

Bipolar Transistors Silicon PNP Epitaxial Type (PCT Process)(Bias Resistor built-in Transistor)

RN2907FE/08FE/09FE

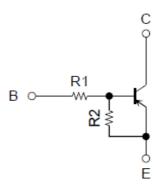
1. Applications

- · Switching
- · Inverter Circuits
- · Interfacing
- · Driver Circuits

2. Features

- (1) AEC-Q101 qualified (Please see the orderable part number list)
- (2) Small package (Dual type)
- (3) The integrated bias resistor reduces the number of external parts required, making it possible to reduce system size and assembly time.
- (4) Complementary to RN1907FE to RN1909FE

3. Equivalent Circuit

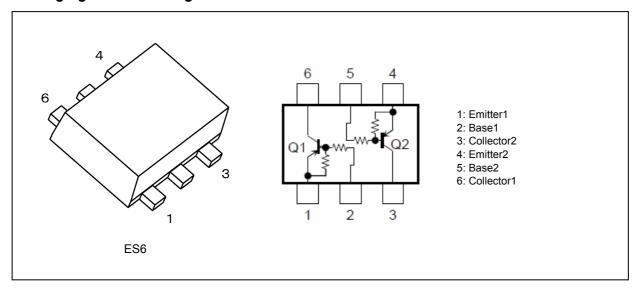


4. Bias Resistor Values

| Part No. | R1 (kΩ) | R2 (kΩ) |
|----------|---------|---------|
| RN2907FE | 10 | 47 |
| RN2908FE | 22 | 47 |
| RN2909FE | 47 | 22 |



5. Packaging and Pin Assignment



6. Orderable part number

| Orderable part number | | AEC-Q101 | | Note | |
|-----------------------|---------------|----------|----------|----------------|----------|
| RN2907FE | RN2907FE,LF | _ | | General Use | |
| | RN2907FE,LXGF | YES | (Note 1) | Unintended Use | (Note 1) |
| | RN2907FE,LXHF | YES | | Automotive Use | |
| RN2908FE | RN2908FE,LF | _ | | General Use | |
| | RN2908FE,LXGF | YES | (Note 1) | Unintended Use | (Note 1) |
| | RN2908FE,LXHF | YES | | Automotive Use | |
| RN2909FE | RN2909FE,LF | _ | | General Use | |
| | RN2909FE,LXGF | YES | (Note 1) | Unintended Use | (Note 1) |
| | RN2909FE,LXHF | YES | | Automotive Use | |

Note 1: For more information, please contact our sales or use the inquiry form on our website.

7. Absolute Maximum Ratings (Note) (Unless otherwise specified, T_a = 25 °C) (Q1, Q2 Common)

| Characteristics | | Symbol | Rating | Unit |
|--------------------------------------|-------------------|------------------|------------|------|
| Collector-base voltage | RN2907FE~RN2909FE | V_{CBO} | -50 | V |
| Collector-emitter voltage | | V_{CEO} | -50 | |
| Emitter-base voltage | RN2907FE | V_{EBO} | -6 | ٧ |
| | RN2908FE | | -7 | |
| | RN2909FE | | -15 | |
| Collector current | RN2907FE~RN2909FE | I _C | -100 | mA |
| Collector power dissipation (Note 1) | | P _C | 100 | mW |
| Junction temperature | | Tj | 150 | °C |
| Storage temperature | | T _{stg} | -55 to 150 | |

