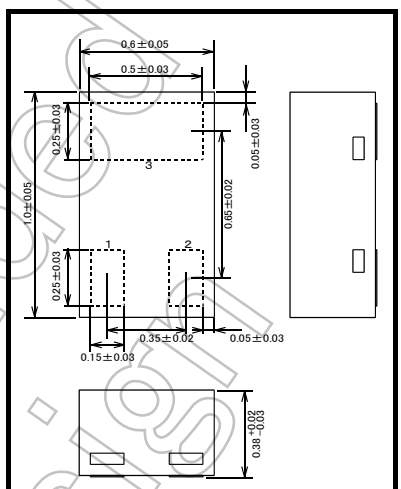
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

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

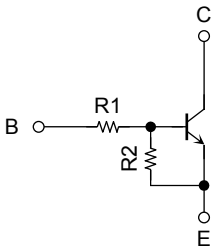
Unit: mm



CST3	1.BASE 2.EMITTER 3.COLLECTOR
JEDEC	—
JEITA	—
TOSHIBA	2-1J1A

Weight: 0.75 mg (typ.)

Equivalent Circuit and Bias Resistor Values



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

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Collector-base voltage	RN1107CT to RN1109CT	V_{CBO}	20	V
Collector-emitter voltage		V_{CEO}	20	V
Emitter-base voltage	RN1107CT	V_{EBO}	6	V
	RN1108CT		7	
	RN1109CT		15	
Collector current	RN1107CT to RN1109CT	I_C	50	mA
Collector power dissipation		P_C	50	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

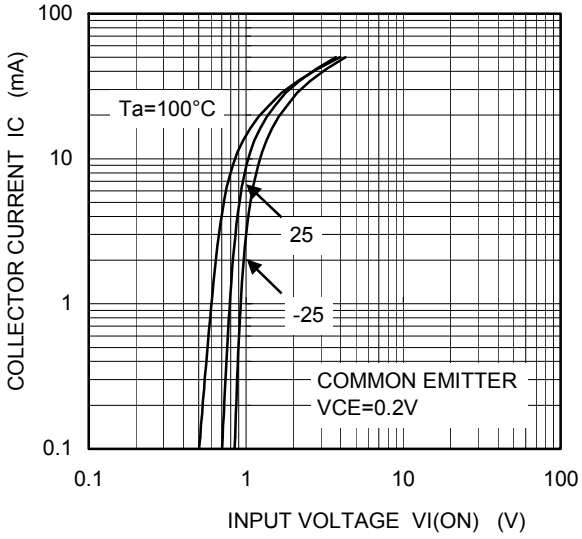
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e.operatingtemperature/current/voltage, etc.) are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

Start of commercial production
2004-10

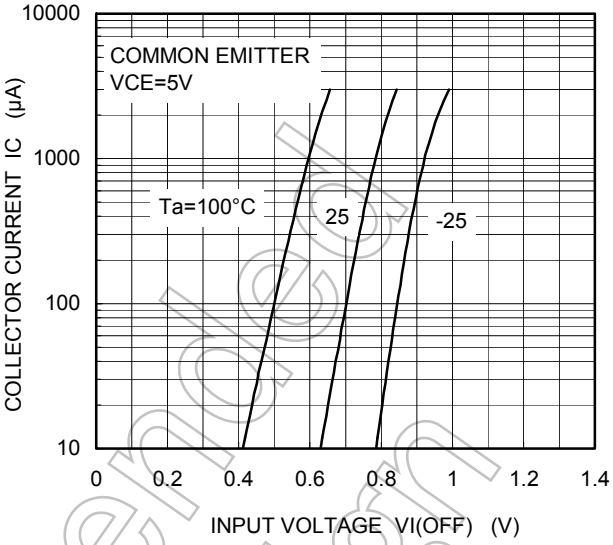
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1107CT to 1109CT	I_{CBO}	V_{CB} = 20 V, I_E = 0	—	—	100	nA
		I_{CEO}	V_{CE} = 20 V, I_B = 0	—	—	500	
Emitter cut-off current	RN1107CT	I_{EBO}	V_{EB} = 6 V, I_C = 0	0.088	—	0.131	mA
	RN1108CT		V_{EB} = 7 V, I_C = 0	0.085	—	0.126	
	RN1109CT		V_{EB} = 15 V, I_C = 0	0.182	—	0.271	
DC current gain	RN1107CT	h_{FE}	V_{CE} = 5 V, I_C = 10 mA	120	—	—	
	RN1108CT			120	—	—	
	RN1109CT			100	—	—	
Collector-emitter saturation voltage	RN1107CT to 1109CT	$V_{CE\ (sat)}$	I_C = 5 mA, I_B = 0.25 mA	—	—	0.15	V
Input voltage (ON)	RN1107CT	$V_{I\ (ON)}$	V_{CE} = 0.2 V, I_C = 5 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 V, I_C = 0.1 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 V, I_E = 0, f = 1 MHz	—	1.2	—	pF
Input resistor	RN1107CT	R1	—	8	10	12	kΩ
	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	

