

TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process)

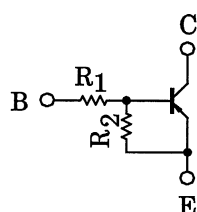
## RN2414,RN2415,RN2416,RN2417,RN2418

Switching, Inverter Circuit, Interface Circuit  
And Driver Circuit Applications

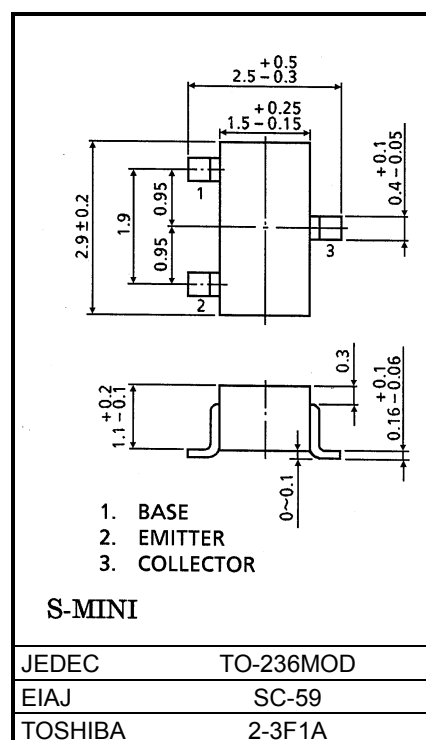
Unit: mm

- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN1414~RN1418

### Equivalent Circuit and Bias Resistor Values



| Type No. | R <sub>1</sub> (kΩ) | R <sub>2</sub> (kΩ) |
|----------|---------------------|---------------------|
| RN2414   | 1                   | 10                  |
| RN2415   | 2.2                 | 10                  |
| RN2416   | 4.7                 | 10                  |
| RN2417   | 10                  | 4.7                 |
| RN2418   | 47                  | 10                  |



