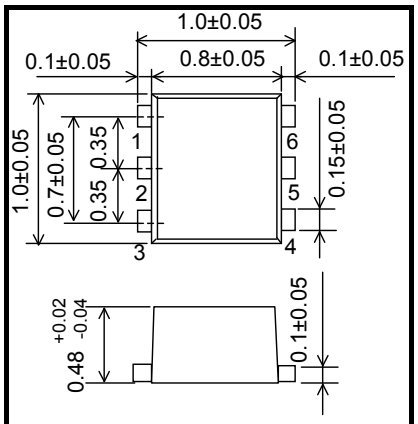
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process) (Transistor with Built-in Bias Resistor)

RN1901AFS, RN1902AFS, RN1903AFS RN1904AFS, RN1905AFS, RN1906AFS

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- Two devices are incorporated into a fine-pitch, Small-Mold (6-pin) package.
- Incorporating a bias resistor into a transistor reduces the parts count. Reducing the parts count enables the manufacture of ever more compact equipment and saves assembly costs.
- Complementary to the RN2901AFS~RN2906AFS

Unit: mm



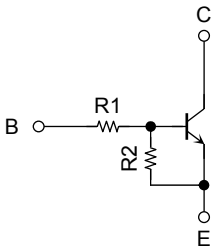
1. EMITTER1 (E1)
2. BASE1 (B1)
3. COLLECTOR2 (C2)
4. EMITTER2 (E2)
5. BASE2 (B2)
6. COLLECTOR1 (C1)

fS6

JEDEC	—
JEITA	—
TOSHIBA	2-1F1D

Weight: 0.001 g (typ.)

Equivalent Circuit and Bias Resistor Values

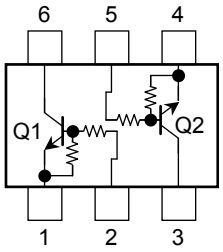


Type No.	R1 (kΩ)	R2 (kΩ)
RN1901AFS	4.7	4.7
RN1902AFS	10	10
RN1903AFS	22	22
RN1904AFS	47	47
RN1905AFS	2.2	47
RN1906AFS	4.7	47

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

Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN1901AFS~1906AFS	V_{CBO}	50	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage	RN1901AFS~1904AFS	V_{EBO}	10	V
	RN1905AFS, 1906AFS		5	
Collector current	RN1901AFS~1906AFS	I_C	80	mA
Collector power dissipation		P_C (Note 1)	50	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55~150	°C

Equivalent Circuit (top view)



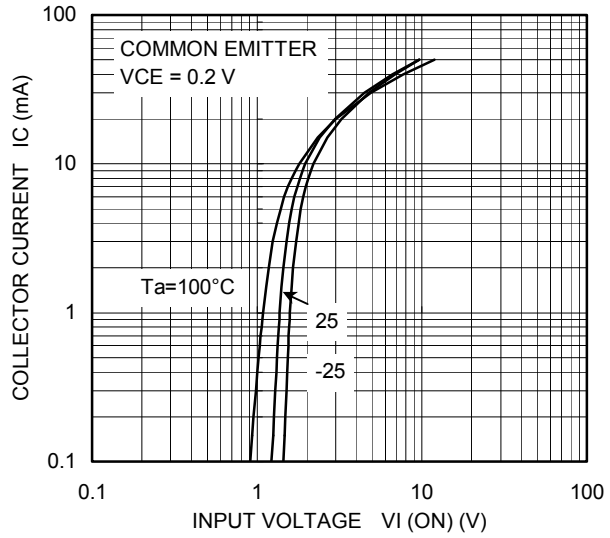
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

