

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

# RN2910FE, RN2911FE

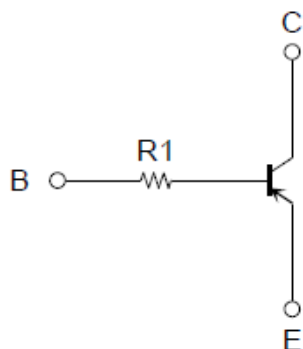
## 1. Applications

- Switching
- Inverter Circuits
- Interfacing
- Driver Circuits

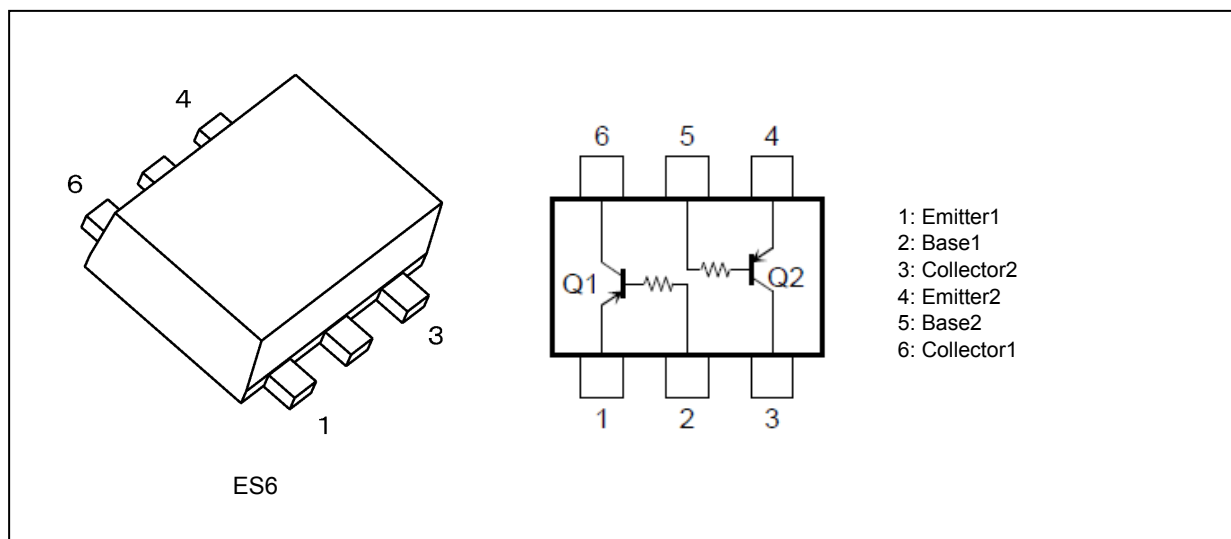
## 2. Features

- (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 RN1910FE to RN1911FE

## 3. Equivalent Circuit



## 4. Packaging and Pin Assignment



Start of commercial production

2000-05

### 5. Orderable part number

| Orderable part number |               | AEC-Q101     | Note                    |
|-----------------------|---------------|--------------|-------------------------|
| RN2910FE              | RN2910FE,LF   | —            | General Use             |
|                       | RN2910FE,LXGF | YES (Note 1) | Unintended Use (Note 1) |
|                       | RN2910FE,LXHF | YES          | Automotive Use          |
| RN2911FE              | RN2911FE,LF   | —            | General Use             |
|                       | RN2911FE,LXGF | YES (Note 1) | Unintended Use (Note 1) |
|                       | RN2911FE,LXHF | YES          | Automotive Use          |

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

### 6. Absolute Maximum Ratings (Note) (Unless otherwise specified, $T_a = 25^\circ\text{C}$ ) (Q1, Q2 Common)

| Characteristics                      | Symbol    | Rating     | Unit             |
|--------------------------------------|-----------|------------|------------------|
| Collector-base voltage               | $V_{CBO}$ | -50        | V                |
| Collector-emitter voltage            | $V_{CEO}$ | -50        |                  |
| Emitter-base voltage                 | $V_{EBO}$ | -5         |                  |
| Collector current                    | $I_C$     | -100       | mA               |
| Collector power dissipation (Note 1) | $P_C$     | 100        | mW               |
| Junction temperature                 | $T_j$     | 150        | $^\circ\text{C}$ |
| 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

