

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

RN2410,RN2411

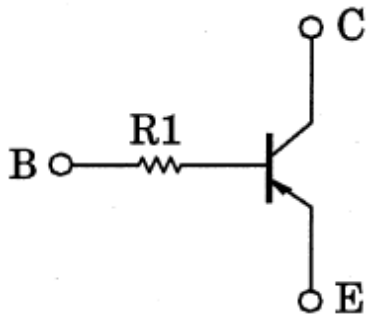
1. Applications

- Switching
- Inverter Circuits
- Interfacing
- Driver Circuits

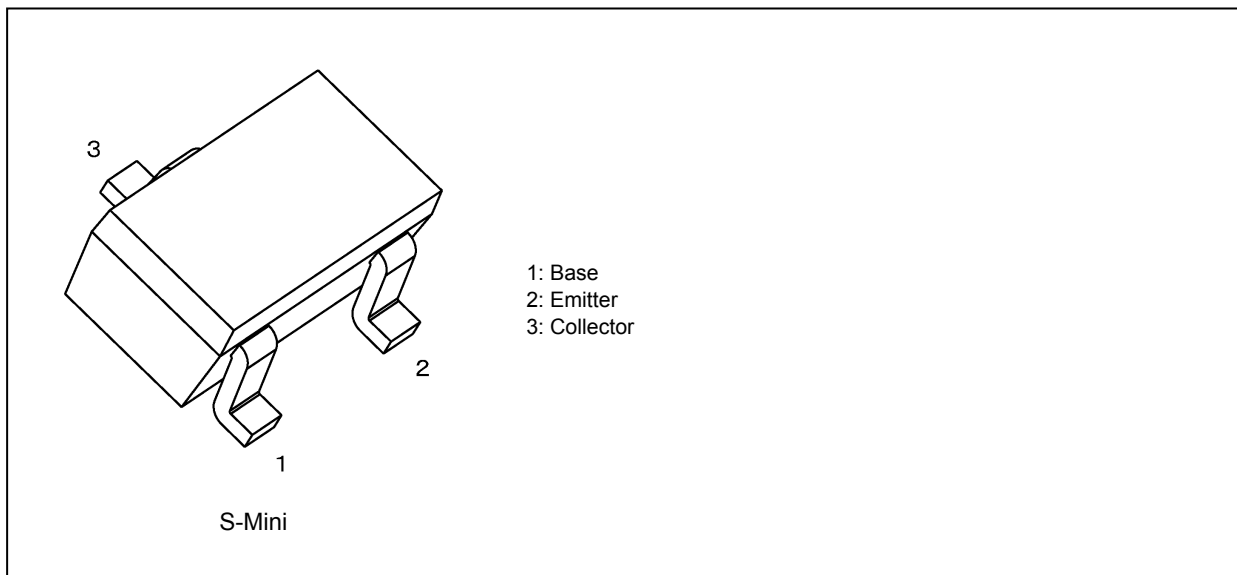
2. Features

- (1) AEC-Q101 qualified (Please see the orderable part number list)
- (2) The integrated bias resistor reduces the number of external parts required, making it possible to reduce system size and assembly time.
- (3) Toshiba offers transistors with a wide range of resistance to accommodate various circuit designs.
- (4) Complementary to RN1410,RN1411

3. Equivalent Circuit



4. Packaging and Pin Assignment



Start of commercial production

1985-05

5. Orderable part number

| Orderable part number | | AEC-Q101 | Note | Note |
|-----------------------|-------------|----------|----------|-------------------------|
| RN2410 | RN2410,LF | — | | General Use |
| | RN2410,LXGF | YES | (Note 1) | Unintended Use (Note 1) |
| | RN2410,LXHF | YES | | Automotive Use |
| RN2411 | RN2411,LF | — | | General Use |
| | RN2411,LXGF | YES | (Note 1) | Unintended Use (Note 1) |
| | RN2411,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, $T_a = 25\text{ °C}$)

| 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 | P_C | 200 | mW |
| Junction temperature | T_j | 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).

