

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

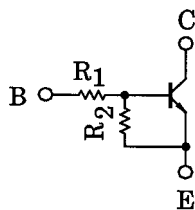
## RN1114,RN1115,RN1116,RN1117,RN1118

Switching, Inverter Circuit, Interface Circuit  
And Driver Circuit Applications

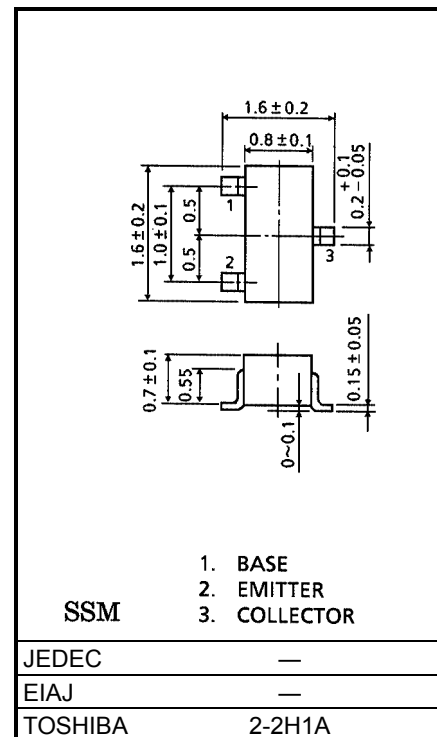
Unit: mm

- With built-in bias resistors.
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN2114~2118

### Equivalent Circuit and Bias Resistor Values



| Type No. | R <sub>1</sub> (kΩ) | R <sub>2</sub> (kΩ) |
|----------|---------------------|---------------------|
| RN1114   | 1                   | 10                  |
| RN1115   | 2.2                 | 10                  |
| RN1116   | 4.7                 | 10                  |
| RN1117   | 10                  | 4.7                 |
| RN1118   | 47                  | 10                  |