Note 1: Total rating

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

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current	RN1901AFS~1906AFS	I_{CBO}	V_{CB} = 50 V, I_E = 0	—	—	100	nA
		I_{CEO}	V_{CE} = 50 V, I_B = 0	—	—	500	
Emitter cutoff current	RN1901AFS	I_{EBO}	V_{EB} = 10 V, I_C = 0	0.89	—	1.33	mA
	RN1902AFS			0.41	—	0.63	
	RN1903AFS			0.18	—	0.29	
	RN1904AFS			0.088	—	0.133	
	RN1905AFS		V_{EB} = 5 V, I_C = 0	0.085	—	0.127	
	RN1906AFS			0.08	—	0.121	
DC current gain	RN1901AFS	h_{FE}	V_{CE} = 5 V, I_C = 10 mA	30	—	—	
	RN1902AFS			50	—	—	
	RN1903AFS			70	—	—	
	RN1904AFS			80	—	—	
	RN1905AFS			80	—	—	
	RN1906AFS			80	—	—	
Collector-emitter saturation voltage	RN1901AFS	$V_{CE\ (sat)}$	I_C = 5 mA, I_B = 0.5 mA	—	—	0.15	V
	RN1902AFS~1906AFS		I_C = 5 mA, I_B = 0.25 mA				
Input voltage (ON)	RN1901AFS	$V_{I\ (ON)}$	V_{CE} = 0.2 V, I_C = 5 mA	1.2	—	2.2	V
	RN1902AFS			1.2	—	2.6	
	RN1903AFS			1.3	—	3.5	
	RN1904AFS			1.5	—	5.0	
	RN1905AFS			0.6	—	1.1	
	RN1906AFS			0.7	—	1.3	
Input voltage (OFF)	RN1901AFS~1904AFS	$V_{I\ (OFF)}$	V_{CE} = 5 V, I_C = 0.1 mA	0.8	—	1.5	V
	RN1905AFS, 1906AFS			0.5	—	0.8	
Collector output capacitance	RN1901AFS~1906AFS	C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	0.7	—	pF
Input resistor	RN1901AFS	R1	—	3.76	4.7	5.64	kΩ
	RN1902AFS			8	10	12	
	RN1903AFS			17.6	22	26.4	
	RN1904AFS			37.6	47	56.4	
	RN1905AFS			1.76	2.2	2.64	
	RN1906AFS			3.76	4.7	5.64	
Resistor ratio	RN1901AFS~1904AFS	R1/R2	—	0.8	1.0	1.2	
	RN1905AFS			0.0376	0.0468	0.0562	
	RN1906AFS			0.08	0.1	0.12	

RN1901AFS IC - VI (ON)



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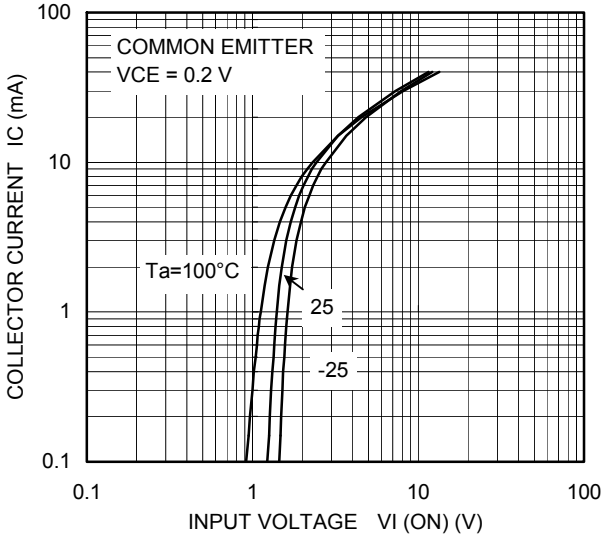

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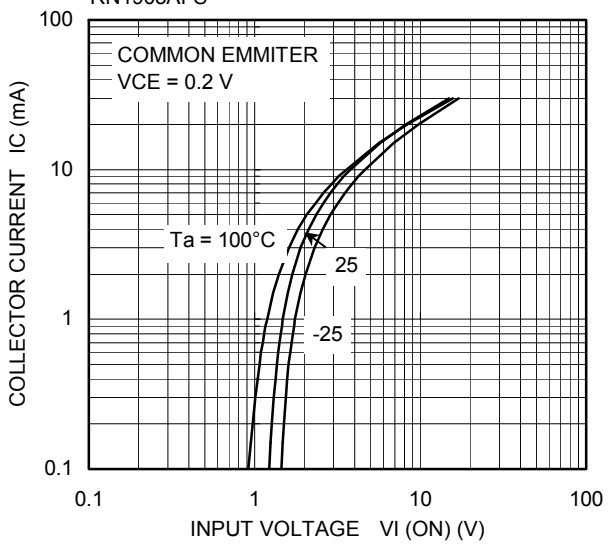

