inverter Circuit, Interface Circuit  
And Driver Circuit Applications

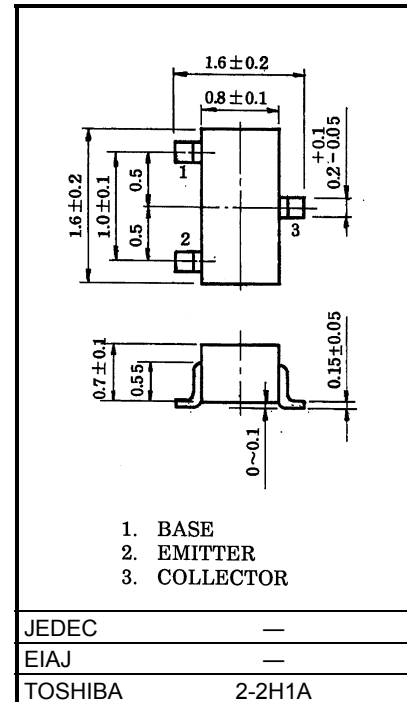
- Built-in bias resistors
- Simplified circuit design
- Fewer parts and simplified manufacturing process
- Complementary to RN1101~RN1106

### Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN2101	4.7	4.7
RN2102	10	10
RN2103	22	22
RN2104	47	47
RN2105	2.2	47
RN2106	4.7	47

Unit: mm



JEDEC	—
EIAJ	—
TOSHIBA	2-2H1A

Weight: 2.4 mg

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

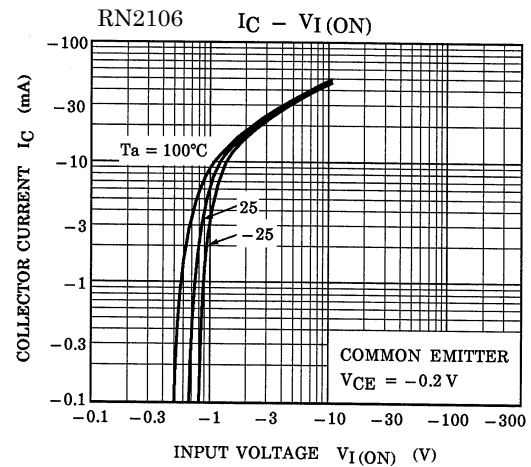
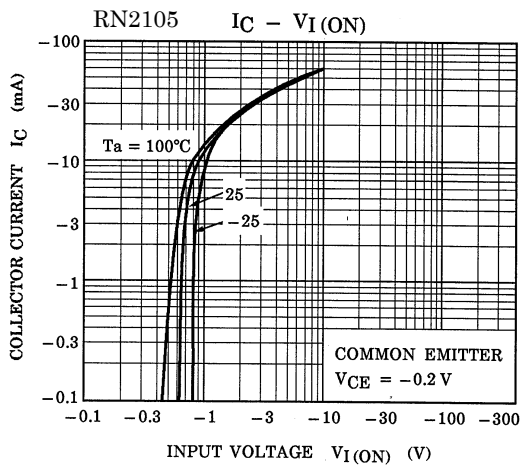
