

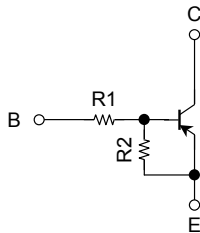
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process) (Bias Resistor Built-in Transistor)

## RN2961FE, RN2962FE, RN2963FE RN2964FE, RN2965FE, RN2966FE

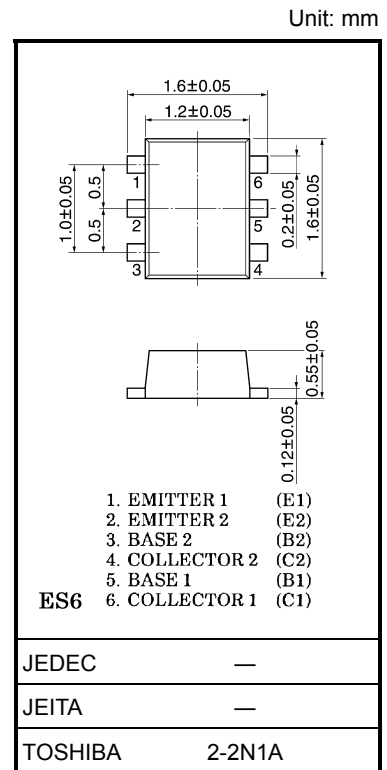
Switching, Inverter Circuit, Interface Circuit and  
Driver Circuit Applications

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



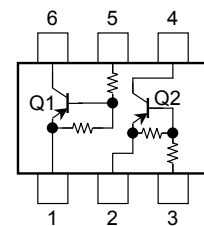
Weight: 0.003 g (typ.)

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

Characteristics		Symbol	Rating	Unit
Collector-base voltage	RN2961FE~2966FE	$V_{CB0}$	-50	V
Collector-emitter voltage		$V_{CEO}$	-50	V
Emitter-base voltage	RN2961FE~2964FE	$V_{EBO}$	-10	V
	RN2965FE, 2966FE		-5	
Collector current	RN2961FE~2966FE	$I_C$	-100	mA
Collector power dissipation		$P_C$ (Note)	100	mW
Junction temperature		$T_j$	150	°C
Storage temperature range		$T_{stg}$	-55~150	°C

