

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

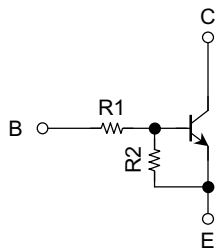
## RN1901FE, RN1902FE, RN1903FE RN1904FE, RN1905FE, RN1906FE

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

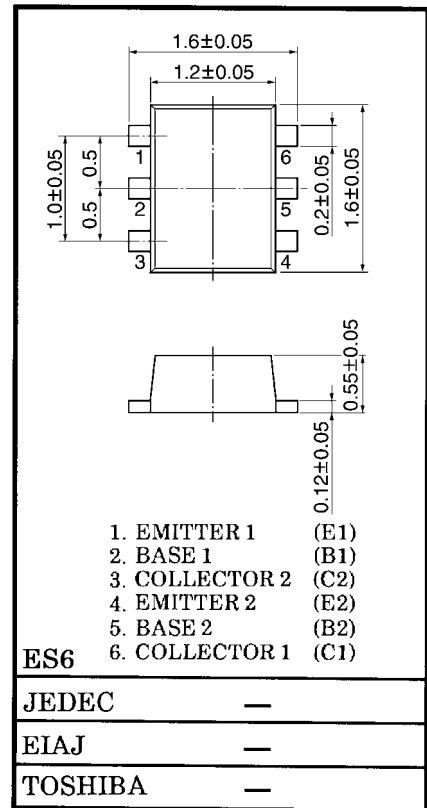
Unit in mm

- 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 enable the manufacture of ever more compact equipment and save assembly cost.
- Complementary to RN2901FE~RN2906FE

### Equivalent Circuit and Bias Resistor Values



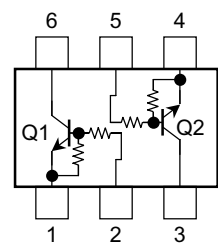
Type No.	R1 (kΩ)	R2 (kΩ)
RN1901FE	4.7	4.7
RN1902FE	10	10
RN1903FE	22	22
RN1904FE	47	47
RN1905FE	2.2	47
RN1906FE	4.7	47



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

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

### Equivalent Circuit (top view)



Note: Total rating

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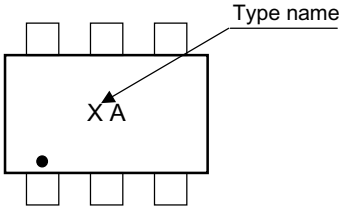
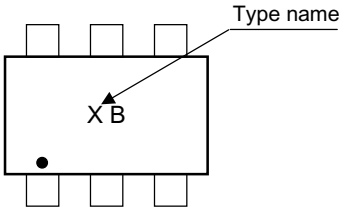
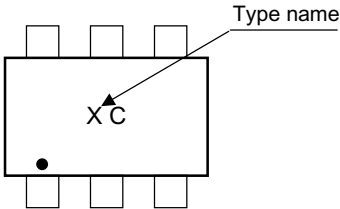
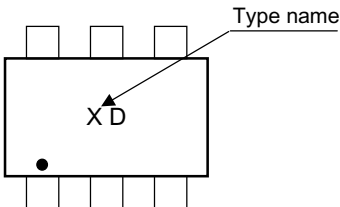
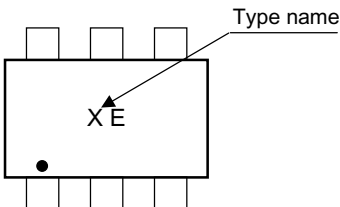
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## Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1901FE~1906FE	$I_{CBO}$	$V_{CB} = 50 \text{ V}, I_E = 0$	—	—	100	nA
		$I_{CEO}$	$V_{CE} = 50 \text{ V}, I_B = 0$	—	—	500	
Emitter cut-off current	RN1901FE	$I_{EBO}$	$V_{EB} = 10 \text{ V}, I_C = 0$	0.82	—	1.52	mA
	RN1902FE			0.38	—	0.71	
	RN1903FE			0.17	—	0.33	
	RN1904FE			0.082	—	0.15	
	RN1905FE	$I_{EBO}$	$V_{EB} = 5 \text{ V}, I_C = 0$	0.078	—	0.145	
	RN1906FE			0.074	—	0.138	
DC current gain	RN1901FE	$h_{FE}$	$V_{CE} = 5 \text{ V}, I_C = 10 \text{ mA}$	30	—	—	
	RN1902FE			50	—	—	
	RN1903FE			70	—	—	
	RN1904FE			80	—	—	
	RN1905FE			80	—	—	
	RN1906FE			80	—	—	
Collector-emitter saturation voltage	RN1901FE~1906FE	$V_{CE(sat)}$	$I_C = 5 \text{ mA}, I_B = 0.25 \text{ mA}$	—	0.1	0.3	V
Input voltage (ON)	RN1901FE	$V_{I(ON)}$	$V_{CE} = 0.2 \text{ V}, I_C = 5 \text{ mA}$	1.1	—	2.0	V
	RN1902FE			1.2	—	2.4	
	RN1903FE			1.3	—	3.0	
	RN1904FE			1.5	—	5.0	
	RN1905FE			0.6	—	1.1	
	RN1906FE			0.7	—	1.3	
Input voltage (OFF)	RN1901FE~1904FE	$V_{I(OFF)}$	$V_{CE} = 5 \text{ V}, I_C = 0.1 \text{ mA}$	1.0	—	1.5	V
	RN1905FE, 1906FE			0.5	—	0.8	
Transition frequency	RN1901FE~1906FE	$f_T$	$V_{CE} = 10 \text{ V}, I_C = 5 \text{ mA}$	—	250	—	MHz
Collector output capacitance	RN1901FE~1906FE	$C_{ob}$	$V_{CB} = 10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$	—	3	6	pF
Input resistor	RN1901FE	R1	—	3.29	4.7	6.11	kΩ
	RN1902FE			7	10	13	
	RN1903FE			15.4	22	28.6	
	RN1904FE			32.9	47	61.1	
	RN1905FE			1.54	2.2	2.86	
	RN1906FE			3.29	4.7	6.11	
Resistor ratio	RN1901FE~1904FE	R1/R2	—	0.9	1.0	1.1	
	RN1905FE			0.0421	0.0468	0.0515	
	RN1906FE			0.09	0.1	0.11	

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Type Name	Marking
RN1901FE	
RN1902FE	
RN1903FE	
RN1904FE	
RN1905FE	
RN1906FE	