

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

# RN1910,RN1911

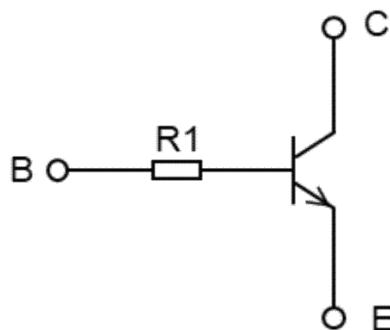
## 1. Applications

- Switching
- Inverter Circuits
- Interfacing
- Driver Circuits

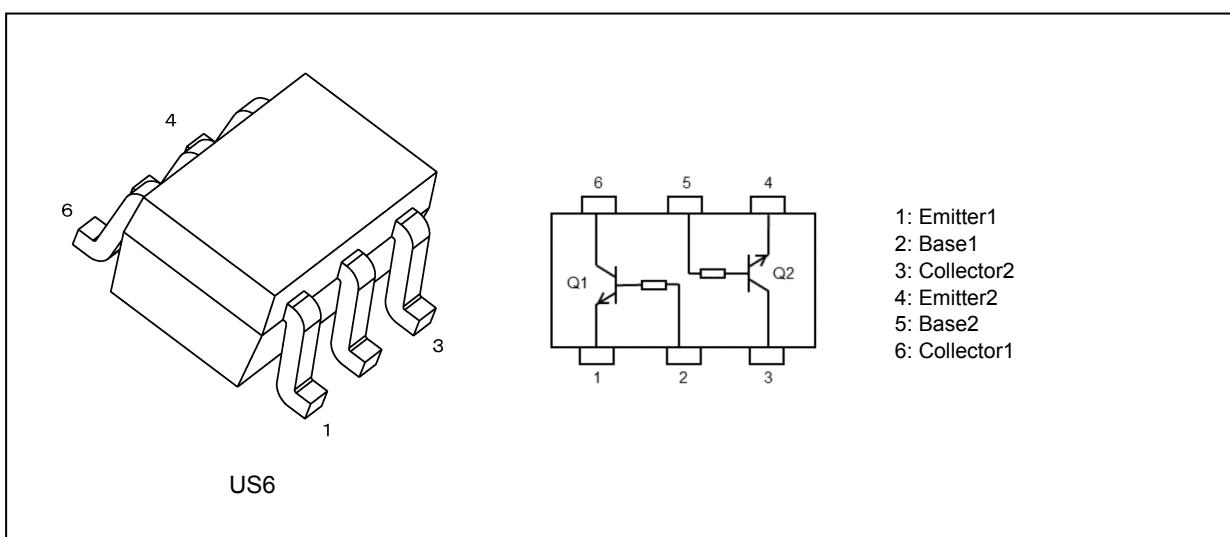
## 2. Features

- (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) Toshiba offers transistors with a wide range of resistance to accommodate various circuit designs.
- (5) Complementary to RN2910 to RN2911

## 3. Equivalent Circuit



## 4. Packaging and Pin Assignment



Start of commercial production  
1990-12

## 5. Orderable part number

| Orderable part number |             | AEC-Q101 |          | Note           |          |
|-----------------------|-------------|----------|----------|----------------|----------|
| RN1910                | RN1910,LF   | —        |          | General Use    |          |
|                       | RN1910,LXGF | YES      | (Note 1) | Unintended Use | (Note 1) |
|                       | RN1910,LXHF | YES      |          | Automotive Use |          |
| RN1911                | RN1911,LF   | —        |          | General Use    |          |
|                       | RN1911,LXGF | YES      | (Note 1) | Unintended Use | (Note 1) |
|                       | RN1911,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<br>(Note 1) | $P_C$     | 200        | 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,  $T_a = 25^\circ\text{C}$ )  
(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 | —    | 700 | —    |            |
| Collector-emitter saturation voltage | $V_{CE(\text{sat})}$ | $I_C = 5\text{ mA}, I_B = 0.25\text{ mA}$                   | —   | 0.1  | 0.3 | V    |            |
| Transition frequency                 | $f_T$                | $V_{CE} = 10\text{ V}, I_C = 5\text{ mA}$                   | —   | 250  | —   | 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                     | RN1910               | $R_1$   | -   | 3.29 | 4.7 | 6.11 | k $\Omega$ |
|                                      | RN1911               |   |     | 7    | 10  | 13   |            |