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1: Total rating



8. Electrical Characteristics (Unless otherwise specified, T_a = 25 °C) (Q1, Q2 Common)

| Characteristics | | Symbol | Test Condition | Min | Тур. | Max | Unit |
|--------------------------------------|--|----------------------|--|--------|-------|--------|------|
| Collector cut-off current | ollector cut-off current RN2907FE~ RN2909FE | | $V_{CB} = -50 \text{ V}, I_{E} = 0 \text{ mA}$ | _ | _ | -100 | nA |
| | | | $V_{CE} = -50 \text{ V}, I_{B} = 0 \text{ mA}$ | _ | _ | -500 | |
| Emitter cut-off current | RN2907FE | I _{EBO} | | | _ | -0.15 | mA |
| | RN2908FE | | V _{EB} = -7 V, I _C = 0 mA | -0.078 | _ | -0.145 | |
| | RN2909FE | | V _{EB} = -15 V, I _C = 0 mA | -0.167 | _ | -0.311 | |
| DC current gain | RN2907FE | h _{FE} | $V_{CE} = -5 \text{ V, } I_{C} = -10 \text{ mA}$ | 80 | _ | _ | _ |
| | RN2908FE | | | 80 | _ | _ | |
| | RN2909FE | | | 70 | _ | _ | |
| Collector-emitter saturation voltage | RN2907FE~ RN2909FE | V _{CE(sat)} | I _C = -5 mA, I _B = -0.25 mA | _ | -0.1 | -0.3 | V |
| Input voltage (ON) | RN2907FE | V _{I(ON)} | V_{CE} = -0.2 V, I_{C} = -5 mA | -0.7 | _ | -1.8 | V |
| | RN2908FE | | | -1.0 | _ | -2.6 | |
| | RN2909FE | | | -2.2 | _ | -5.8 | |
| Input voltage (OFF) | RN2907FE | V _{I(OFF)} | $V_{CE} = -5 \text{ V}, I_{C} = -0.1 \text{ mA}$ | -0.5 | _ | -1.0 | V |
| | RN2908FE | | | -0.6 | _ | -1.16 | |
| | RN2909FE | | | -1.5 | _ | -2.6 | |
| Transition frequency | RN2907FE~ RN2909FE | f _T | V_{CE} = -10 V, I_{C} = -5 mA | _ | 200 | _ | MHz |
| Collector output capacitance | RN2907FE~ RN2909FE | C _{ob} | V _{CB} = -10 V, I _E = 0 mA, f = 1 MHz | _ | 3 | 6 | pF |
| Input resistance | RN2907FE | R ₁ | - | 7 | 10 | 13 | kΩ |
| | RN2908FE | | | 15.4 | 22 | 28.6 | |
| | RN2909FE | | | 32.9 | 47 | 61.1 | |
| Resistor ratio | RN2907FE | R1/R2 | - | 0.191 | 0.213 | 0.232 | _ |
| | RN2908FE | | | 0.421 | 0.468 | 0.515 | |
| | RN2909FE | | | 1.92 | 2.14 | 2.35 | |

9. Marking

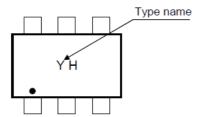


Fig. 9.1 Mraking RN2907FE

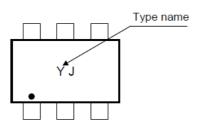


Fig. 9.3 Mraking RN2909FE

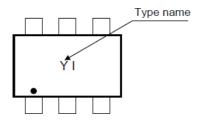
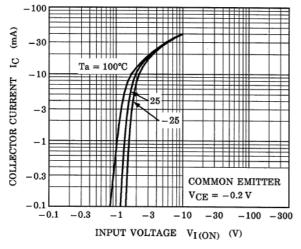