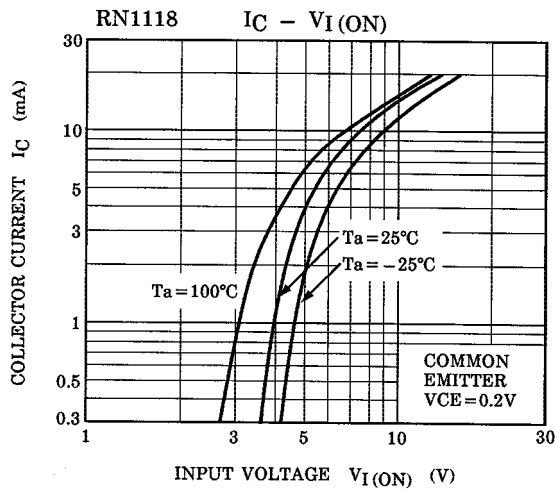
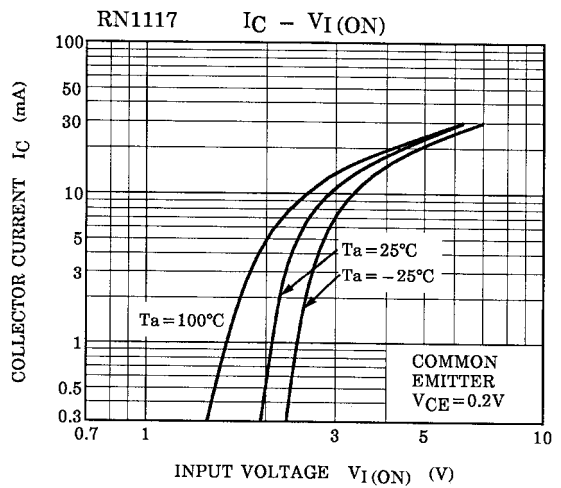
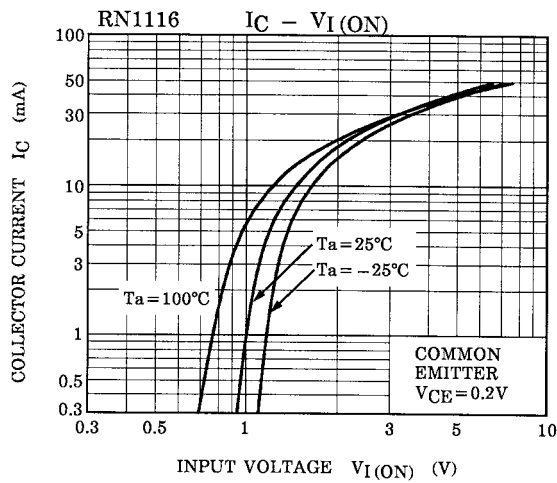
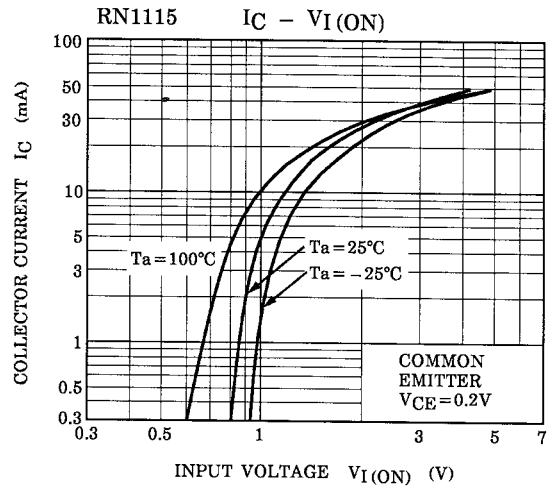
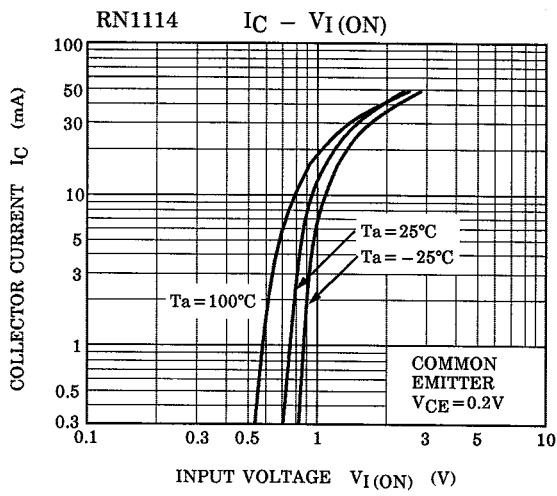
Weight: 2.4mg