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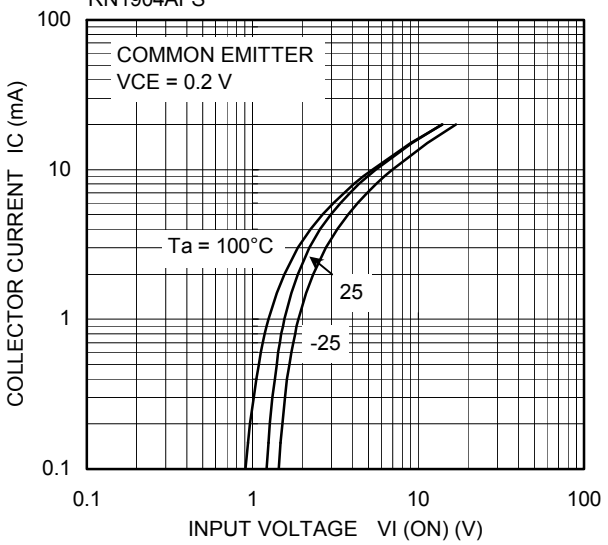

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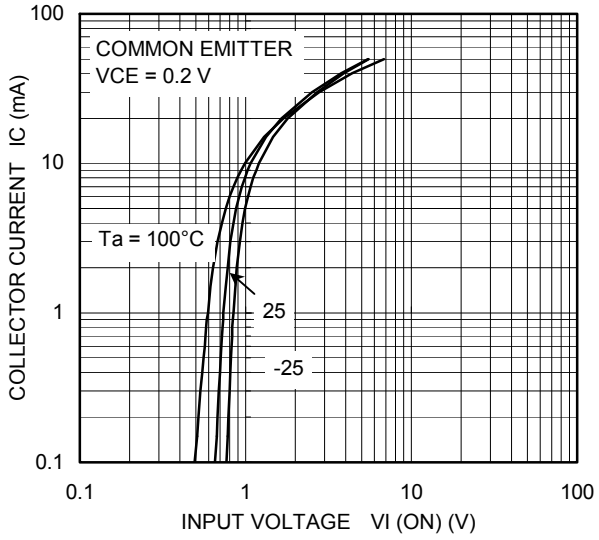

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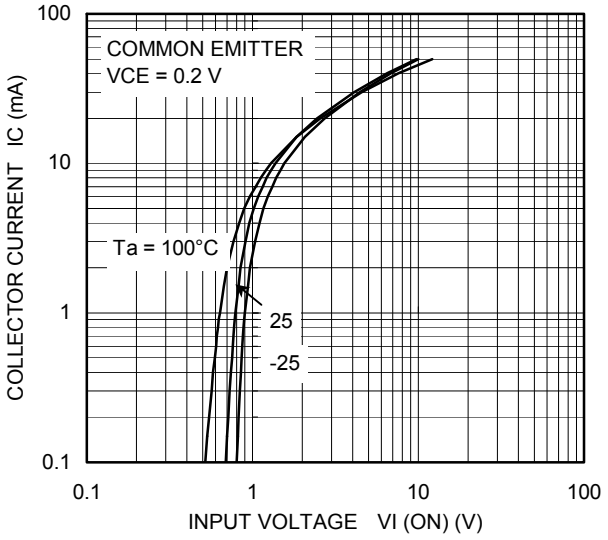

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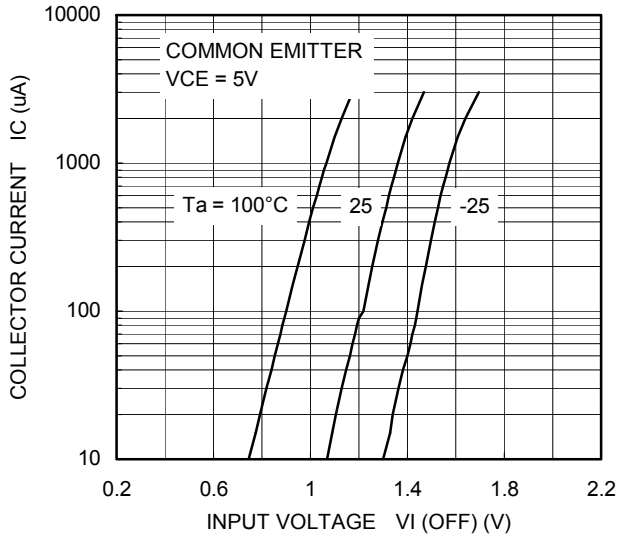

