

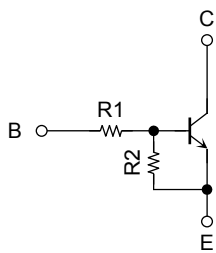
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

## RN1961CT, RN1962CT, RN1963CT RN1964CT, RN1965CT, RN1966CT

Switching Applications  
Inverter Circuit Applications  
Interface Circuit Applications  
Driver Circuit Applications

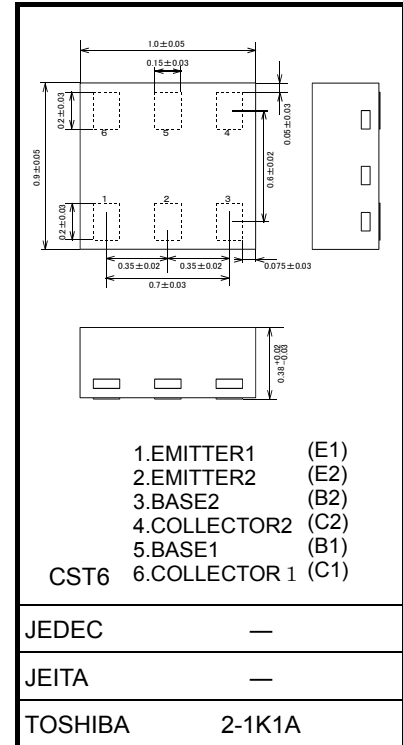
- Two devices are incorporated into a fine pitch Small Mold (6 pin) package.
- Incorporating a bias resistor into a transistor reduces parts count. Reducing the parts count enable the manufacture of ever more compact equipment and save assembly cost.
- Complementary to RN2961CT to RN2966CT

### Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1961CT	4.7	4.7
RN1962CT	10	10
RN1963CT	22	22
RN1964CT	47	47
RN1965CT	2.2	47
RN1966CT	4.7	47

Unit: mm

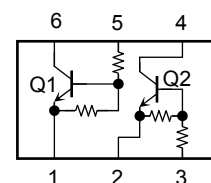


Weight: 1 mg (typ.)

### Absolute Maximum Ratings (Ta = 25°C) (Q1, Q2 common)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	RN1961CT to 1966CT	V <sub>CB0</sub>	20 V
Collector-emitter voltage		V <sub>CEO</sub>	20 V
Emitter-base voltage	RN1961CT to 1964CT	V <sub>EBO</sub>	10 V
	RN1965CT, 1966CT		5 V
Collector current	RN1961CT to RN1966CT	I <sub>C</sub>	50 mA
Collector power dissipation		P <sub>C</sub> (Note1)	50 mW
Junction temperature		T <sub>j</sub>	150 °C
Storage temperature range		T <sub>stg</sub>	-55 to 150 °C

### Equivalent Circuit (top view)



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.

