

# RN1001~1006

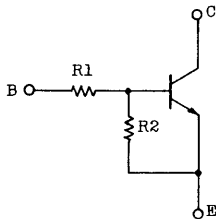
SILICON NPN EPITAXIAL TYPE

SWITCHING, INVERTER CIRCUIT, INTERFACE CIRCUIT  
AND DRIVER CIRCUIT APPLICATIONS.

**FEATURES:**

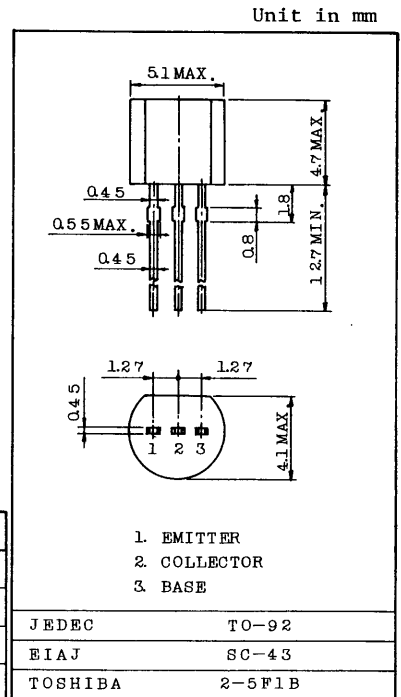
- . With Built-in Bias Resistors
- . Simplify Circuit Design
- . Reduce a Quantity of Parts and Manufacturing Process
- . Complementary to RN2001~2006

**EQUIVALENT CIRCUIT**



**BIAS RESISTOR VALUES**

| TYPE No. | R1 (kΩ) | R2 (kΩ) |
|----------|---------|---------|
| RN1001   | 4.7     | 4.7     |
| RN1002   | 10      | 10      |
| RN1003   | 22      | 22      |
| RN1004   | 47      | 47      |
| RN1005   | 2.2     | 47      |
| RN1006   | 4.7     | 47      |



Weight : 0.21g

**MAXIMUM RATINGS (Ta=25°C)**

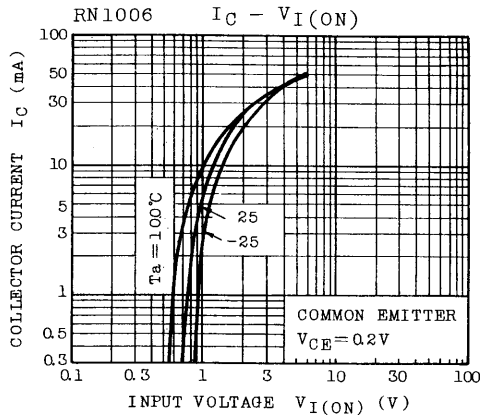
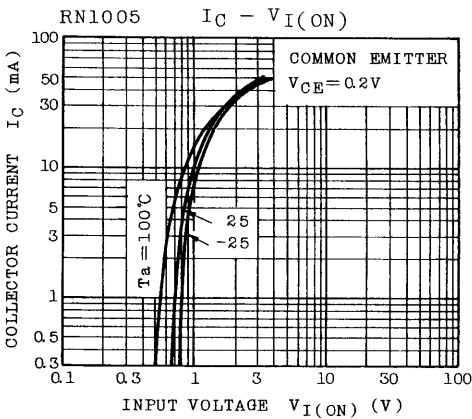
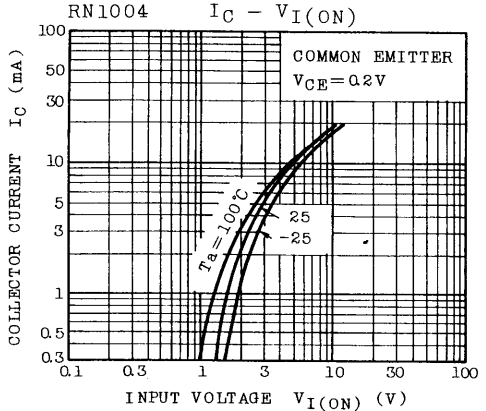
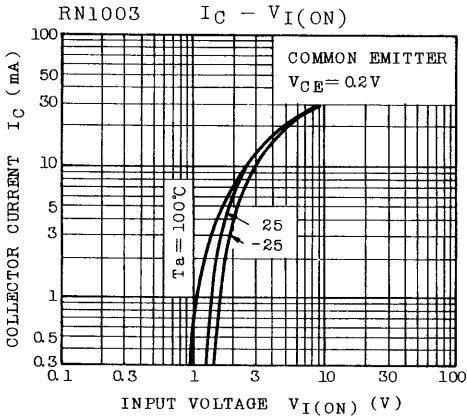
