

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

## RN1107CT, RN1108CT, RN1109CT

Switching Applications

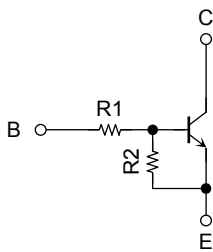
Inverter Circuit Applications

Interface Circuit Applications

Driver Circuit Applications

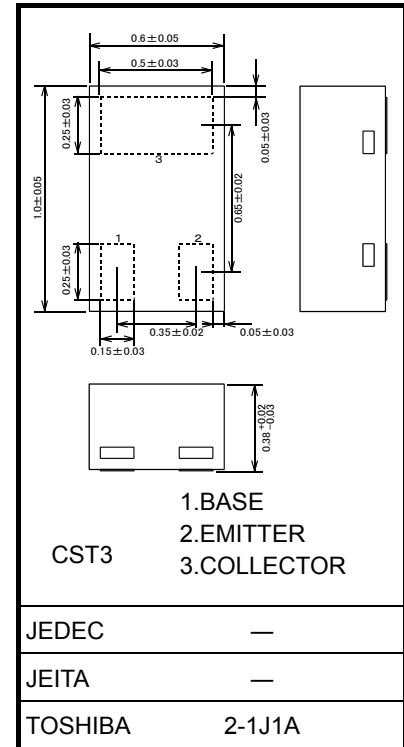
- Incorporating a bias resistor into a transistor reduces the number of parts, which enable the manufacture of ever more compact equipment and saves assembly cost.
- Complementary to RN2107CT to RN2109CT

### Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1107CT	10	47
RN1108CT	22	47
RN1109CT	47	22

Unit: mm



Weight: 0.75 mg (typ.)