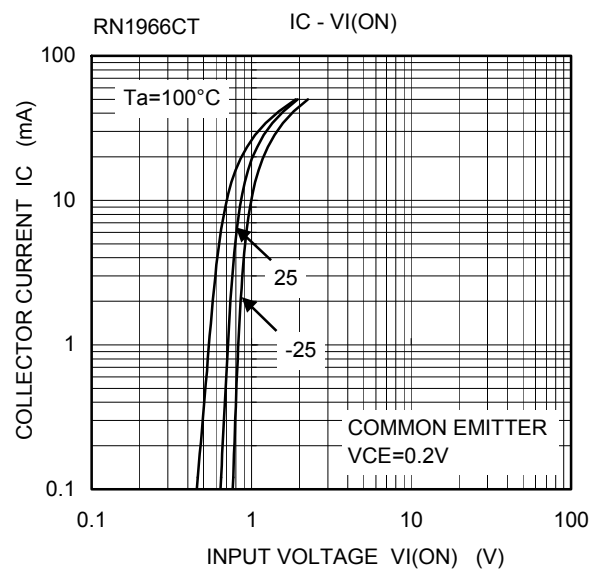
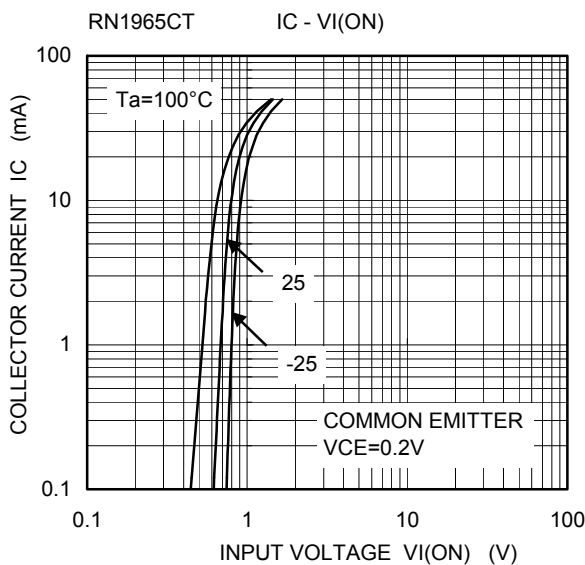
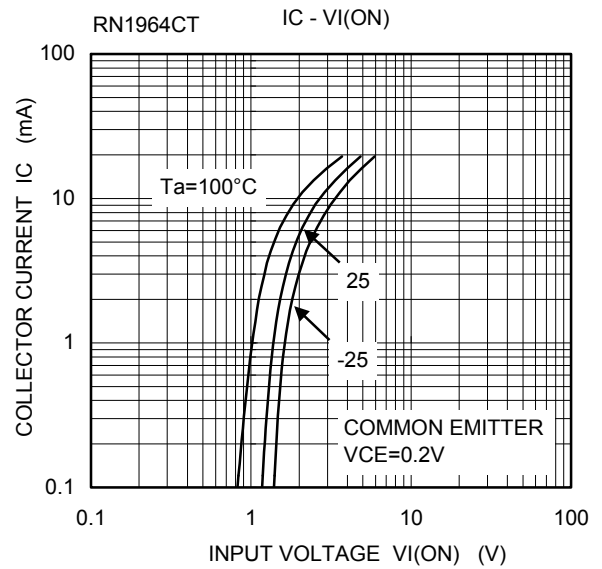
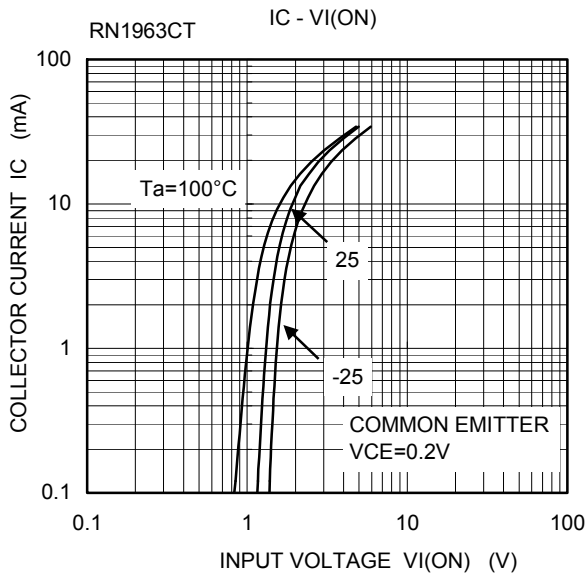
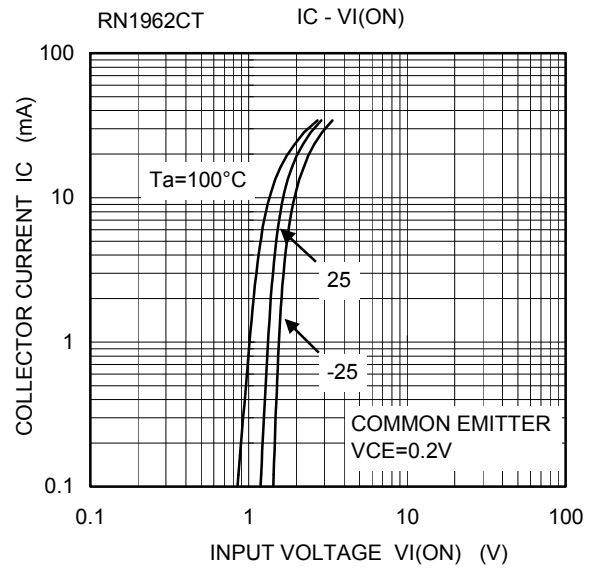
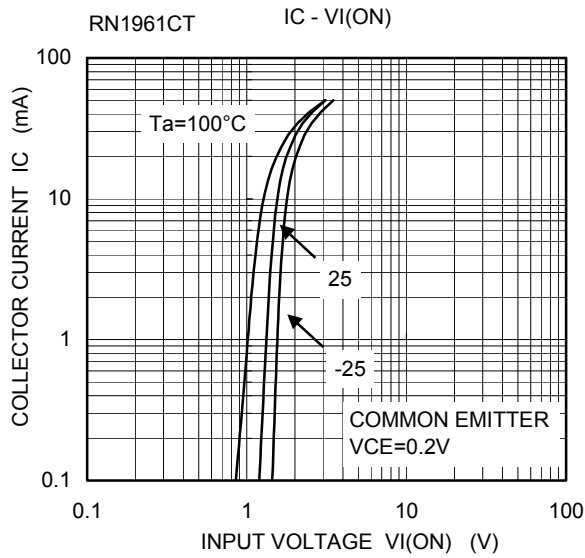
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note1: Total rating