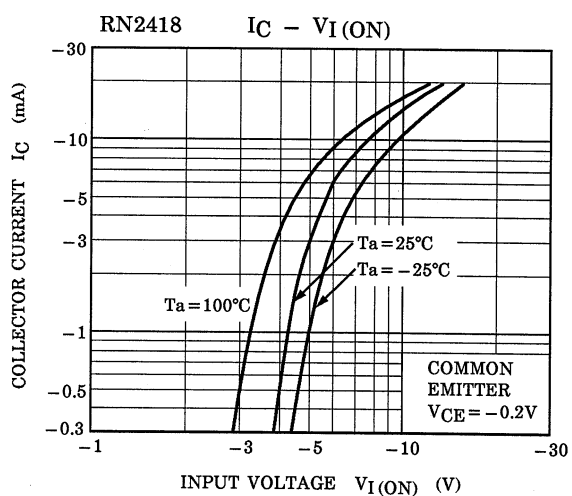
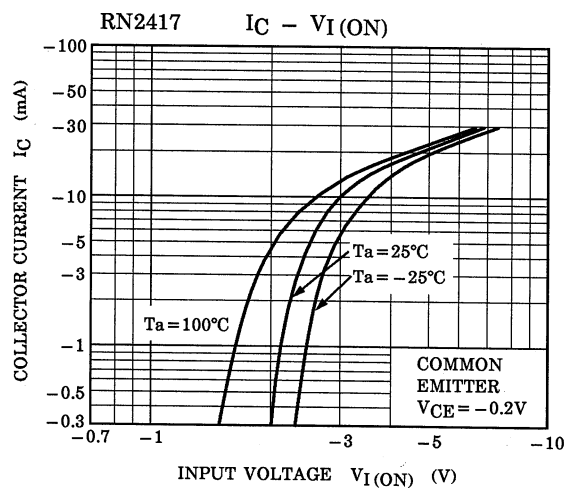
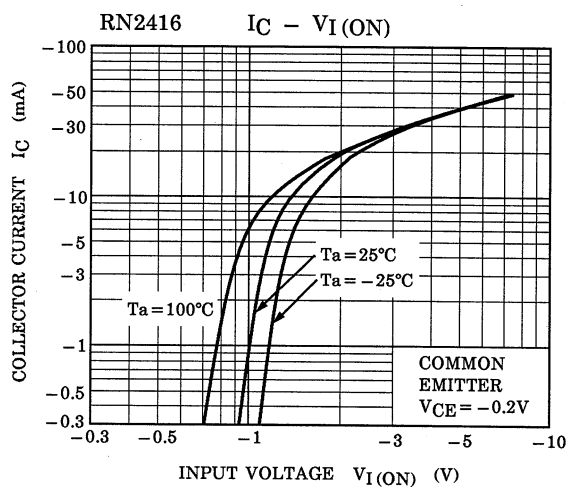
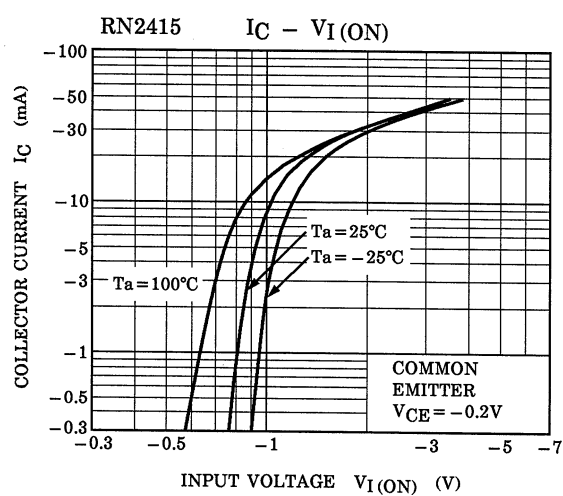
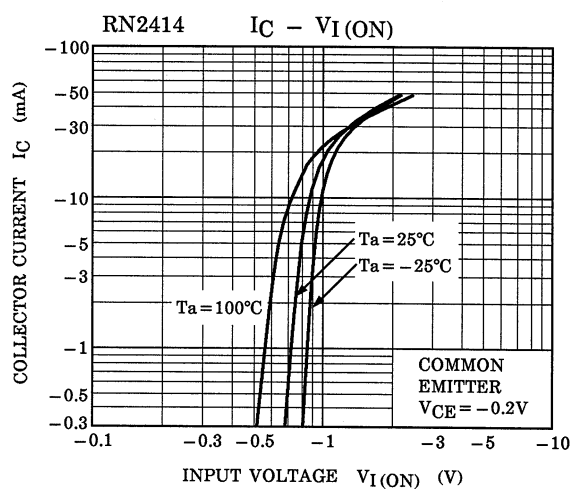
Weight: 0.012g

