

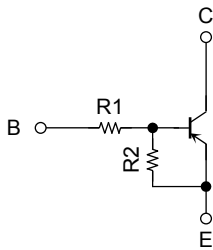
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process) (Bias Resistor Built-in Transistor)

RN2901FE, RN2902FE, RN2903FE RN2904FE, RN2905FE, RN2906FE

Switching, Inverter Circuit, Interface Circuit and
Driver Circuit Applications

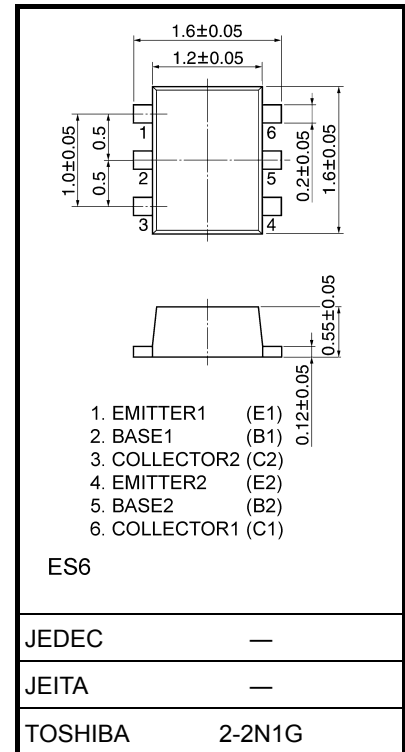
- Two devices are incorporated into an Extreme-Super-Mini (6-pin) package.
- Incorporating a bias resistor into a transistor reduces parts count. Reducing the parts count enables the manufacture of ever more compact equipment and lowers assembly cost.
- Complementary to RN1901FE to RN1906FE

Equivalent Circuit and Bias Resistor Values



| Type No. | R1 (kΩ) | R2 (kΩ) |
|----------|---------|---------|
| RN2901FE | 4.7 | 4.7 |
| RN2902FE | 10 | 10 |
| RN2903FE | 22 | 22 |
| RN2904FE | 47 | 47 |
| RN2905FE | 2.2 | 47 |
| RN2906FE | 4.7 | 47 |

Unit: mm



Weight:0.003 g (typ.)

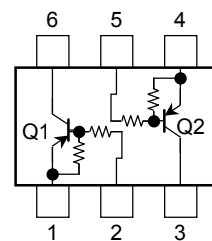
Absolute Maximum Ratings (Ta = 25°C) (Q1, Q2 common)

| Characteristics | | Symbol | Rating | Unit | | | |
|-----------------------------|----------------------|-----------|--------|------|----------------|------------|----|
| Collector-base voltage | RN2901FE to 2906FE | V_{CBO} | -50 | V | | | |
| Collector-emitter voltage | | | | | | | |
| Emitter-base voltage | RN2901FE to 2904FE | V_{EBO} | -10 | V | | | |
| | RN2905FE RN2906FE | | -5 | | | | |
| Collector current | RN2901FE to 2906FE | I_C | -100 | mA | | | |
| Collector power dissipation | | | | | P_C (Note 1) | 100 | mW |
| Junction temperature | | | | | T_j | 150 | °C |
| Storage temperature range | | | | | T_{stg} | -55 to 150 | °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).

Note 1: Total rating

Equivalent Circuit (top view)

