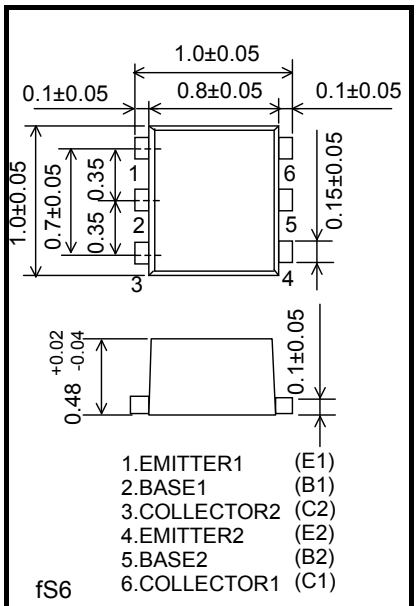
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT process) (Transistor with Built-in Bias Resistor)

RN2901AFS, RN2902AFS, RN2903AFS RN2904AFS, RN2905AFS, RN2906AFS

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 cost.
- Complementary to the RN1901AFS to RN1906AFS

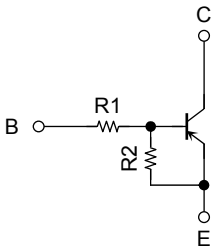
Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	2-1F1D

Weight: 1 mg (typ.)

Equivalent Circuit and Bias Resistor Values

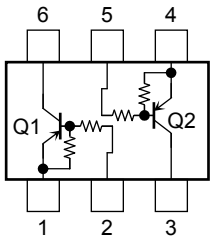


Type No.	R1 (kΩ)	R2 (kΩ)
RN2901AFS	4.7	4.7
RN2902AFS	10	10
RN2903AFS	22	22
RN2904AFS	47	47
RN2905AFS	2.2	47
RN2906AFS	4.7	47

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

Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN2901AFS to 2906AFS	V_{CBO}	−50	V
Collector-emitter voltage		V_{CEO}	−50	V
Emitter-base voltage	RN2901AFS to 2904AFS	V_{EBO}	−10	V
	RN2905AFS, 2906AFS		−5	
Collector current	RN2901AFS to 2906AFS	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 to 150	°C

Equivalent Circuit (top view)



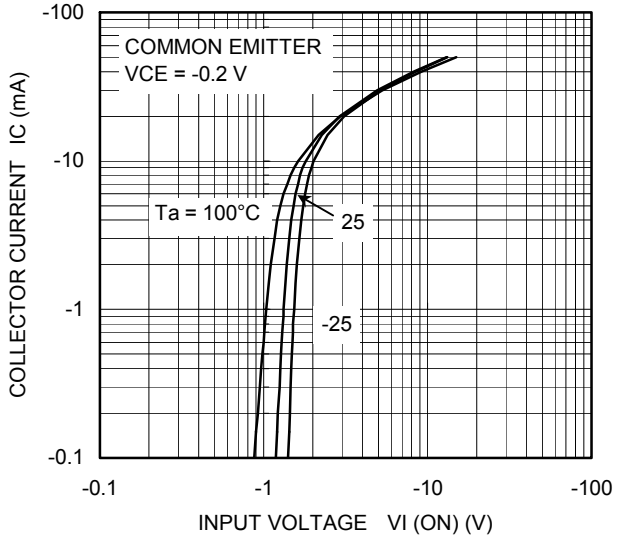
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

