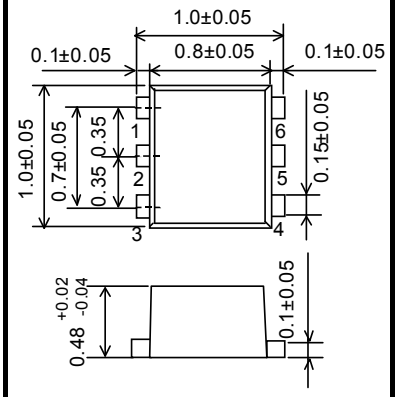
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

# RN2907FS,RN2908FS,RN2909FS

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

- Two devices are incorporated into a fine pitch small mold (6-pin) package.
- Incorporating a bias resistor into a transistor reduces parts count. Reducing the parts count enables the manufacture of ever more compact equipment and lowers assembly cost.
- Complementary to RN1907FS to RN1909FS

Unit: mm



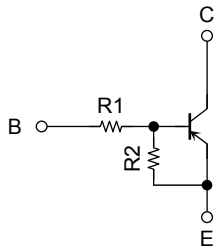

1.EMITTER1 (E1)
2.BASE1 (B1)
3.COLLECTOR2 (C2)
4.EMITTER2 (E2)
5.BASE2 (B2)
6.COLLECTOR1 (C1)

fS6

| | |
|---|---|
| JEDEC | — |
| JEITA | — |
| TOSHIBA | 2-1F1D |

Weight: 1 mg (typ.)

## Equivalent Circuit and Bias Resistor Values

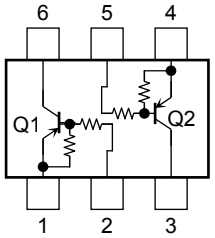



| Type No. | R1 (kΩ) | R2 (kΩ) |
|---|---|---|
| RN2907FS | 10 | 47 |
| RN2908FS | 22 | 47 |
| RN2909FS | 47 | 22 |

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

| Characteristics | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Collector-base voltage | RN2907FS to RN2909FS | $V_{CBO}$ | −20 | V |
| Collector-emitter voltage | | $V_{CEO}$ | −20 | V |
| Emitter-base voltage | RN2907FS | $V_{EBO}$ | −6 | V |
| | RN2908FS | | −7 | |
| | RN2909FS | | −15 | |
| Collector current | RN2907FS to RN2909FS | $I_C$ | −50 | mA |
| Collector power dissipation | | $P_C$* | 50 | mW |
| Junction temperature | | $T_j$ | 150 | °C |
| Storage temperature range | | $T_{stg}$ | −55 to 150 | °C |