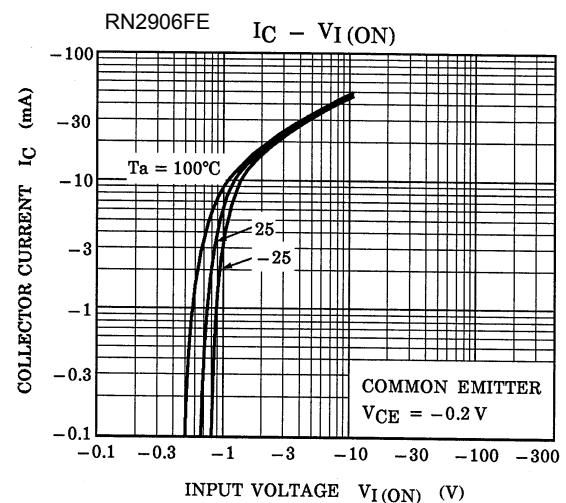
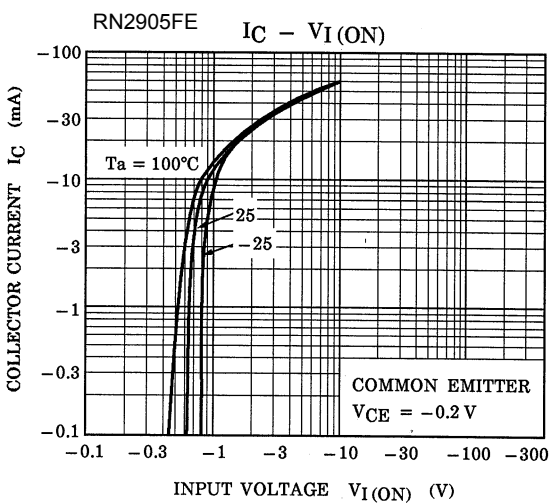
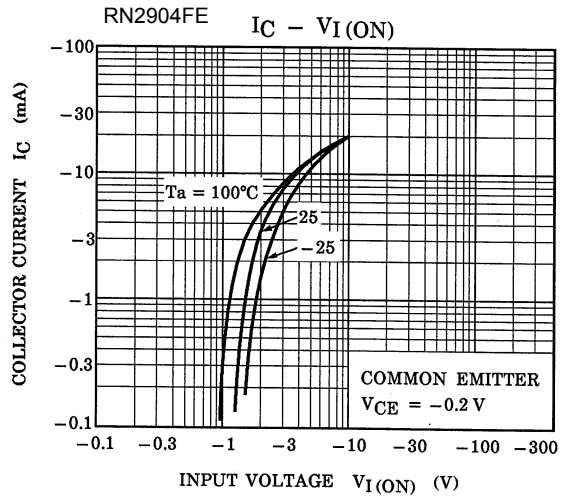
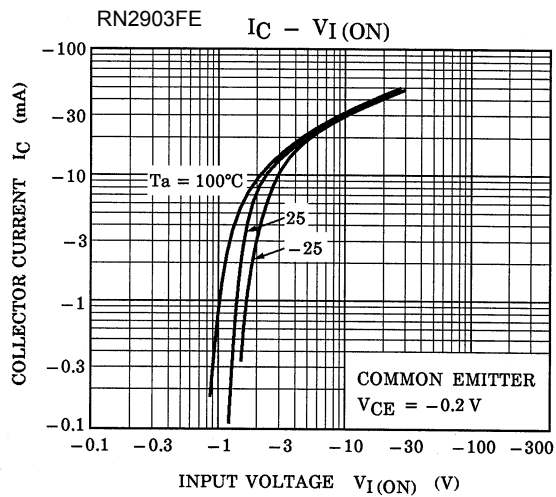
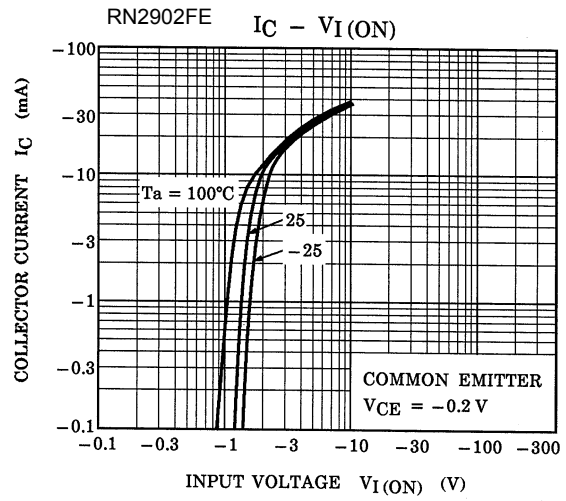
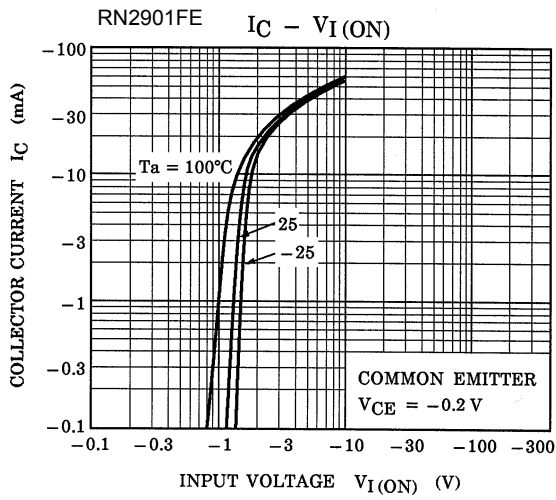