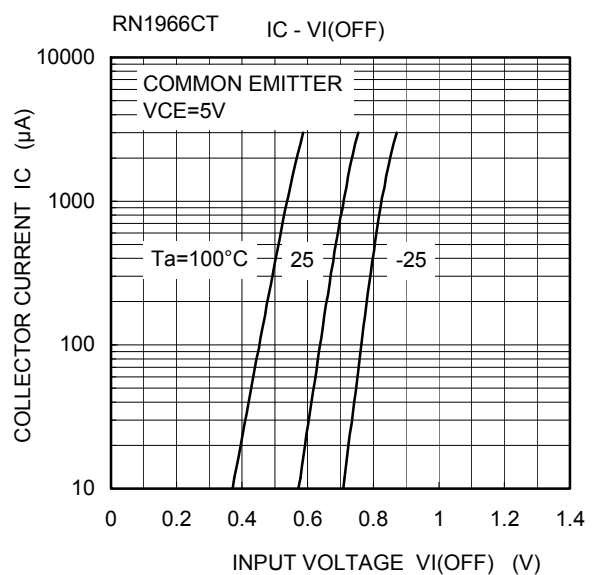
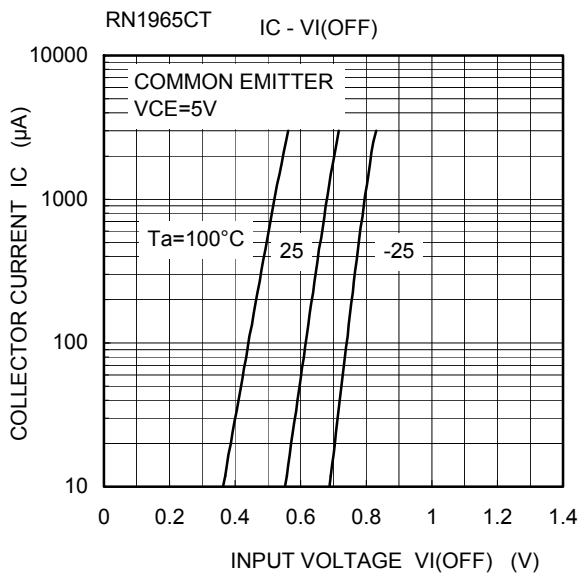
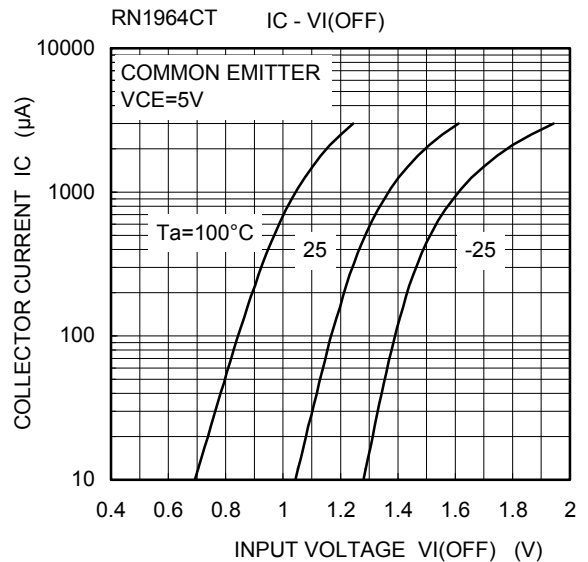
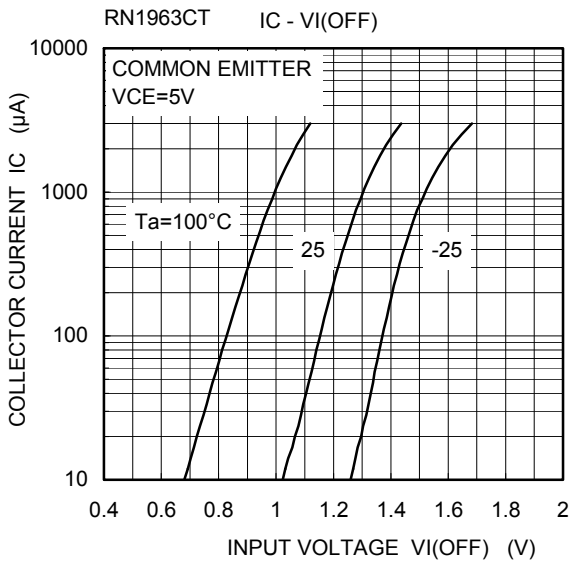
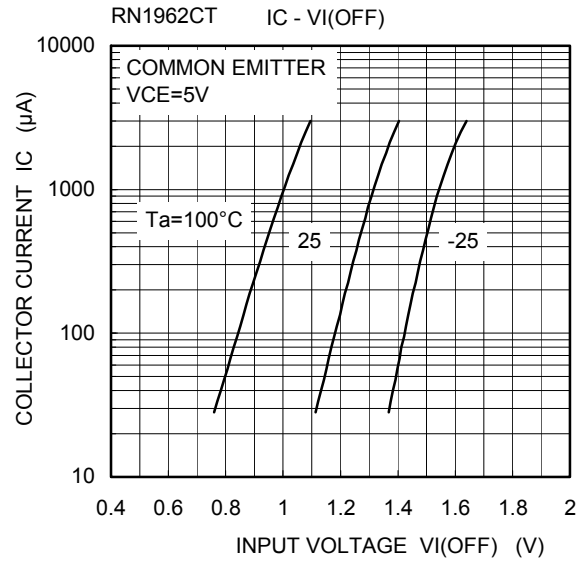
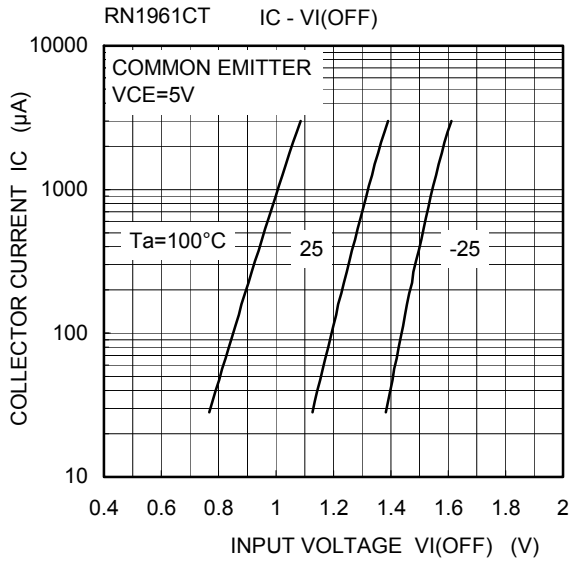
## Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1961CT to 1966CT	$I_{CBO}$	$V_{CB} = 20\text{ V}, I_E = 0$	—	—	100	nA
		$I_{CEO}$	$V_{CE} = 20\text{ V}, I_B = 0$	—	—	500	
Emitter cut-off current	RN1961CT	$I_{EBO}$	$V_{EB} = 10\text{ V}, I_C = 0$	0.89	—	1.33	mA
	RN1962CT			0.41	—	0.63	
	RN1963CT			0.18	—	0.29	
	RN1964CT			0.088	—	0.133	
	RN1965CT	$V_{EB} = 5\text{ V}, I_C = 0$	0.085	—	0.127		
	RN1966CT		0.08	—	0.121		
DC current gain	RN1961CT	$h_{FE}$	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$	30	—	—	
	RN1962CT			60	—	—	
	RN1963CT			100	—	—	
	RN1964CT			120	—	—	
	RN1965CT			120	—	—	
	RN1966CT			120	—	—	