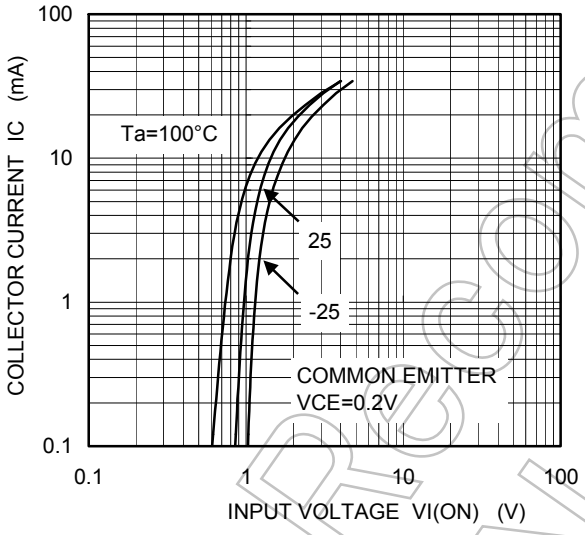
RN1107CT IC - VI(ON)



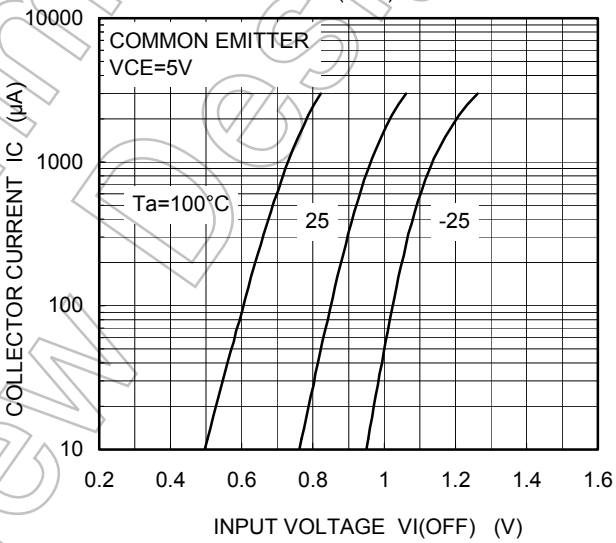
RN1107CT IC - VI(OFF)



RN1108CT IC - VI(ON)



RN1108CT IC - VI(OFF)



