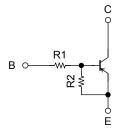
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process) (Bias Resistor Built-in Transistor)

RN2961FE,RN2962FE,RN2963FE RN2964FE,RN2965FE,RN2966FE

Switching, Inverter Circuit, Interface Circuit and **Driver Circuit Applications**

- Two devices are incorporated into an Extreme-Super-Mini (6-pin)
- 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 RN1961FE~RN1966FE

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN2961FE	4.7	4.7
RN2962FE	10	10
RN2963FE	22	22
RN2964FE	47	47
RN2965FE	2.2	47
RN2966FE	4.7	47

1.2±0.05 1.0±0.05 0.2 ± 0.05 0.5 (E1) 1. EMITTER 1 2. EMITTER 2

1.6±0.05

Unit: mm

Weight: 0.003 g (typ.)

3. BASE 2

5. BASE 1

ES6

JEDEC JEITA

TOSHIBA

4. COLLECTOR 2

6. COLLECTOR 1

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

Characteristics		Symbol	Rating	Unit	
Collector-base voltage	RN2961FE~2966FE	V _{CBO} –50		V	
Collector-emitter voltage	141429011 E -29001 E	V _{CEO}	V _{CEO} –50		
Emitter-base voltage	RN2961FE~2964FE	V _{EBO}	-10	V	
	RN2965FE, 2966FE	vEBO.	-5		
Collector current		IC	-100	mA	
Collector power dissipation	RN2961FE~2966FE	P _C (Note 1)	100	mW	
Junction temperature	KIN29011 E-29001 E	Tj	150	°C	
Storage temperature range		T _{stg}	−55~150	°C	

Equivalent Circuit (top view)

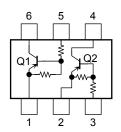
2-2N1A

(E2)

(B2)

(C2)

(B1)



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

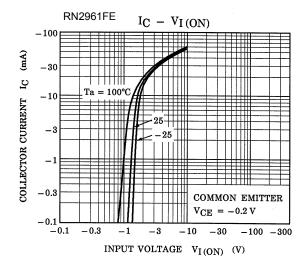
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

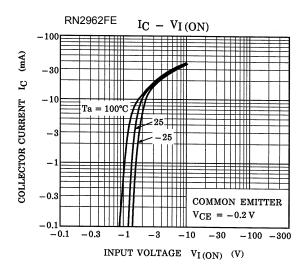
Note 1: Total rating

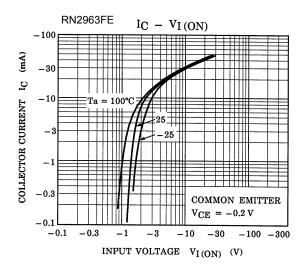


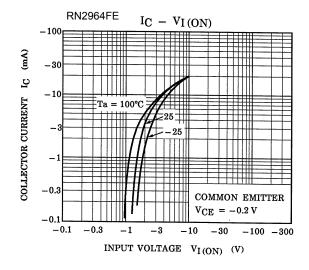
Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