## Equivalent Circuit (top view)



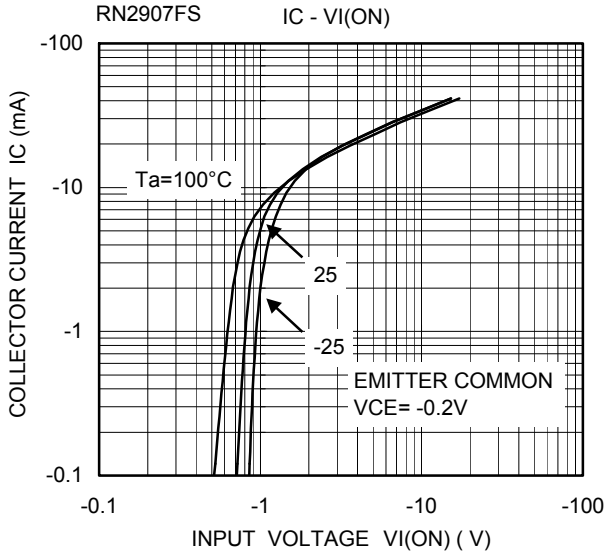

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

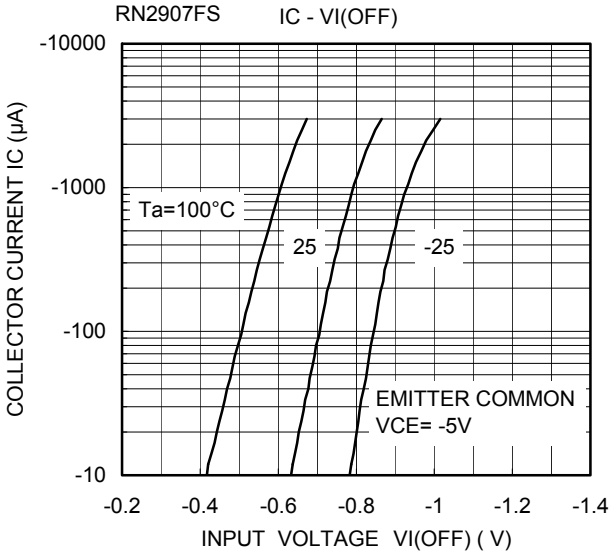
*: Total rating

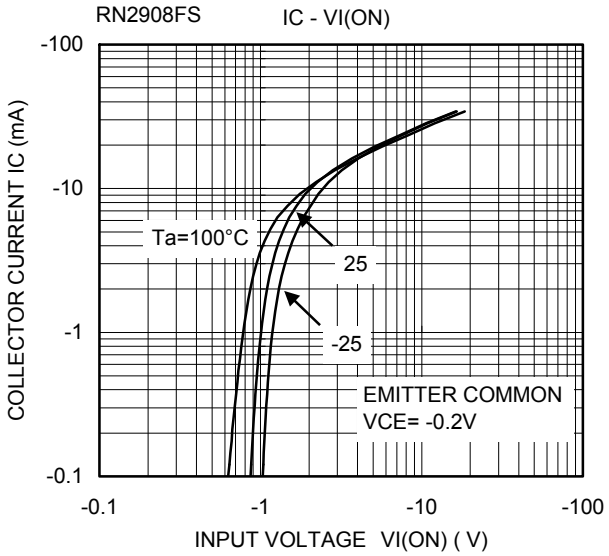
## Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

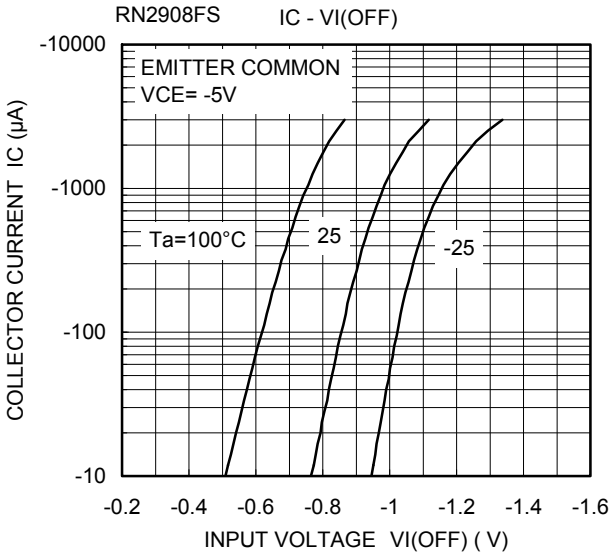
| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|
| Collector cut-off current | RN2907FS to 2909FS | $I_{CBO}$ | $V_{CB}$ = –20 V, $I_E$ = 0 | — | — | –100 | nA |
| | | $I_{CEO}$ | $V_{CE}$ = –20 V, $I_B$ = 0 | — | — | –500 | |
| Emitter cut-off current | RN2907FS | $I_{EBO}$ | $V_{EB}$ = –6 V, $I_C$ = 0 | –0.088 | — | –0.131 | mA |
| | RN2908FS | | $V_{EB}$ = –7 V, $I_C$ = 0 | –0.085 | — | –0.126 | |
| | RN2909FS | | $V_{EB}$ = –15 V, $I_C$ = 0 | –0.182 | — | –0.271 | |
| DC current gain | RN2907FS | $h_{FE}$ | $V_{CE}$ = –5 V, $I_C$ = –10 mA | 120 | — | — | |
| | RN2908FS | | | 120 | — | — | |