Fig. 9.2 Mraking RN2908FE



10. Characteristics Curves (Note)(Q1, Q2 Common)



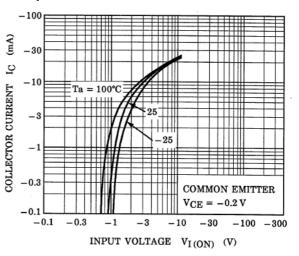


Fig. 10.1 RN2907FE I_C-V_{I(ON)}

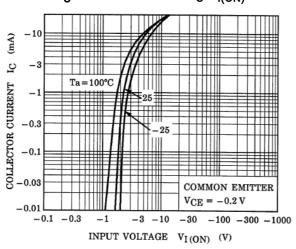


Fig. 10.2 RN2908FE I_C-V_{I(ON)}

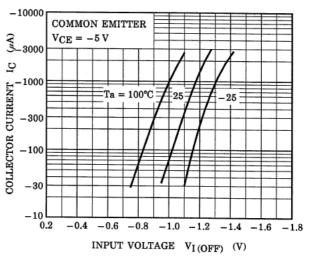


Fig. 10.3 RN2909FE I_C-V_{I(ON)}

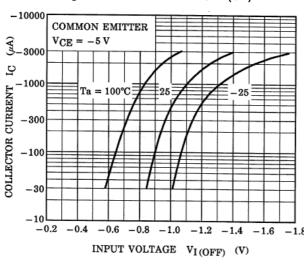


Fig. 10.4 RN2907FE I_C-V_{I(OFF)}

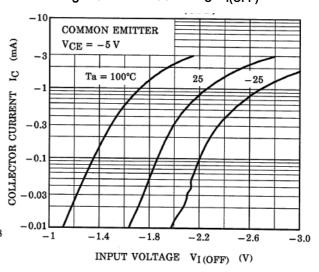
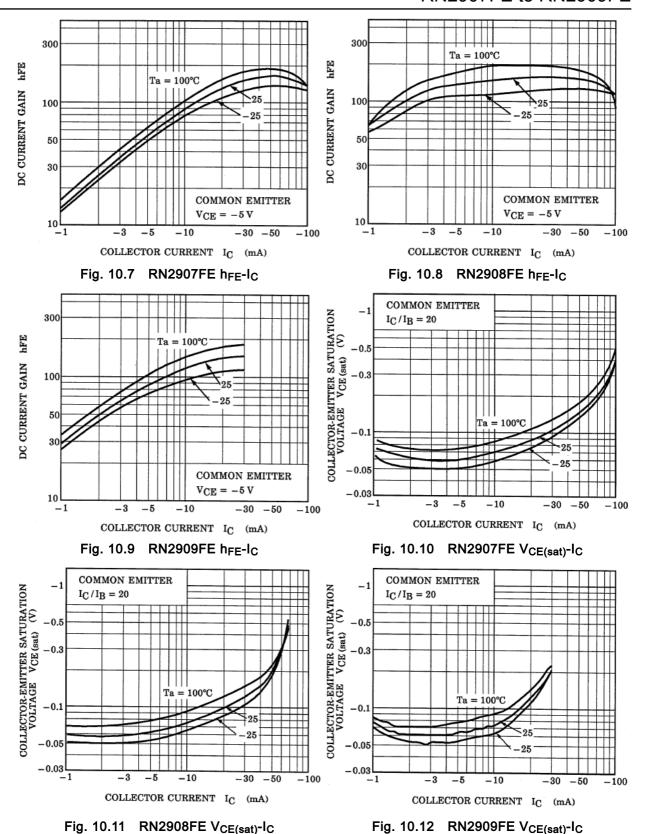


Fig. 10.5 RN2908FE I_C-V_{I(OFF)}

Fig. 10.6 RN2909FE I_C-V_{I(OFF)}



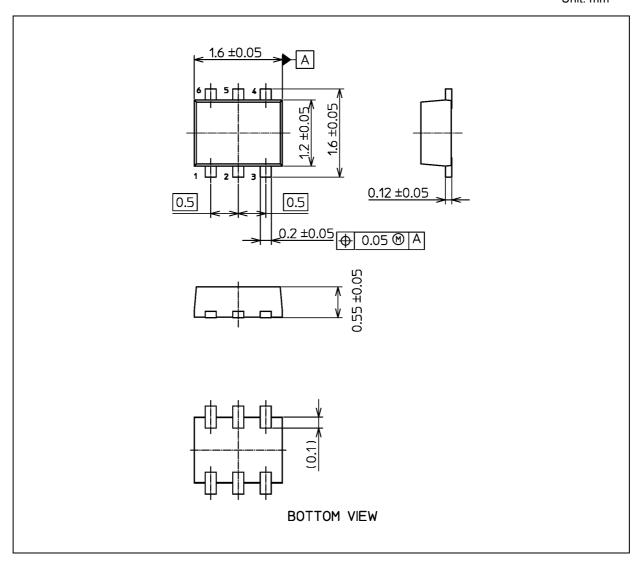


Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.



Package Dimensions

Unit: mm



Weight: 3.0 mg (typ.)

| | Package Name(s) |
|-----------------|-----------------|
| TOSHIBA: 1-2X1S | |
| Nickname: ES6 | |



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