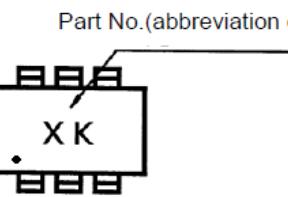
**8. Marking**

Fig. 8.1 Marking RN1910

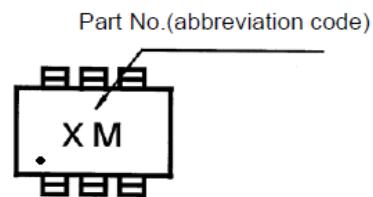


Fig. 8.2 Marking RN1911

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

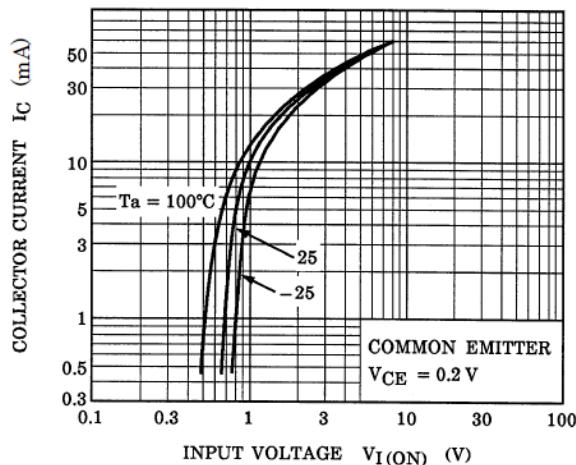


Fig. 9.1 RN1910  $I_C$ - $V_{I(ON)}$

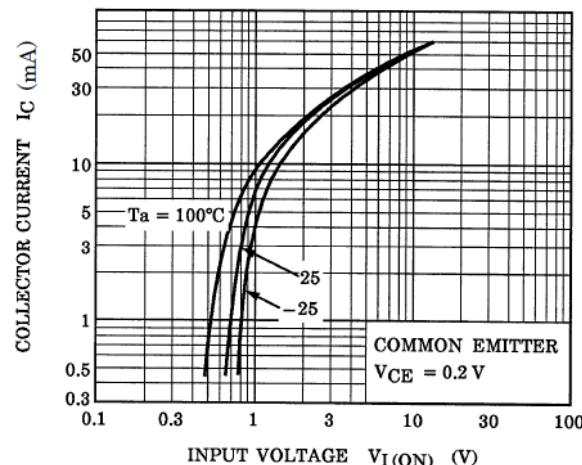


Fig. 9.2 RN1911  $I_C$ - $V_{I(ON)}$

