

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

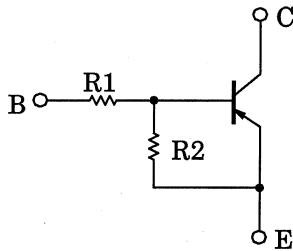
RN2421, RN2422, RN2423, RN2424 RN2425, RN2426, RN2427

Switching, Inverter Circuit, Interface Circuit
and Driver Circuit Applications

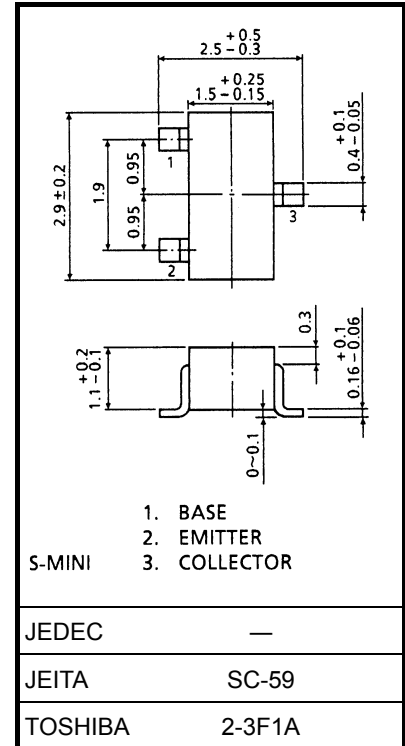
Unit: mm

- High current type ($I_{C(MAX)} = -800\text{mA}$)
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Low $V_{CE(sat)}$
- Complementary to RN1421 to RN1427

Equivalent Circuit and Bias Resistor Values



| Type No. | R1 (kΩ) | R2 (kΩ) |
|----------|---------|---------|
| RN2421 | 1 | 1 |
| RN2422 | 2.2 | 2.2 |
| RN2423 | 4.7 | 4.7 |
| RN2424 | 10 | 10 |
| RN2425 | 0.47 | 10 |
| RN2426 | 1 | 10 |
| RN2427 | 2.2 | 10 |



Weight: 0.012 g (typ.)

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

| Characteristics | | Symbol | Rating | Unit |
|-----------------------------|----------------|-----------|------------|------------------|
| Collector-Base voltage | RN2421 to 2427 | V_{CBO} | -50 | V |
| Collector-Emitter voltage | | V_{CEO} | -50 | V |
| Emitter-Base voltage | RN2421 to 2424 | V_{EBO} | -10 | V |
| | RN2425, 2426 | | -5 | |
| | RN2427 | | -6 | |
| Collector current | RN2421 to 2427 | I_c | -800 | mA |
| Collector power dissipation | | P_c | 200 | mW |
| Junction temperature | | T_j | 150 | $^\circ\text{C}$ |
| Storage temperature range | | T_{stg} | -55 to 150 | $^\circ\text{C}$ |

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.

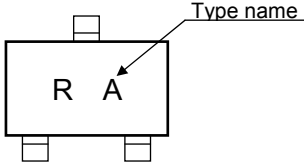
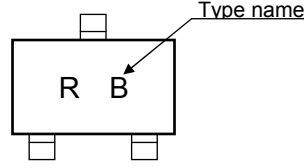
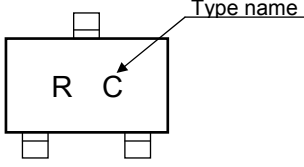
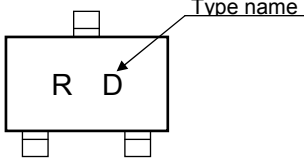
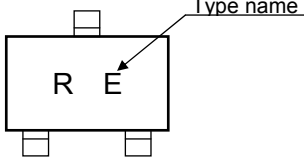
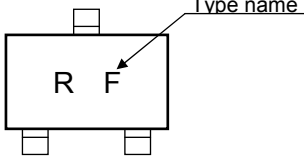
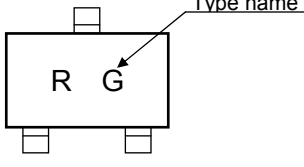
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