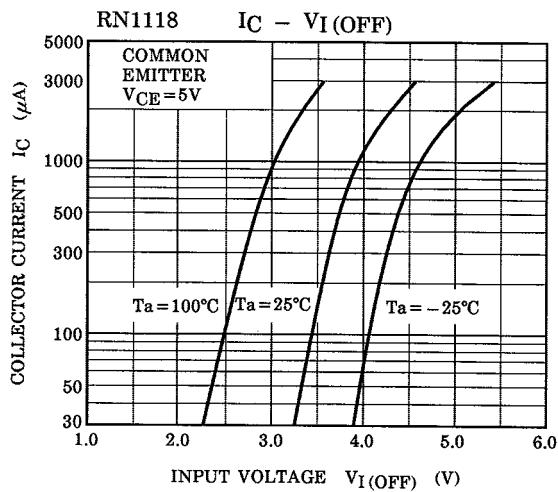
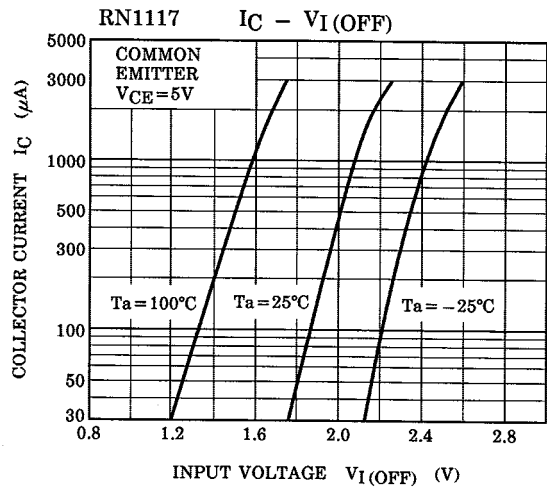
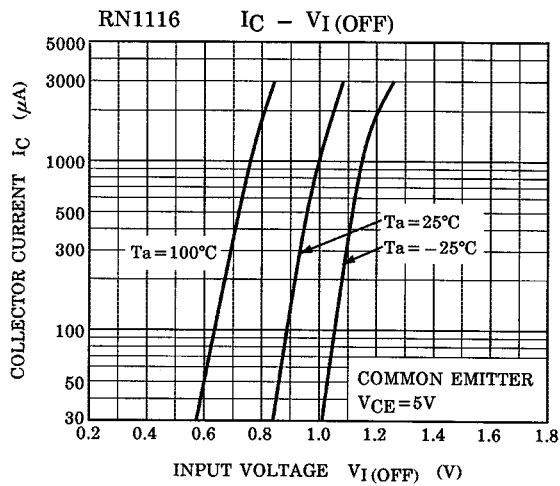
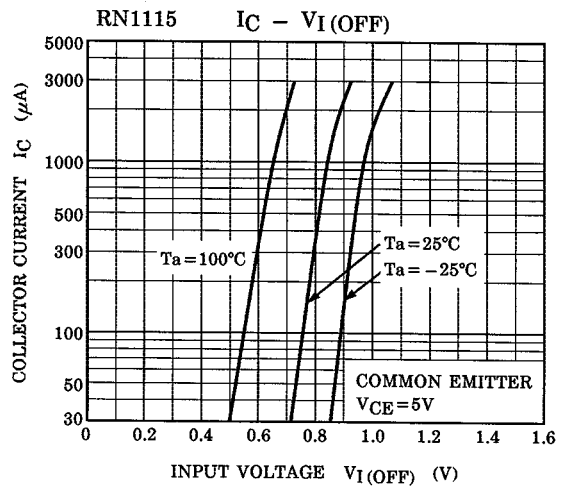
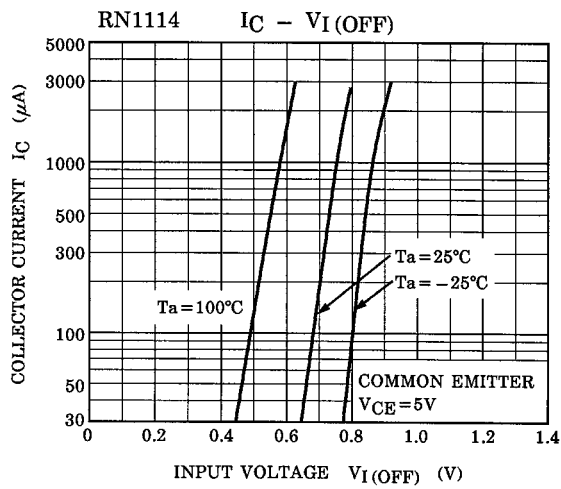
### Maximum Ratings (Ta = 25°C)