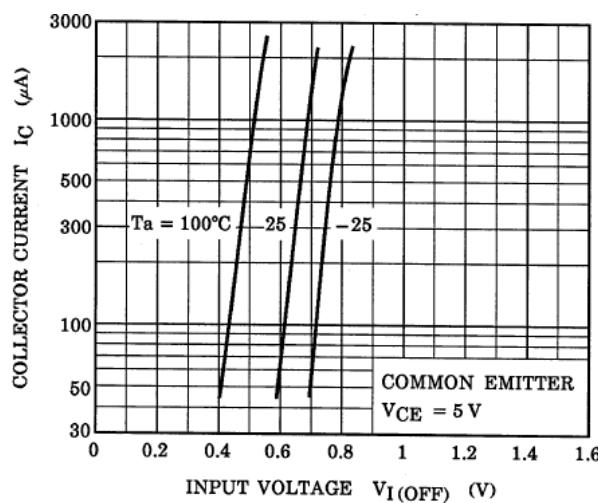


Fig. 9.3 RN1910  $I_C$ - $V_{I(OFF)}$

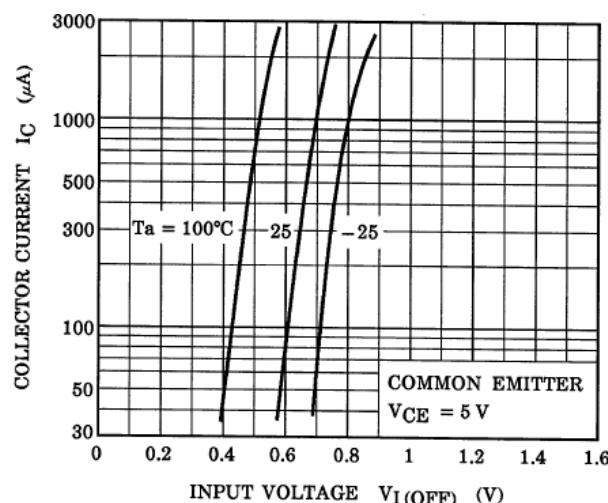


Fig. 9.4 RN1911  $I_C$ - $V_{I(OFF)}$

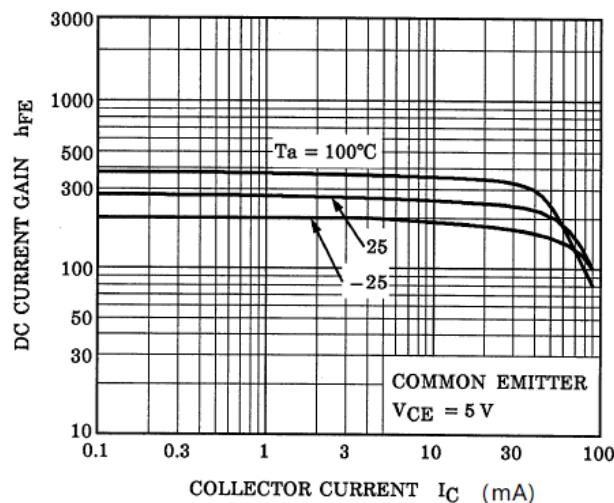


Fig. 9.5 RN1910  $h_{FE}$ - $I_C$

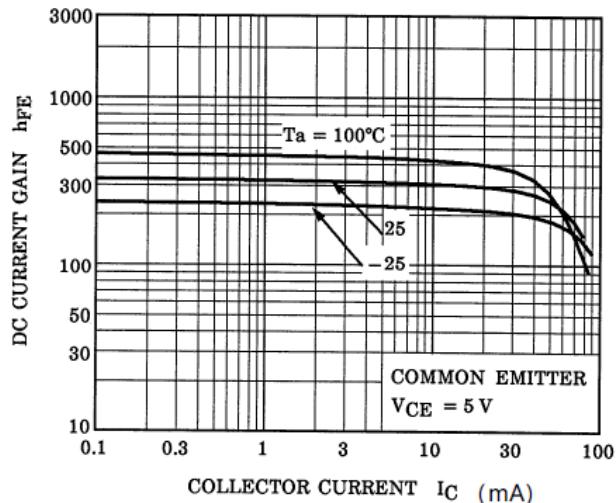


Fig. 9.6 RN1911  $h_{FE}$ - $I_C$

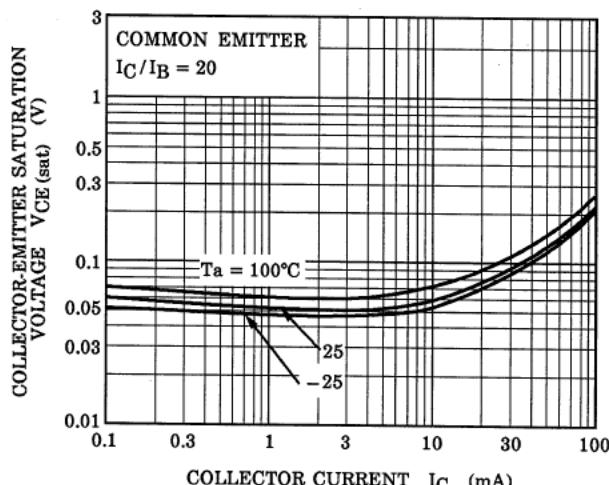


Fig. 9.7 RN1910  $V_{CE(sat)}$ - $I_C$

