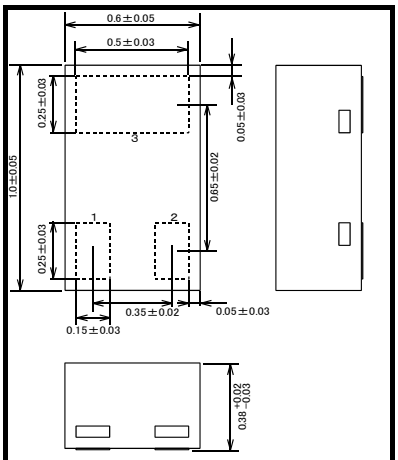
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

RN1101CT,RN1102CT,RN1103CT RN1104CT,RN1105CT,RN1106CT

Switching Applications
Inverter Circuit Applications
Interface Circuit Applications
Driver Circuit Applications

- 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 RN2101CT to RN2106CT

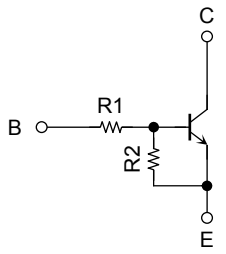
Unit: mm



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)
RN1101CT	4.7	4.7
RN1102CT	10	10
RN1103CT	22	22
RN1104CT	47	47
RN1105CT	2.2	47
RN1106CT	4.7	47

Absolute Maximum Ratings (Ta = 25°C)

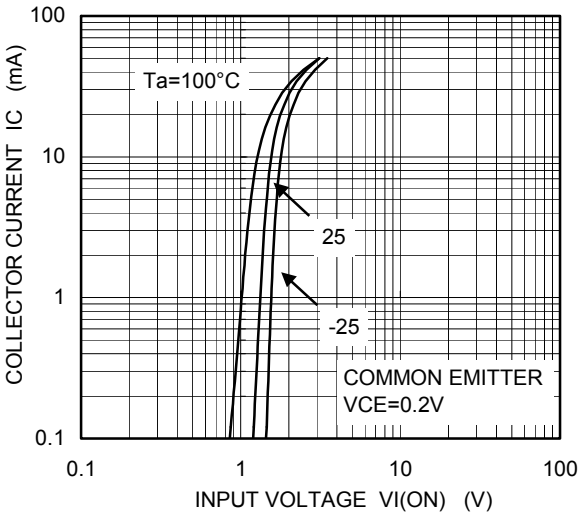
Characteristics		Symbol	Rating	Unit
Collector-base voltage	RN1101CT to 1106CT	V_{CBO}	20	V
Collector-emitter voltage		V_{CEO}	20	V
Emitter-base voltage	RN1101CT to 1104CT	V_{EBO}	10	V
	RN1105CT, 1106CT		5	
Collector current	RN1101CT ro 1106CT	I_C	50	mA
Collector power dissipation		P_C	50	mW
Junction 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).

Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1101CT to 1106CT	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	RN1101CT	I_{EBO}	V_{EB} = 10 V, I_C = 0	0.89	—	1.33	mA
	RN1102CT			0.41	—	0.63	
	RN1103CT			0.18	—	0.29	
	RN1104CT			0.088	—	0.133	
	RN1105CT		V_{EB} = 5 V, I_C = 0	0.085	—	0.127	
	RN1106CT			0.08	—	0.121	
DC current gain	RN1101CT	h_{FE}	V_{CE} = 5 V, I_C = 10 mA	30	—	—	
	RN1102CT			60	—	—	
	RN1103CT			100	—	—	
	RN1104CT			120	—	—	
	RN1105CT			120	—	—	
	RN1106CT			120	—	—	
Collector-emitter saturation voltage	RN1101CT to 1106CT	$V_{CE\ (sat)}$	I_C = 5 mA, I_B = 0.25 mA	—	—	0.15	V
Input voltage (ON)	RN1101CT	$V_{I\ (ON)}$	V_{CE} = 0.2 V, I_C = 5 mA	1.0	—	2.0	V
	RN1102CT			1.0	—	2.2	
	RN1103CT			1.1	—	2.7	
	RN1104CT			1.2	—	3.6	
	RN1105CT			0.6	—	1.1	
	RN1106CT			0.6	—	1.2	
Input voltage (OFF)	RN1101CT to 1104CT	$V_{I\ (OFF)}$	V_{CE} = 5 V, I_C = 0.1 mA	0.8	—	1.5	V
	RN1105CT, 1106CT			0.4	—	0.8	
Collector output capacitance	RN1101CT to 1106CT	C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	1.2	—	pF
Input resistor	RN1101CT	R1	—	3.76	4.7	5.64	kΩ
	RN1102CT			8	10	12	
	RN1103CT			17.6	22	26.4	
	RN1104CT			37.6	47	56.4	
	RN1105CT			1.76	2.2	2.64	
	RN1106CT			3.76	4.7	5.64	
Resistor ratio	RN1101CT to 1104CT	R1/R2	—	0.8	1.0	1.2	
	RN1105CT			0.0376	0.0468	0.0562	
	RN1106CT			0.08	0.1	0.12	

RN1101CT IC - VI(ON)



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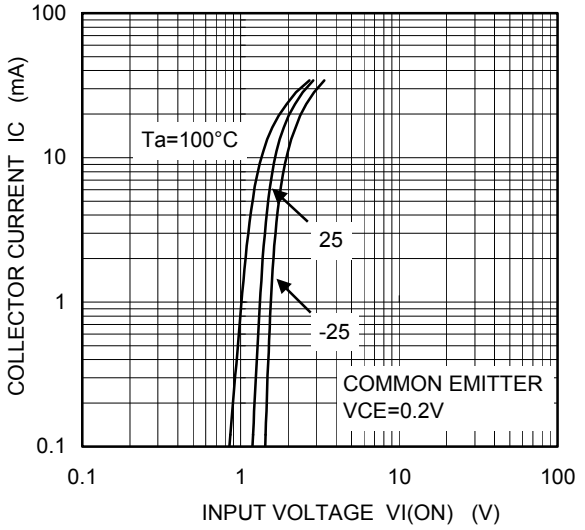

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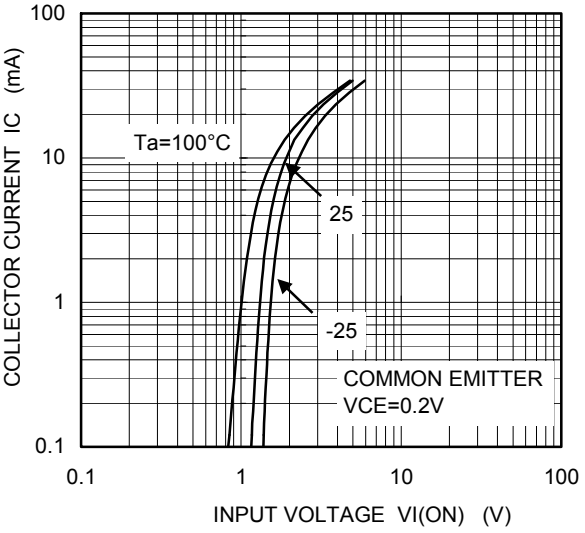

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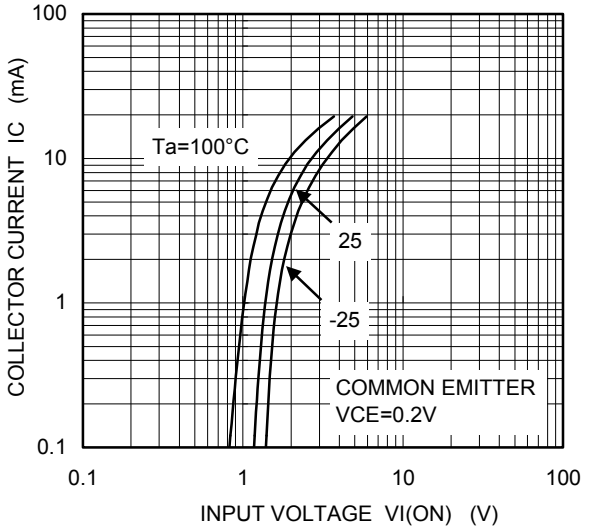