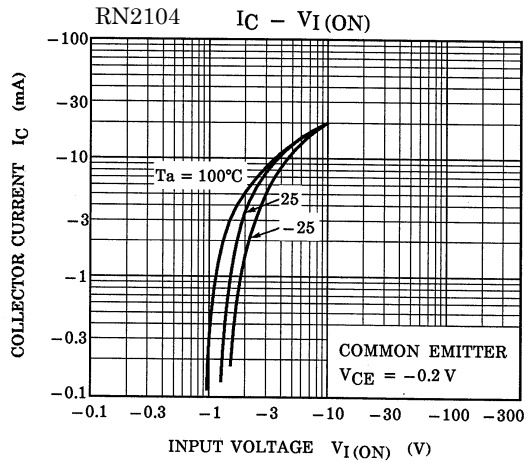
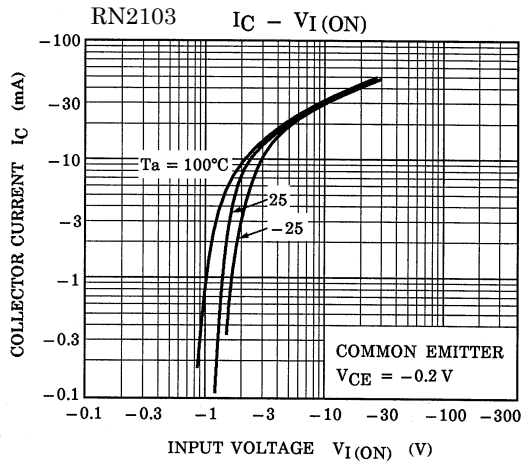
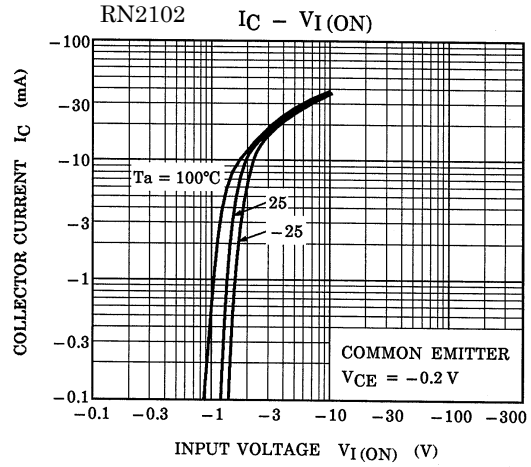
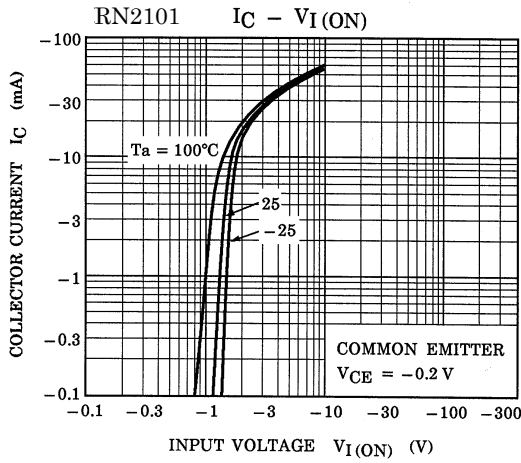
Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN2101~2106	V <sub>CBO</sub>	-50	V
Collector-emitter voltage				
Emitter-base voltage	RN2101~2104	V <sub>EBO</sub>	-10	V
	RN2105, 2106		-5	
Collector current	RN2101~2106	I <sub>C</sub>	-100	mA
Collector power dissipation		P <sub>C</sub>	100	mW
Junction temperature		T <sub>j</sub>	150	°C
Storage temperature range		T <sub>stg</sub>	-55~150	°C