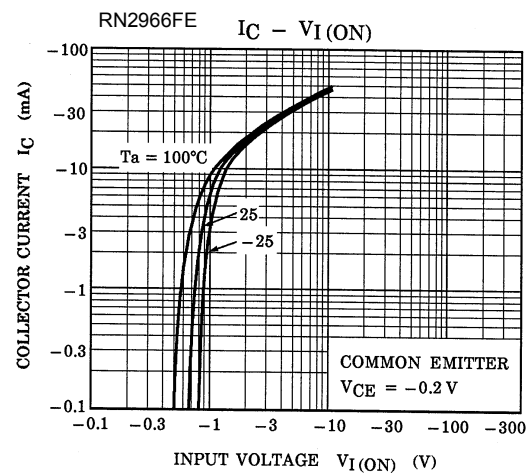
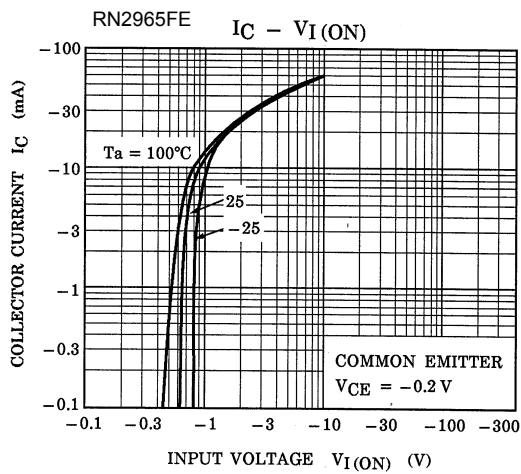
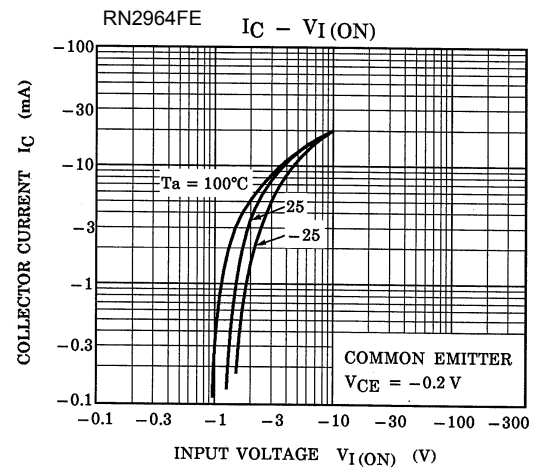
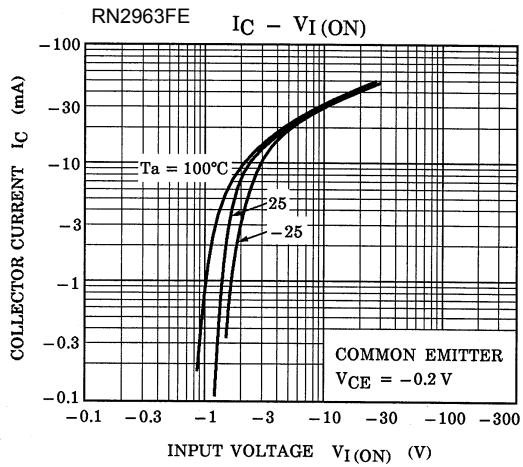
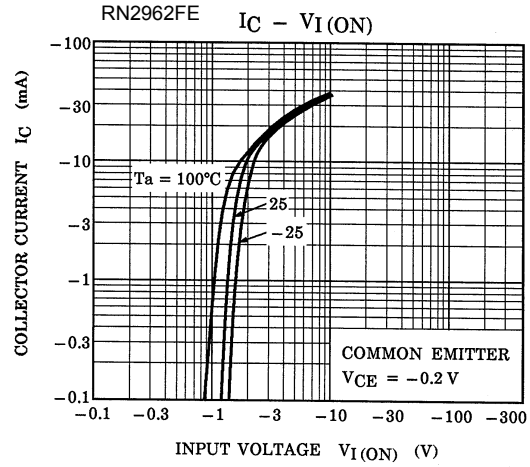
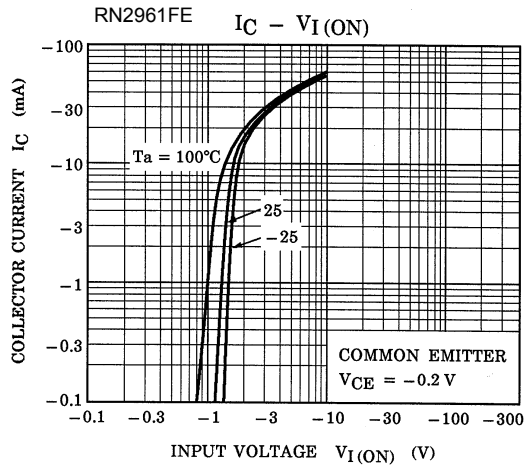
Note: Total rating