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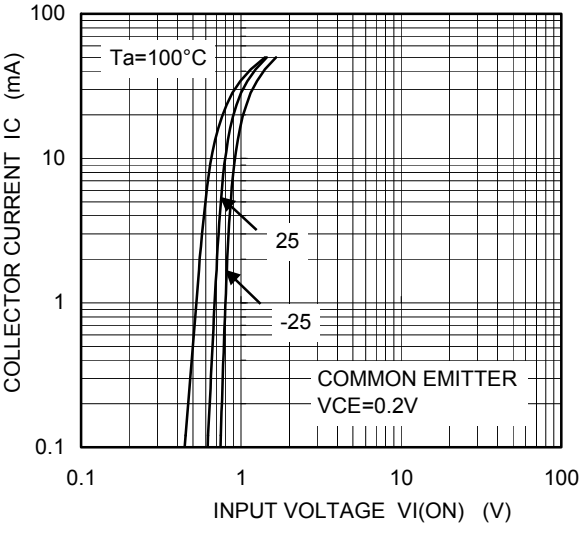

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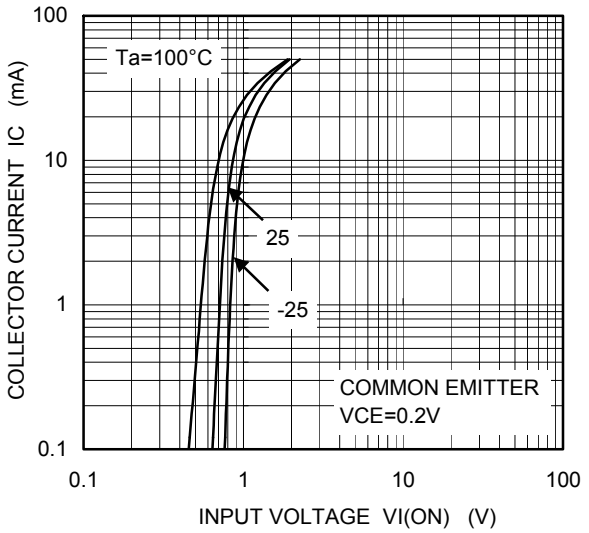

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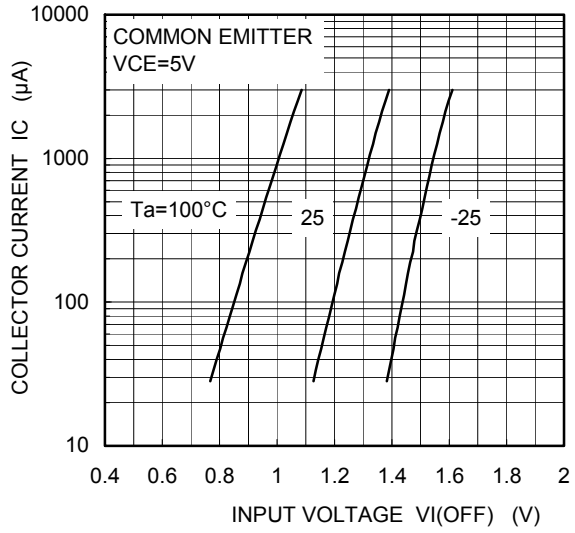