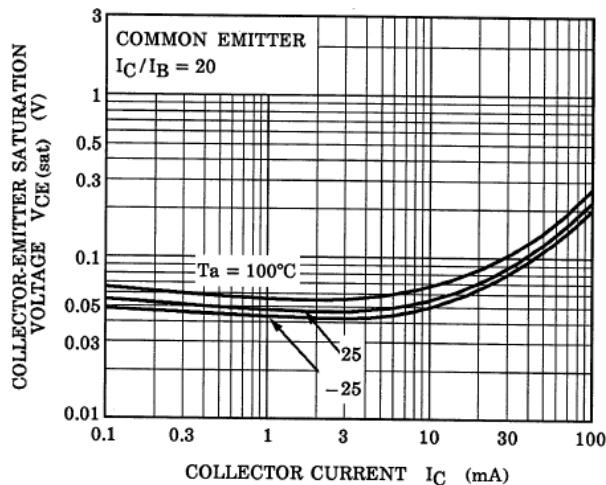
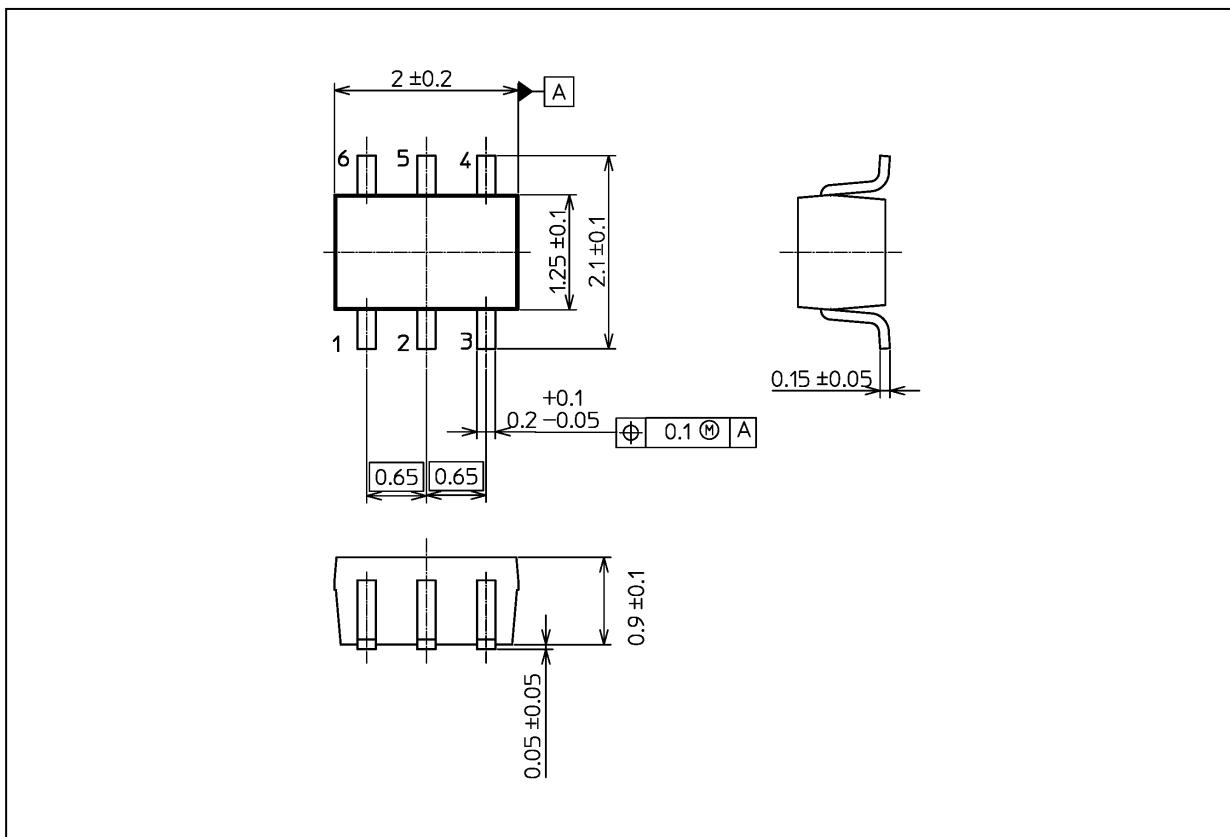


Fig. 9.8 RN1911  $V_{CE(sat)}$ - $I_C$

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

## Package Dimensions

Unit: mm



Weight: 6.8 mg (typ.)

|                 |
|-----------------|
| Package Name(s) |
| Nickname: US6   |

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