

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

RN1910FE, RN1911FE

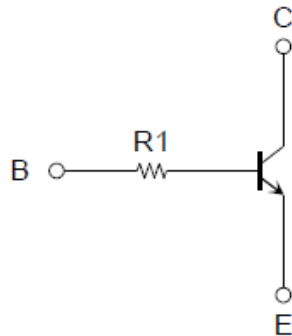
1. Applications

- Switching
- Inverter Circuits
- Interfacing
- Driver Circuits

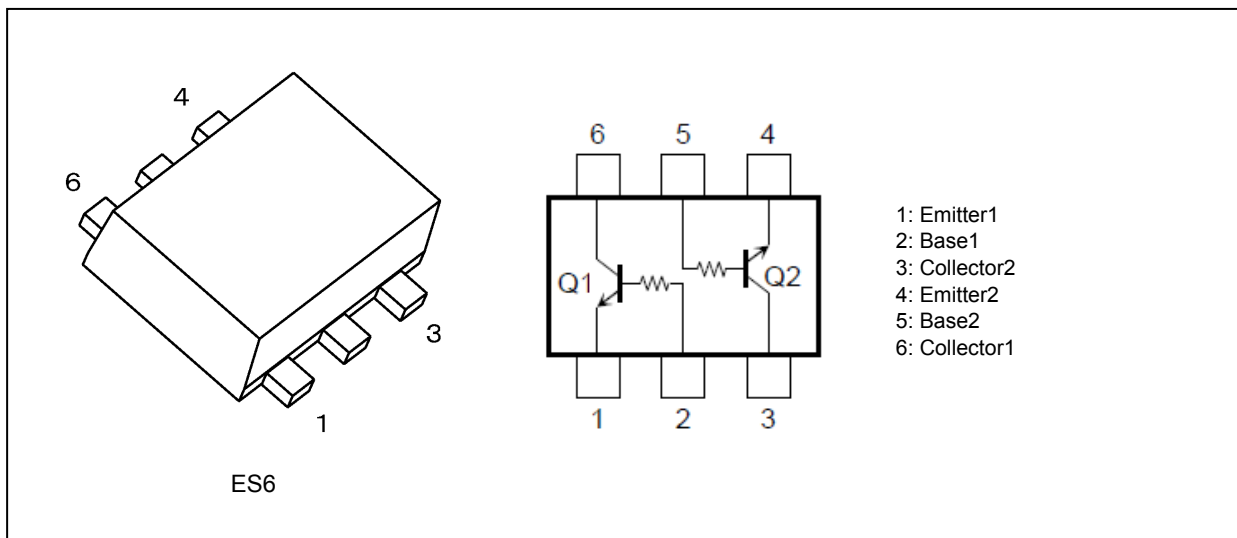
2. Features

- (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 RN2910FE to RN2911FE

3. Equivalent Circuit



4. Packaging and Pin Assignment



Start of commercial production

2000-05

5. Orderable part number

| Orderable part number | | AEC-Q101 | Note |
|-----------------------|---------------|--------------|-------------------------|
| RN1910FE | RN1910FE,LF | — | General Use |
| | RN1910FE,LXGF | YES (Note 1) | Unintended Use (Note 1) |
| | RN1910FE,LXHF | YES | Automotive Use |
| RN1911FE | RN1911FE,LF | — | General Use |
| | RN1911FE,LXGF | YES (Note 1) | Unintended Use (Note 1) |
| | RN1911FE,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, $T_a = 25\text{ }^\circ\text{C}$) (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 | — | 700 | — | |
| 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 | $V_{CE} = 10\text{ V}, I_C = 5\text{ mA}$ | — | 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 | RN1910FE | R_1 | - | 3.29 | 4.7 | 6.11 | k Ω |
| | RN1911FE | | | 7 | 10 | 13 | |