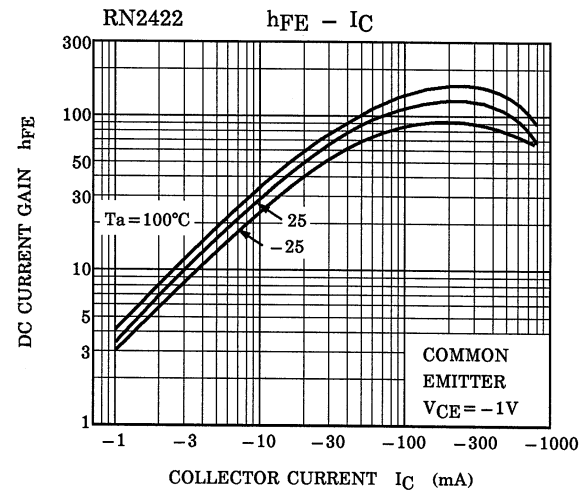
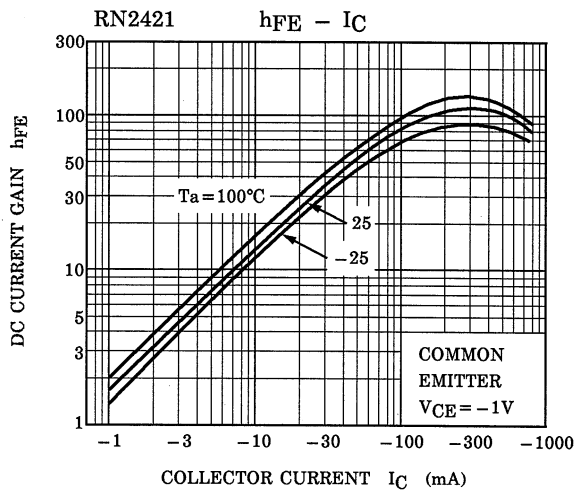
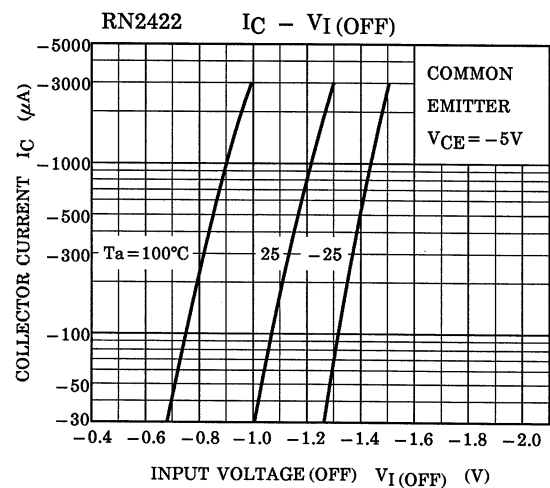
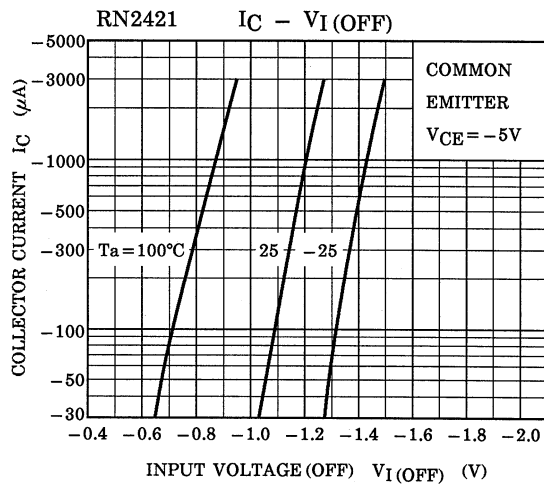
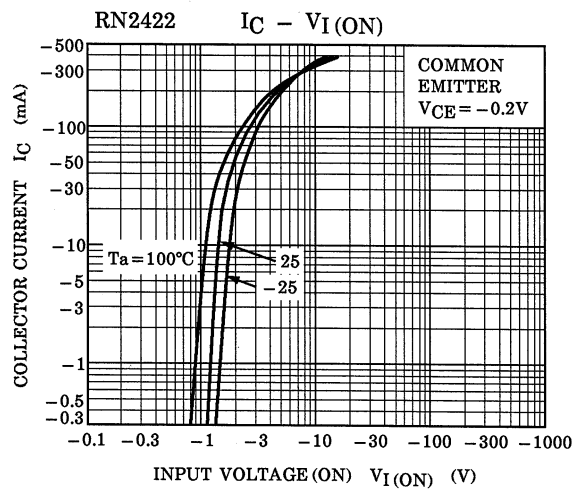
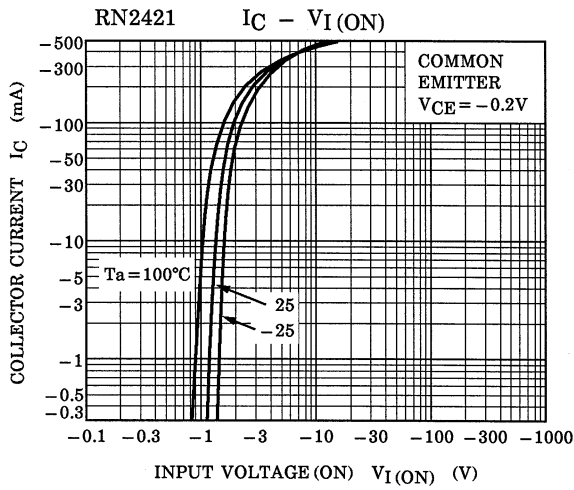
Start of commercial production
1988-02