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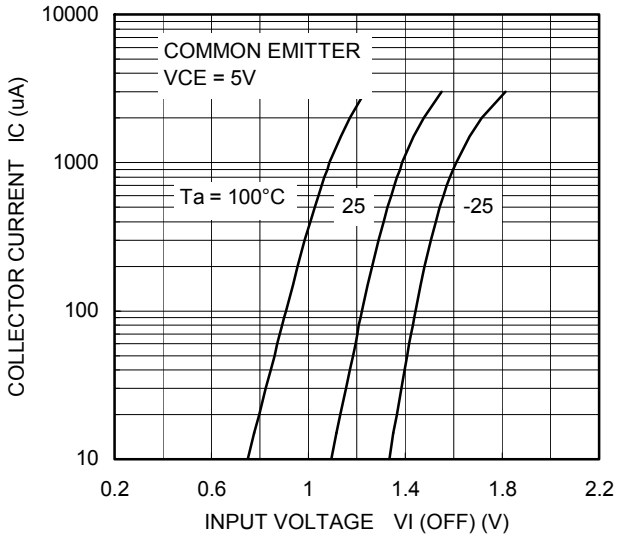

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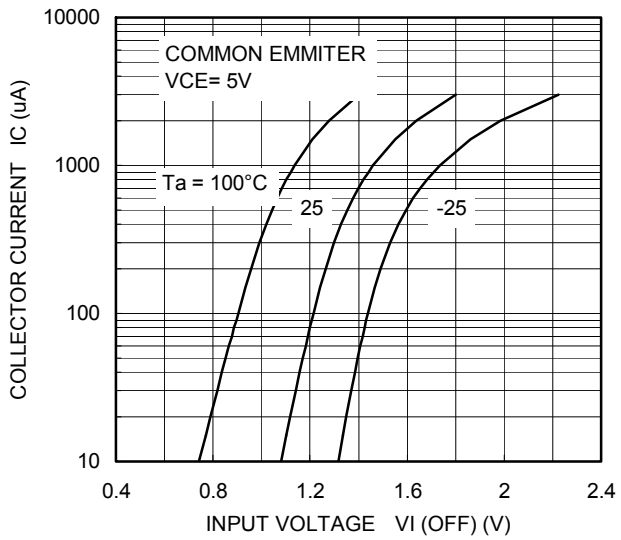

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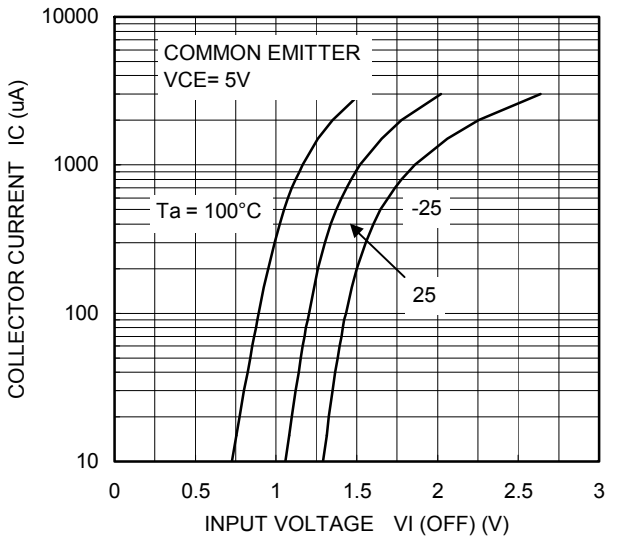