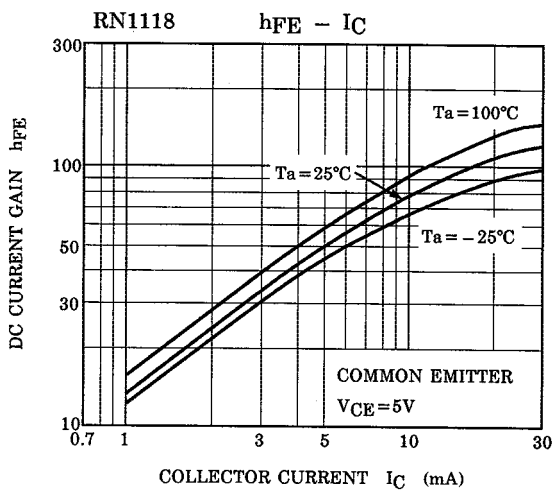
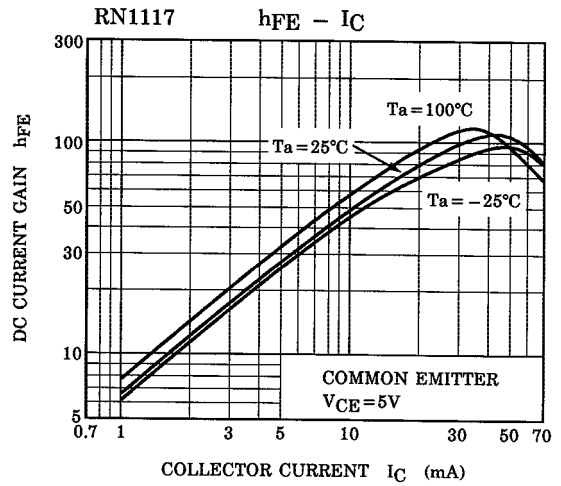
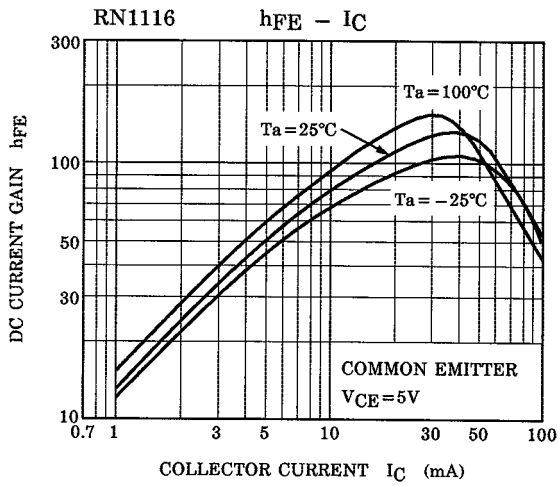
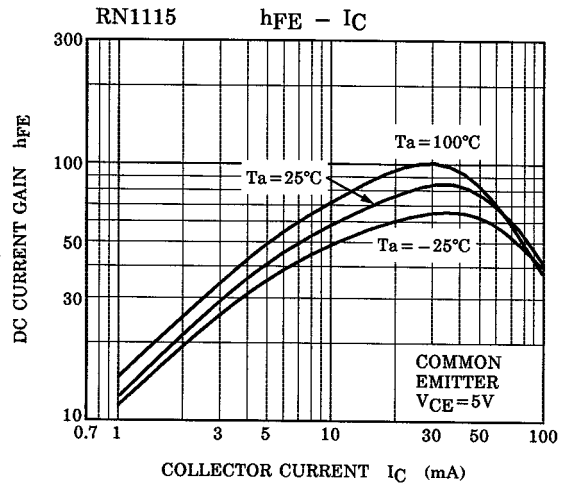
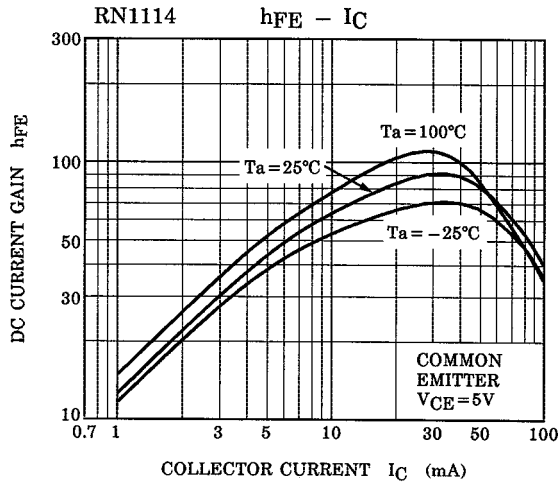
| Characteristic              |             | Symbol           | Rating  | Unit |
|-----------------------------|-------------|------------------|---------|------|
| Collector-base voltage      | RN1114~1118 | V <sub>CBO</sub> | 50      | V    |
| Collector-emitter voltage   |             | V <sub>CEO</sub> | 50      | V    |
| Emitter-base voltage        | RN1114      | V <sub>EBO</sub> | 5       | V    |
|                             | RN1115      |                  | 6       |      |
|                             | RN1116      |                  | 7       |      |
|                             | RN1117      |                  | 15      |      |
|                             | RN1118      |                  | 25      |      |
| Collector current           | RN1114~1118 | I <sub>c</sub>   | 100     | mA   |
| Collector power dissipation |             | P <sub>c</sub>   | 100     | mW   |
| Junction temperature        |             | T <sub>j</sub>   | 150     | °C   |
| Storage temperature range   |             | T <sub>stg</sub> | -55~150 | °C   |