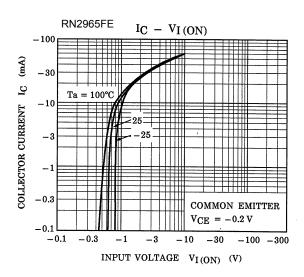
Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current	RN2961FE~2966FE	I _{CBO}	$V_{CB} = -50 \text{ V}, I_E = 0$	_	_	-100	nΛ
		I _{CEO}	$V_{CE} = -50 \text{ V}, I_B = 0$	_	_	-500	nA
Emitter cut-off current	RN2961FE	l _{EBO}	V _{EB} = -10 V, I _C = 0	-0.82	_	-1.52	mA
	RN2962FE			-0.38	_	-0.71	
	RN2963FE			-0.17	_	-0.33	
	RN2964FE			-0.082	_	-0.15	
	RN2965FE			-0.078	_	-0.145	
	RN2966FE		$V_{EB} = -5 \text{ V}, I_{C} = 0$	-0.074	_	-0.138	
	RN2961FE		V _{CE} = -5 V,	30	_	_	
	RN2962FE			50	_	_	
	RN2963FE			70	_	_	
DC current gain	RN2964FE	- h _{FE}	$I_C = -10 \text{ mA}$	80	_	_	
	RN2965FE			80	_	_	
	RN2966FE			80	_	_	
Collector-emitter saturation voltage	RN2961FE~2966FE	V _{CE} (sat)	$I_C = -5 \text{ mA},$ $I_B = -0.25 \text{ mA}$	_	-0.1	-0.3	٧
	RN2961FE	VI (ON)	$V_{CE} = -0.2 \text{ V},$ $I_{C} = -5 \text{ mA}$	-1.1	_	-2.0	V
Input voltage (ON)	RN2962FE			-1.2	_	-2.4	
	RN2963FE			-1.3	_	-3.0	
	RN2964FE			-1.5	_	-5.0	
	RN2965FE			-0.6	_	-1.1	
	RN2966FE			-0.7	_	-1.3	
Input voltage (OFF)	RN2961FE~2964FE	V _{I (OFF)}	V _{CE} = -5 V, I _C = -0.1 mA	-1.0	_	-1.5	V
	RN2965FE, 2966FE			-0.5	_	-0.8	
Transition frequency	RN2961FE~2966FE	f _T	$V_{CE} = -10 \text{ V},$ $I_{C} = -5 \text{ mA}$	_	200	_	MHz
Collector output capacitance	RN2961FE~2966FE	C _{ob}	$V_{CB} = -10 \text{ V}, I_E = 0,$ f = 1 MHz	_	3	6	pF
Input resistor	RN2961FE	- R1	_	3.29	4.7	6.11	kΩ
	RN2962FE			7	10	13	
	RN2963FE			15.4	22	28.6	
	RN2964FE			32.9	47	61.1	
	RN2965FE			1.54	2.2	2.86	
	RN2966FE			3.29	4.7	6.11	
Resistor ratio	RN2961FE~2964FE	R1/R2	_	0.9	1.0	1.1	
	RN2965FE			0.0421	0.0468	0.0515	
	RN2966FE			0.09	0.1	0.11	