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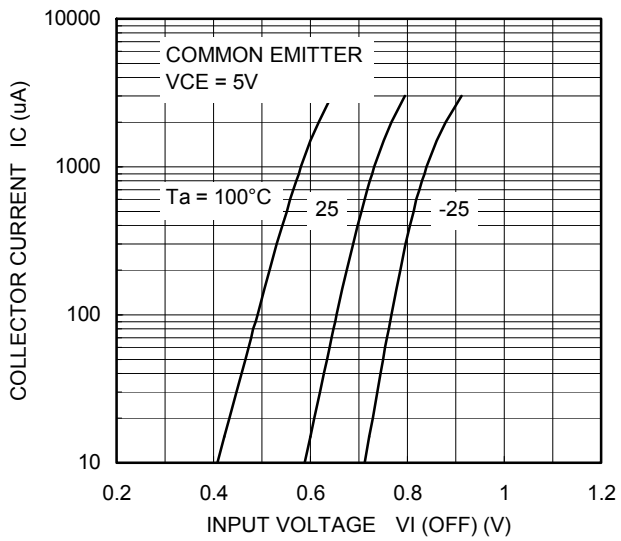

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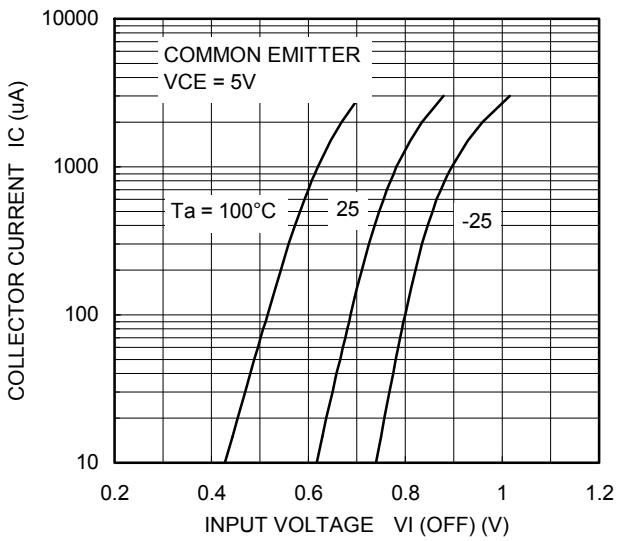

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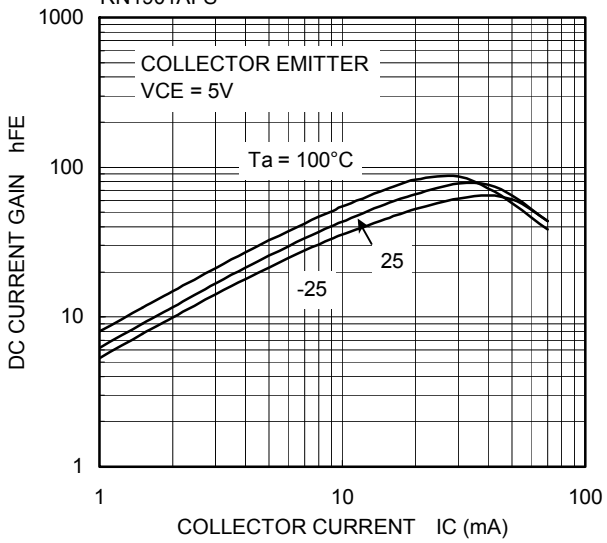

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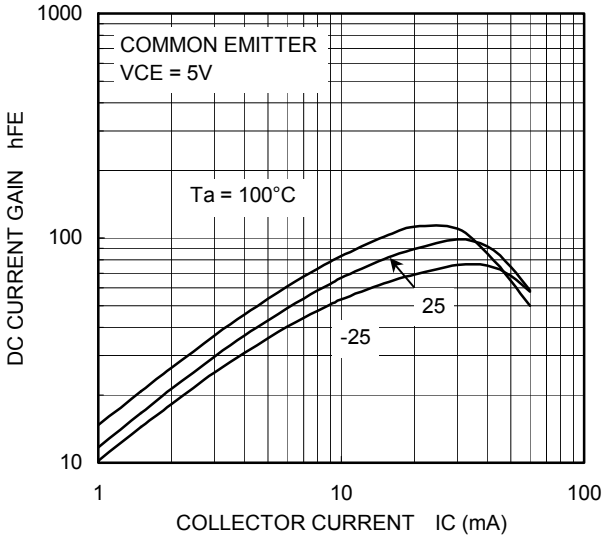

