

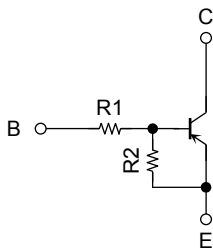
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

## RN2901FS, RN2902FS, RN2903FS RN2904FS, RN2905FS, RN2906FS

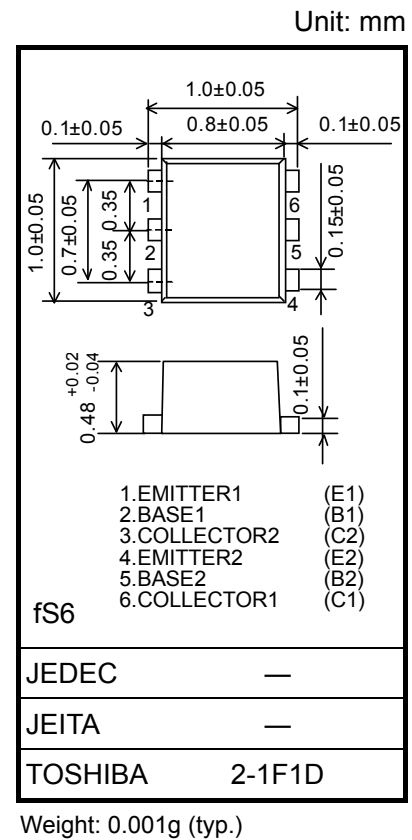
Switching, Inverter Circuit, Interface Circuit and  
Driver Circuit Applications

- Two devices are incorporated into a fine pitch small mold (6-pin) package.
- Incorporating a bias resistor into a transistor reduces parts count. Reducing the parts count enables the manufacture of ever more compact equipment and lowers assembly cost.
- Complementary to RN1901FS~RN1906FS

### Equivalent Circuit and Bias Resistor Values



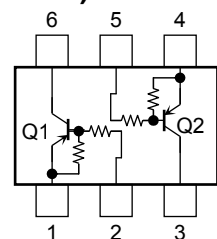
Type No.	R1 (kΩ)	R2 (kΩ)
RN2901FS	4.7	4.7
RN2902FS	10	10
RN2903FS	22	22
RN2904FS	47	47
RN2905FS	2.2	47
RN2906FS	4.7	47



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

Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	-20	V
Collector-emitter voltage	$V_{CEO}$	-20	V
Emitter-base voltage	$V_{EBO}$	-10	V
		-5	V
Collector current	$I_C$	-50	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)