Start of commercial production
2000-05

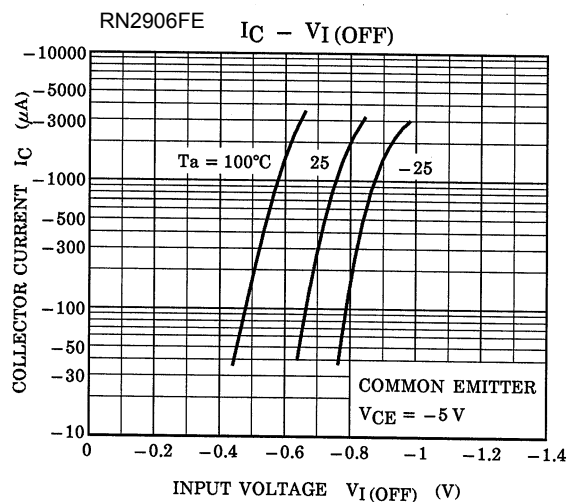
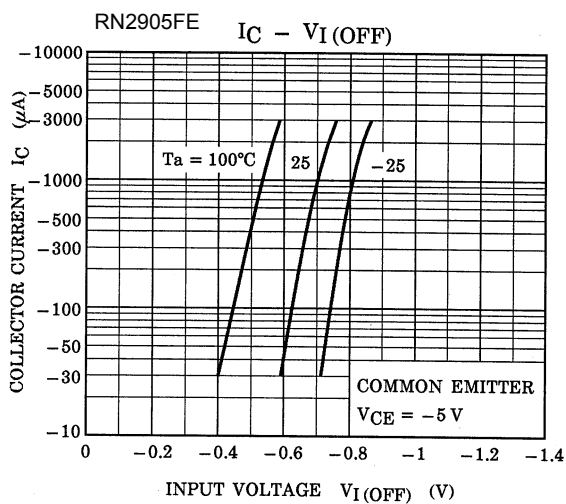
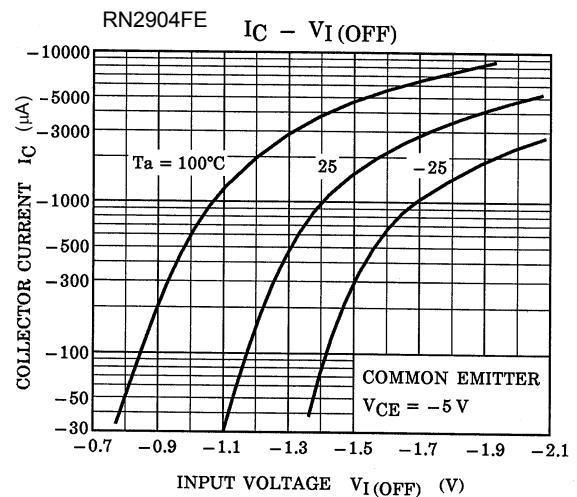
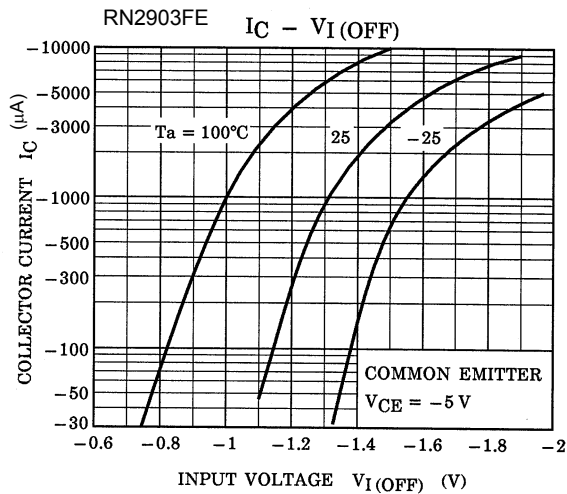
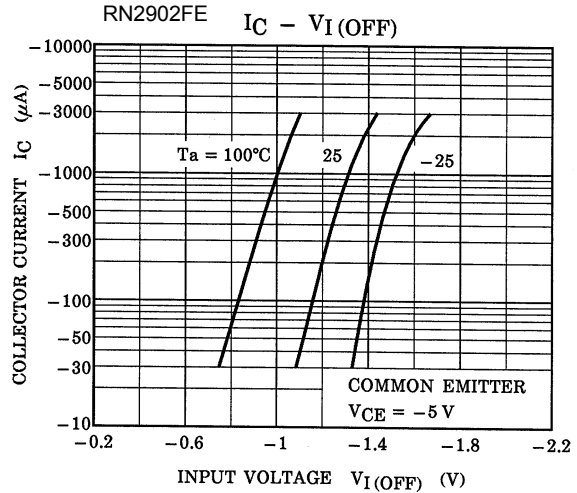
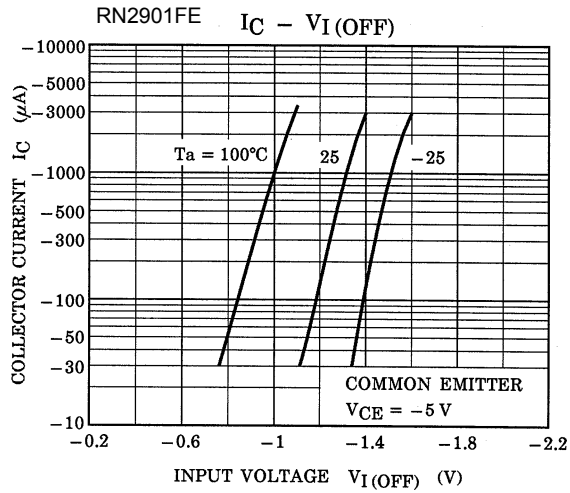
Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