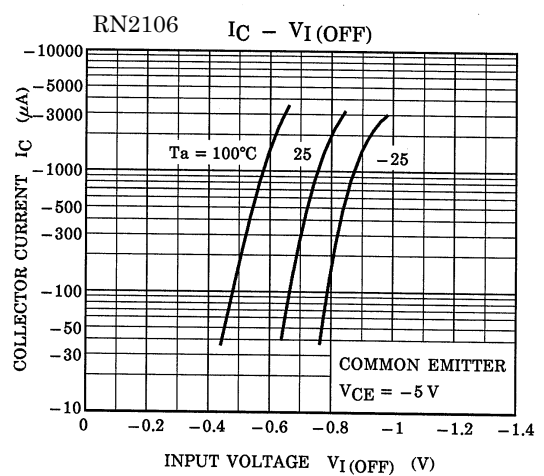
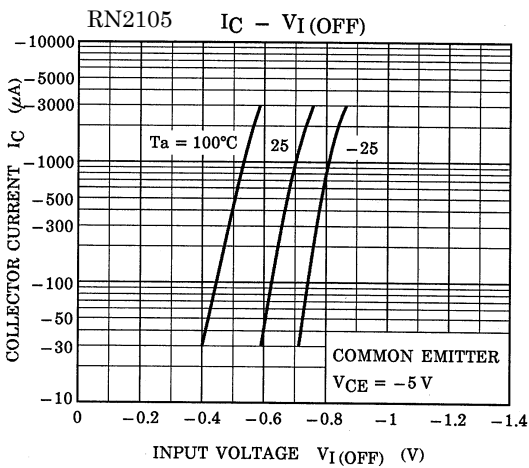
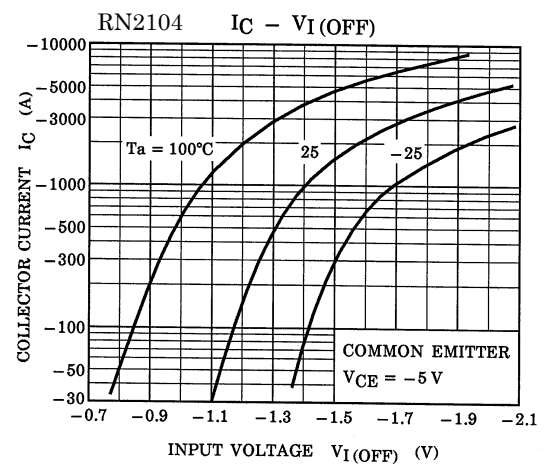
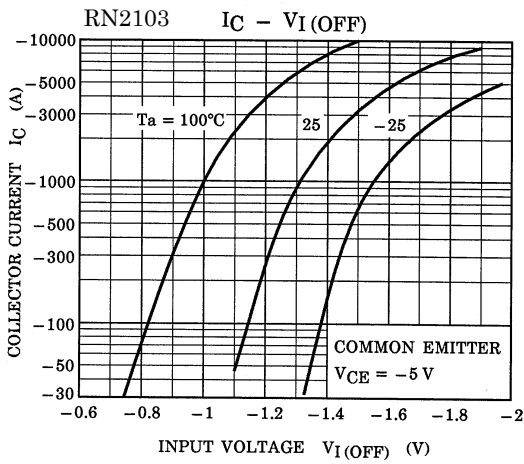
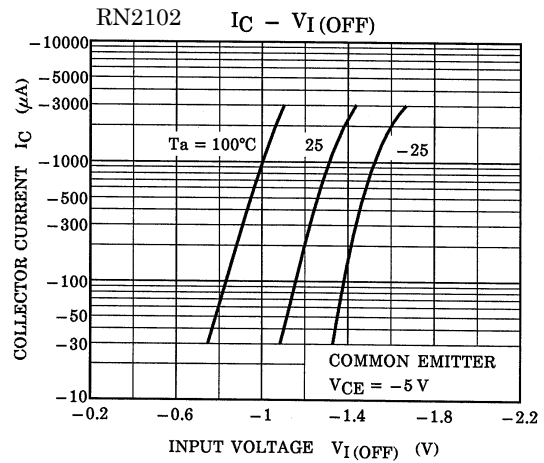
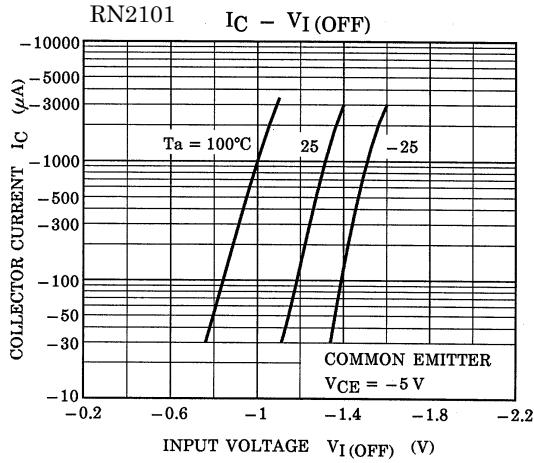
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