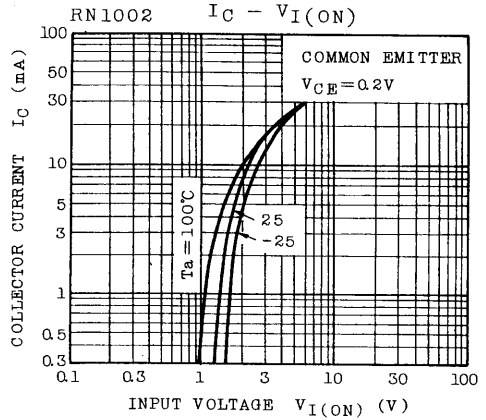
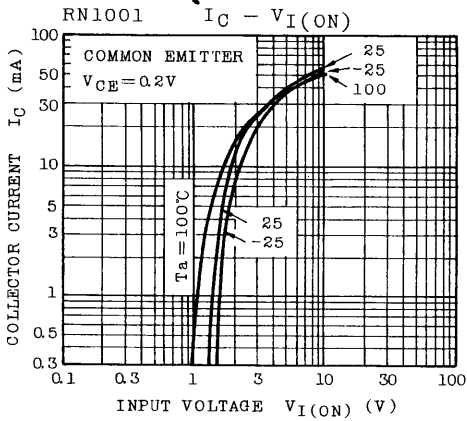
| CHARACTERISTIC              |              | SYMBOL           | RATING  | UNIT |
|-----------------------------|--------------|------------------|---------|------|
| Collector-Base Voltage      | RN1001~1006  | V <sub>CB0</sub> | 50      | V    |
| Collector-Emitter Voltage   |              | V <sub>CEO</sub> | 50      | V    |
| Emitter-Base Voltage        | RN1001~1004  | V <sub>EB0</sub> | 10      | V    |
|                             | RN1005, 1006 |                  | 5       | V    |
| Collector Current           | RN1001~1006  | I <sub>C</sub>   | 100     | mA   |
| Collector Power Dissipation |              | P <sub>C</sub>   | 400     | mW   |
| Junction Temperature        |              | T <sub>j</sub>   | 150     | °C   |
| Storage Temperature Range   |              | T <sub>stg</sub> | -55~150 | °C   |

