

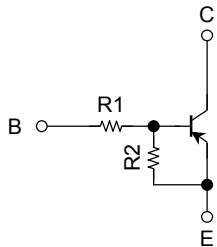
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

RN2967FE, RN2968FE, RN2969FE

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

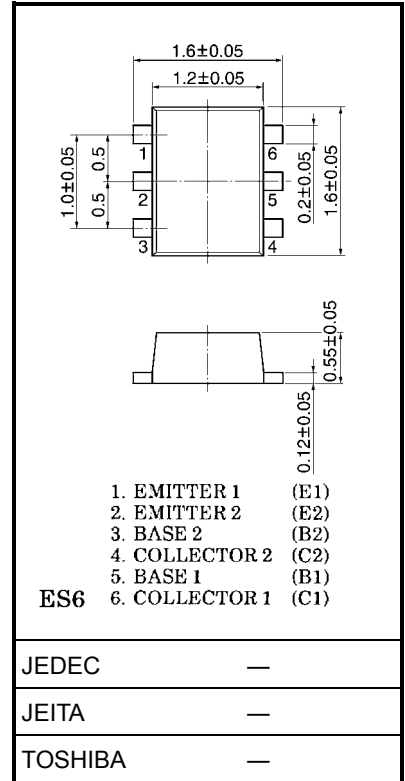
- Two devices are incorporated into an Extreme-Super-Mini (6 pin) package.
- Incorporating a bias resistor into a transistor reduces parts count. Reducing the parts count enable the manufacture of ever more compact equipment and save assembly cost.
- Complementary to RN1967FE~RN1969FE

Equivalent Circuit and Bias Resistor Values



| Type No. | R1 (kΩ) | R2 (kΩ) |
|----------|---------|---------|
| RN2967FE | 10 | 47 |
| RN2968FE | 22 | 47 |
| RN2969FE | 47 | 22 |

Unit: mm



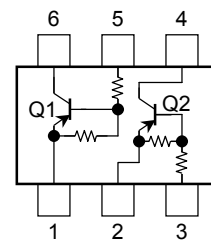
Weight: g (typ.)

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 | RN2967FE | V_{EBO} | -6 | V |
| | RN2968FE | | -7 | |
| | RN2969FE | | -15 | |
| 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 |

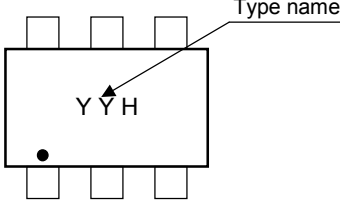
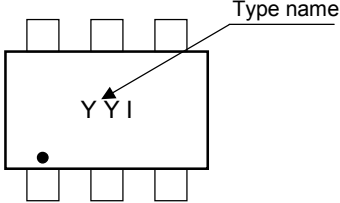
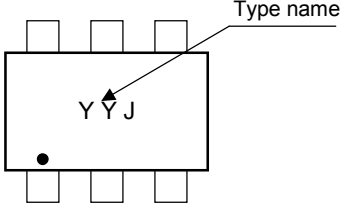
Note: Total rating

Equivalent Circuit (top view)



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

| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|-----------------|---------------|--|--------|-------|--------|------------|
| Collector cut-off current | RN2967FE~2969FE | 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 | RN2967FE | I_{EBO} | $V_{EB} = -6\text{ V}, I_C = 0$ | -0.081 | — | -0.15 | mA |
| | RN2968FE | | $V_{EB} = -7\text{ V}, I_C = 0$ | -0.078 | — | -0.145 | |
| | RN2969FE | | $V_{EB} = -15\text{ V}, I_C = 0$ | -0.167 | — | -0.311 | |
| DC current gain | RN2967FE | h_{FE} | $V_{CE} = -5\text{ V}, I_C = -10\text{ mA}$ | 80 | — | — | |
| | RN2968FE | | | 80 | — | — | |
| | RN2969FE | | | 70 | — | — | |
| Collector-emitter saturation voltage | RN2967FE~2969FE | $V_{CE(sat)}$ | $I_C = -5\text{ mA}, I_B = -0.25\text{ mA}$ | — | -0.1 | -0.3 | V |
| Input voltage (ON) | RN2967FE | $V_{I(ON)}$ | $V_{CE} = -0.2\text{ V}, I_C = -5\text{ mA}$ | -0.7 | — | -1.8 | V |
| | RN2968FE | | | -1.0 | — | -2.6 | |
| | RN2969FE | | | -2.2 | — | -5.8 | |
| Input voltage (OFF) | RN2967FE | $V_{I(OFF)}$ | $V_{CE} = -5\text{ V}, I_C = -0.1\text{ mA}$ | -0.5 | — | -1.0 | V |
| | RN2968FE | | | -0.6 | — | -1.16 | |
| | RN2969FE | | | -1.5 | — | -2.6 | |
| Transition frequency | RN2967FE~2969FE | f_T | $V_{CE} = -10\text{ V}, I_C = -5\text{ mA}$ | — | 200 | — | MHz |
| Collector output capacitance | RN2967FE~2969FE | C_{ob} | $V_{CB} = -10\text{ V}, I_E = 0, f = 1\text{ MHz}$ | — | 3 | 6 | pF |
| Input resistor | RN2967FE | R1 | — | 7 | 10 | 13 | k Ω |
| | RN2968FE | | | 15.4 | 22 | 28.6 | |
| | RN2969FE | | | 32.9 | 47 | 61.1 | |
| Resistor ratio | RN2967FE | R1/R2 | — | 0.191 | 0.2 | 0.232 | |
| | RN2968FE | | | 0.421 | 0.468 | 0.515 | |
| | RN2969FE | | | 1.92 | 2.14 | 2.35 | |

| Type Name | Marking |
|-----------|--|
| RN2967FE |  A diagram of a rectangular component with six pins (three on top, three on bottom). The marking 'Y Y H' is printed in the center. A small black dot is located at the bottom-left corner. An arrow labeled 'Type name' points to the 'H' character. |
| RN2968FE |  A diagram of a rectangular component with six pins (three on top, three on bottom). The marking 'Y Y I' is printed in the center. A small black dot is located at the bottom-left corner. An arrow labeled 'Type name' points to the 'I' character. |
| RN2969FE |  A diagram of a rectangular component with six pins (three on top, three on bottom). The marking 'Y Y J' is printed in the center. A small black dot is located at the bottom-left corner. An arrow labeled 'Type name' points to the 'J' character. |

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