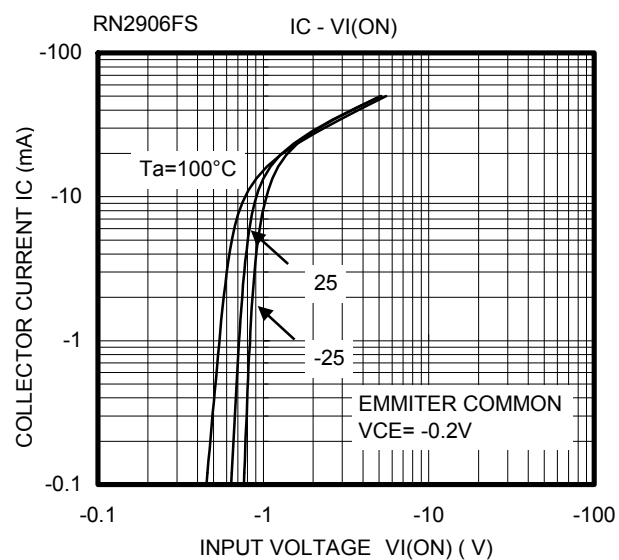
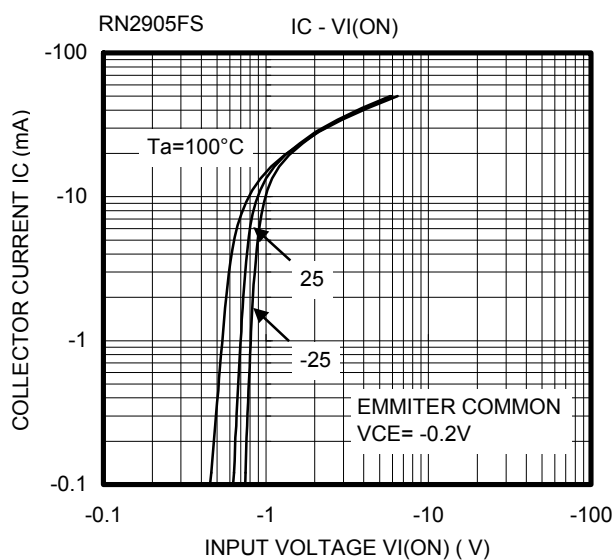
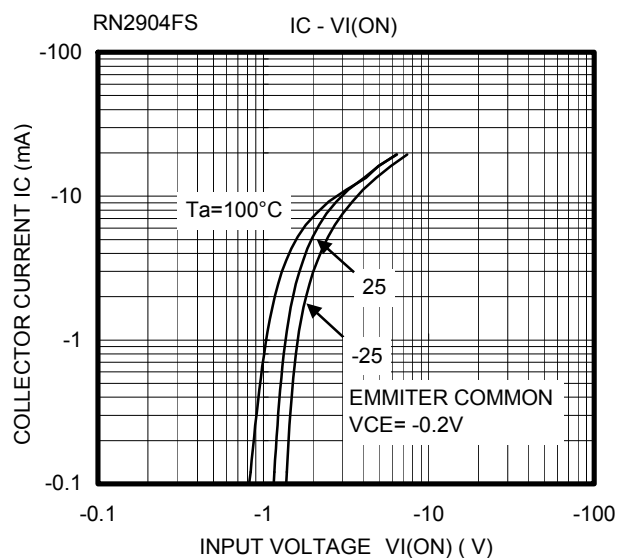
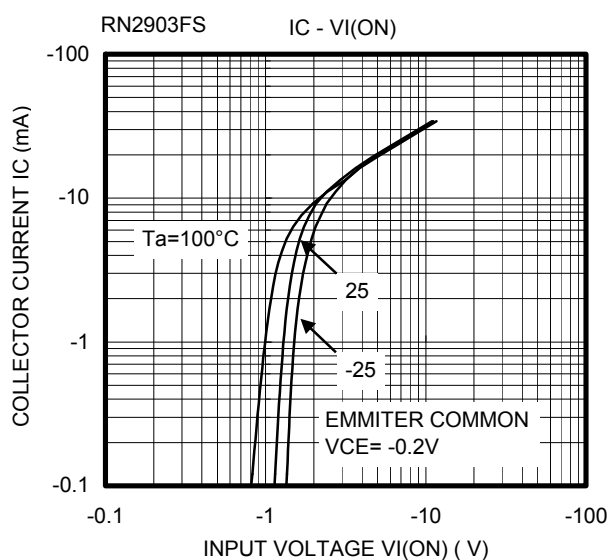
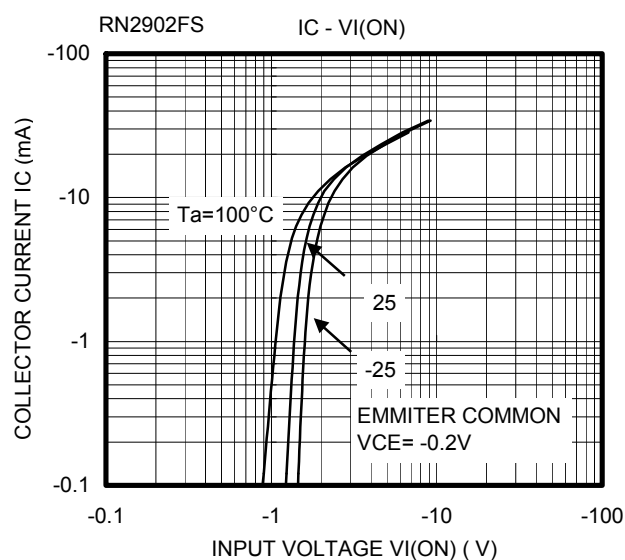
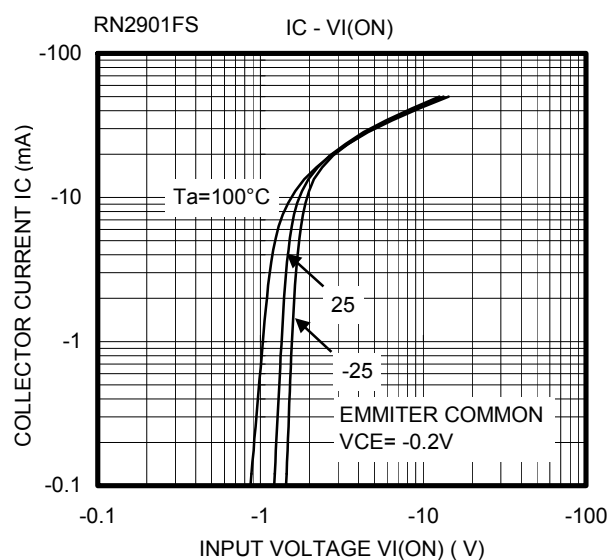
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