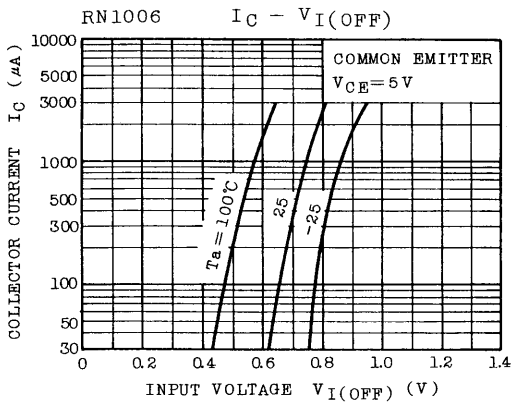
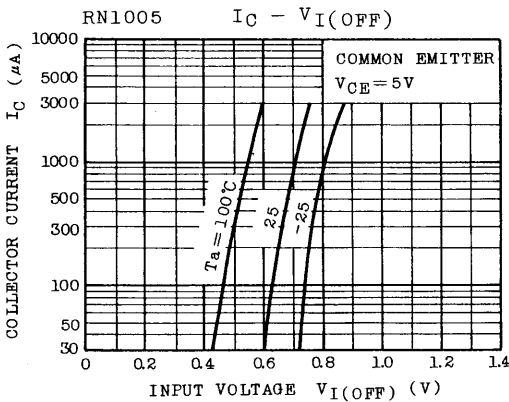
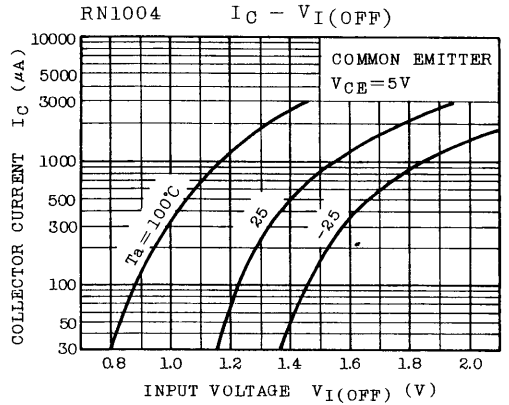
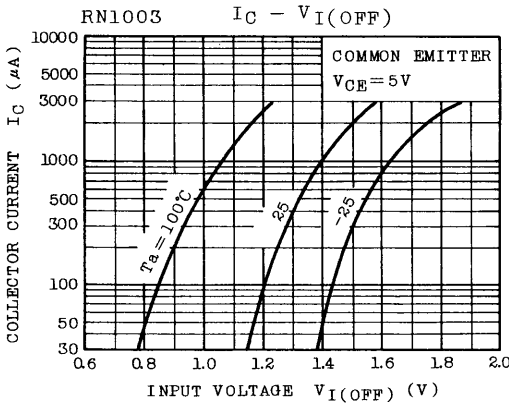
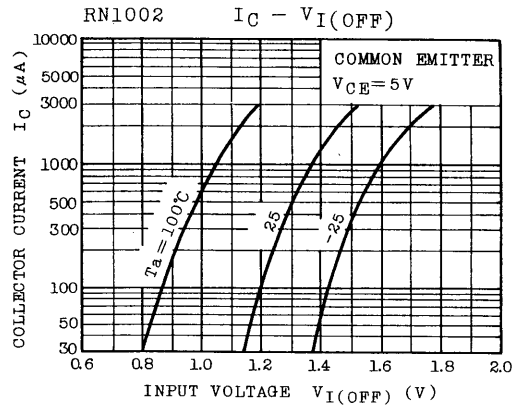
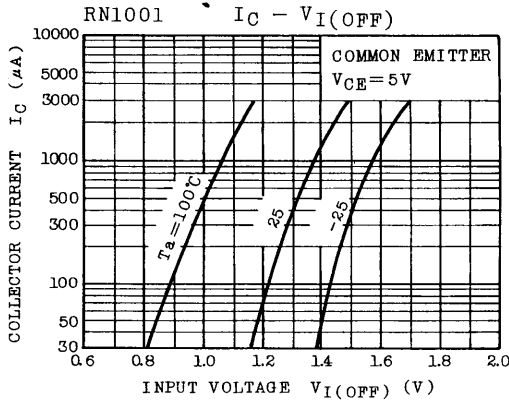
**ELECTRICAL CHARACTERISTICS (Ta=25°C)**