Collector-emitter saturation voltage	RN1961CT to 1966CT	$V_{CE(sat)}$	$I_C = 5\text{ mA}, I_B = 0.25\text{ mA}$	—	—	0.15	V
Input voltage (ON)	RN1961CT	$V_{I(ON)}$	$V_{CE} = 0.2\text{ V}, I_C = 5\text{ mA}$	1.0	—	2.0	V
	RN1962CT			1.0	—	2.2	
	RN1963CT			1.1	—	2.7	
	RN1964CT			1.2	—	3.6	
	RN1965CT			0.6	—	1.1	
	RN1966CT			0.6	—	1.2	
Input voltage (OFF)	RN1961CT to 1964CT	$V_{I(OFF)}$	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ mA}$	0.8	—	1.5	V
	RN1965CT, 1966CT			0.4	—	0.8	
Collector output capacitance	RN1961CT to 1966CT	$C_{ob}$	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	1.2	—	pF
Input resistor	RN1961CT	$R_1$	—	3.76	4.7	5.64	k $\Omega$
	RN1962CT			8	10	12	
	RN1963CT			17.6	22	26.4	
	RN1964CT			37.6	47	56.4	
	RN1965CT			1.76	2.2	2.64	
	RN1966CT			3.76	4.7	5.64	
Resistor ratio	RN1961CT to 1964CT	$R_1/R_2$	—	0.8	1.0	1.2	
	RN1965CT			0.0376	0.0468	0.0562	
	RN1966CT			0.08	0.1	0.12	