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

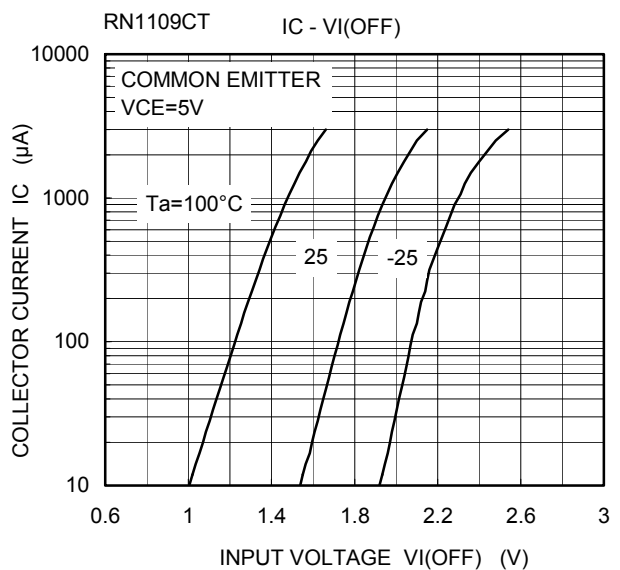
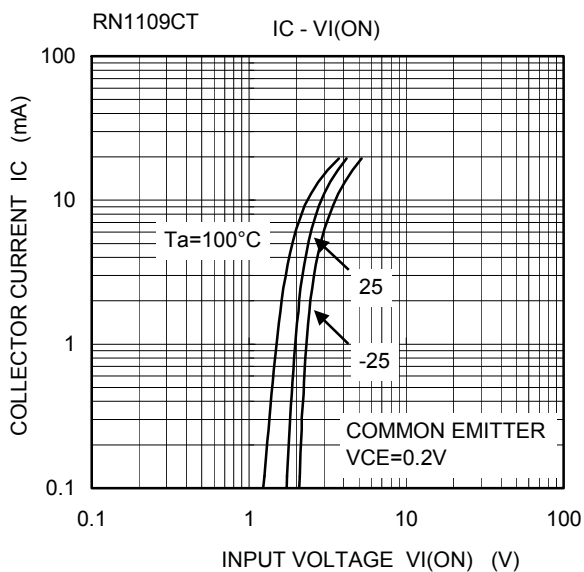
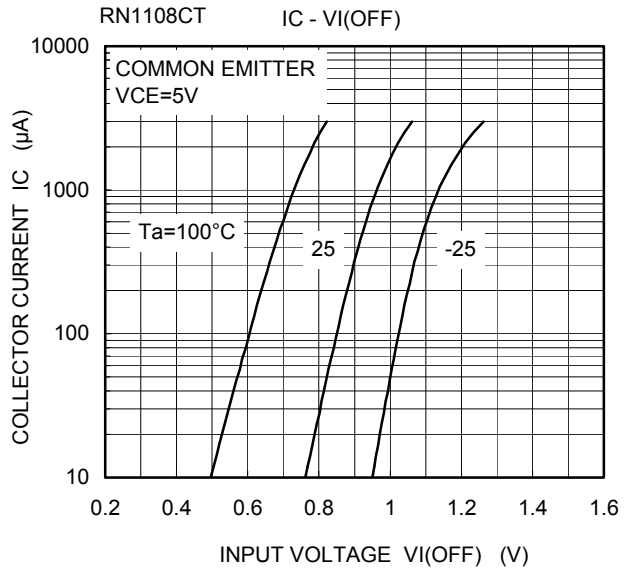
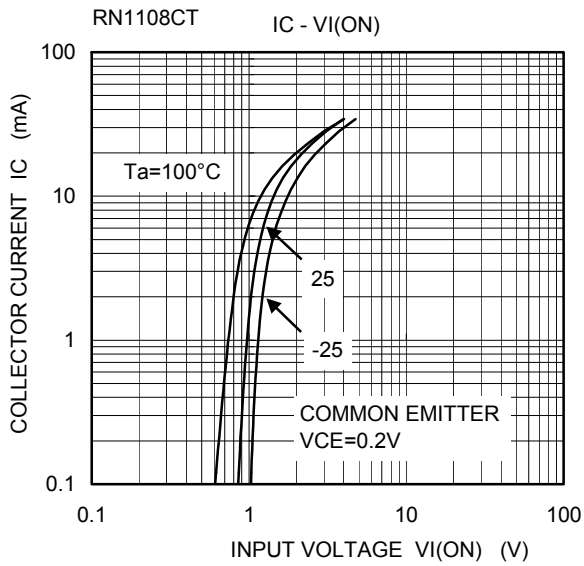
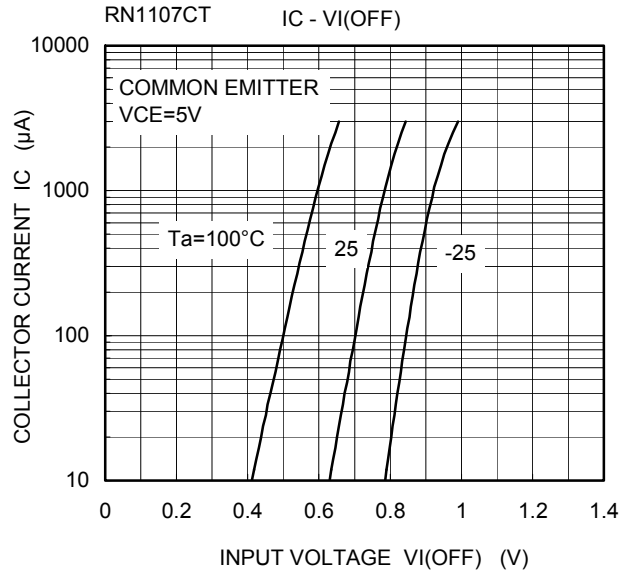
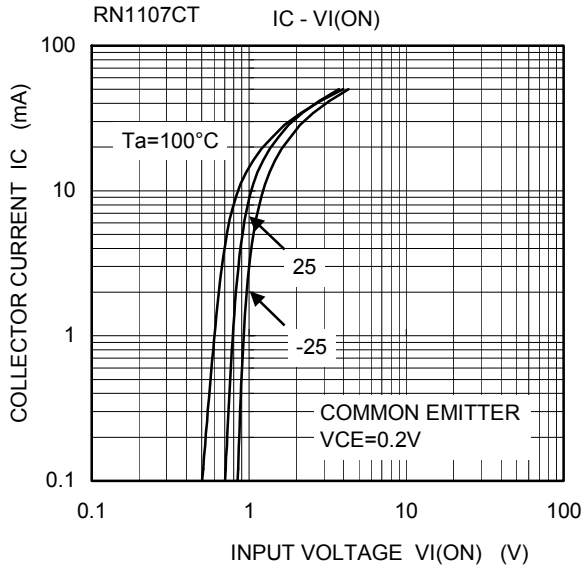
Characteristics		Symbol	Rating	Unit
Collector-base voltage	RN1107CT to RN1109CT	V <sub>CBO</sub>	20	V
Collector-emitter voltage		V <sub>CEO</sub>	20	V
Emitter-base voltage	RN1107CT	V <sub>EBO</sub>	6	V
	RN1108CT		7	
	RN1109CT		15	
Collector current	RN1107CT to RN1109CT	I <sub>C</sub>	50	mA
Collector power dissipation		P <sub>C</sub>	50	mW
Junction temperature		T <sub>J</sub>	150	°C
Storage temperature range		T <sub>stg</sub>	-55 to 150	°C

