

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

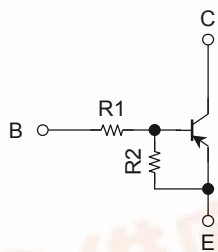
**RN2701JE, RN2702JE, RN2703JE
RN2704JE, RN2705JE, RN2706JE**

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

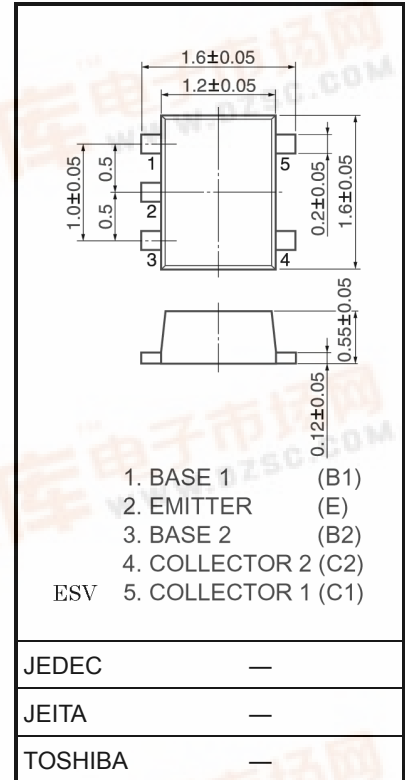
Unit: mm

- Two devices are incorporated into an Extreme-Super-Mini (5 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 RN1701JE~RN1706JE

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN2701JE	4.7	4.7
RN2702JE	10	10
RN2703JE	22	22
RN2704JE	47	47
RN2705JE	2.2	47
RN2706JE	4.7	47



1. BASE 1 (B1)
 2. EMITTER (E)
 3. BASE 2 (B2)
 4. COLLECTOR 2 (C2)
 5. COLLECTOR 1 (C1)
- ESV

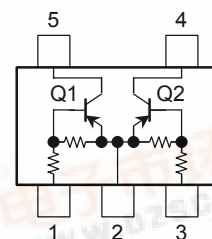
Weight: g (typ.)

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

Characteristics		Symbol	Rating	Unit
Collector-base voltage	RN2701JE~RN2706JE	V_{CBO}	-50	V
Collector-emitter voltage		V_{CEO}	-50	V
Emitter-base voltage	RN2701JE~RN2704JE	V_{EBO}	-10	V
	RN2705JE, RN2706JE		-5	
Collector current	RN2701JE~RN2706JE	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

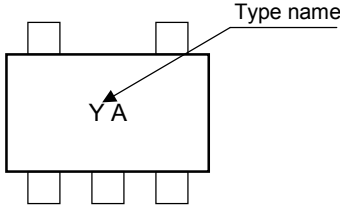
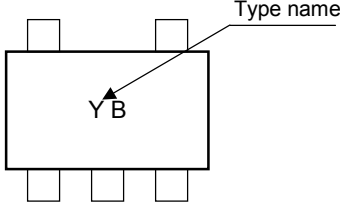
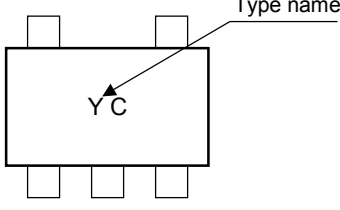
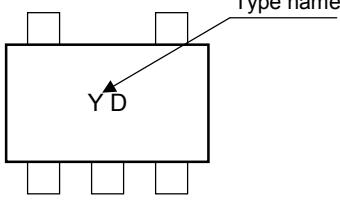
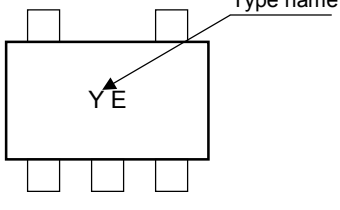
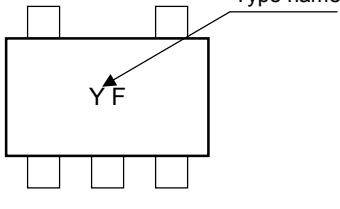
Equivalent Circuit (top view)