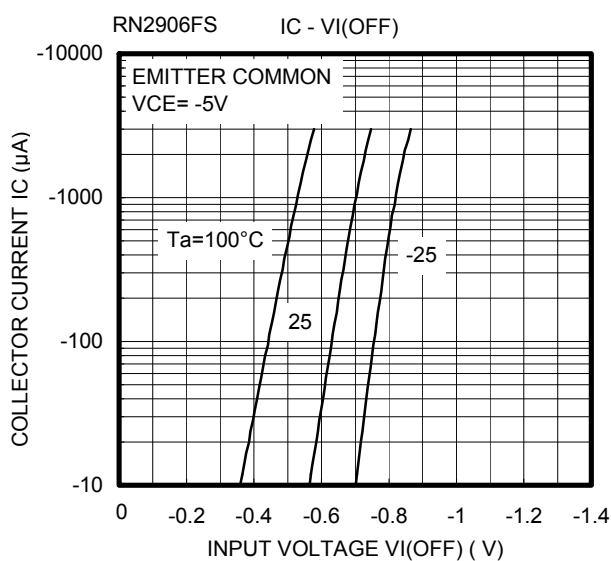
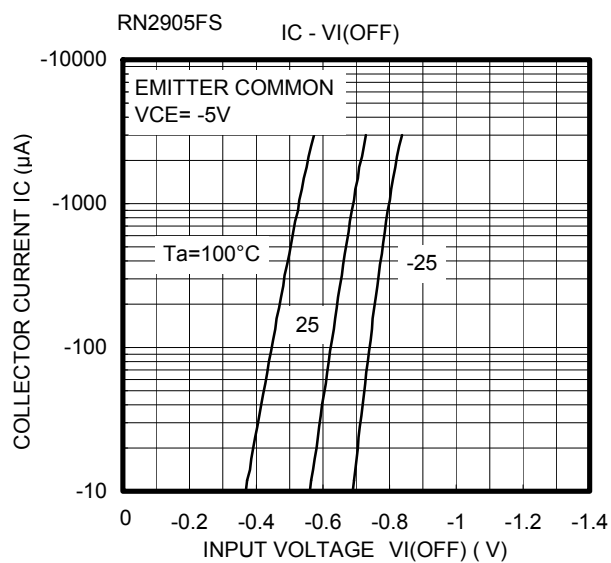
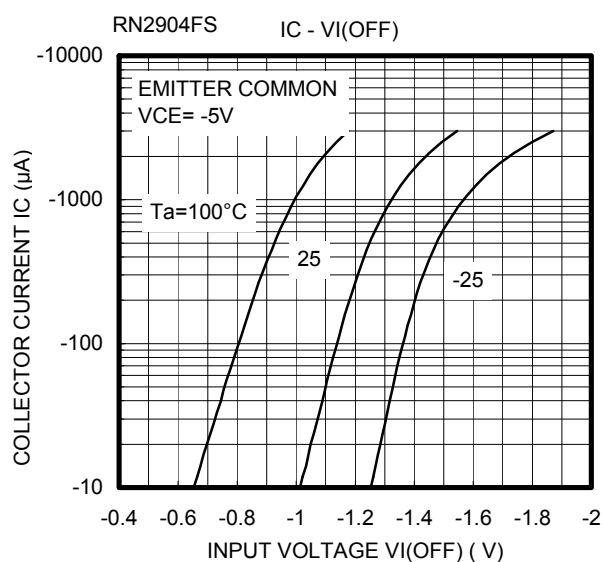
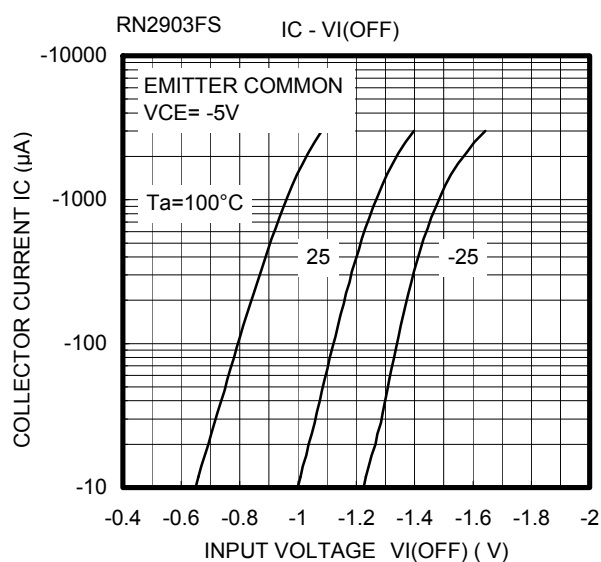