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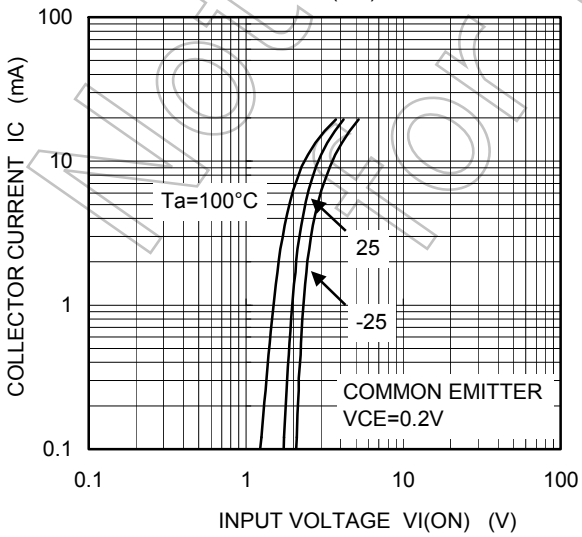
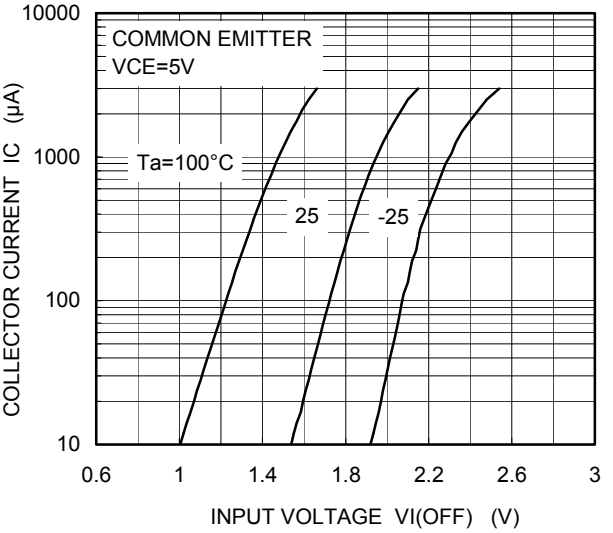
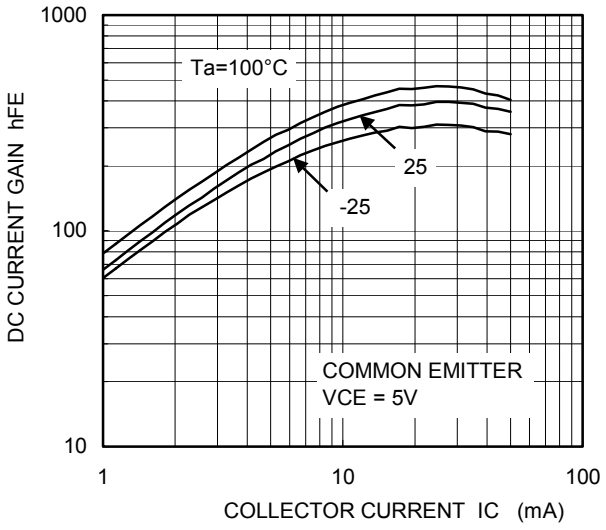


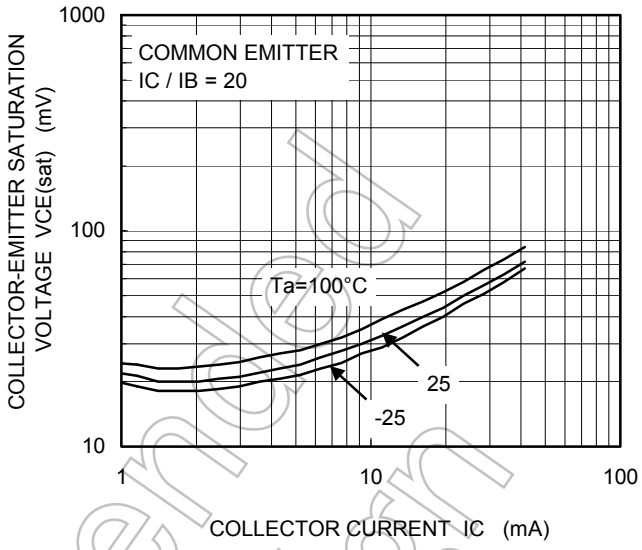
RN1109CT IC - VI(OFF)



RN1107CT hFE - IC



RN1107CT VCE(sat) - IC



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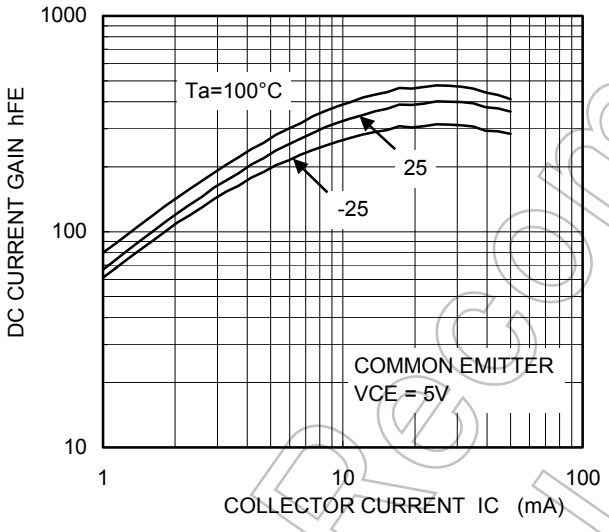