| | RN2909FS | | | 100 | — | — | |
| Collector-emitter saturation voltage | RN2907FS to 2909FS | $V_{CE\ (sat)}$ | $I_C$ = –5 mA, $I_B$ = –0.25 mA | — | — | –0.15 | V |
| Input voltage (ON) | RN2907FS | $V_{I\ (ON)}$ | $V_{CE}$ = –0.2 V, $I_C$ = –5 mA | –0.7 | — | –1.5 | V |
| | RN2908FS | | | –0.8 | — | –2.2 | |
| | RN2909FS | | | –1.6 | — | –5.0 | |
| Input voltage (OFF) | RN2907FS | $V_{I\ (OFF)}$ | $V_{CE}$ = –5 V, $I_C$ = –0.1 mA, | –0.5 | — | –1.0 | V |
| | RN2908FS | | | –0.6 | — | –1.1 | |
| | RN2909FS | | | –1.3 | — | –2.6 | |
| Collector output capacitance | RN2907FS to 2909FS | $C_{ob}$ | $V_{CB}$ = –10 V, $I_E$ = 0, f = 1 MHz | — | 1.2 | — | pF |
| Input resistor | RN2907FS | R1 | — | 8 | 10 | 12 | kΩ |
| | RN2908FS | | | 17.6 | 22 | 26.4 | |
| | RN2909FS | | | 37.6 | 47 | 56.4 | |
| Resistor ratio | RN2907FS | R1/R2 | — | 0.17 | 0.213 | 0.255 | |
| | RN2908FS | | | 0.374 | 0.468 | 0.562 | |
| | RN2909FS | | | 1.71 | 2.14 | 2.56 | |

