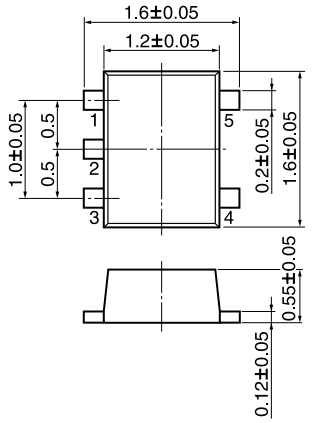
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

# RN2707JE, RN2708JE, RN2709JE

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

- 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.
- Wide range of resistor values are available to use in various circuit designs.
- Complementary to RN1707JE~1709JE

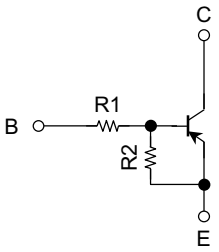
Unit in mm




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

| | |
|---|---|
| ESV | |
| JEDEC | — |
| EIAJ | — |
| TOSHIBA | — |

## Equivalent Circuit and Bias Resistor Values



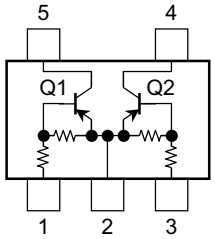

| Type No. | R1 (kΩ) | R2 (kΩ) |
|---|---|---|
| RN2707JE | 10 | 47 |
| RN2708JE | 22 | 47 |
| RN2709JE | 47 | 22 |

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

| Characteristics | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Collector-base voltage | RN1707JE~1709JE | $V_{CBO}$ | −50 | V |
| Collector-emitter voltage | | $V_{CEO}$ | −50 | V |
| Emitter-base voltage | RN1707JE | $V_{EBO}$ | −6 | V |
| | RN1708JE | | −7 | |
| | RN1709JE | | −15 | |
| Collector current | RN1707JE~1709JE | $I_C$ | −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)

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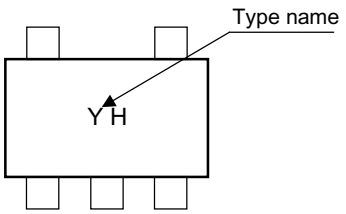
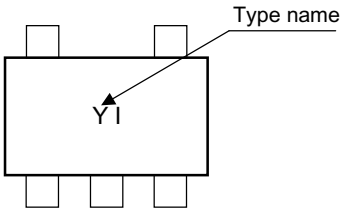
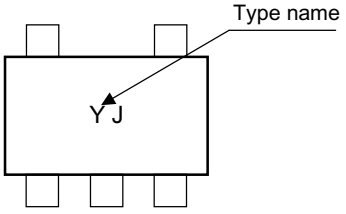
## Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|
| Collector cut-off current | RN2707JE~2709JE | $I_{CBO}$ | $V_{CB}$ = –50 V, $I_E$ = 0 | — | — | –100 | nA |
| | | $I_{CEO}$ | $V_{CE}$ = –50 V, $I_B$ = 0 | — | — | –500 | |
| Emitter cut-off current | RN2707JE | $I_{EBO}$ | $V_{EB}$ = –6 V, $I_C$ = 0 | –0.081 | — | –0.15 | mA |
| | RN2708JE | | $V_{EB}$ = –7 V, $I_C$ = 0 | –0.078 | — | –0.145 | |
| | RN2709JE | | $V_{EB}$ = –15 V, $I_C$ = 0 | –0.167 | — | –0.311 | |
| DC current gain | RN2707JE | $h_{FE}$ | $V_{CE}$ = –5 V, $I_C$ = –10 mA | 80 | — | — | |
| | RN2708JE | | | 80 | — | — | |
| | RN2709JE | | | 70 | — | — | |
| Collector-emitter saturation voltage | RN2707JE~2709JE | $V_{CE\ (sat)}$ | $I_C$ = –5 mA, $I_B$ = –0.25 mA | — | –0.1 | –0.3 | V |
| Input voltage (ON) | RN2707JE | $V_{I\ (ON)}$ | $V_{CE}$ = –0.2 V, $I_C$ = –5 mA | –0.7 | — | –1.8 | V |
| | RN2708JE | | | –1.0 | — | –2.6 | |
| | RN2709JE | | | –2.2 | — | –5.8 | |
| Input voltage (OFF) | RN2707JE | $V_{I\ (OFF)}$ | $V_{CE}$ = –5 V, $I_C$ = –0.1 mA | –0.5 | — | –1.0 | V |
| | RN2708JE | | | –0.6 | — | –1.16 | |
| | RN2709JE | | | –1.5 | — | –2.6 | |
| Transition frequency | RN2707JE~2709JE | $f_T$ | $V_{CE}$ = –10 V, $I_C$ = –5 mA | — | 200 | — | MHz |
| Collector output capacitance | RN2707JE~2710JE | $C_{ob}$ | $V_{CB}$ = –10 V, $I_E$ = 0, f = 1 MHz | — | 3 | 6 | pF |
| Input resistor | RN2707JE | R1 | — | 7 | 10 | 13 | kΩ |
| | RN2708JE | | | 15.4 | 22 | 28.6 | |
| | RN2709JE | | | 32.9 | 47 | 61.1 | |
| Resistor ratio | RN2707JE | R1/R2 | — | 0.191 | 0.213 | 0.232 | |
| | RN2708JE | | | 0.421 | 0.468 | 0.515 | |
| | RN2709JE | | | 1.92 | 2.14 | 2.35 | |

| Type Name | Marking |
|---|---|
| RN2707JE |   |
| RN2708JE |   |
| RN2709JE |   |