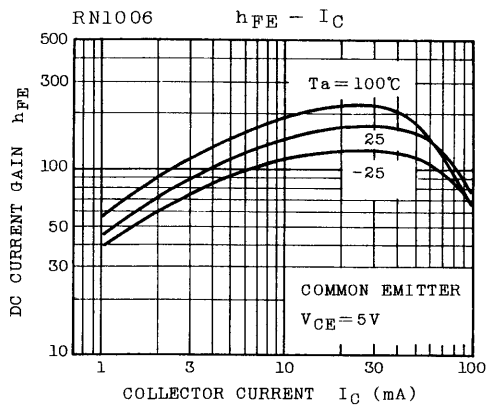
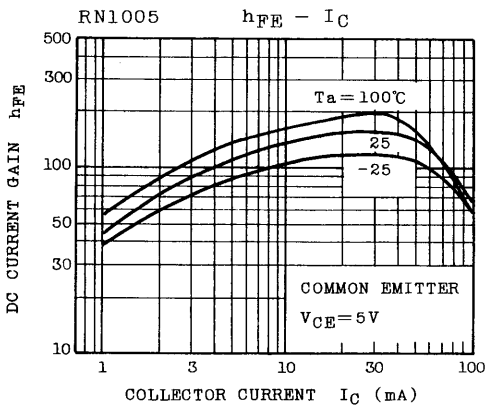
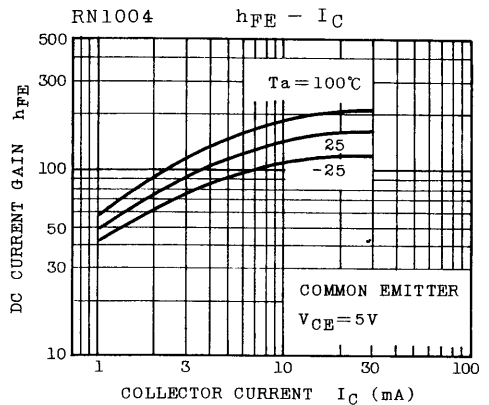
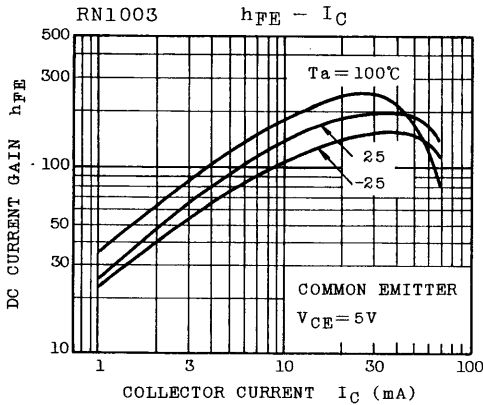
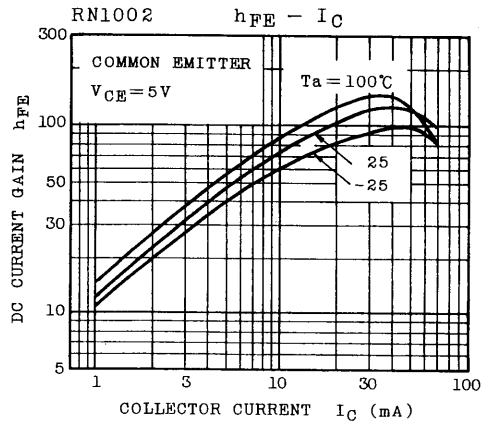
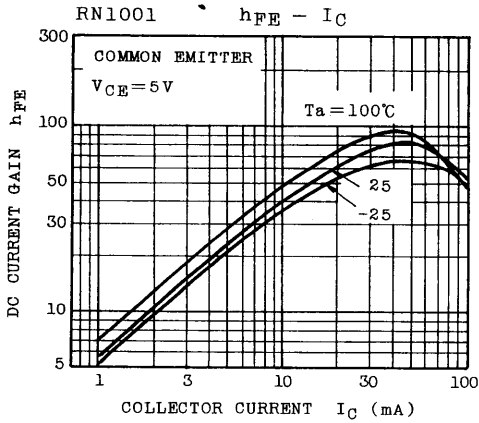
| CHARACTERISTIC            |             | SYMBOL           | TEST CONDITION                          | MIN. | TYP. | MAX. | UNIT |
|---------------------------|-------------|------------------|---|------|------|------|------|
| Collector Cut-off Current | RN1001~1006 | I <sub>CB0</sub> | V <sub>CB</sub> =50V, I <sub>E</sub> =0 | -    | -    | 100  | nA   |
|                           |             | I <sub>CE0</sub> | V <sub>CE</sub> =50V, I <sub>B</sub> =0 | -    | -    | 500  | nA   |

