<u>TO</u>SHIBA

Unit: mm

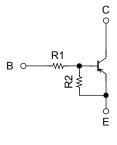
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process) (Bias Resistor Built-in Transistor)

## RN2901FE,RN2902FE,RN2903FE RN2904FE,RN2905FE,RN2906FE

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- Two devices are incorporated into an Extreme-Super-Mini (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 RN1901FE~RN1906FE

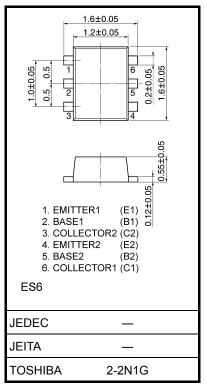
#### **Equivalent Circuit and Bias Resistor Values**



Type No.	R1 (kΩ)	R2 (kΩ)
RN2901FE	4.7	4.7
RN2902FE	10	10
RN2903FE	22	22
RN2904FE	47	47
RN2905FE	2.2	47
RN2906FE	4.7	47

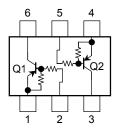
#### Absolute Maximum Ratings (Ta = 25°C) (Q1, Q2 common)

Characteristics		Symbol	Rating	Unit	
Collector-base voltage	RN2901FE~	V <sub>CBO</sub>	-50	V	
Collector-emitter voltage	RN2906FE	V <sub>CEO</sub>	-50	V	
Emitter base veltage	RN2901FE~ RN2904FE	Vero	-10	V	
Emitter-base voltage	RN2905FE, RN2906FE	V <sub>EBO</sub>	-5		
Collector current		Ι <sub>C</sub>	-100	mA	
Collector power dissipation	RN2901FE~	P <sub>C</sub> (Note 1)	100	mW	
Junction temperature	RN2906FE	Tj	150	°C	
Storage temperature range		T <sub>stg</sub>	-55~150	°C	



Weight:0.003 g (typ.)