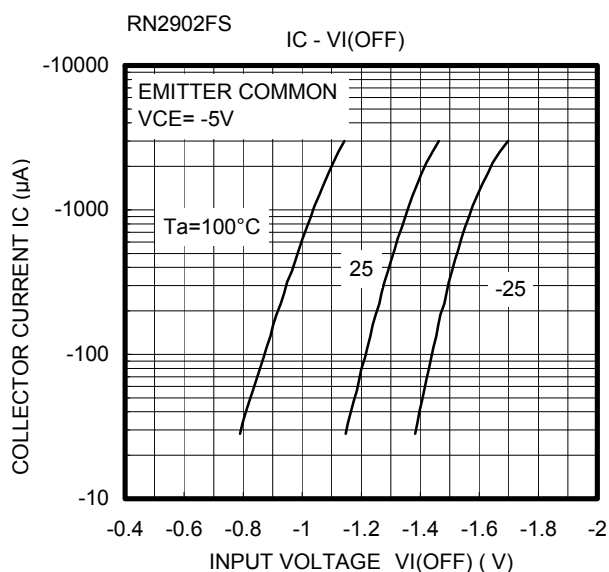
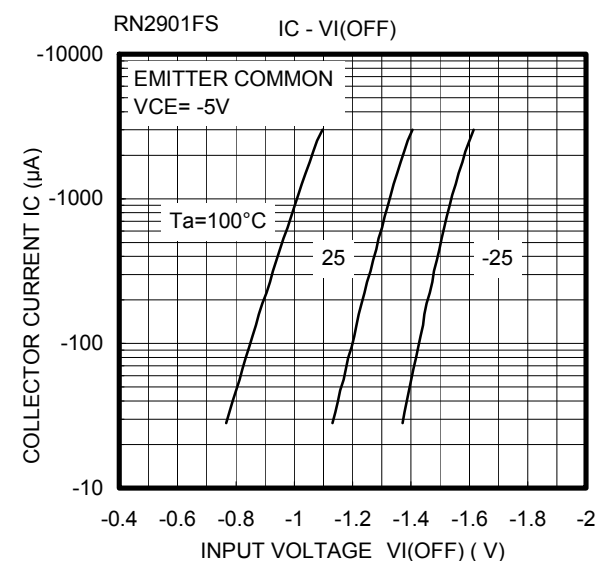
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