## ELECTRICAL CHARACTERISTICS (Ta=25°C)

| CHARACTERISTIC                       |               | SYMBOL                         | TEST CONDITION                                    | MIN.   | TYP.   | MAX.   | UNIT |
|--------------------------------------|---------------|--------------------------------|---|--------|--------|--------|------|
| Emitter Cut-off Current              | RN1001        | I <sub>EBO</sub>               | V <sub>EB</sub> =10V, I <sub>C</sub> =0           | 0.82   | -      | 1.52   | mA   |
|                                      | RN1002        |                                |   | 0.38   | -      | 0.71   |      |
|                                      | RN1003        |                                |   | 0.17   | -      | 0.33   |      |
|                                      | RN1004        |                                |   | 0.082  | -      | 0.15   |      |
|                                      | RN1005        |                                | V <sub>EB</sub> =5V, I <sub>C</sub> =0            | 0.078  | -      | 0.145  |      |
|                                      | RN1006        |                                |   | 0.074  | -      | 0.138  |      |
| DC Current Gain                      | RN1001        | h <sub>FE</sub>                | V <sub>CE</sub> =5V, I <sub>C</sub> =10mA         | 30     | -      | -      | -    |
|                                      | RN1002        |                                |   | 50     | -      | -      |      |
|                                      | RN1003        |                                |   | 70     | -      | -      |      |
|                                      | RN1004        |                                |   | 80     | -      | -      |      |
|                                      | RN1005        |                                |   | 80     | -      | -      |      |
|                                      | RN1006        |                                |   | 80     | -      | -      |      |
| Collector-Emitter Saturation Voltage | RN1001 ~ 1006 | V <sub>CE(sat)</sub>           | I <sub>C</sub> =5mA<br>I <sub>B</sub> =0.25mA     | -      | 0.1    | 0.3    | V    |
| Input Voltage (ON)                   | RN1001        | V <sub>I(ON)</sub>             | V <sub>CE</sub> =0.2V, I <sub>C</sub> =5mA        | 1.1    | -      | 2.0    | V    |
|                                      | RN1002        |                                |   | 1.2    | -      | 2.4    |      |
|                                      | RN1003        |                                |   | 1.3    | -      | 3.0    |      |
|                                      | RN1004        |                                |   | 1.5    | -      | 5.0    |      |
|                                      | RN1005        |                                |   | 0.6    | -      | 1.1    |      |
|                                      | RN1006        |                                |   | 0.7    | -      | 1.3    |      |
| Input Voltage (OFF)                  | RN1001 ~ 1004 | V <sub>I(OFF)</sub>            | V <sub>CE</sub> =5V, I <sub>C</sub> =0.1mA        | 1.0    | -      | 1.5    | V    |
|                                      | RN1005 ~ 1006 |                                |   | 0.5    | -      | 0.8    |      |
| Transition Frequency                 | RN1001 ~ 1006 | f <sub>T</sub>                 | V <sub>CE</sub> =10V, I <sub>C</sub> =5mA         | -      | 250    | -      | MHz  |
| Collector Output Capacitance         | RN1001 ~ 1006 | C <sub>ob</sub>                | V <sub>CB</sub> =10V, I <sub>E</sub> =0<br>f=1MHz | -      | 3      | 6      | pF   |
| Input Resistor                       | RN1001        | R <sub>I</sub>                 |   | 3.29   | 4.7    | 6.11   | kΩ   |
|                                      | RN1002        |                                |   | 7      | 10     | 13     |      |
|                                      | RN1003        |                                |   | 15.4   | 22     | 28.6   |      |
|                                      | RN1004        |                                |   | 32.9   | 47     | 61.1   |      |
|                                      | RN1005        |                                |   | 1.54   | 2.2    | 2.86   |      |
|                                      | RN1006        |                                |   | 3.29   | 4.7    | 6.11   |      |
| Resistor Ratio                       | RN1001 ~ 1004 | R <sub>1</sub> /R <sub>2</sub> |   | 0.9    | 1.0    | 1.1    | -    |
|                                      | RN1005        |                                |   | 0.0421 | 0.0468 | 0.0515 |      |
|                                      | RN1006        |                                |   | 0.09   | 0.1    | 0.11   |      |





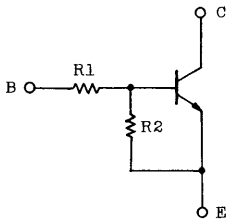


SWITCHING, INVERTER CIRCUIT, INTERFACE CIRCUIT  
AND DRIVER CIRCUIT APPLICATIONS.

**FEATURES:**

- . With Built-in Bias Resistors
- . Simplify Circuit Design
- . Reduce a Quantity of Parts and Manufacturing Process
- . Complementary to RN2007~2009

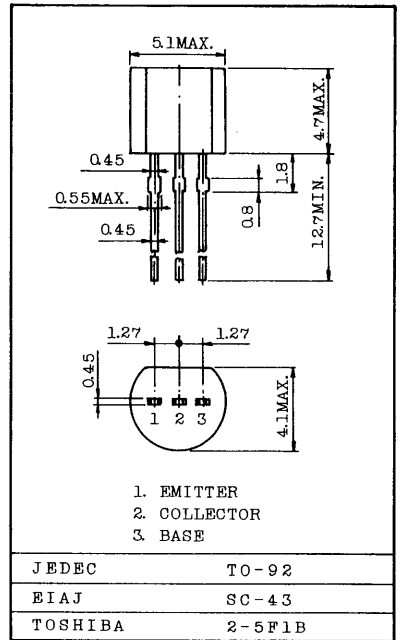
**EQUIVALENT CIRCUIT**



**BIAS RESISTOR VALUES**

| TYPE No. | R1 (kΩ) | R2 (kΩ) |
|----------|---------|---------|
| RN1007   | 10      | 47      |
| RN1008   | 22      | 47      |
| RN1009   | 47      | 22      |