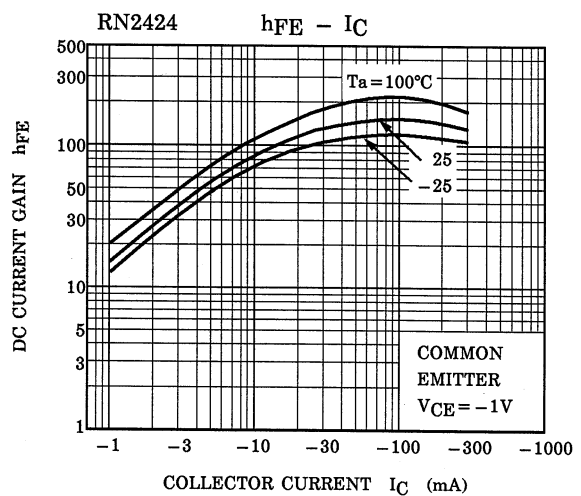
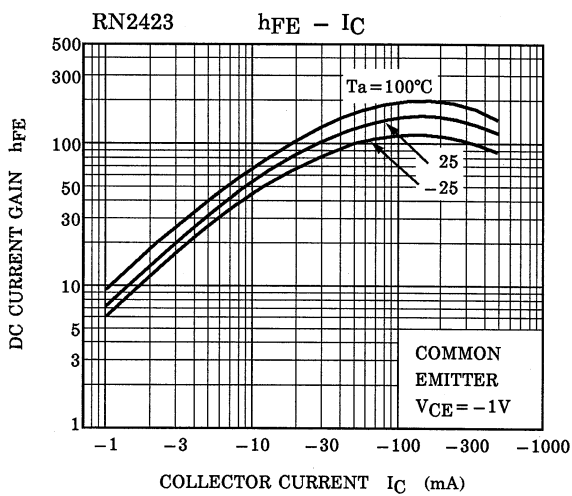
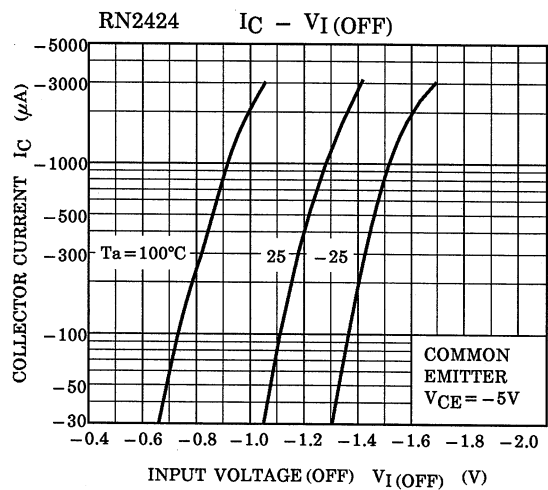
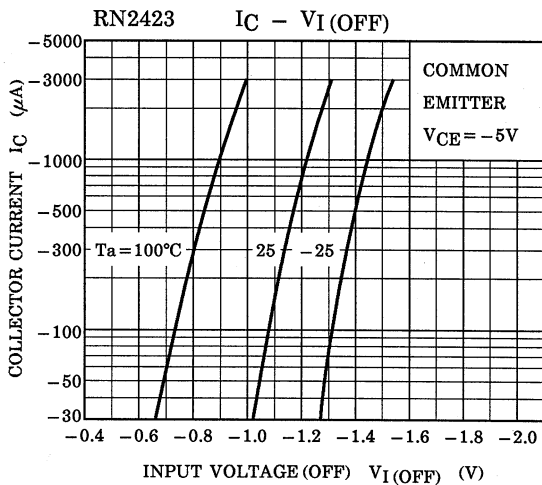
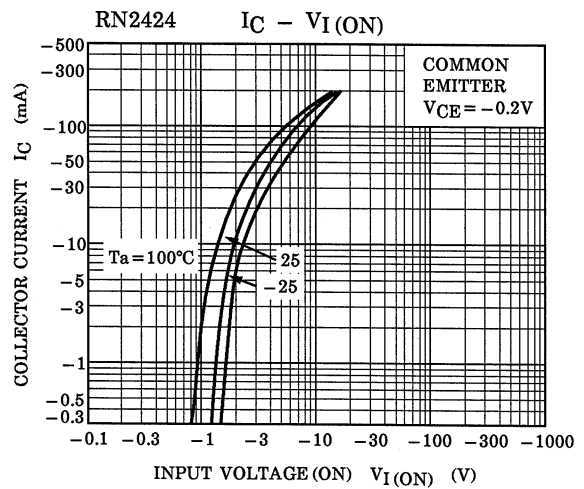
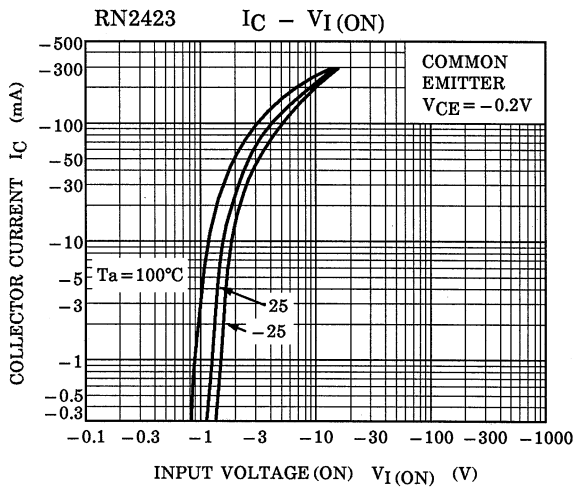
Electrical Characteristics (Ta = 25°C)