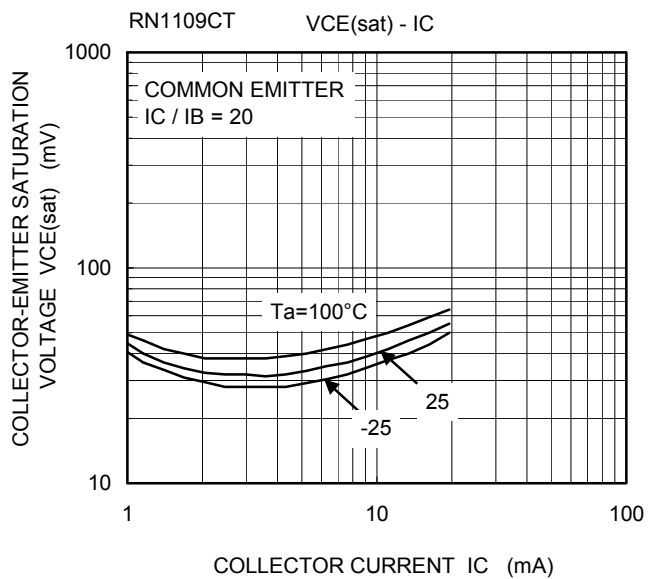
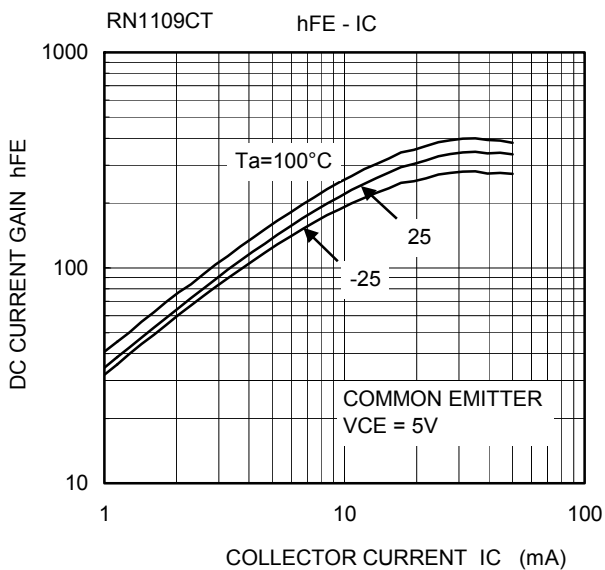
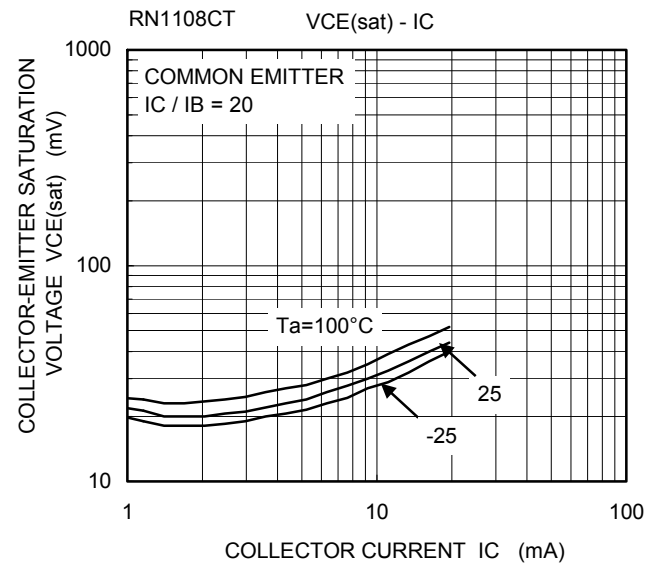
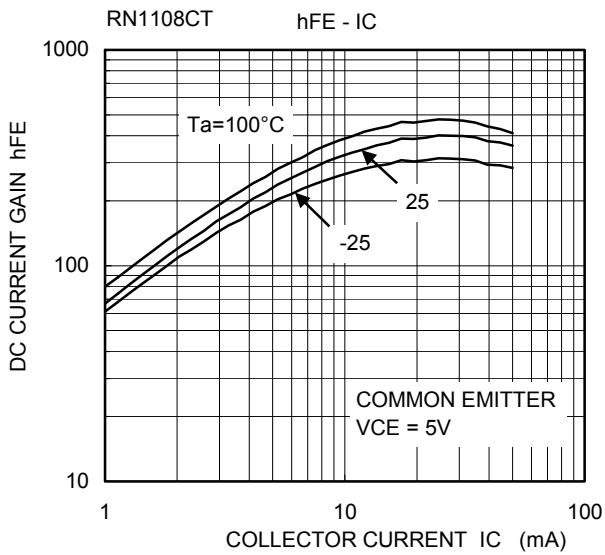
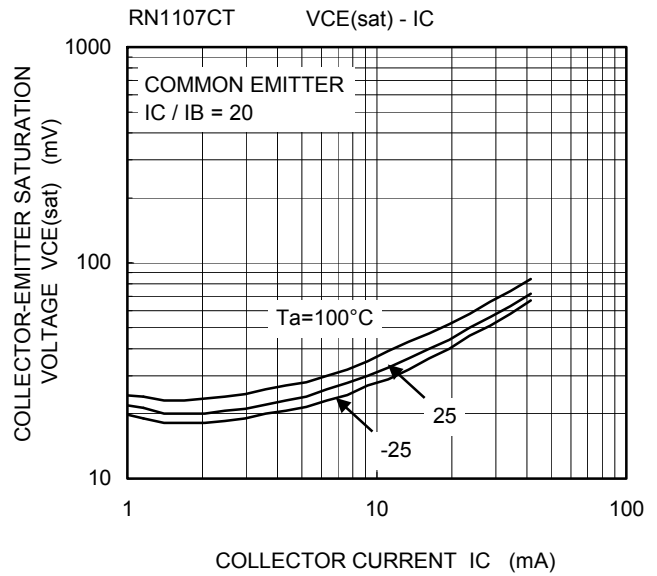
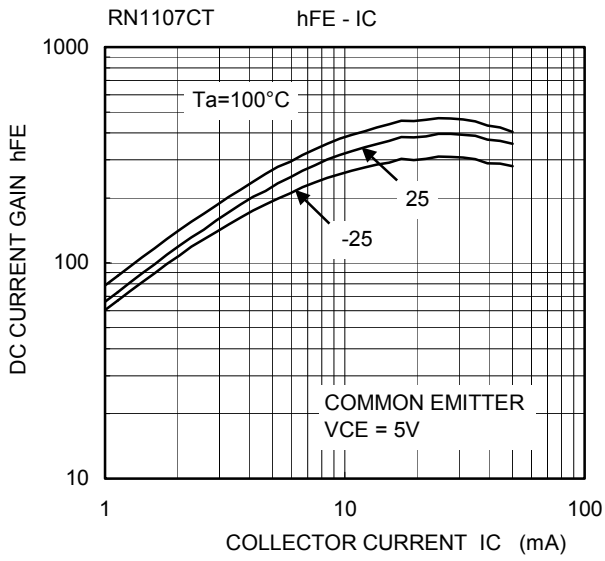
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e.operatingtemperature/current/voltage, etc.) are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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1107CT to 1109CT	$I_{CBO}$	$V_{CB} = 20\text{ V}, I_E = 0$	—	—	100	nA
		$I_{CEO}$	$V_{CE} = 20\text{ V}, I_B = 0$	—	—	500	
Emitter cut-off current	RN1107CT	$I_{EBO}$	$V_{EB} = 6\text{ V}, I_C = 0$	0.088	—	0.131	mA
	RN1108CT		$V_{EB} = 7\text{ V}, I_C = 0$	0.085	—	0.126	
	RN1109CT		$V_{EB} = 15\text{ V}, I_C = 0$	0.182	—	0.271	
DC current gain	RN1107CT	$h_{FE}$	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$	120	—	—	
	RN1108CT			120	—	—	
	RN1109CT			100	—	—	
Collector-emitter saturation voltage	RN1107CT to 1109CT	$V_{CE(sat)}$	$I_C = 5\text{ mA}, I_B = 0.25\text{ mA}$	—	—	0.15	V