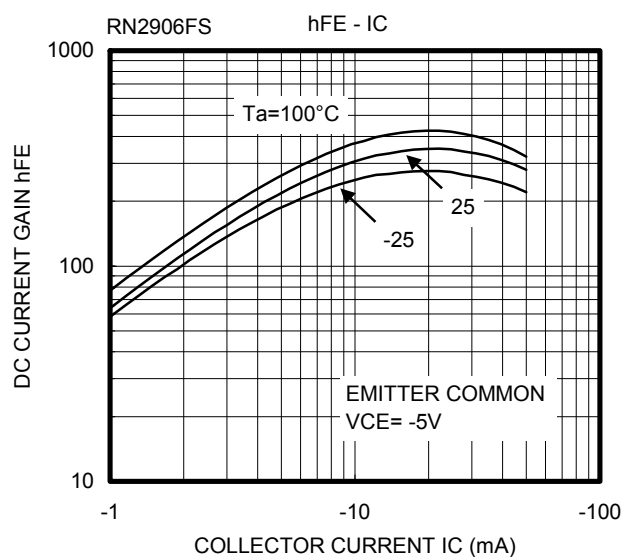
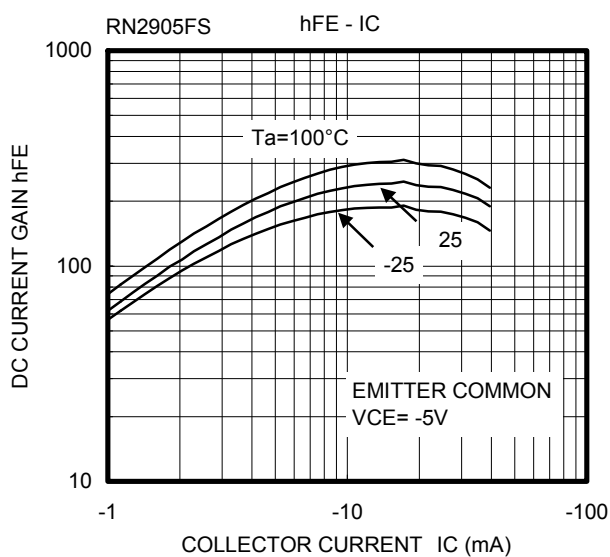
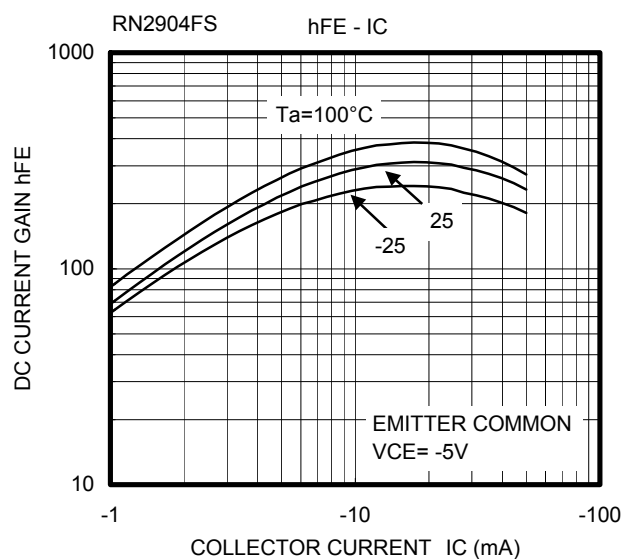