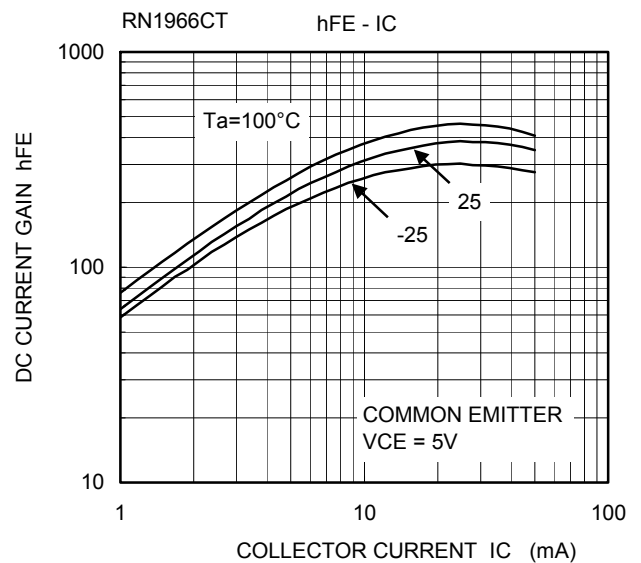
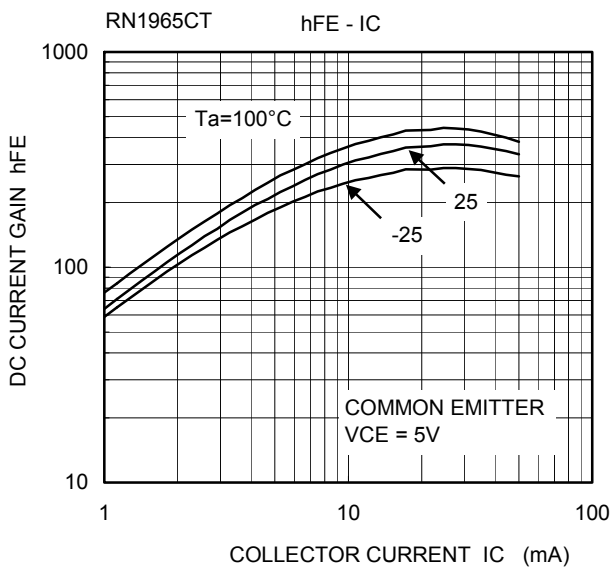
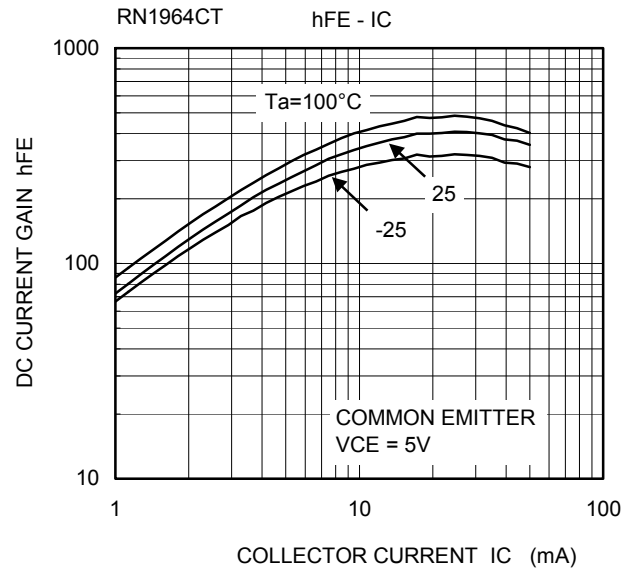
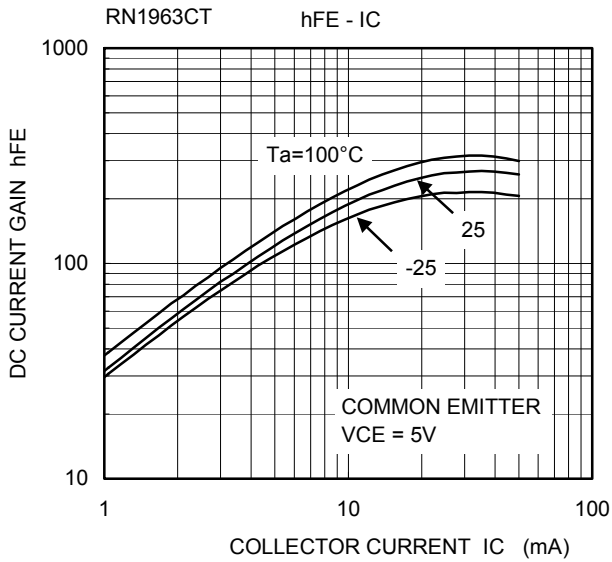
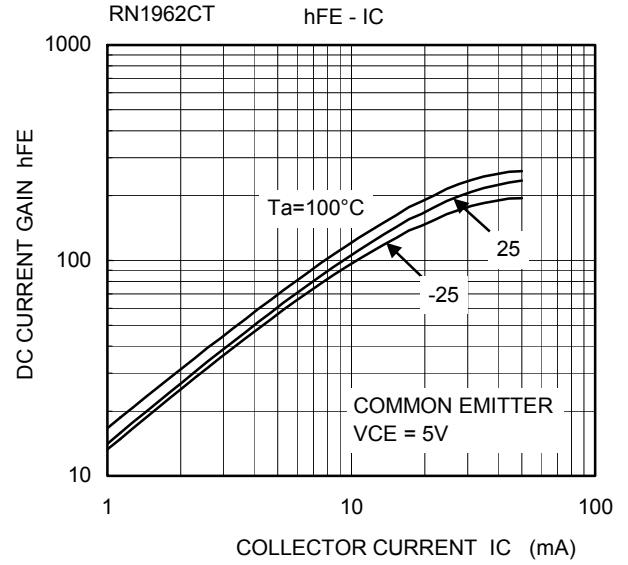
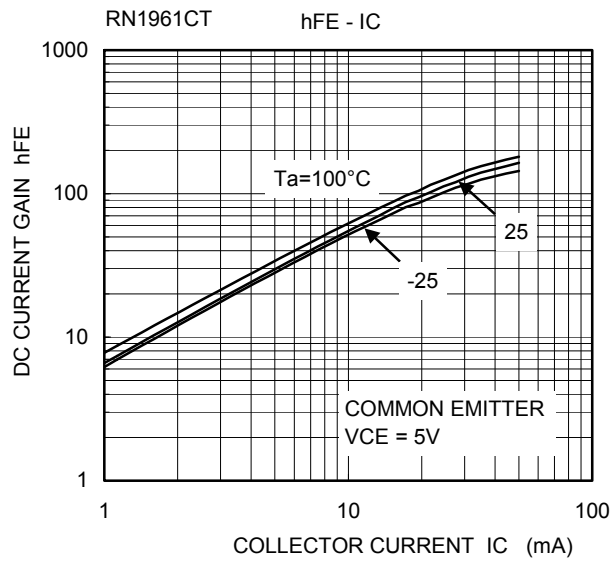
(Q1,Q2 common)