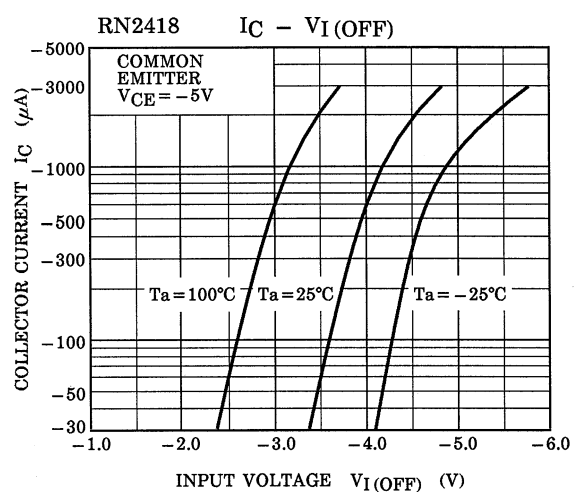
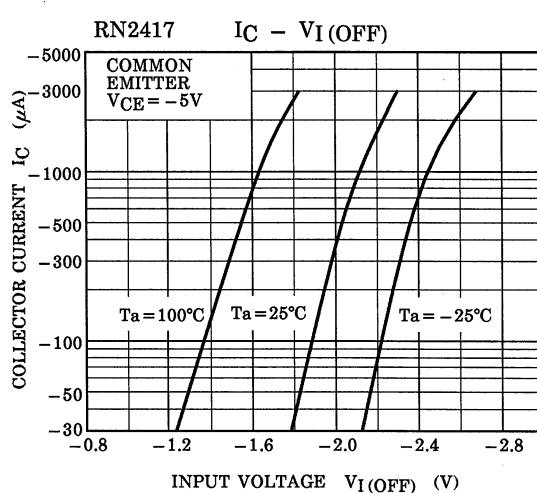
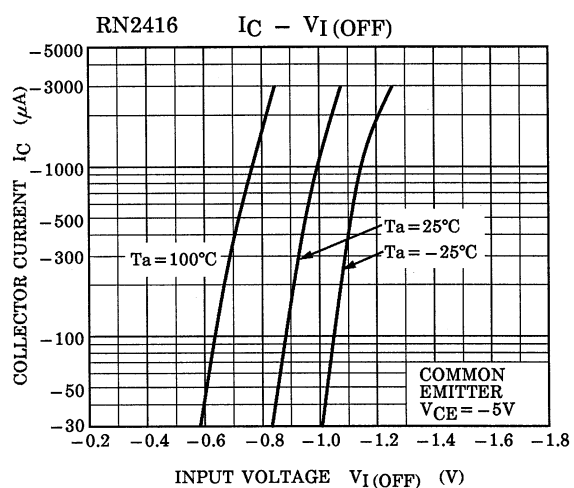
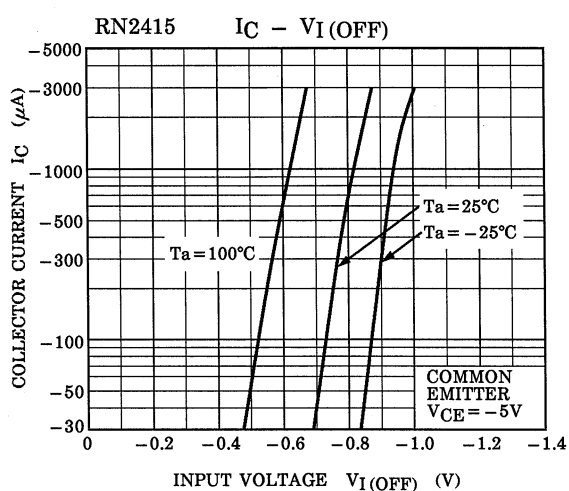
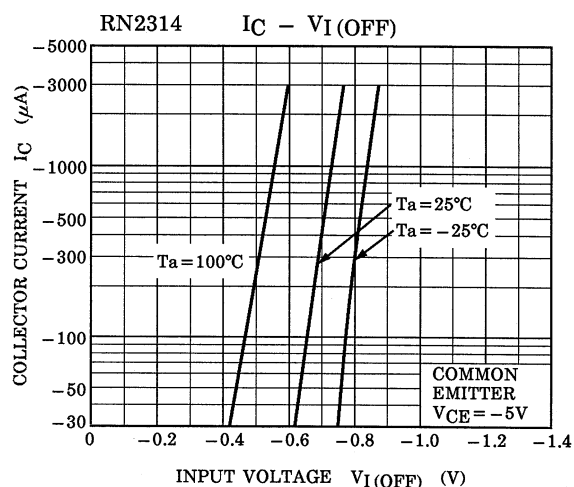
### Maximum Ratings (Ta = 25°C)