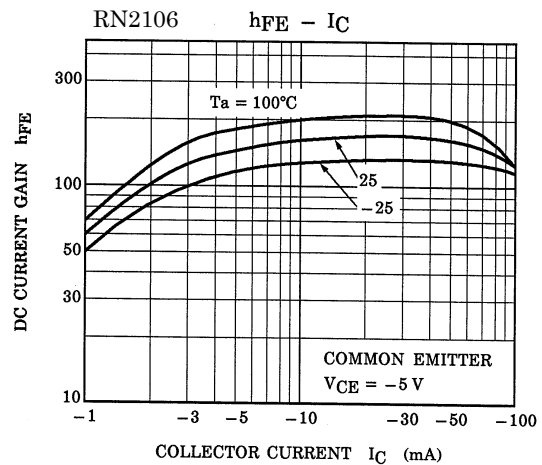
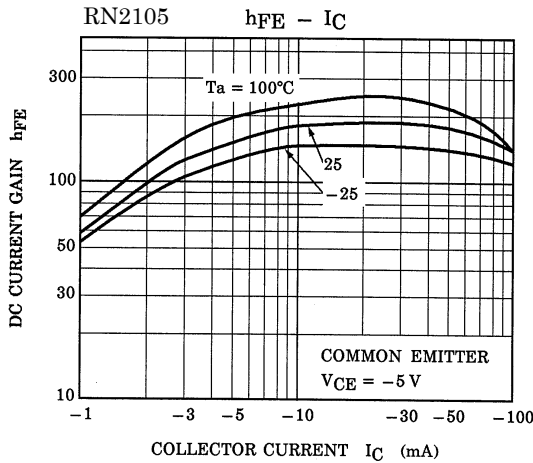
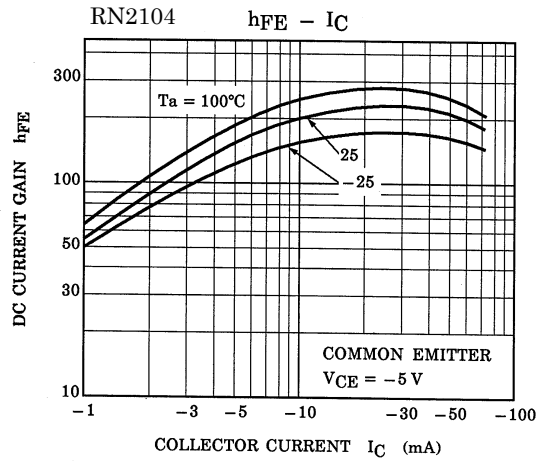
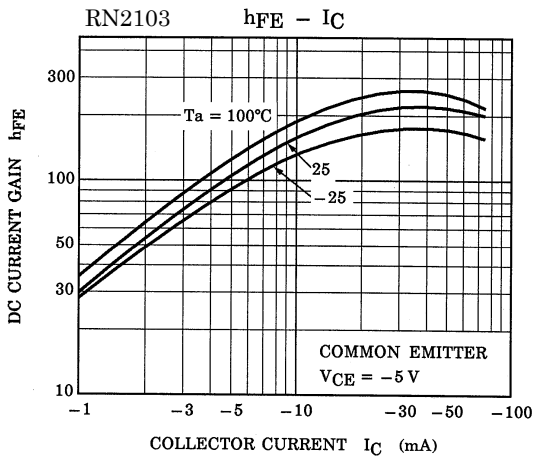
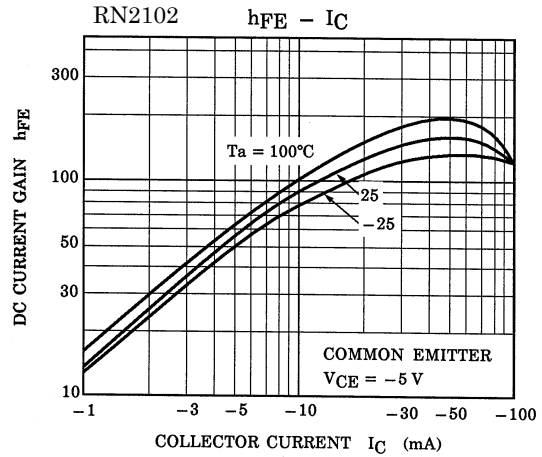
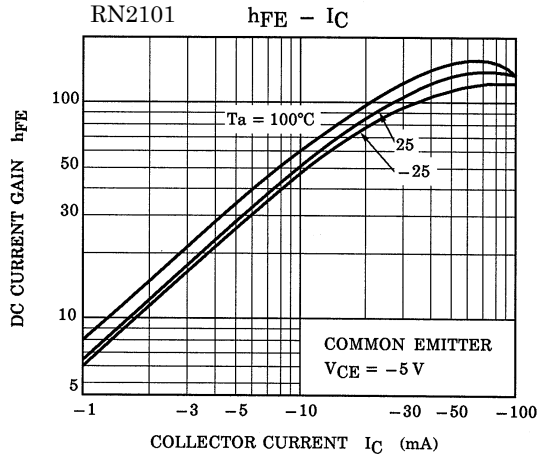
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