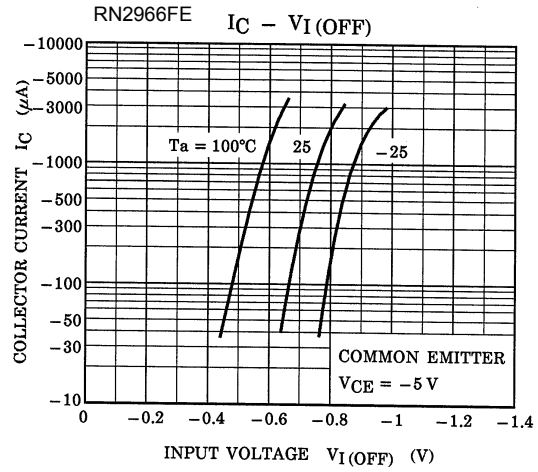
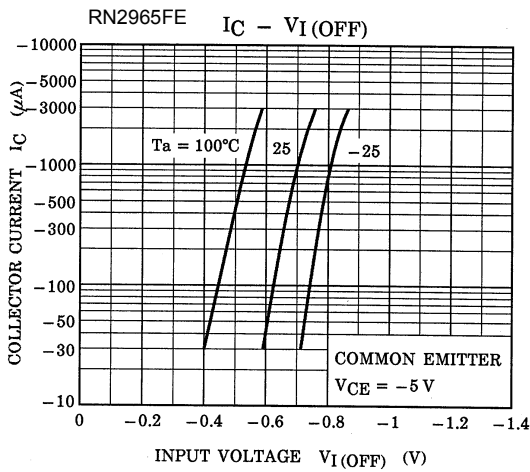
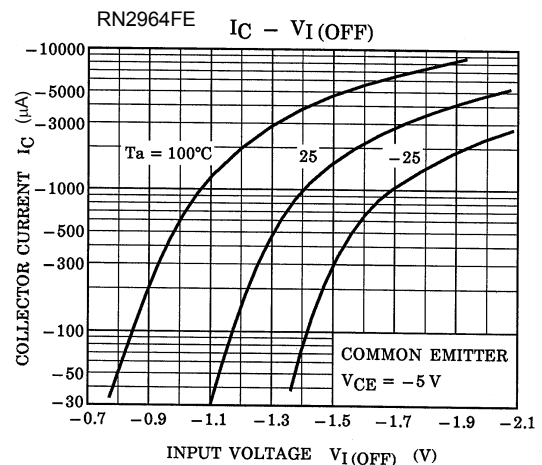
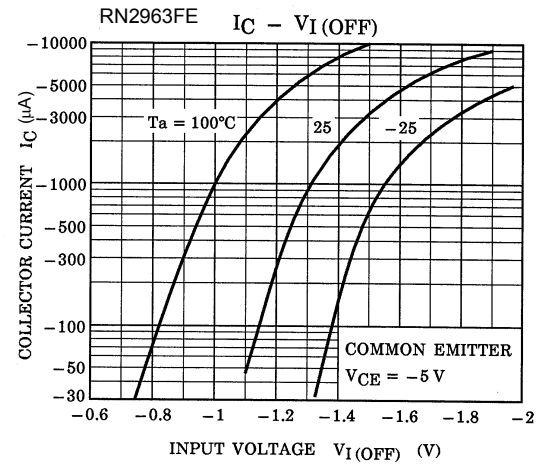
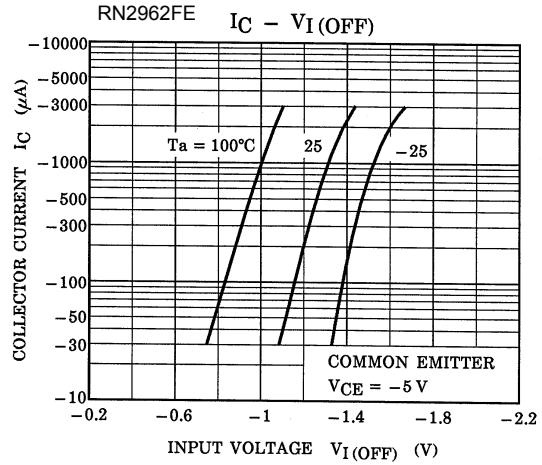
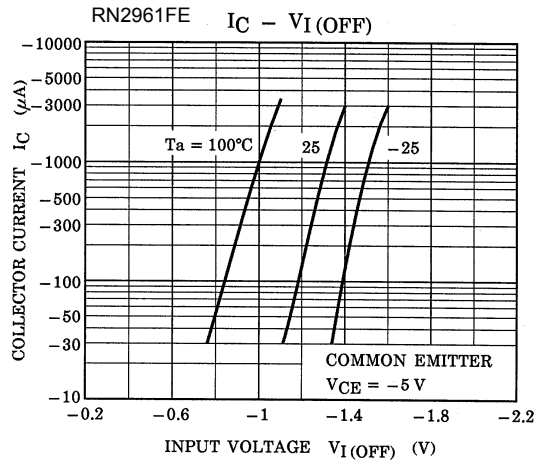
### Equivalent Circuit (top view)