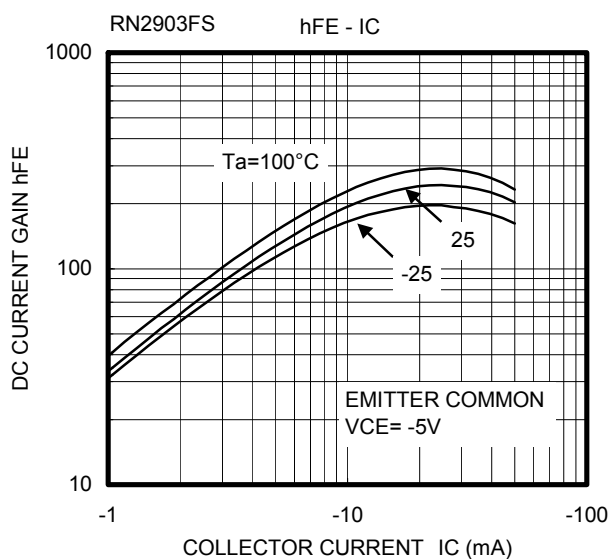
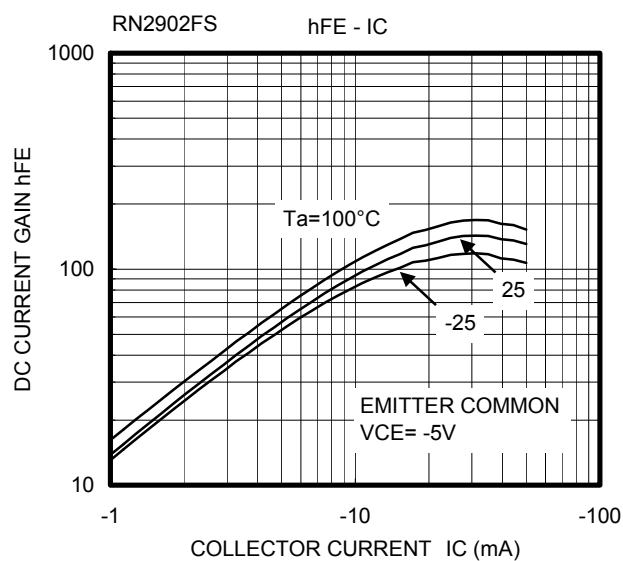
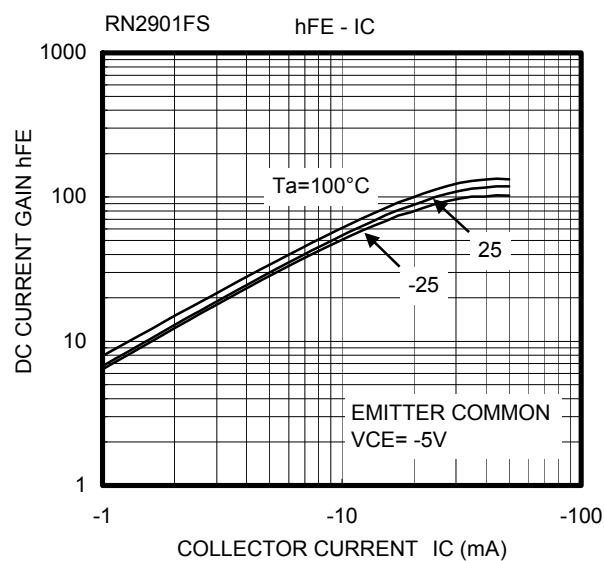
Note 1: Total rating