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

| 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 | RN2410 | R_1 | - | 3.29 | 4.7 | 6.11 | k Ω |
| | RN2411 | | | 7 | 10 | 13 | |

8. Marking

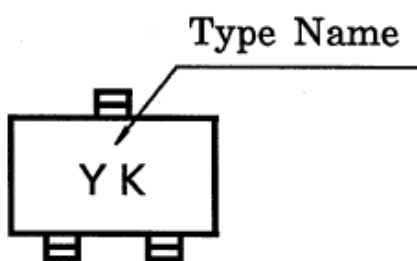


Fig. 8.1 Marking RN2410

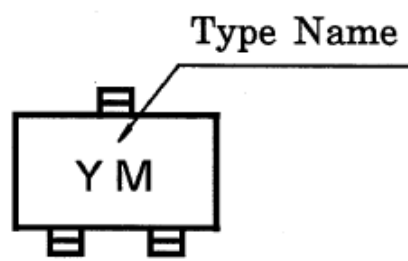


Fig. 8.2 Marking RN2411

9. Characteristics Curves (Note)

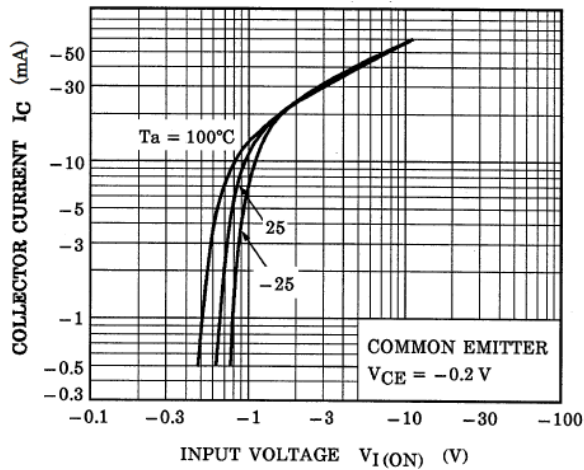