# 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).

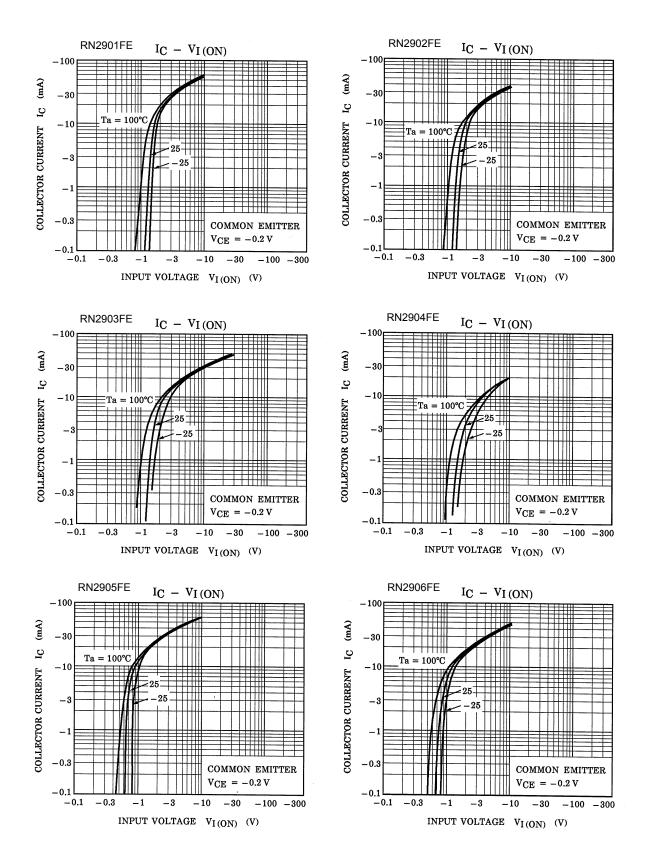
Note 1: Total rating

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

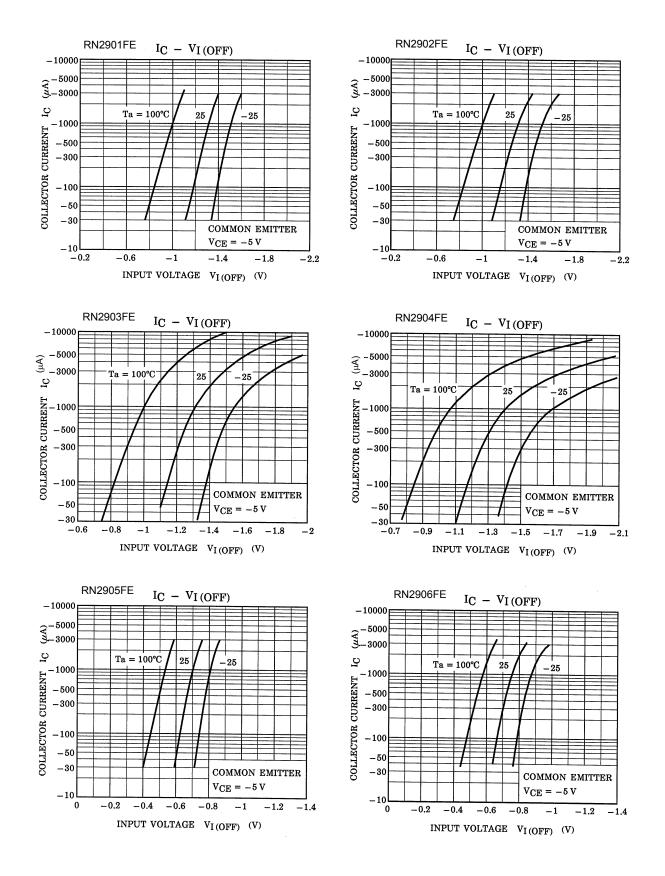
Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current	RN2901FE~2906FE	I <sub>CBO</sub>	$V_{CB} = -50 \text{ V}, \text{ I}_{E} = 0$			-100	nA
		ICEO	$V_{CE} = -50 \text{ V}, \text{ I}_{B} = 0$	_		-500	ΠA
Emitter cut-off current	RN2901FE	ІЕВО	$V_{EB} = -10 \text{ V}, \text{ I}_{C} = 0$	-0.82		-1.52	- mA
	RN2902FE			-0.38	_	-0.71	
	RN2903FE			-0.17		-0.33	
	RN2904FE			-0.082		-0.15	
	RN2905FE		$V_{EB} = -5 V, I_C = 0$	-0.078		-0.145	
	RN2906FE			-0.074		-0.138	
	RN2901FE			30		_	
	RN2902FE		V <sub>CE</sub> = -5 V, I <sub>C</sub> = -10 mA	50	_	_	
DC current gain	RN2903FE	1.		70	_	_	
	RN2904FE	hFE		80	_	_	
	RN2905FE	-		80	_	_	
	RN2906FE			80		—	
Collector-emitter saturation voltage	RN2901FE~2906FE	V <sub>CE (sat)</sub>	I <sub>C</sub> = -5 mA, I <sub>B</sub> = -0.25 mA		-0.1	-0.3	V
	RN2901FE		$V_{CE} = -0.2 \text{ V},$ $I_{C} = -5 \text{ mA}$	-1.1		-2.0	V
Input voltage (ON)	RN2902FE	-		-1.2		-2.4	
	RN2903FE	- Vi (on)		-1.3	_	-3.0	
	RN2904FE			-1.5		-5.0	
	RN2905FE			-0.6	_	-1.1	
	RN2906FE			-0.7	_	-1.3	
Input voltage (OFF)	RN2901FE~2904FE	VI (OFF)	$V_{CE} = -5 V$ , $I_C = -0.1 mA$	-1.0	_	-1.5	v
	RN2905FE, 2906FE			-0.5		-0.8	
Transition frequency	RN2901FE~2906FE	fT	$V_{CE} = -10 V,$ $I_{C} = -5 mA$		200	_	MHz
Collector output capacitance	RN2901FE~2906FE	C <sub>ob</sub>	$V_{CB} = -10 \text{ V}, \text{ I}_{E} = 0, $ f = 1 MHz	_	3	6	pF
Input resistor	RN2901FE	- R1		3.29	4.7	6.11	
	RN2902FE			7	10	13	kΩ
	RN2903FE			15.4	22	28.6	
	RN2904FE			32.9	47	61.1	
	RN2905FE			1.54	2.2	2.86	
	RN2906FE			3.29	4.7	6.11	
Resistor ratio	RN2901FE~2904FE	R1/R2	_	0.9	1.0	1.1	
	RN2905FE			0.0421	0.0468	0.0515	
	RN2906FE			0.09	0.1	0.11	