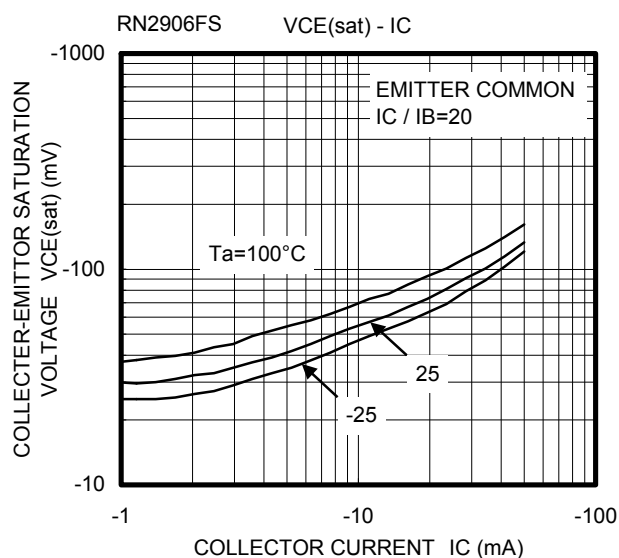
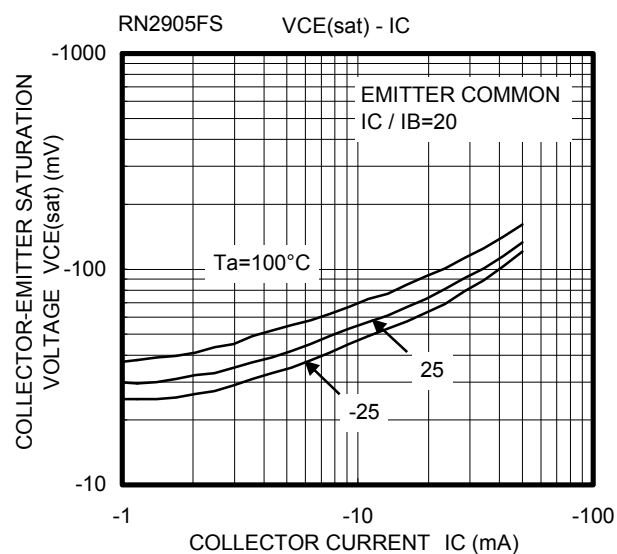
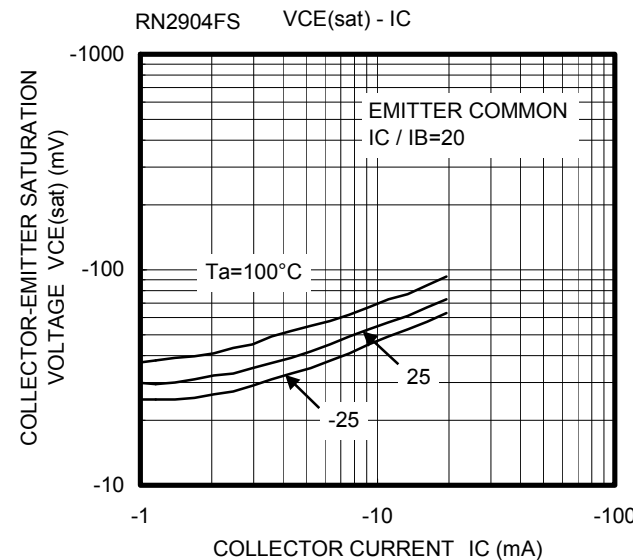
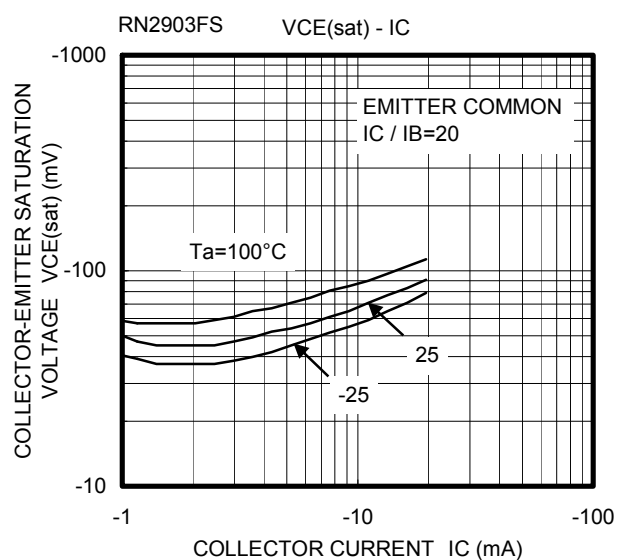
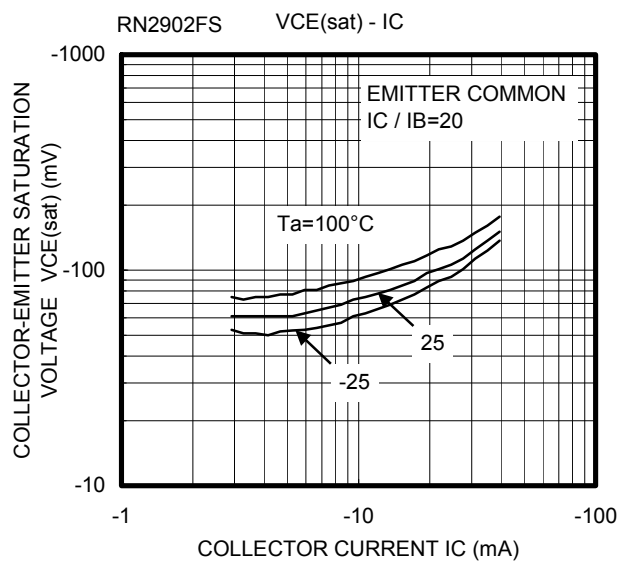
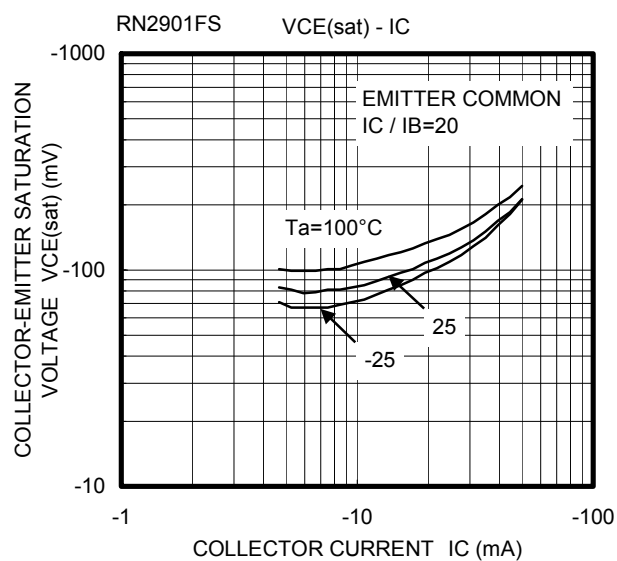
## Electrical Characteristics (Ta =25°C) (Q1, Q2 common)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2901FS~2906FS	$I_{CBO}$	$V_{CB} = -20\text{ V}, I_E = 0$	—	—	-100	nA
		$I_{CEO}$	$V_{CE} = -20\text{ V}, I_B = 0$	—	—	-500	
Emitter cut-off current	RN2901FS	$I_{EBO}$	$V_{EB} = -10\text{ V}, I_C = 0$	-0.89	—	-1.33	mA
	RN2902FS			-0.41	—	-0.63	
	RN2903FS			-0.18	—	-0.29	
	RN2904FS			-0.088	—	-0.133	
	RN2905FS	$I_{EBO}$	$V_{EB} = -5\text{ V}, I_C = 0$	-0.085	—	-0.127	
	RN2906FS			-0.08	—	-0.121	
DC current gain	RN2901FS	$h_{FE}$	$V_{CE} = -5\text{ V}, I_C = -10\text{ mA}$	30	—	—	
	RN2902FS			60	—	—	
	RN2903FS			100	—	—	
	RN2904FS			120	—	—	
	RN2905FS			120	—	—	
	RN2906FS			120	—	—	
Collector-emitter saturation voltage	RN2901FS~2906FS	$V_{CE(sat)}$	$I_C = -5\text{ mA}, I_B = -0.25\text{ mA}$	—	—	-0.15	V