Input voltage (ON)	RN1107CT	$V_{I(ON)}$	$V_{CE} = 0.2\text{ V}, I_C = 5\text{ mA}$	0.7	—	1.5	V
	RN1108CT			0.8	—	2.2	
	RN1109CT			1.6	—	5.0	
Input voltage (OFF)	RN1107CT	$V_{I(OFF)}$	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ mA}$	0.5	—	1.0	V
	RN1108CT			0.6	—	1.1	
	RN1109CT			1.3	—	2.6	
Collector output capacitance	RN1107CT to 1109CT	$C_{ob}$	$V_{CB} = 10\text{ V}, I_E = 0,$ $f = 1\text{ MHz}$	—	1.2	—	pF
Input resistor	RN1107CT	R1	—	8	10	12	k $\Omega$
	RN1108CT			17.6	22	26.4	
	RN1109CT			37.6	47	56.4	
Resistor ratio	RN1107CT	R1/R2	—	0.17	0.213	0.255	
	RN1108CT			0.374	0.468	0.562	
	RN1109CT			1.71	2.14	2.56	





Type Name	Marking
RN1107CT	
RN1108CT	
RN1109CT	

**Handling Precaution**

When handling individual devices (which are not yet mounted on a circuit board), be sure that the environment is protected against electrostatic electricity. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static materials.

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