Note 1: Total rating

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

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current	RN2901AFS to 2906AFS	I_{CBO}	V_{CB} = −50 V, I_E = 0	—	—	−100	nA
		I_{CEO}	V_{CE} = −50 V, I_B = 0	—	—	−500	
Emitter cutoff current	RN2901AFS	I_{EBO}	V_{EB} = −10 V, I_C = 0	−0.89	—	−1.33	mA
	RN2902AFS			−0.41	—	−0.63	
	RN2903AFS			−0.18	—	−0.29	
	RN2904AFS			−0.088	—	−0.133	
	RN2905AFS		V_{EB} = −5 V, I_C = 0	−0.085	—	−0.127	
	RN2906AFS			−0.08	—	−0.121	
DC current gain	RN2901AFS	h_{FE}	V_{CE} = −5 V, I_C = −10 mA	30	—	—	
	RN2902AFS			50	—	—	
	RN2903AFS			70	—	—	
	RN2904AFS			80	—	—	
	RN2905AFS			80	—	—	
	RN2906AFS			50	—	—	
Collector-emitter saturation voltage	RN2901AFS	$V_{CE\ (sat)}$	I_C = −5 mA, I_B = −0.5 mA	—	—	−0.15	V
	RN2902AFS to 2906AFS		I_C = −5 mA, I_B = −0.25 mA				
Input voltage (ON)	RN2901AFS	$V_{I\ (ON)}$	V_{CE} = −0.2 V, I_C = −5 mA	−1.2	—	−2.2	V
	RN2902AFS			−1.2	—	−2.6	
	RN2903AFS			−1.3	—	−3.5	
	RN2904AFS			−1.5	—	−5.0	
	RN2905AFS			−0.6	—	−1.1	
	RN2906AFS			−0.7	—	−1.3	
Input voltage (OFF)	RN2901AFS to 2904AFS	$V_{I\ (OFF)}$	V_{CE} = −5 V, I_C = −0.1 mA	−0.8	—	−1.5	V
	RN2905AFS, 2906AFS			−0.5	—	−0.8	
Collector output capacitance	RN2901AFS to 2906AFS	C_{ob}	V_{CB} = −10 V, I_E = 0, f = 1 MHz	—	0.9	—	pF
Input resistor	RN2901AFS	R1	—	3.76	4.7	5.64	kΩ
	RN2902AFS			8	10	12	
	RN2903AFS			17.6	22	26.4	
	RN2904AFS			37.6	47	56.4	
	RN2905AFS			1.76	2.2	2.64	
	RN2906AFS			3.76	4.7	5.64	
Resistor ratio	RN2901AFS to 2904AFS	R1/R2	—	0.8	1.0	1.2	
	RN2905AFS			0.0376	0.0468	0.0562	
	RN2906AFS			0.08	0.1	0.12	

RN2901AFS IC - VI (ON)



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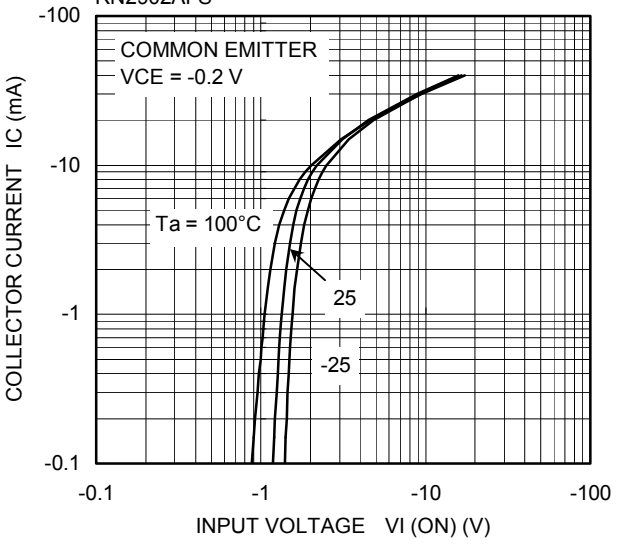

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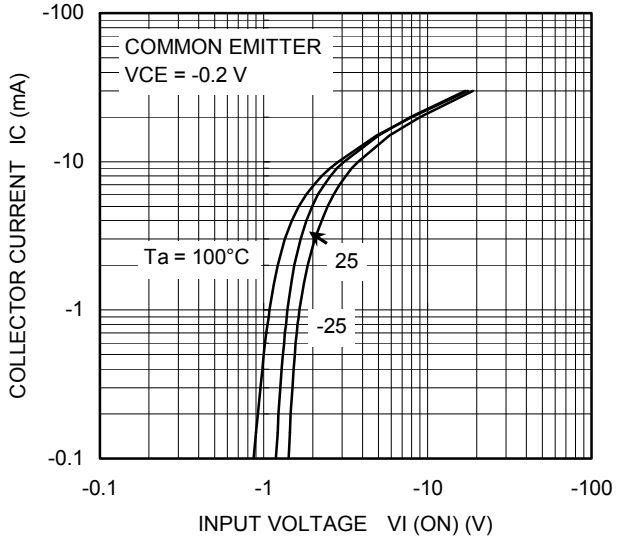