Input voltage (ON)	RN2901FS	$V_{I(ON)}$	$V_{CE} = -0.2\text{ V}, I_C = -5\text{ mA}$	-1.0	—	-2.0	V
	RN2902FS			-1.0	—	-2.2	
	RN2903FS			-1.1	—	-2.7	
	RN2904FS			-1.2	—	-3.6	
	RN2905FS			-0.6	—	-1.1	
	RN2906FS			-0.6	—	-1.2	
Input voltage (OFF)	RN2901FS~2904FS	$V_{I(OFF)}$	$V_{CE} = -5\text{ V}, I_C = -0.1\text{ mA}$	-0.8	—	-1.5	V
	RN2905FS, 2906FS			-0.4	—	-0.8	
Collector output capacitance	RN2901FS~2906FS	$C_{ob}$	$V_{CB} = -10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	1.2	—	pF
Input resistor	RN2901FS	R1	—	3.76	4.7	5.64	kΩ
	RN2902FS			8	10	12	
	RN2903FS			17.6	22	26.4	
	RN2904FS			37.6	47	56.4	
	RN2905FS			1.76	2.2	2.64	
	RN2906FS			3.76	4.7	5.64	
Resistor ratio	RN2901FS~2904FS	R1/R2	—	0.8	1.0	1.2	
	RN2905FS			0.0376	0.0468	0.0562	
	RN2906FS			0.08	0.1	0.12	









Type Name	Marking
RN2901FS	
RN2902FS	
RN2903FS	
RN2904FS	
RN2905FS	
RN2906FS	

### Handling Precaution

When handling individual devices (which are not yet mounted on a circuit board), be sure that the environment is protected against electrostatic discharge. 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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