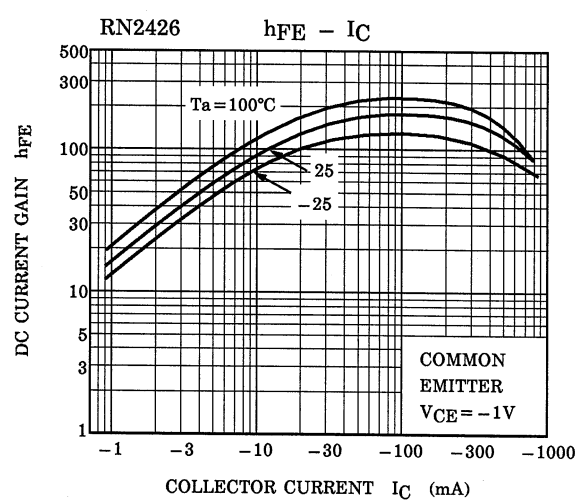
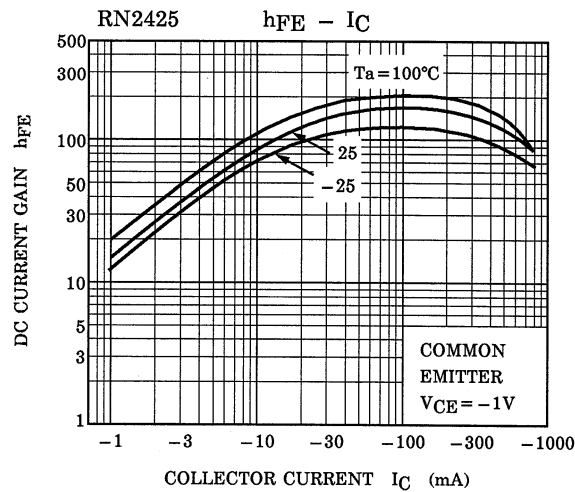
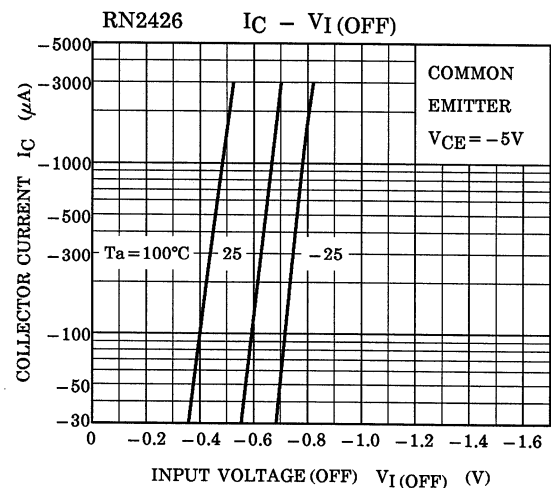
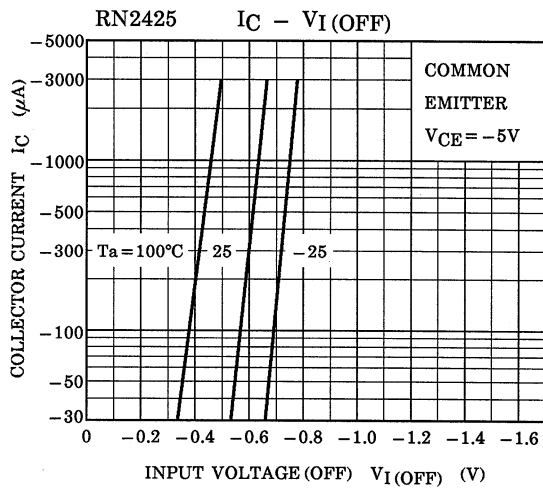
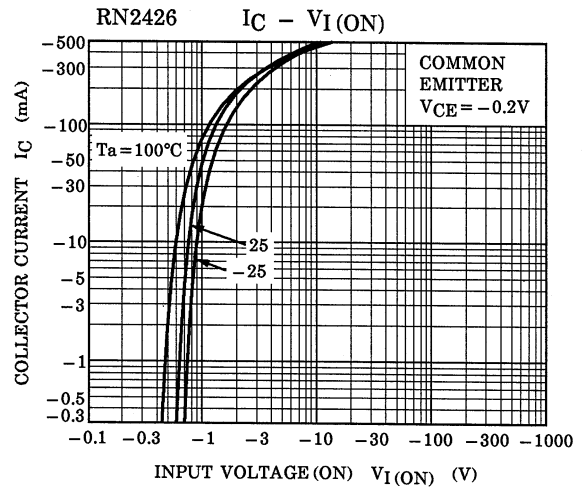
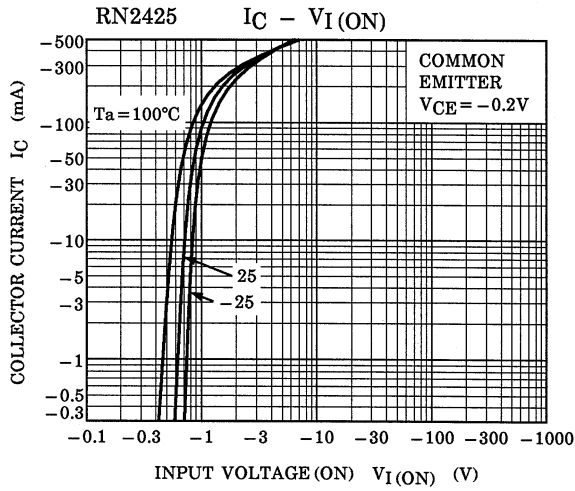
| Characteristics | | Symbol | Test Circuit | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|----------------|---------------|--------------|------------------------------------|-------------------------|--------|--------|------|
| Collector cut-off current | RN2421 to 2427 | I_{CBO} | — | $V_{CB} = -50V, I_E = 0$ | — | — | -100 | nA |
| | | I_{CEO} | — | $V_{CE} = -50V, I_B = 0$ | — | — | -500 | |
| Emitter cut-off current | RN2421 | I_{EBO} | — | $V_{EB} = -10V, I_C = 0$ | -3.85 | — | -7.14 | mA |
| | RN2422 | | — | | -1.75 | — | -3.25 | |
| | RN2423 | | — | | -0.82 | — | -1.52 | |
| | RN2424 | | — | $V_{EB} = -5V, I_C = 0$ | -0.38 | — | -0.71 | |
| | RN2425 | | — | | -0.365 | — | -0.682 | |