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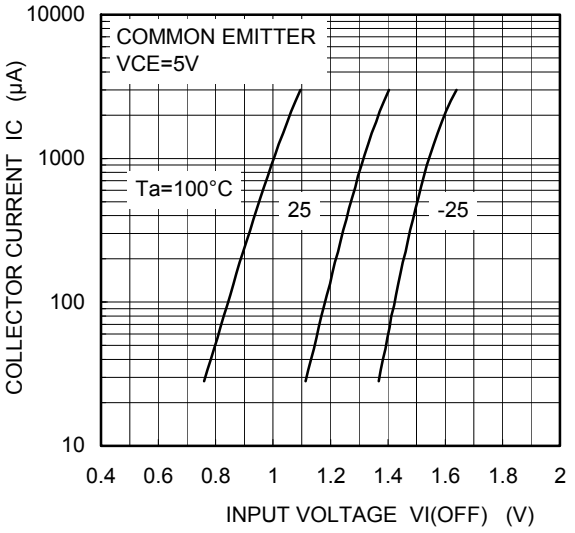

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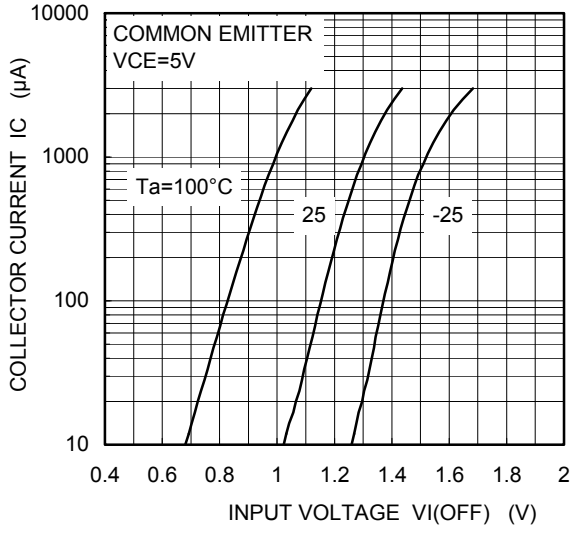

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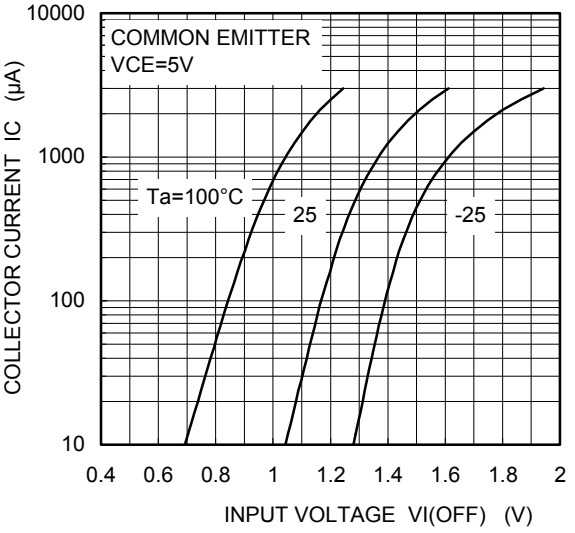

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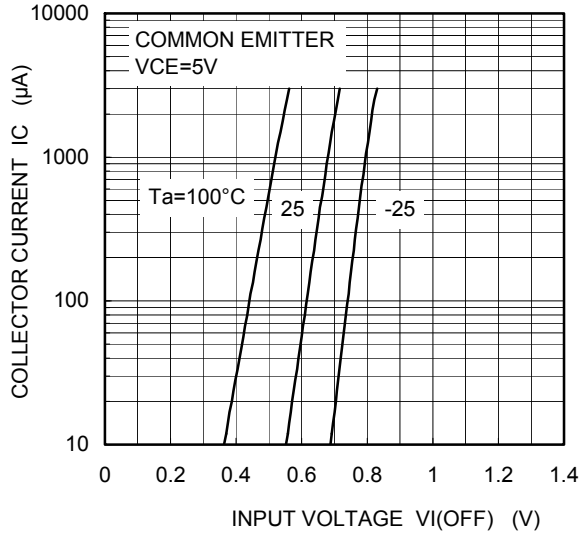