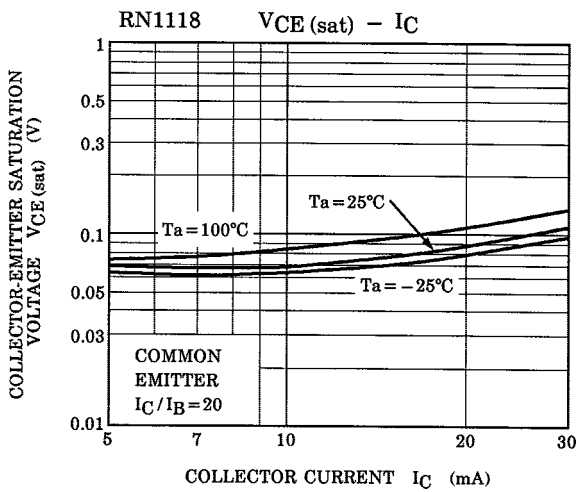
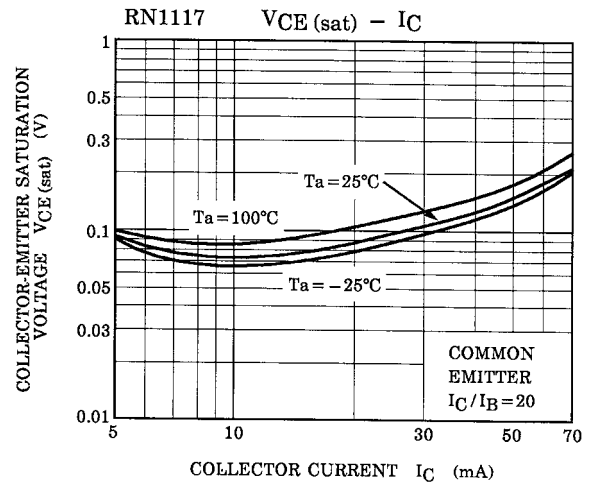
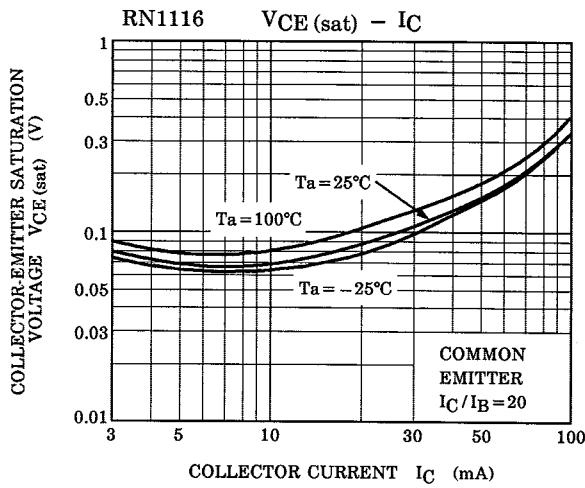
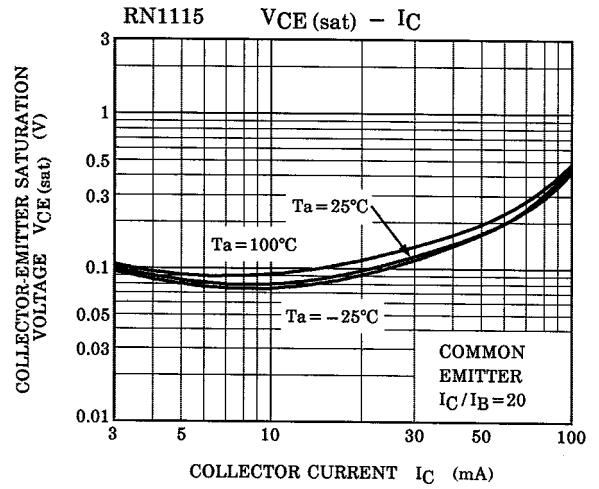
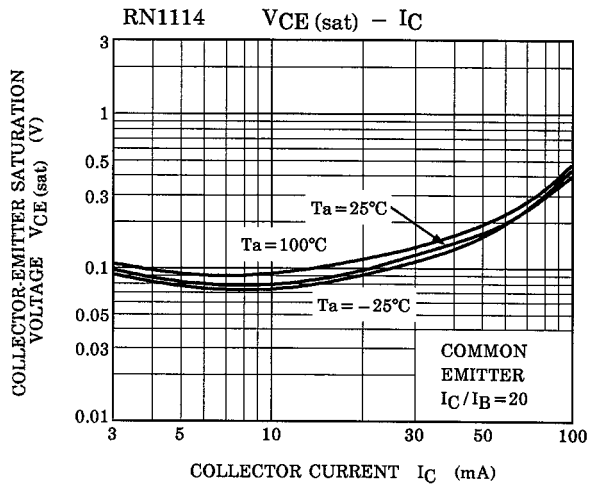
## Electrical Characteristics (Ta = 25°C)