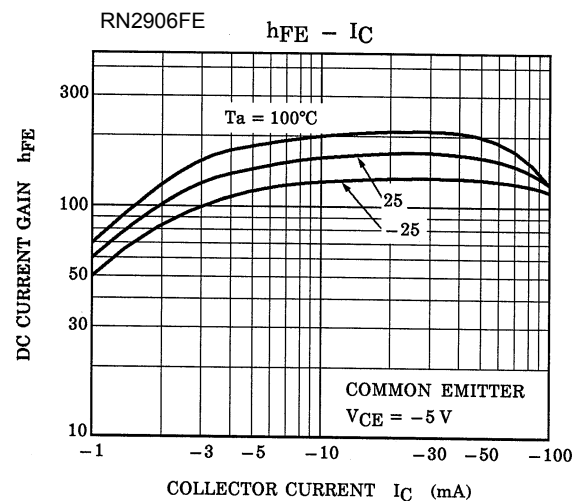
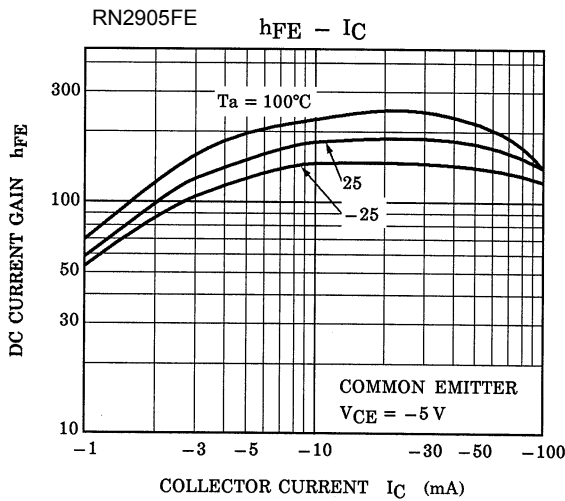
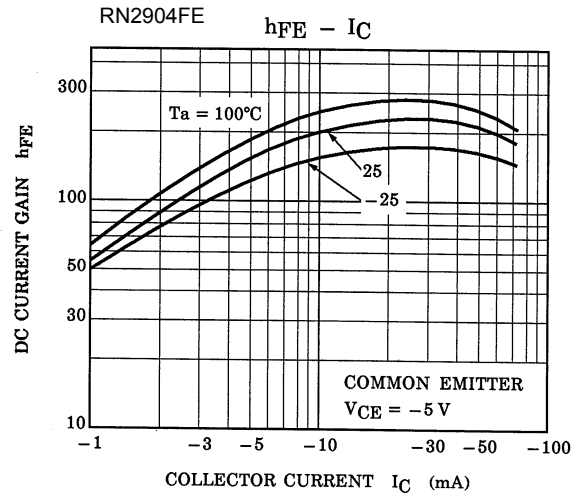
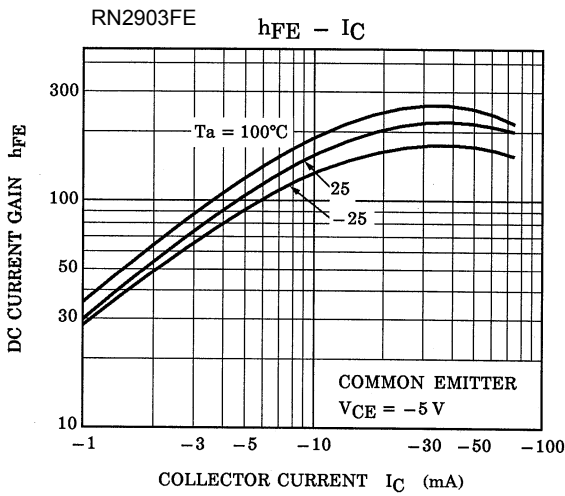
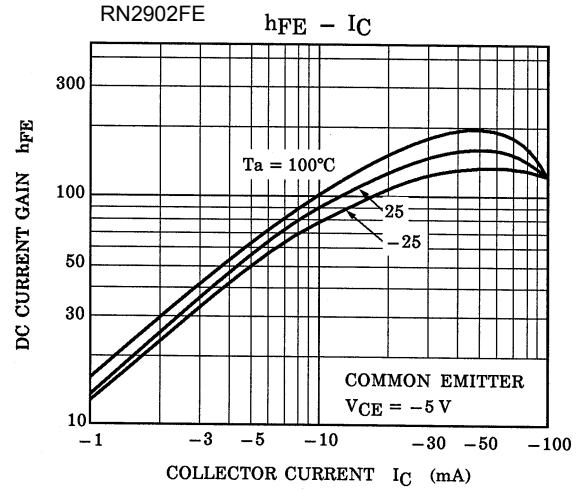
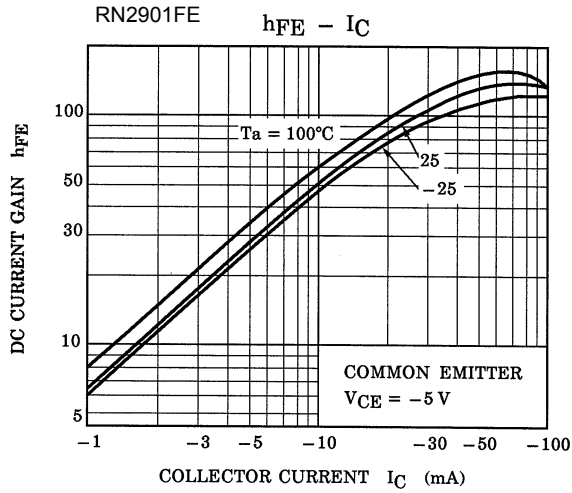
| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|--------------------|---------------|--|--------|--------|--------|------|
| Collector cut-off current | RN2901FE to 2906FE | I_{CBO} | $V_{CB} = -50\text{ V}, I_E = 0$ | — | — | -100 | nA |
| | | I_{CEO} | $V_{CE} = -50\text{ V}, I_B = 0$ | — | — | -500 | |
| Emitter cut-off current | RN2901FE | I_{EBO} | $V_{EB} = -10\text{ V}, I_C = 0$ | -0.82 | — | -1.52 | mA |
| | RN2902FE | | | -0.38 | — | -0.71 | |
| | RN2903FE | | | -0.17 | — | -0.33 | |
| | RN2904FE | | -0.082 | — | -0.15 | | |
| | RN2905FE | | $V_{EB} = -5\text{ V}, I_C = 0$ | -0.078 | — | -0.145 | |
| | RN2906FE | | | -0.074 | — | -0.138 | |
| DC current gain | RN2901FE | h_{FE} | $V_{CE} = -5\text{ V}, I_C = -10\text{ mA}$ | 30 | — | — | |
| | RN2902FE | | | 50 | — | — | |
| | RN2903FE | | | 70 | — | — | |
| | RN2904FE | | | 80 | — | — | |
| | RN2905FE | | | 80 | — | — | |
| | RN2906FE | | | 80 | — | — | |