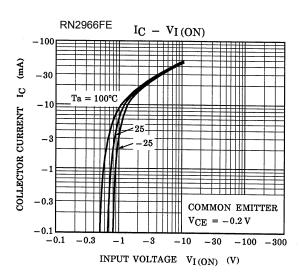


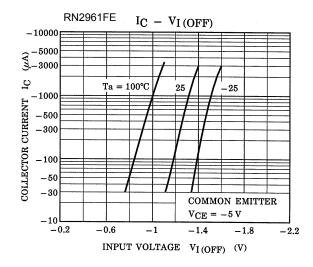


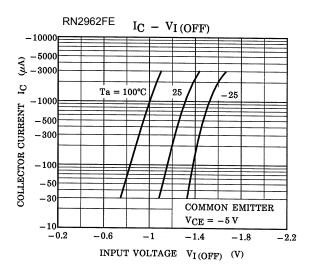


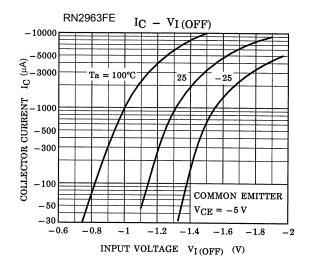


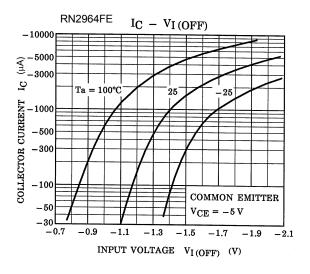


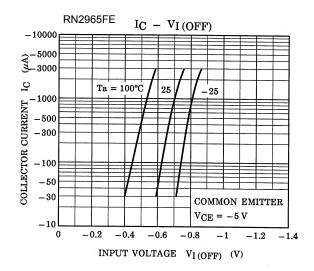


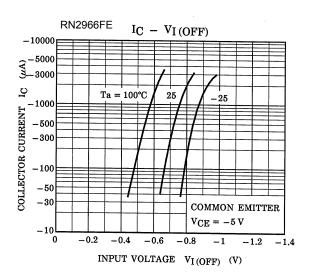


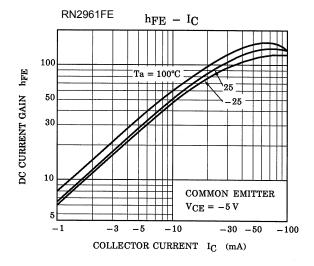


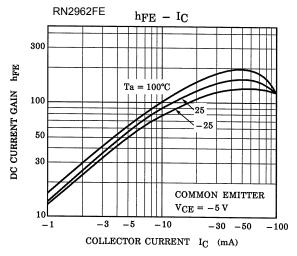


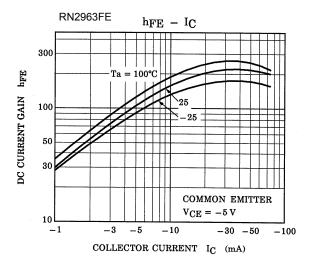


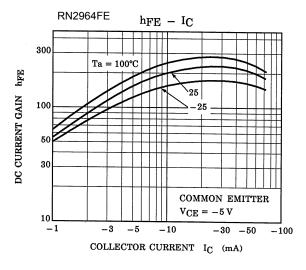


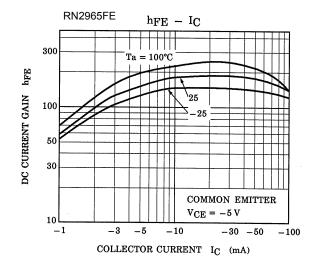


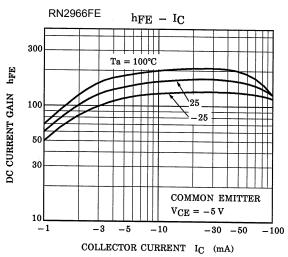


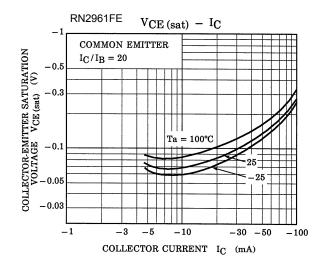


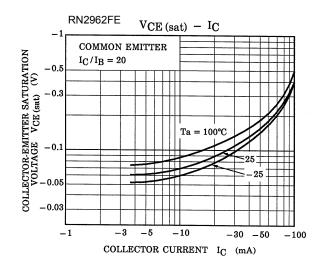


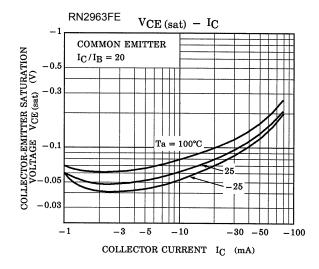


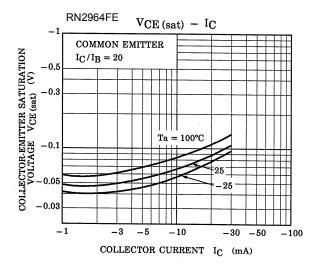


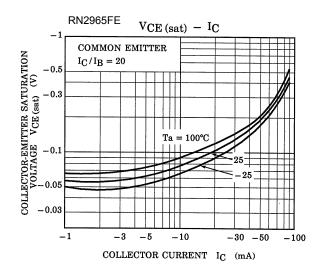


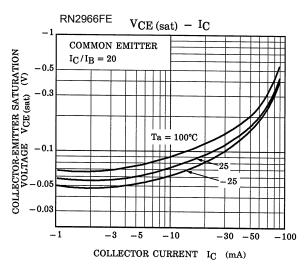












Type Name	Marking
RN2961FE	Type name Y Y A
RN2962FE	Type name Y Y B
RN2963FE	Type name Y Y C
RN2964FE	Type name Y Y D
RN2965FE	Type name Y Y E
RN2966FE	Type name YYF •

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