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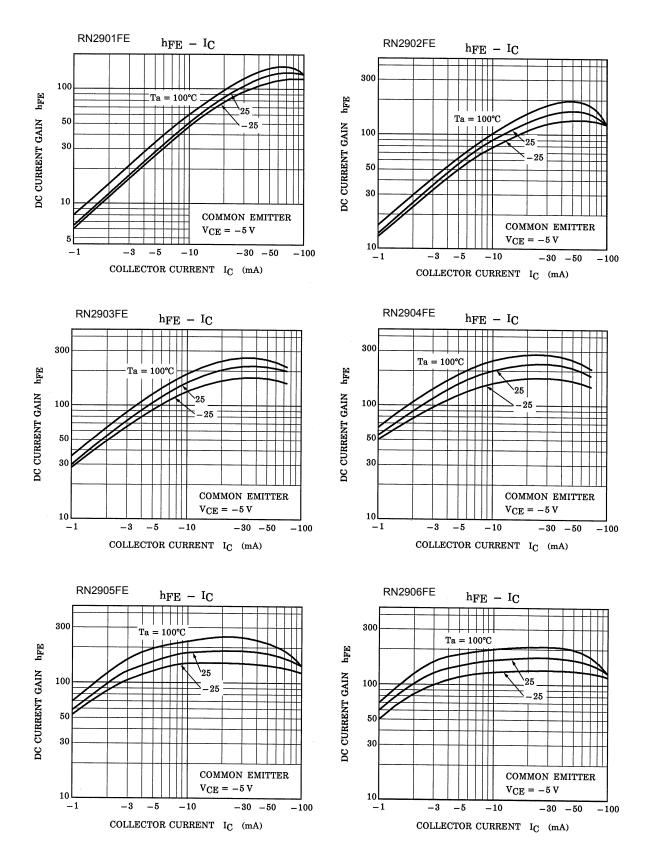
#### Q1, Q2 Common



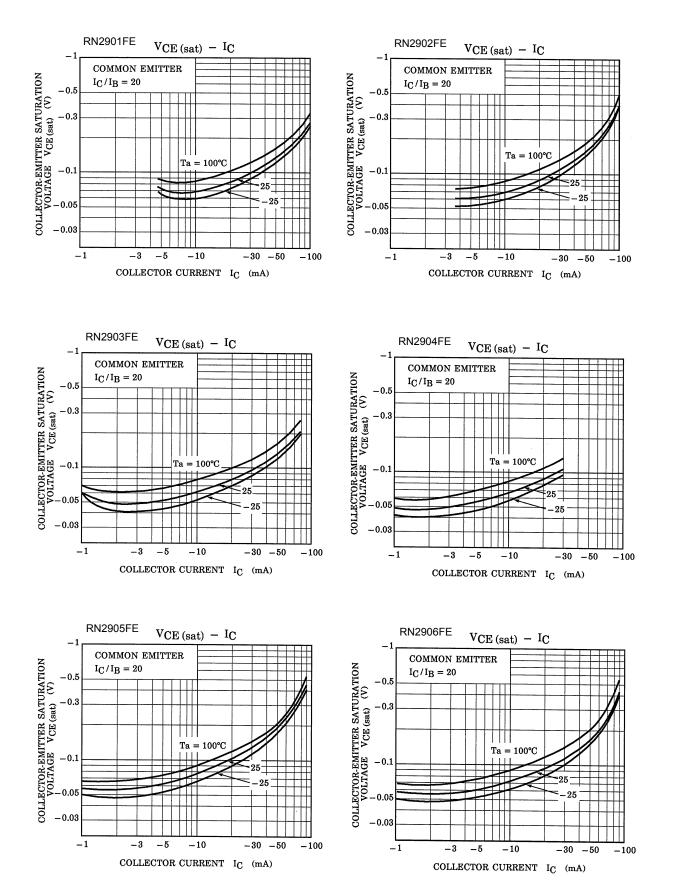
#### Q1, Q2 Common



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Type Name	Marking
RN2901FE	Type name YA
RN2902FE	Type name YB
RN2903FE	Type name YC
RN2904FE	Type name
RN2905FE	Type name YE
RN2906FE	Type name YF

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