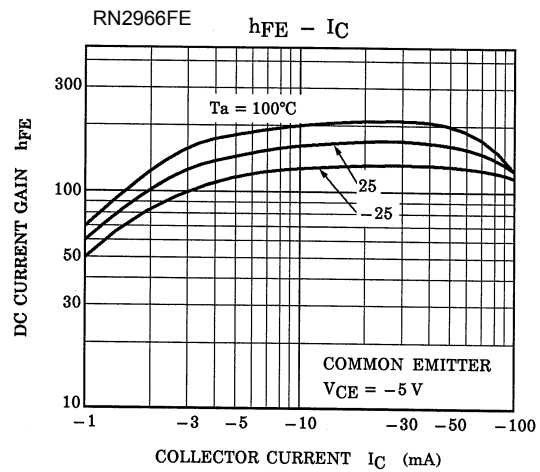
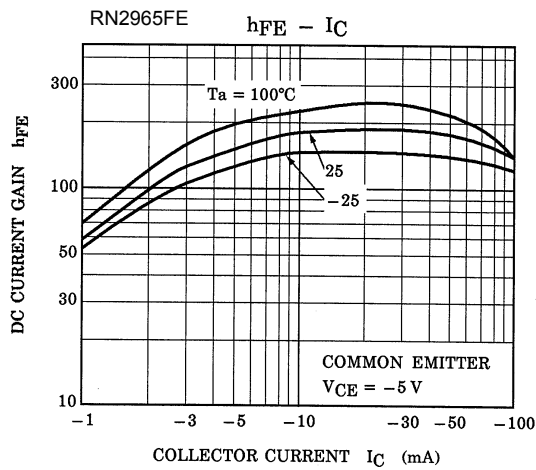
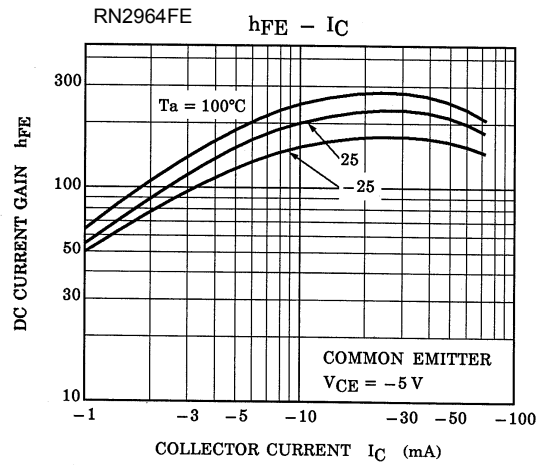
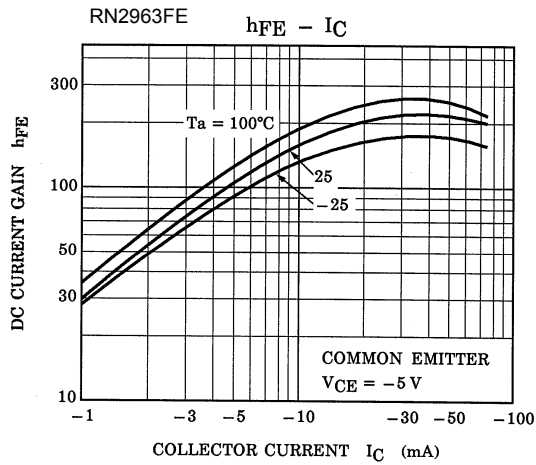
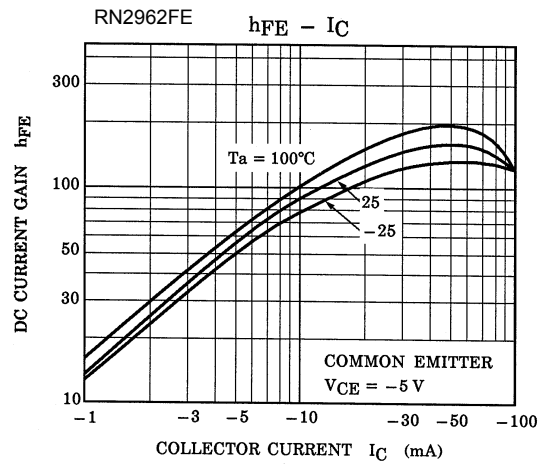
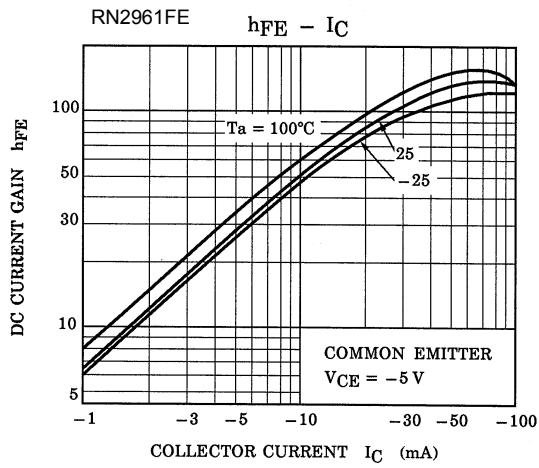