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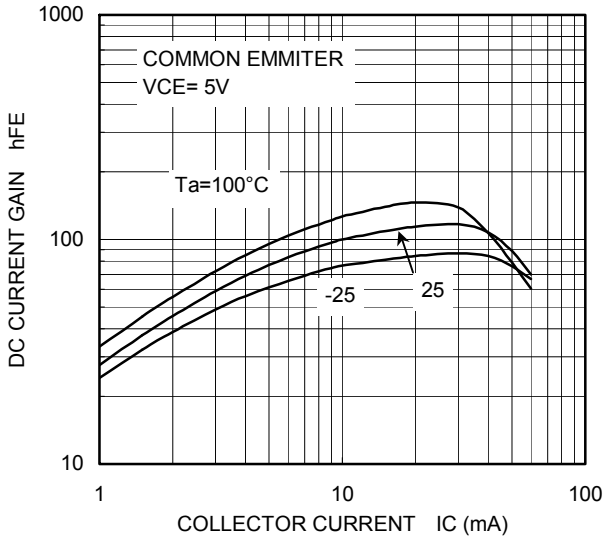

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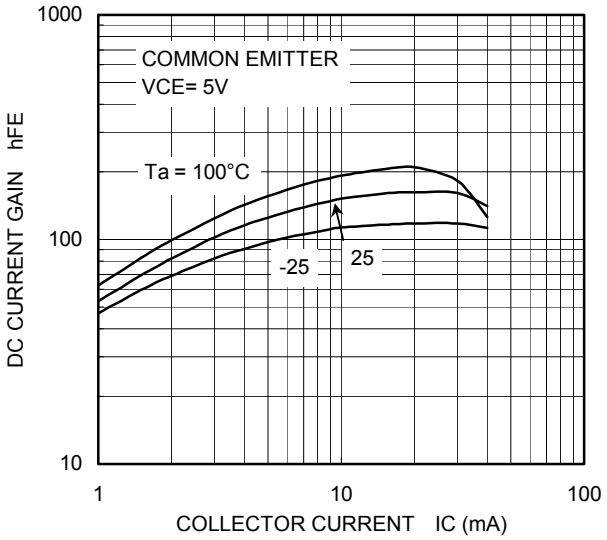

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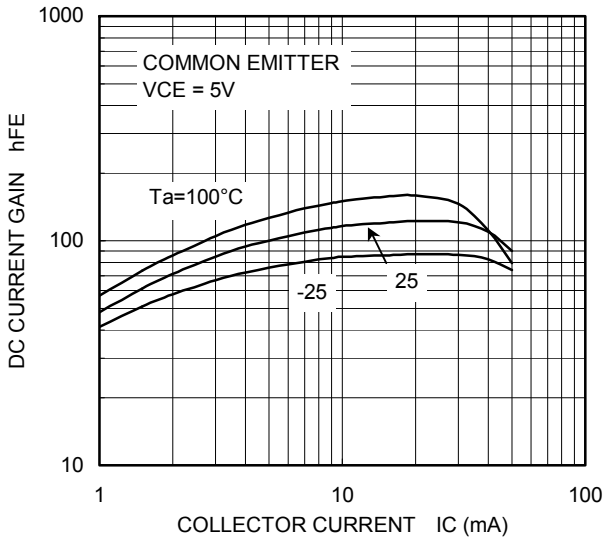

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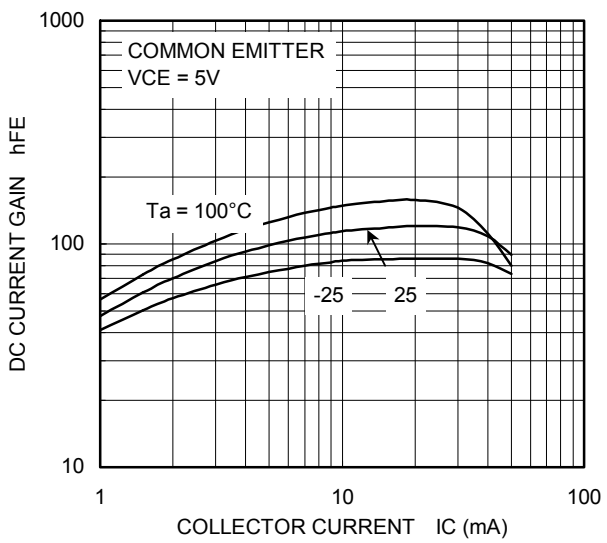