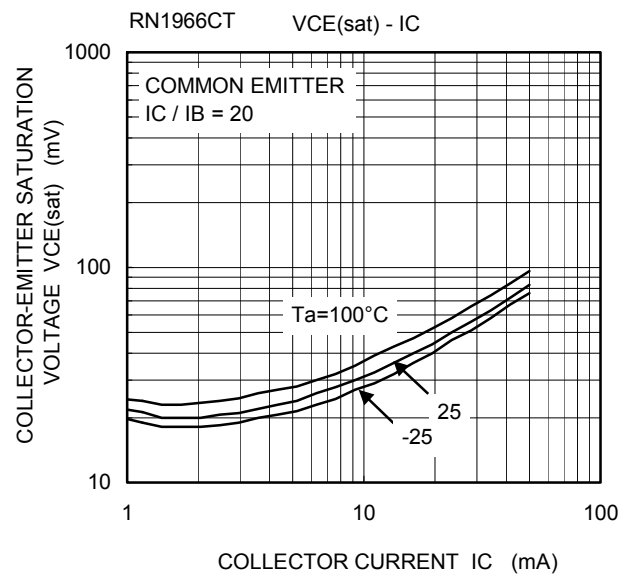
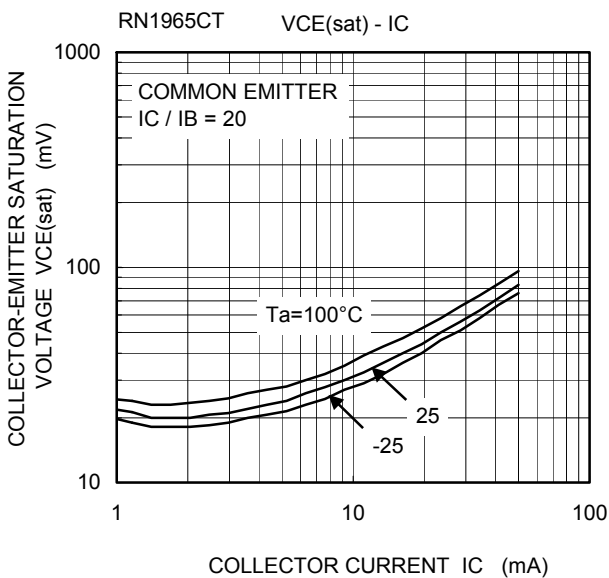
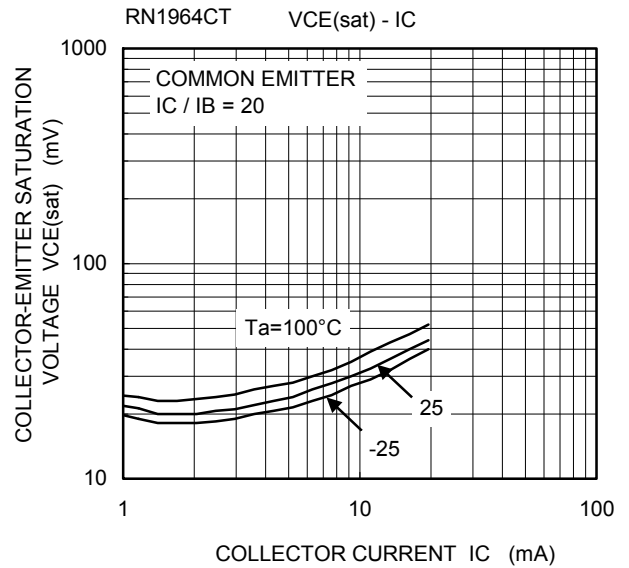