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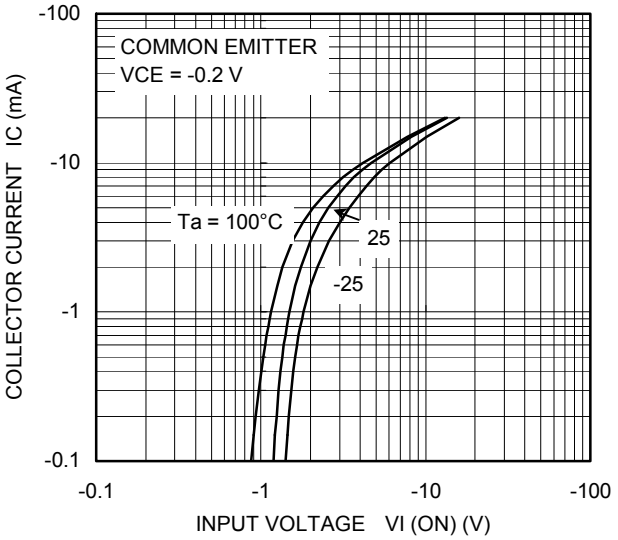

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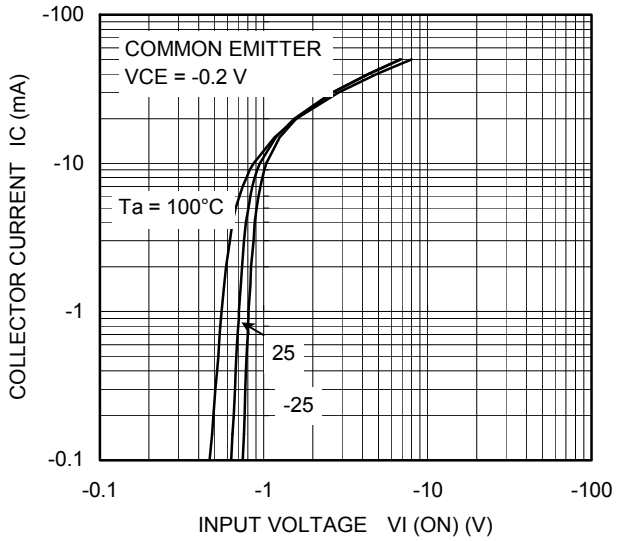

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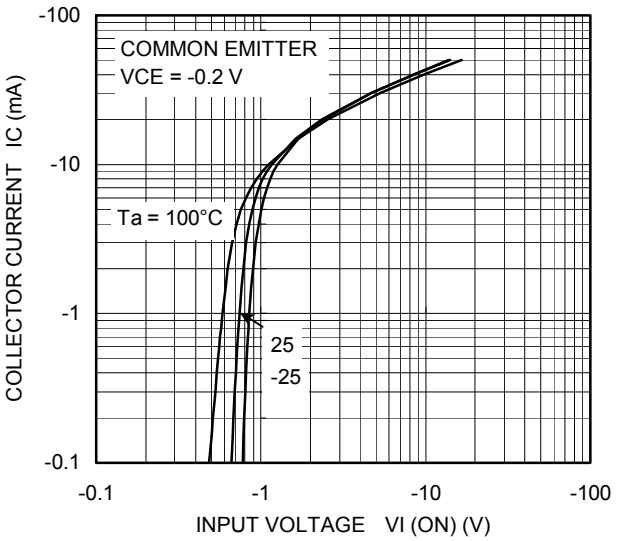

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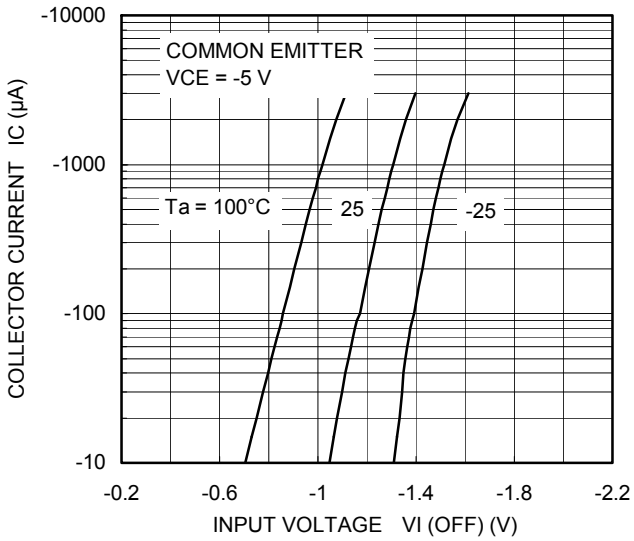