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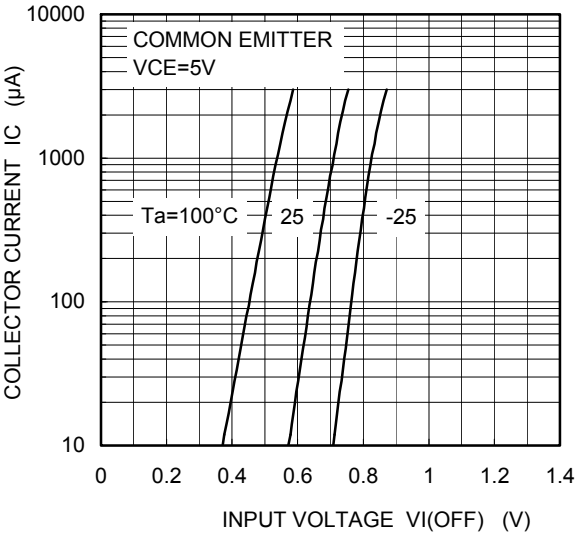
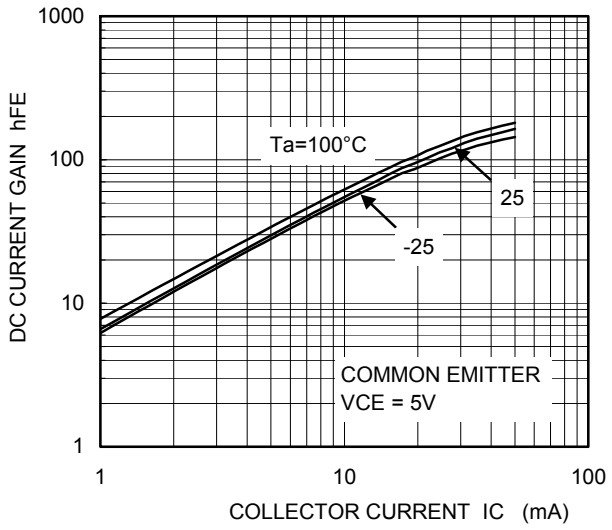


RN1101CT hFE - IC



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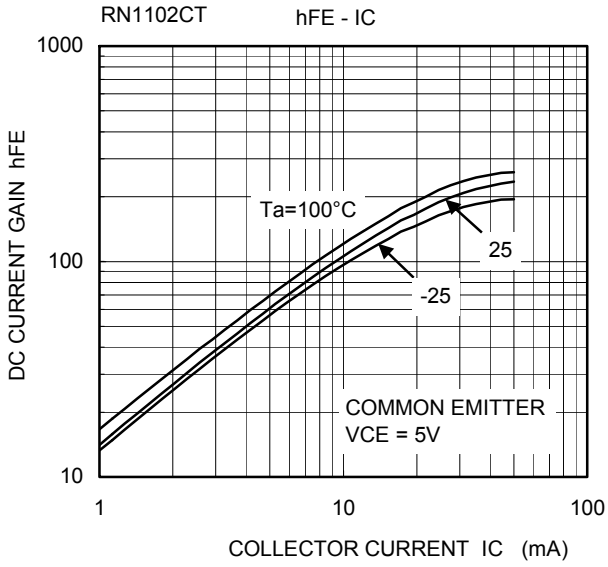

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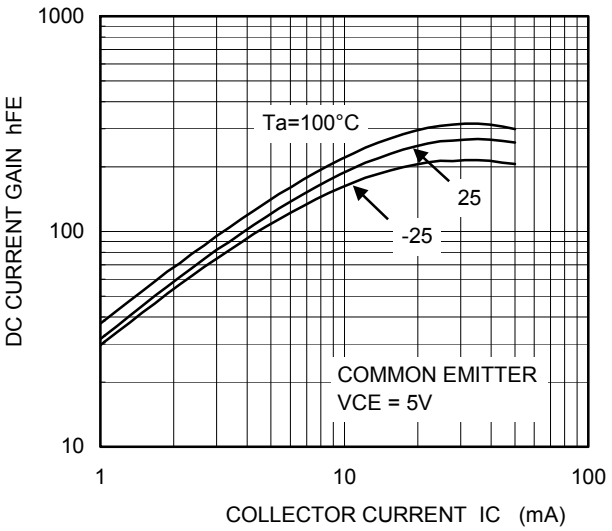