Unit in mm



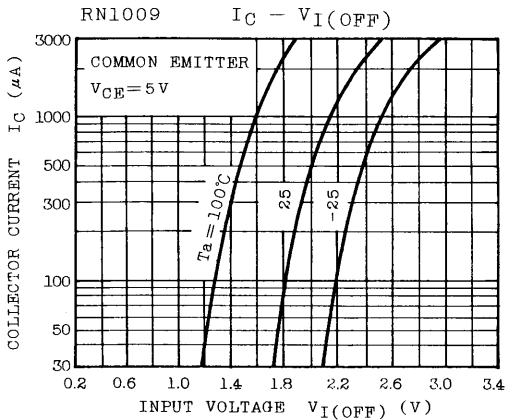
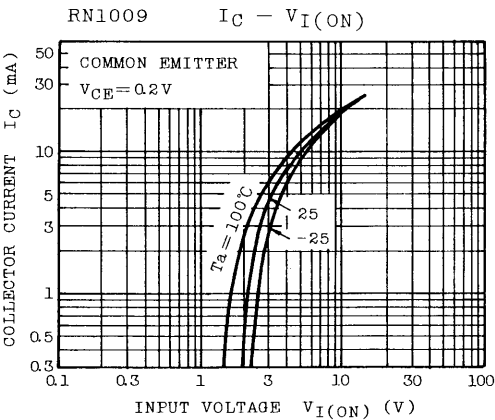
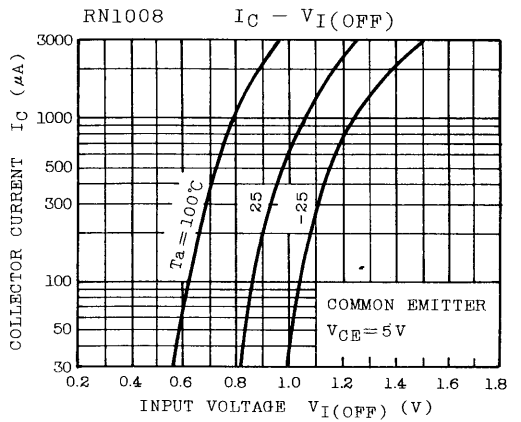
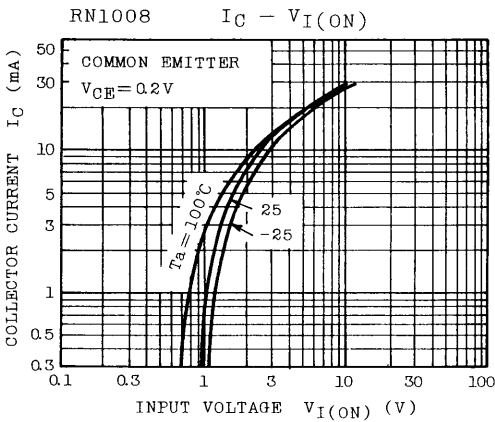
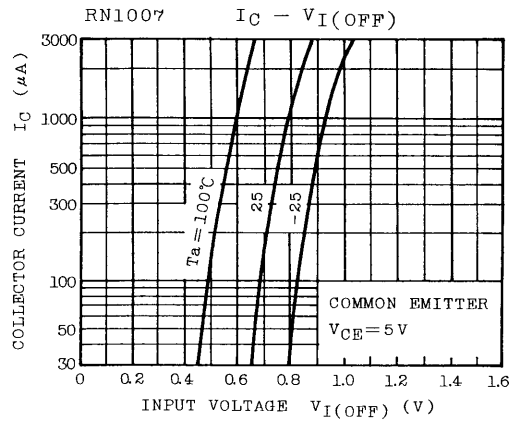
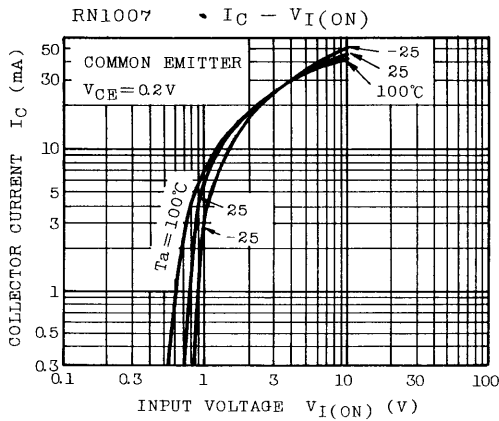
Weight : 0.21g.