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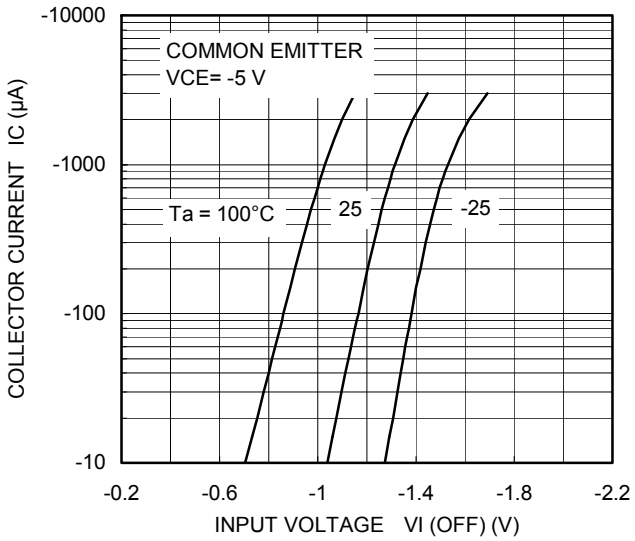

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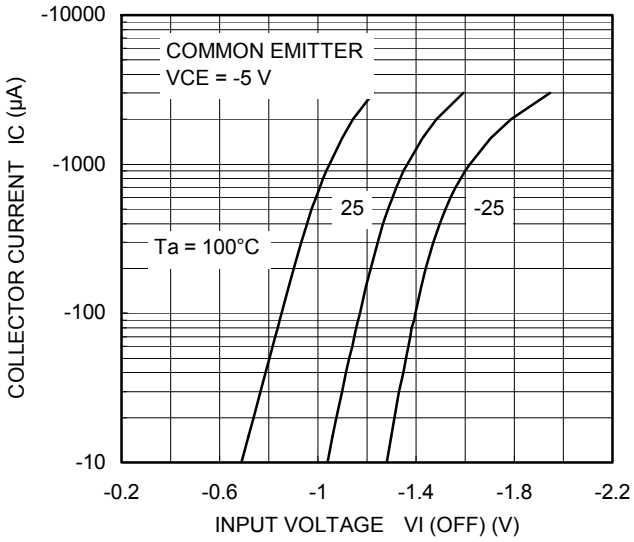

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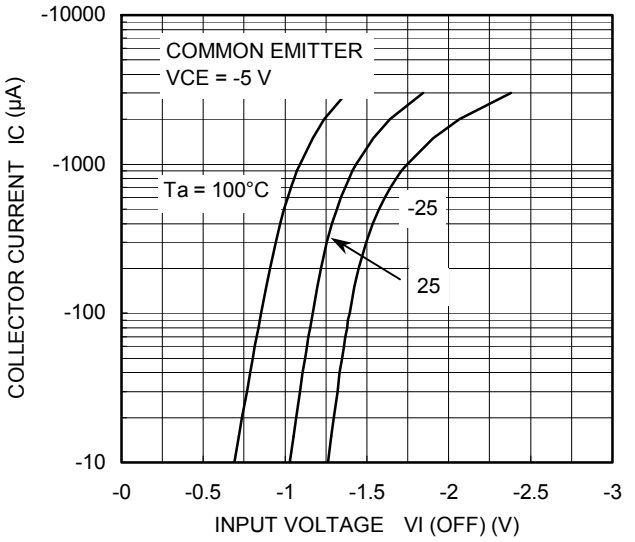

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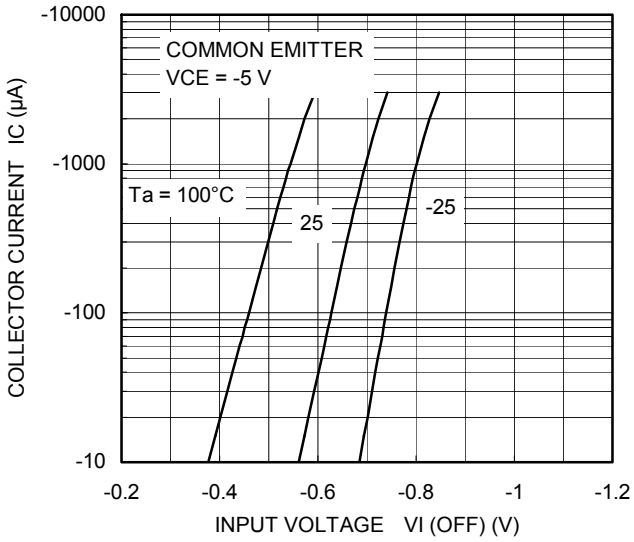