7. Electrical Characteristics (Unless otherwise specified,  $T_a = 25\text{ }^{\circ}\text{C}$ )  
(Q1, Q2 Common)

| Characteristics                      |          | Symbol        | Test Condition   | Min  | Typ. | Max  | Unit       |
|--------------------------------------|----------|---------------|--|------|------|------|------------|
| Collector cut-off current            |          | $I_{CBO}$     | $V_{CB} = -50\text{ V}, I_E = 0\text{ mA}$                   | —    | —    | -100 | nA         |
| Emitter cut-off current              |          | $I_{EBO}$     | $V_{EB} = -5\text{ V}, I_C = 0\text{ mA}$                    | —    | —    | -100 |            |
| DC current gain                      |          | $h_{FE}$      | $V_{CE} = -5\text{ V}, I_C = -1\text{ mA}$                   | 120  | —    | 400  | —          |
| Collector-emitter saturation voltage |          | $V_{CE(sat)}$ | $I_C = -5\text{ mA}, I_B = -0.25\text{ mA}$                  | —    | -0.1 | -0.3 | V          |
| Transition frequency                 |          | $f_T$         | $V_{CE} = -10\text{ V}, I_C = -5\text{ mA}$                  | —    | 200  | —    | MHz        |
| Collector output capacitance         |          | $C_{ob}$      | $V_{CB} = -10\text{ V}, I_E = 0\text{ mA}, f = 1\text{ MHz}$ | —    | 3    | 6    | pF         |
| Input resistance                     | RN2910FE | $R_1$         | -  | 3.29 | 4.7  | 6.11 | k $\Omega$ |
|                                      | RN2911FE |               |  | 7    | 10   | 13   |            |