| Collector-emitter saturation voltage | RN2901FE to 2906FE | $V_{CE(sat)}$ | $I_C = -5\text{ mA}, I_B = -0.25\text{ mA}$ | — | -0.1 | -0.3 | V |
| Input voltage (ON) | RN2901FE | $V_{I(ON)}$ | $V_{CE} = -0.2\text{ V}, I_C = -5\text{ mA}$ | -1.1 | — | -2.0 | V |
| | RN2902FE | | | -1.2 | — | -2.4 | |
| | RN2903FE | | | -1.3 | — | -3.0 | |
| | RN2904FE | | | -1.5 | — | -5.0 | |
| | RN2905FE | | | -0.6 | — | -1.1 | |
| | RN2906FE | | | -0.7 | — | -1.3 | |
| Input voltage (OFF) | RN2901FE to 2904FE | $V_{I(OFF)}$ | $V_{CE} = -5\text{ V}, I_C = -0.1\text{ mA}$ | -1.0 | — | -1.5 | V |
| | RN2905FE, RN2906FE | | | -0.5 | — | -0.8 | |
| Transition frequency | RN2901FE to 2906FE | f_T | $V_{CE} = -10\text{ V}, I_C = -5\text{ mA}$ | — | 200 | — | MHz |
| Collector output capacitance | RN2901FE to 2906FE | C_{ob} | $V_{CB} = -10\text{ V}, I_E = 0, f = 1\text{ MHz}$ | — | 3 | 6 | pF |
| Input resistor | RN2901FE | R1 | — | 3.29 | 4.7 | 6.11 | kΩ |
| | RN2902FE | | | 7 | 10 | 13 | |
| | RN2903FE | | | 15.4 | 22 | 28.6 | |
| | RN2904FE | | | 32.9 | 47 | 61.1 | |
| | RN2905FE | | | 1.54 | 2.2 | 2.86 | |
| | RN2906FE | | | 3.29 | 4.7 | 6.11 | |
| Resistor ratio | RN2901FE to 2904FE | R1/R2 | — | 0.9 | 1.0 | 1.1 | |
| | RN2905FE | | | 0.0421 | 0.0468 | 0.0515 | |
| | RN2906FE | | | 0.09 | 0.1 | 0.11 | |