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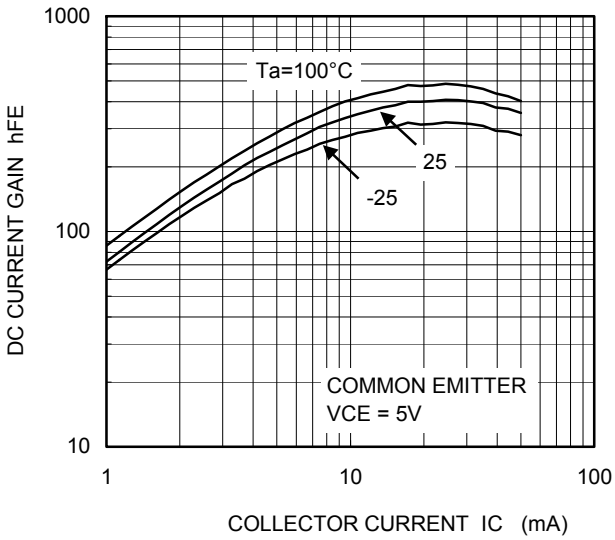

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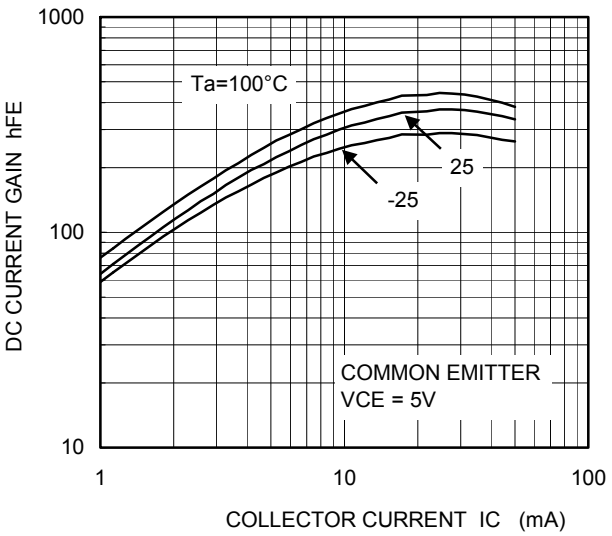

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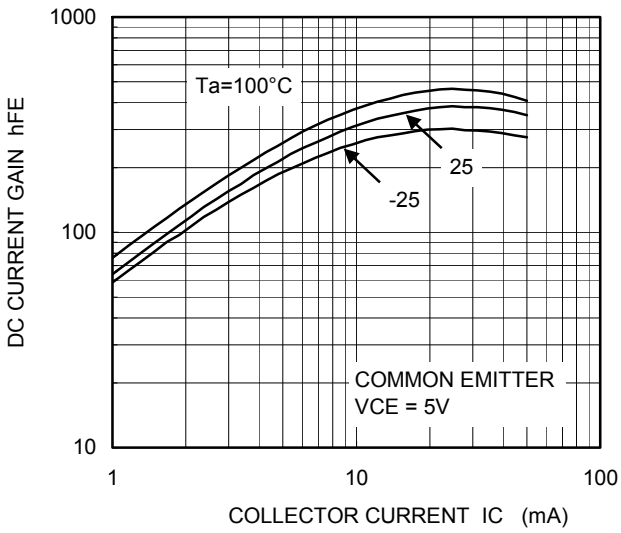