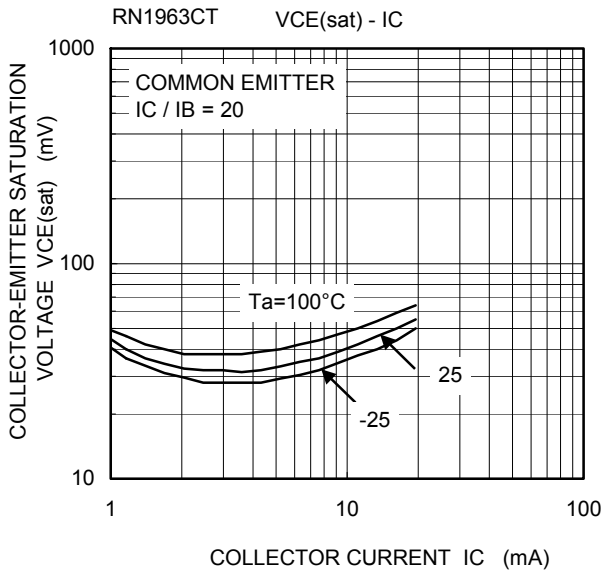
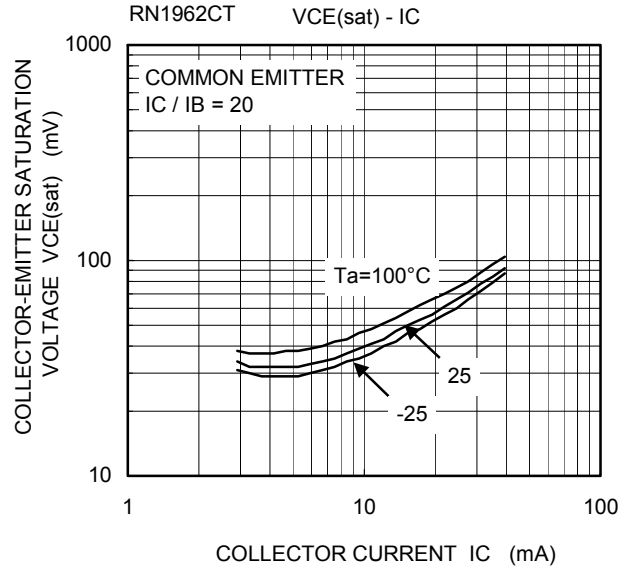
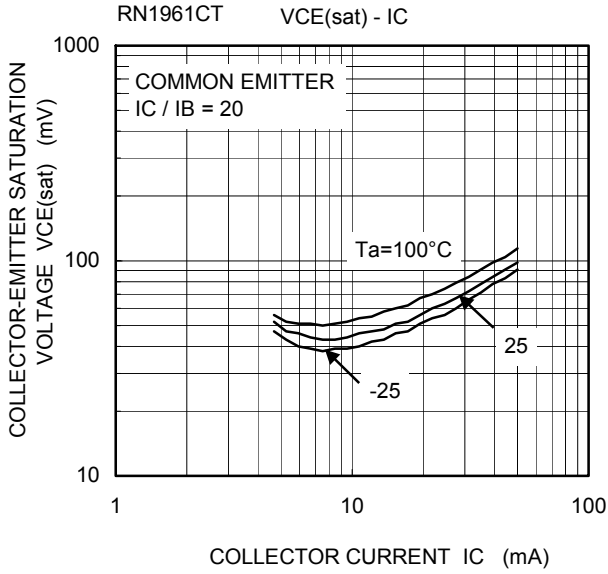
(Q1,Q2 common)