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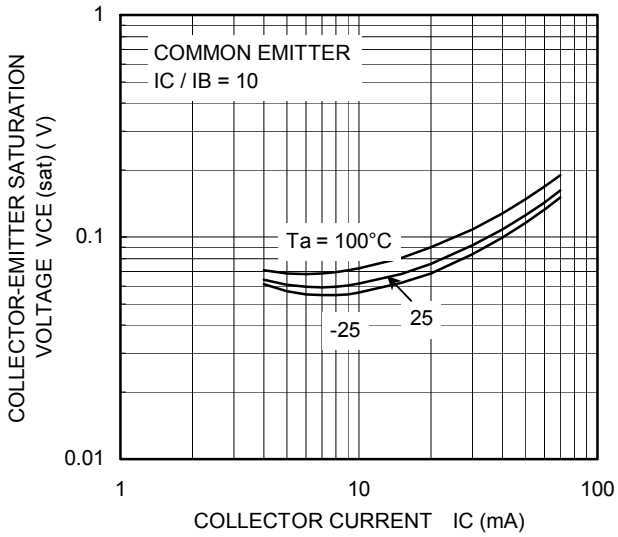

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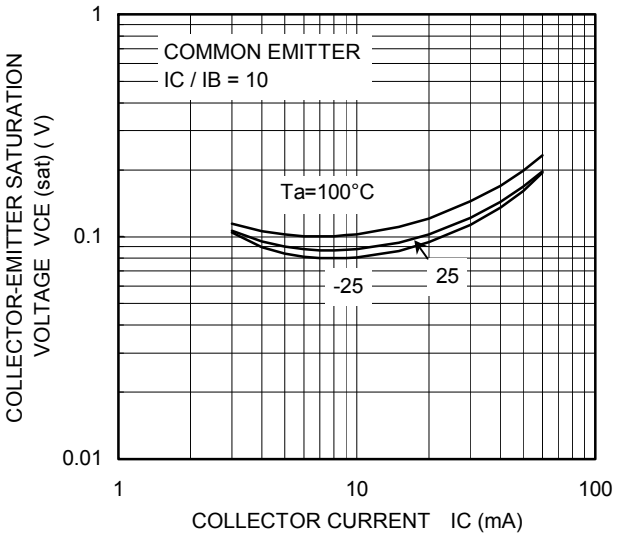

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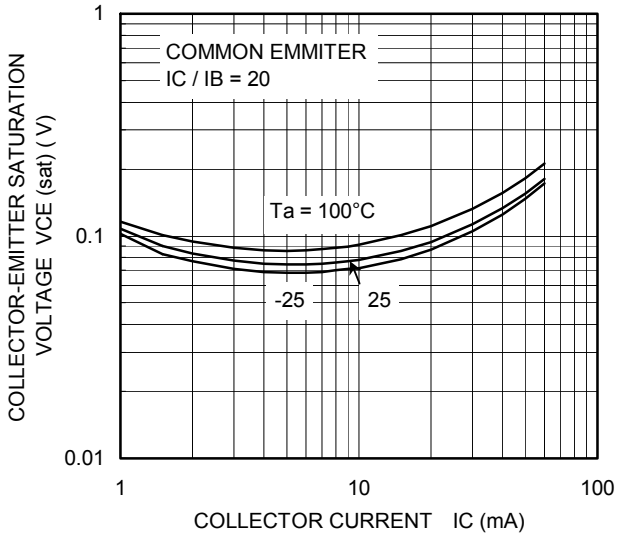

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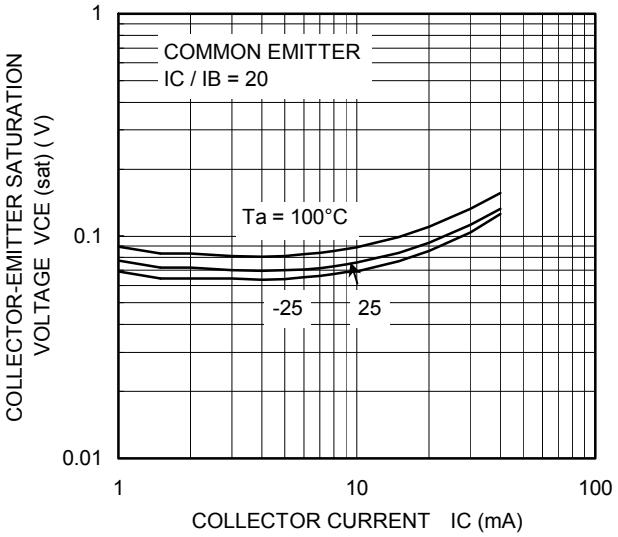