8. Marking

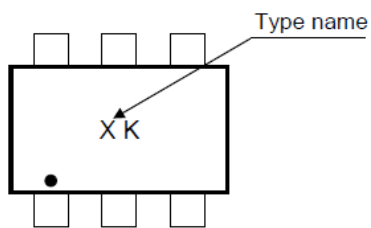


Fig. 8.1 Marking RN1910FE

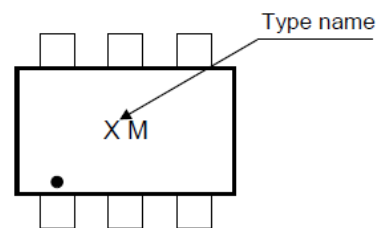


Fig. 8.2 Marking RN1911FE

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

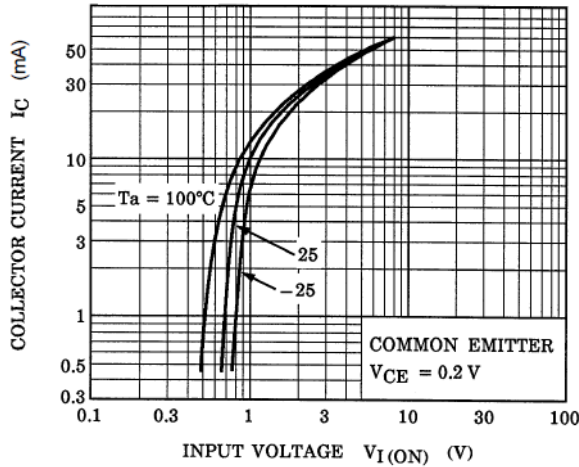


Fig. 9.1 RN1910FE I_C - $V_{I(ON)}$

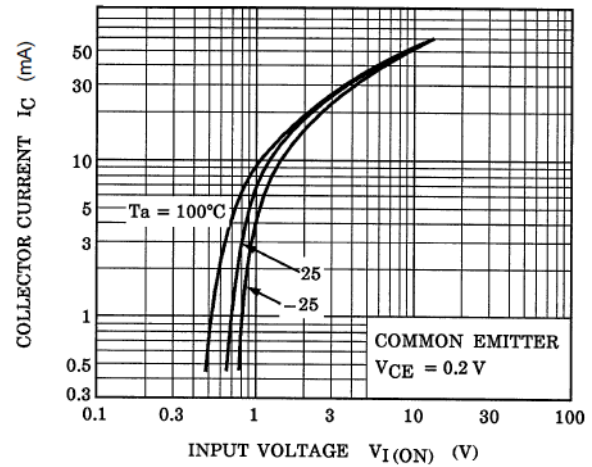


