

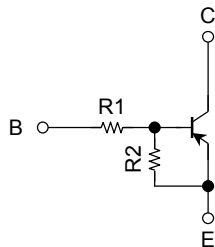
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

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

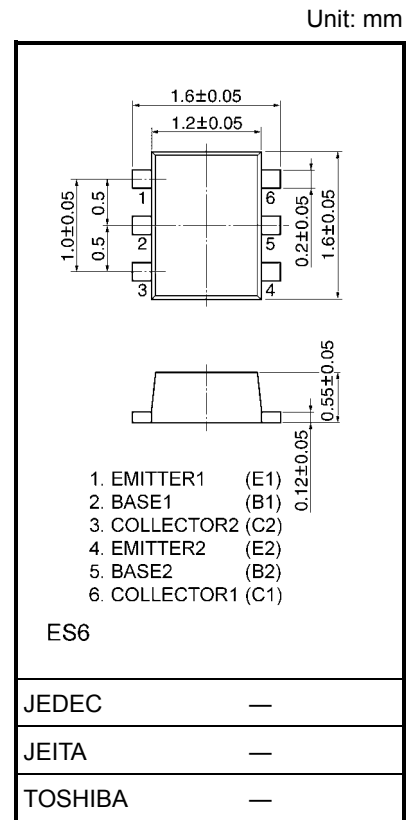
Switching, Inverter Circuit, Interface Circuit and  
Driver Circuit Applications.

- 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 enable the manufacture of ever more compact equipment and save 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      |



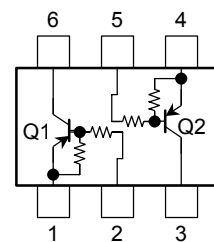
Weight: g (typ.)

### 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      |      |
| 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   |

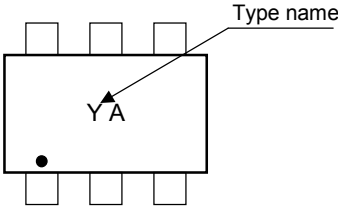
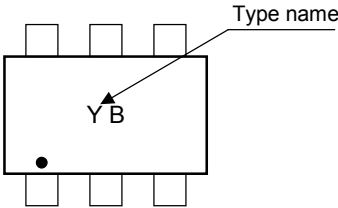
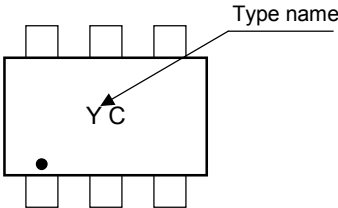
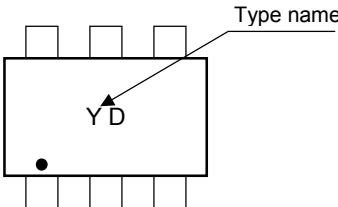
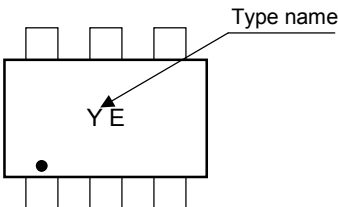
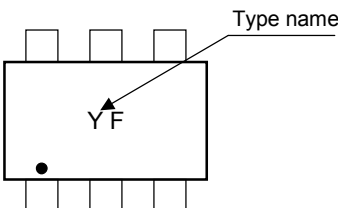
Note: Total rating

### Equivalent Circuit (top view)



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

| Characteristics                      |                  | Symbol        | Test Condition                                     | Min    | Typ.   | Max    | Unit       |
|--------------------------------------|------------------|---------------|----------------------------------------------------|--------|--------|--------|------------|
| Collector cut-off current            | RN2901FE~2906FE  | $I_{CBO}$     | $V_{CB} = -50\text{ V}, I_E = 0$                   | —      | —      | -100   | nA         |
|                                      |                  | $I_{CEO}$     | $V_{CE} = -50\text{ V}, I_B = 0$                   | —      | —      | -500   |            |
| Emitter cut-off current              | RN2901FE         | $I_{EBO}$     | $V_{EB} = -10\text{ V}, I_C = 0$                   | -0.82  | —      | -1.52  | mA         |
|                                      | RN2902FE         |               |                                                    | -0.38  | —      | -0.71  |            |
|                                      | RN2903FE         |               |                                                    | -0.17  | —      | -0.33  |            |
|                                      | RN2904FE         |               |                                                    | -0.082 | —      | -0.15  |            |
|                                      | RN2905FE         | $I_{EBO}$     | $V_{EB} = -5\text{ V}, I_C = 0$                    | -0.078 | —      | -0.145 |            |
|                                      | RN2906FE         |               |                                                    | -0.074 | —      | -0.138 |            |
| DC current gain                      | RN2901FE         | $h_{FE}$      | $V_{CE} = -5\text{ V}, I_C = -10\text{ mA}$        | 30     | —      | —      |            |
|                                      | RN2902FE         |               |                                                    | 50     | —      | —      |            |
|                                      | RN2903FE         |               |                                                    | 70     | —      | —      |            |
|                                      | RN2904FE         |               |                                                    | 80     | —      | —      |            |
|                                      | RN2905FE         |               |                                                    | 80     | —      | —      |            |
|                                      | RN2906FE         |               |                                                    | 80     | —      | —      |            |
| Collector-emitter saturation voltage | RN2901FE~2906FE  | $V_{CE(sat)}$ | $I_C = -5\text{ mA}, I_B = -0.25\text{ mA}$        | —      | -0.1   | -0.3   | V          |
| Input voltage (ON)                   | RN2901FE         | $V_{I(ON)}$   | $V_{CE} = -0.2\text{ V}, I_C = -5\text{ mA}$       | -1.1   | —      | -2.0   | V          |
|                                      | RN2902FE         |               |                                                    | -1.2   | —      | -2.4   |            |
|                                      | RN2903FE         |               |                                                    | -1.3   | —      | -3.0   |            |
|                                      | RN2904FE         |               |                                                    | -1.5   | —      | -5.0   |            |
|                                      | RN2905FE         |               |                                                    | -0.6   | —      | -1.1   |            |
|                                      | RN2906FE         |               |                                                    | -0.7   | —      | -1.3   |            |
| Input voltage (OFF)                  | RN2901FE~2904FE  | $V_{I(OFF)}$  | $V_{CE} = -5\text{ V}, I_C = -0.1\text{ mA}$       | -1.0   | —      | -1.5   | V          |
|                                      | RN2905FE, 2906FE |               |                                                    | -0.5   | —      | -0.8   |            |
| Transition frequency                 | RN2901FE~2906FE  | $f_T$         | $V_{CE} = -10\text{ V}, I_C = -5\text{ mA}$        | —      | 200    | —      | MHz        |
| Collector output capacitance         | RN2901FE~2906FE  | $C_{ob}$      | $V_{CB} = -10\text{ V}, I_E = 0, f = 1\text{ MHz}$ | —      | 3      | 6      | pF         |
| Input resistor                       | RN2901FE         | R1            | —                                                  | 3.29   | 4.7    | 6.11   | k $\Omega$ |
|                                      | RN2902FE         |               |                                                    | 7      | 10     | 13     |            |
|                                      | 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   |            |

| Type Name | Marking                                                                             |
|-----------|-------------------------------------------------------------------------------------|
| RN2901FE  |    |
| RN2902FE  |    |
| RN2903FE  |   |
| RN2904FE  |  |
| RN2905FE  |  |
| RN2906FE  |  |

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