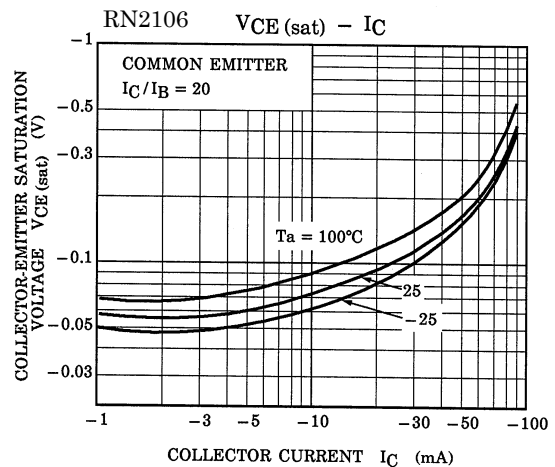
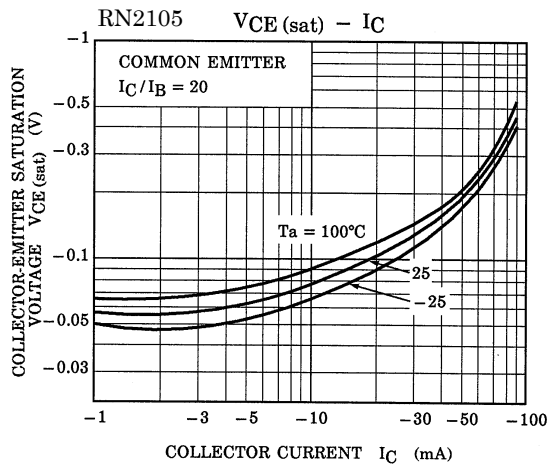
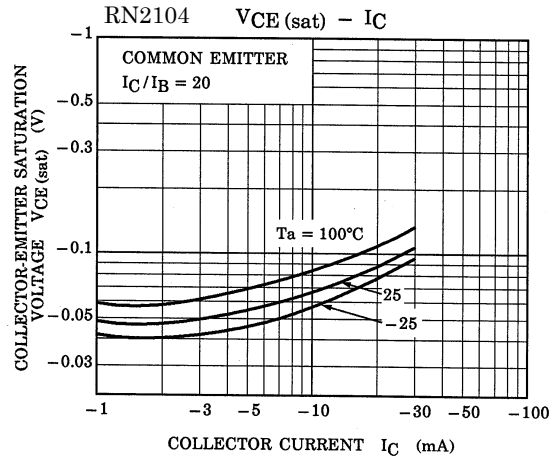
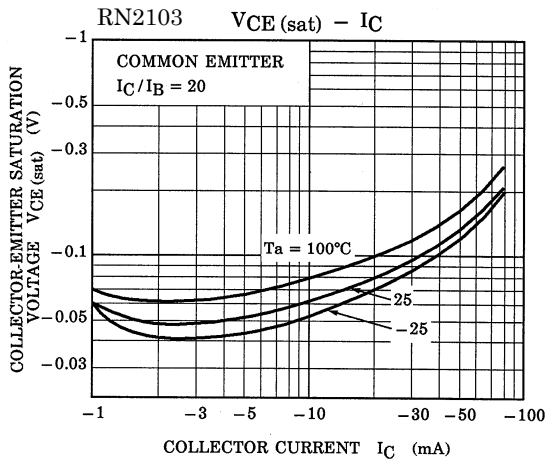
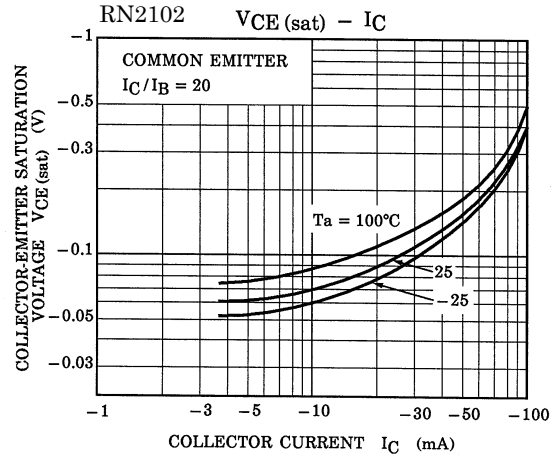
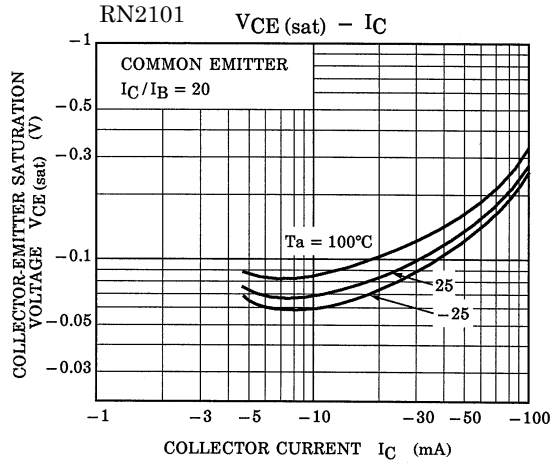
## Electrical Characteristics (Ta = 25°C)