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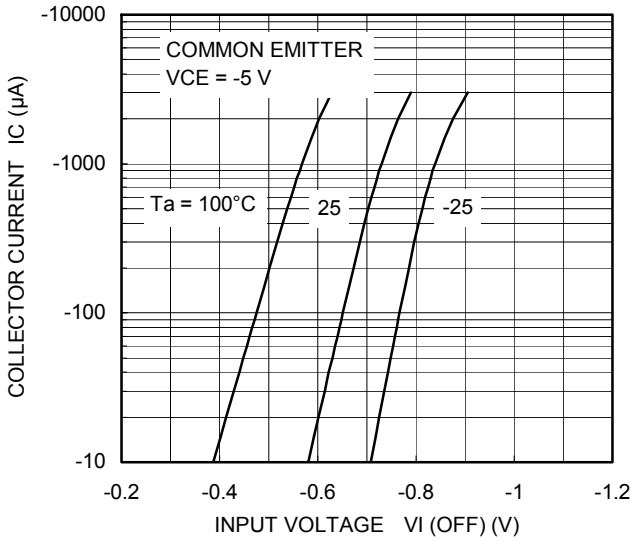

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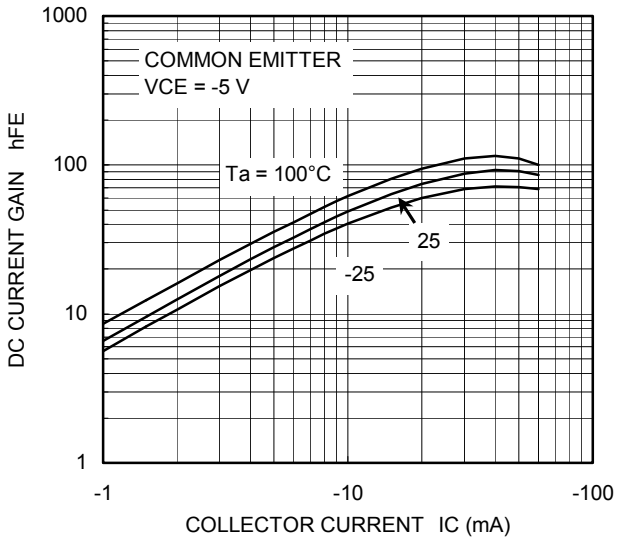

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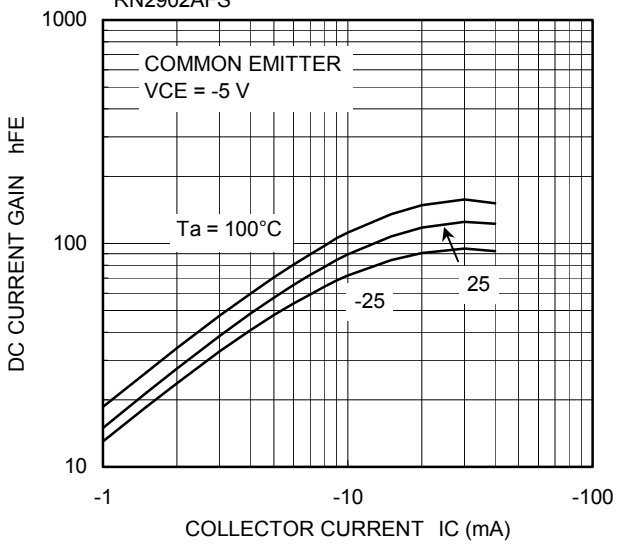