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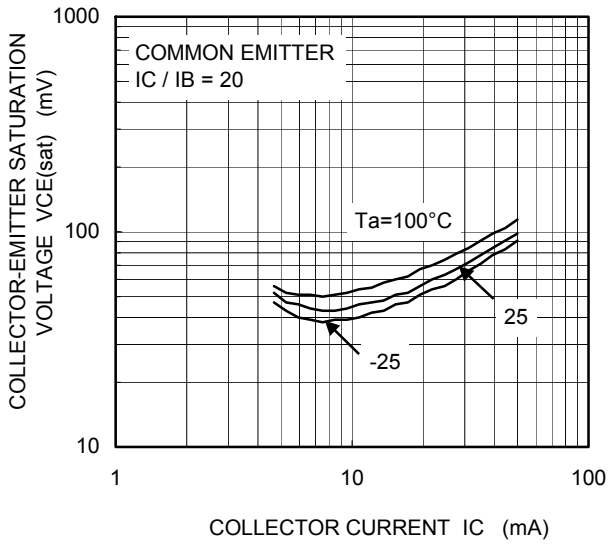

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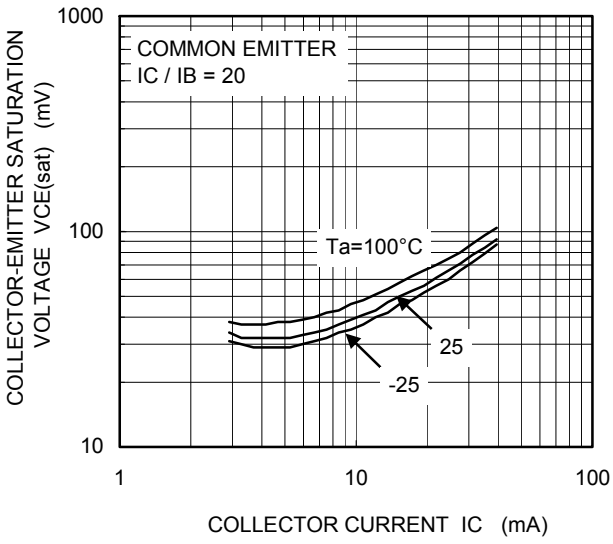

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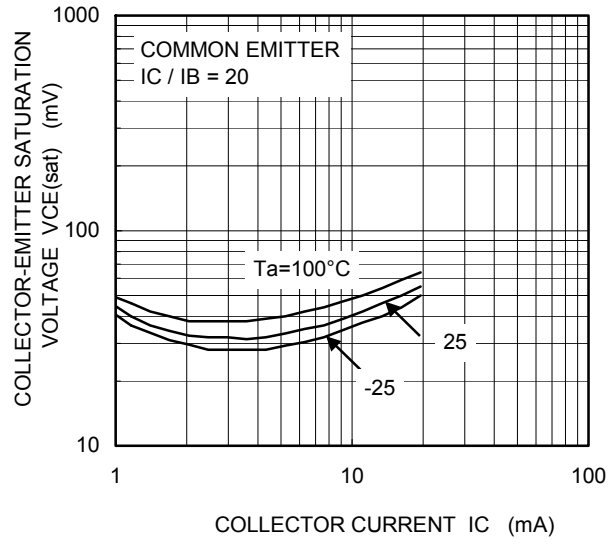

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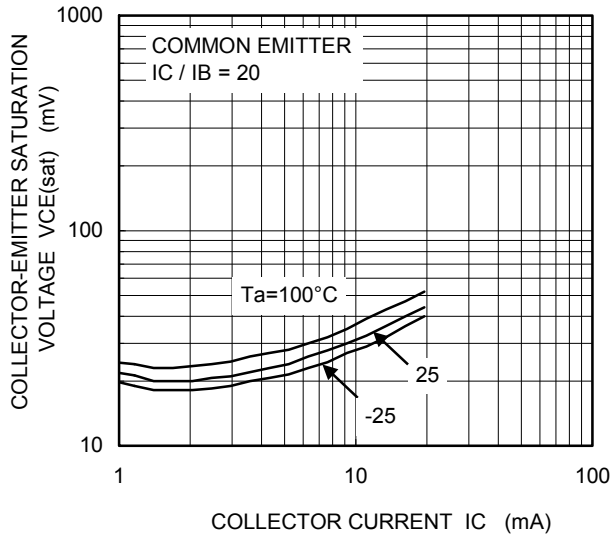