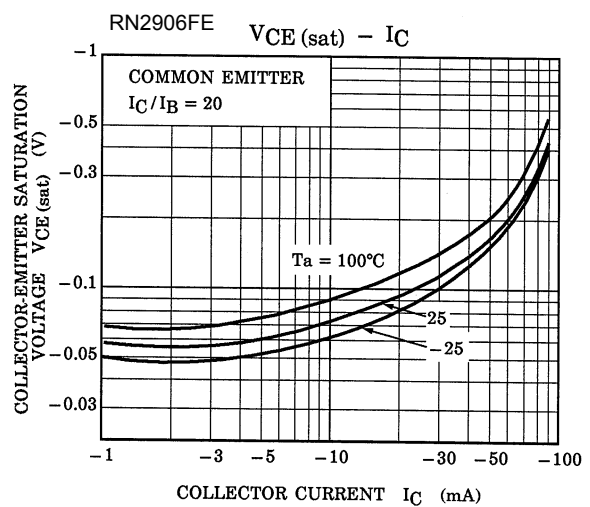
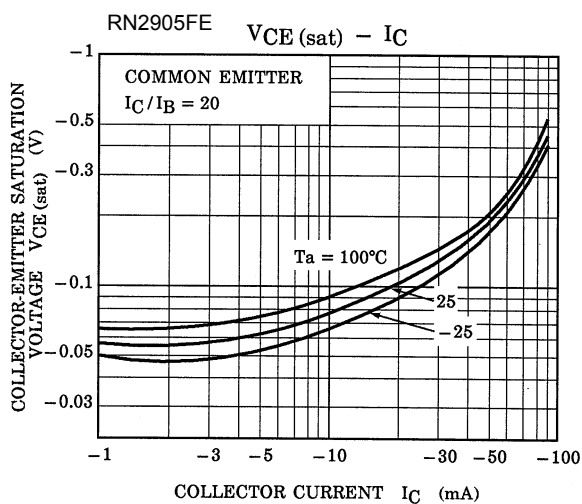
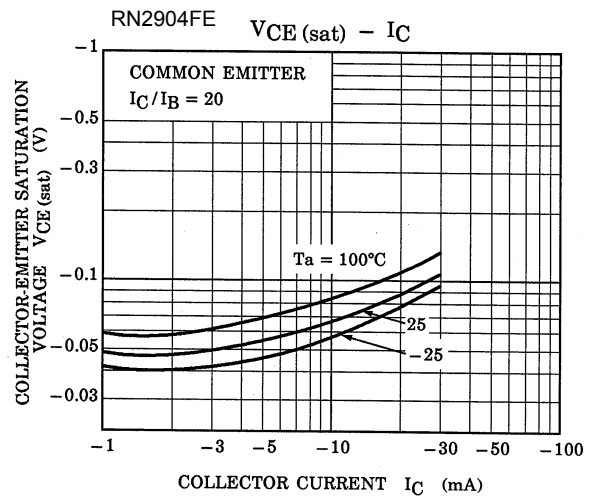