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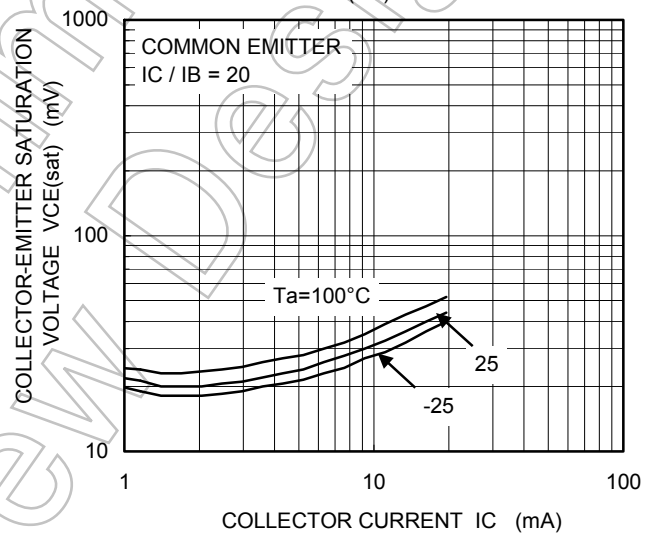

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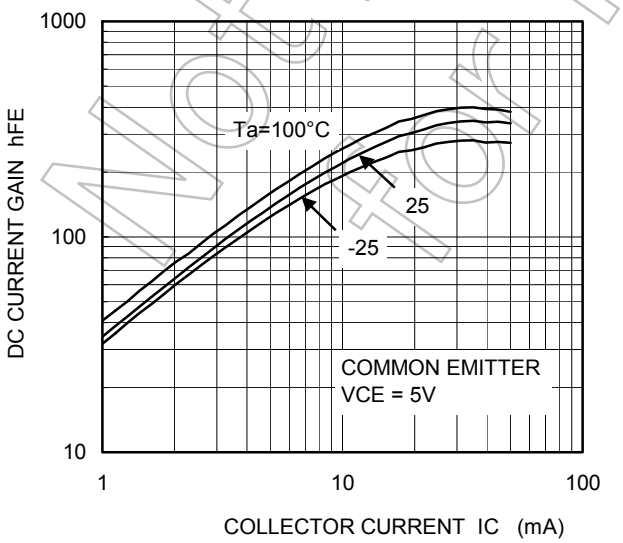
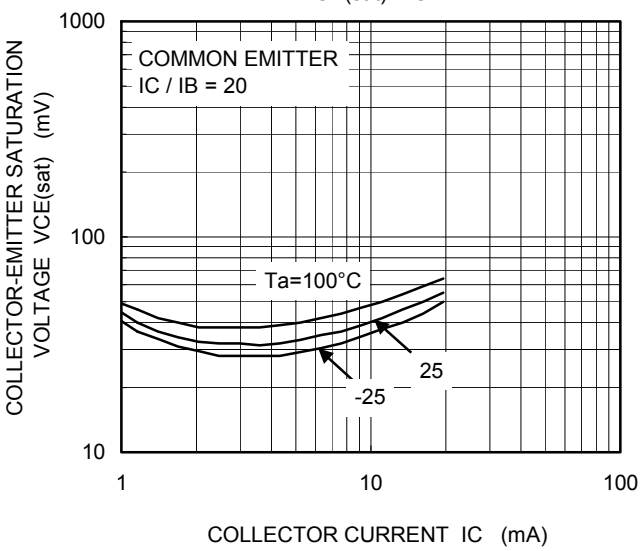
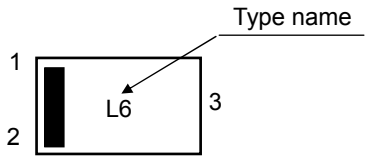
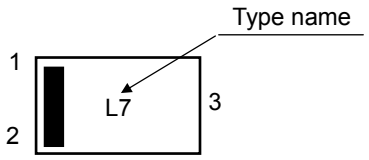
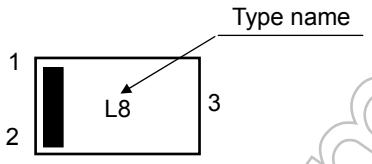


RN1109CT VCE(sat) - IC



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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