8. Marking

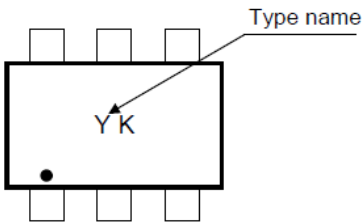


Fig. 8.1 Marking RN2910FE

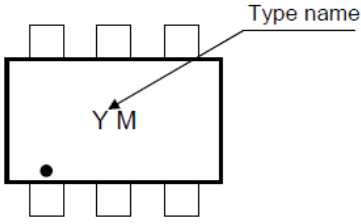


Fig. 8.2 Marking RN2911FE

### 9. Characteristics Curves (Note)(Q1, Q2 Common)

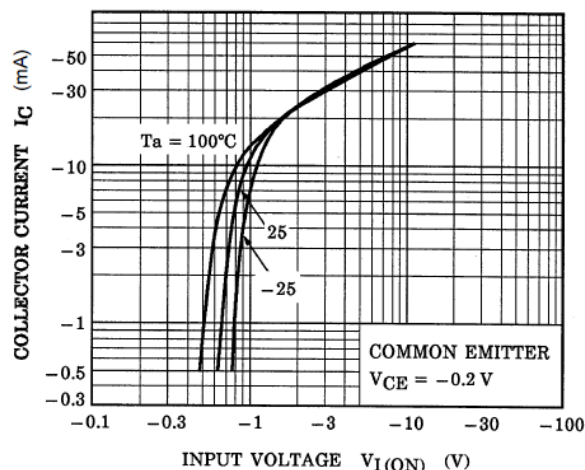


Fig. 9.1 RN2910EF  $I_C$ - $V_{I(ON)}$

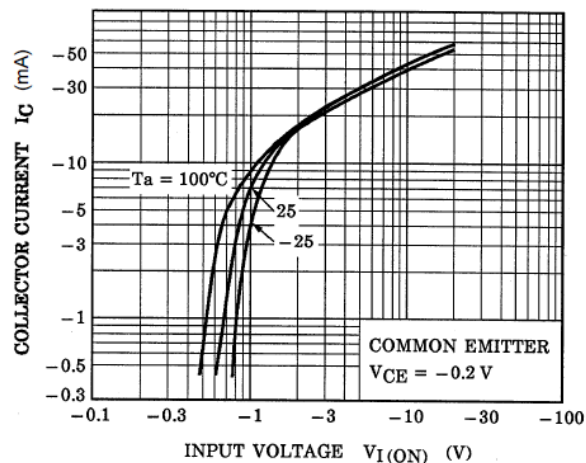


Fig. 9.2 RN2911EF  $I_C$ - $V_{I(ON)}$

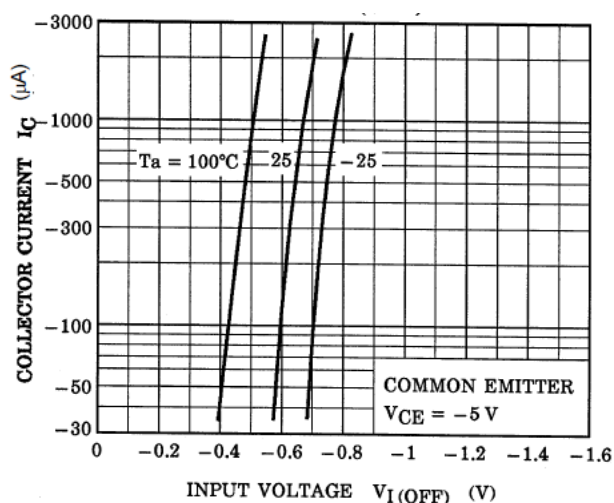


Fig. 9.3 RN2910EF  $I_C$ - $V_{I(OFF)}$

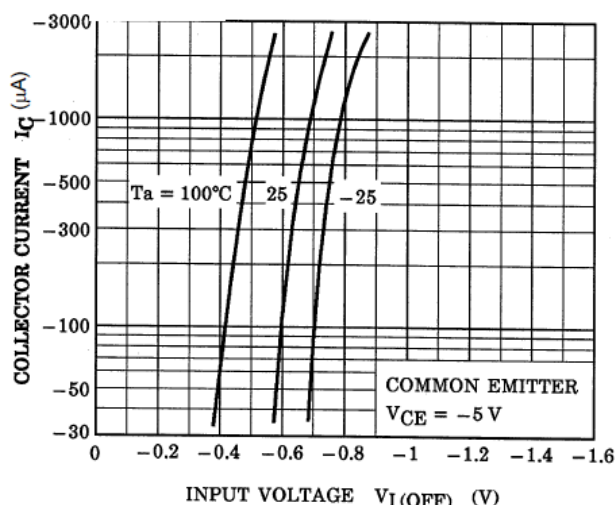