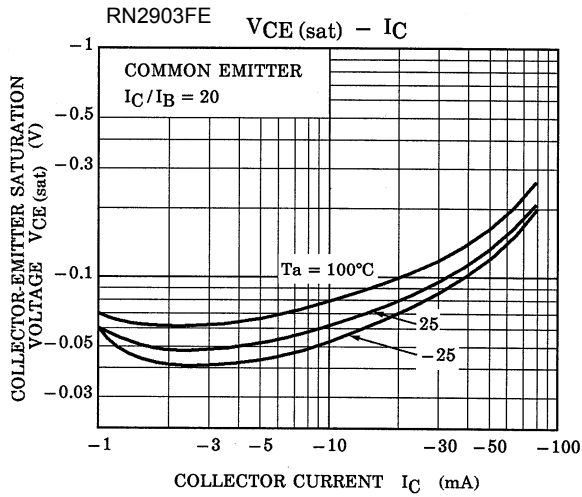
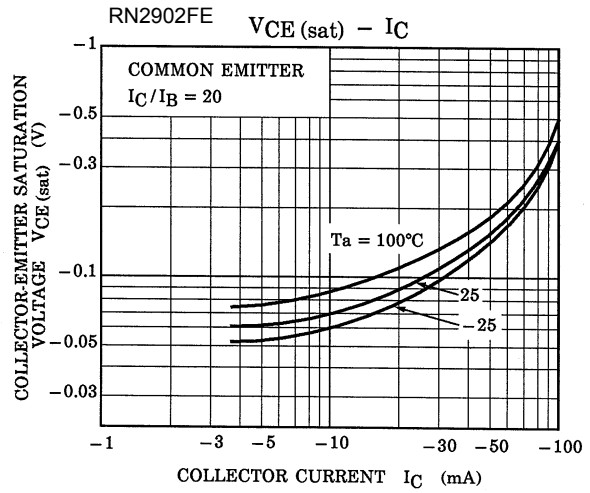
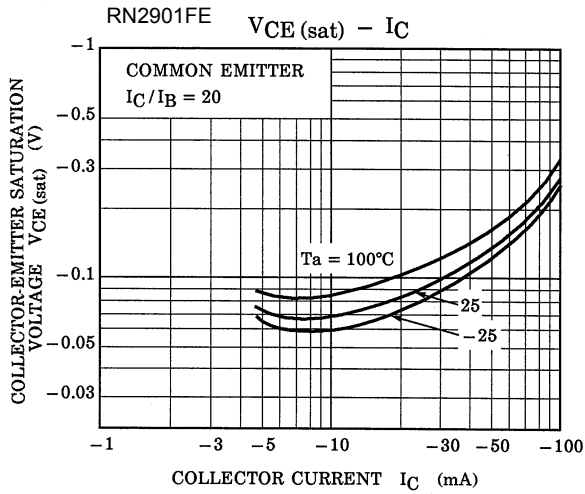
Q1, Q2 Common