Fig. 9.1 RN2410 I_C - $V_{I(ON)}$

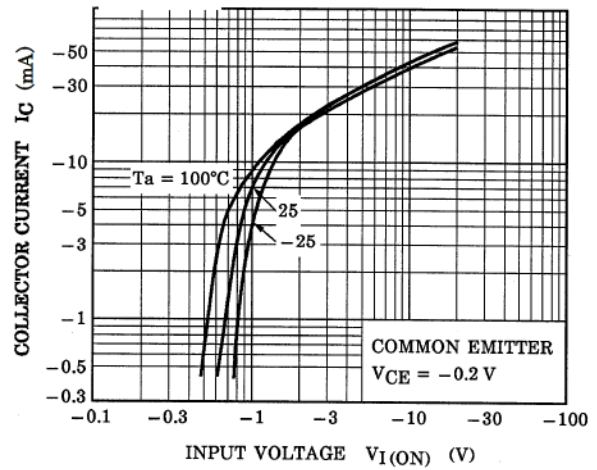


Fig. 9.2 RN2411 I_C - $V_{I(ON)}$

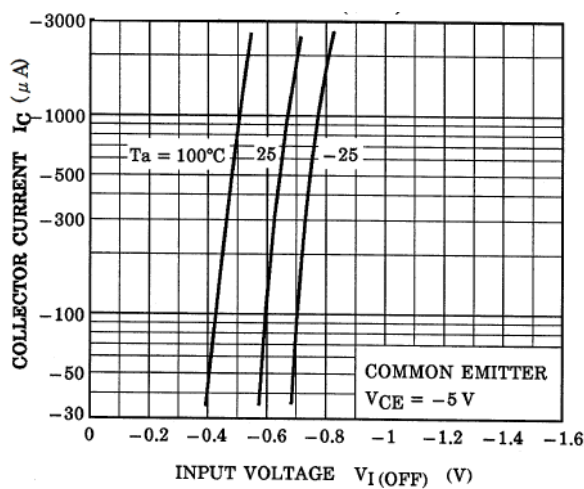


Fig. 9.3 RN2410 I_C - $V_{I(OFF)}$

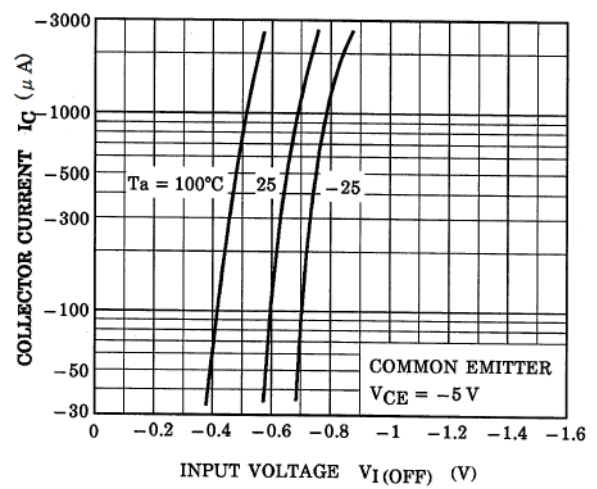


Fig. 9.4 RN2411 I_C - $V_{I(OFF)}$

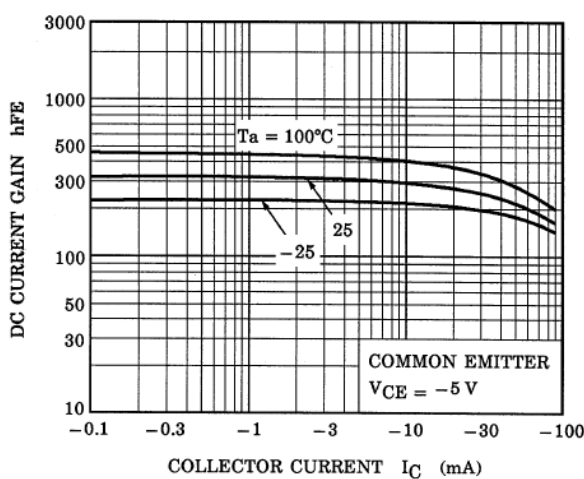


Fig. 9.5 RN2410 h_{FE} - I_C

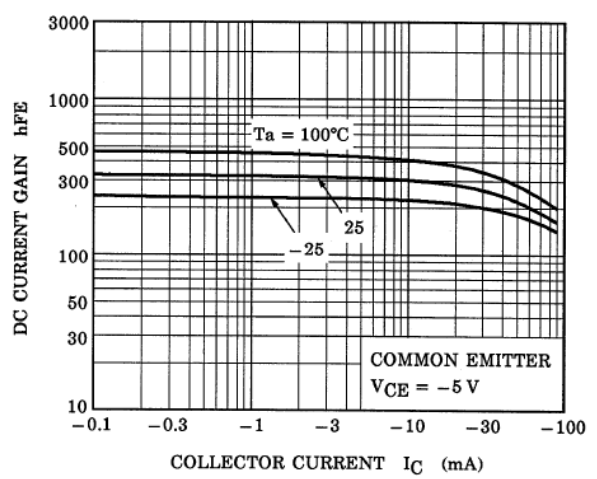


Fig. 9.6 RN2411 h_{FE} - I_C