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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2701JE~2706JE	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	RN2701JE	I_{EBO}	$V_{EB} = -10\text{ V}, I_C = 0$	-0.82	—	-1.52	mA
	RN2702JE			-0.38	—	-0.71	
	RN2703JE			-0.17	—	-0.33	
	RN2704JE			-0.082	—	-0.15	
	RN2705JE	$V_{EB} = -5\text{ V}, I_C = 0$	-0.078	—	-0.145		
	RN2706JE		-0.074	—	-0.138		
DC current gain	RN2701JE	h_{FE}	$V_{CE} = -5\text{ V}, I_C = -10\text{ mA}$	30	—	—	
	RN2702JE			50	—	—	
	RN2703JE			70	—	—	
	RN2704JE			80	—	—	
	RN2705JE			80	—	—	
	RN2706JE			80	—	—	
Collector-emitter saturation voltage	RN2701JE~2706JE	$V_{CE(sat)}$	$I_C = -5\text{ mA}, I_B = -0.25\text{ mA}$	—	-0.1	-0.3	V
Input voltage (ON)	RN2701JE	$V_{I(ON)}$	$V_{CE} = -0.2\text{ V}, I_C = -5\text{ mA}$	-1.1	—	-2.0	V
	RN2702JE			-1.2	—	-2.4	
	RN2703JE			-1.3	—	-3.0	
	RN2704JE			-1.5	—	-5.0	
	RN2705JE			-0.6	—	-1.1	
	RN2706JE			-0.7	—	-1.3	
Input voltage (OFF)	RN2701JE~2704JE	$V_{I(OFF)}$	$V_{CE} = -5\text{ V}, I_C = -0.1\text{ mA}$	-1.0	—	-1.5	V
	RN2705JE, 2706JE			-0.5	—	-0.8	
Transition frequency	RN2701JE~2706JE	f_T	$V_{CE} = -10\text{ V}, I_C = -5\text{ mA}$	—	200	—	MHz
Collector output capacitance	RN2701JE~2706JE	C_{ob}	$V_{CB} = -10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	3	6	pF
Input resistor	RN2701JE	R_1	—	3.29	4.7	6.11	k Ω
	RN2702JE			7	10	13	
	RN2703JE			15.4	22	28.6	
	RN2704JE			32.9	47	61.1	
	RN2705JE			1.54	2.2	2.86	
	RN2706JE			3.29	4.7	6.11	
Resistor ratio	RN2701JE~2704JE	R_1/R_2	—	0.9	1.0	1.1	
	RN2705JE			0.0421	0.0468	0.0515	
	RN2706JE			0.09	0.1	0.11	

Type Name	Marking
-----------	---------

RN2701JE	 <p>The diagram shows a rectangular component with two pins on the top and three on the bottom. An arrow points from the label 'Y A' to the top-left pin. Another arrow points from the label 'Type name' to the top-right pin.</p>
RN2702JE	 <p>The diagram shows a rectangular component with two pins on the top and three on the bottom. An arrow points from the label 'Y B' to the top-left pin. Another arrow points from the label 'Type name' to the top-right pin.</p>
RN2703JE	 <p>The diagram shows a rectangular component with two pins on the top and three on the bottom. An arrow points from the label 'Y C' to the top-left pin. Another arrow points from the label 'Type name' to the top-right pin.</p>
RN2704JE	 <p>The diagram shows a rectangular component with two pins on the top and three on the bottom. An arrow points from the label 'Y D' to the top-left pin. Another arrow points from the label 'Type name' to the top-right pin.</p>
RN2705JE	 <p>The diagram shows a rectangular component with two pins on the top and three on the bottom. An arrow points from the label 'Y E' to the top-left pin. Another arrow points from the label 'Type name' to the top-right pin.</p>
RN2706JE	 <p>The diagram shows a rectangular component with two pins on the top and three on the bottom. An arrow points from the label 'Y F' to the top-left pin. Another arrow points from the label 'Type name' to the top-right pin.</p>

RESTRICTIONS ON PRODUCT USE

000707EAA

- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.