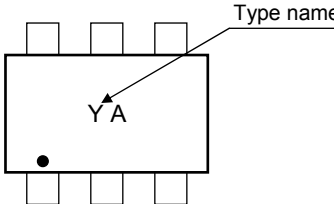
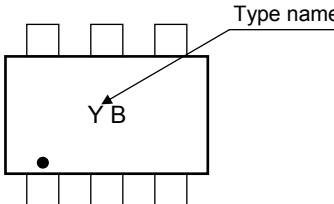
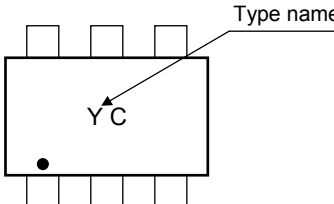
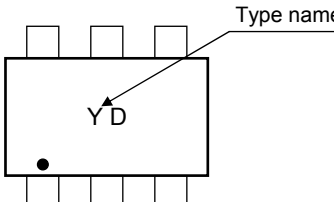
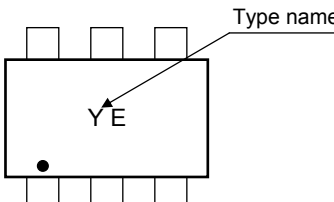
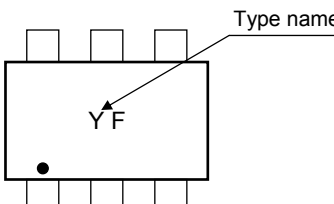


Q1, Q2 Common







| Type Name | Marking |
|-----------|---|
| RN2901FE |  |
| RN2902FE |  |
| RN2903FE |  |
| RN2904FE |  |
| RN2905FE |  |
| RN2906FE |  |

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