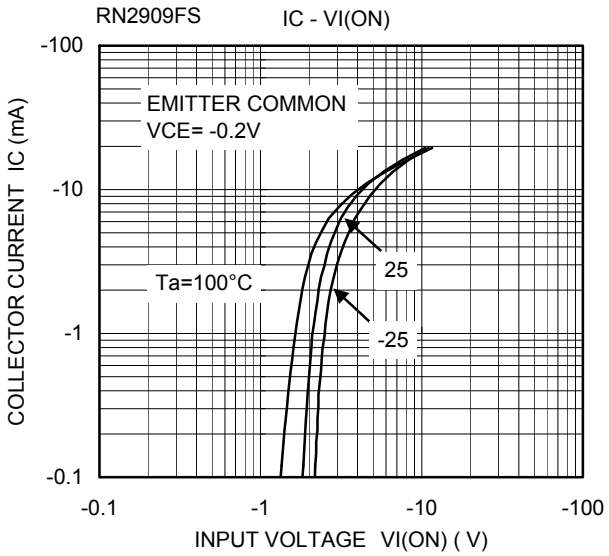
## Q1, Q2 Common

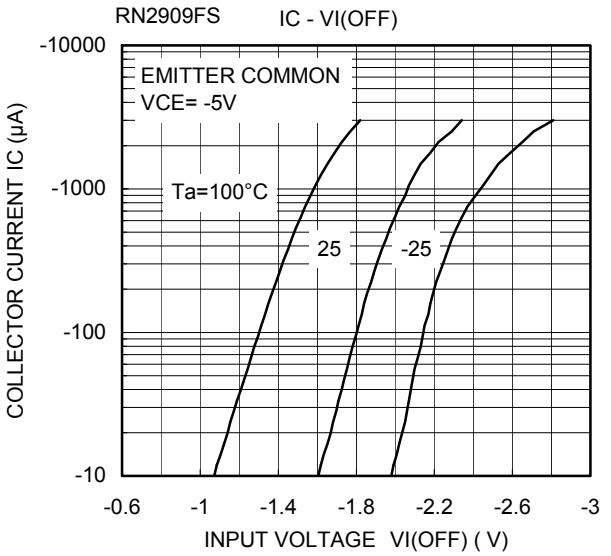


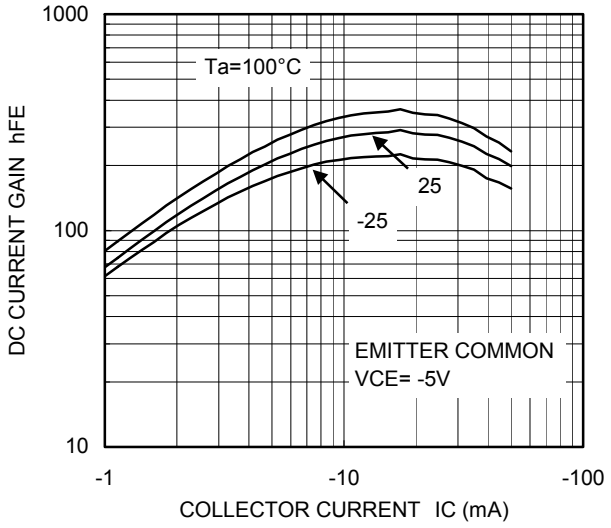



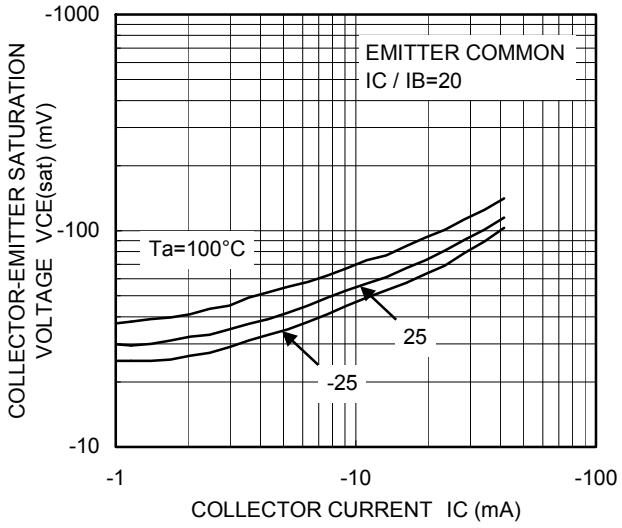



## Q1, Q2 Common

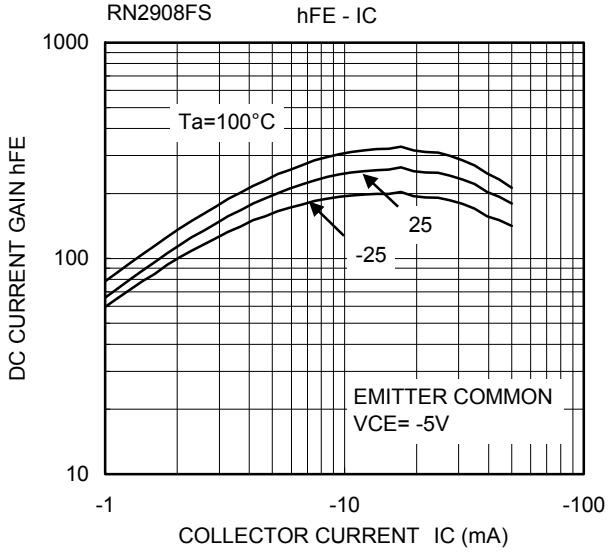
RN2907FS hFE - IC



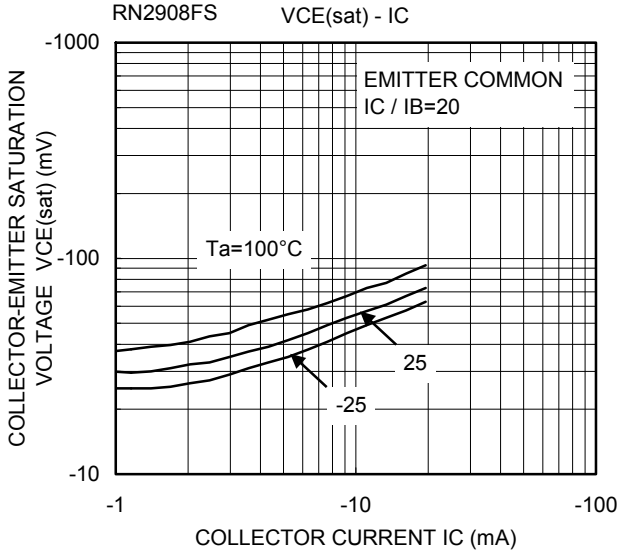

RN2907FS VCE(sat) - IC



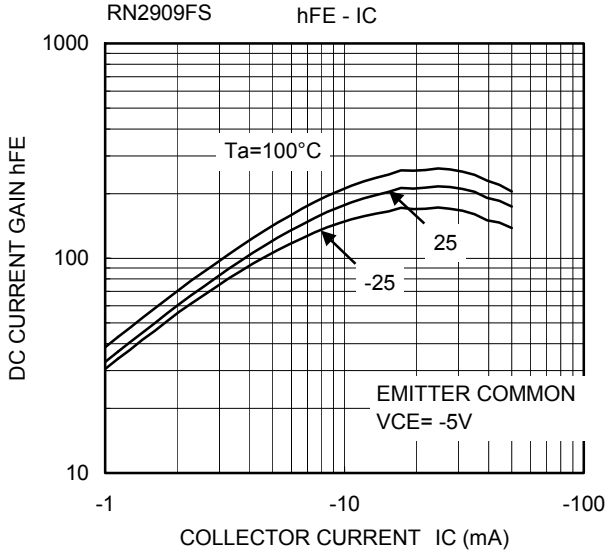

RN2908FS hFE - IC



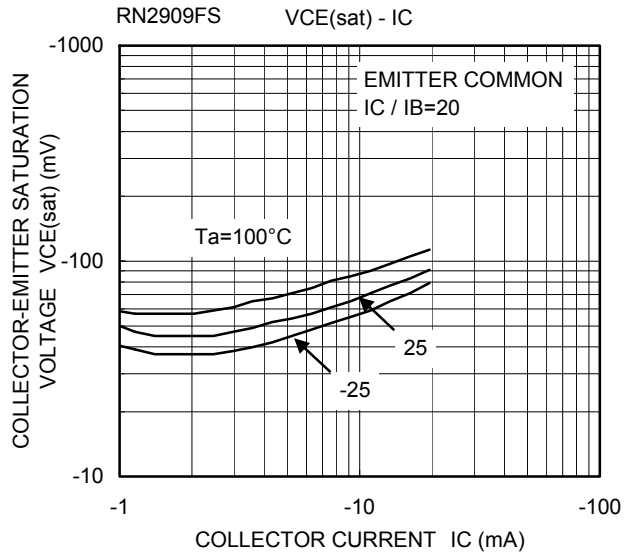

RN2908FS VCE(sat) - IC



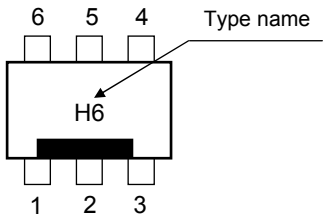
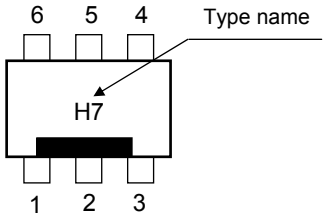
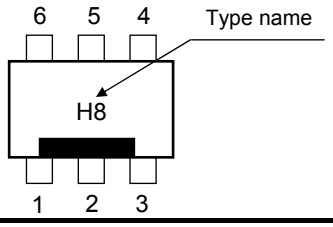

RN2909FS hFE - IC




RN2909FS VCE(sat) - IC



## Marking

| Type Name | Marking |
|---|---|
| RN2907FS |   |
| RN2908FS |   |
| RN2909FS |   |

## Handling Precaution

When handling individual devices (which are not yet mounted on a circuit board), be sure that the environment is protected against electrostatic discharge. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static materials.

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