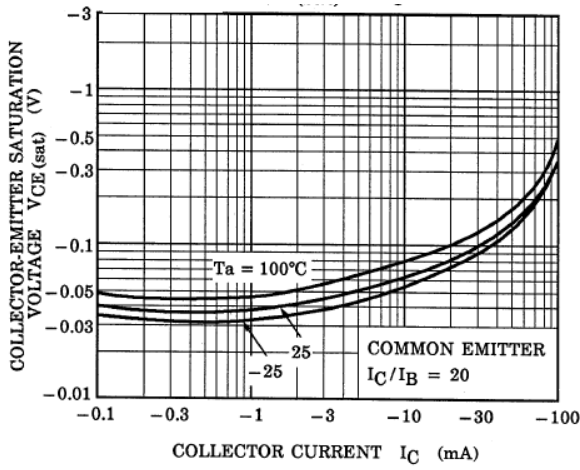


Fig. 9.7 RN2410 $V_{CE(sat)}$ - I_C

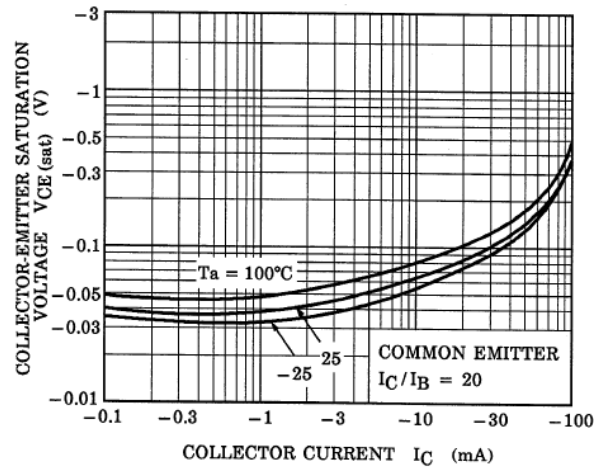
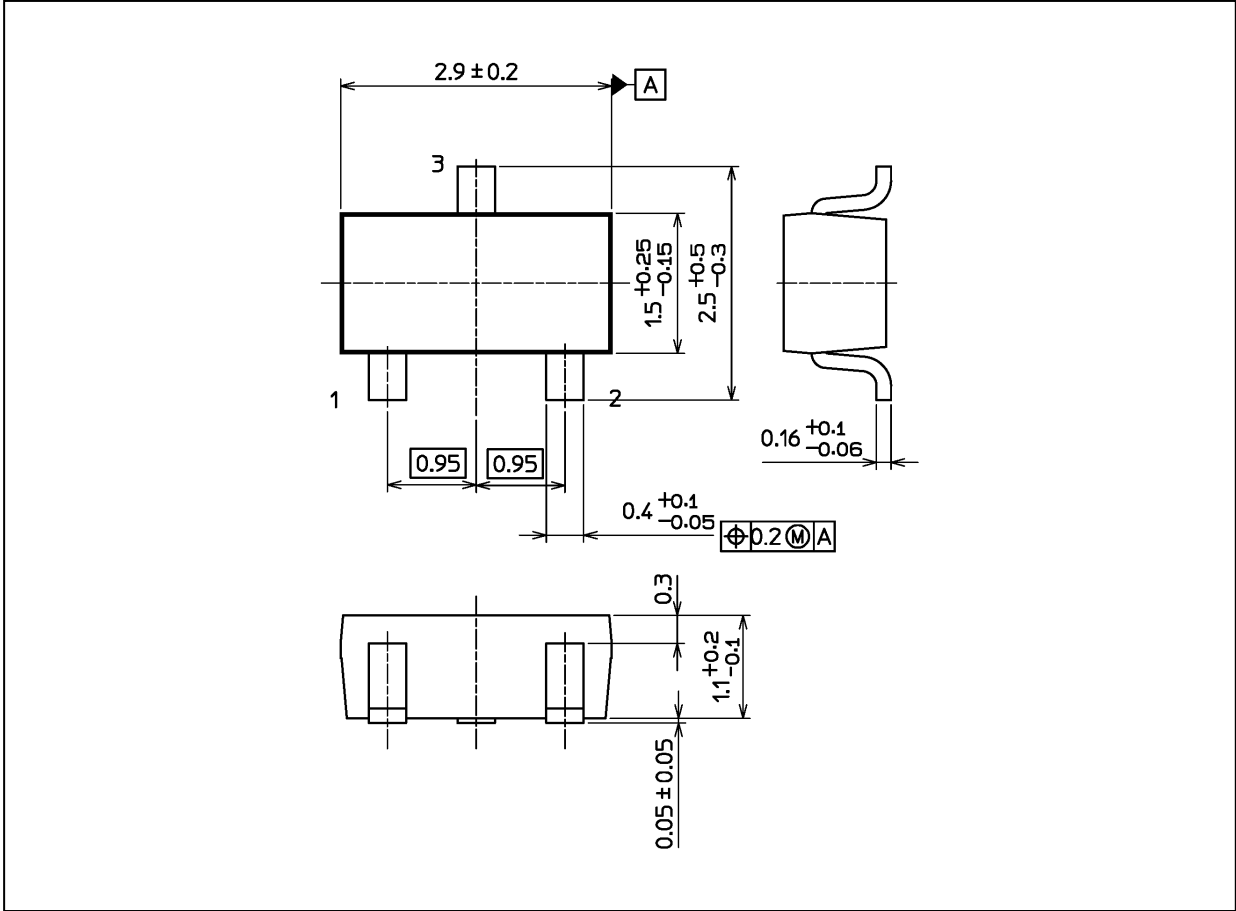


Fig. 9.8 RN2411 $V_{CE(sat)}$ - I_C

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

Package Dimensions

Unit: mm



Weight: 12 mg (typ.)

| Package Name(s) |
|------------------|
| TOSHIBA: 2-3F1S |
| Nickname: S-Mini |

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