| | RN2426 | | — | | -0.35 | — | -0.65 | |
| | RN2427 | | — | | $V_{EB} = -6V, I_C = 0$ | -0.378 | — | |
| DC current gain | RN2421 | h_{FE} | — | $V_{CE} = -1V, I_C = -100mA$ | 60 | — | — | |
| | RN2422 | | — | | 65 | — | — | |
| | RN2423 | | — | | 70 | — | — | |
| | RN2424 | | — | | 90 | — | — | |
| | RN2425 | | — | | 90 | — | — | |
| | RN2426 | | — | | 90 | — | — | |
| | RN2427 | | — | | 90 | — | — | |
| Collector-Emitter saturation voltage | RN2421 | $V_{CE(sat)}$ | — | $I_C = -50mA, I_B = -2mA$ | — | — | -0.25 | V |
| | RN2422 to 2427 | | — | $I_C = -50mA, I_B = -1mA$ | | | | |
| Input voltage (ON) | RN2421 | $V_{I(ON)}$ | — | $V_{CE} = -0.2V, I_C = -100mA$ | -1.0 | — | -3.5 | V |
| | RN2422 | | — | | -1.4 | — | -4.5 | |
| | RN2423 | | — | | -2.0 | — | -6.5 | |
| | RN2424 | | — | | -3.0 | — | -12.0 | |
| | RN2425 | | — | | -0.6 | — | -2.0 | |
| | RN2426 | | — | | -0.7 | — | -2.5 | |
| | RN2427 | | — | | -1.0 | — | -3.0 | |