**MAXIMUM RATINGS (Ta=25°C)**

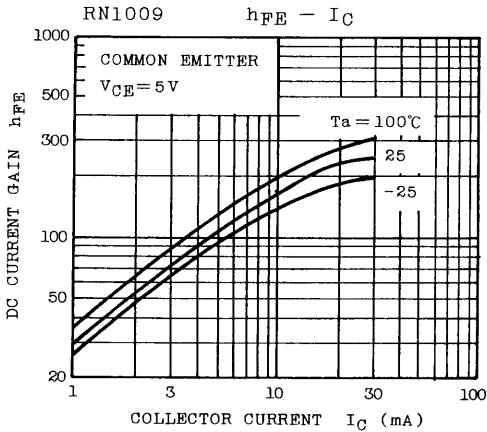
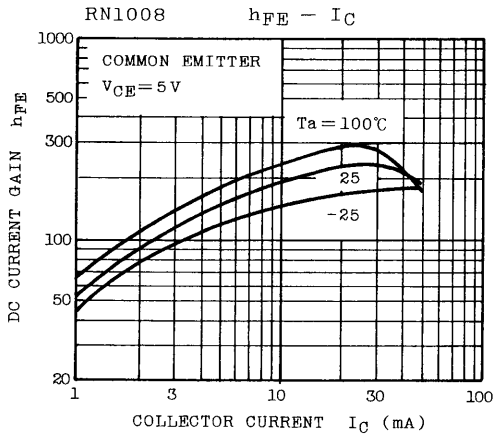
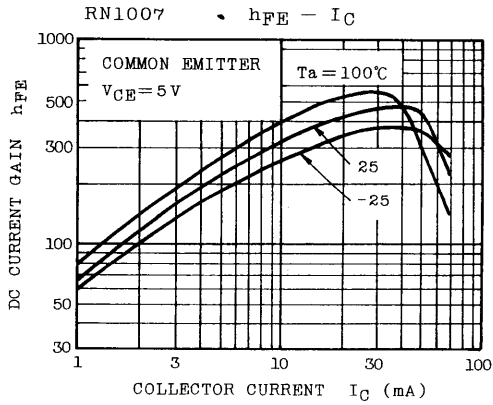
| CHARACTERISTIC              | SYMBOL           | RATING  | UNIT |
|-----------------------------|------------------|---------|------|
| Collector-Base Voltage      | V <sub>CB0</sub> | 50      | V    |
| Collector-Emitter Voltage   | V <sub>CE0</sub> | 50      | V    |
| Emitter-Base Voltage        | RN1007           | 6       | V    |
|                             | RN1008           | 7       |      |
|                             | RN1009           | 15      |      |
| Collector Current           | I <sub>C</sub>   | 100     | mA   |
| Collector Power Dissipation | P <sub>C</sub>   | 400     | 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 CONDITION                                    | MIN.  | TYP.  | MAX.  | UNIT |
|--------------------------------------|--------|--------------------------------|---|-------|-------|-------|------|
| Collector Cut-off Current            |        | ICBO                           | V <sub>CB</sub> =50V, I <sub>E</sub> =0           | -     | -     | 100   | nA   |
|                                      |        | ICEO                           | V <sub>CE</sub> =50V, I <sub>B</sub> =0           | -     | -     | 500   | nA   |
| Emitter Cut-off Current              | RN1007 | IEBO                           | V <sub>EB</sub> =6V, I <sub>C</sub> =0            | 0.081 | -     | 0.15  | mA   |
|                                      | RN1008 |                                |   | 0.078 | -     | 0.145 |      |
|                                      | RN1009 |                                |   | 0.167 | -     | 0.311 |      |
| DC Current Gain                      | RN1007 | hFE                            | V <sub>CE</sub> =5V, I <sub>C</sub> =10mA         | 80    | -     | -     | -    |
|                                      | RN1008 |                                |   | 80    | -     | -     |      |
|                                      | RN1009 |                                |   | 70    | -     | -     |      |
| Collector-Emitter Saturation Voltage |        | V <sub>CE(sat)</sub>           | I <sub>C</sub> =5mA, I <sub>B</sub> =0.25mA       | -     | 0.1   | 0.3   | V    |
| Input Voltage (ON)                   | RN1007 | V <sub>I(ON)</sub>             | V <sub>CE</sub> =0.2V, I <sub>C</sub> =5mA        | 0.7   | -     | 1.8   | V    |
|                                      | RN1008 |                                |   | 1.0   | -     | 2.6   |      |
|                                      | RN1009 |                                |   | 2.2   | -     | 5.8   |      |
| Input Voltage (OFF)                  | RN1007 | V <sub>I(OFF)</sub>            | V <sub>CE</sub> =5V, I <sub>C</sub> =0.1mA        | 0.5   | -     | 1.0   | V    |
|                                      | RN1008 |                                |   | 0.6   | -     | 1.16  |      |
|                                      | RN1009 |                                |   | 1.5   | -     | 2.6   |      |
| Transition Frequency                 |        | f <sub>T</sub>                 | V <sub>CE</sub> =10V, I <sub>C</sub> =5mA         | -     | 250   | -     | MHz  |
| Collector Output Capacitance         |        | C <sub>ob</sub>                | V <sub>CB</sub> =10V, I <sub>E</sub> =0<br>f=1MHz | -     | 3     | 6     | pF   |
| Input Resistor                       | RN1007 | R <sub>I</sub>                 |   | 7     | 10    | 13    | kΩ   |
|                                      | RN1008 |                                |   | 15.4  | 22    | 28.6  |      |
|                                      | RN1009 |                                |   | 32.9  | 47    | 61.1  |      |
| Resistor Ratio                       | RN1007 | R <sub>1</sub> /R <sub>2</sub> |   | 0.191 | 0.213 | 0.232 | -    |
|                                      | RN1008 |                                |   | 0.421 | 0.468 | 0.515 |      |
|                                      | RN1009 |                                |   | 1.92  | 2.14  | 2.35  |      |