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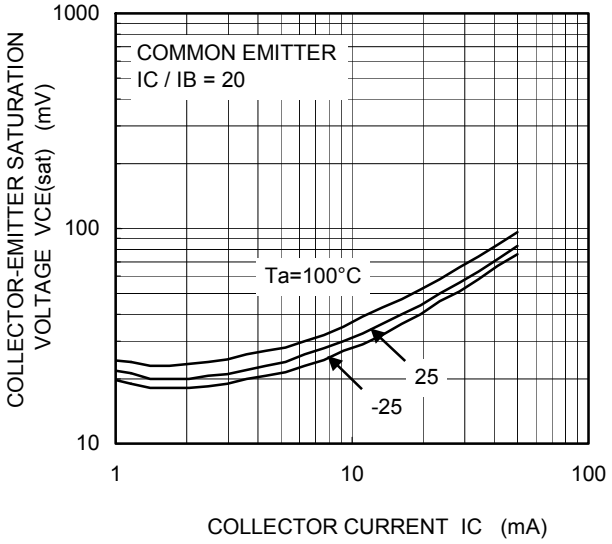

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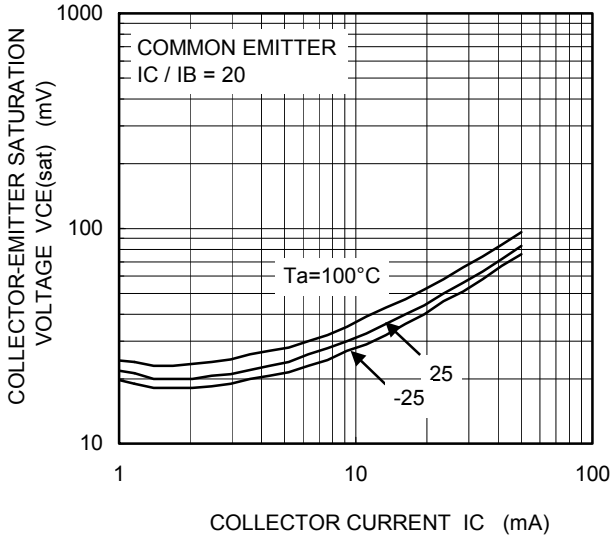

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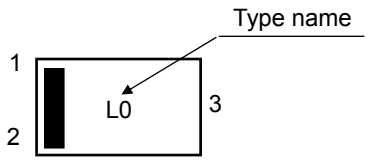
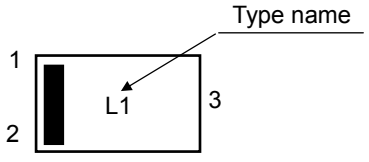
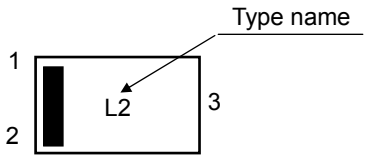
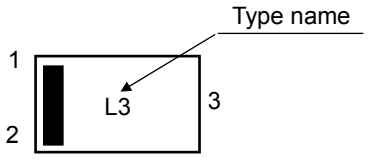
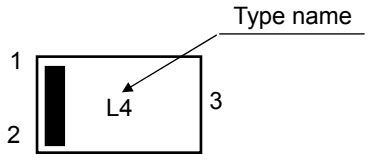
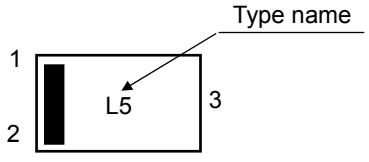
RN1101CT	
RN1102CT	
RN1103CT	
RN1104CT	
RN1105CT	
RN1106CT	

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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