| Input voltage (OFF) | RN2421 to 2424 | $V_{I(OFF)}$ | — | $V_{CE} = -5V, I_C = -0.1mA$ | -0.8 | — | -1.3 | V |
| | RN2425, 2426 | | — | | -0.4 | — | -0.8 | |
| | RN2427 | | — | | -0.5 | — | -1.0 | |
| Transition frequency | RN2421 to 2427 | f_T | — | $V_{CE} = -5V, I_C = -20mA$ | — | 200 | — | MHz |
| Collector output capacitance | RN2421 to 2427 | C_{ob} | — | $V_{CB} = -10V, I_E = 0, f = 1MHz$ | — | 13 | — | pF |
| Input resistor | RN2421 | R1 | — | — | 0.7 | 1.0 | 1.3 | kΩ |
| | RN2422 | | — | | 1.54 | 2.2 | 2.86 | |
| | RN2423 | | — | | 3.29 | 4.7 | 6.11 | |
| | RN2424 | | — | | 7 | 10 | 13 | |
| | RN2425 | | — | | 0.329 | 0.47 | 0.61 | |
| | RN2426 | | — | | 0.7 | 1.0 | 1.3 | |
| | RN2427 | | — | | 1.54 | 2.2 | 2.86 | |
| Resistor ratio | RN2421 to 2424 | R1/R2 | — | — | 0.9 | 1.0 | 1.1 | |
| | RN2425 | | — | | 0.0423 | 0.047 | 0.0517 | |
| | RN2426 | | — | | 0.09 | 0.1 | 0.11 | |
| | RN2427 | | — | | 0.2 | 0.22 | 0.24 | |