Fig. 9.2 RN1911FE I_C - $V_{I(ON)}$

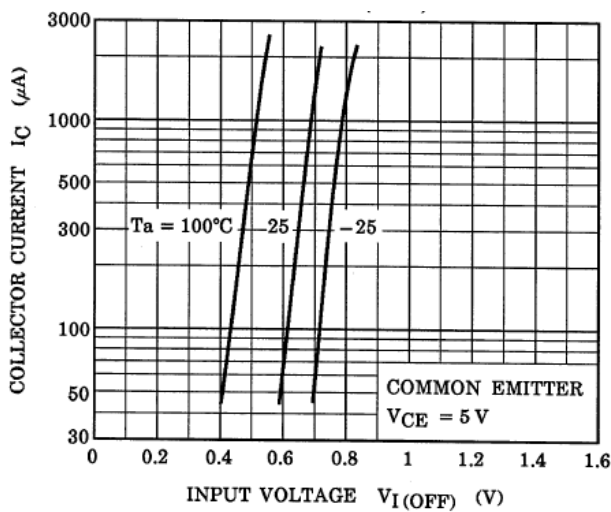


Fig. 9.3 RN1910FE I_C - $V_{I(OFF)}$

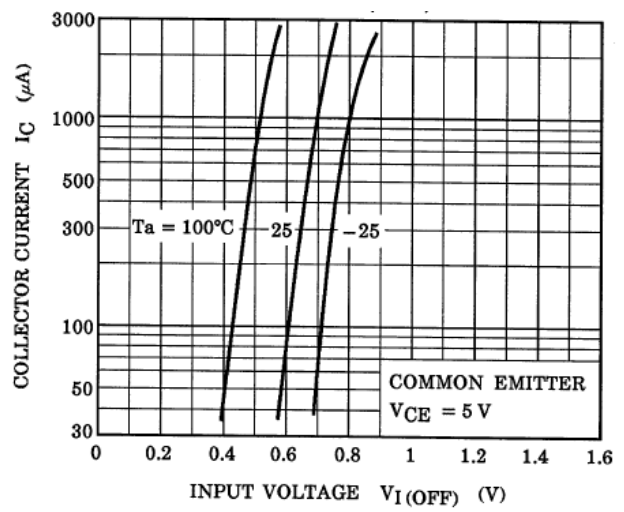


Fig. 9.4 RN1911FE I_C - $V_{I(OFF)}$

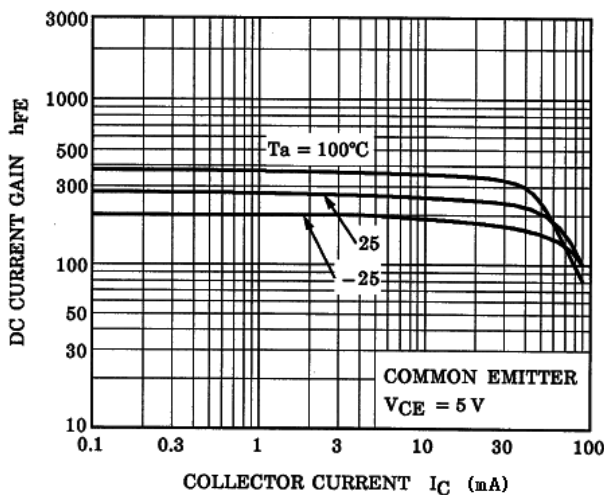


Fig. 9.5 RN1910FE h_{FE} - I_C

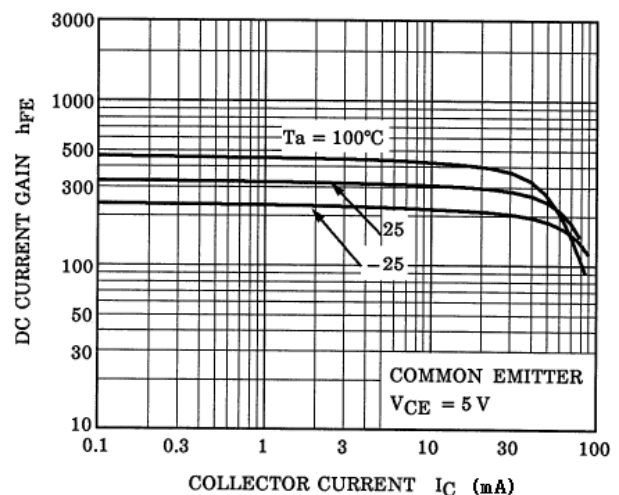