Fig. 9.4 RN2911EF  $I_C$ - $V_{I(OFF)}$

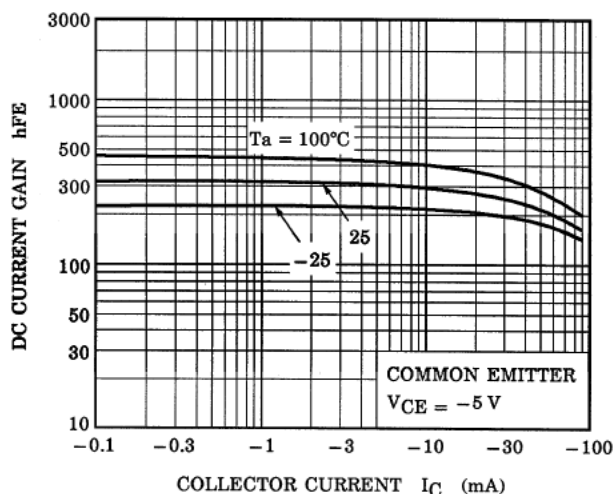


Fig. 9.5 RN2910EF  $h_{FE}$ - $I_C$

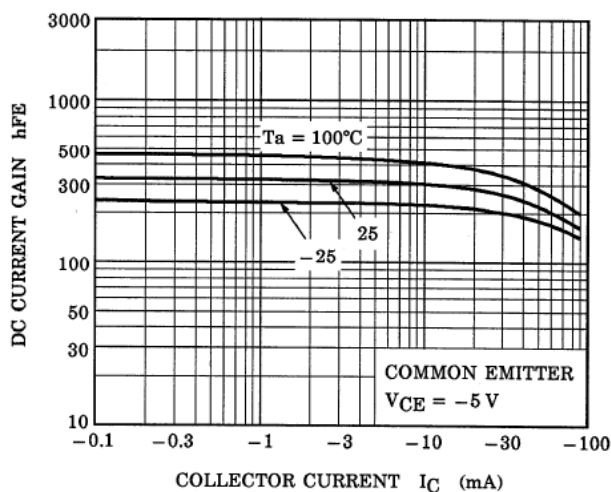


Fig. 9.6 RN2911EF  $h_{FE}$ - $I_C$

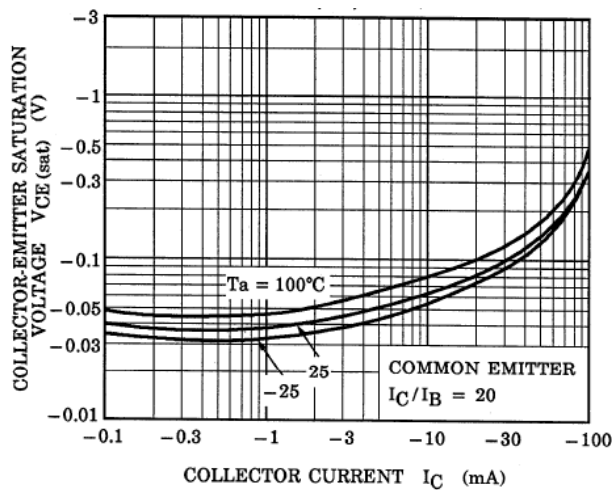


Fig. 9.7 RN2910EF  $V_{CE(sat)}-I_C$

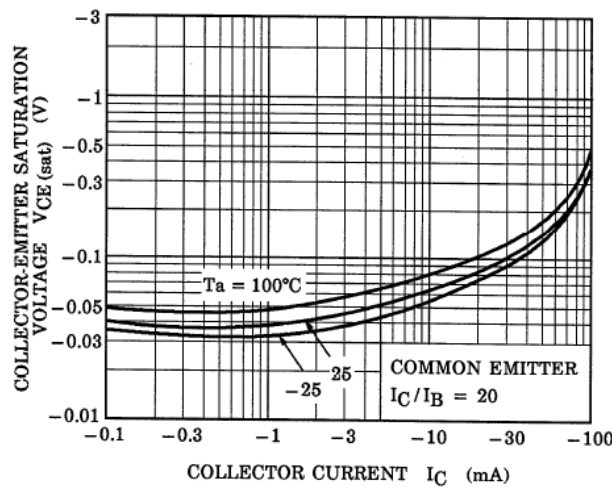
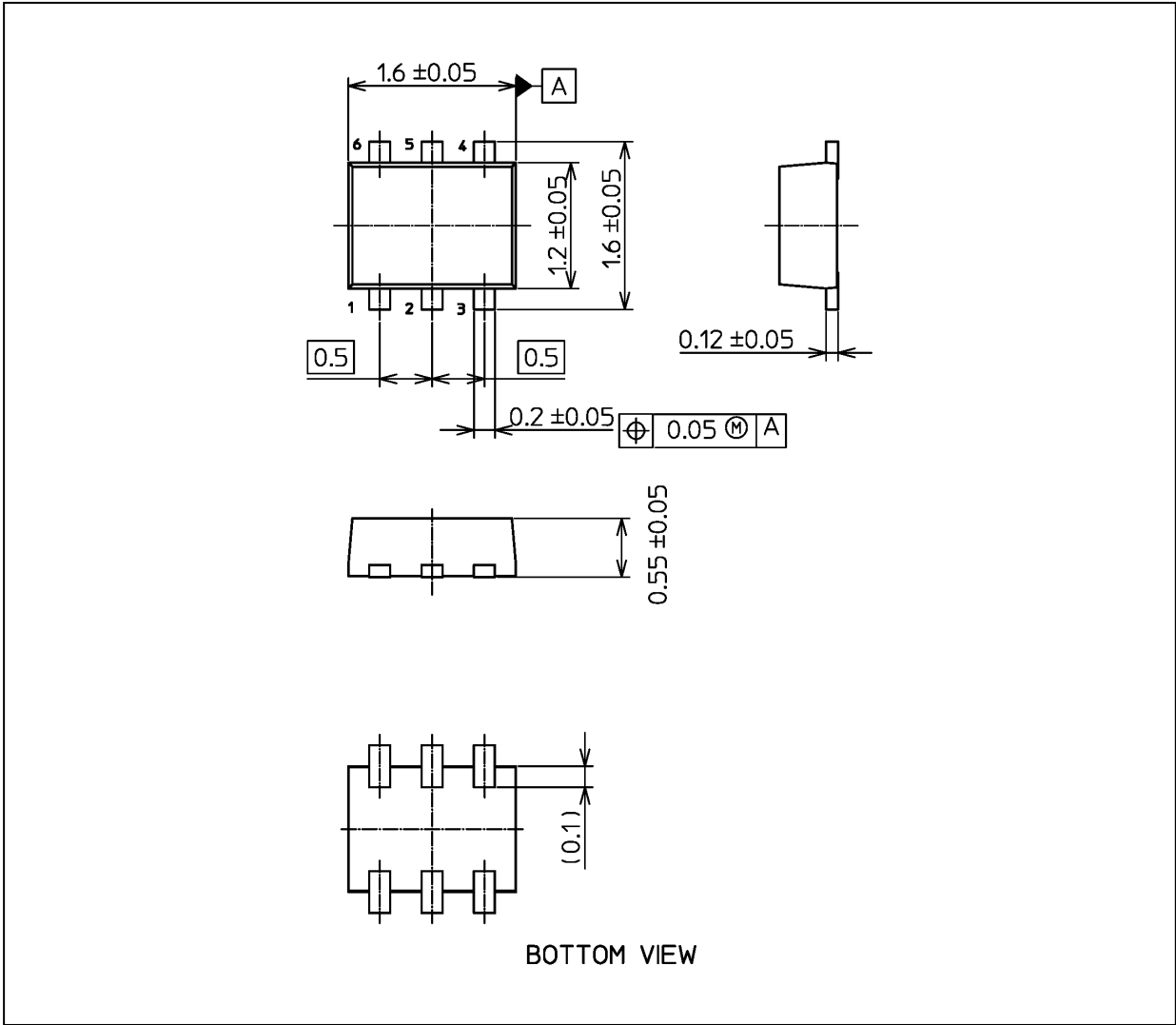


Fig. 9.8 RN2911EF  $V_{CE(sat)}-I_C$

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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