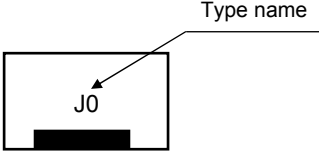
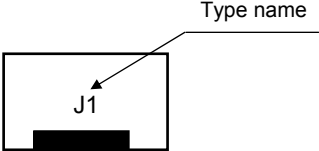
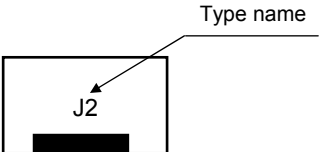
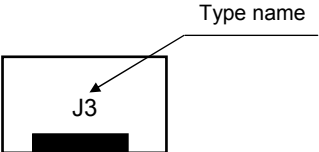
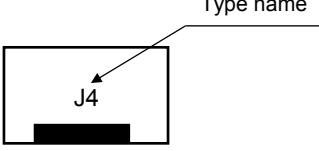
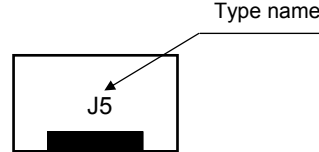


(Q1,Q2 common)



(Q1,Q2 common)



Type Name	Marking
RN1961CT	
RN1962CT	
RN1963CT	
RN1964CT	
RN1965CT	
RN1966CT	

## 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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