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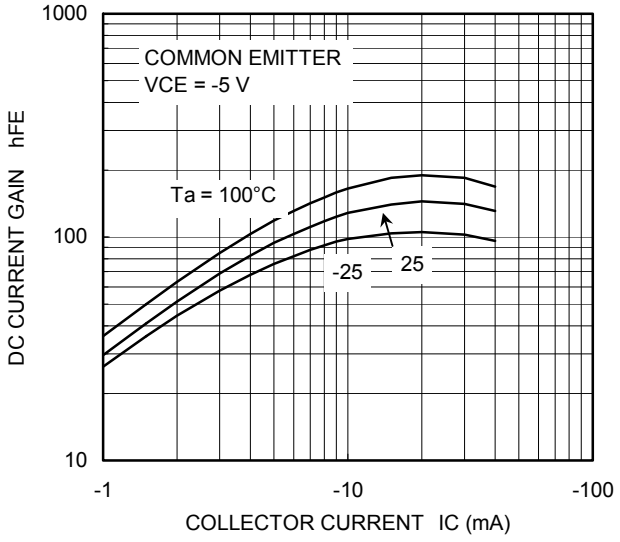

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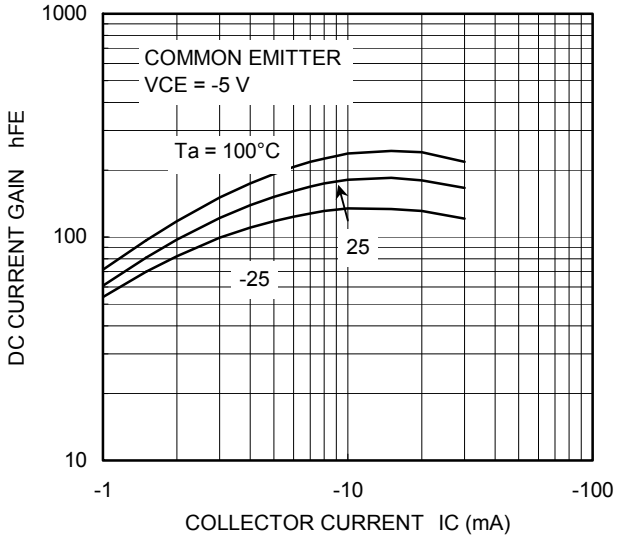

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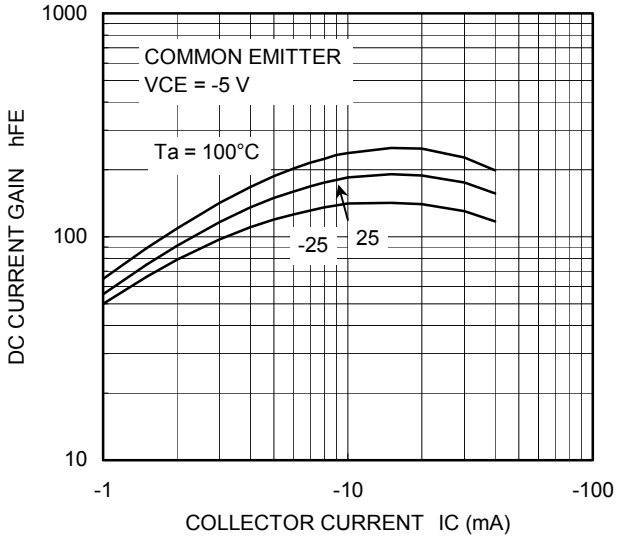

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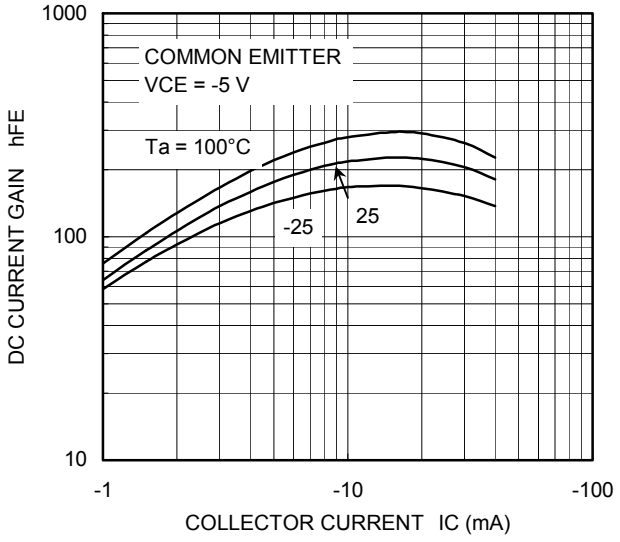