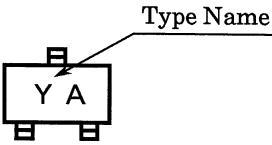
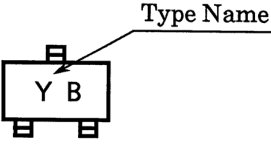
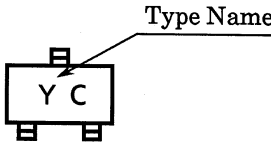
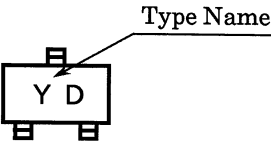
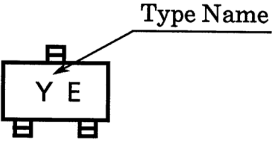
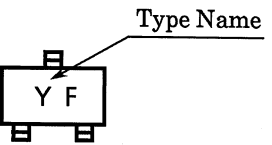
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2101~2106	$I_{CBO}$	—	$V_{CB} = -50\text{ V}, I_E = 0$	—	—	-100	nA
		$I_{CEO}$		$V_{CE} = -50\text{ V}, I_B = 0$	—	—	-500	
Emitter cut-off current	RN2101	$I_{EBO}$	—	$V_{EB} = -10\text{ V}, I_C = 0$	-0.82	—	-1.52	mA
	RN2102				-0.38	—	-0.71	
	RN2103				-0.17	—	-0.33	
	RN2104			-0.082	—	-0.15		
	RN2105			$V_{EB} = -5\text{ V}, I_C = 0$	-0.078	—	-0.145	
	RN2106				-0.074	—	-0.138	
DC current gain	RN2101	$h_{FE}$	—	$V_{CE} = -5\text{ V}, I_C = -10\text{ mA}$	30	—	—	
	RN2102				50	—	—	
	RN2103				70	—	—	
	RN2104				80	—	—	
	RN2105				80	—	—	
	RN2106				80	—	—	
Collector-emitter saturation voltage	RN2101~2106	$V_{CE(sat)}$	—	$I_C = -5\text{ mA}, I_B = -0.25\text{ mA}$	—	-0.1	-0.3	V
Input voltage (ON)	RN2101	$V_I(ON)$	—	$V_{CE} = -0.2\text{ V}, I_C = -5\text{ mA}$	-1.1	—	-2.0	V
	RN2102				-1.2	—	-2.4	
	RN2103				-1.3	—	-3.0	
	RN2104				-1.5	—	-5.0	
	RN2105				-0.6	—	-1.1	
	RN2106				-0.7	—	-1.3	
Input voltage (OFF)	RN2101~2104	$V_I(OFF)$	—	$V_{CE} = -5\text{ V}, I_C = -0.1\text{ mA}$	-1.0	—	-1.5	V
	RN2105, 2106				-0.5	—	-0.8	
Transition frequency	RN2101~2106	$f_T$	—	$V_{CE} = -10\text{ V}, I_C = -5\text{ mA}$	—	200	—	MHz
Collector Output capacitance	RN2101~2106	$C_{ob}$	—	$V_{CB} = -10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	3	6	pF
Input resistor	RN2101	R1	—		3.29	4.7	6.11	kΩ
	RN2102				7	10	13	
	RN2103				15.4	22	28.6	
	RN2104				32.9	47	61.1	
	RN2105				1.54	2.2	2.86	
	RN2106				3.29	4.7	6.11	
Resistor ratio	RN2101~2104	R1/R2	—		0.9	1.0	1.1	
	RN2105				0.0421	0.0468	0.0515	
	RN2106				0.09	0.1	0.11	









Type Name	Marking
RN2001	
RN2102	
RN2103	
RN2104	
RN2105	
RN2106	

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20070701-EN GENERAL

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