Fig. 9.6 RN1911FE h_{FE} - I_C

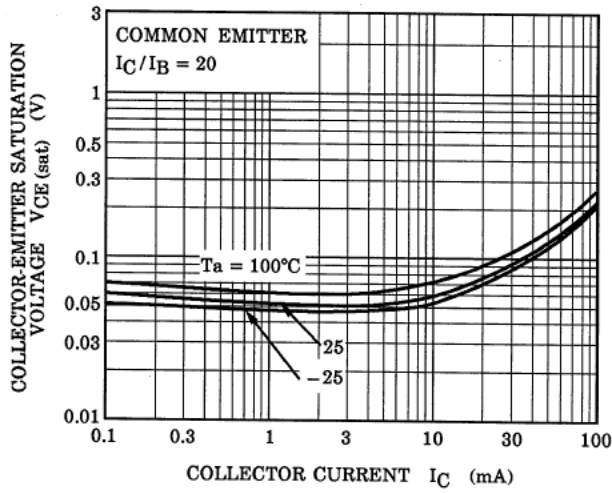


Fig. 9.7 RN1910FE $V_{CE(sat)}-I_C$

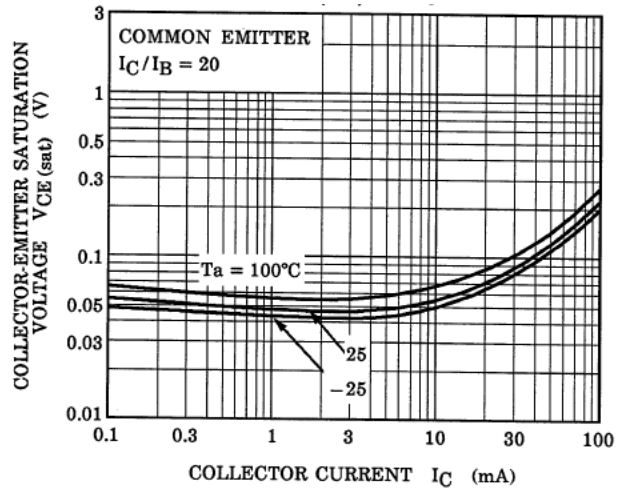
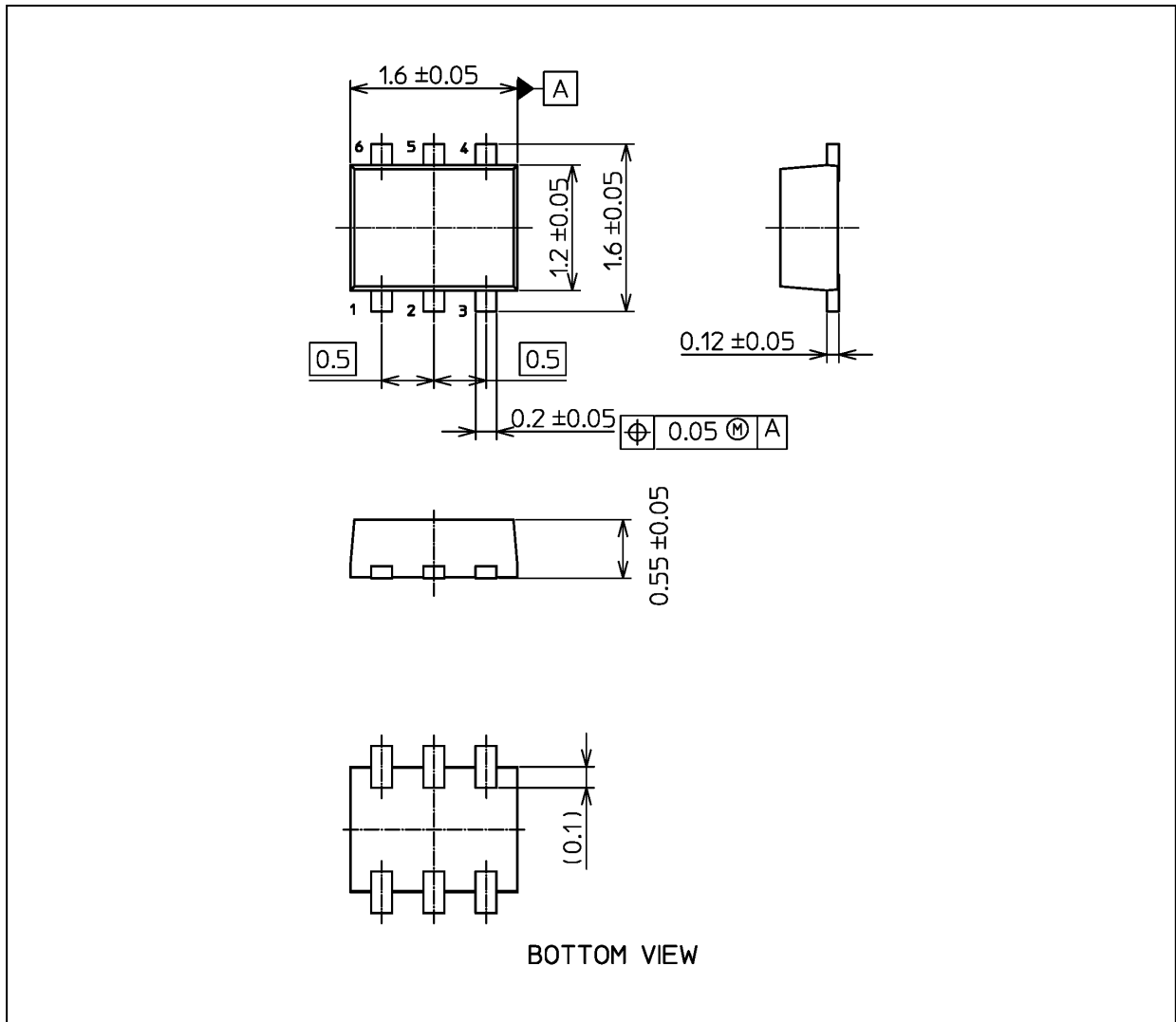


Fig. 9.8 RN1911FE $V_{CE(sat)}-I_C$

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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