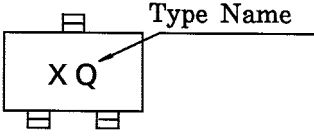
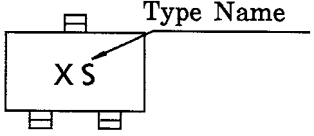
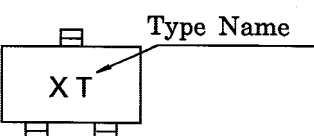
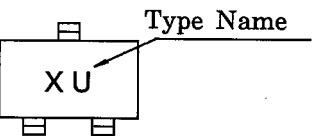
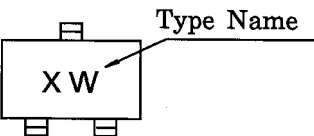
| Characteristic                       |               | Symbol        | Test Circuit | Test Condition                    | Min  | Typ. | Max  | Unit |
|--------------------------------------|---------------|---------------|--------------|-----------------------------------|------|------|------|------|
| Collector cut-off current            | RN1114~1118   | $I_{CBO}$     | —            | $V_{CB} = 50V, I_E = 0$           | —    | —    | 100  | nA   |
|                                      | RN1114~1118   | $I_{CEO}$     | —            | $V_{CE} = 50V, I_B = 0$           | —    | —    | 500  | nA   |
| Emitter cut-off current              | RN1114        | $I_{EBO}$     | —            | $V_{EB} = 5V, I_C = 0$            | 0.35 | —    | 0.65 | mA   |
|                                      | RN1115        |               | —            | $V_{EB} = 6V, I_C = 0$            | 0.37 | —    | 0.71 |      |
|                                      | RN1116        |               | —            | $V_{EB} = 7V, I_C = 0$            | 0.36 | —    | 0.68 |      |
|                                      | RN1117        |               | —            | $V_{EB} = 15V, I_C = 0$           | 0.78 | —    | 1.46 |      |
|                                      | RN1118        |               | —            | $V_{EB} = 25V, I_C = 0$           | 0.33 | —    | 0.63 |      |
| DC current gain                      | RN1114~16, 18 | $h_{FE}$      | —            | $V_{CE} = 5V, I_C = 10mA$         | 50   | —    | —    | —    |
|                                      | RN1117        |               | —            |                                   | 30   | —    | —    |      |
| Collector-emitter saturation voltage | RN1114~1118   | $V_{CE(sat)}$ | —            | $I_C = 5mA, I_B = 0.25mA$         | —    | 0.1  | 0.3  | V    |
| Input voltage (ON)                   | RN1114        | $V_{I(ON)}$   | —            | $V_{CE} = 0.2V, I_C = 5mA$        | 0.6  | —    | 2.0  | V    |
|                                      | RN1115        |               | —            |                                   | 0.7  | —    | 2.5  |      |
|                                      | RN1116        |               | —            |                                   | 0.8  | —    | 2.5  |      |
|                                      | RN1117        |               | —            |                                   | 1.5  | —    | 3.5  |      |
|                                      | RN1118        |               | —            |                                   | 2.5  | —    | 10.0 |      |
| Input voltage (OFF)                  | RN1114        | $V_{I(OFF)}$  | —            | $V_{CE} = 5V, I_C = 0.1mA$        | 0.3  | —    | 0.9  | V    |
|                                      | RN1115        |               | —            |                                   | 0.3  | —    | 1.0  |      |
|                                      | RN1116        |               | —            |                                   | 0.3  | —    | 1.1  |      |
|                                      | RN1117        |               | —            |                                   | 0.3  | —    | 2.3  |      |
|                                      | RN1118        |               | —            |                                   | 0.5  | —    | 5.7  |      |
| Translation Frequency                | RN1114~1118   | $f_T$         | —            | $V_{CE} = 10V, I_C = 5mA$         | —    | 250  | —    | MHz  |
| Collector output capacitance         | RN1114~1118   | $C_{ob}$      | —            | $V_{CB} = 10V, I_E = 0, f = 1MHz$ | —    | 3.0  | 6.0  | pF   |
| Input Resistor                       | RN1114        | $R_1$         | —            | —                                 | 0.7  | 1.0  | 1.3  | kΩ   |
|                                      | RN1115        |               | —            |                                   | 1.54 | 2.2  | 2.86 |      |
|                                      | RN1116        |               | —            |                                   | 3.29 | 4.7  | 6.11 |      |
|                                      | RN1117        |               | —            |                                   | 7.0  | 10.0 | 13.0 |      |
|                                      | RN1118        |               | —            |                                   | 32.9 | 47.0 | 61.1 |      |
| Resistor Ratio                       | RN1114        | $R_1/R_2$     | —            | —                                 | —    | 0.1  | —    | —    |
|                                      | RN1115        |               | —            |                                   | —    | 0.22 | —    |      |
|                                      | RN1116        |               | —            |                                   | —    | 0.47 | —    |      |
|                                      | RN1117        |               | —            |                                   | —    | 2.13 | —    |      |
|                                      | RN1118        |               | —            |                                   | —    | 4.7  | —    |      |









| Type Name | Marking   |
|-----------|---|
| RN1114    |    |
| RN1115    |    |
| RN1116    |    |
| RN1117    |   |
| RN1118    |  |

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