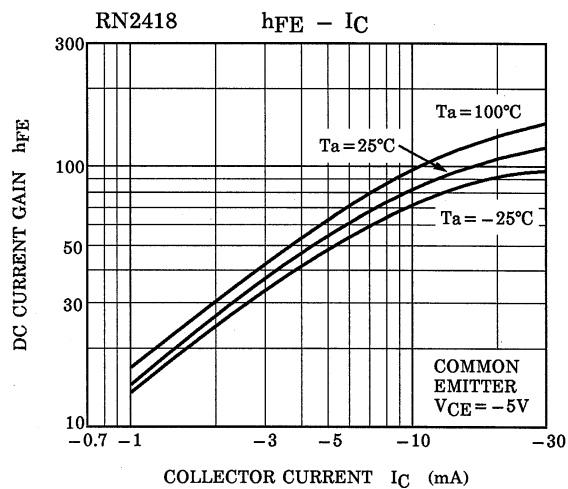
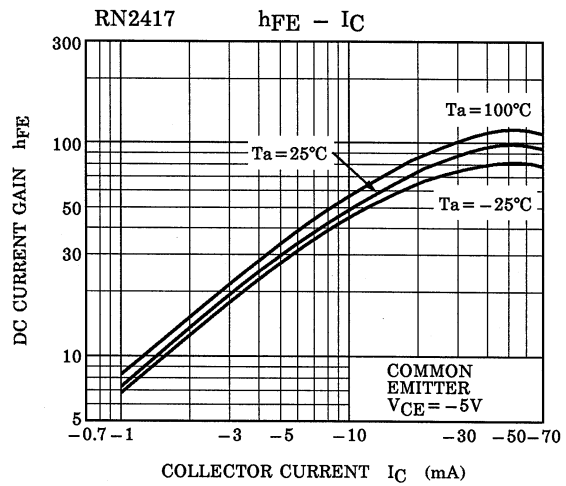
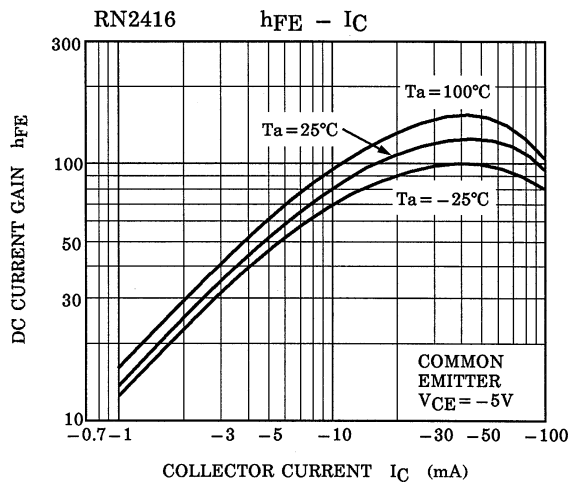
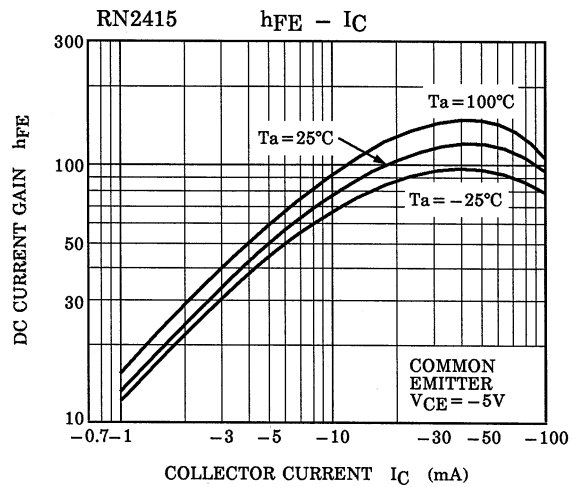
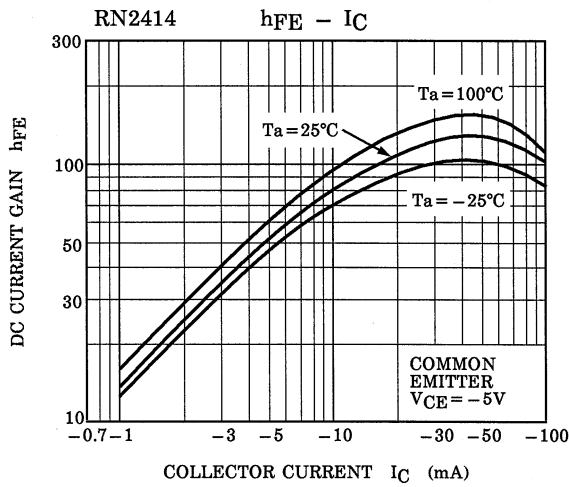
| Characteristic              | Symbol           | Rating  | Unit |
|-----------------------------|------------------|---------|------|
| Collector-base voltage      | V <sub>CBO</sub> | -50     | V    |
| Collector-emitter voltage   | V <sub>CEO</sub> | -50     | V    |
| Emitter-base voltage        | V <sub>EBO</sub> | -5      | V    |
|                             |                  | -6      |      |
|                             |                  | -7      |      |
|                             |                  | -15     |      |
|                             |                  | -25     |      |
| Collector current           | I <sub>C</sub>   | -100    | mA   |
| Collector power dissipation | P <sub>C</sub>   | 200     | mW   |
| Junction temperature        | T <sub>j</sub>   | 150     | °C   |
| Storage temperature range   | T <sub>stg</sub> | -55~150 | °C   |