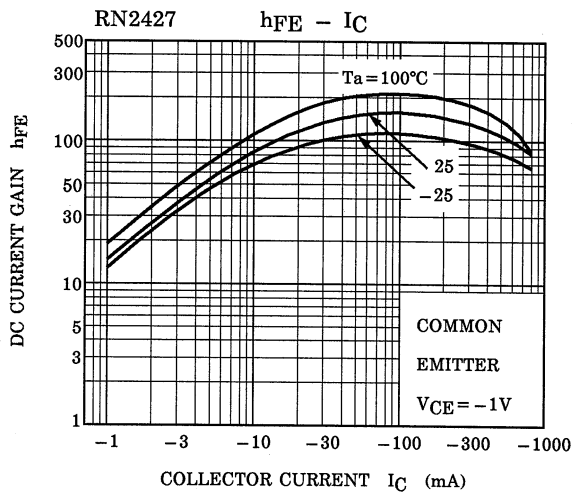
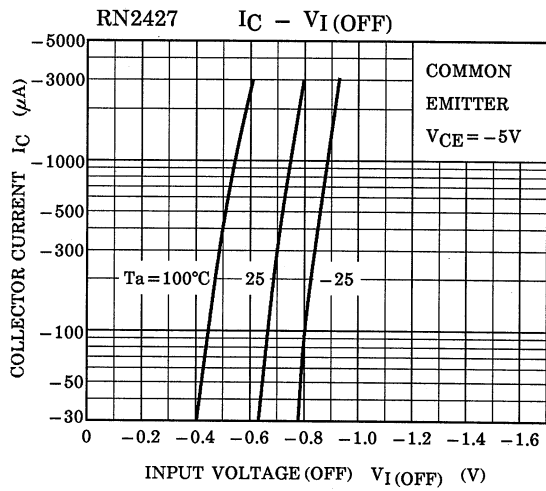
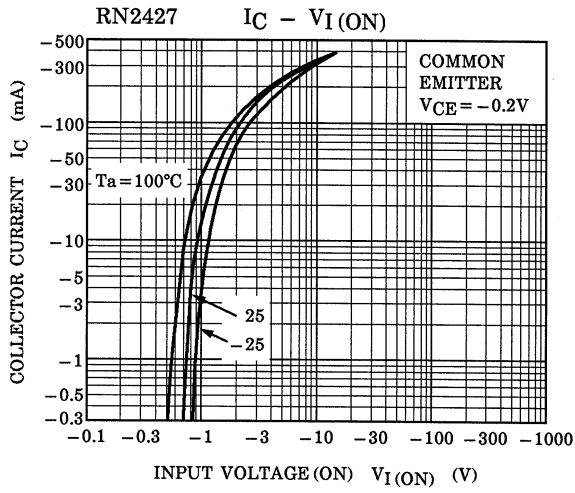
Marking

| Type No. | Marking |
|----------|---|
| RN2421 |  |
| RN2422 |  |
| RN2423 |  |
| RN2424 |  |
| RN2425 |  |
| RN2426 |  |
| RN2427 |  |









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