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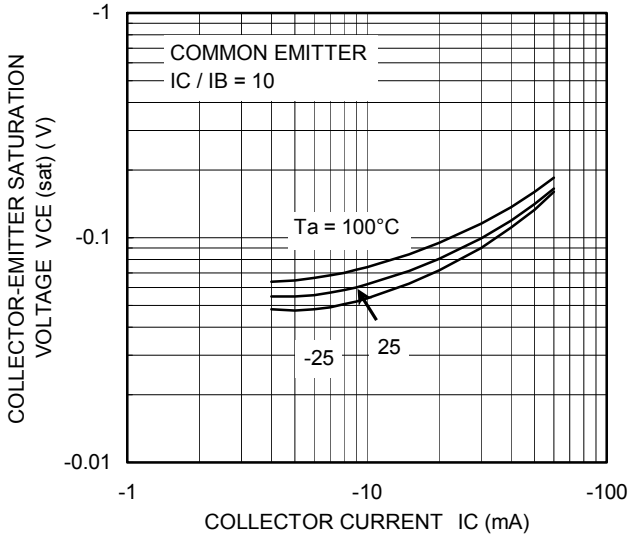

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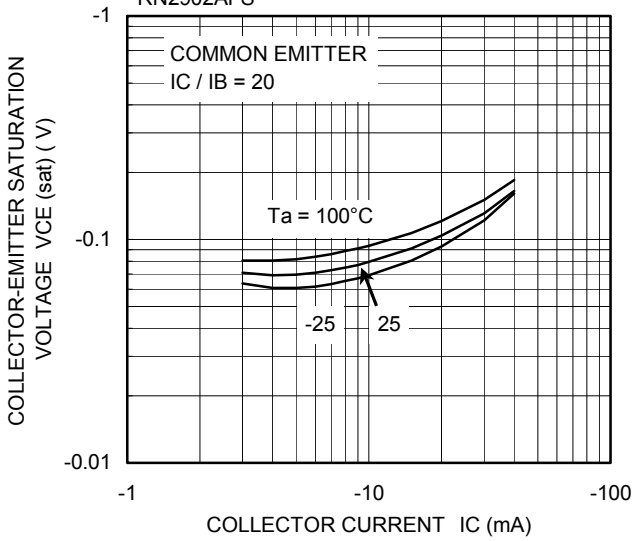

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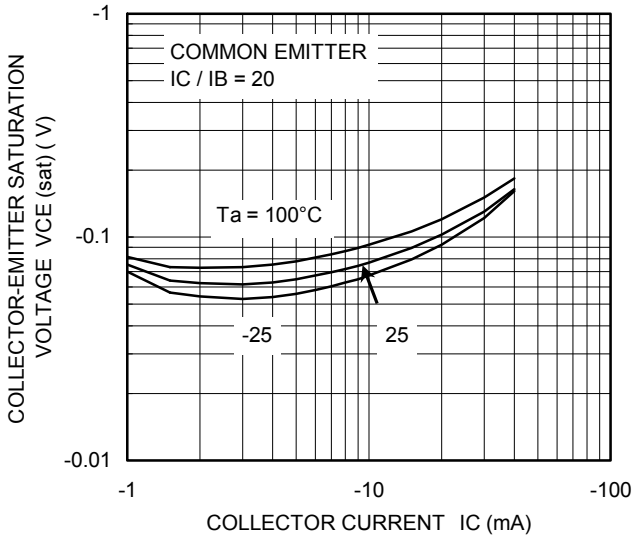

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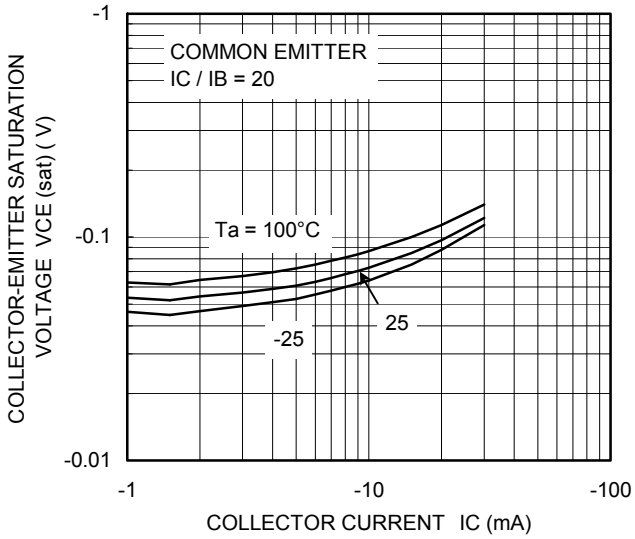