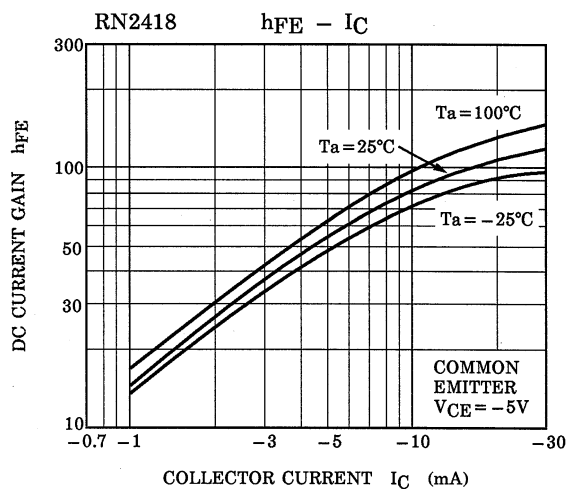
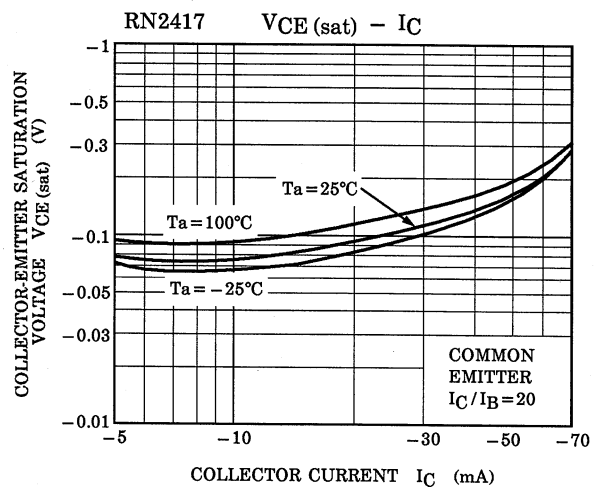
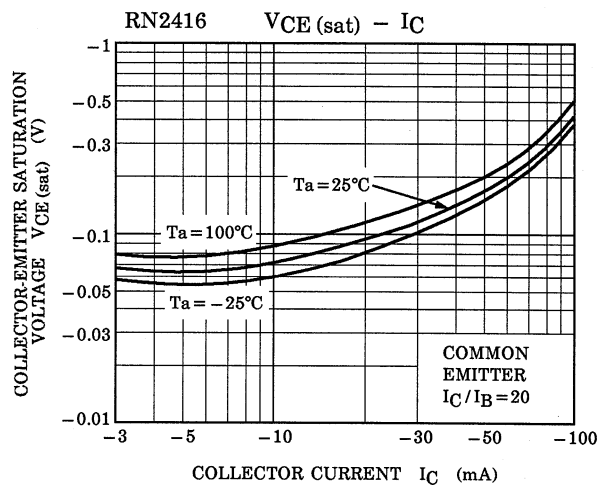
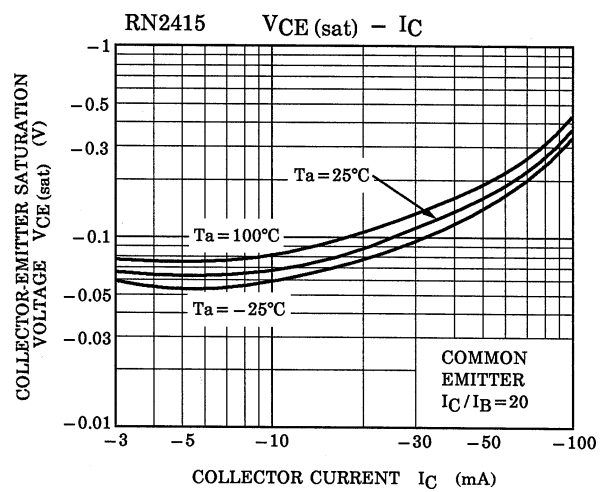
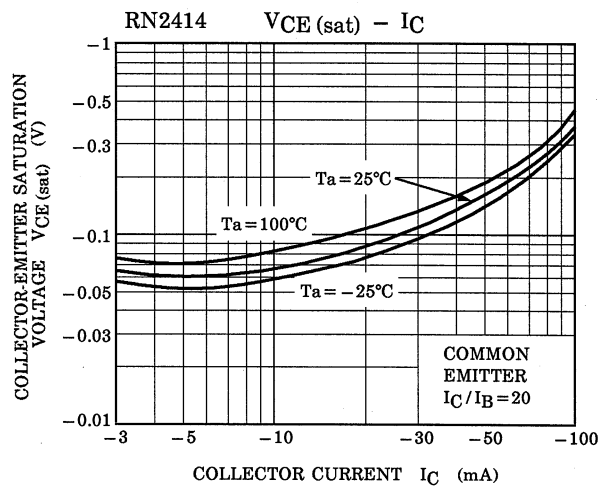
## Electrical Characteristics (Ta = 25°C)