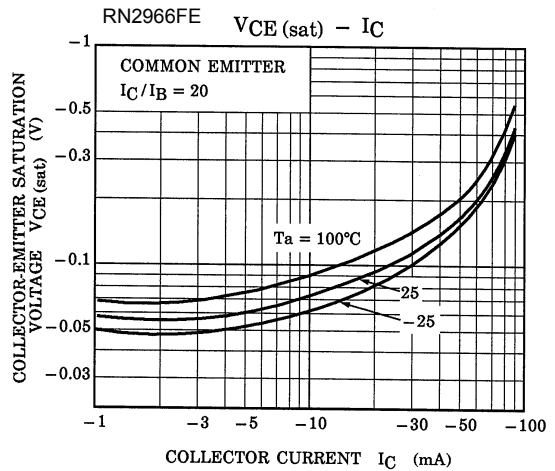
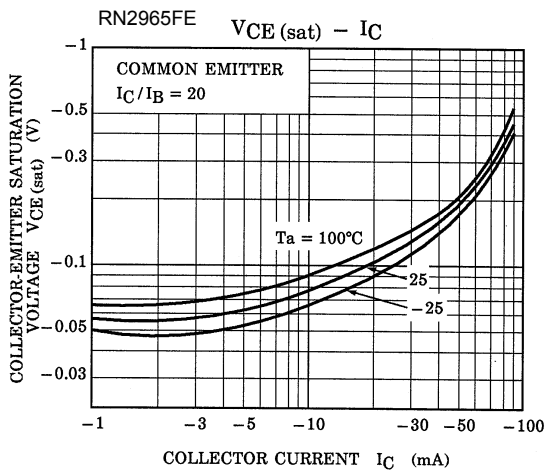
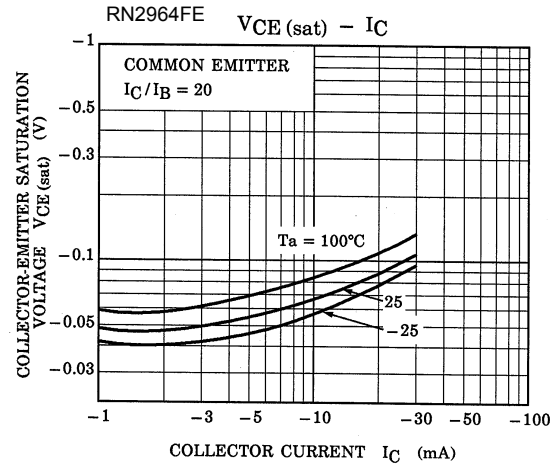
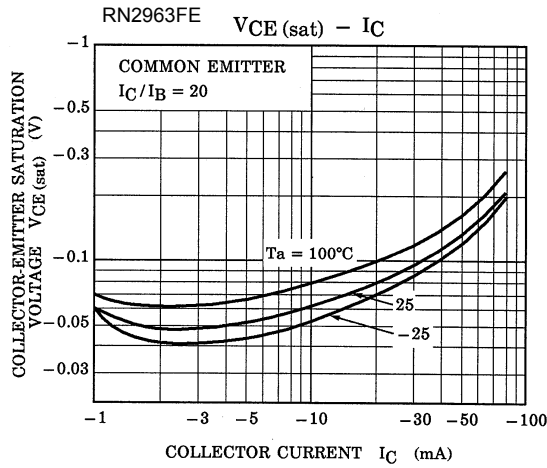
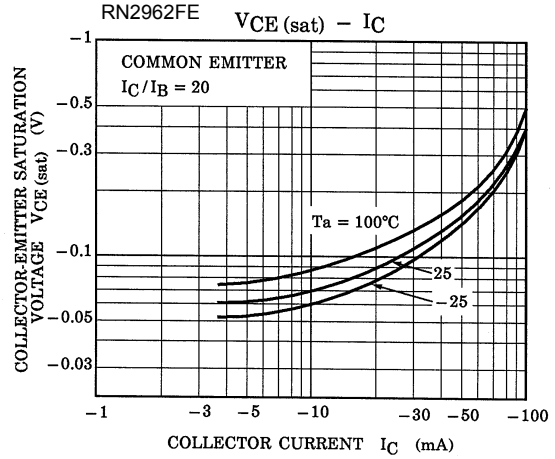
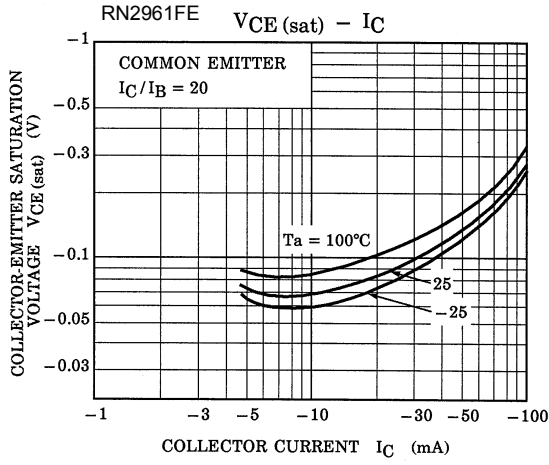
**Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)**