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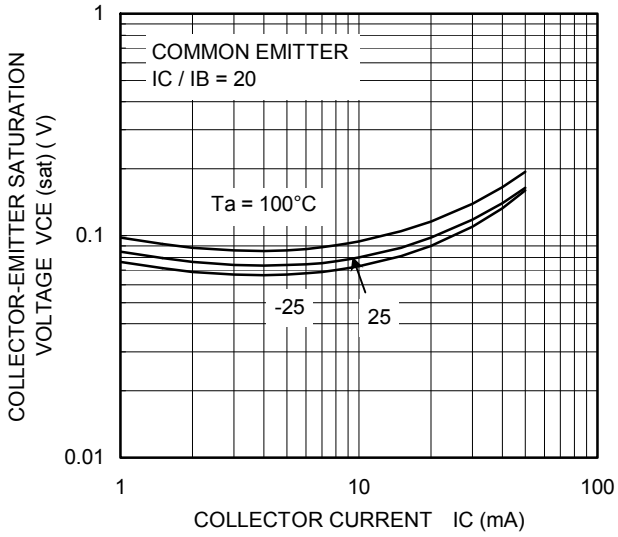

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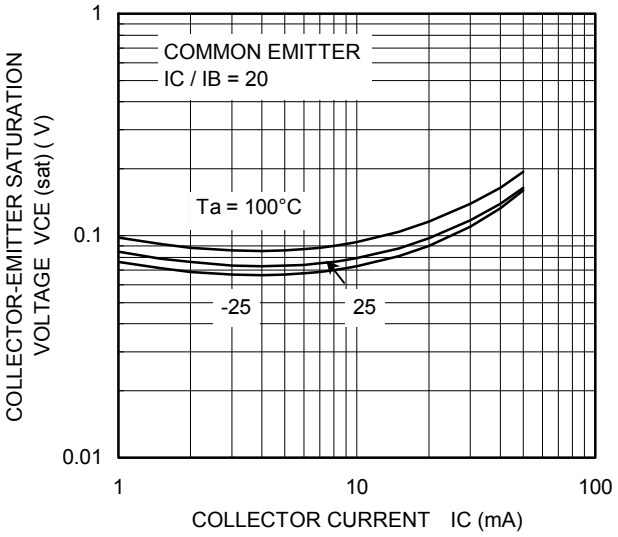

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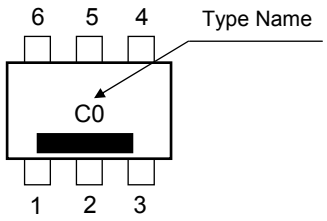
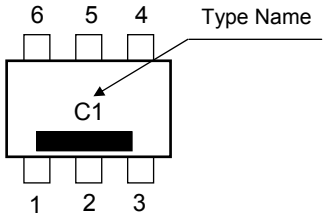
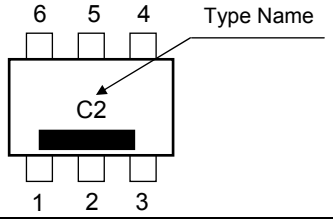
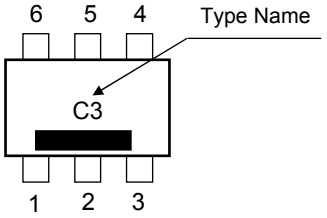
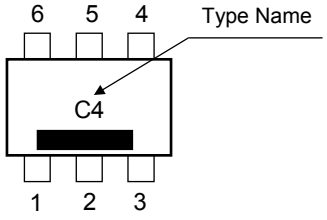
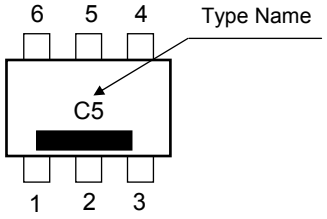
RN1901AFS	
RN1902AFS	
RN1903AFS	
RN1904AFS	
RN1905AFS	
RN1906AFS	

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