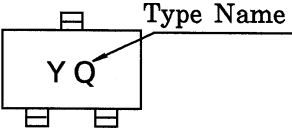
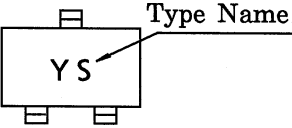
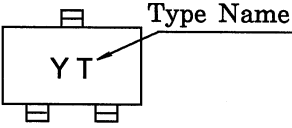
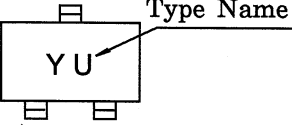
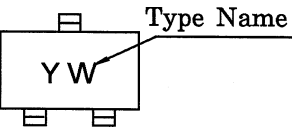
| Characteristic                       |               | Symbol        | Test Circuit | Test Condition                     | Min   | Typ. | Max   | Unit |
|--------------------------------------|---------------|---------------|--------------|------------------------------------|-------|------|-------|------|
| Collector cut-off current            | RN2414~2418   | $I_{CBO}$     | —            | $V_{CB} = -50V, I_E = 0$           | —     | —    | -100  | nA   |
|                                      | RN2414~2418   | $I_{CEO}$     | —            | $V_{CE} = -50V, I_B = 0$           | —     | —    | -500  | nA   |
| Emitter cut-off current              | RN2414        | $I_{EBO}$     | —            | $V_{EB} = -5V, I_C = 0$            | -0.35 | —    | -0.65 | mA   |
|                                      | RN2415        |               | —            | $V_{EB} = -6V, I_C = 0$            | -0.37 | —    | -0.71 |      |
|                                      | RN2416        |               | —            | $V_{EB} = -7V, I_C = 0$            | -0.36 | —    | -0.68 |      |
|                                      | RN2417        |               | —            | $V_{EB} = -15V, I_C = 0$           | -0.78 | —    | -1.46 |      |
|                                      | RN2418        |               | —            | $V_{EB} = -25V, I_C = 0$           | -0.33 | —    | -0.63 |      |
| DC current gain                      | RN2414~16, 18 | $h_{FE}$      | —            | $V_{CE} = -5V, I_C = -10mA$        | 50    | —    | —     | —    |
|                                      | RN2417        |               | —            |                                    | 30    | —    | —     |      |
| Collector-emitter saturation voltage | RN2414~2418   | $V_{CE(sat)}$ | —            | $I_C = -5mA, I_B = -0.25mA$        | —     | -0.1 | -0.3  | V    |
| Input voltage (ON)                   | RN2414        | $V_I(ON)$     | —            | $V_{CE} = -0.2V, I_C = -5mA$       | -0.5  | —    | -2.0  | V    |
|                                      | RN2415        |               | —            |                                    | -0.6  | —    | -2.5  |      |
|                                      | RN2416        |               | —            |                                    | -0.7  | —    | -2.5  |      |
|                                      | RN2417        |               | —            |                                    | -1.5  | —    | -3.5  |      |
|                                      | RN2418        |               | —            |                                    | -2.5  | —    | -10.0 |      |
| Input voltage (OFF)                  | RN2414        | $V_I(OFF)$    | —            | $V_{CE} = -5V, I_C = -0.1mA$       | -0.3  | —    | -0.9  | V    |
|                                      | RN2415        |               | —            |                                    | -0.3  | —    | -1.0  |      |
|                                      | RN2416        |               | —            |                                    | -0.3  | —    | -1.1  |      |
|                                      | RN2417        |               | —            |                                    | -0.3  | —    | -3.0  |      |
|                                      | RN2418        |               | —            |                                    | -0.5  | —    | -5.7  |      |
| Translation frequency                | RN2414~2418   | $f_T$         | —            | $V_{CE} = -10V, I_C = -5mA$        | —     | 200  | —     | MHz  |
| Collector output capacitance         | RN2414~2418   | $C_{ob}$      | —            | $V_{CB} = -10V, I_E = 0, f = 1MHz$ | —     | 3.0  | 6.0   | pF   |
| Input resistor                       | RN2414        | $R_1$         | —            | —                                  | 0.7   | 1.0  | 1.3   | kΩ   |
|                                      | RN2415        |               | —            |                                    | 1.54  | 2.2  | 2.86  |      |
|                                      | RN2416        |               | —            |                                    | 3.29  | 4.7  | 6.11  |      |
|                                      | RN2417        |               | —            |                                    | 7.0   | 10.0 | 13.0  |      |
|                                      | RN2418        |               | —            |                                    | 32.9  | 47.0 | 61.1  |      |
| Resistor ratio                       | RN2414        | $R_1/R_2$     | —            | —                                  | —     | 0.1  | —     | —    |
|                                      | RN2415        |               | —            |                                    | —     | 0.22 | —     |      |
|                                      | RN2416        |               | —            |                                    | —     | 0.47 | —     |      |
|                                      | RN2417        |               | —            |                                    | —     | 2.13 | —     |      |
|                                      | RN2418        |               | —            |                                    | —     | 4.7  | —     |      |









| Type Name | Marking                                                                             |
|-----------|-------------------------------------------------------------------------------------|
| RN2414    |    |
| RN2415    |    |
| RN2416    |    |
| RN2417    |   |
| RN2418    |  |

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000707EAA

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