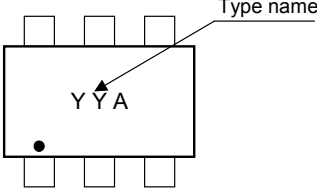
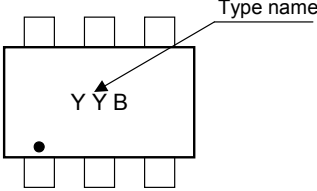
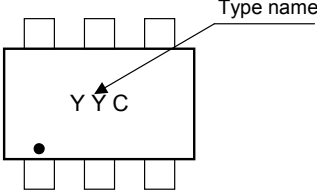
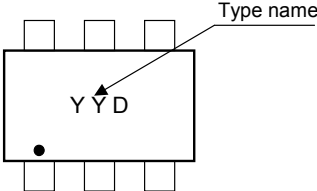
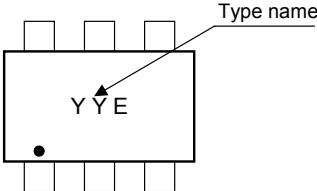
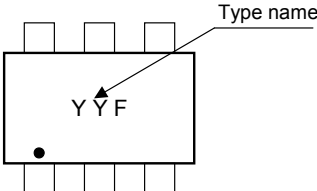
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2961FE~2966FE	$I_{CBO}$	$V_{CB} = -50\text{ V}, I_E = 0$	—	—	-100	nA
		$I_{CEO}$	$V_{CE} = -50\text{ V}, I_B = 0$	—	—	-500	
Emitter cut-off current	RN2961FE	$I_{EBO}$	$V_{EB} = -10\text{ V}, I_C = 0$	-0.82	—	-1.52	mA
	RN2962FE			-0.38	—	-0.71	
	RN2963FE			-0.17	—	-0.33	
	RN2964FE			-0.082	—	-0.15	
	RN2965FE	$V_{EB} = -5\text{ V}, I_C = 0$	-0.078	—	-0.145		
	RN2966FE		-0.074	—	-0.138		
DC current gain	RN2961FE	$h_{FE}$	$V_{CE} = -5\text{ V}, I_C = -10\text{ mA}$	30	—	—	
	RN2962FE			50	—	—	
	RN2963FE			70	—	—	
	RN2964FE			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	V
Input voltage (ON)	RN2961FE	$V_{I(ON)}$	$V_{CE} = -0.2\text{ V}, I_C = -5\text{ mA}$	-1.1	—	-2.0	V
	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	$V_{I(OFF)}$	$V_{CE} = -5\text{ V}, I_C = -0.1\text{ mA}$	-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	$C_{ob}$	$V_{CB} = -10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	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	
RN2962FE	
RN2963FE	
RN2964FE	
RN2965FE	
RN2966FE	

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