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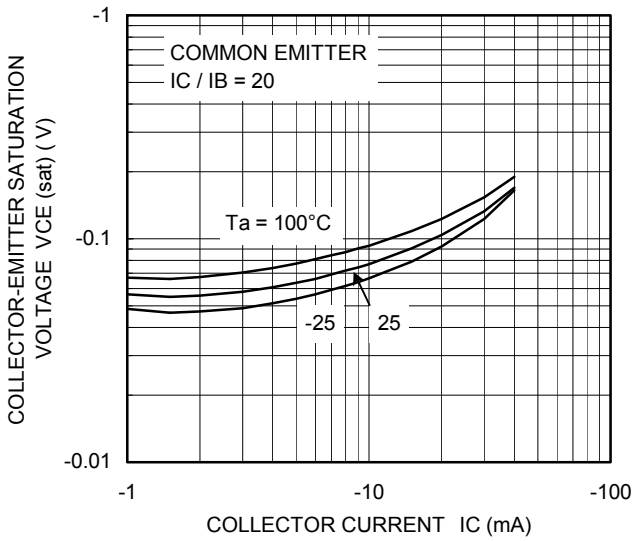

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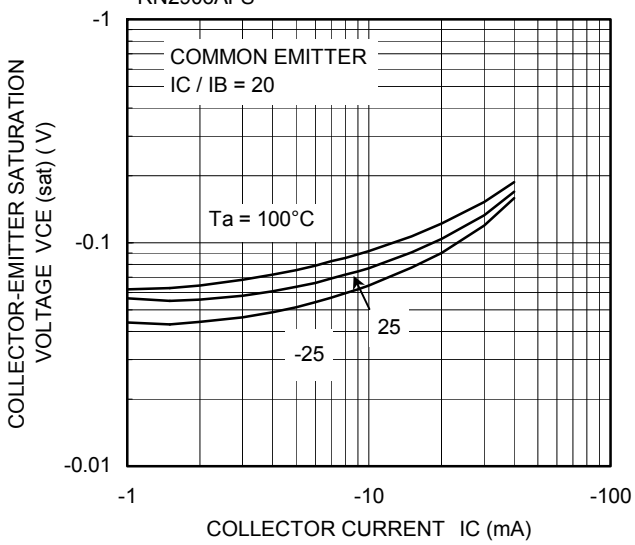

Marking

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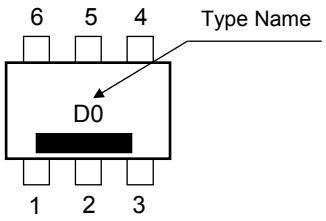
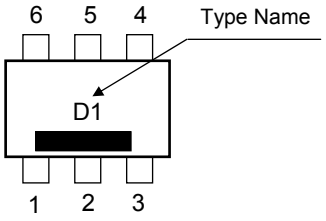
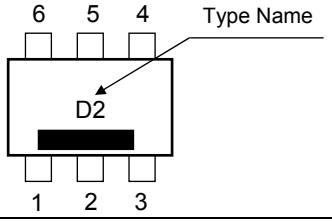
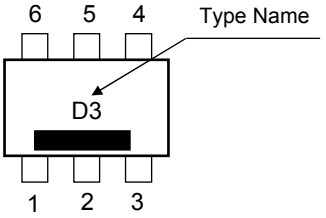
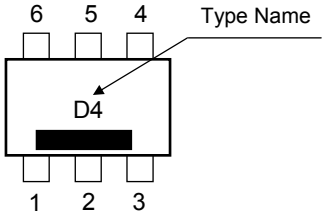
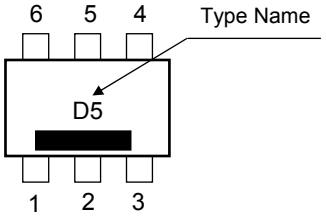
RN2901AFS	
RN2902AFS	
RN2903AFS	
RN2904AFS	
RN2905AFS	
RN2906AFS	

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