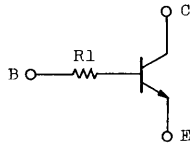
# RN1010/1011

SWITCHING, INVERTER CIRCUIT, INTERFACE CIRCUIT  
AND DRIVER CIRCUIT APPLICATIONS.

**FEATURES:**

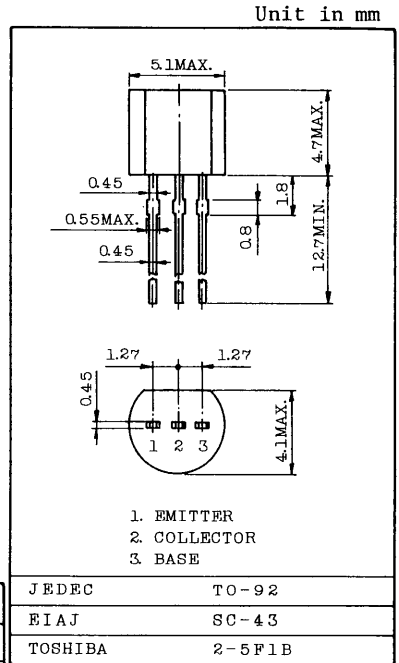
- . With Built-in Bias Resistor
- . Simplify Circuit Design
- . Reduce a Quantity of Parts and Manufacturing Process
- . Complementary to RN2010, RN2011

**EQUIVALENT CIRCUIT**



**MAXIMUM RATINGS (Ta=25°C)**

| CHARACTERISTIC              | SYMBOL           | RATING  | UNIT |
|-----------------------------|------------------|---------|------|
| Collector-Base Voltage      | V <sub>CB0</sub> | 50      | V    |
| Collector-Emitter Voltage   | V <sub>CEO</sub> | 50      | V    |
| Emitter-Base Voltage        | V <sub>EB0</sub> | 5       | V    |
| Collector Current           | I <sub>C</sub>   | 100     | mA   |
| Collector Power Dissipation | P <sub>C</sub>   | 400     | mW   |
| Junction Temperature        | T <sub>j</sub>   | 150     | °C   |
| Storage Temperature Range   | T <sub>stg</sub> | -55~150 | °C   |



Weight : 0.21g .

**ELECTRICAL CHARACTERISTICS (Ta=25°C)**

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| CHARACTERISTIC                       | SYMBOL               | TEST CONDITION                                  | MIN. | TYP. | MAX. | UNIT |
|--------------------------------------|----------------------|---|------|------|------|------|
| Collector Cut-off Current            | I <sub>CB0</sub>     | V <sub>CB</sub> =50V, I <sub>E</sub> =0         | -    | -    | 100  | nA   |
| Emitter Cut-off Current              | I <sub>EB0</sub>     | V <sub>EB</sub> =5V, I <sub>C</sub> =0          | -    | -    | 100  | nA   |
| DC Current Gain                      | h <sub>FE</sub>      | V <sub>CE</sub> =5V, I <sub>C</sub> =1mA        | 120  | -    | 700  |      |
| Collector-Emitter Saturation Voltage | V <sub>CE(sat)</sub> | I <sub>C</sub> =5mA, I <sub>B</sub> =0.25mA     | -    | 0.1  | 0.3  | V    |
| Transition Frequency                 | f <sub>T</sub>       | V <sub>CE</sub> =10V, I <sub>C</sub> =5mA       | -    | 250  | -    | MHz  |
| Collector Output Capacitance         | C <sub>ob</sub>      | V <sub>CB</sub> =10V, I <sub>E</sub> =0, f=1MHz | -    | 3    | 6    | pF   |
| Input Resistor                       | RN1010               | R1  | 3.29 | 4.7  | 6.11 | kΩ   |
|                                      | RN1011               |   | 7    | 10   | 13   |      |

# RN1010/1011

